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# Film and Sheet EXTRUSION

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# AMI

Third Floor, One Brunswick Square,  
Bristol, BS2 8PE, United Kingdom  
Tel: +44 (0)117 924 9442  
Fax: +44 (0)117 311 1534  
www.amiplastics.com  
www.twitter.com/plasticworld  
Registered in England No: 2140318

### EDITORIAL

**Editor-in-Chief:** Chris Smith  
chris.smith@amiplastics.com  
**Editor:** Lou Reade  
lou.ream@amiplastics.com  
**Events and Magazines Director:**  
Andy Beevers  
andy.beevers@amiplastics.com

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### ADVERTISING

**Advertisement Manager:** Claire Bishop  
claire.bishop@amiplastics.com T/ +44 (0)7905 848744  
**Head of Business Development:** Paul Beckley  
paul.beckley@amiplastics.com T/ +44 (0) 117 311 1529  
**Advertising Sales (China/Hong Kong):** Maggie Liu  
maggie.liu@ringiertrade.com T/ +86 13602785446  
**Advertising Sales (Taiwan):** Ms Sydney Lai  
sydneylai@ringier.com.hk T/ +886-913625628  
**Advertising and Expo Sales (India):** Yogesh Vyas  
yogesh@exhibetter.com T/ +91 9920735930

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# US-based Tredegar sells Terphane to Oben Group

Peru-based packaging specialist Oben is to buy flexpack company Terphane from Tredegar Corporation for around US\$116 million.

Terphane employs around 500 people and has two manufacturing sites - in Cabo de Santo Agostinho, Brazil and Bloomfield, New York. The company is headquartered in São Paulo, Brazil, and exports to 29 countries.

"We believe that Oben's purchase of Terphane will enhance the scale and growth opportunities in the global flexible packaging market," said John Steitz,

president and CEO of Tredegar.

For the 12 months ended 30 June 2023, net sales and EBITDA from Terphane's ongoing operations were US\$152m and US\$16.4 million, respectively. Closing of the transaction depends on satisfying customary conditions, including clearance by competition authorities in Brazil and Colombia.

Gonzalo Belaunde, CEO of Oben, added: "This will strengthen our position as a global player in flexible films, by expanding capacity of BOPET films and provid-

ing a great platform to expand production for other films - especially BOPP - in the US and Brazil."

In July, Oben acquired the flexpack film manufacturing facility of Mexico's Agusa - including its KristaFilm brands and portfolio of BOPP, CPP, metallised, and PE films.

Prior to this, Terphane announced a strategic partnership with Origin Materials to produce sustainable, high-performance bio-polymer films. Terphane has signed a multi-year capacity reservation agreement to purchase PEF bio-polymer to make BOPEF film - for food and beverage packaging and high-value industrial applications.

Rich Riley, co-CEO of Origin Materials, said: "This partnership represents further progress in our mission to enable the world's transition to sustainable materials."

Origin converts non-food biomass into chemicals using a patented process.

> [www.obengroup.com](http://www.obengroup.com)  
> [www.terphane.com](http://www.terphane.com)

## Isik Plastik buys US sheet firm

Isik Plastik of Turkey has acquired Ug Plastic Inc - a sheet manufacturer that trades in North America as US Plast.

US Plast makes multi-wall and solid polycarbonate sheet, and multi-wall polypropylene sheet. It operates an 8,000 m<sup>2</sup> production facility in York, Pennsylvania, where it has an annual production capacity of 11,500 tonnes. Its products are sold into many end markets.

"We entered the US market in 2016 with the acquisition of Sirius Plastic," said Abdullah Ceker, CEO of Isik Plastik. "With the Ug Plast transaction, we will reduce lead times, create cost advantages and acquire a new customer base."

Isik operates two production facilities in Turkey, with a total production area of 28,000 m<sup>2</sup> and annual production capacity of 65,000 tonnes. Its products include plastic sheet and thermoformed food packaging.

> [www.isikplastik.com](http://www.isikplastik.com)  
> <https://usplast.com>



Oben has bought flexpack company Terphane from Tredegar for around US\$116m

# UPM Biochemicals takes over SunCoal

UPM Biochemicals has acquired SunCoal Industries of Germany, which has developed a technology portfolio to make performance products from renewable raw materials.

SunCoal's technology will now be integrated into the production of UPM's BioMotion renewable functional

fillers - one of the products made at UPM's biorefinery in Leuna.

"This will strengthen our position in renewable chemicals and marks a next step in the growth of our biorefining businesses," said Winfried Schaur, executive vice president for technology and biorefining at UPM. "Scaling

our biorefinery businesses is one of the key transformative steps for UPM."

SunCoal has pilot and lab facilities and employs 30 people. Its hydrothermal treatment technology has been licenced to UPM for the production of wood-based functional fillers.

> [www.upmbiochemicals.com](http://www.upmbiochemicals.com)

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**IN BRIEF...**

ReCover, the new recycling business segment of packaging firm **Coveris**, is opening an industrial film recycling plant with de-inking capabilities in Lincolnshire in the UK. With the capacity to produce 5,000 tonnes/year of rPE, the facility uses printed waste feedstock from within Coveris, production waste from its customers, and other suitable post-industrial waste films.

[www.coveris.com](http://www.coveris.com)

Indian packaging major **Cosmo First** posted sales of INR658 crore (around US\$80m) in the first quarter of the year. This was a dip of around 25% compared to the same period last year, which the company said was due to "inventory loss arising from the sharp drop in prices of raw material towards the quarter end".

[www.cosmofirst.com](http://www.cosmofirst.com)

**Borealis** has signed an agreement to buy Rialti, an Italian producer of mechanically recycled polypropylene (PP) compounds for extrusion, for applications such as construction.

[www.borealisgroup.com](http://www.borealisgroup.com)

# Wendel sells Constantia Flexibles to One Rock

Flexpack giant Constantia Flexibles has changed hands - with owner Wendel selling it to US-based One Rock Capital Partners.

It will be sold for a price that yields net proceeds of just over €1 billion (US\$1.1bn) - reflecting a multiple of almost twice Wendel's total investment in Constantia since 2015. Wendel has owned Constantia since 2015, with an approximate 60% stake in the company.

The closing of the transaction should take place during the second half of 2023, subject to contractual conditions and clearance by regulatory authorities.

"The history of Constantia



IMAGE: CONSTANTIA FLEXIBLES

**Vervaat: "Wendel's support over the years has enabled our growth"**

in our portfolio highlights the validity of our long-term investor model, which has enabled us to support the company in its development," said David Darmon, deputy CEO of Wendel.

Constantia produces

flexible packaging for more than 4,000 pharmaceutical, food and consumer goods customers, and employs more than 7,000 people.

Pim Vervaat, CEO of Constantia Flexibles, added: "We are grateful for Wendel's supportive partnership over the years, which has enabled our growth."

Constantia says it delivered "strong results" in the first half of 2023 - but, as a private company - did not provide specific figures.

"Constantia has grown through acquisition and innovation to be a leader serving its food and pharma customers," said Telmo Valido, a partner at One Rock.

[www.cfex.com](http://www.cfex.com)

## CCL buys pharma labels firm

Canada-based CCL Industries, a label and packaging producer, has acquired Faubel - a Germany specialist in labels for pharmaceutical clinical trials.

Faubel has a manufacturing facility in Melsungen, Germany, and sales offices

in the US and China. It had sales of C\$66 million with nearly \$31m in adjusted EBITDA last year.

The business will now trade as CCL Faubel.

"Clinical trials labelling has long been an important component of our North

American healthcare business," said Geoffrey Martin, president and CEO of CCL. "This acquisition adds organisational and operational capacity in Europe to build a global presence in the space."

[www.cclind.com](http://www.cclind.com)

## Recycling polystyrene in German plant

Ineos Styrolution has teamed up with sorting company Tomra and recycling firm EGN in a German facility that recycles polystyrene (PS) waste into material suitable for food packaging.

EGN will build a greenfield mechanical recycling facility that can process 40,000 tonnes/year of post-consumer

PS in Krefeld, which will include sorting and washing. Ineos Styrolution will be responsible for the 'super-cleaning' purification process to comply with European Food Safety Authority requirements for food contact applications. Tomra provides sorting technology and feedstock. Start-up is expect-

ed in mid-2025.

"I expect the dairy industry to especially benefit from this new offering by allowing it to mechanically recycle from yoghurt pot to yoghurt pot," said Pierre Vincent, managing director of EGN.

[www.ineos-styrolution.com](http://www.ineos-styrolution.com)

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Top: Partly coated with anti-fog



Bottom: Stacked packaging, coated with anti-block

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# Expanding Plastics World Expo to be held in Brussels for 2024

AMI's next Plastics World Expos will take place at the Brussels Expo in Belgium on 11-12 September 2024.

The event, which includes a new focused exhibition and extra features, aims to build on the expos that took place this year in Essen, Germany.

The *Compounding World Expo* and *Plastics Recycling World Expo* will be joined in 2024 by the *Plastics Extrusion World Expo*, which is already part of the AMI Plastics World Expos in Cleveland, Ohio, USA. It is Europe's only focused tradeshow for extruders of film, sheet, pipe, profile and tubing.

Each expo has its own dedicated conference theatre. There will be a new Learning Space theatre hosting educational presentations and training seminars. Another new feature, the Chemical Recycling Zone, is being added to the *Plastics Recycling World Expo* in response to visitor requests.

The Plastics World Expos attracted 230 exhibitors and 3,385 visitors from 71 countries to Messe Essen on 14-15 June 2023, making it the largest, most international AMI event in Europe to date.

Andy Beevers, events director at AMI, said: "We are delighted that our Plastics World Expos continue to



IMAGE: AMI

**This year's Plastics World Expos in Germany attracted 230 exhibitors and 3,385 visitors from 71 countries**

expand in Europe and are looking forward to accelerating that growth in Brussels next year."

The location has been well received by exhibitors thanks to its excellent transport connections and proximity to key customers in Belgium, North Rhine-Westphalia, the Netherlands and northern France.

Peter Imhof, head of sales at the Swiss compounder Polycompound, said: "My favourite part of the show was the networking. You have all you need in one place."

Florian Riedl, director of business development at German plastics

recycler APK, added: "It's my third time here at the Plastics Recycling World Expo and I can definitely recommend it. It's always a great place for collaboration."

Companies that have already booked stands for next year include B+B, Brabender, Coperion, Erema, Farrel Pomini, Gneuss, HPF The Mineral Engineers, ICMA San Giorgio, Krauss-Maffei, Leistritz, LKAB, NGR, Nordson, Pellenc ST, Polystar, Sesotec, Sikora, Sirmax, Sogapol, Starlinger and Weima. For further information, visit:

**[www.amiplastics.com/events/exhibitions](http://www.amiplastics.com/events/exhibitions)**

## North America: Q2 plastics machinery sales fall

Sales of North American plastics machinery declined in the second quarter of this year.

An initial estimate for the period shows a sales value of nearly US\$332 million. This is a decrease of around 4% compared to the previous quarter - and nearly 20% lower than Q2 in 2022, according to the

Plastics Industry Association's Committee on Equipment Statistics (CES).

Sales of twin-screw extruders fell 15% compared to Q1 2023, and 11% year-on-year - though sales of single-screw extruders grew 39% since the last quarter, and by nearly 41% compared to Q2 2022, said the association.

"Although the US economy exhibited resilience in the first half of 2023, the decline in plastics machinery shipments signifies a subdued manufacturing landscape," according to Perc Pineda, chief economist at the association.

During Q2, US exports of plastics machinery rose by

more than 10%, reaching a total value of nearly \$253m. The main export destinations, Mexico and Canada, held their positions - collectively receiving exports worth more than US\$126m. This accounts for half of all US plastics machinery exports, according to the association.

► [www.plasticsindustry.org](http://www.plasticsindustry.org)



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# Simona sees decline in first-half results

Simona of Germany saw a dip in both sales and profits for the first half of the year.

The company reported sales of €320 million (US\$350m) – a decrease of around 12% compared to the same period last year. Profitability (EBIT) fell by around 10% to just under €26m (US\$28m).

Simona saw a decline in two of the three regions in which it operates. In EMEA, sales shrank by 16% to €199m (US\$218). This was driven mainly by reduced demand across the board. Profitability in EMEA fell to €5.8m (US\$6.3m) – about half of value of the same period in 2022. Sales in this region mainly comprise pipes and profiles.

In the Americas, sales fell by nearly 7% to €95m (US\$104m), due mainly to declines in its industrial products and outdoor & leisure businesses. However, EBIT jumped upwards by around 23% to reach nearly €20m (US\$22m). The region's main business is in thermoplastic sheet for aircraft interiors.

In Asia-Pacific, sales grew nearly 3% to exceed €25m (US\$27m). Growth was driven by the semicon-



IMAGE: SIMONA

**Schönberg:**  
"Tumbling commodity prices are exerting downward pressure on our sales prices"

ductor and photovoltaic industries, while the rest of the industrial products business remained stable.

"We clearly felt the effects of a lacklustre global economy in the first six months of the year," said Matthias Schönberg, CEO of Simona. "Tumbling commodity prices are exerting downward pressure on our sales prices."

Simona does not anticipate much improvement in global demand, so has lowered its full-year revenue guidance from €650-675m to €610-630m – down 6-7%.

"Based on our earnings performance to date, we are retaining our forecast of an EBIT margin of 6-8%.

➤ [www.simona.de](http://www.simona.de)

# Braskem increases bio-PE capacity in Brazil by 30%



IMAGE: BRASKEM

Braskem has invested US\$87m in its bio-based ethylene plant in Triunfo, Brazil – which will raise capacity to 260,000 tonnes/year, a 30% increase. The ethylene will be used to make its bio-based PE.

"This reinforces our commitment to sustainable development and innovation," said Walmir Soller, O/P VP for Europe and Asia.

➤ [www.braskem.com](http://www.braskem.com)



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# Multiple benefits: latest in multi-layer packaging

*Delegates at a recent conference heard about some of the most recent advances in redesigning multi-layer packaging to be more sustainable - and effective - than before*

Multi-layer packaging is critical in many packaging products - especially those that need to provide an oxygen or moisture barrier. However, the need to raise recycling means that many manufacturers are considering alternative methods - such as moving to mono-material solutions.

At the recent *Multi-Layer Flexible Packaging* conference - organised by **AMI** and held in Chicago, USA - a number of speakers addressed the move towards mono-material solutions.

Andrea Jenn, a consultant at AMI, told delegates that both biaxially and machine-direction oriented polyethylene (BOPE and MDO-PE) are on the rise - as they can cut pack weight and improve recyclability.

There are currently eight producers of BOPP

that are working on the production of BOPE.

"Commercial availability is hoped to ramp up over the next few years - with increasing material availability, along with continued improvements in equipment and raw material," she said.

For BOPE, there are two resin choices to make films for different applications.

LLD-BOPE is used as a sealing layer in laminates, as base film for frozen food packaging and - in future - as mono-material packaging for applications such as noodles and confectionery. HD-BOPE is for use as a base film for mono-PE stand up pouches (replacing PET in PET/PE laminates). In addition it can be used for flow wrap and vertical form-fill-seal applications and products with barrier requirements.

To 2030 and beyond, BOPE is likely to replace

**Main image:  
Multi-layer  
pouches are an  
increasingly  
common form  
of packaging**

IMAGE: OBEN



**Above: Oben creates a number of mono-material films, including those made from BOPA**

materials such as BOPP, BOPET and blown PE, in both Europe and North America - with replacement of blown PE film applications in the US likely to be most prevalent.

### **Mono-material film**

Peter Malmros, business development manager at US-based **Baystar**, said the company had used Borealis' Borstar material to create various products - including stand-up pouches (SUPs), sachets and heavy-duty shipping sacks.

In one case, it combined two 'enhanced' grades of Borstar - FB1350 and FB2230 - to create a three-layer film structure. Benefits of the grades include: better processability; more bubble stability; and higher sealability, yield stress and tensile strength.

"The melt strength of FB1350 supports the sealing layer and avoids deformation during the sealing process," he said.

Similarly, a three-layer SUP featured an inner layer of PE lamination film, an adhesive layer, plus an MDO PE outer/surface layer - offering high stiffness, good flatness and printability and good sealability. "It is fully recyclable due to the all-PE material mix," said Malmros.

Similarly, Michelle Tsui - associate TS&D scientist at **Dow**, told delegates that using various Dow grades allowed the creation of mono-material, multi-layer films. "Most flexible packaging must be designed for recyclability," she said.

While multiple layers remain, they need to be converted mainly to PE to be eligible for recycling using store drop-off collection method, she added. However, extra sustainability brings new challenges, she said - such as the need for the machinability of mono-material PE films to be optimised in order to broaden the packaging window. PE cannot be used as a direct replacement for other materials such as PP or PET - and if this is done, it may lead to more pouch failures and higher scrap rates.

Dow has teamed up with **Mespack** to create an all-PE packaging line. It involves pairing the right resin with the right equipment technologies, optimising sealants and assessing the impact of MDO on printing.

Dow has a large number of resins, include its Innate and Elite grades, plus Affinity sealant. One important factor was the effect of sealant density on the packaging window - and the project studied the use (or non-use) of triple-point sealer.

Tsui said that combining Dow resins with Mespack's all-PE line showed that mono-material PE films could have a packaging window of 27°-37°C - similar to PET-laminate films - at reasonable pouch speeds (of 30-60 bags per minute).

### **Recycled content**

Oriented film manufacturer **Oben** presented details of many of its mono-material films - including many with recycled content.

Omar Gonzalez, regional development manager at Oben, told delegates: "There is no universal polymer that can provide all properties by itself. Polymers need to be mixed in a single structure [for multi-layer packaging]."

This is because different layers have different functions. He described a typical three-layer structure - with an outer 'printable' layer, a middle barrier layer and an inner layer that comes into contact with the product.

However, he said it is possible to combine variants of the same polymer - such as PE - within a multi-layer package. An example was a PE-based SUP, made from bi-oriented HDPE - with enhanced mechanical and thermal properties, as well as good haze and gloss - for the outer layer.

He pointed out that bi-oriented film typically has superior properties to standard blown film, in areas such as mechanical strength.

Oben also offers mono-material, high-barrier cast PP pouches, for applications such as coffee or

bakery products. Here, the product makes use of metallisation for the barrier. Other mono-material products include ultra-high barrier BOPP, thermo-stable BOPP (which has a special PP homopolymer on the outside), and heat-sealable BOPET (suitable for oven temperatures).

The company also offers a number of films containing recycle, including BOPET, BOPP and BOPA. For instance, its ET8p-QN is a BOPET film with 80% recycle that loses no performance. A BOPP grade uses 90% recycle - and is designed for secondary packaging - while it also offers a BOPA grade made from 100% post-industrial recycle.

**Greater strength**

**Polyplastics USA** has also used the 'different variants' approach to create recyclable PE-based SUPs - by incorporating its cyclic olefin copolymer (COC) into the formulation.

Paul Tatarka, market development manager at Polyplastics USA, said that COC shares many features with polymers such as LLDPE - including an ethylene co-monomer and a linear structure.

"COC and LLDPE share similar chemical features, making COC compatible with PE," he

said. "COC's molecular structure also enables higher temperature resistance."

COC was used to develop a recyclable, mono-material SUP. The challenges to overcome included: poor dimensional stability under load; low temperature resistance; difficulty

of fabrication; and poor aesthetics. The answer was to add two layers of COC to recyclable PE mono-material films. The result was a recyclable SUP with a good balance of properties and attractive appearance that was easy to fabricate.

The total structure uses around 20% COC in the formulation - including two COC layers and two blended LLDPE-COC layers. The COC layers



**Left: Baystar has used Borstar grades from Borealis to create stand-up pouches**



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IMAGE: REIFENHAUSER



**Above:**  
**Reifenhäuser**  
**says its Evo**  
**Fusion can**  
**convert ‘fluff’**  
**back into film**

decreased haze and improved clarity - while COC’s presence raised heat resistance and boosted tensile yield strength. “COC can provide complementary enhancements to PE which will enable recyclable all-polyolefin SUP films,” he said.

### Layered approach

One way to boost the properties of PE - and avoid having to use another material - is to use ‘layered co-extrusion’. Here, a single layer of PE is split into many micro- or nano-layers.

Michael Ponting, chief science officer at **Peak Nano Systems**, told delegates that this kind of layering can produce from 32 to more than 4,000 layers - helping to boost barrier properties and modulus. It is achieved using a feedblock that ‘multiplies’ the number of layers.

“Microlayer coextrusion adds additional film formulation freedom to rearrange polymer materials in unique combinations and very highly ordered structures,” he said.

In addition, the technique can be applied to films made from recyclate.

He reported both PP- and PE-based films that used nano layering and up to 50% recyclate. The nano layered PP films exhibited downgauging, improved film handling and higher mechanical properties (such as stress at break), while the nano layered LLDPE showed similar improvements.

The technique has also been used to produce capacitor film - as an alternative to BOPP or BOPET. Benefits include: twice the dielectric constant; improved breakdown strength; and a 70°C increase in usage temperature.

“Nano layering enabled a scalable product development path to high energy storage dielectric films - enabling capacitor device fabrication with up to 30% smaller volumes and increased temperature limits,” he said.

Capacitor film development has demonstrated

the scalability of micro- and nano-layering to industrially relevant production rates - including speeds of 200 ft/min and film geometries up to 36in widths, he said.

### Fluff to film

As well as trying to ensure packaging recyclability, film extruders want to incorporate more recyclate into their products - preferably using the plastic waste from their own internal manufacturing processes.

Steve De Spain, general manager of **Reifenhäuser** in the US, told delegates that this can be done by converting either granules or ‘fluff’ back into film. He said that going through the re-pelletising process can be energy- and cost-intensive - and that materials quality suffers. Instead, he said that scrap can be shredded and directly extruded back into film. “This reduces process steps and improves material quality,” he said.

This can be achieved on the company’s Evo Fusion twin-screw technology, he added. Skipping the re-pelletisation stage can save around 40% in energy, he said.

He cited the example of PE/PET films, which have a scrap rate of around 15% - which typically cannot be used to create new films. However, using Evo Fusion, he says that the ‘fluff’ - comprising a PE/PET laminate - can be recovered and re-used. After being fed into the shredder, it can be used in the middle layer of new film - accounting for around 70% of film thickness. “This gives recycled PET/PE laminates a second life,” he said.

Potential applications include packaging for diapers or detergents. A 20-micron, three-layer film incorporates: outer and inner layers (each 15%) using virgin resins; and a middle layer comprising 70% PET/PE ‘fluff’, plus some virgin resin and a compatibilizer.

Other applications included a mailing bag, collation shrink film and trash bags.

### Stretching properties

Orientation can be a critical process in creating better packaging, according to **Windmoller and Holscher**. Mike Andrews, of technical sales and process support for extrusion at W&H in the US, said that machine direction orientation (MDO) can help to improve the sustainability performance of packaging film.

MDO works by heating, stretching, annealing and cooling the film. This can be performed at high speed, leading to flat film with no creases and wrinkles, he said. A stretching unit fits neatly onto a blown film line.



The process causes changes to the structure of the film - orienting the molecules in the machine direction. This causes changes in the crystalline structure - which helps to boost mechanical, optical and barrier properties.

Another benefit is that it introduces micro pores - creating 'breathable' films for applications such as diapers.

The technique has been used to create all-PE pouches that are easier to recycle than mixed-material versions. In one case, MDO-PE was used to replace PET - in a mono-material solution that allowed high-speed printing and sealing.

Developments in MDO include: wider machines; increased thermal capacity; bigger dies - with more layers and higher throughput; and new automated systems for reproducible processing.

MDO-PE can also be combined with EVOH to create an even higher barrier - which still remaining recyclable, he said. The company helped to create a 25-micron, nine-layer SUP.

**Nylon recycling**

Despite the focus on mono-material solutions, nylon producers say that their material can be recycled along with PE.

Brad Celmer, technical service engineer at **Ube**, told delegates of four 'myths' in nylon recycling. These, he said, were:

Multi-layer films become 'fluffy' when shredded due to the toughness of nylon - so are hard to extrude with more than 5% nylon content;

Moisture absorption of nylon makes these films unrecyclable;

Nylon in recycle generates instabilities such as gels; and,

Multi-layer structures containing nylon cannot be recycled - and it is a 'contaminant'.

He went through these in turn, saying that each was false. In the first case, he said multi-layer films with up to 30% nylon could be shredded very smoothly. Regarding moisture, he said that no extra drying was needed and that extrusion into new pellets were tested and evaluated.

"They were processable within a PE temperature range," he said.

He also alluded to the qualities of extruded blown film - showing that films retained properties such as haze and mechanical strength.

He also pointed to the fact that the Association of Plastic Recyclers recognise 'Performance PA SC 15' as meeting - or exceeding - the strictest APR PE-CG01 critical guidance protocol for PE film and flexible packaging criteria. "Multi-layer PE/nylon films are recyclable," he said.



IMAGE: DOW

**Left: W&H has created a number of MDO pouches, including this one with Dow and B&B**

■ The next Multilayer Flexible Packaging conference takes place in Barcelona, Spain on 21-22 November 2023. For more details, contact Carole Charrade ([carole.charrade@amiplastics.com](mailto:carole.charrade@amiplastics.com)) on +44 (0) 117 314 8111.

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# Going flat out: thermoforming developments



*Recent developments in thermoforming include new materials for making EV battery components, a cockpit for a speedboat and a bio-based cup made from recycled PLA*

Thermoforming is a flexible technique that allows the production of many types of part – from packaging to medical products – with relatively low investment in tooling and machinery.

**TotalEnergies Corbion** and **Coexpan** recently launched a bio-based cup using recycled PLA – which is available in white and with high transparency.

After completing tests at Coexpan in Spain, full validation was achieved for line speeds and output using form-fill-seal (FFS) technology.

“We are proud to include this new sustainable product that increases the number of technical solutions we can put on the market,” said Gonzalo Sanchez, recycling manager at Coexpan. “Having used this material for more than 10 years, we are the leading PLA resin converter in the FFS market.”

Environmental stresses have increased pressure to meet recycling and sustainability targets. With readily available recycled rPLA, brands can offer consumers sustainable options without extra investment or significant changes in existing FFS facilities.

Luminy rPLA is a bio-based polymer made from

sugarcane. It has the same properties as virgin PLA, including food contact approval in the EU, China and the US.

Derek Atkinson, senior director of sales and business development at TotalEnergies Corbion, added: “We have a team of specialised engineers to work with our partners and develop the right Luminy PLA grades. And we buy back the used PLA to recycle it at our facilities.”

He added that PLA recycling is a more energy-efficient process than for other plastics.

“We appeal to all PLA users to get in touch and set up a collection structure.”

## Sheet for inserts

**Roehm** says that its transparent orthopaedic sheet – called Europlex O – makes it easy to manufacture high-quality orthoses.

The transparent material is aimed at manufacturing high-quality orthoses, shoe inserts and other orthopaedic aids. It is formable at low temperatures – using standard tools – while being very stable. It also has high chemical resistance and withstands both skincare products and sweat.

**Main image: TotalEnergies Corbion and Coexpan have launched a bio-based cup using recycled PLA**

IMAGE: ROEHM



**Above: Roehm says that shoe inserts made from its Europlex O are light, comfortable and inconspicuous**

“One major application advantage is that Europlex O can be bent and moulded at temperatures as low as 90°C without pre-drying, while remaining more stable than many comparable materials,” said Christian Wacker, product manager at Roehm.

Thanks to its high mechanical stability and impact resistance, shoe inserts and orthoses made from it are “virtually indestructible”. Its good thermoformability allows orthopaedic technicians to adapt the material to the anatomy - and, if needed, make alterations later. The transparency

makes it easy to spot pressure points that need to be readjusted.

Transparent Europlex O sheets are available in the size 2000 x 1250mm and thicknesses of 1.5 to 4.0mm. The material will be on show at the forthcoming Compamed exhibition, in Germany in November.

**Film from PET**

**AMB** of Italy has begun using a technology that improves the recycling of PET food trays.

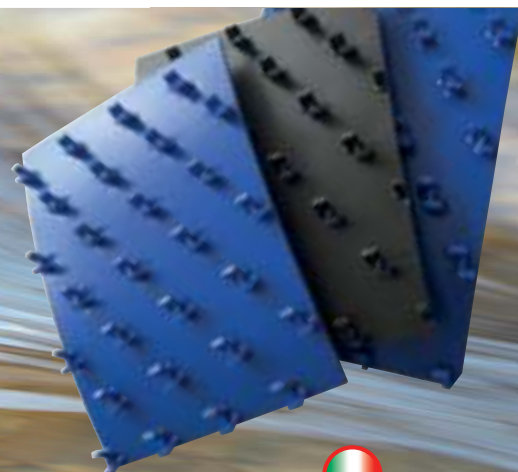
The company has become a partner with **Indorama Ventures**, to use flake from recycled PET trays to make film that is suitable for food packaging trays.

The partnership with AMB aims to divert more than 150 million post-consumer PET trays away from landfill or incineration by the end of 2025. Indorama will supply recycled PET flakes - from post-consumer trays - to AMB to use in making food-grade transparent film. This increases the recycled content sourced from trays in AMB’s end-products.

“Consumers want a guarantee that the food trays they use are recyclable,” said Paolo Cescutti,

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chief procurement officer at AMB. "The recycled material available through our partnership with Indorama means we can divert more plastic waste - to become safe, food-grade packaging."

After more than 72 months of research and development, Indorama was able to produce rPET flakes from post-consumer trays commercially at its facility in Verdun, France.

DK Agarwal, deputy group CEO at Indorama, added: "Each new partnership with companies like AMB smooths the path towards a circular economy for PET trays and extends the PET lifecycle."

In 2022, AMB launched its tray-to-tray recycling brand 'AMB TrayRevive' to develop infrastructure to support recyclable packaging.

**Complex parts**

**Sabic** has introduced two new materials for sheet extrusion and thermoforming.

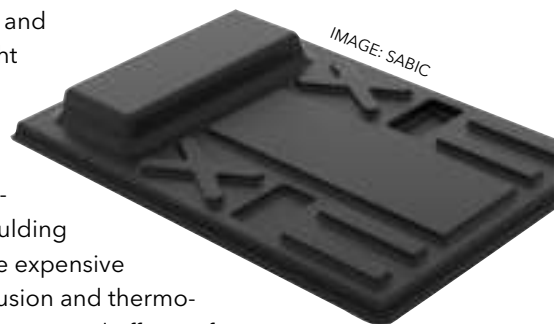
It says its PP compound H1090 and Stamax 30YH611 offer an alternative to traditional sheet metal forming, compression and injection moulding - allowing customers to form large, complex structural parts, it said.

The products are 30% glass fibre-reinforced,

intumescent, flame retardant (FR) materials, based on polypropylene (PP). They can be used for electric vehicle (EV) battery pack components such as top covers, enclosures and module separators. Both grades offer good thermal barrier properties to delay or contain thermal runaway propagation.

In addition, their properties offer design, system cost, inherent thermal and electrical insulation and weight advantages compared to stamped sheet metal, said Sabic. Compared to injection moulding of thermoplastics and compression moulding for thermosets - which require expensive tooling and equipment - extrusion and thermoforming can be more cost-effective and efficient for several cases, said Sabic.

"By providing alternatives to traditional materials and processes, we can enable customers to design and manufacture the next generation of battery components while driving down costs and gaining a competitive advantage," said Abdullah Al-Otaibi, general manager for ETP and market solutions at Sabic.



**Above: Two new Sabic materials can be used for parts such as EV battery pack components**



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**Above: The SP80, which has a polycarbonate cockpit, will attempt a world speed record next year**

The company has validated the mechanical, fire safety performance and manufacturability of both resins in EV battery applications with complex geometries - both in its labs and with customers. The materials allow the replacement of sheet metal or thermosets in final applications - and can be used to create prototypes to determine the feasibility of investing in injection moulding tools.

**Speed record**

A speedboat powered only by the wind - which glides across the water at 80 knots - is hoping to break a world record next year.

Weight and safety play a major role in achieving speed records on the SP80 speedboat. The cockpit is made of 12mm-thick solid polycarbonate sheets from **Exolon** that are thermoformed by French company Vitalo/Starplast.

The transparent sheets provide optimum visibility thanks to their high optical quality, are resistant to environmental conditions, and are impact resistant and lightweight. They can be hot and cold formed, so can be adapted optimally to the aerodynamic requirements of the boat.

The SP80 is 10.5m long and 7.5m wide and has space for two pilots. Together with the sail and the

power module, the cockpit is one of the three most important elements of the sailboat.

**Three concepts**

**SML** says that it offers all three main extrusion concepts for producing PET sheet - giving customers more choice of an optimum solution.

The company offers single screw extrusion (which it calls ClassicPET), twin screw extrusion (FlexiPET) and recycling extrusion (RecyPET). All three line concepts can be supplied with an EFSA/ FDA food-approval package.

"The extrusion system plays a crucial role in PET sheet manufacturing, as practically all production processes depend on how the raw materials are treated in the extruder," said Martin Kastner, R&D engineer at SML.

Its single screw extrusion system is for customers that are focused on manufacturing PET sheet in a wide thickness range, such as for thermoforming applications. The concept stands for constant production stability through the production process, and is easy to adjust. Changeover times from one sheet type to another are short. Virgin and recycled granules can both be processed.

The FlexiPET conical twin-screw extruder concept boasts high energy efficiency. Its main application is for flakes, though it also handles virgin granules. It can be optimised for dusty material streams. Switch-over times from one type of raw material to another are also short.

RecyPET is aimed at high-volume production of mono-layer sheet, particularly from post-consumer and post-industrial PET flakes. In combination with the Vacurema system, decontamination and dehumidification take place at the reactor pot mounted on the extruder. The intrinsic viscosity drop is minimal.

"Whatever the requirements, our PET sheet lines ensure moderate capital expenditure, high outputs and operational ease," he said. ➤



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IMAGE: KIEFEL



**Above: Kiefel is offering fast availability of its polymer packaging machines to help customers grow capacity**

**In the now**

**Kiefel** has revised its production philosophy to launch a new long-term programme called ‘Kiefel Now’ - giving immediate availability of polymer packaging machines.

Customers can benefit from a selection of the company’s most popular thermoforming machines at their immediate disposal - allowing them to instantly grow production capacity and increase profits, it says.

“With Kiefel Now, we we have practically eliminated the usual delivery times for certain machines,” said Thomas Halletz, CEO of Kiefel. “Therefore, customers can realise their orders in the shortest possible time.”

The Kiefel Now range includes both steel rule machines and tilting machines, which are available immediately or within a few weeks. Steel rule cutting machines - such as the KMD 78.2 Speed and KMD 90 Premium for food tray production - and tilting machines like the KTR 5.2 Speed for lid, cup or coffee capsule production, are among those ready to be shipped worldwide. Kiefel’s website offers an up-to-date overview of immediately available machines.

Armin Dietrich, global director of polymer packaging at Kiefel, added: “The positive feedback from customers who have already purchased several of these machines shows us that we made the right decision.”

**New design**

At K2022 last year, **WM Thermoforming Machines** of Switzerland presented its newly designed FC1000 IM2 - which it says combines maximum size with speed.

Fast-changing markets with shorter product cycle times need flexible, reliable thermoforming equipment that can deliver quick tool changes and fast machine start-ups, says WM. The IM2 configu-

ration enables customers to switch from the ‘form with in-mould trim’ to the ‘form with separate cut’ setting, according to specific product needs.

The FC1000 IM2 with its 130 US tons claims to offer the highest machine throughput per square metre on the thermoforming market. Its engineered toggle and yoke compensation system also gives the highest speed and cutting precision for any material, claims the company.

The redesigned FC 1000 IM2 thermoformer is available in a red-grey colour combination.

In addition, WM’s upgraded intuitive in-house software - with new pre-setting function - can automatically calculate up to 90% of the optimal machine setting. This allows experienced operators to shorten the machine start-up of new products, and less experienced operators to learn from the machine algorithm that has been developed.

**High output**

Last year, **GN Thermoforming** launched its GN915 - which claims high output and precision.

The robust, easy-to-operate machine is aimed at a variety of product packaging possibilities for the medical, food and consumer packaged goods industries.

The 100-tonne capacity of the forming and cutting presses improves product quality and increases the range of product possibilities, says GN. The flexible system can use all thermoformable materials including those with 100% recycled content and various biodegradable materials, such as PLA.

The GN915 was created to accommodate tooling designed for other thermoforming machines of its size. Customers do not need to purchase additional tooling to run their existing product lines on a GN915.

Standard in-mould-cut capability in the forming press allows forming and cutting in the same station for products that require precision trim. The servo-controlled knife position in the cutting press also improves precise cutting, preventing scrap waste and increasing product yield.

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# Developing plasticisers for the future of PVC



IMAGE: GRUPA AZOTY

## *The latest innovations in PVC plasticisers tackle health and environmental concerns while promising better cost and performance. Mikell Knights reports*

With traditional plasticisers continuing to face pressure over potential health and environmental concerns, alternatives continue to emerge for these essential additives for the flexible PVC industry. The latest developments include phthalate-alternative products – both bio-based and high molecular weight types – with many producers focusing on application-specific plasticisers that offer benefits ranging from improved toxicological profiles and reduced environmental impact, while simultaneously enhancing performance characteristics such as heat stability, mechanical properties, migration-resistance or efficiency.

Brazil-headquartered **Innoleics** continues to expand its portfolio of bio-based primary plasticisers with the development of two new general-purpose grades, already released into the Brazilian market, which have successfully replaced DINP and DOTP in plastisol formulations, according to Jacyr Quadros,

director at Innoleics USA. The materials are now being made available internationally, with Innoleics USA providing local technical support in the North American market and Varteco Iberica in Europe.

The company's GPe 9 and GPe 10 grades are described as sustainable plasticisers for use in s-PVC (suspension grade) compounds and plastisols. They are manufactured using Innoleic's vegetable oil chemical modification technology, which the company says results in a phthalate-free primary plasticiser that does not display the compatibility issues that can occur with epoxidated soybean oil (ESO) types. Innoleics says it subjects the soybean oil fatty acids to transesterification, epoxidation, and acylation to produce materials that offer improved compatibility with PVC and lower volatility, which helps in high performance applications.

Both general purpose plasticisers are said to feature reduced plastisol gelation and fusion

**Main image:**  
**Plasticiser producers are developing new products with better toxicological, environmental and performance profiles**

**Right: Cargill's Bioverobio-based plasticisers target flooring applications**

temperatures in comparison to competing general-purpose formulations, as well as improved thermal stabilisation due to their inherent epoxy groups. The company says the formulations allow for the complete replacement of ESO as a co-stabiliser, which it says simplifies the formulation and reduces raw material inventory and SKUs.

Both grades are claimed to provide an improved dry-up time in suspension PVC compounds and a reduced carbon footprint. The materials are also said to offer increased throughput, which can reduce unit manufacturing costs, and to allow lower oven temperatures which can reduce energy costs. When used as a replacement for petroleum-based GP plasticisers, Innoleics says the new grades can impart increased clarity and surface gloss to the finished product.

The company says GPe 9 is a slightly lower cost grade intended for use in applications where characteristics are not critical. It presents reasonable mass loss in comparison with petroleum-based general-purpose plasticisers but higher volatility is said to make it most suitable for less volatility-sensitive applications. In addition, the slightly higher viscosity aging may require formulation adjustments for plastisols, the company says.

GPe 10 is said to present good viscosity and oven ageing performance, with improved low



temperature flexibility. Innoleics says it offers similar volatility and viscosity aging when compared to petroleum-based GP plasticisers, allowing it to provide similar service life in final products with little need for formulation adjustments. In addition, it has improved low-temperature flexibility.

**Bio-based solutions**

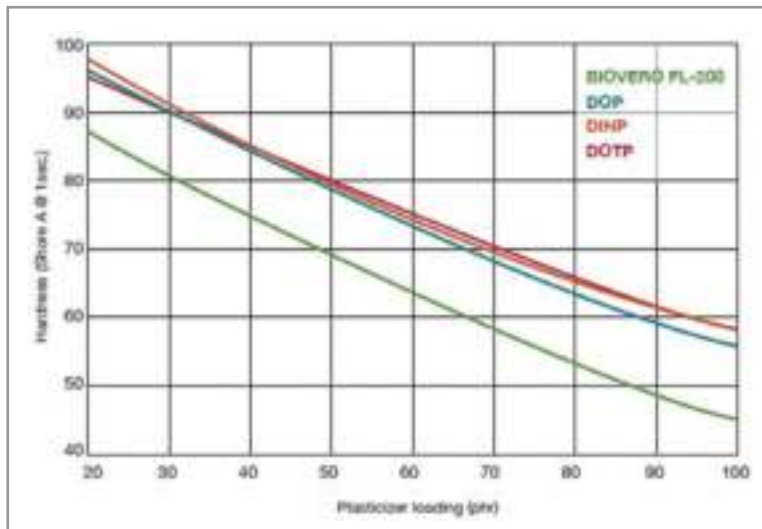
US-headquartered agri-products group **Cargill** is steadily making a name for itself in bio-based feedstocks through both technical innovation and acquisition. In 2021 it expanded its plasticisers group with the acquisition of Arkema's epoxides business, which included a manufacturing facility at Blooming Prairie, MN, US, specialising in epoxidised vegetable oils.

Epoxidised vegetable oils are key components in Cargill's own bio-based plasticisers and polyols. "Adding this capability will allow us to innovate across the polyol value chain, transforming our vegetable oil into highly functional compounds that bring benefits like flexibility, durability and heat stability to a wide range of industrial products," according to Kurtis Miller, managing director of Cargill's bioindustrial business, when the purchase was announced.

The deal also included Arkema's Vikoflex and Vikolox family of epoxidised vegetable, soybean and linseed-oil grades, as well as the Vikopol epoxidised polybutene used as an adhesive and epoxy enhancer and Vikinol aliphatic diols. The materials are now incorporated into Cargill's bioindustrial portfolio.

Cargill further expanded its bioindustrial solutions with its new Biovero bio-based plasticiser, which is designed primarily for extruded and calendered flooring products but can be used for a variety of other PVC manufacturing applications, including production of plastic films and sheets.

The Biovero FL-200 grade is derived from feedstocks sourced from bio-based materials and is a non-phthalate plasticiser that can provide cost savings and performance benefits, according to Cargill. It is said to offer low extractability, can achieve required flexibility at lower loading levels, provides faster processing and line speeds, supports lower processing temperatures, and is more resistant to degradation from heat exposure (Figure 1). The company says the plant-based plasticiser can allow manufacturers to produce



**Figure 1: Efficiency curves for Biovero FL-200 compares with DOP, DINP, DOTP (samples aged at 50°C for 7 days; hardness normalised to 60 Shore A)**

Source: Cargill



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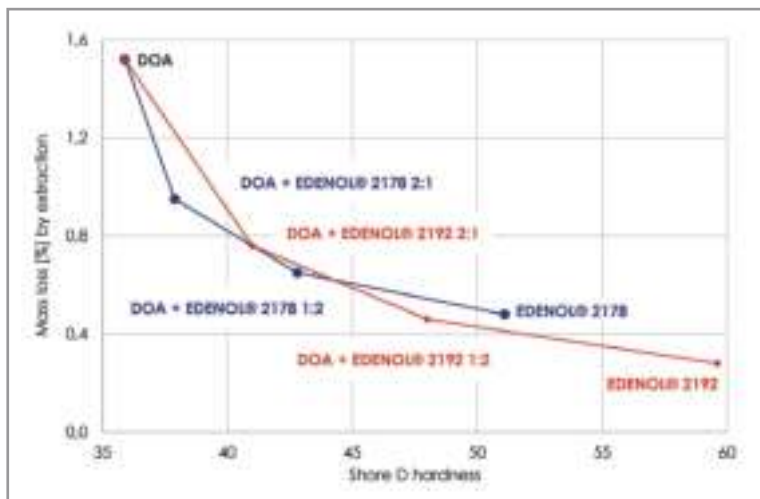
*It was a great event, and the topics were relevant to the current sustainability trends. It was also a good opportunity to expand our networks and meet potential business partners.*

Assistant SBU Head, Treasure Island Industrial Corporation



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**Figure 2: Impact on extraction resistance when replacing DOA with a blend of DOA and Edenol 2178 or 2192**

Source: Emery Oleochemicals

goods more efficiently than using conventional plasticisers, while reducing energy, scrap, and material usage.

Japanese additives specialist **Adeka** launched its ADK Cycloaid bio-based plasticisers as environmentally friendly alternatives to fossil-based materials. The company says its ADK Cycloaid PNB series formulation for PVC uses 90% or more biomass raw materials yet exhibits equal or better performance compared to general-purpose plasticisers based on phthalates or dibasic esters in terms of oil resistance (resistance to oil extraction), heat aging stability and migration. ADK Cycloaid PNB received “Biomass Mark” labeling and certification from the Japan Organics Recycling Association.

Adeka also offers its ADK Cizer C series of linear or branched trimellitate plasticisers for PVC applications where high heat resistance, flexibility at low temperature and low volatility are required, while it says its ADK Cizer PN series of polymeric plasticisers for PVC offer very good oil resistance, anti-migration performance and extremely low volatility.

As the industry transitions toward sustainable additives, the aim is to strike a balance between green goals and the performance of PVC products, according to **Emery Oleochemicals**. Manufacturers need to consider intended use, end-user safety and environ-

mental impact when formulating PVC products as the choice of plasticiser depends on the specific requirements of the application. Factors such as flexibility, temperature resistance, chemical resistance and regulatory compliance play a significant role in selection.

Migration characteristics are of particular importance in food packaging applications. EU Directive 10/2011 sets migration limits for substances approved for indirect food contact. Emery Oleochemicals says it has developed a portfolio of plasticisers with exceptionally low migration characteristics and adds that these are in compliance with Directive 10/2011. To meet the demanding requirements of this industry, it offers a full line of polymeric plasticisers over a viscosity range from 700 to 13,000 mPa\*s (20°C) that have very low migration properties.

Emery Oleochemicals has developed several plasticisers for technical PVC applications. For roof membranes it offers Edenol 1233 Spezial, a polymeric plasticiser based on adipic acid that has a high viscosity and offers good resistance to extraction by oils, fats, grease, aliphatic hydrocarbons, and aqueous systems. Meanwhile, its Edenol 9789 polymeric plasticiser, which is based on azelaic acid, is said to offer low volatility and high temperature and weather resistance, making it suitable for use in cast films for the automotive industry.

Last year, Emery Oleochemicals announced the development of two 100% bio-based plasticisers – Edenol 2178 and 2192 – that can partially replace the monomeric plasticiser DOA. Shore hardness is said to be marginally compromised while extraction resistance is noticeably improved (Figure 2). The two plasticisers are said to show very good performance in both PVC and in bioplastic resins. They can be used as single plasticisers, in combination with each other, or in conjunction with other plasticisers. Both are biodegradable.



**Right: Emery’s Edenol 9789 polymeric plasticiser offers the low volatility and durability required for cast films for the automotive industry**

IMAGE: EMERY OLEOCHEMICALS

**Mass-balance approach**

Germany’s **BASF** has been using a biomass-balanced (BMB) approach for its Hexamoll DINCH BMB, Palatinol N BMB, Palatinol 10-P BMB and Plastomoll DOA BMB plasticisers since 2020. Further supporting its circular goals, the company recently expanded its BMB portfolio with Plastomoll DNA and the



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# FDA denies call for phthalate food ban

Last month, the US Food and Drug Administration (FDA) denied a **petition** calling on it to reconsider an earlier decision not to ban the use of eight ortho-phthalate plasticisers in food contact applications and not to revoke sanctioned uses for five.

The reconsideration petition had been filed by US-based public interest legal group Earthjustice and referred to the FDA's earlier denial of a citizen petition submitted in 2016 by Earthjustice and a number of other groups, including the Center for Food Safety, Center for Environmental Health, Center for Science in the Public Interest, Consumer Federation of America, and the Natural Resources Defense Council.

That original petition had called on the agency to ban the use of eight ortho-phthalate plasticisers – DIBP, DBP, BBP, DCHP, DnHP, DIOP, DEHP and DiNP – in all food contact applications and to remove five prior-sanctioned uses for BPBG, DEP,

IMAGE: SHUTTERSTOCK



EPEG, DEHP and DIOP.

The FDA said in its **response** to the reconsideration petition that it had evaluated it and concluded that it did not provide a basis for modifying its original decision.

“Our response explains that we adequately considered relevant information and views contained in the administrative record when

responding to the original citizen petition,” it said. “Additionally, we have considered the information submitted in the reconsideration petition and other relevant information in the administrative record. The FDA’s decision to deny the original petition remains unchanged.”

- > [www.fda.gov](http://www.fda.gov)
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polymeric grades Palamoll 652, 654 and 656 in a BMB version.

“Customers are focusing on smart ways to reduce the carbon footprint in their formulations,” said Ellen Strubel, head of sales plasticisers EMEA at BASF. The company says that using biomass-balanced versions of known plasticisers means customers can realise a reduced carbon footprint through the attribution of renewable raw materials within BASF’s integrated production system. Such plasticisers offer the same product features as their conventional counterparts, so they can be used and processed in the same way.

Calculation of the product carbon footprint (PCF) follows the “Together for Sustainability” methodology, in which BASF and several other chemical companies have agreed on a global guideline with the goal of assessing, auditing, and improving sustainability practices within their global supply chains. TÜV Rhineland has certified that BASF’s method to calculate cradle-to-gate product carbon footprint is in line with the relevant ISO standards and with the Greenhouse Gas Protocol Product Standard.

Prior to June of this year, BASF offered its biomass balanced plasticisers only in accordance with the REDcert2 certification scheme. Since June, its biomass-balanced plasticisers are also certified to the ISCC Plus certification scheme.

Better meeting customers’ needs is the driver for expansion of the plasticiser product range at **Evonik Oxeno**, the company says.

“The portfolio expansion is in line with our expansion strategy with the latest generation of isononanol (INA)-based plasticisers,” said Roland Pietz, market segment head for oxo-alcohols and plasticisers at Evonik Oxeno. He says the product launch strengthens Evonik’s business in the PVC plasticiser sector.

Evonik’s Elatur product line comprises the Elatur DINCD and Elatur CH (DINCH) general purpose plasticisers for outdoor and indoor applications, and Elatur DPT fast gelling plasticiser. The company’s portfolio also includes Vestnol 9 (DINP), a high molecular weight universal plasticiser that the company says is suitable for almost any flexible PVC applications.

Evonik Oxeno’s ISCC Plus certification means it

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IMAGE: EVONIK

**Above: Elatur TM is the latest addition to the Evonik Oxeno plasticiser portfolio, pitched at high temperature cable and automotive applications**

can use mass balance methods to offer grades that can be attributed as bio-based, circular, bio-circular, or reduced-footprint. The company also recently developed its myFlexino portal, providing customers with 24/7 access to relevant technical documents and supplementary information, including online sample request.

Poland's **Grupa Azoty** has for some time focused its plasticiser developments and business on non-phthalate grades, introducing its first non-phthalate product in 2011 and gradually expanding its offering which, since 2020, has been marketed under the **Oxoplast** name.

"We definitely don't miss phthalates. Discontinuing their production was a measure that the company consciously took in view of the regulations coming into force back then, which continue to have a significant impact on the nature of the market," said Maciej Budner, who heads up the Oxoplast Business Unit. "We are well aware that the path that

Europe and the entire world are following, and will continue to follow, involves further restrictions on orthophthalates. So it was a natural course of action for us to set up a large plant for the production of DOTP [non-orthophthalate plasticiser]."

Last year, the company opened a second R&D centre at Kędzierzyn-Koźle in Poland. The 1,900m<sup>2</sup> facility represents an investment of around €8.7m and includes 10 research labs. The company says it will focus on extending its speciality product portfolio with a special focus on development of bio-based and renewable products. The Oxoplast speciality plasticiser business unit, in particular, is expected to benefit from the extended capabilities.

Budner says the company is also focused on regional diversification. Two years ago it established storage capacity on the east coast of the US for 2-Ethylhexanol to serve its customers in the North American market. In 2022 it rented a second storage tank and now has capacity of 2,500 tonnes for 2-Ethylhexanol alcohol and 1,500 tons for Oxoviflex b plasticiser. He says the longer term goal is to deploy several thousand tons of both products annually in the US market.

### Business challenges

Like all businesses, Grupa Azoty has also had to make operational changes to deal with the impacts of the Covid pandemic and, more recently, Russia's invasion of Ukraine. "In recent years, we have experienced a demand and price boom, largely fueled by the Covid-19 pandemic," Budner said. "Purchasing capacity and demand for products, largely the ones for which our products are used, have increased. Consequently, Oxoplast recorded





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peak results in 2021. Foreseeing what 2022 would look like, we predicted a slowdown from the middle of the year.”

However, Russia’s aggression intensified the challenge with spikes in gas prices at levels not seen previously. It also cut the company off from its supply of propylene in Ukraine. “This was the first and most challenging problem of last year. Within a month, we constructed an alternative system for securing the Oxoplast Business Unit in basic raw material and implemented a mechanism for short-term planning and operation that is flexible and adapted to the conditions we face,” Budner says.

The Pro-Environment Oxo portfolio of products from Sweden’s **Perstorp** includes plasticisers, polyols, acids, and alcohols made from mass balanced renewable or recycled raw materials. The company’s Pro-Environment products and mass balance method, as well as its greenhouse gas calculations, are ISCC Plus certified.

The company’s portfolio of plasticisers based on ISCC Plus certified renewable raw materials include its Pevalen Pro non-phthalate polyol ester material, which was launched in 2014 and is based on 8% or 36% renewable carbon content, and its Emoltene

100 Pro C10 general-purpose grade with 14% renewable carbon content produced using biogas and launched in 2020.

Last year Perstorp announced the development of a partly bio-based 2-ethylhexanol (2-EH). 2-EH is widely used in the production of plasticisers for flexible vinyl and acrylate applications, according to Magnus Hindsö, business manager for the company’s Pro-Environment Oxo portfolio. The new 2-EH is chemically identical to its fossil-based counterpart but offers the benefit of a reduced carbon footprint and lower CO<sub>2</sub> emissions. The company says there is no trade-off in terms of performance and the grade can be used as a drop-in replacement in existing formulations.

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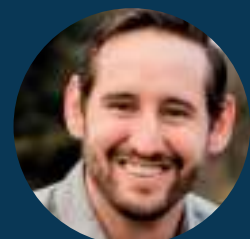
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IMAGE: NORNER

# Scaling up: latest in laboratory extruders

*Pilot-plant plastics operations - which often rely on laboratory-scale extruders - are a useful way to test out concepts before scaling them up to full commercial output*

Laboratory extruders are a key piece of equipment that help plastics extruders - including research organisations - to try out new ideas and formulations.

Norwegian research organisation **Norner**, for instance, has installed a seven-layer cast/blown film extrusion pilot line - which it says will be used for barrier flexible packaging with recycled content.

The company says the line - from **Collin Lab and Pilot Solutions** of Germany - is "the largest investment ever made by Norner".

The line can produce both cast and blown films - as well as cast sheet - up to 550mm wide. This enables films to be laminated, printed and used in commercial packaging lines. This is important for further upscaling of innovative solutions into commercial production, says Norner.

"With the new line, we can produce prototype films with even higher performance to support mono-material developments," said Asbjørn Norberg, manager of the application pilot centre at Norner.

The line can also make mono- and multi-layer sheets up to 2mm thick, for applications such as trays, cups and other thermoformed products.

Norner already has a development centre for film and sheet applications and flexible packaging which include several extrusion lines, an MDO pilot

and laboratories for testing materials, films and packages.

It says the new line fits into its pilot infrastructure - allowing it to run a range of materials, as well as pilot trials with barrier film structures in both cast and blown film technology. This will allow developments in mono-material flexible packaging, and both healthcare and technical applications. The films can also be run on MDO for investigations of MDO barrier films.

## Course expansion

**SKZ**, the German Plastics Centre, has also invested in a Collin blown film extrusion line - which will be used to enable practical training courses. The machine will also be available as a sample line for training courses in quality management and quality assurance.

The new line is located in the technical centre of the quality training centre. It takes participants through current application areas - in a realistic production environment and situations - or teaches them new tasks.

The line includes three high-performance extruders. There is also a five-layer die head that can also be operated as a three-layer die head. The maximum flat lay width of the line is 600mm. The

**Main image:**  
**Norner has installed a seven-layer extrusion pilot line from Collin Lab and Pilot Solutions**



IMAGE: LUCA HOFFMANNBECK, SKZ

**Above:**  
Germany's SKZ can now offer practical training on a new blown film extrusion line

line can be operated with different material systems and film thicknesses from around 50 250 microns.

In future, SKZ will offer several courses in blown film extrusion, which will differ in their entry level. These will range from courses for experienced machine operators - in which detailed technical knowledge will be imparted - to those for career changers, who will learn the process and plastics processing from scratch.

"We are pleased to now include blown film extrusion in our advanced training portfolio," said Andreas Büttner, group manager for education material development, compounding and extrusion at SKZ. "Until now, we unfortunately did not have any equipment available at SKZ."

**Innovation centre**

German chemical company **Röhm** - whose products include Plexiglas acrylic sheet - has opened a new innovation centre at its site in Worms.

The company is pooling its European research activities at new complex, which comprises a laboratory building and a technical centre with pilot plants. The plant has taken 18 months to build

and includes two roofs with photovoltaic panels and heating supplied by heat pumps.

"Our innovation centre will become an incubator for future-oriented technologies in methacrylate chemistry, and strengthen our leading position in Europe and beyond," said Michael Pack, CEO of Röhm.

Röhm has already invested at the site in recent years, including new production plants and capacity expansions. The innovation centre will create a further 100 jobs at the location. Employees working in research, development, and application technology will collaborate on the development and optimisation of products, processes, and applications at the new centre.

In addition, Röhm has recently begun operations at research centres in China and the US.

**PC pilot**

At the same tie, Trinseo has inaugurated a polycarbonate (PC) dissolution pilot facility in Terneuzen in the Netherlands. Currently in the R&D phase, the pilot facility is situated in a temporary area and will later be moved into the Central Process Research Laboratory at the same site.

"We are excited to have started up the pilot facility for PC dissolution," said Francesca Reverberi, senior vice president and chief sustainability officer at Trinseo. "This technology deepens the potential in circularity."

Dissolution recycling is a process whereby polymer is extracted using solvents which dissolve PC contained in end-of-life parts while other materials will remain.

**CLICK ON THE LINKS FOR MORE INFORMATION:**

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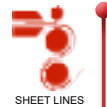
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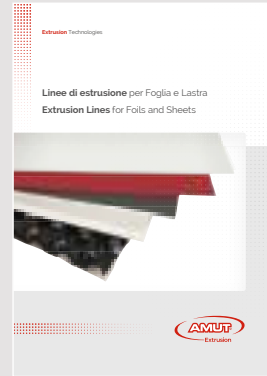
## DIING KUEN: BLOWN FILM



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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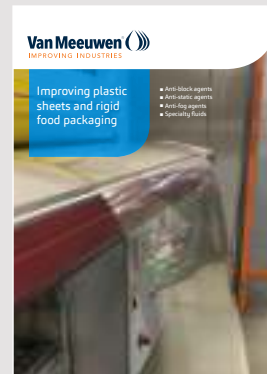
## HAN KING



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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## Isik Plastik

<b>Head office:</b>	Gebze, Türkiye
<b>CEO:</b>	Abdullah Çeker
<b>Founded:</b>	1988
<b>Ownership:</b>	Public (listed on Borsa Istanbul)
<b>Employees:</b>	More than 250
<b>Turnover (2022):</b>	Around TRY980 million (around US\$36m)
<b>Profile:</b>	Isik Plastik, founded in 1988, is a leading Turkish manufacturer of thermoformed food packaging products and industrial plastic sheet. Its acrylic, polycarbonate and PET-G sheets are used in industries including construction, agriculture, automotive and food packaging.
<b>Product lines:</b>	The company's main focus is on single- and multi-wall sheet - sold under its Policam brand. Its polycarbonate solid sheet is used for applications such as noise barriers, lighting displays and instrument panels. Its acrylic (PMMA) sheet is aimed at applications where high strength and thermal resistance are not necessary - such as point of sale displays, cladding and automotive interiors. Its PET-G sheet is used in areas such as medical and safety. Its multi-wall PC sheet is used for applications such as skylights and conservatories.
<b>Factory locations:</b>	The company operates two production facilities with a total production area of 28,000 sqm in Gebze Organized Industrial Zone in Türkiye, where it has an annual production capacity of 65,000 tonnes. In addition, the company recently bought US-based sheet maker Ug Plastic (which trades as US Plast) - which has an 8,000 sq m production facility in Pennsylvania.

To be considered for 'Extruder of the Month', contact the editor on [lou.reade@amiplastics.com](mailto:lou.reade@amiplastics.com)

## Film and Sheet FORTHCOMING FEATURES EXTRUSION

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## **Film and Sheet July/August 2023**

The July-August edition of Film and Sheet Extrusion has a cover article on advances in bioplastics, including projects using wood, carbon dioxide and cellulose as raw materials. Other features look at sustainability developments in stretch and shrink film and plastic pouches.

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## **Film and Sheet June 2023**

The June edition of Film and Sheet Extrusion has a cover feature on recent developments in film and sheet printing, including company investments and new products. Other articles look at downstream equipment, masterbatch and cooling rings.

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## **Compounding World August 2023**

The August edition of Compounding World looks at wood plastic composites, PVC plasticisers, high temperature compounds, and the latest in process control; plus all the regular features and news from the global industry.

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## **Plastics Recycling World July/August 2023**

The July/August edition of Plastics Recycling World magazine looks at how car makers are ramping up their plans to use recycled plastics. Plus, the latest developments in chemical recycling, washing technology, and innovation in recovering ABS-base polymers from WEEE material streams.

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## **Pipe and Profile September 2023**

The September 2023 edition of Pipe and Profile Extrusion magazine contains feature articles looking at the latest in sustainable window profile production, developments in downstream equipment, and innovation in large diameter and PEX pipe.

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## **Injection World September 2023**

The September edition of Injection World magazine takes a look at how plastics suppliers are adapting to OEM demands for materials with recycled content. Plus an update on the latest developments in machine control technology and medical moulding.

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## GLOBAL EXHIBITION GUIDE

2023	<b>5-8 September</b>	Plast 2023, Milan, Italy	<a href="http://www.plastonline.org/en">www.plastonline.org/en</a>
	<b>20-23 September</b>	T-Plas, Bangkok, Thailand	<a href="http://www.tplas.com">www.tplas.com</a>
	<b>26-28 September</b>	Interplas, Birmingham, UK	<a href="http://www.interplasuk.com">www.interplasuk.com</a>
	<b>28-30 September</b>	Central Asia Plast World, Almaty, Kazakhstan	<a href="https://plastworld.kz/?lang=en">https://plastworld.kz/?lang=en</a>
	<b>5-7 October</b>	PackPrintPlas Philippines, Manila, Philippines	<a href="https://www.globallinkmp.com/packprintplas">https://www.globallinkmp.com/packprintplas</a>
	<b>17-21 October</b>	Fakuma, Friedrichshafen, German	<a href="http://www.fakuma-messe.de">www.fakuma-messe.de</a>
	<b>7-10 November</b>	Plastimagen, Mexico City, Mexico	<a href="http://www.plastimagen.com.mx">www.plastimagen.com.mx</a>
	<b>15-16 November</b>	Plastics Extrusion World Expo USA, Cleveland, USA	<a href="http://www.extrusion-expo.com/na/">www.extrusion-expo.com/na/</a>
	<b>22-25 November</b>	PlastEurasia, Istanbul, Turkey	<a href="https://plasteurasia.com/en">https://plasteurasia.com/en</a>
	<b>28 Nov-2 Dec</b>	IPF Japan 2023, Chiba, Japan	<a href="https://www.ipfjapan.jp/english/">https://www.ipfjapan.jp/english/</a>
<b>13-15 December</b>	Arabplast, Dubai, UAE	<a href="https://arabplast.info/">https://arabplast.info/</a>	


## AMI CONFERENCES

<b>26-28 September 2023</b>	Biax Film Global, Brussels, Belgium
<b>3-4 October 2023</b>	Polyolefin Additives, Barcelona, Spain
<b>14-16 November 2023</b>	Waterproof Membranes, Cologne, Germany
<b>21-22 November 2023</b>	Multilayer Flexible Packaging, Barcelona, Spain
<b>22-23 November 2023</b>	Recycling Flexible Packaging, Barcelona, Spain
<b>28-29 November 2023</b>	Thin Wall Packaging Europe, Cologne, Germany
<b>29-30 November 2023</b>	Stretch and Shrink Film North America, Charleston, USA
<b>12-14 February 2024</b>	Polyethylene Films, Tampa, USA
<b>27-28 February 2024</b>	Stretch and Shrink Films Asia, Bangkok, Thailand
<b>28-29 February 2024</b>	Specialty Packaging Films Asia, Bangkok, Thailand

For information on all these events and other conferences on film, sheet, pipe and packaging applications, see [www.amiplastics.com](http://www.amiplastics.com)

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