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UN report suggests alternatives to plastics to prevent pollution

UN Environment has published a report assessing the potential of replacing conventional plastics with alternative materials in certain applications.

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

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

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

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

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

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

The UN says that adopting alternative materials could help to reduce plastic pollution – especially in the sea

Schur adds to portfolio with latest packaging acquisition

Schur Flexibles of Germany has acquired UNI Packaging, a France-based specialist in packaging for cheese and dairy products.

The company was acquired by Lindsay Goldberg – the parent of Schur Flexibles – and will be integrated into the group in the medium term.

Schur says the takeover will give it new strength in a number of areas. For instance, Schur says it will apply UNI's expertise in pouches – a growing market segment – throughout Europe.

UNI is also an expert in digital printing for flexible packaging, says Schur. This will complete Schur's portfolio and provide many customer segments with options for small order quantities and rapid design changes.

"We will thus offer all printing technologies from rotary and flexo printing processes to offset and digital printing, so can respond to customer requirements with maximum flexibility," said the company.

Founded in 2012, Schur is expected to increase sales to more than €500m in 2018.

It has recently made other acquisitions – including Cats Flexibles Packaging, Hänsel Flexible Packaging and Nimax from the Clondalkin Group.

Schur also recently appointed a new CEO, Thorsten Kühn, in April of this year.

› **www.schurflexibles.com**

Cosmo raises sales

India-based Cosmo Films grew sales in 2018 – though profits remained relatively flat.

The company said it realised its highest ever sales volumes in the final quarter of the year (up 14%) – due mainly to being near full capacity utilisation for a BOPP line commissioned in February – to post full-year sales of around US$294m. This was an increase of nearly 16%.

› **www.cosmofilms.com**

Petoskey funds expansion

US-based film manufacturer Petoskey Plastics is to invest nearly US$30m to expand its operations in Morristown, in Tennessee. The move will increase capacity there, and create around 70 jobs there over the next five years.

"We needed to add additional capacity – which has required us to invest in more capital," said Jason Keiswetter, executive vice president of Petoskey Plastics. "We look forward to completing the building addition in 2018 and continue to add capacity and jobs within the structure for several years to come."

Petoskey will add 30,000 sq ft – an expansion of around one-third – to its existing Morristown facility, which specialises in polyethylene (PE) film. It has multiple extrusion lines using recycled materials, as well as converting lines.

Work on the expansion is scheduled to begin in the second quarter of 2018. The company anticipates the first phase of the new expansion will be operational by the end of this year.

Petoskey operates three manufacturing plants across the US and has more than 400 employees, 100 of them in Morristown.

› **www.petoskeyplastics.com**

Bio-polymer capacity growing at same rate as conventional plastics

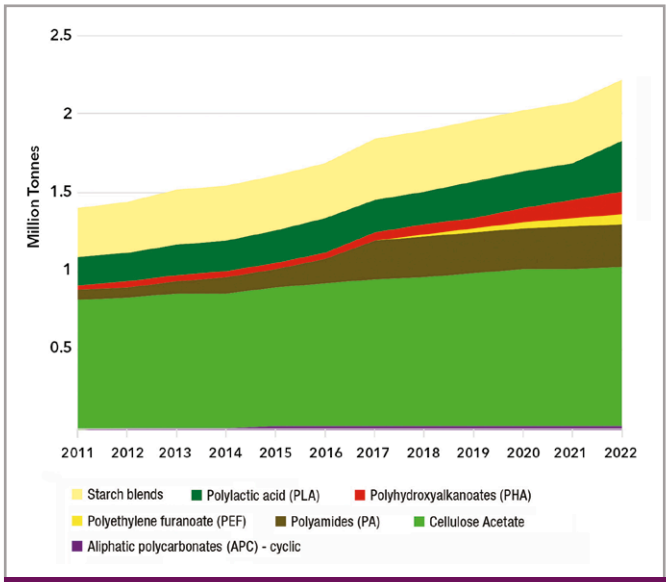
Production capacity of bio-based polymers is growing no faster than that of conventional polymers – meaning they will continue to account for around 2% of the market.

A report by the Nova Institute of Germany says that capacity is growing by 3-4% per year.

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

"Additionally, for some bio-based polymers such as PHA, PEF, bio-PE and bio-PP, the prospects for the future are quite positive," said the report.

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



Dedicated bio-polymers, which have no 'petroleum equivalents' are expected to see fast growth

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

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

› **www.nova-institut.de**

Clean expansion in Mexico

Prent, a US-based specialist in custom medical and electronics thermoformed packaging, is building a 45,000 square-foot manufacturing facility in Tijuana, Mexico.

The facility, which will become operational in the fourth quarter of this year, will meet growing regional demand for medical packaging.

The new facility will be an ISO 9001-certified plant with a certified Class 7 clean room environment.

As part of Prent's vertical integration strategy, it will access Prent's Global Package Design Teams, Worldwide Machine Build and Custom Tool Build facilities – ensuring the same standards there as in other Prent facilities.

› **www.prent.com**

Photo: istock

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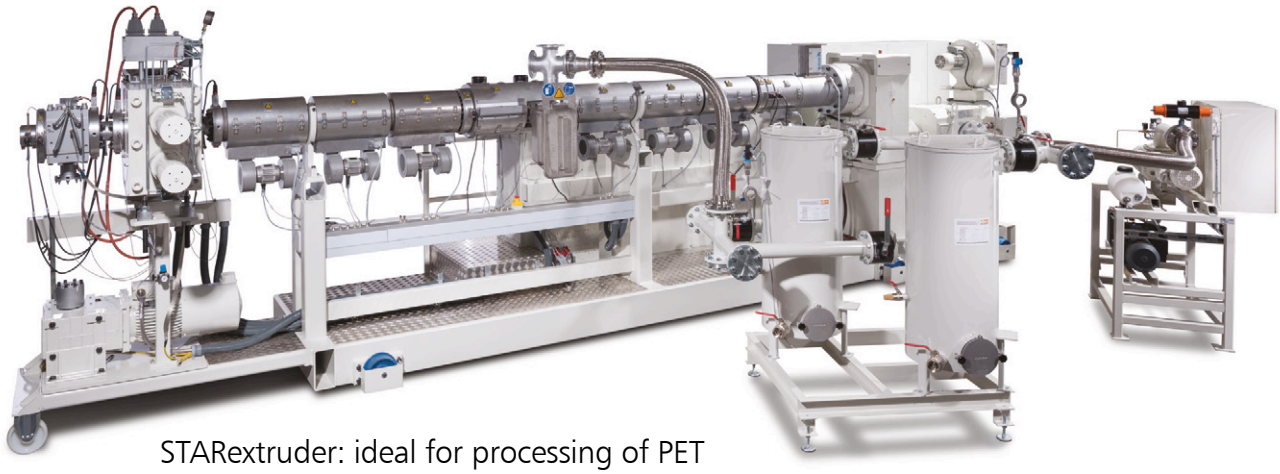
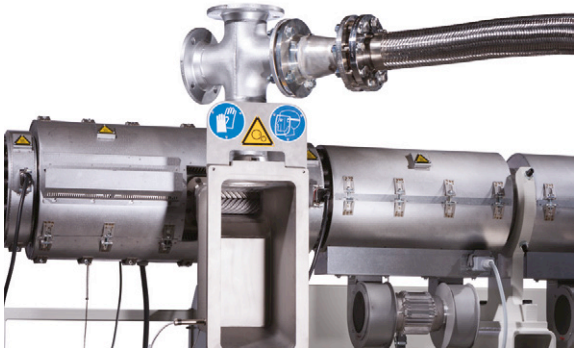


STARextruder: ideal for processing of PET



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Packaging industry heads to AMI recycling show in Essen

Leading producers and users of packaging materials have signed up to attend the Plastics Recycling World Exhibition 2018, which takes place at Messe Essen in Germany on 27-28 June. The free-to-attend event will feature a wide range of exhibitors, including leading plastics recyclers, plus a two-day conference programme focusing on the latest recycling technologies, market trends, legislative developments and application opportunities.

Major players in the packaging supply chain that have already signed up to attend include Bischof + Klein, Coca-Cola, Heineken, Huhtamaki, Innovia Films, Jindal Films, Johnson & Johnson, Kimberly-Clark, Kraft Heinz, Mars Petcare, Mars Wrigley Confectionery, Mauser Group, McBride, Nestle, P&G, PepsiCo, Polifilm, Reckitt Benckiser, RPC, Schur Flexibles, Taghleef, Tetra Pak, Treofan, Unilever, United Caps and many more.

"Raising recycling rates is a critical issue for the plastics packaging industry, so we are delighted that so many leading producers and users are planning to be at the Plastics Recycling World Expo to learn about the latest developments in this exciting field," said Rita Andrews, head of exhibitions at AMI. "We are also seeing large numbers of registrations from other end-use markets such as the automotive and electrical industries".

The Plastics Recycling World Exhibition will take place alongside the Compounding World Expo in adjacent halls at Messe Essen, which is just 20 minutes' drive from Dusseldorf Airport. They will feature more than 180 exhibitors and 70 expert speakers across three free-to-attend conference theatres

More than 2,500 people have already registered to attend the shows, including large numbers of leading plastics recyclers and compounders. To register for your free ticket, visit: www.plasticsrecyclingworld.eventkit.live/register

Chinaplas welcomed record number of visitors this year

Adsale, the organiser of Chinaplas, says this year's edition of the show was the largest in its history.

The four-day show, held this year at a new venue – the National Exhibition and Convention Center (NECC) in Shanghai – attracted just over 180,000 visitors. This was a rise of nearly 22% compared to the previous Shanghai event in 2017, and more than 16% higher than last year's show in Guangzhou.

Visitor numbers grew by 22% compared to the last Shanghai event in 2016

Ada Leung, general manager of Adsale, said: "I have never seen such a huge number of visitors before."

The new venue also covered more space – at 340,000 sq m – than any previous event.

Adsale said there were nearly 48,000 overseas visitors, accounting for more than a quarter of the total count..

The show returns to Guangzhou next year, on 21-24 May 2019.

› **www.chinaplasonline.com**

Faerch to buy CGL of France

Danish food tray supplier Faerch Plast is looking to expand operations by acquiring French packaging specialist CGL Pack from PSB Industries.

The deal is expected to close by the end of July, says Faerch.

CGL manufactures bespoke packaging solutions for the food service industry, healthcare and consumer products.

The acquisition would include the activities of two French manufacturing sites in Annecy and Lorient.

› **www.faerchplast.com**

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German exports hit another high with 8% growth in 2017

Exports of German plastics and rubber machinery grew by almost 8% last year – the eighth consecutive year of growth.

Sales of core machinery to the USA – the top export destination – swelled by 10%, taking total sales there to €847m (US$1bn). China remained the second largest export market, with sales there up more than 14% to €717m (US$851m).

Other major export markets were Mexico – up nearly 5% to €269m (US$319m) – and Italy, where sales grew by 32% to reach €250m (US$297m). This growth was down to policies of the Italian government to stimulate the use of 'Industry 4.0' tools, said VDMA.

The only dips in demand, in major export markets, were from France – down 3% to €191m (US$227m) – and India, which fell nearly 4% to €172m (US$204m).

Outside the 'Top 10', sales to Russia bounced back after a long decrease, rising more than one-third to €114m (US$135m). In Brazil, where "the longest and strongest recession has come to an end", sales grew by 35% to reach 75m (US$89m).

Kühmann: "We are in a very long boom phase that has already exceeded its usual length"

VDMA said that 2018 order books were full, and that it expected growth of at least 3% for the year. However, it signalled a note of caution, saying the "climate is starting to change".

"We are in a very long boom phase that has already exceeded its usual length," said Thorsten Kühmann, managing director of VDMA's plastics and rubber machinery division. "Due to this, delivery times of machinery manufacturers – and those of suppliers – are unusually long."

He added that companies were finding it hard to recruit skilled workers.

› **http://plastics.vdma.org**

Top 10 export markets for German plastics machinery, 2017

Country	Sales, 2017 (m €)	% change vs 2016
USA	847	10.1
China	717	14.3
Mexico	269	4.5
Italy	250	32.1
Poland	233	9.7
France	191	-3.2
Czech Republic	175	7.2
India	172	-3.7
UK	145	2.3
Spain	139	2.1
Total exports: €5.4bn (+7.7%)		
Source: VDMA		

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Standing out at NPE 2018

We pick out some highlights from the recent NPE 2018 show, which are of relevance to film and sheet extruders

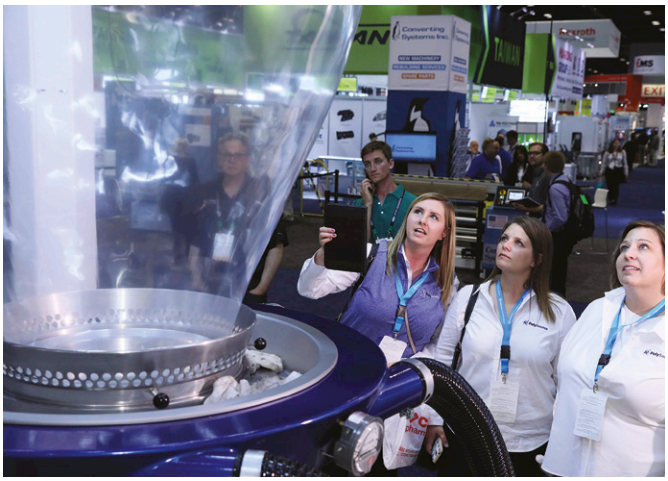


PHOTO: NPE2018

Blown film lines featured prominently at the show

Exhibitors at the recent NPE show in the USA were a mix of large and small, offering both new materials and machinery to the gathered visitors. The Plastics Industry Association, which organised the show, said it was the biggest NPE in history – with more than 2,180 exhibitors occupying a space exceeding 1.2m square feet.

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

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

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

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

Windmöller & Hölscher announced the sale of nine blown film lines to Sigma, taking the company's complement of W&H lines to 40.

Six Optimax FFS lines will be installed and commissioned before the end of the summer at Sigma's Republic Bags facility at Houston in Texas. They will produce sacks to package the growing volume of PE resin exports being produced at plants in the region following recent shale-related investments.

The Republic Bags investment is Sigma's first in the FFS sack film market. The Optimax lines will produce multicolour printed and gusseted PE films ready for the FFS packaging equipment. Sigma estimates a total annual throughput of 20,000 tonnes across the six lines.

W&H also finalised an order for two Varex II blown film lines for converter-grade films for Sigma's McNeeley Plastics operation at Clinton in Massachusetts. The order includes three and five-layer lines both equipped with Filmatic S winders with reverse wind capability. The five-layer line is also equipped with W&H's TurboClean automated resin purging system, which was introduced at K2016 and can reduce changeover times to as little as 12 minutes.

The ninth line – a 5-layer Varex system - has just started operation at Sigma's IsoFlex plant at Washington in Indiana. IsoFlex produces a variety of specialty films for shrink, barrier, laminating and coating applications.

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

Taking the heat

PSI-Polymer Systems introduced two late-stage developments for processors of rigid PVC – a high performance screenchanger and gear pump. Both are claimed to overcome the challenges presented by the material's sensitivity to thermal exposure.

"Rigid PVC is the material that nobody designs for as it has its own particular processing problems," said PSI general manager Don Macnamara. "Flexible PVC has a broad processing window and is quite easy to work with, but rigids are a different story."

The key challenge is the thermal sensitivity of the polymer. Extended interruptions of the melt flow, such as those required to change a screen filter, can result in material picking up heat and burning while any transitions or steps in the flow path can create shear heating, which has a similar negative result.

PSI's solution is to replace the mechanical clamping systems typically found on a traditional screenchanger with its own Expansion Plate design. This employs expansion and contraction of thermal bolts to allow the screenchanger plate to be released, moved then clamped again. In

addition to speed – a full cycle takes around six minutes but melt flow is only impacted for around 90 seconds – this arrangement also relies on direct metal-to-metal contact, so eliminates the need for seals that can often create flow path interruptions.

Gear pumps allow improved control of the extrusion process and can lift output rates. However, in many modern designs the polymer melt acts as a lubricant for the gears and bearings, which is not a viable option when processing rigid PVC due to its shear and thermal sensitivity.

Macnamara said the new Chlorinated Gear Pump is designed to draw heat away from the gears and bearings. Body and side plates are jacketed for heat transfer media, extended gear shafts help move heat energy out from the bearings, and polymer used for lubrication is bled constantly (amounting to 0.01% of total throughput).

"It took some hard work and several modifications but our product will now allow customers running a thermally sensitive polymer to take advantage of the die pressure stabilisation, increased output, and reduction of extruder pressure benefits of a gear pump," he said.

Both products are late stage prototypes but some gear pumps are already in beta trials, with screen-changer tests due to commence shortly, says PSI. The company expects to be able to put production versions on the market within six months.

Conductive developments

US compounder **Modern Dispersions** made two new additions to its range of electrically conductive masterbatches, targeted at producers of anti-static trays, boxes and pallets for use in the electronics sector and parts for use in ATEX environments.

"There seems to be a trend to masterbatch in this market," said vice president Jano Kozma, on the decision to extend its masterbatch options. "It can be more cost effective if you are prepared to take on responsibility for handling the masterbatch and it gives you more flexibility."

One of the new grades, CF-238, is a universal masterbatch suitable for injection moulding and extrusion of PE, PP, PVC and PLA. Addition levels are typically in the range from 40-50%. (The second new product was for injection moulding only.)

The masterbatch processes well – as long as care is taken to avoid high shear.

"When running any conductive compound you can work the conductivity out of the polymer and you need to be conscious of that even with a masterbatch," Kozma said.

Modern Dispersions is also carrying out work with nano-materials. PP-20GO is a graphene oxide filled PP development grade that promises improved thermal conductivity, tensile strength and barrier performance.

PTI's 'tuck-under' option

Processing Technologies International (PTI) introduced a 'tuck-under' motor option for its high performance Super-G HighSpeed extruders, reducing machine footprint by around 33%.

Introduced last year, the Super-G single screw extruder is designed for processing of PP and PS. Features include an oversized feed section to better handle high regrind volumes, easy clean vent chamber and high efficiency air-cooled heater and blower. The units also use PTI's Super-G Lobe screw design.

The tuck-under motor option is available on the SGHS3000-36D and SGH3000-42D models, which are equipped with 500hp and 600hp motors respectively and offer maximum screw speeds of 1,000 and 1,200 rpm. PTI said a number of machines are already in operation with customers using the tuck-under motor arrangement.

PTI has a Super-G HighSpeed extrusion line installed in its newly commissioned 1,400m^2 demonstration centre at its facility at Aurora in Illinois, US. The centre was part of a $10m investment that increased production space by 3,700m^2 and lifted capacity by 50%.

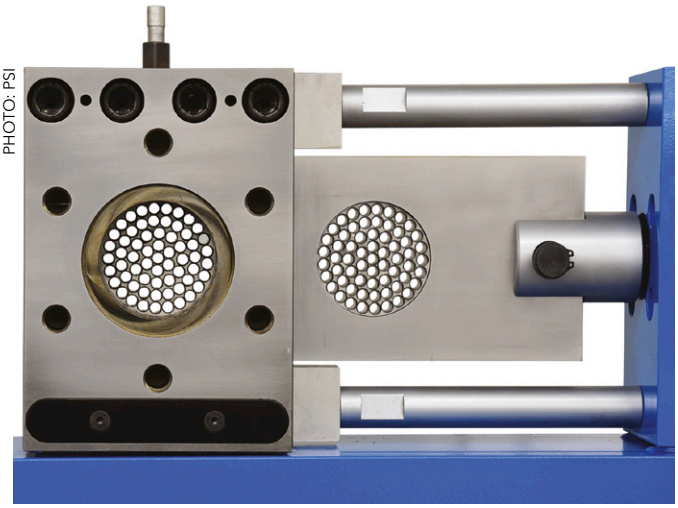
Polyolefin return

Some of the largest polymer producers were also out in force, with one in particular marking its 'return' to the North American market: **Shell Polymers**, which has not produced polyolefins on the continent since 2005, has been tempted back by the attractive economics of shale.

The company has begun construction of a 1.6m tonnes/year polyethylene (PE) plant in Pennsylvania in the USA – and had a large presence at NPE.

It stopped producing polyolefins in North America when it sold its stake in the Basell joint venture with BASF (the business was merged two years later into LyondellBasell). Now, however, Shell is returning with its new plant. Located in Beaver County, 45km north-west of Pittsburgh, it includes an ethane cracker and three PE polymerisation units that will produce HDPE and LLDPE grades. Construction began in the fourth quarter of 2017, with the first products set to reach the

PHOTO: PSI



PSI's ESC screenchanger is designed for use with rigid PVC

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PHOTO: SABIC

SABIC's Lexan Margard FHC10 has a pre-cured hard coating yet can be processed like normal polycarbonate sheet

market in the early 2020s.

Shell Polymers business integration lead Michael Marr explained that building the site in Pennsylvania – rather than on the Gulf Coast – puts it close to the huge Marcellus and Utica shale fields, to maximise the benefits of the new resource.

"Our thought was to put the plant closer to the shale fields and to the market – as 70% of the North American PE market is within 700 miles," he said.

Marr said the company's purpose at NPE was to identify new potential customers for the new facility, which will initially be focused on supplying the North American market. A decision to export further afield is yet to be made.

SABIC targets US growth

Underlining the importance of the US market for its long-term growth, **SABIC** executive vice president for petrochemicals Abdulrahman Al-Fageeh said the company planned to double its manufacturing footprint in the country over the next five years and expand sales from 2.7m to 5.4m tonnes by 2022.

A key element in this growth is the planned 1.8m tonnes/year ethane cracking joint venture with Exxon Mobil, which will include two new PE polymerisation units. However, Al-Fageeh said the company's move to more differentiated products and a sectorial approach to the market will also play a major part: he cited the formation earlier this year of three new business segments targeting caps and closures, industrial hygiene and thin wall packaging as examples of this more application-focused approach.

Al-Fageeh said the combination of SABIC's own C4 and C6 polyolefin technologies with the C8 technologies from its partnership with South Korea's SK Chemical gives it a considerable resource.

PHOTO: SABIC

Al-Fageeh: "We have the technologies to make sure we have the right backbone for our products"

"We have the technologies to make sure we have

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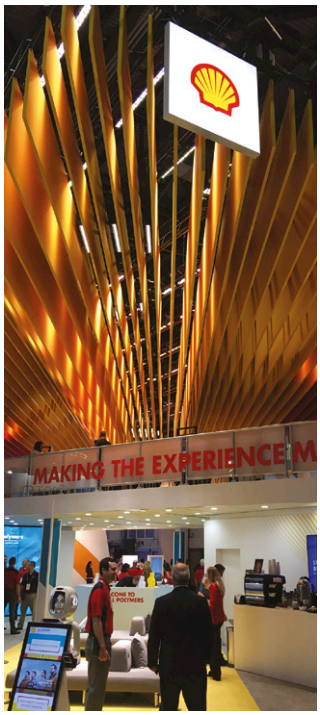

Shell is capitalising on the economics of shale gas to restart polyolefin production in North America

the right backbone for our products," he said.

At the show, SABIC also introduced its Lexan Margard FHC10 sheet. It features a tough polycarbonate (PC) base with high optical quality – combined with a formable hard coating that is pre-cured to allow processing like regular PC sheet. It helps customers avoid post-coating operations, and gives automotive OEMs and their suppliers a new option for creating new glazing designs.

The product's proprietary silicone-based formable hard coating uses dual-cure (thermal/thermal) technology. The coating is pre-cured to the point that it can be easily handled and fabricated like any regular PC sheet, but maintains enough flexibility to be formed within specified limits.

After forming, the coating requires post-curing for three hours at 130°C to optimise abrasion resistance and meet ECE R43 requirements. The sheet offers superior impact strength, as well as high optical quality.

"Market analysts predict strong growth in automotive glazing, propelled by technological advancements in materials such as polycarbonate and continued demand for increasingly lightweight components – particularly in electric vehicles," said Peter Chedd, segment leader for glazing functional forms at SABIC.

Primary applications are moderately shaped glazing components for lower-production vehicles – where it can be more cost effective than injection moulding. It can also be used for non-automotive glazing, such as machine guards or cabin glazing for heavy equipment.

It is initially available globally in 3-5mm gauges, with thicker gauges likely to be available in future, said the company.

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Pressing business: latest in thermoforming

Recent advances in thermoforming technology include a high impact material, a barrier coated film and a granulator developed specifically for processing skeletal waste. Lou Reade reports

Thermoforming is a dynamic, fast-changing area, so it's no surprise that recent advances cover the whole spectrum of materials, machinery – and ancillaries.

Oman Oil Refineries and Petroleum Industries Company (**Orpic**) has launched a new polypropylene (PP) thermoforming grade, which it says will increase the productivity and overall performance of transparent thermoformed cups, trays and containers.

The material, called Luban HP1151K, uses Hyperform HPN-600ei nucleation technology from **Milliken**. It combines high clarity and aesthetics with a new level of superior dimensional stability for thermoformed products, says Orpic – offering the food packaging and household storage solutions industries a new standard in PP.

As well as being able to increase the number of articles that can be produced, the high quality finished products provide good stacking performance. It also offers a broad processing window that allows product quality and consistency advantages, as well as productivity benefits for converters.

Additionally, the grade delivers optimal environmental and handling-related advantages associated with using lightweight PP compared to other materials, says Orpic.

"Luban HP1151K reduces haze in the product and increases clarity and gloss," said Gilles Rochas, general manager for polymers at Orpic. "We are confident that it will help international packaging customers reduce their cycle times and achieve better results through less wastage – while offering all-round productivity improvements."

Hyperform HPN-600ei also offers good organoleptics with no contamination risk – making Luban HP1151K suitable for food applications.

Main image: Orpic says its new PP thermoforming grade will increase the productivity and performance of transparent thermoformed cups

Property balance

Meanwhile, **Braskem** has developed a new thermoplastic – called Prisma 6810 – that offers a balance of transparency, stiffness and impact toughness for thermoforming applications.

Braskem says that the material combines characteristics not typically seen in single resin

Right: SBC 240 from Tekni-Films can be used as an alternative to PCTFE in thermoformable blister applications

solutions – including the toughness of an impact copolymer, but stiffness and haze values close to that of a clarified homopolymer. These properties offer new options in packaging applications such as refrigerated deli containers, cold blended drink cups, and meat or seafood trays.

The company says that – as well as preferring more transparent containers – its clients were looking for new single-pellet resin solutions that do not require the addition of an elastomer to achieve the necessary performance characteristics. Prisma 6810 also maintains its ductile characteristics at temperatures as low as -10°C.

Isla Regenye, Braskem America market segment leader, said: "We believe Prisma 6810 meets the market's growing preference for clearer containers and that its performance properties make it an ideal new candidate for material replacement opportunities."

K-cup tooling

Bosch Sprang, a subsidiary of **Kiefel**, has developed a new patent pending thermoforming tooling system to make polypropylene (PP) coffee cups.

The tooling system can be adapted to most tilting bed style thermoforming machines, so does not require any special machine adaptions. The technology is based on several multi-functional elements in the tool that enable and control specific mechanical properties of the coffee cups. These mechanical properties ensure problem-free usage of the cups in all commercial K-cup coffee systems.

The cups can be recycled in water separation systems because their material density is below 1 kg/m^3.

The production of cups can only be consistent if the sheet specification, process parameters and tool are well balanced, says Kiefel.

The production line is based on a Kiefel KTR 6.1 Speed, a Bosch Sprang 91-cavity tool and Mould & Matic downstream equipment.

The company recently presented the production line to the public for the first time. During NPE, Kiefel displayed the K-Cup production of the KTR 6.1 Speed. In June, the complete production system will be demonstrated at an open day at Kuhne in the USA.

Blister barrier

Tekni-Films, part of Tekni-Plex, has developed a super barrier-coated (SBC) thermoformable film for pharmaceutical blister pack.

Tekni-Films says that its SBC 240 can be used as an alternative to 4- and 6-mil PCTFE and cold formed foil in thermoformable blister applications. The triplex structure is ideal for applications such as pharmaceuticals, nutraceuticals, probiotics and related products.

As well as having high clarity, the material does not require stiffening ribs – which improves on PCTFE's ability to lie flat – or the oversized blister wells created by cold forming. This means that pharmaceutical companies can use a smaller blister card to contain the same number of tablets or capsules, or increase the count on a same-sized card. The end result is material cost savings throughout the packaging process, as well as improved production efficiencies.

SBC 240 offers high moisture and oxygen barrier properties to protect susceptible products from degradation. It also has a wider processing window than PCTFE – as much as 20F – which helps it meet specific production speed preferences.

It is created by applying a 'next generation' high-

Below: Kiefel subsidiary Bosch Sprang has developed a thermoforming tool to make PP coffee cups

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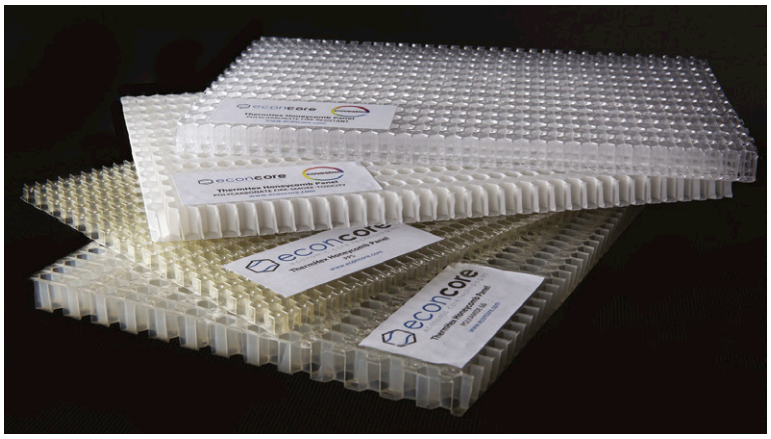

Above: EconCore's ThermHex technology is used to make PP honeycombs and sandwich materials

barrier variant of polyvinylidene chloride (PVdC) coating to a film structure made from layers of polyethylene (PE). Multiple layers can be applied to create different coating thickness weights. As coating weight increases, so do barrier attributes.

This grade is the latest example of Tekni-Film's SBC thermoformable film capabilities. It also offers 120-, 150-, 180- and 210-gram coating thicknesses, as well as other custom solutions.

Forming on show

A number of suppliers were present at recent exhibitions, including both NPE and Plast.

CMT Materials, for example, which develops thermoforming plug-assist materials, showed its range of Hytac syntactic foams at NPE. The materials were also featured at the booths of several leading thermoforming machine manufacturers including: Germany-based Illig, Kiefel, and Gabler; Italy-based Wrapping Machinery and OMG; and US-based Sencorp, Brown Machine Group, and Irwin Research & Development.

Illig, for instance, used an RKDP 72 thermoformer to run a 6-up tool for PET tray production at 42 cpm, while Kiefel demonstrated PP K-cup production on a KTR-6 thermoformer with new tooling from Bosch-Sprang featuring Hytac XTL plugs.

Conor Carlin, sales and marketing manager for CMT Materials, noted that the increased growth for the company's products was largely focused in food packaging applications in Europe and Asia, with material shifts away from PS to PP and new multilayer films.

"These more complex polymers require more sophisticated plug assists beyond our basic epoxy-structured materials," he said.

Automotive honeycomb

EconCore of Belgium, whose ThermHex technology is used to make polypropylene (PP) honeycombs and sandwich materials using thermoforming, highlighted a recent automotive project during NPE.

Fynotej, a manufacturer based in Mexico City that makes automotive non-wovens and industrial carpets, is EconCore's first North American licensee to focus on automotive applications. It went into production earlier this year with a range of honeycomb sandwiches for automotive interiors, including the trunk space. The products, branded Fynocore, have a PP honeycomb core with skins – thermally bonded in-line – in either solid PP sheet or with a non-woven surface finish. They combine low weight with high performance and aesthetics.

"Fynocore products combine our expertise and experience in non-wovens with EconCore's ThermHex honeycomb technology," said Daniel Kalach, VP of manufacturing at Fynotej.

American debut

Also at NPE, **GN Thermoforming Equipment** showcased its GN800 thermoformer for the first time in North America.

It offers many standard features in order to meet manufacturers' needs, including a forming capability of 5in above and below the sheet line, in-mould-cut capability, auto-grease, heavy-duty bearings in the toggle system, and high-efficiency solar heaters.

A top priority is to improve productivity and ensure that customers produce the most finished parts per pound of sheet. Over the years, GN has perfected common-edge-cut tooling technology for its contact-heat series of thermoformers. Common-edge tooling offers the ability to form a series of square or rectangular trays in a row or multiple rows while eliminating all web between the edges of the products.

The GN800 is designed to work with minimal thicknesses of plastic materials and – in combination with the common-edge system – can increase finished part output per pound (kg) of material.

At NPE, the company demonstrated a common-

Right: At NPE, GN showed a common-edge-cut tool that was developed for its GN800 by a Romanian toolmaker

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Above: Rapid's ThermoPro series is designed specifically for in-line processing of skeletal waste from thermoforming lines

edge-cut tool that was developed for the GN800 thermoformer in collaboration with Gravolab, a toolmaker from Romania. GN ran a meat tray in PET/PE laminate with a 12-cavity mould while maintaining a reduced scrap rate of 18%, said Jerome Romkey, GN's business development manager.

Skeletal recycling

At Plast, **Rapid Granulator** introduced a new range of granulators designed specifically for in-line processing of skeletal waste from sheet and film thermoforming lines.

The patent-pending ThermoPro series – based on a previously patented Rapid design – is available in various standard and low-built formats for handling scrap widths from 600 to 1,500mm (24-60in). A ThermoPro 400-90 for granulating webs up to 900mm (35in) in width was on display at the show.

"Thermoforming companies live or die according to how well they handle and recycle their trim," said Bengt Rimark, Rapid's CEO. "Skeletal waste can easily account for 30-40% of total throughput, so it is critical that trimmed material is returned to the process as cost-effectively as possible. When everything works the way it should, the savings that the converter can make are enormous."

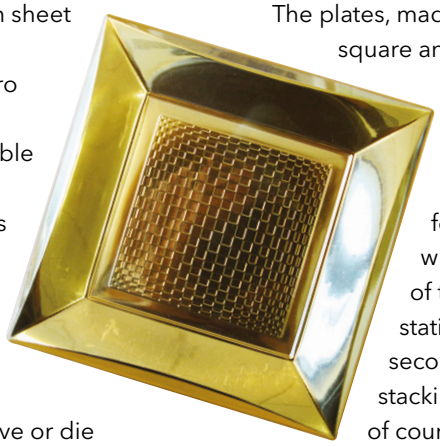
ThermoPro machines use some features from previous Rapid granulators – such as double-scissor cutting action, and an 'open hearted' design for fast production changeovers and ease of maintenance – with new elements that were tailor-made to make thermoforming operations easier to run and more cost-effective.

"When we designed the ThermoPro, we wanted to get inside the head of the operator to see how we could help make their life easier, more controlled and more reliable," said Rimark. "That's why we have been cooperating with some really big and demanding players in the field during development."

Several special features make these granulators attractive to thermoformers. One is the compact designs of the integrated roll feed and dancer bar. Together, these enable the skeleton to be pulled into the machine, which is running constantly, in sync with the production line, which operates discontinuously. The roller feed has a pneumatic pressure control so it can adapt to the thickness of the incoming material.

The ThermoPro uses a heavy-duty roller feed as standard, enabling problem-free handling of skeletal waste. This makes it possible to run several webs into the granulator at the same time. It also facilitates granulation at the start-up of a thermoforming line, when the parts are not stamped out of the sheet, meaning that the entire web, trim and parts together, needs to be fed into the granulator.

Also at Plast, **WM Thermoforming Machines** of Switzerland exhibited its FC 780 E IM2 Plus thermoforming machine at Plast – producing gold-coloured plates.



Right: WM thermoformed gold-coloured plates at Plast

The plates, made from PET, were 230 x 230mm square and made from 0.4mm thick film. They were made in a six-cavity mould at a rate of around 13,700 plates per hour.

The machine itself has a forming area of 780 x 570mm, which allows forming and cutting of the product in the same forming station – or allows the cutting in a second inline station with subsequent stacking and discharging of the piles of counted products on a conveyor belt.

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Brand new, process-focused and free-to-attend, AMI's first Compounding World Expo and Plastics Recycling World Exhibition take place in Essen, Germany, on 27-28 of June 2018. We preview what's in store for visitors

Essen set to welcome new plastics events

Two new free-to-attend plastics exhibitions emerge on the European polymer events scene next month. Organised by *Film and Sheet Extrusion* publisher AMI, the Compounding World Forum and the Plastics Recycling World Exhibition take place in adjacent halls at Messe Essen in Germany on 27-28 June and both combine a tightly-focused exhibition with high quality free conference streams. Together, the two shows bring together more than 180 exhibitors and in excess of 2,500 visitors have already registered to attend.

While the focus of the shows is on compounding and recycling, there will be plenty going on at each to satisfy extrusion processors and injection moulders looking to find out more about the latest developments in additives, compounds and masterbatches or how to improve the sustainability of their processing or products.

Exhibitors include some of the biggest names in plastics such as BASF, Borealis, Coperion, Dow, Evonik, ExxonMobil, Fraunhofer, Imerys, KraussMaffei Berstorff, Maag, Merck, Mitsui, Motan Colortronic, NGR, Nordson, Omya, Solvay, Starlinger, Veolia, Wacker, and many more.

Compounds and additives

The Compounding World Expo features three free-to-attend debates covering key issues impacting on the technical compounds, masterbatch and PVC markets. Participants in the technical compounds debate include A. Schulman Senior Vice President and General Manager EMEA Heinrich Lingnau, Albis Plastic Vice President Technical Compounds Bernd Sparenberg, Ensinger Head of Compounding Dr Oliver Frey, and Kingfa Sci & Tech Europe General Manager Dr Christof Krogmann.

The masterbatch outlook will be explored by Ampacet Corporation President & CEO Yves

Main image: The German city of Essen hosts two brand new free-to-attend European plastics events in June – The Compounding World Expo and Plastics Recycling World Exhibition

Trends in the technical compounds business will be debated at the Compounding World Expo by (from left to right) A. Schulman Senior Vice President and General Manager EMEA Heinrich Lingnau, Albis Plastic Vice President Technical Compounds Bernd Sparenberg, Ensinger Head of Compounding Dr Oliver Frey, and Kingfa Sci & Tech Europe General Manager Dr Christof Krogmann

Carette, Clariant International Head of Region EMEA Norbert Merklein, Lifocolor Farben Managing Director Dr Martin Fabian, and PolyOne Corporation Global Marketing Director Color Additives and Inks Gary Fielding. Developments in PVC compounding will be discussed by KemOne Director of Marketing & Sales Yves Heroes, Automotive Compounding Industry/Perplastic Group General Manager Fernando Amaral, and EPPA Managing Director Gerald Feigenbutz.

Training and skills development will also be a key theme of the Compounding World Expo conference programme. For example, Dr Anna Gergely, Director for EHS Regulatory at the international law firm Steptoe & Johnson, will explain the process of compliance with the EU's REACH regulations. And Dennis Keller, PolyOne's European Head of Colour Marketing, will explore the psychology of colour and its importance in buying decisions.

The Compounding World Expo conference programme also features presentations detailing the latest developments in polymers, additives and compounds. These will examine topics such as electrically and thermally conductive compounds; flame retardants; compatibilisation; friction modification; nanocomposites; cross-linking agents; functional fillers; thermoplastic elastomers; and high-temperature polyamides. These insights will be delivered by technical experts from companies including Borealis, Europiren, Falcone, Georg H. Luh, HPF, Interface Polymers, Polyscope, Unipetrol, and Ziegler.

Recycling innovations

The Plastics Recycling World Exhibition also features a high-value, free-to-attend conference programme, again including several high level debates. These include a discussion of the future legislative landscape of recycling within the EU's Circular Economy between Steptoe & Johnson's Anna Gergely, RPC-BPI Group External Affairs Director Mike Baxter, Müller-Guttenbrunn Group Public Affairs and E-Waste Manager Chris Slijkhuis, and Nextek Managing Director Edward Kosior.

The future of End-of-Life Vehicle (ELV) recycling will be explored by WIPAG Deutschland General Manager Peter Weidemann, Fraunhofer ICT Department for Polymer Engineering Deputy Director Jan Diemert, and Veolia's Van Scherpenzeel Group Managing Director Roger Beuting. Packaging recycling issues will be discussed by Sloop Consulting Managing Director Graham Houlder, Ghent University Professor Kim Ragaert, and Suez Director Business Innovation Recycling and Recovery Christine Levêque. And development of Waste Electrical and Electronic Equipment (WEEE) recycling will be explored by Galloo Plastics Marketing Director Jannick Sercu, Fraunhofer IVV Business Field Manager Recycling and Environment Martin Schlummer, Axion Polymers Business Development Director Keith Freegard, and CoolRec Manager Plastics Tessa Slagter.

Building contacts

The organisers of the Compounding World Expo and Plastics Recycling World Exhibition have included two informal networking opportunities into the event. Football fans will appreciate the screening of the World Cup match between Germany and Korea in one of the conference theatres from 16:00 on the first day. And this will be followed by a networking party for visitors and exhibitors in Messe Essen's beer garden.

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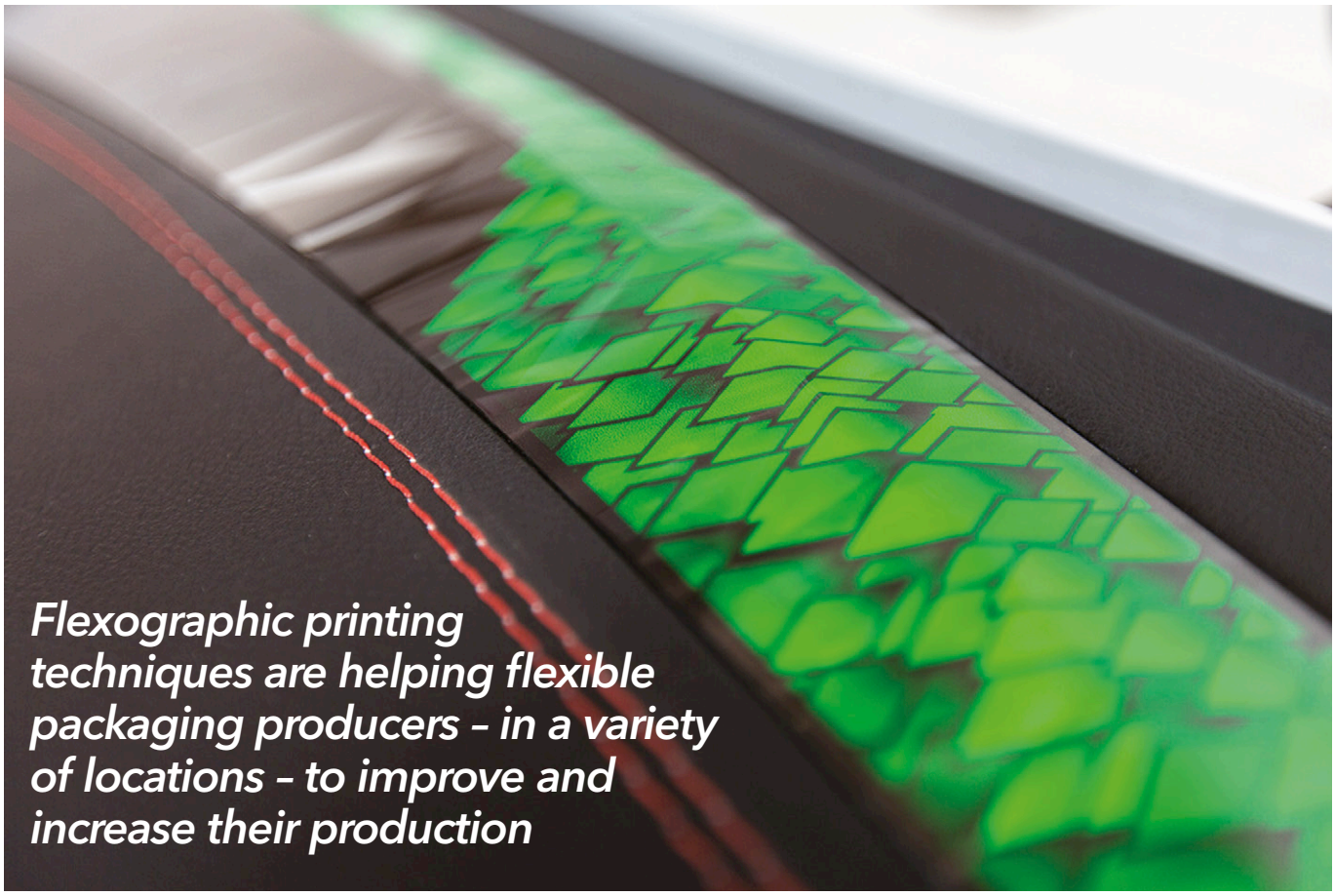

Flexographic printing techniques are helping flexible packaging producers – in a variety of locations – to improve and increase their production

Top marks: innovations in film printing technology

As digital technology has steadily improved, so the ability to print ever more sophisticated packaging has increased.

Polyprint, a packaging printer based in Belarus, has commissioned a Miraflex S flexo printing press from **Windmöller & Hölscher** of Germany.

The company began initial operation of the new line at its site in Logoysk in the Minsk region in late 2017. Polyprint specialises in label printing and works with international food producers. It is one of the largest printing companies in Belarus, with 200 employees.

The new line is fully automated and equipped with modern systems to allow maximum print quality. The Viscocontrol viscosity control ensures the correct fluidity of the ink, while Easy Set S is used for automatic setting of the colour decks and Easy Reg S for register setting of all inking rollers for fast, reliable job changes.

The new system offers Polyprint extra production capacity for high quality products, which are in increasing demand.

"We opted to go with a traditional company, like W&H, on account of the high quality of their systems in particular," said Felix Gitelman, who owns Polyprint. "The entire installation work was planned in advance, and installation went seamlessly."

Main image: Kurz recently showcased its ability to decorate car interiors

Printing success

Leonhard Kurz of Germany has won a 2018 European Digital Press Award for its DM-Liner UV-Ink digital print finishing machine – which can transfer metallised decorative finishes onto plastic substrates using inkjet technology.

The DM-Liner UV-Ink is the second digital metal transfer machine from Kurz to receive the EDP Award, the company having already received an award in 2015 for its toner-based DM-Liner.

"We are proud of this recognition of our digital finishing technology," said Stefanie Schmidt, product

manager at Kurz. "We have developed various digital finishing systems that cater for the different equipment and order structure of print shops."

The DM-Liner UV-Ink can be combined with digital or offset colour printing, and the print enhancement can be performed up- or downstream of the colour printing. The DM-Liner with inkjet technology is available both for sheet-fed and narrow web printing. The DM-Liner UV-Ink for web-fed printing is available as a stand-alone machine that can be used regardless of the printing process. A second version can be integrated directly into the digital printing system, while a third can be retrofitted to web-fed flexographic printing machines.

Separately, the company has been showcasing its vision for the car interior of the future at the Automotive Interiors Expo in Germany. Visitors saw innovative Human Machine Interface (HMI) applications, including a multifunction steering wheel with optional selectable functions. A further highlight was a decorative trim with a day/night design: during daylight the viewer sees an elaborate surface design with various matte finish structures – but a touch button activates partial backlighting, and a touch slider changes the light colour and intensity. Also on display was a seamless dual touchscreen, a multi-touch pad with a wide variety of IMD designs, and a touch-controlled air conditioning system.

African contracts

Spanish printing specialist **Comexi** has recently won three contracts in Africa, for its F2 MB flexographic press.

The company has traditionally had a large presence in North Africa, with a 90% market share in the flexo sector in countries like Algeria. Recently, the group has sold a number of different flexographic presses to African customers across the continent.

"Now we are in a clear phase of expansion and we will continue to grow – and have many projects on the table," said Miquel Gironès, Comexi area manager in Africa.

Tropic Plastic & Packaging of South Africa is a leading flexible packaging supplier, and recently installed an F2 MB flexographic press in order to enhance production. It has been a Comexi customer since 2011, and already has a Comexi FPlus flexographic press and Comexi F2 MP press.

"Tropic is one of the largest packaging companies in the country and is continuously growing – achieving the maximum from our printing technologies," said Gironès.

This latest Comexi F2 MB press acquisition is an advanced machine dedicated to short and medium runs that shares the patented FlexoEfficiency concepts or ergonomics and accessibility of the Comexi F2 family.

Ismail Simjee, Tropic's managing director, says that aftersales service was the main reason that his company has continued to buy new machinery from Comexi.

"Comexi has helped us gain competitive edge in the Southern African market and we look forward to growing as a strategic partner in the future," he said.

Tropic was recently recognised at the local Goldpack Awards – which included winning a Gold Award for the best overall flexible plastic packaging in South Africa.

Further north, Comexi has installed the same model of machine at Natpak's facilities in Harare, Zimbabwe.

Founded in September 1981, Natpak expanded to Harare in 1994 and has grown from being a woven polypropylene manufacturer to process other packaging materials such as LDPE. It produces a variety of products for different flexible packaging sectors, mostly food packaging.

The relation between the two companies dates back to 2014 when Natpak bought a Comexi FW flexographic press. Now, it has added to this by purchasing an F2 MB – the evolution of the earlier model – to boost its productivity.

"Since 2015 we have strengthened our position in the African market, which has a tremendous potential. Our vision is to become Africa's preferred supplier," said Gironès. "We are achieving great results with sales in countries like Zimbabwe, Ivory Coast, Algeria, Morocco, South Africa, Ghana and Mauritius."

In a third recent contract win, Comexi supplied another F2 MB flexo press – as well as a Dual

Below: Natpak of Zimbabwe recently installed a Comexi F2 MB flexographic press

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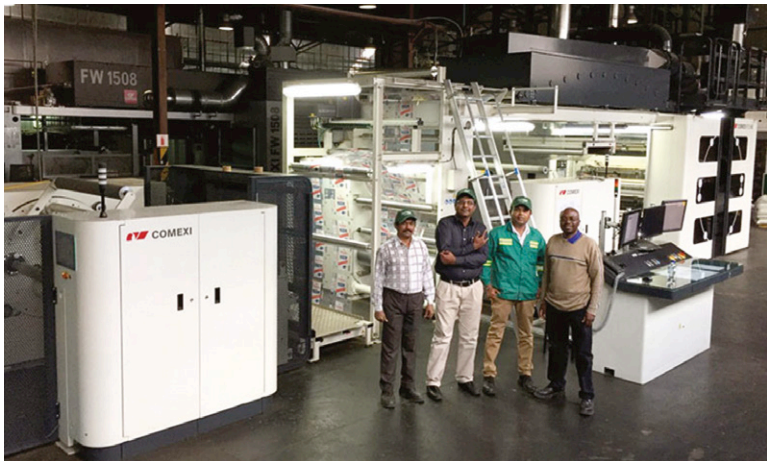

Above: Natpak of Zimbabwe recently installed a Comexi F2 MB flexographic press

laminator and S2 DT slitter – to Socipack of Ivory Coast. All three have now been installed at the company's headquarters in Abidjan.

"Ivory Coast is in a phase of rapid expansion and has possibilities to become the hub of West Africa," sid Gironès.

Socipack, a leading flexpack producer, previously installed a similar package of flexo press, laminator and slitter from Comexi back in 2016. The latest acquisition will help Socipack to increase its productivity and capabilities, to produce a wider range of products.

Abdallah Hassan, Socipack's managing director, said: "This has enhanced our productivity and brought a new range of products onto the African market as the demand growth has evolved."

The F2 MB press is designed to satisfy the printing needs of medium flexible packaging runs. It shares the group's patented FlexoEfficiency concepts of ergonomics and accessibility as well as the performance and robustness of the rest of F2 flexo press range, said Comexi.

Flexo in the Gulf

Riyadh Plastic Factory (RPF), part of Harwal Group, has installed a **Bobst** 20Six CI flexo press to extend its production capacity in flexible packaging.

Its sister company, Interplast – based in Sharjah, UAE – bought the same model of machine in 2014.

The new press is almost identical to the first one. Featuring 10 colours, a print width of 1450mm, printing speed up to 500 m/min and maximum repeat of 1200mm, it meets the customer's demands for a wide range of applications. Among the highlights of the presses is the SmartGPS off-press set-up system that not only reduces the job change overtime and amount of waste during set-up to almost zero, but also serves as a quality control instrument for printing hardware and plate mounting.

"Ever since the first Bobst 20Six was installed, it has performed to our full satisfaction, both in terms of print quality and productivity," said Mike Koroukian, executive director of the packaging materials division of Harwal Group.

Both presses are used for printing films in a variety of materials – including LDPE, BOPP and PET – in forms such as laminates, shrink sleeves and twist wraps.

Earlier, at last year's Labelexpo Europe show, Bobst launched the M8, a high speed, automated print production and finishing system for flexipack.

The new line is a multi-process, multi-web inline printing and converting machine using Bobst's Digital Flexo technology on a machine with web widths up to 1070mm and speeds up to 400 m/min. Bobst Digital Flexo features include complete digital control of the press, with camera-monitored closed loop press operations that enable fully automated pre-register and adjustment of the print pressure and register, and camera-based print quality/PDF comparisons at all speeds.

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Expansion plans: blown film dies

Refinements in blown film dies include stackable versions that avoid material degradation, designs for more effective production of barrier film, and versions that allow easy retrofitting

Main image: Brampton's Vector S air ring uses segmented air to reduce starting gauge by up to 80%

The sheer variety of film structures – and the need to produce it at speed – has meant that die designs continue to adapt to the demands of film producers.

Macro Engineering has refined the design of its Macropack co-extrusion blown film die, to create a version for the production of barrier film.

Its latest version, called Macropack-FP, has a stacked design in which each layer is fed by an extruder at a different centreline height. The main advantages of this design are:

- The ability to incorporate temperature isolation – each layer can be processed at its ideal melt temperature and the die is especially conducive to running temperature-sensitive resins;
- The residence time in the spirals is equal, which reduces the degradation of temperature-sensitive resins; and,
- It can run less than 10% nylon on the outside, and the transition time from nylon to PE is up to three times faster than competitive stackable dies, says Macro.

Macro has two previous designs of the die.

Macropack-CP has a concentric mandrel design where all the extruders are at the same centreline height. Macro says it has a low profile design – for shorter flow passages and reduced pressures – and a lower height for easier maintenance. It is able to run mostly polyolefin materials.

It also offers a conical die design called Macropack-MPC. design. Again, the extruders are at the same centreline height. This design uses fewer bolts, which makes maintenance easier. For dies with diameters over 1m, this type of die has lower residence time (and less pressure) than the stackable design of the Macropack-FP – so the operational window can be increased. This die is suitable for agricultural and geomembrane applications.

The dies were showcased at the recent NPE show in the US.

Layered performance

Also at NPE, **Alpha Marathon** highlighted a number of its blown film extrusion technologies – including its patented Layer Sequence Alpha Dual Spiral System (LSADSS) dies, which it claims offer better performance through superior mixing and melt flow.

The ADSS stackable dies provide high film quality by 'doubling' each layer. They are particularly effective in high barrier film packaging applications for food or medical films where more expensive resins may be used to achieve proper film characteristics, says the company. By combining two layers per module the film produced per layer will yield improved performance.

Because temperature isolation is provided for each module, a wider range of resin and film

structures – including those using temperature-sensitive resins – can be produced. Multi-layer films formed with an ADSS die can achieve the properties required for highly demanding applications, says Alpha.

Film line supply

Davis-Standard recently supplied three film lines – one 2.5m cast film hygiene line and two five-layer agricultural blown film stretch lines – to one of its leading existing customers, Sigma Plastics. The line included the supply of blown film dies.

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

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

Davis-Standard has been expanding its offerings in blown film dies – and to this end recently installed an in-house machining centre. The centre is home to innovative designs that deliver high outputs and reliable gauge control, says the company.

It has also expanded its operations by acquiring **Brampton Engineering** of Canada – which, among its offerings, supplies multi-layer blown film dies.

Die retrofitting

At NPE – prior to the takeover being announced – Brampton said that its SCD 4.0 die technology had been made available for retrofit on all existing lines – regardless of age, model and manufacturer.

"The market demands more layers and SCD 4.0 is the only co-extrusion die that enables producers to process each polymer in a multi-layer barrier film structure at its ideal temperature," said Gary Hughes, Brampton CEO.

Brampton says that the die has a direct path from the extruders and streamlined melt channels, to achieve "the shortest melt residence time and lowest wetted surface area in the industry".

It says that SCD 4.0 dies ensure optional film quality and minimal downtime for purging and die cleaning for two reasons:

- They minimise average residence time and eliminate dead spots where resin can move very slowly – gradually bleeding black specks of degraded resin; and,
- They ensure that each resin can be processed optimally by selecting the right SCD 4.0 technology and profiling their temperatures according to the film structure.

Retrofitting is ideal for lines that require specific process improvements, says Brampton. Results include boosting productivity, improving quality and product performance, and increasing profitability – at a fraction of a cost of a new line.

"If your existing line is in good condition – but limited to a number of layers – a viable option is to replace the die and add new extruders to match the number of layers required for greater portfolio flexibility," said the company. "The most recommended course of action is to upgrade to a seven-layer system. This will allow production of a wide range of films, from co- extruded monolayer to high-barrier films. These projects typically require an outlay of 35-50% of that of a new line – and the payback is achieved in a shorter period of time."

Below: Davis-Standard recently installed an in-house machining centre for blown film dies

Cooling assistance

While blown film dies are crucial to getting attributes like film thickness correct, some of the downstream equipment – such as cooling systems – also help to maximise product quality. Brampton also supplies these types of system. At NPE, for instance, Brampton expanded its Vector air ring product line.

The new Vector S offers an auto gauge option by using segmented air. It reduces starting gauge by up to 80% compared to conventional air rings, says the company. It also has very high resolution, as it has 180 digital control points adjacent to the lip compared to the usual 60-80 controls in conventional air rings.

Brampton engineers used aerospace engineering to create the Vector line – distributing chilled air uniformly around the bubble using a single inlet while controlling the flow to secure stable 'bubble-lock' and boost output on the blown film line.

Vector reduces starting gauge variability thanks to uniform airflow around the lip, while Vector S

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Left: Intensive Cooling systems from Addex can boost output on blown film lines

offers a more precise level of control by using segmented air, says the company. At NPE, Brampton will show a full-scale model of the Vector air ring.

Cool technology

There are many other suppliers of cooling equipment for blown film. **Addex**, which supplies auto-profile and other cooling systems for blown film lines, showcased its latest Intensive Cooling technology during NPE.

The company launched its 'Height-Adjustable' Intensive Cooling twin-stack system, which is designed to optimise performance for both high- and low-melt processes.

It offers an enclosed, two-level, stacked Intensive Cooling system with a lower element that mounts flat to the die and a second, height-adjustable element just below the air ring. The system is adaptable to changes in materials and supports fast changeovers.

The fully-enclosed Intensive Cooling Twin-Stack elements can be separated over a range of 1in to 16in, allowing the operator to change the height between the cooling elements to control the effect. For super low-melt materials, a short distance between the elements is ideal. For high-melt strength operation, the cooling zone can be extended to its maximum by the push of a button. The Height-Adjustable Twin-Stack system can be fine-tuned across a broad range of products without time-consuming equipment changes and while the line is running.

The original fixed-height Twin-Stack system can increase output by 15-20% for very low-melt strength materials, and by 40-50% for high-melt strength materials. The Height-Adjustable version of the Twin-Stack is expected to produce even greater increases.

Addex also highlighted its dual-flow air rings, available for retrofit since 2016. These replace the standard low-velocity lower lip with a single Intensive Cooling element, delivering 10-15% greater output and better bubble stability – though some processors report up to 40% gains in output rate versus the competition, it says.

PolyExpert, a Canadian producer of PE film, has bought several single-element Intensive Cooling air ring systems and reported improved output. The air rings are installed with Addex's auto-profile system.

"Intensive Cooling products will continue to evolve, fuelled by customer feedback and the learning curve, as more systems are put into operation on a variety of processes and materials in production," said Bob Cree, president of Addex.

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Plastic pouches offer environmental benefit because of their light weight, but they must be made easily recyclable – such as by using mono-material designs – if they are to become truly sustainable

Standing up to be counted

Delegates at the recent *Plastic Pouches* conference in Vienna, organised by **Applied Market Information**, heard a lot about sustainability.

Graham Houlder, managing director of **Sloop Consulting** – who coordinates the **Ceflex** initiative to boost recycling in flexible packaging – told delegates that it was vital for flexible packaging to be part of the 'circular economy' – and that plastic pouches should be included within that.

"Some plastic pouches are already being recycled today," he said.

He cited mono-material PE and PP pouches that were being positively sorted in Germany and several other markets. If there is no PE or PP stream, they are sorted with mixed polyolefin.

Multi-material pouches that use aluminium foil can also be sorted, using eddy current separation followed by pyrolysis of the aluminium and using the energy from the plastic.

"We estimate the European market at 23 billion pouches," he said. "Dog and cat food accounts for 49%, food for 38% and beverage for 12%."

Some are already made from mono-materials, so are prime candidates for recycling. Some, such as pouches for dry pet food, will need to be redesigned to mono-materials.

Proper design

Achim Grefenstein, senior vice president of group R&D at **Constantia Flexibles**, explained how his company is making pouch laminates more sustainable. At two locations it is using thinner packaging (with equivalent performance) and avoiding volatile substances. He also pointed out the importance of packaging redesign.

"Thirty percent of plastic packaging needs fundamental redesign before it can be reused or recycled," he said.

Some designs – such as those for packaging nuts – rely on multi-layer barrier packaging in order to prevent oxidation and product deterioration.

"PET and PE are incompatible, and thus not easily recyclable," he said.

A similar problem was seen in coffee packaging – which also contains aluminium – though he said it could be recycled in the metal stream if the aluminium content is high enough. Again, the use of both PE and PET makes recycling more difficult.

A simpler solution is seen with chocolate or crisp packaging, which comprises BOPP and while PE.

"BOPP and PE are both polyolefins and thus compatible – though pure PP or pure PE would be better," he said.

Main image: Petfood is the most common application of plastic pouches

Right: Like many other manufacturers, Constantia Flexibles is working to make pouch laminates more sustainable

Constantia offers a mono-material PE laminate that uses oriented PE as an outer, printable layer and typical PE sealing films for the inner layer. An alternative is to use a thin barrier coating – rather than a barrier layer such as EVOH – on a PE base layer.

"The combination of oriented PE, new barrier technologies and lightweight sealant layers can improve the environmental footprint of recyclable laminate structures," he said.

Repeat performance

A similar approach was presented by Lila Shpakovsky, CTO of Israel's **Tadbik Flexible Packaging**. She told delegates about her company's Repeat technology.

It is a pouch made from multiple layers of PE film – including barrier film – laminated together. It is filled and sealed using standard packaging lines and aimed at applications such as vegetables, nuts, dried fruit and pet food.

"Recyclability is part of packaging integrity," she said. "More easily recyclable flexible packaging will be a key driver.

All-PP pouches

Two companies presented details of all-polypropylene (PP) pouches, which would make recycling easier.

Marco Izzi, application development and technical service engineer at **Basell Polyolefine** in Italy, said the company offered a 'non phthalate' grade of PP for retortable pouches. This has been made possible by the company's polymerisation technology, whose fifth generation of catalysts are phthalate free.

Similarly, **Borealis** offers a number of PP grades for use in mono-material pouches.

Stefan Ortner, application technology manager for flexible packaging, told delegates that one aluminium can weighs about the same as eight stand-up pouches (SUPs) – making SUPs a sustainable option in terms of weight reduction.

However, a hard-to-recycle SUP is harder to justify, so Borealis is one company that is trying to address this by working to convert multi-material SUPs to mono-material equivalents.

He said that PP in its many forms has a broad property window – in aspects such as thermal properties, optics and mechanics.

■ Next year's Plastic Pouches conference runs on 2-3 April 2019 in Vienna, Austria. For more details, contact Emily Renshaw on +44 117 3148111 (**emily.renshaw@ami.international**).

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Barrier benefits lift pouch performance

A key attribute of pouches is often its barrier properties – allowing them to replace aluminium cans, for instance. So, the better the barrier, the more effective the pouch.

Toppan Printing says that its GL Film is a transparent barrier film has a PET base with a vapour-deposited AlOx or SiOx layer, plus a top coating layer. This is then printed, before a heat sealable film layer is added. It is available for retort and non-retort applications. It recently developed GL-LP, a mono-material barrier that combines a coated BOPP layer with a CPP sealant film and adhesive.

Similarly, **Michelman** presented details of its oxygen barrier coating that helps to make thinner pouches. It can be applied at low coat weight to retain or improve on the shelf life of packaged food. The technology has been tested on peanuts, mustard and crisps. In each case, taste testing showed no difference with packaging made from conventional laminates.

"It can reduce overall packaging cost by up to 25%," said Robin Cooper, marketing strategic program manager.

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AMI's third European Polymer Testing & Analysis conference takes place in Berlin in Germany in September. We take a look at the programme and speaker line-up

Putting polymers to the test

Main image: Testing is an essential element in plastics development and processing. AMI's Polymer Testing & Analysis conference in Berlin later this year highlights the latest developments

Polymer testing and analysis underpins all stages of successful plastics processing. As the market demands new plastics products that are smaller, smarter, stronger and safer, so the challenges for materials suppliers, designers and specifiers increase. Now in its third annual edition, AMI's *Polymer Testing & Analysis* conference has established itself as one of the international meeting places for scientists, laboratory staff, researchers and R&D professionals involved in development, testing and analysis of new polymer materials, formulations and products.

The 2018 European edition of the Polymer Testing & Analysis conference provides an opportunity to discover and discuss the latest innovations in characterisation and analysis techniques specifically for plastics materials and products. This year's event moves to the German capital Berlin and takes place on 11-12 September 2018. It will bring together an international line-up of expert speakers to cover the very latest testing and analysis techniques for assessment of polymer stability, mechanical properties, flow characteristics, emissions, surface quality, and colour control. Other topics on the agenda include quality control methods, non-destructive testing technologies, and failure analysis. This article looks at what is in store for attendees.

This year's conference will be opened by **Dr Andreas Balster**, Head of Proficiency Testing at **Kunststoff-Institut Lüdenscheid** in Germany. He will detail five reasons why you should participate in a laboratory benchmarking programme. Next up is **Holger Lieder**, Sales Director at **Sikora** in Germany, who will detail a novel optical inspection and analysis system that combines the advantages of a light table with automatic material control. The third paper in the session will focus on extending the limits for elemental analysis of polymers and plastics using XRF and will be presented by **Dirk Wissmann**, Senior Product Manager at **Spectro Analytical Instruments** in Germany.

Evaluating emissions

The second session explores polymer emissions and will be opened by **Dr Nuria García Batista**, a Researcher at the **AIMPLAS** plastic technology

centre in Spain, who will present a paper covering the evaluation of plastics and air quality in the passenger compartment of automotive vehicles. Then **Christoph Wiedmer**, Research Associate at the **Fraunhofer Institute for Process Engineering and Packaging IVV** in Germany, will discuss the challenge of identifying and characterising odour-active substances in polymer materials.

The conference will then move on to discuss testing procedures for assessing the processability of plastics. **Johannes Lorenz**, Sales Manager OEM and Key Account at **Dynisco Europe** in Germany, will start the session by exploring accurate determination of the melt flow rate of plastic materials in an extrusion system using online rheometry**.** Then **Nico Laufer**, CEO of the **Institute for Polymer Technologies** in Germany, will detail the effects of volume fraction, size and geometry of different fillers on interparticle interactions in PP melts.

Polymer ageing

The final session of the first day of the conference will cover polymer ageing and will be kicked off by **Dr Emmanuelle Brendlé**, Senior Scientific Project Manager at **Intertek (Schweiz)** in Switzerland, who will provide a comprehensive analytical view on aged polymers. Then **Roland Valk**, Consultant Materials at **Kiwa Technology** in The Netherlands, will detail an evaluation of the long-term strength of polyethylene using the strain hardening test. And the formal part of the day will end with a talk by **Dr Jiří Sadílek**, Senior Researcher at **Unipetrol RPA – Polymer Institute Brno** in the Czech Republic, who will discuss the content of ethylene in PP-RC materials with a focus on properties versus the time to rupture.

Packaging issues

Day two of *Polymer Testing & Analysis 2018* opens with a presentation from **David Eaves**, Chemical Analysis & Regulatory Consultant at **ITS Testing Services** in the UK, who will look at testing for the presence of non-intentionally added substances (NIAS) in plastics materials and articles intended to contact food. He will be followed by **Martina Lindner**, Researcher in Materials Development at **Fraunhofer Institute for Process Engineering and Packaging IVV** in Germany, who will explore techniques for thickness determination of evaporated aluminium coatings on polymer web materials. Then **Elena Domínguez Solera**, a Researcher in the Sustainability and Industrial Recovery Department at **AIMPLAS** in Spain, will present a study of the degree and disintegration rate of biodegradable polymers in different environmental conditions.

Exploring failure

The second session of the day will examine new developments in failure testing. The first presentation will analyse systematic failure of glass fibre reinforced isolation sleeves and will be given by **Sina van de Kamp**, Project Engineer, Microscopy at the **Institut Für Kunststoffverarbeitung (IKV)** in Germany. Next, **Dr Michael Soll**, EU Business Development Manager at **Frontier Laboratories** in Germany, will speak about the use of pyrolysis GC-MS for identification and damage analysis of rubber samples.

The final session of the conference will address the latest polymer testing options for demanding applications. **Prof Alois Schlarb**, Chair of Composite Engineering (CCe) at the **Technische Universität Kaiserslautern (TUK)** in Germany, will discuss the efficient analysis and determination of environmental stress cracking of polymers in different environments. And **Dr Marysilvia Ferreira da Costa**, Professor at **Coppe / Universidade Federal do Rio de Janeiro** in Brazil, will bring the conference to a close with an examination of stress-relaxation behaviour of poly(vinilidene fluoride).

Expert speakers at Polymer Testing & Analysis Europe include – top to bottom: Dr Andreas Balster from Kunststoff-Institut Lüdenscheid, Dirk Wissmann from Spectro Analytical Instruments, Christoph Wiedmer from the Fraunhofer Institute for Process Engineering and Packaging IVV, and AIMPLAS researchers Dr Nuria García Batista and Elena Domínguez Solera

About Polymer Testing & Analysis Europe 2018

The third European *Polymer Testing & Analysis* conference takes place on 11-12 September 2018 in Berlin, Germany, presenting an ideal opportunity to learn about the latest polymer testing equipment and techniques. Find out from experts how these innovations are being applied to further develop polymer materials and to ensure compliance with complex regulatory demands. In addition to the formal conference sessions, the event provides extensive networking opportunities throughout the informal breaks, including access to the table top exhibition area and complementary cocktail reception at the end of the first day. To find out more about attending the conference, taking a table-top exhibition space, or becoming a conference sponsor, visit the **conference website** or contact Conference Organiser Alexandra Fish. Tel: +44 (0)117 314 8111; email: **alexandra.fish@ami.international**

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ADDITIVES

Foaming agents for extruders

Momentum International, a German additives producer, has developed two new chemical foaming – Microcell 547 and 548 – aimed at applications in film and sheet.

"We focused on density reduction at low dosing levels, and surfaces without any defects such as streaks," said the company's Klaus Gerhardt. "We were able to obtain these properties with our Microcell 547 at dosing levels of 0.8-1.0% in HDPE. Microcell 547 enables the processor to extrude foam sheet and film with glossy surfaces."

Microcell 547 uses a microporous powder to create a large number of nucleation sites. This gave cell sizes of 50-100 microns in size.

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DECORATIVE FILM

Portfolio of car wrapping films stretches even further

Avery Dennison Graphics Solutions has extended its range of premium car wrap films – bringing the total colour count across its Supreme Wrapping and Conform Chrome ranges to more than 100.

The designs were seen at the recent Fespa show – including four new gloss metallic colours for Supreme Wrapping film and three for the Conform Chrome range.

Both ranges come with the company's Easy Apply RS adhesive technology for faster and higher-quality installation results.

At the same time, the company has launched three new series in its Automotive Window Film (AWF) range – which enable creative vehicle restyling, safety enhancements and the rejection of both heat and glare.

Oliver Guenther, senior director for marketing and channel strategy for Avery Dennison, said the new window film portfolios are attractive to installers because they allow material properties to be matched precisely to user needs.

"There are 17 distinct materials in the window film portfolios," he said. "It means that whatever aesthetics and level of light transmission a customer wants – from 6% to optically clear – one of these materials will be a good choice."

Window film options include high-performance, infrared and non-reflective films. AWF non-reflective films use nanotechnology to reject heat. Light transmission ranges from 5-50%, with 99% UV block and up to 94% glare reduction. They do not contain a metal layer, so create no interference with electronics. The AWF infrared film rejects heat radiation while allowing visible light and blocking 99% of UV light.

› **www.averydennison.com**

BARRIER FILM

New BOPP films in development

Innovia Films is developing a range of Biaxially Oriented Polypropylene (BOPP) products with optimum barrier performance. The first to market will be high barrier metallised films, followed by AlOx clear high barrier films and co-extruded oxygen barrier films, said the company.

Stephen Langstaff, global business manager for packaging, said: "We have been working hard to develop new films that will extend the shelf life of a range of products, thereby reducing food waste. We will be developing options that allow pack simplification, by removing or replacing layers within lamination materials that restrict recycling."

Innovia will also develop mono layer materials for different applications, which can be recycled more easily.

› **www.innoviafilms.com**

BLOWN FILM

Nine-layer line starts up in Colombia

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

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

Plastilene has used W&H lines since 2005, and now has 19 of them – including a Primaflex

flexographic printing press and several extrusion and converting systems. The new line has been commissioned at its Novalene subsidiary, situated near Bogotá in Colombia. From there, it supplies markets with films for high-tech barrier structures and technical films.

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

The Varex II has been combined with a Miraflex AM8 flexographic printing press and a Corematic non-stop roll handling system for the printing press rewind.

The entire installation has been adapted to Novalene's needs and is specialised for the manufacture and printing of films for the food industry.

Plastilene has production facilities in Colombia, Guatemala, and Ecuador, employs more than 800 people and has revenues of around US$150m.

› **www.wuh-group.com**

STATIC CONTROL

Smart cleaning at Plast

Meech International launched Hyperion SmartControl – a new remote monitoring and performance adjusting controller for its Hyperion range of anti-static bars – at the recent Plast show.

The company also gave an exhibition debut to IonWash – which allows fast, consistent removal of contamination from 3D plastic components – and its 924EX, which is designed to eliminate static electric charges for short range applications in hazardous environments.

Hyperion SmartControl offers ease of communication between connected devices through LAN or WAN networks, allowing for continuous observation and alteration to static bar performance. The control system, designed for use with Hyperion static control equipment, allows for quick remote adjustment through a single interface, reducing the need for onsite monitoring.

"Using the SmartControl, operators of our static control equipment can access their static bar performance information on a remote device and adjust the operating settings to achieve maximum productivity and quality output," said Adam Battrick, sales director at Meech.

The IonWash cleaning system incorporates powerful ionisation, as well as blow and vacuum airflows to achieve effective contamination removal from complicated 3D components across a variety of sectors, including automotive, aerospace and electronics. The 924EX, meanwhile, is robust and built for the most arduous of settings, including that of gravure printing, film extrusion and coating applications.

› **www.meech.com**

RECYCLING

Consent installs MRS line

Dubai-based Consent Plastic, a producer of strapping tapes, has installed a new line based around a Gneuss MRS (Multi Rotation System) extruder for manufacturing PET strapping tapes from 100% non-dried post-consumer bottle, preform and trapping flake.

The company said the investment was spurred by its desire to avoid time and energy-intensive drying and crystallisation of PET flake. The new line reduces energy use by 25%. It also produces better quality tape, said the company.

› **www.gneuss.de**

Are you a plastics industry expert looking to take your career in an exciting new direction?

AMI is seeking an expert in polymer technology to research and create compelling conference programmes for its expanding portfolio of highly respected events for the international plastics industry.

The Conference Producer role involves identifying key market trends, crafting focused agendas and securing high calibre speakers to attract large and influential global audiences. Candidates should have a broad knowledge of plastics materials and processes, have strong interpersonal skills, be highly organised with the ability to manage multiple projects and a keen, intellectually curious mind.

The successful candidate will join our large and experienced conference team based in Bristol, UK. They will receive training in conference production and have access to AMI's extensive industry databases and receive support and guidance from our knowledgeable team of market consultants and magazine editors. The full-time role will involve some overseas travel.

Founded in 1986, AMI is a leading provider of information, market intelligence, and events for the global plastics industry, with offices in the UK and USA. Our teams of consultants, researchers, writers, and event organisers include many of the most respected experts in their fields.

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To apply please email your CV and covering note telling us why this role is perfect for you to Charmaine Russell, Head of Conference Production charmaine.russell@ami.international

AMI

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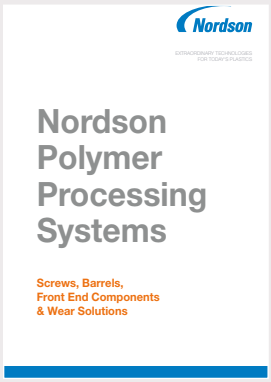
NORDSON: SCREWS & BARRELS



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

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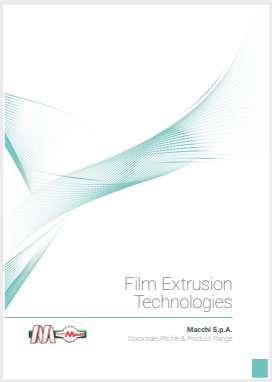
MACCHI: FILM EXTRUSION



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

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COLINES: BARRIER FILMS

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

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W&H: VAREX II FILM SYSTEMS

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

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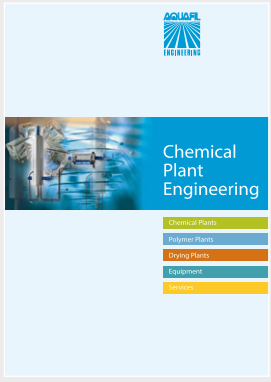
AQUAFIL: PLANT ENGINEERING



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

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DAVIS-STANDARD: EXTRUDERS

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

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

Learn more about AMI's upcoming conferences

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

SINGLE-SERVE CAPSULES USA

This brand new North American conference takes place in Chicago on 19-20 of June 2018 and brings together a line-up of industry-elite speakers to deliver expert insight into the fast growing market for single-serve capsules.

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HEAVY DUTY SACKS 2018

The 2nd edition of AMI's international Heavy Duty Sacks conference will take place on 19-20 June 2018 in Cologne, Germany. Find out how advances in film technology and materials are helping plastic industrial sacks displace multi-wall paper sacks in key markets.

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BIAX FILMS 2018

AMI is launching Biax Film, the only global conference dedicated exclusively to the bi-oriented film industry. This unique forum for the entire BOPP, BOPET, BOPA and BOPE supply chain takes place on 19-21 June 2018 in Vienna, Austria.

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MEDICAL FLUID BAGS 2018

AMI's first European Medical Fluid Bags conference takes place in Cologne in Germany on 21-22 June 2018. This high level event looks at the newest innovations in design and production of polymer bags for fluid containment.

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POLYMER TESTING & ANALYSIS US 2018

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

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AGRICULTURAL FILM 2018

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

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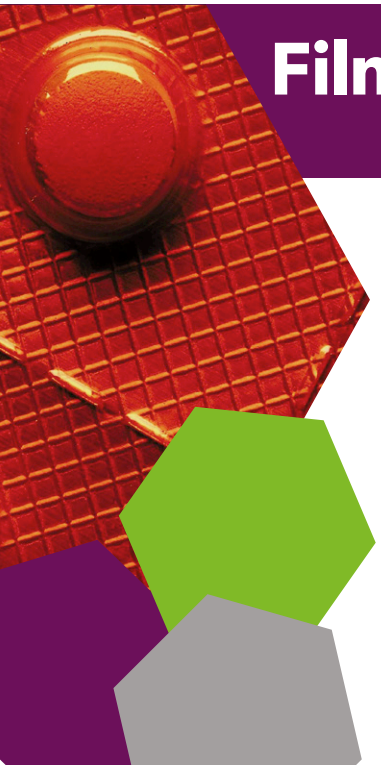
To see our full line-up of more than 50 plastics industry events over the next 12 months, please visit www.ami.international/events

RKW

Head office:	Frankenthal, Germany
CEO:	Harald Biederbick
Founded:	1957
Ownership:	Private
Employees:	Around 3,000
Sales (2017):	€902m (around US$1bn)
Profile:	RKW, founded in 1957 as a manufacturer of plastic film, has since grown – through many acquisitions – into a worldwide organisation that processes more than 375,000 tonnes of plastics per year. It is family-owned, and a market leader in a number of areas, including hygiene and agricultural films.
Product lines:	RKW supplies film for a number of areas, including: hygiene; agriculture; the beverage industry; and packaging for powdery goods. In hygiene and medical, it produces products such as backsheets – both breathable and non-breathable – and perforated film for topsheets. Its brand names include its Aptra breathable films – which can be applied to applications such as protective garments and industrial films – RKW Provent (packaging for powdery goods) and its FPO (filled polyolefin film), used in applications such as butter wrapping.
Factory locations:	As an international manufacturer, RKW has a total of 20 manufacturing sites. In addition to its headquarters in Frankenthal, it has 19 other production sites dotted around the globe. There are seven in Germany (including Micheldorf, where it recently expanded capacity in agricultural films by nearly 25%), three in France, two each in Belgium and the USA, plus various others in countries including Finland, Egypt, Vietnam and – its newest plant – China.

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



Film and Sheet Extrusion FORTHCOMING FEATURES

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

July/August 2018
Converting/Bag making equipment
Stretch & shrink film
Masterbatch ● Bioplastics
Show reviews: Plast; CWE/PRWE

September 2018
Biaxially oriented film
Downstream equipment
PVC plasticisers
Lab extruders

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

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

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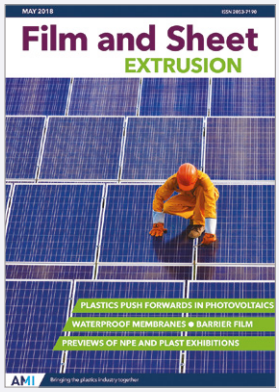

Film and Sheet
May 2018
The May issue of Film and Sheet Extrusion looks at the role of plastics in photovoltaics. It also covers new developments in barrier materials, waterproof membranes and materials handling.

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Film and Sheet
April 2018
The April edition of Film & Sheet Extrusion looks at the latest innovations in agricultural film. Also in this issue is an article from Cloeren on how nano-layering can enhance the properties of film and sheet structures.

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Compounding World
May 2018
The May edition of Compounding World looks at how the EU's Construction Products Regulation is placing new demands on the cable industry. Plus Industry 4.0 technology developments and a preview of NPE 2018's compounding highlights.

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

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Pipe and Profile
June 2018
The June 2018 edition of Pipe and Profile Extrusion takes a look at what's new in infrastructure pipe and reports industry news from NPE 2018. Plus articles on pipe joining and corrugation technology.

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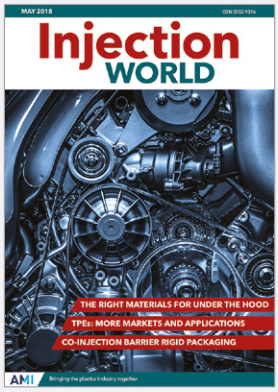

Injection World
May 2018
The May edition of Injection World looks at plastics for demanding automotive under-hood applications. It also explores the development of co-injection barrier packaging and reviews the latest innovations in TPEs and process energy management.

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

GLOBAL EXHIBITION GUIDE

2018	**11-14 June**	Argenplas, Buenos Aires, Argentina	www.argenplas.com.ar/en
	19-20 June	Plastics Design & Moulding, Telford, UK	www.pdmevent.com
	20-23 June	Interplas Thailand, Bangkok	www.interplasthailand.com
	27-28 June	Compounding World Expo, Essen, Germany	www.compoundingworldexpo.com
	27-28 June	Plastics Recycling World Expo, Essen, Germany	plasticsrecyclingworldexpo.com/eu
	2-4 August	Plasti & Pack, Lahore, Pakistan	www.plastipacpakistan.com
	15-19 August	Taipei Plas, Tapei, Taiwan	www.taipeiplas.com.tw
	19-22 September	Indoplast, Jakarta, Indonesia	www.indoprintpackplas.com
	24-28 September	ColombiaPlast, Bogota, Colombia	www.colombiaplast.org
	28 September-1 October	Koplas, Seoul, South Korea	www.koplas.com
	14-17 October	Pack Expo, Chicago, USA	www.packexpointernational.com
	16-20 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
	7-9 November	Expo Plasticos, Guadalajara, Mexico	www.expoplasticos.com.mx
	5-7 December	Plastic Japan, Chiba, Japan	www.plas.jp/en
	5-8 December	Plast Eurasia, Istanbul, Turkey	www.plasteurasia.com/en
2019	**5-8 January**	ArabPlast, Dubai	www.arabplast.info
	12-15 March	Pro-Pack Africa, Johannesburg, South Africa	www.propakafrica.co.za
	19-21 March	EU Coatings Show, Nuremberg, Germany	www.european-coatings-show.com
	25-29 March	Plástico Brasil, São Paulo, Brazil	www.plasticobrasil.com.br
	8-12 April	Feiplastic, Sao Paulo, Brazil	www.feiplastic.com.br
	8-9 May	Compounding World Expo, Cleveland, USA	www.compoundingworldexpo.com

AMI CONFERENCES

19-20 June 2018	Heavy Duty Sacks, Cologne, Germany
19-21 June 2018	Biax Film, Vienna, Austria
21-22 June 2018	Medical Fluid Bags, Cologne, Germany
5-6 September 2018	Single Serve Capsules, Vienna, Austria
17-19 September 2018	Agricultural Film, Madrid, Spain
25-26 September 2018	Thin Wall Packaging Asia, Bangkok, Thailand
4-5 October 2018	Medical Fluid Bags, Woburn, USA
9-10 October 2018	Smart Packaging, Hamburg, Germany

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

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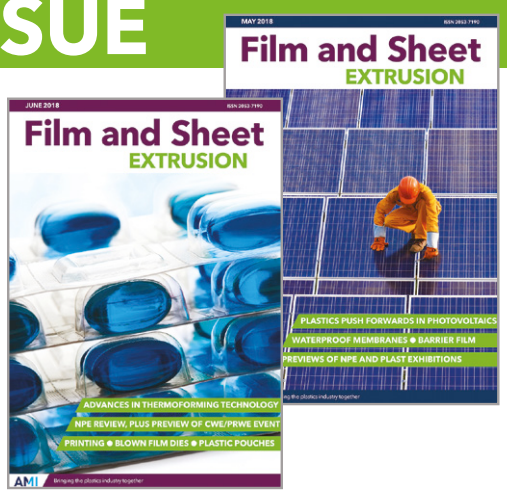

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