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Amcor posts 2% drop in sales in 2020, but 4% increase in profits

Packaging major Amcor has reported a drop of less than 2% in full-year sales.

The company posted sales of more than US$12 billion to the end of June 2020 – a dip of 1.8% compared to the previous year. Profitability (EBIT) for the period was close to US$1.5bn, an increase of around 4%.

Overall volumes were marginally up on the previous year, said the company.

While sales in flexible packaging fell by just over 3% (to around US$9.8bn) but profitability rose by nearly 8%. In rigid packaging, sales were down 6% (to around US$2.7bn), with profitability falling by a similar amount.

Volumes were higher in the North America, Europe and Asia Pacific flexibles businesses. There was particularly strong growth in China and India towards the end of the fourth quarter, said Amcor.

The company has also spent the past year integrating Bemis, which it bought in June 2019.

"Benefits from the transformational acquisition of Bemis were increasingly evident through the year," said Ron Delia, CEO of Amcor.

› **www.amcor.com**

Biome books largest order for its compostable material

UK-based Biome Technologies has received an order worth US$550,000 – from an existing US-based client – to supply its heat-stable, compostable bioplastic for coffee pods.

The company says it is the largest single order to date for the material, which was first commercialised in 2019. Deliveries under this order are due to be completed in the next two months.

This material takes less than three months to compost in industrial composting environments and is designed to provide the structure for coffee pods, whilst preventing deformation when exposed to hot water. It was developed in Biome's R&D facility in the UK and is now being manufactured in the USA in commercial quantities.

Biome has received its largest single order for its compostable material for coffee pods

"We believe there is significant commercial potential for this material, as brands in the hot beverage sector move to bio-based and compostable solutions to transform the sustainability of their products," said Paul Mines, CEO of Biome Technologies.

› **www.biomebioplastics.com**

Expanding XPS plant in Serbia

Austrian thermal insulation specialist Austrotherm is raising production of expanded polystyrene (XPS) in Serbia, at its plant in Nis.

The investment of €3.5 million (US$4m) for a new production line will create 15 jobs.

"These panels make a significant contribution to reducing energy costs and CO_2 emissions in buildings and energy costs," said Klaus Haberfellner, managing director of Austrotherm.

› **www.austrotherm.at**

Huhtamaki shows 'good resilience' to Covid-19

Finnish packaging giant Huhtamaki says its results showed "good resilience" in the face of the Coronavirus pandemic in the first half of this year.

The company says that sales decreased by 2% to €1,642 million (US$1,916m) for the period. At the same time, profitability (adjusted EBIT) fell 2% to around €144m (US$167m).

Its food service business in Europe, Asia and Oceania (EAO) suffered worst – with sales down 18% to €385m (US$448m) for the period. Sales in North America grew 4% to €582m (US$678m), while flexible packaging sales rose 7% to €534m (US$621m).

In terms of profits (adjusted EBIT), food service EAO fell 44% and flexible packaging fell by 7%. However, profits in North America grew by 29% for the period.

Staff levels have increased by 4% across the company in the period.

› **www.huhtamaki.com**

Simona revenues fall in first half as North American sales slump

German plastics extruder Simona – whose products include plastic pipe and sheet – saw revenue dip by more than 12% in the first half of the year.

The company posted sales of just under €200 million (US$231m). The company ascribed this to a poor second quarter, a decline in its US business and a fall in demand from the aerospace industry.

"The effects of the coronavirus pandemic were clearly visible in the second quarter," said the company.

Year-on-year sales fell by 21% in Q2, compared to a dip of just 3% in Q1. Profitability (EBIT) for the first half of the year fell by nearly 20%, to below €15m (US$17m).

"EBIT rose markedly in Europe, whereas the USA saw a substantial decline in this key financial indicator," said the company. "The EBIT margin stood at 7.3%, compared to 8.0% for the same period a year ago."

Schönberg: "Against the backdrop of the global crisis, we are very satisfied with EBIT in the first half of the year"

While sales in Europe declined by nearly 8%, the fall in the Americas was just over 20%.

"Against the backdrop of this historic global crisis, we are very satisfied with EBIT achieved in the first half of the year," said Matthias Schönberg, CEO of Simona. "We are consistently pursuing our strategic goals of greater application and process orientation, which is illustrated by the acquisition of Stadpipe."

On 1 July, Simona acquired a 75% stake in Stadpipe, a Norwegian manufacturer of plastic pipe systems for fish farms. In future, the company says it will be the only supplier to offer pipes, fittings and sheet to the aqua-culture market.

Schönberg said it was too early to make a reliable forecast for the year as a whole. "Too much depends on the further course of the pandemic.," he said.

However, he said that the company will not achieve its original revenue target of €430-440m (US$498-510m).

› **www.simona.de**

Pactiv aims for listing on Nasdaq

Pactiv Evergreen, a US manufacturer of fresh food and beverage packaging, is looking to raise up to US$100 million in an initial public offering (IPO) – and a listing on the Nasdaq.

However, investment bank Renaissance Capital believes the move could raise up to US$750m.

Pactiv Evergreen – currently known as Reynolds Group Holdings – and booked US$6.8 billion in revenue for the 12 months ending 30 June 2020.

› **www.reynolds-groupholdings.com**

RKW starts five-layer line in Finland with more regranulate

RKW has begun production of lawn and garden films on a five-layer line in Pori, Finland.

The line is running new formulations that use a higher proportion of regranulate – including post-consumer recyclate (PCR).

"Our customers are delighted with the quality, feel and appearance of the products," said Pekka Saariluoma, director of the site.

Lawn and garden films need high printability, opacity and puncture resistance, among other properties, he said.

RKW's new line in Finland uses more regranulate than before

"We aim to increase the share of recycled PCR material while not sacrificing on materials qualities," he added.

RKW plans to install a similar line at its site in Ville le Marclet, France -- where it produces films for food and beverage packaging – in the near future.

› **www.rkw-group.com**

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Anchor grows by acquisition

US-based thermoformer Anchor Packaging has grown in size by acquiring Panoramic.

Anchor, headquartered in St Louis, Missouri, provides a range of rigid packaging products, as well as clingfilm. Panoramic, based in Janesville, Wisconsin, provides a stock line of rigid packaging for the bakery, deli, confectionery, and produce markets.

"This acquisition is strategically important to us for two reasons," said Jeff Wolff, president and CEO of Anchor Packaging. "It will broaden our offering to attract bakery, produce, deli, and confectionery customers. Also, it expands our capabilities and speed to market to support the growing needs of our customers."

P&M Corporate Finance advised Panoramic in its sale to Anchor.

› **www.anchorpackaging.com**
› **www.pmcf.com**

German plastic machine orders fall in H1 2020

The German plastics machinery sector "nose-dived" in the first half of this year, with a 20% fall in orders compared to the same period in 2019.

VDMA, the trade organisation that represents German machinery manufacturers, said that this decline in orders is a continuation of poor results for 2019 – when exports declined by nearly 7%.

"The pandemic was the stab in the back for customer industries that had already been performing badly," said Thorsten Kühmann, managing director of VDMA. "However, we also notice that many machines are being supplied – particularly to the medical engineering and packaging sectors."

Exports for the first five months of this year were down by 19% compared to the same period in 2019, said VDMA. Sales to China and the US both fell by 3% due to the Coronavirus pandemic.

Above: Kuehmann: "Pandemic was a stab in the back for industries that had already been performing badly"

However, while the decline in exports to the US is "only the beginning", VDMA said there were positive signs for future exports to China.

Exports to several European markets were also affected, including Italy (down 31%), France (down 42%) and Spain (down 48%). While there was also a 73% reduction in sales to India, exports to Russia (up 28%) and Turkey (up 102%) both improved.

"The majority of manufacturers expect a turnover decline of up to 30% in 2020," said VDMA.

Most machinery manufacturers expect to wait until 2022 to see turnover volumes return to 2019 levels – although a few expect it to happen next year.

"For the second half of 2020, many expect incoming orders from Western Europe and China to recover, which indicates the first signs of a turnaround," said VDMA.

The organisation has also released full-year results for 2019 – which show 1% fall in sales and a 7% decline in exports.

Sales of core machinery slipped to €7.8 billion (US$9bn) – the first fall in 11 years – but more ominously, orders fell by 14% (fuelled mainly by a 24% decline in orders from the European Union).

› **http://kug.vdma.org**

US machinery market uptick in Q2

Primary plastics machinery shipments in North America increased by 4% from the previous quarter to reach $263.4m, reported the Plastics Industry Association's Committee on Equipment Statistics.

The value of shipments of single- and twin-screw extruders fell 35.8% and 30.1%, respectively, in the same period. For comparison, shipments of injection moulding machinery fell by 11.4% from the first quarter.Plastics machinery exports in the second quarter totalled $289m, a 21.0% drop from the previous quarter. Imports rose by 15.0% to $649.5m.

Perc Pineda, Chief Economist at the association, said: "Although primary plastics machinery shipments are still lower than the previous quarters, the second quarter uptick is consistent with gradual improvement in the US economy."

The statistics committee's quarterly survey of plastics machinery suppliers regarding market conditions found 40.0% of respondents expect conditions to either improve or hold steady in the third quarter versus 18.5% who felt similarly in the first quarter. As for the next 12 months, 24.0% of respondents expect market conditions to be steady or better, slightly above the 22.6% who felt similarly in the previous quarterly survey.

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This year's events in Europe and the USA have been postponed until 2021

AMI postpones EU and North American plastics expos

AMI has announced that its plastics industry exhibitions – which were scheduled to take place in Germany in October and in the USA in November this year – have been postponed until June and November next year.

Ongoing uncertainty created by Coronavirus pandemic led to the decision to delay the Compounding World, Plastics Recycling World, Plastics Extrusion World and Polymer Testing World Expos according to AMI, which publishes *Film & Sheet Extrusion*.

The four focused exhibitions will now be held at Messe Essen in Germany on 1-2 June 2021 and at the Huntington Convention Center in Cleveland, Ohio on 3-4 November 2021.

Rita Andrews, head of exhibitions at AMI, said: "We have been reviewing the fast-changing situations in Europe and America daily, and have been consulting with exhibitors, the venues, and local authorities.

Our primary concerns are for the health and safety of all attendees at our events, and delivering the very best audience for our exhibitors. With these factors in mind, we have taken the decision to postpone both expos to next year."

AMI announced the decisions to reschedule the events in early August of this year.

Andy Beevers, events director at the company, said: "We felt it was important to make and announce these decisions now, in order to end the current uncertainty and to allow exhibitors, speakers and attendees to plan effectively for the new dates. We have had tremendous support and understanding from the industry during this process and are now all looking to forward to returning to Essen and Cleveland with successful shows next year."

Admission to the four expos and their five conference theatres will continue to be free of charge. Registration for the Essen event will re-open later this year, while registration for Cleveland will restart next year. Visitors who have already registered for the 2020 events will simply be able to renew their free tickets for the 2021 exhibitions.

Any companies interested in exhibiting at the Essen or Cleveland events should contact AMI's expo team (**exhibition_sales@ami.international**).

› **www.ami.international/exhibitions**

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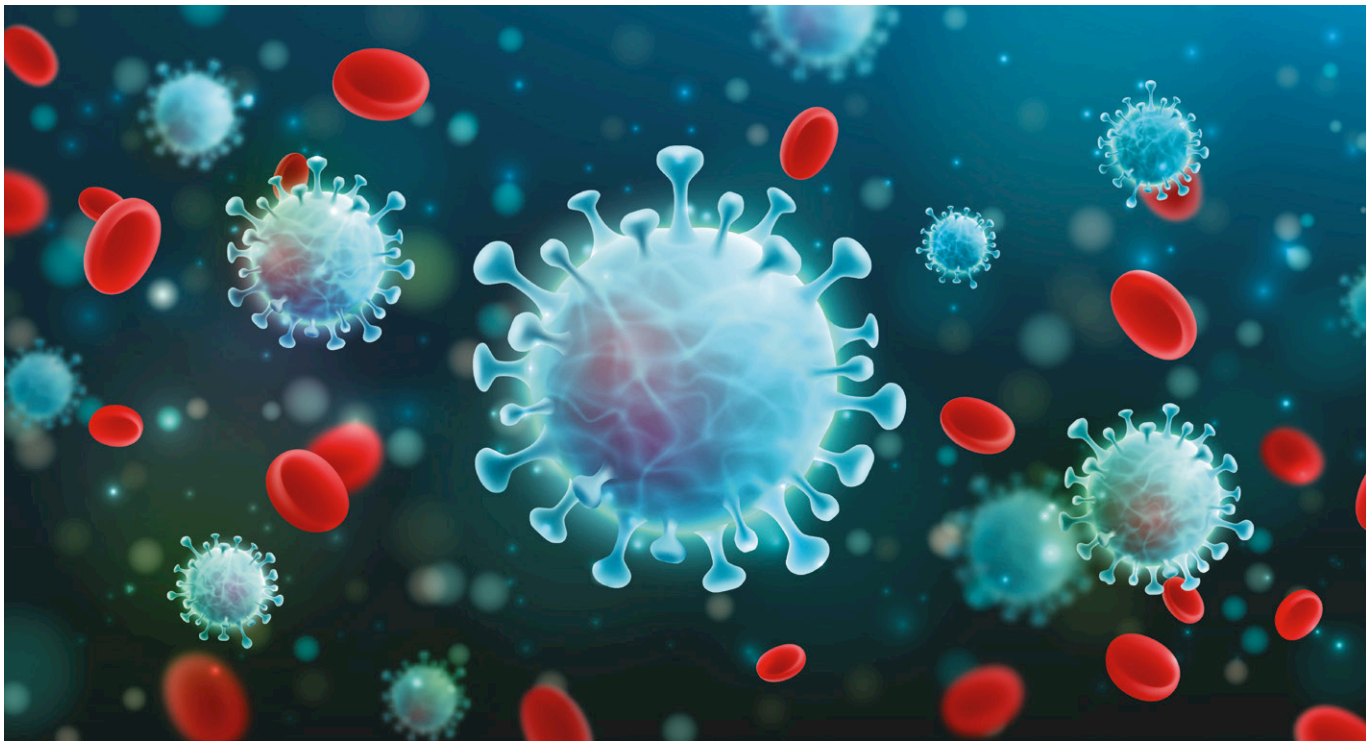


IMAGE: SHUTTERSTOCK

Gauging the business impact of the Covid-19 pandemic

The Covid-19 pandemic has hit the global economy hard. A new survey by *Film & Sheet Extrusion* publisher AMI measures the impact on the plastics industry and expectations for recovery

The global plastics industry has certainly not escaped the impact of the Covid-19 pandemic with more than 60% of businesses experiencing a reduction in activity of 10% or more over the first half of the year, according to the findings of a global survey of plastics industry business sentiment carried out by *Film & Sheet Extrusion* publisher AMI in the second half of June. However, the survey also reveals a high level of optimism among plastics industry players – more than 60% of respondents expect their business to have returned to per-Covid-19 levels by the end of 2021.

Unsurprisingly, the AMI survey confirms that the impact of the Covid-19 pandemic on the plastics industry was both sudden and significant. Most respondents experienced a negative impact on business activity during the first half of the year with a significant minority seeing their activity decline by 20% or more. It was also clear from responses that the impact of Covid-19 was felt at different points in time around the world – China in the first quarter, the rest of Asia together with Europe and North America around March, and South America and the Middle East and Africa through Q2. Aside from the timing, however, the business impact appears very similar in each region.

For the majority of the participating businesses – some 70% - the impact on their business was negative in H1, with 40% seeing a reduction in activity of 20% or more. The data shows that resin producers and masterbatch makers experienced some of the biggest immediate hits, most likely as a result of processors taking the opportunity to de-stock and use up inventory (which may correspondingly mean they see a faster pick-up). Companies active in automotive and transport were also hit hard, with 91% reporting a negative impact and more than 60% seeing a decline of 20% or more on H1 2019.

However, 14% of respondents reported no significant impact on their business, and 14% identified better than expected levels of activity. Businesses involved in flexible food packaging markets were the most bullish, with 30% of those experiencing an increase in business activity in the first half of the year compared to an industry average of 10%.

In terms of the challenges the pandemic presented to plastics businesses around

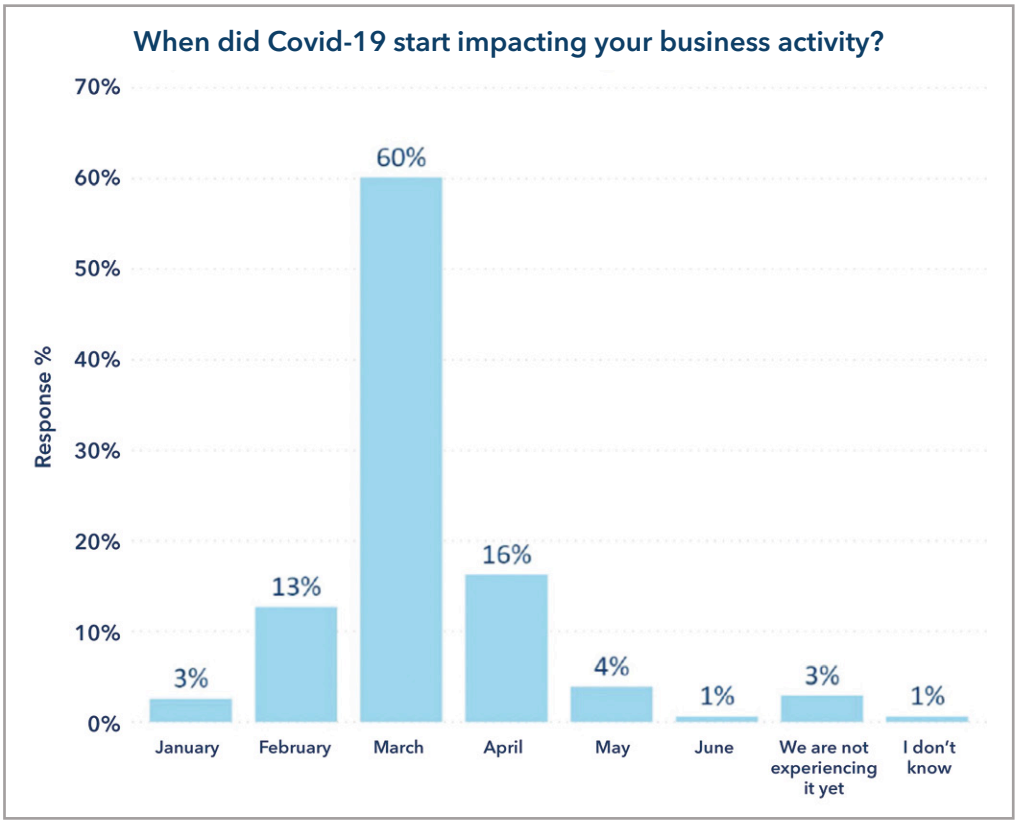
the world, the biggest by some margin was the sudden drop in demand, which was identified by 66% of respondents. Other key challenges included staff working from home (cited by 49%), implementing Covid-19 workplace safety measures (44%), logistical difficulties (31%) and material shortages (28%). For a minority of firms – 20% – the need to meet sudden demand spikes was a significant challenge.

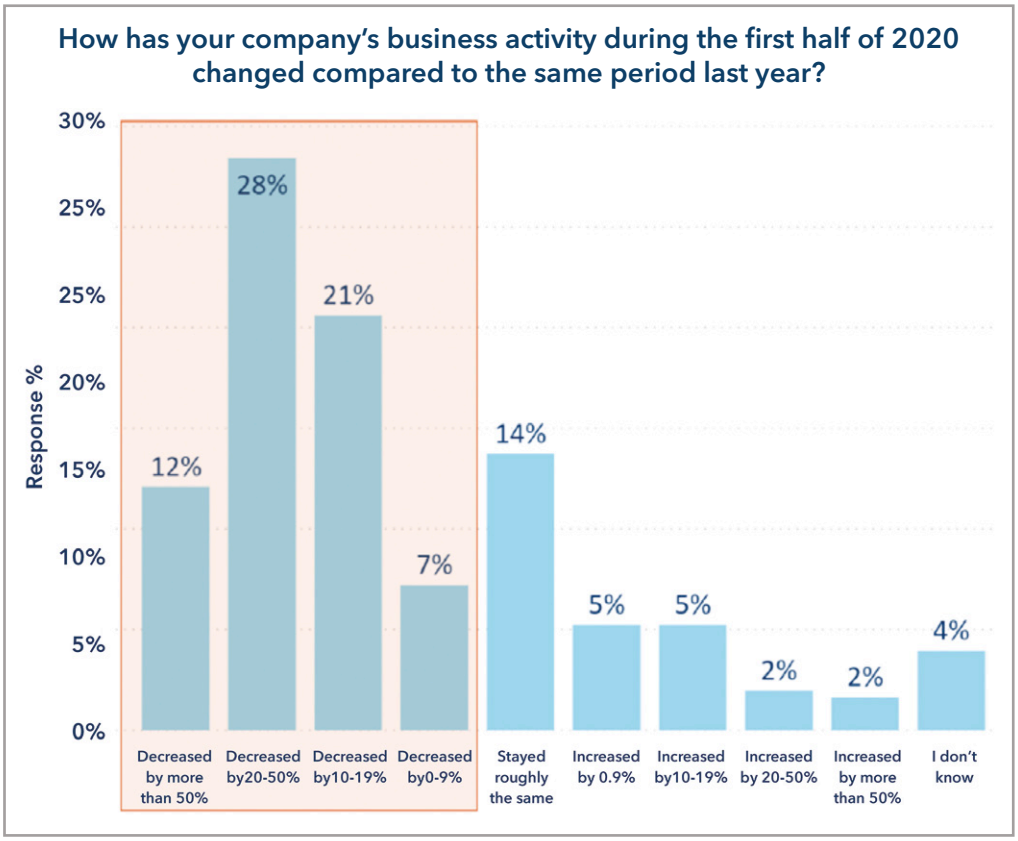
Production impact

Given that the majority of these and other less commonly identified business challenges were negative, it is no surprise to see that production capacity was impacted. Almost half of respondents (48%) said production was reduced against just 8% that recorded increases. Capital investment plans have also been negatively impacted with more than 40% flagging an immediate or significant reduction. Spending on new product development and sales and marketing remain neutral across the surveyed companies (meaning any intended reductions are balanced by planned increases).

In terms of the response to the Covid-19 challenges, the most intense focus is identifying and targeting new market opportunities. This was cited as a priority by 49% of respondents. Other common actions mentioned by respondents included renegotiating supplier contracts (23%), reducing sales prices (22%), identifying alternative materials and components (20%), and collaborating more closely with local companies (19%).

Other responses include reducing staff training (16%), streamlining product lines (15%), extending maintenance schedules (14%), and delaying supplier payments (13%). Despite the disruption the pandemic caused to global supply chains, only 3% of respondents said reshoring of production was a priority.





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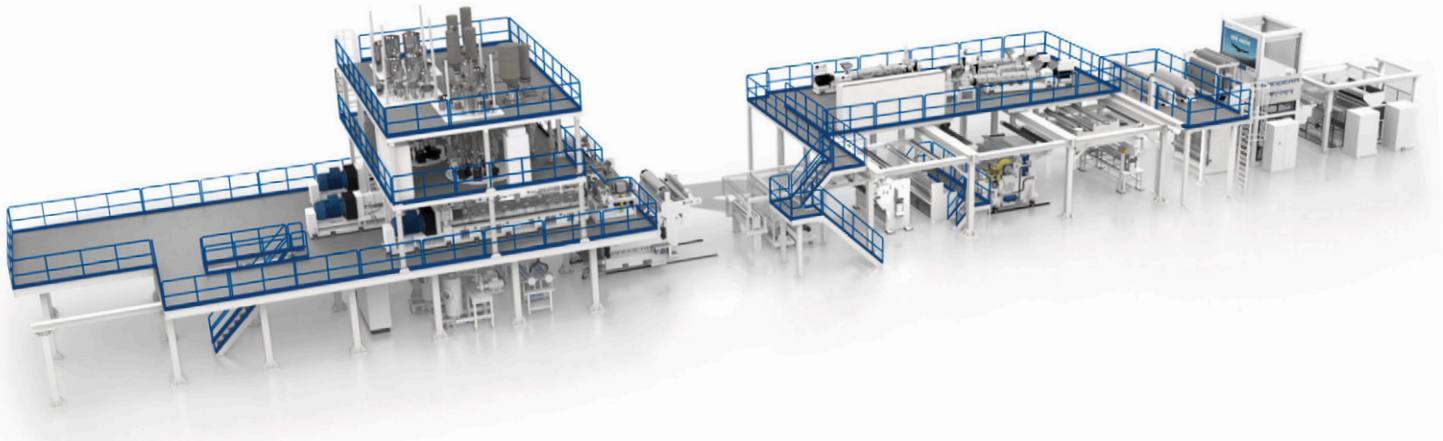

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The number of respondents was too small to be certain on any sectorial trends, but companies involved in flexible non-food packaging and rigid packaging showed a slightly higher interest in localisation of production.

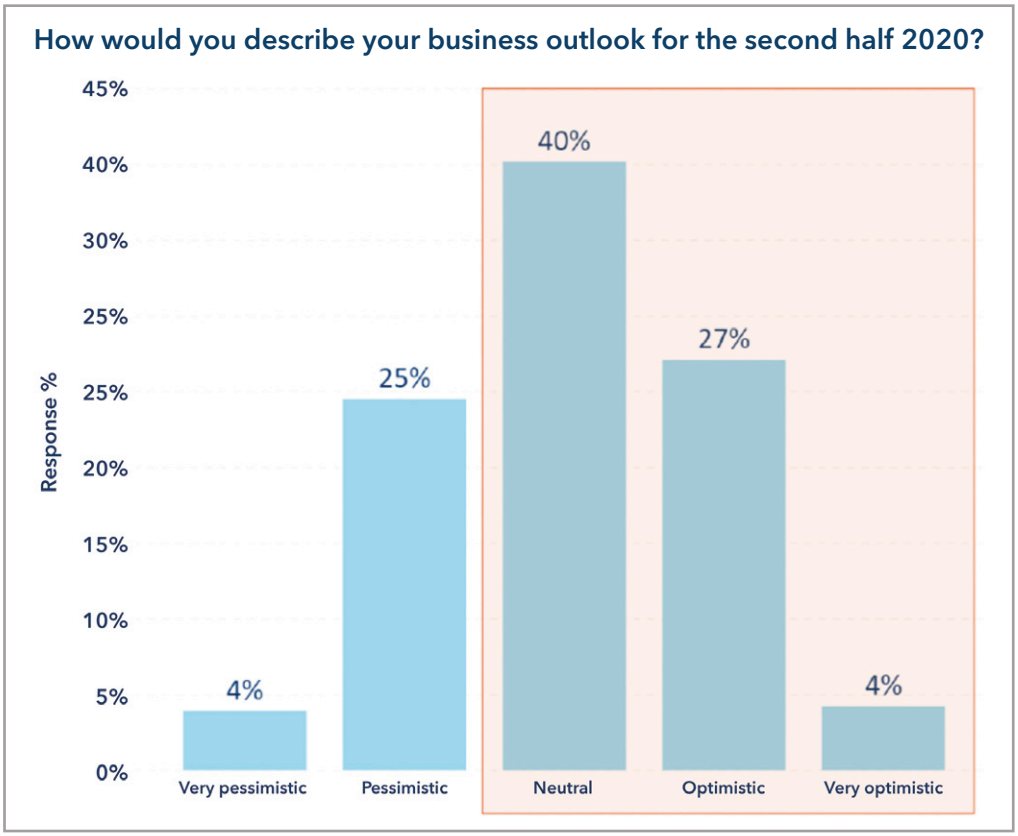
Optimism evident

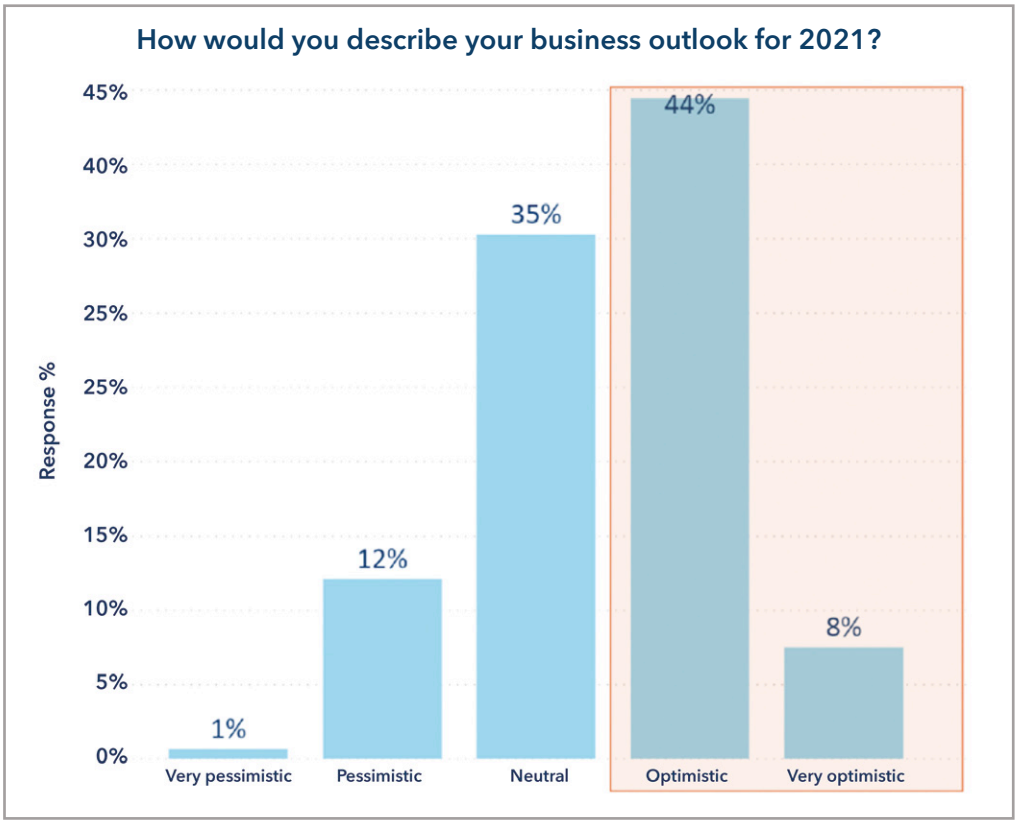
The survey confirms that many plastics companies experienced business conditions and impacts on an unprecedented scale and with no forewarning. However, optimism remains intact across much of the sector. More than 30% of respondents said they were optimistic or very optimistic for their business in the second half of the year, rising to more than 70% when including those with a neutral (no better, no worse) view. Less than 30% held a pessimistic view while 21% expect their business activity to return to pre-Covid-19 levels during this year.

Extending that timeframe to 2021 reveals an even brighter outlook, with 52% of respondents holding an optimistic view against just 13% pessimistic. In fact, the survey reveals 64% of respondents expect their business activity to be back to pre-Covid-19 levels by the end of 2021. Of those expecting a slower return to pre-pandemic activity levels, 30% are forecasting 2022 and just 6% beyond that.

In terms of the strategic actions plastics business are planning over the next two years to realise this recovery to pre-Covid-19 levels, the majority of companies said they will maintain or increase their activity in research and development (88%), sales and marketing (89%), and new product development (89%).

More than 60% of respondents said they would also increase their efforts to develop new markets. In terms of market focus, the survey revealed a 5% swing among respondents to medical and 2% swings to non-food flexible food packaging and to construction/infrastructure. Automotive and transport,





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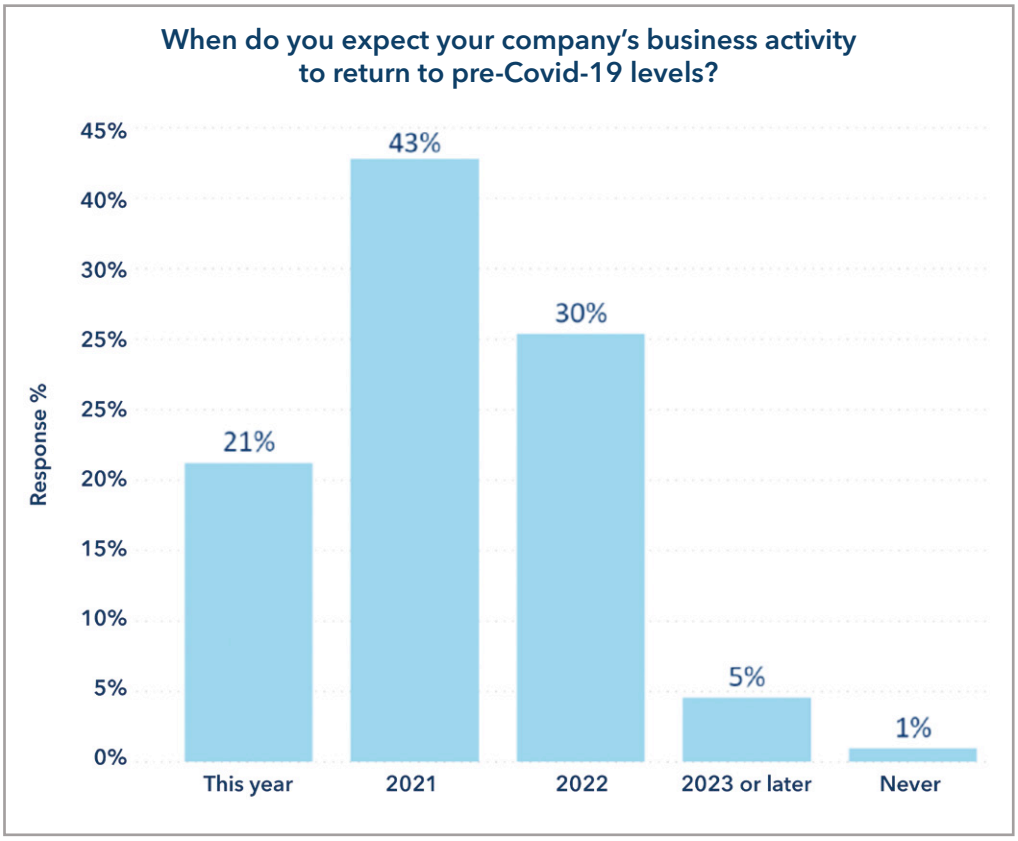
however, saw a -4% swing. That suggestion of the waning appeal of automotive is, perhaps, unsurprising given the stress the sector has experienced during the pandemic, with many car plants at a complete standstill.

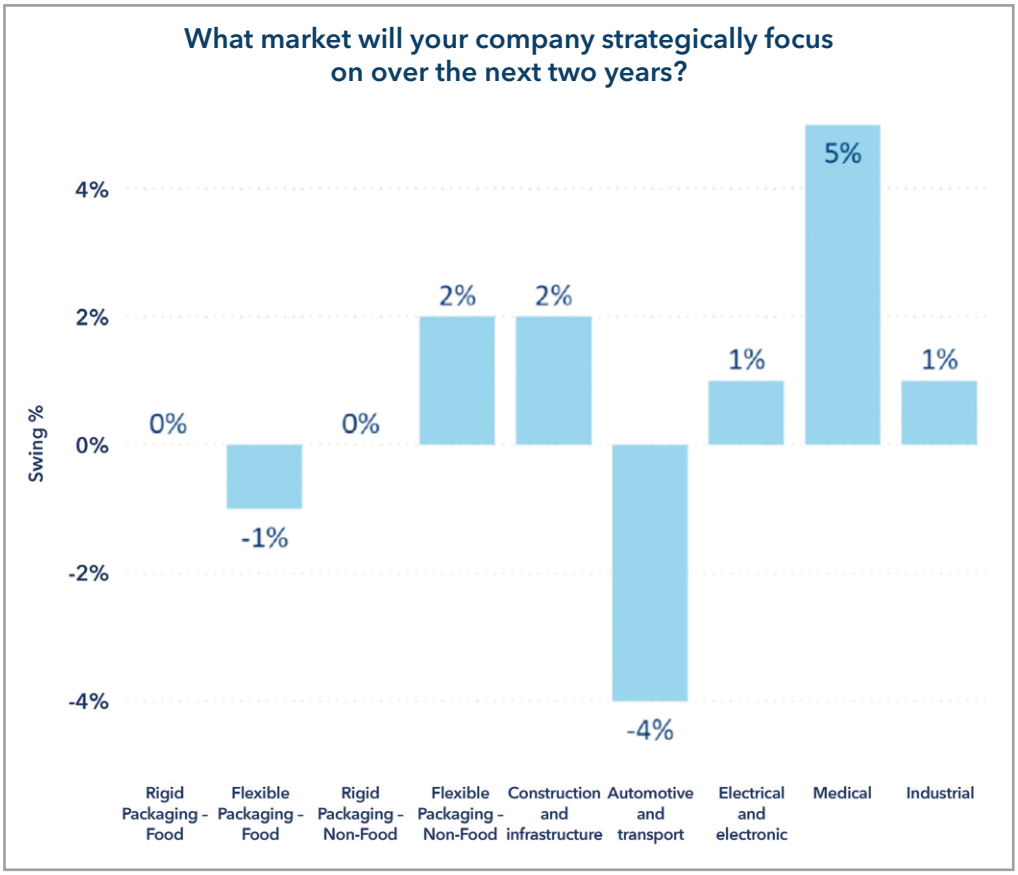
About the study

This article is based on a survey of the business sentiment, experiences and plans of 306 plastics companies around the world carried out by *Film & Sheet Extrusion* publisher AMI over the period from 24 June to 5 July 2020. Responding companies were located in all five regions of the world and covered the entire plastics industry supply chain.

Classified by geography, 57% of survey respondents were based in Europe, 21% in North America and 15% in Asia. Analysed by position in the plastics industry value chain, 27% were processors, 16% resin suppliers, 15% machinery suppliers, 12% additive suppliers and 12% compounders. Plastics end users accounted for 3% of the survey respondents and recyclers 4%.

In terms of principal plastics markets, 21% of survey participants were involved in flexible food packaging, 13% in automotive and transport, 12% in construction and infrastructure, 8% in rigid food packaging and 5% in electrical and electronic. Non-food rigid and flexible packaging accounted for a further 7%.





The data was reported and discussed online in AMI's Plastics and the Pandemic Virtual Forum on 21 July 2020. That can be viewed on demand HERE.

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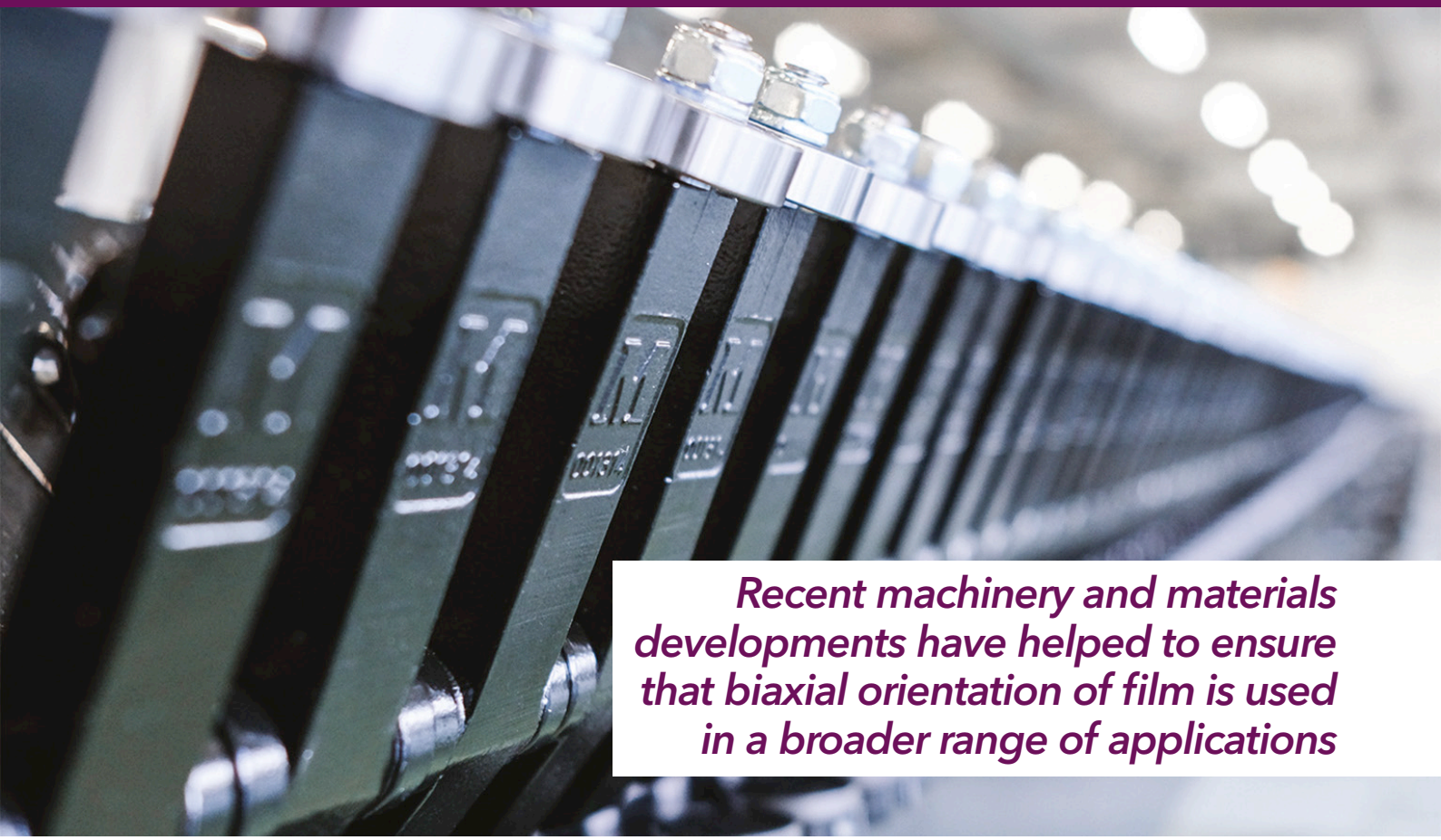


Recent machinery and materials developments have helped to ensure that biaxial orientation of film is used in a broader range of applications

Pulling power: latest in biaxially oriented film

Biaxial orientation is an established technique that is commonly used to improve the properties of polypropylene (PP). However, the technique is also applied to materials such as PET and polyamides – and is gaining increasing importance within polyethylene (PE).

Bulgarian oriented film producer **Plastchim-T** recently ordered a new hybrid line from **Bruckner**, which can produce both bioriented PP (BOPP) and PE (BOPE).

The companies have been cooperating for two years to develop films that can be recycled more easily. The main focus is on BOPE film, which can replace traditional multi-layer films that are made from different materials.

Plastchim-T has now invested in a 6.6m wide BOPP/BOPE hybrid line to make an extended range of films, including mono-material multi-layer films in BOPE as well as BOPP products such as UHB films and inline-coated films.

Output for each type of film is up to 26,000 tonnes/year, and material change can be handled within a few hours, says Bruckner.

The five-layer machine, with inline coater, can produce very thin functional layers within the nano-range. This means that the layers do not disrupt sorting and recycling. It can also incorporate aluminium oxide coating.

"This is a major step into the future," said Aydan Faik, Plastchim-T's owner. "We are convinced that the BOPE films produced on our new line will match the requirements of the circular economy. And we are proud that we are among the first film producers to make this move."

The new line is due to be commissioned next year, according to Plastchim-T.

Main image: Ultra-thin clips on Marchante's Masim help to reduce film defects in applications such as battery separator film

Nigeria BOPP boost

A leading producer of BOPP packaging in Nigeria – Africa's most populous country – is to increase production, following investment in a new high-speed line.

Tempo Paper Pulp & Packaging, based in Ota in Ogun State, recently ordered its second BOPP film production line from Bruckner.

"Since our first BOPP line started some years

Right: Brueckner has used a new food-grade lubricant from Klueber in its sequential film stretching machinery

ago, markets have developed," said Seun Obasanjo, CEO of the Tempo Group. "Now for us it's time for further investments."

He says that local demand for packaging film is rising – and especially in Nigeria.

Tempo's existing BOPP line – also from Bruckner – has a current production capacity of 33,000 tonnes/year. The company offers a wide range of transparent, white, pearlized and metallised BOPP packaging films for applications such as labelling and food packaging.

Tempo's expansion plans include a BOPET film production line, a second CPP film line and more metallisers.

Its deputy managing director, Nassos Sidirofagis, said: "Our investment strategy is long-term. We are already thinking of several investments to consolidate our position in the market."

The new BOPP line will make various flexible packaging films and is scheduled to start production in 2021.

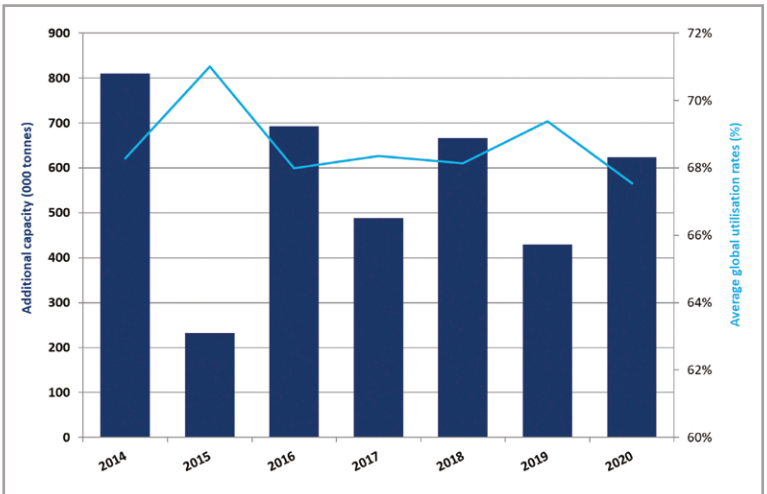
Stretching ratios

Marchante of France has updated and improved its Masim simultaneous stretching equipment with two separate ranges – for lower and higher stretching ratios.

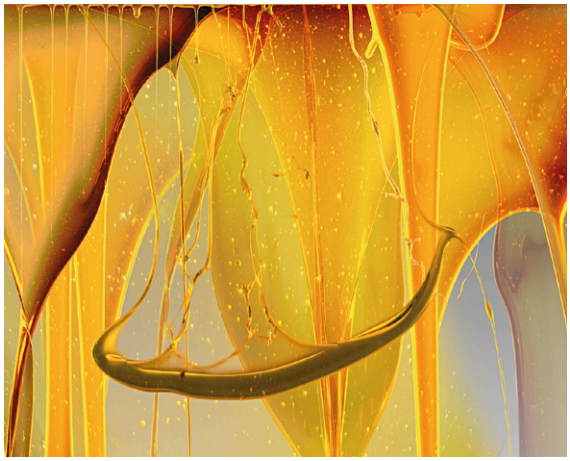
Its Masim L series is designed to work at stretching ratios of 1:2, while its S series works at ratios of 1:12. The L range typically runs at 1-180 m/min, while the S range runs at 1-300 m/min. Both are available in widths of 1-8m.

The company says that the new machines will improve the optical and mechanical properties of biax film, and move closer to a 'global biax stretching solution'.

The new ranges offer better stabilisation and



Average global utilisation rates for BOPP film fell slightly this year, as additional capacity rose
Source: AMI Consulting 2020



heating settings – leading to higher relaxing rates even at high stretching ratios, it says. Films can be produced at up to 450°C

Other benefits include: lower stretching forces, which is ideal for films such as BOPA, which are more delicate to stretch; low stretching ratios – including "the first simultaneous stretching system for MD & TD ratios under 2; higher precision; and a higher flexibility in stretching ratios.

Ultra-thin clips (25mm) help to reduce film defects and turbulence at the edges, which is critical in applications such as battery separator film.

Lubricant assistance

German lubricants specialist **Klueber** is helping Bruckner to improve the performance of its biaxial stretching machinery, by developing a new range of food-grade lubricants.

High-speed machines designed to give high film output require special chain oils with reliable lubrication and low residue formation. This is because residues from the used chain oil often cause more friction – which in turn requires more lubricant. However, this causes further contamination, meaning that the entire chain system (TDO) needs to be cleaned – reducing machine uptime.

"The aim is to maximise machine performance, while keeping the effort and cost to do this to a minimum," said Klueber.

Brueckner's sequential film stretching machinery has previously used Klübersynth CFH 2-400, a specialist lubricant that can reduce the build-up and adhesion of residues in the chain system. However, it wanted to provide food-processing customers with a product that could cut the risk of potential lubrication contamination.

"The food-processing industry is increasingly calling for efforts to refrain from using anything that can later lead to costly product recalls," said Klueber.

Now, the company's tribology experts have developed Klüberfood NH1 CH 2-260 Plus – an

H1-registered oil that maintains food safety while retaining performance. It has undergone extensive testing using techniques including TGA and DSC, while assessing factors such as friction, wear behaviour and residue formation.

The synthetic chain oils can be used at up to 250°C. The low viscosity of 260 mm²/s at 40°C leads to a low frictional torque, particularly when starting the machine in low ambient temperatures.

Products in the series are ISO 21469 certified and NSF H1-registered, conforming with FDA 21 CFR 178.3570. The lubricants have been developed for unforeseen contact with products and packaging in the food-processing industry. They are designed to lubricate all drive, control and conveyor chains in high-temperature and high-load areas. Preferential applications include low, medium and high-speed chains in film sheet manufacturing as well as other high-temperature chain applications in the food-processing industry.

BOPP demand rising

Annual demand for BOPP film is expected to keep growing at around 4%, despite the effects of the Coronavirus.

In its latest assessment of the BOPP films market, **AMI** estimates that global demand will exceed 11 million tonnes by 2024.

This comes on the back of a growth rate of 4.6% between 2014 and 2019 – which added around 1.5 million tonnes to the global market, taking it to 9 million tonnes.

"Demand for BOPP film continues on a growth trajectory – despite Covid-19 slowdown experienced in other plastics markets – given its important role in primary food packaging and its core functional characteristic as a cost-effective barrier protection," said the report.

Growth in packaged foods markets around the world will continue to be a key driver for future demand, it added. "This is particularly so in emerging markets experiencing population growth, urbanisation and rising incomes."

Left: Innovia's Encore BOPP films are made from renewable raw materials

Despite factors such as disrupted raw materials supply and trade tariffs, BOPP film producers have seen improved overall margins over the last two years – thanks to a reduction in overcapacity and more favourable raw materials prices.

Capacity investment continues – but the fastest growth is now seen in India, rather than China.

"India has seen capacity nearly double over the past five years, driven by the opening up of its retail sector, growth in middle classes and associated consumer spending on packaged food and other goods," said the report.

Biaxplen buys in Italy

Consolidation is an ongoing trend within this market – and last year, Russian BOPP manufacturer **Biaxplen** took a 50% stake in Italian BOPP producer **Manucor**.

The tie-up gives Biaxplen access to the European market. At the same time, PolyLab – the R&D centre run by Biaxplen's parent company, **Sibur** – will help to develop new products.

"Together, [we] expect to create the leading BOPP film producer in Europe," said the companies.

"This transaction will allow Manucor and Biaxplen to expand and complete their product portfolio, extend geographic coverage and commercial presence and expand and share R&D capabilities," said Luigi Scagliotti, CEO of Manucor.

Biaxplen has a BOPP film capacity of 180,000 tonnes/year across five regions, and its products are exported to 27 countries. Manucor has a single facility in southern Italy, which has a capacity of 100,000 tonnes/year of BOPP.

Marat Falyakhov, executive director at Biaxplen, added: "This deal is an important milestone in our work on the international market. It will help us expand our European footprint and exchange best practices."

Nova's HD-BOPE material allows the creation of all-PE, recyclable multilayer film structures

"This represents the first step in our journey to produce more sustainable films, with the next step being products that contain recycled post-consumer content," said Langstaff. "We have agreements in place and hope to be able to launch the first of these in 2022."

Bio-based BOPP

Innovia has developed a new family of recyclable BOPP films, called Encore. The films are made from renewable, non-food based raw materials.

Encore packaging and labelling film will have the same properties as equivalent fossil-based BOPP film – including clarity and gloss, stiffness, water vapour barrier and printability. The material has been assessed by Interseroh – an independent German recycling and consulting company – and received its highest rating, confirming they are fully recyclable.

"Using our in-house Life Cycle Analysis (LCA) programme we have calculated that, by using renewable polymer, Encore films offer reductions in [cradle to gate] carbon footprint," said Steve Langstaff, business manager for packaging at Innovia.

The first two grades of Encore film are a low temperature heat seal film for packaging and one for pressure sensitive labelling applications.

Large packs

Cosmo Films has developed a BOPP-based transparent film aimed at large packs and pouches in the fresh food packaging Industry.

The new antifog film has good cold and hot anti-fogging property, superior fusion sealing strength (of 1226-3498 g/in), hot tack ranging from 280 to 530 g/in for a temperature range of 130-140°C and is available in thicknesses of 25, 30 and 35 microns.

The film is designed for applications such as food packaging, fresh vegetables, fruits and meat products.

Separate to this, the company plans to restart installation of a bioriented polyester (BOPET) film line before the second quarter of 2022-23.

The new line will be commissioned at the Waluj site in Aurangabad, Maharashtra, India with a capacity of 30,000 tonnes/year. This plant already houses BOPP, extrusion coating and chemical

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coating lines, plus metallisers and a CPP line. Cosmo says the new line will add to its existing BOPP capacity of 200,000 tonnes/year and allow it to offer a wider portfolio for flexible packaging, labelling, lamination and industrial applications.

The project cost is estimated at around Rs3bn (US$41m).

"Speciality BOPET is a niche segment which caters to multiple application segments, with high margins and opportunities for import substitution as well as worldwide exports," said Pankaj Poddar, CEO of Cosmo Films.

Mono-material structures

An emerging theme in plastics right now is mono-material packaging – where a multi-layer structure is made from a single material, making it easier to recycle

Nova Chemicals has developed a material for making biaxially-oriented polyethylene (BOPE). Its HD-BOPE material allows the creation of all-PE, recyclable multilayer film structures with improved physical performance compared to blown film, it says.

The technology is aimed at applications including food packaging, heavy duty sacks and e-commerce. Nova says that HD-BOPE can help film manufacturers create recyclable PE mono-material structures without sacrificing stiffness and print clarity.

"Brand owners and consumers are looking for easy-to-recycle packaging that prevents contamination and extends the shelf life of their products," said Alan Schrob, consumer and industrial films group manager at Nova's polyethylene business. "Our HD-BOPE technology provides an additional building block for converters to make recyclable multilayer films that perform as well as traditional mixed-material structures."

Biaxial orientation can produce films with higher toughness, barrier and optical properties. HD-BOPE resins are designed for use in the print web, before being laminated to a sealant film made with lower density PE. The finished film has high stiffness, which allows downgauging and improved processability in converting steps compared to blown film alternatives, says Nova. BOPE films also demonstrate good thickness uniformity and film flatness for high yield rates, it says.

Nova has been working with stretch line machinery manufacturer Brückner to accelerate the development and commercialisation of the technology. ›

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Sebastian Ruhland, senior sales manager at Brueckner, said: "We have been pleased with the performance of Nova's products on our equipment and are getting positive feedback from the converters who are making film with it."

Ruhland said that the technology could open new possibilities to provide PE films for 100% mono-material packaging films, to help overcome recycling challenges.

Nano behaviour

While the latest technology developments help to satisfy ongoing customer needs – such as faster throughput or higher performance film – there is also plenty of basic research going on to develop materials for the future.

Researchers from **Michigan State University** in the USA have analysed the behaviour of nanocomposite-based BOPP film when stretched using simultaneous or sequential stretching.

The unstretched extruded polypropylene film included 2 wt%, 5 wt% and 10 wt% of silicate nanocomposites in nanolayers.

Simultaneous stretching was done on square pieces of 1.2mm thick extruded sheet at 156°C in a Karo IV apparatus. Area stretch ratios of 45-50 were obtained without breaking the film. The resulting film was clear for the nanocomposite. Sequential stretching was done in a continuous line where the stretch ratio along the machine direction was 5, followed by a stretch ratio of nearly 10 along the transverse direction.

While the simultaneous stretching process produced clear film without defects, the sequential process resulted in cavitated regions on the film. This appeared during the transverse stretching step around submicron-sized nanolayer stacks.

The researchers also found that permeability to water vapour could be reduced by up to 75%, compared to standard BOPP film, depending on the loading of nanoclay, the process used and the multilayer configuration.

Stretching PA6

Japanese researchers have studied the characteristics of biaxially stretched PA6 film – which is commonly used in applications such as food packaging. The study looked at PA blends and the three main stretching methods: simultaneous and sequential stretching, and the 'double bubble' tubular process.

"There are no reports which describe the difference among the three stretching methods and film properties, so it was not clarified why the films have big differences in their properties," said

Left: Tempo has ordered a second BOPP line from Bruckner

the researchers, from **KT Polymer**, **Kanazawa University** and **Idemitsu Unitech**.

"For this reason, the higher order structure and stretching behaviours of the three stretching methods were studied."

Sequential stretching showed strong stretched effect and molecular orientation in the transverse direction. However, the unstretched part showed low TD orientation and high MD orientation, because of low TD stretching effect.

"The non-uniform part causes retardation distribution and the film balance to worsen," said the researchers.

In simultaneous stretching, the molecular orientation was equal in both directions. The double bubble process produced well-balanced film and equal orientation in terms of the phase difference in the plane of film, said the researchers.

"Low stretching temperature, slow stretching speed and high stretching ratio are important to obtain highly oriented film with high physical properties," said the researchers.

Blends of PA6 with meta-xylene diamine (MXD6) have a high gas barrier, easy tear properties and low stretching stress but poor thickness uniformity.

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- **www.tempopackaging.com**
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Thermoforming machine manufacturers have recently had to adapt their approach – whether by designing special machinery, or changing how they install it

Pressing concerns: latest in thermoforming technology

Many plastics companies have recently refocused their efforts to produce personal protective equipment (PPE) – and thermoformers are no different.

Amut-Comi recently designed a special purpose machine, which it says can help to limit the spread of Covid-19.

Its automated ACF820 thermoforming machine was recently adapted to produce 'non-woven fabric' protective face masks – at a rate of more than 80,000 per shift. It is being used by a Tunisian manufacturer to make PPE.

The high-speed technology includes a stacking robot and 12-cavity mould. The robotic stacking system and suction cup gripper hand has proven to be extremely efficient, even using vacuum-permeable material.

A redesigned chain conveyor system has made it possible to minimise the formation of dust, due to the rubbing of the material on the contrast guides. The integration of an inkjet mask marking system, between the forming and cutting stations, has proved very effective. It helps to reduce the number of staff employed in the process.

At the same time, the company has expanded its ACF 980 series with a new model for the North American market.

The new ACF980 XL has a maximum mould size of 980 x 840 mm and maximum moulding depth up to 200mm. It is used to make expanded polystyrene (XPS) foam trays and has been equipped several new options.

The optimised version allows the forming station with integrated cut with 100 tonne clamping force; the die-cutting station now has a force of 100 tonnes; and a new stacking robot can reach 40 cycles per minute.

The machine can be interfaced with the factory management system (ERP) to download the work programmes in PDF format, for easy consultation by the operator. At the end of the production batch, the thermoforming packaging machine sends a file to the management system, which

Main image: Kreyenborg's IR-Clean features an infrared drum dryer

processes it for the subsequent closure/execution phases of the order.

PET decontamination

Two South American producers of thermoformed PET trays recently retrofitted IR-Clean systems from **Kreyenborg** of Germany.

The systems have been fitted to three production lines that have an average output of more than 1,000 kg/h. Now, the companies can process up to 100% recycled PET on their lines, as the IR-Clean system helps to decontaminate the material.

The system offers high decontamination output, has FDA and EFSA approvals, and boasts high energy efficiency and reduced assembly space. Kreyenborg says it recently succeeded in increasing decontamination performance.

Recycled material that has been treated in IR-Clean can be used to make 100% rPET for any kind of food packaging – and stored for 365 days at room temperature – says Kreyenborg. This is because of the speed and efficiency with which the machine handles PET recycling material, it says.

Both manufacturers use their own, shredded in-house edge-trim produced in the thermoforming process, as well as bought-in post-consumer recycling material. Recyclate is conveyed to the metering hopper of the IR-Clean, where it flows into a rotary drum through a volumetric metering system.

A welded continuous screw spiral guarantees homogeneous material flow, with a pre-defined residence time. Material is stirred continuously and its surface is revolved permanently.

"This is an ideal method for efficient decontamination," said the company.

The infra-red module quickly heats the material to a high temperature, while a constant air flow extracts humid air and other contaminant particles. This whole process takes a few minutes. The recycling material then prepared is directly conveyed into the extrusion line.

"Owing to the pre- treatment of the material, the South American film manufacturers are now in a position to run their extrusion lines with a higher throughput," said Kreyenborg. "IR-Clean combines ecological and economic benefits in processing recycling material, while increasing the performance of sheet extrusion lines."

Remote installation

Early in the Coronavirus lockdown, two Russian companies installed thermoforming machinery – from separate suppliers – remotely.

At the beginning of the pandemic, Georg Polymer – a Russian producer of rigid meat trays – needed its new GN760 machine (from **GN Thermoforming** of Canada) installed quickly to meet growing demand in Eastern Europe.

Rather than postpone the installation – due to travel restrictions – GN remotely guided the customer through the process using the WhatsApp web platform. The installation, which would normally take three to four days to install onsite, took around a week via WhatsApp. The machine is now up and running, producing 240,000 meat trays per day.

"It gives us great comfort and confidence knowing that we can accomplish this kind of installation remotely with a customer who has a high degree of mechanical ability," said Paul Phillips, GN sales and marketing manager.

The installation was successful thanks to the customer's broad mechanical expertise with this type of machine – and a high-speed internet connection. Although it has carried out other remote machine installations using WhatsApp – one for a US-based customer, the other for Pro-Form in Hungary – GN says it would prefer to return to 'conventional' installation.

"We will continue to review and examine our remote installations closely and optimise our solutions to ensure our customers get the support and training they require," said Phillips.

Single frames

Similarly, **WM Thermoforming** of Switzerland has helped its Russian customer Upax-Unity to install and commission three machines – which were delivered to its facility in Perm at the beginning of lockdown.

Here, all the machines were delivered fully assembled in a single frame – with all electrical connections between electrical cabinet and machine components. Because of this, technicians were able to put the machines in place and connect all utilities using only the instruction manual.

Right: Hütthaler will use Mondi's recyclable, mono -material thermoforming film for its meat and sausages

WM machines combine a PLC and control system with advanced software, making it possible to commission the machine – via a stable internet connection. WM said this was the first time a customer had started up a machine without the physical presence of a WM technician.

Mikhail Tsirkulev, senior project leader at Upax-Unity, arrived in Perm to help commission the three machines.

"The big advantage of WM machinery is the presence of a self-adjustment setting when using a new mould for the first time," he said. "Thanks to that, we were able to produce many different thermoformed articles within a few days."

WM says this was the first time that a customer had started up a machine without the WM technician being physically present.

"With remote commissioning, even if difficulties and 'force majeur' circumstances take place – during or after delivery of the equipment – it will no longer be an obstacle to worry about," said WM.

Mono material for meat

Packaging group **Mondi** has developed a recyclable, mono-material thermoforming film for Austrian meat producer Hütthaler, which it will use for its meat and sausage products.

The new film provides a barrier to protect the food and extend its shelf life. The independent Cyclos-HTP Institute for Recyclability and Product Responsibility has awarded this film the AAA classification for recyclability.

Mondi re-invented the packaging for Hütthaler – maintaining functionality while reducing raw material usage. It manufactured the complete film, including the bottom film at its Styria plant in Austria – which has also been awarded AA+ for food safety by the British Retail Consortium.

"We worked with Hütthaler to find a more sustainable approach that still meets the high food standards, preserves shelf life and guarantees runnability on the machines," said Thomas Kahl, project manager for EcoSolutions at Mondi Consumer Flexibles. "The new film meets all these requirements and helps to save disposal fees due to its recyclability."

Making an impact in thermoformed trays

Sukano has launched a transparent impact modifier masterbatch for cold, flash frozen and room temperature thermoformed tray applications. Part of its rPET product portfolio, the company says it can replace specialised co-polyester resins and GAG film structures to allow the end product to be both mono-material and recyclable.

Alessandra Funcia, head of marketing at Sukano, said the new material offers improved durability and toughness and enhanced impact resistance without a loss in transparency. It also generates fewer sharp edges and shards during die cutting, which can help speed up production lines and avoid cross-contamination.

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IMAGE: SHUTTERSTOCK

Plasticisers continue to trend away from low molecular weight orthophthalate-based chemistries to alternatives seen as safer, particularly for consumer and medical uses. Jennifer Markarian reports

Plasticiser developments follow sustainable path

The PVC plasticisers industry continues to work on development and application of alternatives to low-molecular weight (LMW) orthophthalate-based plasticisers, which do a very effective job but face increasing regulatory restrictions. Today, high molecular weight (HMW) orthophthalates and a range of non-orthophthalate alternatives, including bio-based plasticisers, are already being used.

Europe has led the shift away from LMW phthalates. Some LMW phthalates – benzyl butyl phthalate (BBP), dibutyl phthalate (DBP), diisobutyl phthalate (DIBP), and diethylhexylphthalate (DEHP) – have been restricted through their inclusion in Annex XIV of the Authorisation list in the REACH regulations as Category 1B due to reproductive effects. As a consequence there is very limited production and use of these LMW phthalates in Europe today and biomonitoring studies show a significant decrease in exposure, according to **European Plasticisers**, a sector group of Cefic (the European Chemical Industry Council).

An additional restriction, under REACH Annex XVII, covering the same plasticisers came into effect in July 2020. This restricts, with some exceptions, their use to less than 0.1% in articles for the EU market. According to European Plasticisers, these latest restrictions are intended primarily to target imported products. Enforcement is down to member states.

In addition, the European Chemicals Agency (**ECHA**) submitted a recommendation to the European Commission (EC) in July 2019 to amend the Authorisation List (Annex XIV of REACH) entries by adding endocrine disrupting properties to the BBP, DBP, DIBP, and DEHP entries. "Once the Commission decides on the amendment, some previously exempted uses will require authorisation. For example, [if] DEHP is listed as endocrine disruptor for the environment, authorisation applications will have to be submitted for its use in food-contact materials and medical devices," says Michela Mastrantonio, Manager at European Plasticisers. ›

Main Image: The PVC industry is moving away from low molecular weight plasticisers as the regulatory environment continues to tighten

Right: A new regulation that will further restrict use of DEHP in medical devices has been delayed due to the Covid-19 pandemic

Medical moves

A new medical device regulation – Regulation (EU) 2017/745) – that will further restrict use of DEHP was scheduled to come into effect in 2020, but due to the pandemic, has been postponed until 26 May, 2021. In June 2019, the EC's Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) issued guidelines for the use of DEHP in medical devices as included in the new regulation, says Mastrantonio.

In December 2019, EFSA also updated its risk assessment of DBP, BBP, DEHP, diisononyl phthalate (DINP) and diisodecyl phthalate (DIDP) for use in food-contact materials (FCM). Although EFSA reported they were not a concern for public health, it proposed a tolerable daily intake (TDI) limit, on a temporary basis, of 50 µg/kg of body weight (bw) per day for the combined total intake of DBP, BBP, DEHP, DINP, and confirmed a TDI of 150 µg/kg of bw per day for DIDP.

"It is important to note that the EFSA opinion is not supported by scientific evidence or ECHA's Risk Assessment Committee's assessment of DINP [which said DINP did not warrant classification for reprotoxic effects]. The opinion acknowledges the uncertainties related to the outcome of an assessment that, due to time constraints, could not be performed in a thorough manner," Mastrantonio says. "The European Commission is currently working on a new mandate for EFSA to further assess phthalates in FCM. European Plasticisers provided input in the EFSA public consultation in April 2019 and it is ready to support any further assessment of substances in food-contact materials as appropriate, consistently ensuring a robust scientific weight of evidence approach."

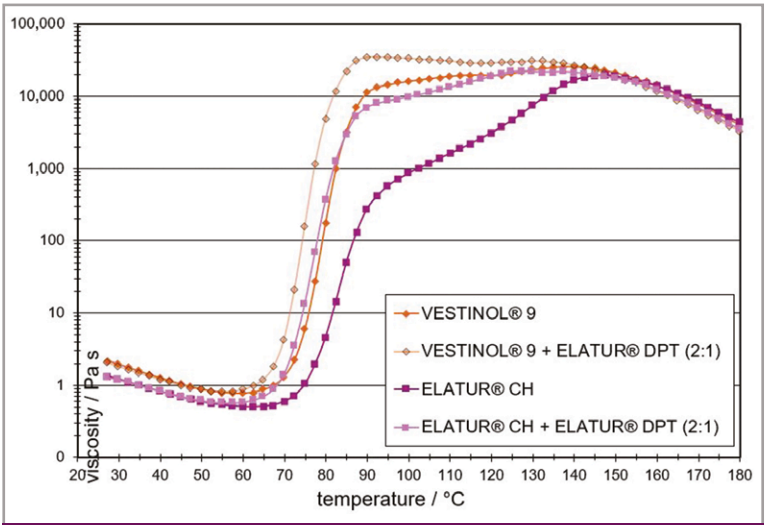

Figure 1: Elatur DPT can boost gelation of Elatur CH to near DINP (Vestinol 9) levels or further speed gelation of DINP
Source: Evonik

IMAGE: SHUTTERSTOCK

Phthalate research

Recent research aims to provide more scientific data on phthalate plasticisers, says the trade association. For example, the University of Edinburgh in the UK is preparing to publish a study comparing DBP and DINP that confirms DINP does not cause adverse reproductive effects and is not an endocrine disruptor. European Plasticisers and VinylPlus say they are are supporting "scientifically solid risk assessments, compared to those which use simple in-vitro studies which are not representative of the complex metabolism in whole organisms" by developing and publishing physiologically based pharmacokinetic (PBPK) models. The group reports that a PBPK model for DINCH has been published in a peer-reviewed journal, and the model for DINP was submitted for publication in 2020. Others are being developed.

In the US, the Environmental Protection Agency (**EPA**) began assessments for phthalates that were identified as high priority chemicals, including BBP, DBP, DIBP, DEHP, and dicyclohexyl phthalate. EPA also began evaluations of DINP and DIDP as requested by their manufacturers – Evonik, ExxonMobil Chemical, and Teknor Apex had requested an evaluation of DINP uses and ExxonMobil had also requested evaluation of DIDP through the **American Chemistry Council**'s High Phthalates Panel. The assessments are expected to take three years and the manufacturers say they are confident tests will show that these high molecular weight phthalates are safe for use.

Alternative plasticisers

Evonik produces and sells DINP under the brand name Vestinol 9 and says that in Europe it is an important general-purpose plasticiser for soft PVC because of its broad processing window and beneficial cost/performance ratio. The company also produces alternative plasticisers: cyclohexanoate under the brandname Elatur CH;

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IMAGE: SHUTTERSTOCK

Above: The medical industry is looking for good performing phthalate-free plasticisers

and dipentyl terephthalate (DPT) under the name Elatur DPT. It describes Elatur DPT as a fast-fusing, low viscosity plasticiser with a very low semivolatile organic compound content and says it is especially effective in combination with Elatur CH in a variety of plastisol applications (Figure 1).

Orthophthalate plasticiser alternatives continue to expand in use in North America, according to Patrick Harmon, Industry Manager for **BASF** Industrial Petrochemicals, who says growth is being led by dioctyl terephthalate (DOTP). "The toys and childcare market have already shifted to alternative plasticisers since global regulations were enacted in the 2000s. Various reports show that DINCH [such as BASF's Hexamoll DINCH], DOTP and ATBC [acetyl tributyl citrate] are the most common plasticisers used for these applications. Retailers and brands also continue to drive additional substitution."

The company says that its Palatinol DOTP has been shown to have low toxicity using the GreenScreen hazard assessment methodology and is listed in the CleanGredients database using the US EPA Safer Choice criteria. BASF has its own program for analysing how products contribute to sustainability, which it calls Sustainable Solutions Steering. The company uses the method for its own products and has made it available to third parties as well. Using this method, DOTP and DINCH are classified as "Accelerators," which are defined as products that have a "substantial sustainability contribution in the value chain."

In medical and healthcare applications, which are highly regulated, concerns about additive safety are a critical issue that has driven some shift to alterna-

tive plasticisers, but change is slow due to the costs and regulatory process. In Europe, the new medical device regulation that will go into effect in 2021 may increase the pace of change, suggests Harmon. In the new regulation, substances classified as carcinogenic, mutagenic or toxic to reproduction (CMR) 1a and 1b (which includes DEHP) are restricted unless there is a justification. BASF says that the European Pharmacopoeia has been updated to now include DINCH, DOTP, tris (2-ethylhexyl) trimellitate (TOTM), and n-butyryl-tri-n-hexyl citrate (BTHC) as alternatives to DEHP in medical device applications.

Phthalate-free norm

"Globally phthalate-free solutions are becoming the norm, with DOTP gradually replacing medical-grade DOP [dioctyl phthalate] in the medical sector," says Marat Avetisov, Sales Director, Plastics and Organic Synthesis Products at **Sibur**. The Russian-made medical compound and items based on it have been certified by the country's Federal Service for Surveillance in Healthcare (**Roszdravnadzor**).

Sibur says that in Russia DOTP is being used to make plastic containers for transfusion of blood and its components, for example. DOTP properties

Left: Sibur claims its plant at Perm in Russia, opened last year, is Europe's largest DOTP production site

claimed to be beneficial for these applications include low volatility and low odour. Compared to DOP, DEHP, and DINP, DOTP has increased volume resistivity, better thermal stability, and improved mechanical characteristics in PVC compounds, the company claims. Low-temperature properties, such as frost resistance, of DOTP are better than DOP/DEHP and slightly better than DINP, the company says.

IMAGE: SHUTTERSTOCK

Above: Renewability is rising up the agenda in a range of consumer-facing PVC applications, such as synthetic leathers

In May 2020, Sibur's DOTP was certified under European Pharmacopoeia standards for the medical and pharmacological industries, which allows use in medical compounds in Europe. "Given the COVID-19 pandemic and enormous rise in demand for disposable protective medical items and equipment, many processors have switched from technical compounds to medical ones," according to Avetisov.

He cites the example of a Serbian company using Sibur's PVC and DOTP to produce medical compounds for surgical masks used by hospital staff treating coronavirus patients. The mask comes with a replaceable filter so it can be used up to five times. In May, the masks were being shipped to the UK, Croatia, Montenegro, Bulgaria and Romania, the company says. Another Eastern European company set up a production line to make medical compounds using Sibur's DOTP and that compound is now being supplied to ventilator mask manufacturers in Western Europe.

Sibur commissioned its facility at Perm in Russia to produce its DOTP plasticiser in May 2019. The company says the facility is the largest single production site for DOTP in Europe and will supply to the Russian market (replacing imported product) as well as Europe and other regions. In addition to new uses in medical applications, DOTP is used in floor and roof coatings, wallpaper, cable compounds, and automotive coatings.

Off-the-shelf options

Teknor Apex recently launched a range of "off-the-shelf" medical-grade compounds made without DEHP or other orthophthalate plasticisers. The Apex and Flexalloy PVC introductions are intended to help speed time to market and provide multiple options for replacing conventional phthalate plasticisers. "We supply these new products with a full complement of physical property, biocompatibility, and regulatory test data, and we support rapid prototyping by offering quick turnaround times for samples. In addition, identical grades of each compound are available worldwide," says Derek Laffey, Medical Industry Manager for the Vinyl Division at Teknor Apex.

The new Apex PVC and Flexalloy PVC elastomer compounds are supplied in a range of hardnesses, with grades for extrusion (used, for example, in tubing and in cable jacketing on medical devices) and for injection moulding (typically used in luers, canulae, caps, connectors, valves, ear protection, endotracheal airway cuffs, mouthpieces, oxygen masks, safety goggles, resuscitation bags, and bulbs). Standard grades have a high-clarity medical-blue tint but the company says it can custom formulate options to meet a variety of colour, opacity and self-frosting needs as specified by the device manufacturer. The compounds can be ETO, gamma, and E-beam-sterilised and are said to exhibit good colour hold.

Teknor Apex, which produces several plasticiser types as well as formulated compounds, is offering the new grades with TOTM, ATBC, or in proprietary blends with DOTP. TOTM displays the least extract-ability from the PVC matrix and greatest resistance to crazing or stress cracking when in contact with polycarbonate or ABS, says the company. ATBC, derived from citric acid, is said to offer excellent toxicology and processing behaviour very similar to that of DEHP and is considered to be a good choice where PC or ABS contact is not a concern.

The company says DOTP is a cost-effective alternative to DEHP and blending it with TOTM or ATBC can provide a balance of cost-effective performance, processing, and toxicology performance, as well as maintaining or improving compatibility with PC and ABS.

Renewable solutions

Swedish company **Perstorp** has set itself the goal of becoming "finite material neutral" and, as a result, is looking at all product lines to see if fossil-based raw materials can be shifted to renewable raw materials. "We have seen an increase in requests for biobased or bio-attributed products coming from various industry sectors like automotive and consumer goods, especially for new product lines," says Jenny Klevås, Market Segment Manager for Polyolester Plasticisers at the company.

Pevalen Pro, a PETV (pentaerythritol tetravalerate) based partly on renewable content, is its newest non-phthalate plasticiser offering and is due to be made available to the market in the third quarter of 2020. That is a little later than originally planned – the product launch was pushed back

and the audit by ISCC, an organisation that certifies that bio-based input is sustainably sourced, delayed by Covid-19 travel restrictions. With those now loosening, Klevås is hopeful the audit will soon be completed.

Perstorp plans to offer Pevalen Pro in three grades, from 8% renewable content up to almost 40% renewable content. The renewable content is assigned on the mass balance concept, which tracks the amount of renewable material going into a process and allocates it to certain products. Perstorp says it applies the principles more strictly in what they call a "traceable mass balance," which it claims is both physically and chemically traceable.

"Physical traceability means that a production process exists within the site for producing the product from the recycled/renewable raw material(s)," says Klevås. "Chemical traceability is following stoichiometry meaning that there needs to be a real connection between the raw materials and the end product. So we cannot buy 'green credits' and apply them to other products. In Pevalen we have, in total, 25 carbon atoms. To produce Pevalen Pro 36, we change 9 'black' carbons to 'green' carbons, which gives a renewable content of 36%. These green carbons come from biogas, bio-acetaldehyde, and bio-methanol."

She says the aim of this stricter traceability is to create a real transformation that supports the development of recycled or renewable raw materials. The company is also is looking into sourcing alternatives that will allow it to offer Pevalen based on 100% renewable content.

In October 2019, **DIC Corporation** in Japan announced it had developed a fully plant-based, polyester plasticiser that is derived entirely from biomass resources. The company says the additive is the first plasticiser to earn the "Biomass 100%" Biomass Mark, a designation certifying that a product is made entirely with biomass under the Japan Organics Recycling Association (JORA)'s labeling system. The company has begun shipping samples and plans to scale up its capabilities to facilitate mass production.

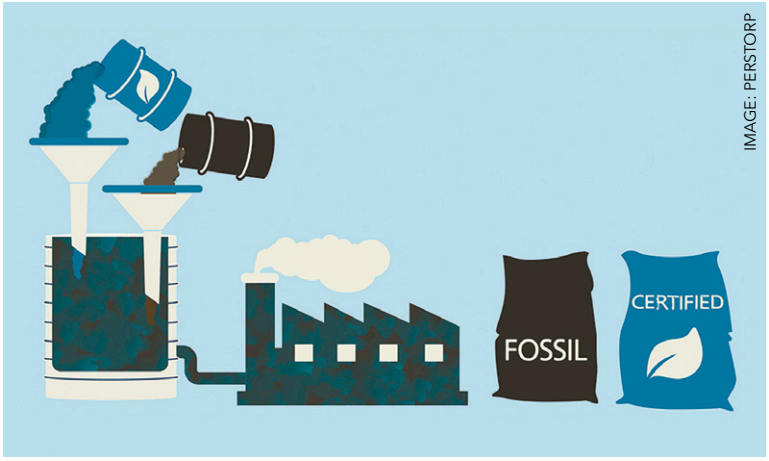

IMAGE: PERSTORP

Above: Perstorp says its mass balance concept is based on physical and chemical traceability

Plant-based specialities producer **Roquette** manufactures bio-based building blocks for plasticisers. Its Polysorb isosorbide can be used to make diester plasticisers. Its Biosuccinium biosuccinic acid can be used with alcohols to make di-(2-ethylhexyl)-succinate (DEHS) and with diols as a building block in polymeric plasticisers. DSM and Roquette ended Reverdia, their bio-succinic acid JV, last year. Roquette now runs the Biosuccinium plant in Italy, with DSM as the exclusive licensor.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.europeanplasticisers.eu**
- **www.echa.europa.eu**
- **www.epa.gov**
- **www.americanchemistry.com**
- **www.evonik.com**
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Laboratory-scale extruders help to get material formulations and running conditions right, before they are produced at full production volumes

Scaling up: advances in laboratory extruders

Plastics extrusion consumes a lot of material, so producers must ensure that processing conditions are absolutely correct before they proceed to full-scale production. This is why laboratory extruders are so important, as they help to set processing conditions under conditions that can be scaled up accurately.

However, lab extruders can also be used to make 'regular' products when circumstances dictate. Germany-based **Collin**, which develops modular pilot and laboratory lines, recently assembled a production line – including an extruder, slot die and a calender with winder – to make protective shield film in its technical centre.

"We already produce PET film for medical sectors such as hospitals and pharmacies – and are happy to offer our support here," said Friedrich Kastner, CEO of Collin Lab & Pilot Solutions.

Its cooperation with recycling specialist Next Generation Recycling (NGR) gives it a ready source of material, he added. "Due to our core competences, we were in a position to assemble a production line very quickly," he said.

With the line, Collin calenders PET films with a thickness from 250 to 450 microns for visors, though thinner and thicker films can also be produced. The machine can be used in calender and in cast mode. The machine can perform film casting, as well as extrusion coating of packaging films and non-woven fabrics for hygiene and medical products. In addition, the calender can be enhanced with modules such as camera inspection, surface treatment or web edge control.

At the same time, Collin has established two new representatives in China and one in Vietnam.

Techwin Medical Science is now representing Collin for presses, extruders, blown film lines, roll mills and other products in the medical arena in China; Team Testing Equipment (TTE) is representing it in the petrochemical and plastics industry. Both companies are based in Shanghai. Song Song, based in Ho Chi Minh City, will represent Collin in Vietnam.

Multi-layer lines

Thailand-based **Labtech** launched a number of new lab-scale extrusion lines at K2019 last year.

Its Compact LCF-400 co-ex film blowing line is a

Main image: Collin's new line is used to make protective shield film

Above: Sophia Faust uses Brabender's Metabridge software to access data in her biodegradable film project

low-cost alternative to its regular blown film lines. It has five modular extruders of 'low boy' type, connected to a five-layer pancake-type blown film die – designed by John Perdikoulias of Compuplast in Canada. It is mounted on a sturdy steel foundation, which is equipped with casters and levelling bolts for easy positioning. The whole film tower is mounted on low-friction slides so can easily be moved to give full access to the die.

The standard line has a stabiliser cage with Teflon rolls, polished wood collapsing frame, hard-chromed and rubber haul-off rolls and a surface winder. This is mounted over a die assembly on a 360° oscillating tower frame.

It is designed to take up minimal floor space. Oscillating nip rolls are fitted as standard, and motorised height adjustment of the tower nip gap with collapsing frame allows optimum flexibility of blow up ratio and bubble cooling rate, says the company

The company also added two coextrusion film lines to its Ultra Micro range, which is designed to reproduce larger lab and production lines. One of the lines is a three-layer line for film and sheet (ABC or ABA); the second is a five-layer line co-ex line for blown film (ABCDE). Both are based on the company's conical, single-screw extruder. The screw has an ending diameter of 8mm – yet can still process regular-sized pellets.

Pea power

Sophia Faust, a student at the **Albstadt-Sigmaringen University of Applied Sciences** in Germany, is conducting a study into making a biodegradable plastic film from pea protein. It will form the basis of her thesis.

Faust has been carrying out research work at **Brabender**, which includes using a TwinLab-F 20/40 twin-screw extruder. Pea protein isolate is thermally and mechanically treated and formed into a film through a ribbon die.

The compact TwinLab-F 20/40 includes an integrated drive. With a rotational speed of up to 1200rpm, it offers greater flexibility when it comes to energy input and throughput, says Brabender. The cylinder is split horizontally and is hinged at both sides, which makes the segmented screws easily accessible. Data is accessed via Brabender's Metabridge software.

To achieve elasticity of the film, a plasticiser is added in different concentrations. Important physical properties of the finished films are determined, and the influence of the different plasticiser concentrations observed. These properties include tensile strength and elasticity. Finally, results are summarised in a publication and compared with literature results.

In the ideal scenario, the film will have barrier properties and mechanical stability, with similar properties to a conventional plastic film – while being biodegradable.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.collin-solutions.com**
- **www.hs-albsig.de**
- **www.labtechengineering.com**
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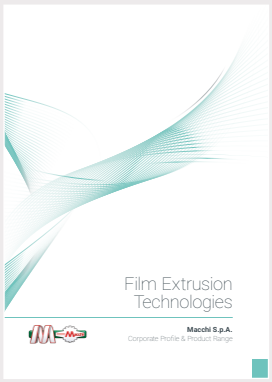

This 28-page brochure from Macchi covers the company's wide range of film extrusion technologies including coextrusion lines, wide webs, die heads, take offs, winders, trim recovery and control systems.

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COLINES: BARRIER FILMS

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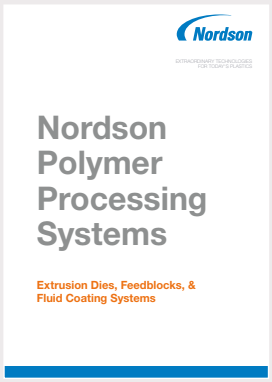

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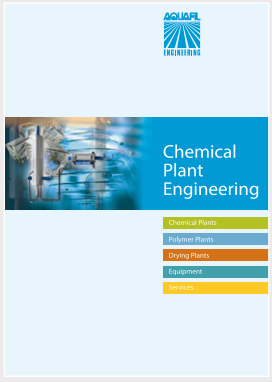

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WATERPROOF MEMBRANES

Taking place on 16-18 November 2020 in Bonn, Germany, Waterproof Membranes provides a global forum for discussion of the latest solutions, technology and market trends within bitumen, polymeric and liquid membranes across all waterproofing applications.

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STRETCH & SHRINK FILM

The 15th edition of AMI's Stretch & Shrink Film US conference will take place on 30 November to 2 December in New Orleans, Louisiana. The annual conference hosts brand owners, retailers, stretch and shrink film producers and distributors, plus raw material suppliers.

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THIN WALL PACKAGING

AMI's Thin Wall Packaging conference on 30 November-2 December 2020, in Nuremberg, Germany, offers a meeting point for the industry to debate business trends and improvements in packaging technology, as well as legislation driving change.

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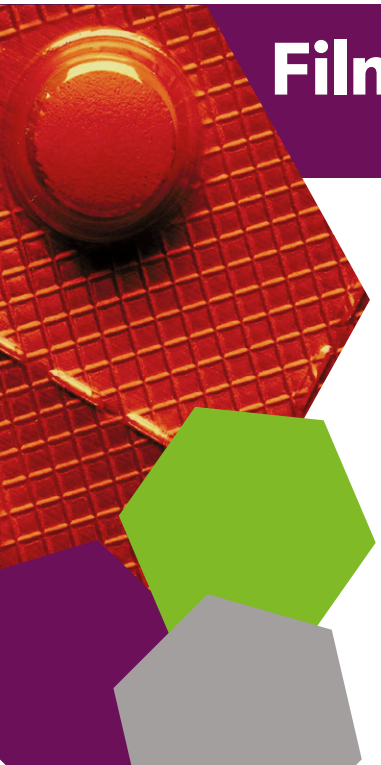
To see our full line-up of more than 50 plastics industry events over the next 12 months, please visit www.ami.international/events

Plastchim-T

Head office:	Tervel, Bulgaria
CEO:	Aydan Faik
Founded:	1967
Ownership:	Private
Employees:	Around 1,000
Profile:	Plastchim-T, founded in 1967, is a specialist in biaxially oriented film and cast film. Its main product lines are flexible packaging and packaging film. From its origins as a local producer of PP yarn and PE film, it now exports its products to countries in Europe, North America, Asia and Africa.
Product lines:	The company offers a range of flexible packaging products and films. Its films include cast PP, BOPP and PE products. Its PLPEDF, for instance, is a three-layer PE blown film that packs food products for freezer storage down to -25°C. It also offers several CPP films, such as PLCB – which has one corona-treated side. Its extensive range of BOPP film includes FXCMLS, a co-extruded, metallised film with good barrier properties. Its flexible packaging products include flexible intermediate bulk containers (FIBCs) and PP bags, for products such as construction materials, fertilisers and sugar.
Factory locations:	Plastchim-T has three factory locations within Bulgaria – in Tervel, Aksakova and Devnya. The Devnya plant opened in 2019. In total, the company says it has an annual output of 110,000 tonnes of BOPP film, 12,000 tonnes of CPP film and 2,500 tonnes of PE film. It recently ordered a hybrid BOPP/BOPE stretching line from Bruckner. The 6.6m wide line makes five-layer film and includes an inline coater – to make very thin functional layers. The line is due to be fully commissioned next year.

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:

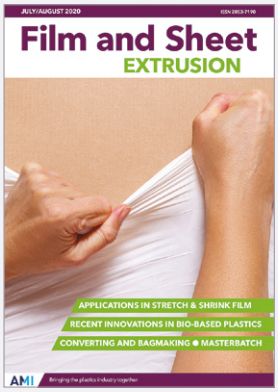
October 2020	**November 2020**
Extruder developments	Thin wall packaging
Recycling	Sheet materials
Mineral fillers	Construction
Multi-layer packaging	Active/intelligent packaging

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

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

Keep informed: read our latest editions

AMI publishes five process-specific FREE plastics industry magazines. Simply click on the cover below to read each magazine. Or download the issue in the relevant Apple or Android app



Film and Sheet
July/August 2020
The July/August 2020 edition of Film and Sheet Extrusion magazine looks at developments in shrink and stretch films. It also explores the latest in bioplastics, masterbatches, film conversion technology, and progress in European PVC recycling.

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Film and Sheet
June 2020
The June edition of Film and Sheet Extrusion magazine takes a look at some of the latest developments in printing systems. It also explores new ideas in pouch packaging, blown film control technology and downstream equipment.

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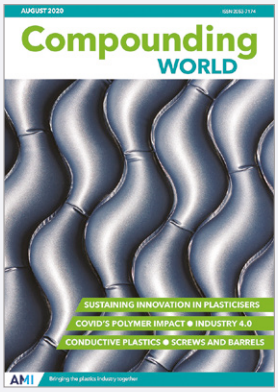

Compounding World
August 2020
The August issue of Compounding World delves deep into thermally conductive additives and production data usage, plus the latest on development of sustainable plasticisers and what's new in screws and barrels.

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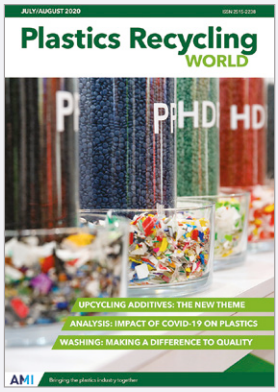

Plastics Recycling World
July/August 2020
The July/August edition of Plastics Recycling World looks at additives for "upcycling" recycled polymers, recycling of WEEE/ELV plastics, and washing technology. It also includes unique AMI data and analysis on recycling demand and the global impact of Covid-19.

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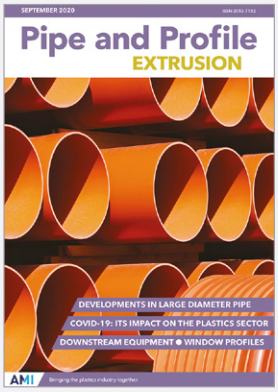

Pipe and Profile
September 2020
The September issue of Pipe and Profile Extrusion looks at how growth in sizes is affecting developments in large diameter pipes. Another feature covers new materials playing a role in improving performance of window profiles. Plus downstream extrusion equipment.

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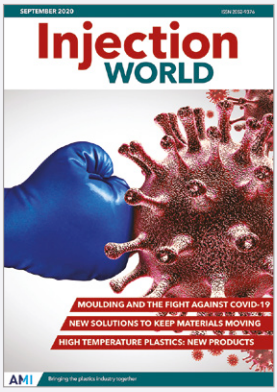

Injection World
September 2020
The September issue of Injection World has an in-depth feature on medical technology, and how injection moulders and machinery groups are contributing to the fight against Covid-19. Plus new products in temperature-resistant polymers and the latest in materials handling.

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Take out your own FREE subscriptions to any of the magazines. Click on the logos below to simply register on-line.

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

GLOBAL EXHIBITION GUIDE

2020	**7-8 October**	Plastics Extrusion World Expo Europe **POSTPONED**	https://eu.extrusion-expo.com
	29-31 October	MECSPE, Parma, Italy	www.mecspe.com
	4-5 November	Plastics Extrusion World Expo USA **POSTPONED**	www.extrusion-expo.com/na/
	8-11 November	Pack Expo, Chicago, USA **CANCELLED**	www.packexpointernational.com
	23-26 November	All4Pack, Paris, France **POSTPONED**	www.all4pack.com
	2-4 December	Plastic Expo, Tokyo, Japan	www.plas.jp/en-gb.html
2021	**11-14 January**	Plastimagen, Mexico City, Mexico	www.plastimagen.com.mx
	25 February-3 March	Interpack, Dusseldorf, Germany	www.interpack.com
	1-3 April	Plastics Printing Packaging, Dar-es-Salaam, Tanzania	www.expogr.com/tanzania/pppexpo
	13-16 April	Chinaplas, Shenzhen, China	www.chinaplasonline.com
	4-7 May	Plast 2021, Milan, Italy	www.plastonline.org/en
	17-21 May	NPE 2021, Orlando, USA	www.npe.org
	1-2 June	Plastics Extrusion World Expo Europe **NEW DATE**	https://eu.extrusion-expo.com
	22-25 June	Colombiaplast **NEW DATE**	www.colombiaplast.org
	29 June-1 July	Interplas, Birmingham, UK	www.interplasuk.com
	14-18 September	Equiplast, Barcelona, Spain **NEW DATE**	www.equiplast.com
	3-4 November	Plastics Extrusion World Expo USA **NEW DATE**	https://na.extrusion-expo.com

AMI CONFERENCES

20-21 October 2020	Agricultural Film Virtual Global Summit
3-4 November 2020	Chemical Recycling Europe, Hamburg, Germany
16-18 November 2020	Waterproof Membranes Europe, Bonn, Germany
24-25 November 2020	Single-Serve Capsules Europe, Berlin, Germany
30 Nov-2 Dec 2020	Thin Wall Packaging Europe, Nuremberg, Germany
30 Nov-2 Dec 2020	Stretch & Shrink Film North America, New Orleans, USA
28-29 January 2021	Stretch & Shrink Film Asia, Bangkok, Thailand
2-4 February 2021	Polyethylene Films North America, Coral Springs, USA

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

www.ami.international

PLASTICS RECYCLING WORLD EXPO

POLYMER TESTING WORLD EXPO

PLASTICS EXTRUSION WORLD EXPO

COMPOUNDING WORLD EXPO

1 - 2 June, 2021
ESSEN, GERMANY

3 - 4 November, 2021
CLEVELAND, OHIO

www.ami.international/exhibitions