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Pipe and Profile EXTRUSION

SHOW PREVIEW

PLASTICS EXTRUSION WORLD EXPO

Essen, Germany
29-30 September

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PREVIEW: PLASTICS EXTRUSION WORLD EXPO

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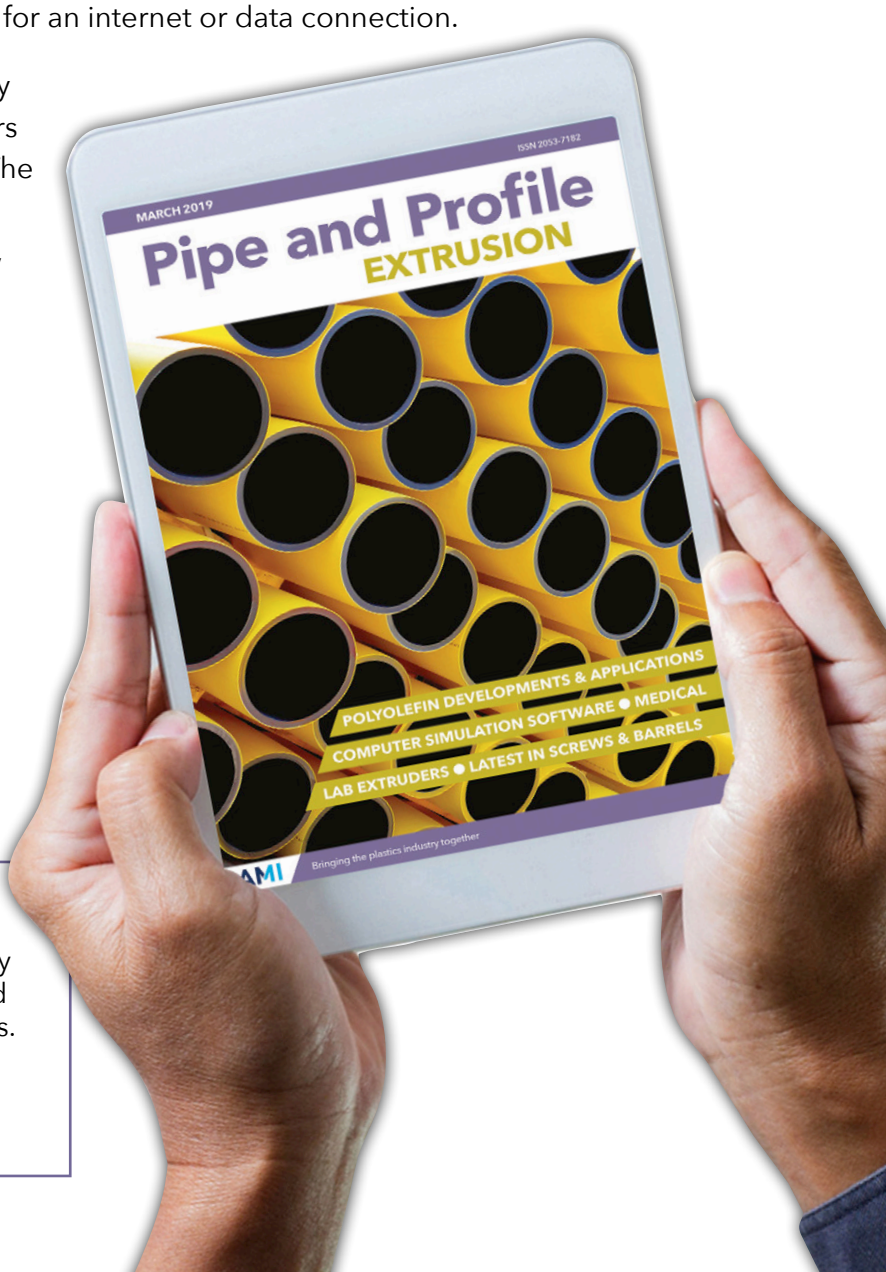

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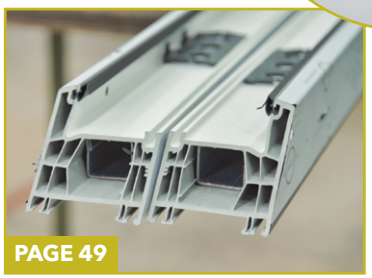

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Compounding WORLD

IMAGE: AMI

Getting back to business

Travel and live events are back at last. While Covid has certainly not been consigned to history, the highly successful vaccination, testing, and mitigation strategies implemented by national authorities mean our industry's business activities can now, finally, begin to return to a sort of normality. And as a first step towards that, I'm pleased to be able to invite you to join me and my colleagues at one of our two **Plastics Extrusion World Expos**, which take place in Europe and America later this year.

Organised by *Pipe and Profile Extrusion* publisher AMI, the first of these 'real world' events will be held in Essen in Germany on 29-30 September 2021, while the second takes place in Cleveland, Ohio on 3-4 November 2021. Both are free-to-attend and mark a return to 'face-to-face' networking and learning for the plastics industry (you and any of your colleagues can register for free tickets **here**).

Whether you join us in Europe or North America, you will benefit not only from a focused plastics extrusion expo, but also be able to visit the co-located Compounding World, Plastics Recycling World and Polymer Testing World Expos. Altogether, each location will include more than 200 exhibitor companies.

See the current European exhibitor list here
See the current American exhibitor list here

Aside from the exhibitions, you will also be able to participate in the five free-to-attend conference theatres running at each event. These include dedicated plastics extrusion sessions with panel discussions exploring the future of the plastic pipes industry, plus technical talks on developments in processing and materials technologies, as well as sustainability issues. Extrusion visitors can also join any of the compounding, recycling and testing theatres. Altogether, you can choose to listen to and learn from any of 100 expert speakers at each location.

View the European conference programme here
View the American conference programme here

Of course, these two expos will be different from their predecessors. International health experts and governments have made great progress in managing Covid, but it is certainly not defeated. Hygiene and infection mitigation measures will be evident across the venues, during your travel, and at your accommodation. All of us at AMI take the health and safety of our expo exhibitors and visitors very seriously. You can rest assured that we are working with our venue partners to ensure all necessary precautions are in place and these will be clearly communicated to all registered attendees before and on arrival at each expo to make sure you have a safe, effective, and enjoyable experience.

The Plastics Extrusion World Expos present an ideal opportunity for our industry to begin to get back to business and to reconnect with customers and suppliers. I really hope to see some of you in either Essen or Cleveland later this year.

Chris Smith
Editor-in-Chief
AMI Magazines

Main image: The scene is now set for a return to face-to-face business activity such as this (show floor from the 2019 expo in Cleveland, US)

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Deceuninck posts 'record' interim sales

Belgian profiles producer Deceuninck says it posted 'record' sales in the first half of this year.

Sales in H1 rose to €404 million (US$478m), an increase of nearly 40%. At the same time, an adjusted EBITDA of €51m (US$60m) was almost twice last year's figure

The main driver for the increase was a strong residential construction market in all regions, which led to a 31.5% volume growth. Home improvement was also buoyant, while new build benefited from increased demand for single family homes.

"Despite constrained supply of raw materials, we have realised a strong volume growth in all our regions," said Francis Van Eeckhout, CEO of Deceuninck. "Yet, due to strong demand and raw material scarcity, we have not always been able to meet our delivery terms towards our customers."

He said that, to avoid production outages, it had to accept higher purchase prices – and increase selling prices several times.

"Going forward, we might have to further increase our prices to protect our margins or to restore them in some markets," he said.

The company also expects further raw material price increases, though more moderate than before.

Deceuninck is expanding its recycling site in Diksmuide, Belgium – which is expected to be fully operational by the end of this year.

Overall, the company expects "the strong performance of the residential construction market seen in the first half of the year to continue in the second".

› **www.deceuninck.com**

Putnam adds capacity in medical manufacturing

US-based Putnam Plastics has finished building an extension to its manufacturing facility in Dayville, Connecticut.

The new 57,000 sq ft space will be used for clean manufacturing, increasing production capacity for existing and new medical device customers. New equipment includes several new extrusion lines, along with braiding and coiling machines to make reinforced catheter shafts.

As well as adding machinery, the company intends to hire more than 100 new staff. The expansion will also allow Putnam to keep everything under one roof – such as the tooling room and engineering team.

Putnam Plastics has added a 57,000 sq ft extension to its facility in Dayville, Connecticut

"This space will allow us to increase our capabilities in both manufacturing and product development," said Jim Dandeneau, CEO of Putnam Plastics.

Putnam says the expansion will avoid unnecessary duplications in personnel that is common when working across different locations. The company adds that it can minimise logistical issues and increase overall efficiency.

› **www.putnamplastics.com**

Veka ups capacity in USA

German window profile manufacturer **Veka** is to raise extrusion capacity in North America.

The company is to invest more than US$48 million in 2021 and 2022 to expand capacity at its four US-based plants. In total, it will add 23 extrusion lines – expanding both window and door profile extrusion and outdoor products.

"We see excellent potential in working with our existing customers to take advantage of a strong market that promises to continue for the foreseeable future," said Joe Peilert, president and CEO of Veka North America.

The company is also looking to hire extra staff in order to "address a current bottleneck affecting most building products manufacturers".

"While we believe availability of raw material components will be tight through the end of the year, we see labour availability as an ongoing issue," said Peilert.

Veka's North American facilities are in Pennsylvania, Texas, Nevada and North Carolina.

The expansion comes just months after Veka announced plans to invest in a 25,000 sq m production and logistics site in Chile in South America, which will help to expand output there.

› **www.veka.com**

Increased demand helps Uponor report strong results in first half

Pipes giant Uponor has reported increased sales and profits for the first half of this year.

The company posted sales of €663 million (US$784m) – a growth of nearly 20%. Its operating profit of €94m was nearly 60% ahead of the same period in 2020.

For the second quarter, both sales and profit were well ahead of the same period last year.

"Strong demand combined with a solid operational performance drove the increase of our operating profit and profitability," said Jyri Luomakoski, president and CEO of Uponor. However, he added that the comparison period was weak "due to Covid-19 related lockdowns".

Building solutions in Europe had a strong performance, with net sales growing in most markets. Increased sales volumes, and initiatives under the operational excellence programme, drove the improved profitability, he said. Net sales and operating profit also improved in building solutions in North America. Demand has been at a high level in both the USA and Canada, he said.

However, while Uponor Infra's net sales increased, its operating profit decreased. This was due to increased input costs – which was partly offset by higher sales volumes, product mix and designed solutions sales in Norway, said Luomakoski.

The company recently revised its guidance for the 2021 financial year. It says it expects to raise both sales and profits by at least 2.5% by the end of this year – thanks to increased demand for its products.

› **www.uponor.com**

IMAGE: UPONOR

Right: Luomakoski: "Strong demand and solid performance drove increased profitability"

Lubrizol to sell C-PVC in India

Lubrizol Advanced Materials is to begin selling its C-PVC compounds in India after signing a partnership with Prince Pipes and Fittings.

The agreement will see Prince Pipes and Fittings begin to manufacture and sell Lubrizol's Corzan C-PVC in India.

"This further supports Lubrizol's long history and commitment to the Indian market," said Scott Mold, general manager for TempRite engineered polymers at Lubrizol. "With Prince Pipes, I am confident this partnership will prosper and deliver a high standard of quality."

› **www.lubrizol.com**

Capacity expansion programme helps Trex add sales and profits

US decking manufacturer Trex has reported a 32% increase in sales for the first half of the year.

The company, which makes products from wood-plastic composites (WPCs), posted sales of US$557 million for the period. Within this, sales of residential products rose 34% to reach US$532m.

Profitability for the period (EBITDA) exceeded US$162m – a 29% increase on the previous period in 2020.

"Strong second quarter revenue growth was driven by broad-based demand across all residential product lines and market share gains from wood," said Bryan Fairbanks, chairman and CEO of Trex.

The completion of a US$200m capacity expansion programme helped Trex to increase sales by 43% in Q2.

"As expected, higher raw material costs and logistic expenses pressured second quarter gross margin," said Fairbanks. "This was partially offset by growth in the residential segment."

Higher than expected productivity at its new facility Virginia – which added 350 jobs – will help Trex manage some of the inflationary pressure seen in the first half of this year.

"For the third quarter of 2021, we expect net sales of US$320-$330m," he said.

› **www.trex.com**

IMAGE: TREX

Above: Trex is best known for its decking and railing products

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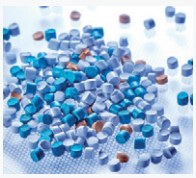





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Simona interim sales and profits increase

German plastics extruder Simona – whose products include plastic pipe – saw sales and profits increase in the first half of the year.

The company reported sales revenues of nearly €260 million (US$307m), an increase of 30% compared to the same period last year. It put this down to a general recovery in the global economy – and enjoyed a particularly strong second quarter (sales up 51% to €138m, or US$163m).

Profitability (EBIT) for the first half of the year rose by more than 80%, to €27m (US$32m).

"Buoyant global demand for plastics led to a considerable increase in the cost of raw materials, which we were able to offset to some extent by raising prices,"

Schönberg: "Simona products in high demand in construction, chemical plants and semiconductor factories"

said the company.

Another reason for the increased sales was the inclusion of revenue from newly acquired businesses. These include Simona Stadpipe in Norway – which works in aquaculture – and Simona Plastech in Turkey, which mainly provides pipes and fittings for waste water supply and energy transport.

Overall, sales in Europe rose by almost 34% to reach €175m (US$207m). In North America, sales rose by around 18% to €66m (US$78m), while Asia saw a 50% increase in sales to around €19m (US$22m).

"Our products are in high demand within construction, and are also used in the expansion of chemical plants and semiconductor factories," said Matthias Schönberg, CEO of Simona.

Based on these results, Simona has raised its revenue guidance for the year as a whole to €495-505 million (US$585-597m).

› **www.simona.de**

Eurocell bounces back in H1

UK-based window profiles manufacturer Eurocell has bounced back with a set of positive results.

First-half sales of £168 million (US$231m) were up 80% compared to the same period last year, and by around 23% compared to the first half of 2019 (which was seen as a better comparison).

As a result of the strong H1 performance – and expected further improvement in H2 – Eurocell estimates pre-tax profits for the full year to be around £23m (US$32m).

The strong performance was underpinned by high demand in the repair, maintenance and improvement (RMI) market. Sales in profiles was up by 19%, while building plastics rose 23% due to strong performance across the full range of own-brand products and traded goods. The company opened four new standard format branches in H1, with eight more to follow in H2.

› **www.eurocell.co.uk**

Dura-Line flags quality issue

Dura-Line, part of Orbia, says that earlier this year it paused delivery of some small diameter pipe for natural gas distribution, due to a quality issue. The pipe, mainly for use in the USA, was of 1.5in diameter or smaller. The company said that the pipe affected had "short, localised segments where the pipe walls were thinned below specification".

It says it has received demands for compensation – and expects to get more.

› **www.orbia.com**

Nordson grows with acquisition of NDC

US-based Nordson has acquired NDC Technologies – which supplies a range of measurement systems for plastics extrusion.

Nordson says the move will expand its test and inspection capabilities into new end markets and adjacent technologies. The cash transaction is valued at around US$180 million.

"NDC will bring new capabilities and expertise to our test and inspection platform," said Jeffrey Pembroke, executive vice president at Nordson Advanced Technology Solutions. "The acquisition is further progress on our strategy to achieve top-tier growth with leading margins and returns."

NDC, based in Dayton, Ohio, employs around 300 people.

Marti Nyman, president of NDC Technologies, added: "We are excited to join the Nordson family. This will afford us the opportunity to continue to deliver innovative measurement and process control solutions."

› **www.nordson.com**

› **www.ndc.com**

GFPS moves ahead in 2021

Georg Fischer Piping Systems (GFPS) has reported strong interim results.

The division – the largest part of parent company Georg Fischer, accounting for around 54% of sales – posted half-year sales of CHF983 million (US$1,076m). This was a 16% increase compared to the same period last year.

It also reported a profitability (EBIT) of €128m (US$140m) – an increase of 36%. The division's strong recovery was due mainly to its presence in growth markets and segments such as microelectronics, water and gas infrastructure, said the company.

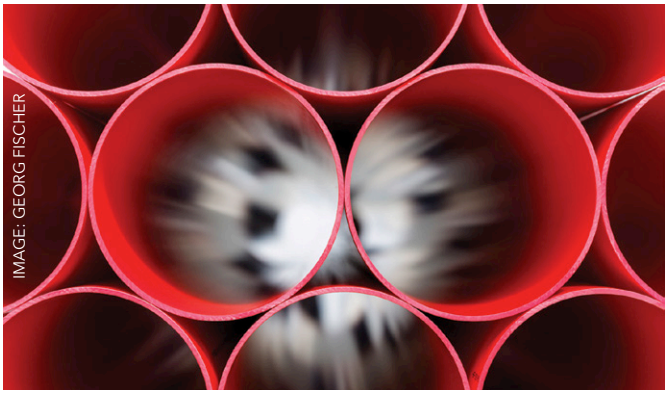

IMAGE: GEORG FISCHER

GFPS added that sales in the first half of the year were "spearheaded by China". Asia as a whole accounts for 31% of sales, with Europe taking 45% and the Americas 19%.

For comparison, the parent company grew sales by 20%, while EBIT more than doubled. The main contributor to this was casting solutions, which grew sales by nearly 40%.

The pipes division is focusing its efforts on solutions with sustainability benefits. An example is non-destructive testing of pipe connections in infrastructure installations. GFPS has also been adding capacity in fast-growing markets, such as the acquisition of FGS Brasil last year.

The company is also building a plant in Yangzhou, China, with production there expected to start by the beginning of next year.

The recovery seen in the first half of this year is expected to continue, driven by healthy order intake, and initiatives such as government infrastructure projects.

"GF expects sales growth in the double-digits in 2021, as well as a substantial increase in profit," it said.

› **www.georgfischer.com**

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IMAGE: SHUTTERSTOCK

From reeling in finished product to checking its quality, downstream equipment ensures that extruded pipe and profile is properly handled once it has emerged from the die

Handling with care: latest in downstream equipment

Once pipe or profile has been extruded from the die, the task of checking its quality – and preparing it for onward delivery – begins. This ranges from determining pipe diameter and surface quality through to coiling pipe onto reels or cutting it to size.

Maillefer has developed a pipe reeler for micro-ducts that offers an extension in product length.

The KWD reeler for micro-ducts was previously limited to a 1000mm reel but is now available in a 1250mm version.

"Extrusion line performance and micro-duct tube lengths for blown fibre bundles continue to be the subject of improvements and innovative design," said Philippe Giovangrandi, technical director at Maillefer. "We've given a boost of nearly 2/3 more in product length capacity at the reeling end of our micro-duct lines."

The KWD 1250 automatic dual reeler integrates to the end of Maillefer's Micro-duct Pipe Extrusion Line, where it conditions micro-duct ranging in diameters of 3.5 to 16 mm. The larger machine can handle full reels from 650 to 1250mm, weighing up to 300kg. A 67% potential increase in volume leaves more lay room for product, says the company.

Finished reels with longer lengths become an advantage in the next operation: assembly and sheathing.

Individual micro-ducts can be brought together to be bundled and jacketed into a principal duct. A bundle can count up to 24 micro-ducts and measure a total outer diameter of up to 63mm. By having longer micro-ducts available – from each reel that feeds assembly and sheathing – a longer bundle can be produced in one go before requiring a new joint or junction.

For longer lengths, Maillefer offers an alternative that uses barrels rather than a reeler. Its automatic barrel packer is suited for getting more length at high speeds into octagon barrels. It offers several cost-related advantages – including a shorter time to produce bundles thanks to fewer interruptions in

Main image: Maillefer says its KWD 1250 reeler can handle longer lengths of micro-ducting

FB BALZANELLI

Above: FB Balzanelli has updated its automatic coilers to accommodate larger pipe sizes

micro-duct lengths. Tube lengths that are contained in high-capacity barrels are much longer than those on a reel. Also, by laying the tube down in a loose fashion, micro-duct integrity is retained in a relaxed form.

Octagon barrels are easy to stack and store before being used in the subsequent assembly operation, while unwinding from octagon barrels is quite simple, says the company.

Coiling update

FB Balzanelli of Italy has modified its range of automatic coilers for larger pipe sizes.

The company says that installing pipe from a coil is simpler and faster for installers – because less welding is required. It says that its Excellence series of coilers – such as the TR3510PE and TR3515PE – add new features that add automation and make the equipment safer to operate.

The coilers can be upgraded in steps and include two main elements: a round pipe system; and automatic strapping.

The round pipe system features one haul-off on board that reduces ovalisation while optimising the coiling process. It adds several benefits during coiling, including: pipe control while securing to the reel; better control of ovalisation when coiling; and reducing the reel internal diameter, to give more compact coils that are easier to transport.

Automatic strapping systems – with one or two strapping heads – improve coiler performance, making it safer to operate. Strapping is performed automatically on large coils. Safer, faster strapping allows coiling stop time to be reduced. Where necessary, strapping time can be reduced by adding a second strapping head.

Radar measurement

US-based Jet Stream – a manufacturer of construction-grade pipe systems – is using a Warp radar system from **Inoex** to monitor pipe diameter.

One of Jet Stream's specialities is C900 PVC pipe for high pressure water distribution, in diameters of 4-24in – which must not be made out of specification.

Before using a Warp system, Jet Stream did not have a good way to measure critical pipe attributes during production. Instead, it relied on inspection after pipe had been sawed to its final length. The C900 line is quite long – with two cooling tanks, a haul-off unit and sawing station after the vacuum tank. This means that a lot of material was already in process if a problem was detected in inspection.

After Jet Stream installed a Warp unit after the vacuum tank it could see what was happening in the process in real time.

The company can now see impending problems immediately and adjust for them before non-conforming product is produced.

"We can also see how our process spread looks relative to the tolerances – and adjust so we don't give away all this free material," said Paul England, assistant plant manager at Jet Stream.

Jet Stream has also found that the measurement data enables it to get start-ups producing good pipe more quickly. Initial projections on the payback time for the system were very accurate. Through material savings and reduced scrap, it is already paying for itself, said the company.

Faster measurement

Pixargus says that its AllRounDia DualVision system has helped **Uponor** speed up production of composite pipes.

When Uponor introduced new production technology for its OD 16 to 32mm composite pipes, production speed almost doubled. The inspection systems used in quality control were unable to cope with this. So, the company invested

IMAGE: INOEX

Right: The Warp system from Inoex allows operators to adjust production to correct for excess material use

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IMAGE: PIXARGUS

Above: The AllRounDia DualVision system from Pixargus has helped Uponor raise production of composite pipes

in new inspection technology from Pixargus – its AllRounDia DualVision (DV) system.

Pixargus says it is the first 360-degree inspection system for round products. It combines surface inspection and dimension measurement within one sensor head and shows the measured data in real time on the display. The first system has been in operation at Uponor in Zella-Mehlis for one year.

Uponor uses the quality data to optimise the production process. Process parameters can be analysed over time. In this way, Uponor can see whether certain machine settings lead to more or fewer defects – allowing it to refine its recipes.

"The system can measure the diameter and ovality, and inspect the complete surface area of round extruded products for a wide range of materials," said Michael Frohn, sales manager at Pixargus.

After the successful commissioning of the first system, Uponor has ordered three more AllRounDia DV systems.

Cutting innovation

Baruffaldi of Italy has developed a number of recently downstream innovations.

One is a double hot blade guillotine – in two sizes. Each can cut plastic profiles coming from two extrusion lines that are close to each other. Also, the servo-driven guillotines can perform angled cuts thanks to the rotation of the cutting group that is assembled on a metal plate. The smaller guillotine has a cutting section of 100 x 200mm, while the larger one has a cutting section of 200 x 300mm. In addition, Baruffaldi can customise the guillotine according to the specific customer requirements.

Baruffaldi has also developed the iCut pipe cutting system, which has no planetary blade. The reduced size improves dynamics and enables short pipe lengths to be cut more quickly and without material removal – avoiding the production of dust. It also has low energy consumption. Further advantages include a reduced number of moving components – and less maintenance – as well as increased precision and flexibility.

Baruffaldi has also conceived a palletiser that is equipped with a robot – with two rotational clamps that move vertically and horizontally. It takes cable ducts and rotates them by 180°, and deposits them in an orderly manner, says the company.

Cutting it

Gillard of the UK has developed a new extrusion cutter called Servo-Torq Spiral-Cut.

The new range of machines can handle tube diameters from 3 to 60 mm. It is typically used to cut semi-rigid plastics, including PE, PP and PA.

The Spiral-Cut includes an Accra-Feed caterpillar infeeder and a Servo-Torq fly-knife cutter that cuts the finished tubes to length. A length cutter & a coiling head can be added if required.

The machine is designed to cut a right- or left-handed spiral along a length of plastic tube. It is typically used to cut cable-wrap and similar products. Options include blade lubrication and a pre-heater system (which is recommended for more rigid polymers or thicker walled tubes).

The Spiral-Cut rotates a specially designed knife

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IMAGE: GILLARD

Above: Gillard's Servo-Torq Spiral-Cut can handle tube diameters from 3 to 60 mm

blade at high speeds. The tube is cut with the spiral longitudinally as it passes through the centre of the cutting head. The pitch of the spiral is determined by adjusting the cutter blade rotation speed relative to the extrusion line speed. Features and benefits include: Lenze i700 multi-axis AC servo control for optimum speed and accuracy; faster blade speed for a larger spiral pitch range; full-colour 178mm (7in) touch-screen panel; twin direct drive servo motors powering the puller belts via planetary gearboxes; slide-away cutter head to make in-line start-up easier; and a compact design.

Optimised measurement

Sikora says that its Ecocontrol processor systems – available in three models – help to control and optimise production processes.

Ecocontrol processor systems are available with 22', 15' or 8.4in TFT screens. All models are characterised by their simple, intuitive touchscreen operation and a clearly arranged display.

Recorded production data can be stored on the internal SSD hard disk or directly on a server. Production reports (time-, length- and batch-based) are also available for all Ecocontrol models. These are used in quality control – and in daily production – to document product quality over a defined period of time.

Right: Sikora offers three separate Ecocontrol processor systems

The Ecocontrol series has all standard market interfaces, such as Fieldbus and OPC UA, to transfer measurement data. The devices are ideally suited for use in modern tube and pipe extrusion lines with increasing levels of automation, says Sikora.

As well as displaying and documenting measured data, the series offers its own automatic control with the Set Point module. Here, the processor system modifies the haul-off speed or extruder speed to control to the nominal value of the wall thickness. The Ecocontrol models enable a higher degree of automation (especially for older extrusion lines) and raise process reliability.

Constant speed

Bellaform says that its A 600 take-off ensures constant speeds for all types of extrusion line.

The belts of the upper and lower carriages are controlled by two separate direct drives, removing the need for toothed belts (which are maintenance-intensive). In addition, both carriages are movable, to ensure a stable centre and greater accuracy.

The A 600 allows synchronous gap adjustment, for constant product centring. Extruded products are guided by side rollers, in which the roller spacing can be adjusted by a hand wheel on the roller guide.

It also allows quick opening: in the event of a malfunction, the lower and upper carriages return to their maximum gap positions. Product through-put is monitored by a counter wheel.

Pipe equipment

US-based **Conair** has introduced a complete line of downstream pipe processing equipment and

IMAGE: SIKORA

tooling, called PipeMaster.

The equipment is available in six size ranges, for pipe diameters from 0.4-24.9in (10-630mm) in up to five-layer construction. Conair says it should help to ensure a larger share of the equipment market for extruded PVC and polyolefin plastic pipe.

To date, Conair's pipe processing equipment has served sizes of 8in (200mm) or less.

"Extruded pipe processors can choose equipment from all over the world, with various levels of quality and price points," said Ernie Preiato, vice president of extrusion for Conair. "Our feedback from processors was that they wanted a reliable US source for equipment that delivers high-end quality but without the huge price tag."

Preiato said the key to the PipeMaster line – which includes spray tanks, puller/haul-off units, saw cutters, and drop-off tables – is in its simplicity and attention to the needs of processors.

"This equipment combines rugged construction with simple, well-engineered controls," he said. "It is complemented by a range of the extruder tooling, including pipe dies and calibration sleeves – which most processors need, but often have difficulty finding or building at a competitive price."

Monolayer and multilayer pipe extrusion dies are optimised to different material types and for a range of pipe diameters (63, 110, 160, 250, 400 and 630mm). Each die is mounted on a movable, height-adjustable stand and features polished, heat-treated internal surfaces. Interchangeable die pins and nozzles allow dies to produce multiple sizes of pipe.

Multilayer extrusion dies can extrude up to five layers in a single pipe. Output is 550-3520 lbs/hr (250-1600 kg/hr).

PipeMaster includes a full range of pipe calibration tools, with options for dry sizing or water-ring cooling and sizing. Vacuum immersion, vacuum-spray, or immersion-only cooling tanks with single or dual chambers are available. All tanks feature stainless steel construction, painted-steel exterior surfaces, simple frame-mounted controls and fully-adjustable stands.

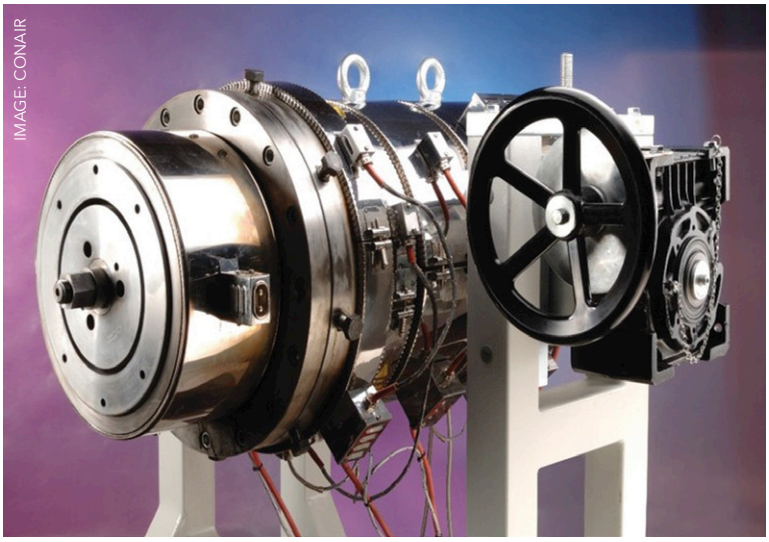
IMAGE: CONAIR

Above: Pipe dies are just one element of Conair's PipeMaster range of downstream pipe equipment

Cleated puller/haul-off units automatically synchronise their speed with that of the extruder screw.

Servo-driven pipe cutting units, also synchronised to line speed, measure and cut pipe in a variety of lengths. Multiple cutter types accommodate different pipe sizes and application requirements – including rotating disc cutters for chipless displacement cuts, and planetary cutters for milled or chamfered cuts.

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Think big: advances in large diameter pipe

IMAGE: UPONOR

Large diameter pipe – typically made from polyolefins – is used in a variety of end projects, including energy generation, drainage and the marine industry

Hidden beneath the surface of many large construction projects are some surprisingly large pipes – which are used in everything from sewage systems, hydropower plants and even fish farms.

For instance, FishGlobe of Norway has constructed an enormous floating fish farm – 18m tall and 22m in diameter – using polyethylene pipe from **Uponor** subsidiary Weholite. The company says it is the world's largest PE plastic structure designed for marine conditions.

FishGlobe wanted to build it using PE100 plastic – but it needed to be strong enough to withstand the conditions of the Norwegian Sea and support the size of the structure, which weighs around 200 tonnes.

The project uses both Weholite pipes and Wehopanels, made from layered PE profile.

These durable structures can be dimensioned individually for applications including tanks, underground pumping station chambers and floating or submerged marine structures. In recent years, many innovative new products and structures have been developed using Wehopanel.

"This project is the only one of its kind in the world," said Kari Karjalainen, export manager at Uponor Infra. "No PE plastic structure of this size has ever before been designed and built for use in marine conditions."

Karjalainen said that a Wehopanel profile was customised for FishGlobe, because no panels this strong and large had been made before. Calculation results ran to "hundreds of pages", to ensure the durability of the structure, he said.

At its Vaasa plant, Uponor Infra robot-welded Wehopanels up to 3 x 8m, from 250 x 200 x 20mm profiles, for use as the functional shell and internal structures. A Weholite pipe with an internal diameter of 3m served as its central pipe.

Main image: FishGlobe has built an enormous floating fish farm that relies in part on Weholite PE pipe from Uponor

IMAGE: PPI

Above: A 54in diameter HDPE pipe – installed using HDD – won an award from PPE recently

In addition, there are six water feed pipes that are 1,100mm pressure pipes. These supply the facility with seawater – which is then treated and discharged back into the sea through the central pipe.

An even larger version is already being designed – with a diameter of 44m and height of 30m.

Hydropower pipe

Krah of Germany is supplying large diameter pipe to a huge hydropower project in the Philippines. The 14.5MW Siguil Hydro power plant, in Mindanao, is expected to be completed in 2022.

The 18km headrace pipeline of DN/ID 2000mm – which links collected water from a weir to the power house – has been replaced by Krah's structured wall pipes. The pipeline's original design used glass-fibre pipes. The decision to switch was made in order to ensure on-schedule delivery of the project.

Krah says that the physical characteristics of its pipes – such as workability, durability, and easy on-site weldability – make them easier to lay in the steep terrains of the mountain landscape. Another advantage, says Krah, is the ability to customise their wall design according to the needs of the project.

Krah categorised the pipes in three types, according to the depth at which they had to be buried (ranging from 4m to 15m). Part of the pipeline will also pass along concrete bridges.

Electrofusion joining helps speed up installation and can be carried out at a rate of around 36m/day. A pneumatic control test is performed every after joint is made – as joint tightness is vital for the project.

Krah adds that the non-corrosive – yet flexible – nature of the pipes makes them superior to other pipe material candidates, such as GRP and ductile iron.

Krah is also involved in other hydropower projects in the Philippines. In one – also a headrace pipeline project – the original design called for a reinforced concrete box culvert. This would have taken three years to complete – but Krah pipes are likely to help cut this in half, says the company.

Pipe award

In the USA, companies including JM Eagle and Agru America scooped awards at the **PPI** projects of the year.

In the Municipal & Industrial division, the companies supplied and installed 54in diameter HDPE pipe for a new 7.5 mile main sewer in Fort Lauderdale, Florida. The project used horizontal directional drilling (HDD) to install the pipe.

The US$65 million wastewater transmission line from the GT Lohmeyer wastewater treatment plant to the wastewater lift station was completed earlier this year – several months ahead of schedule. ›

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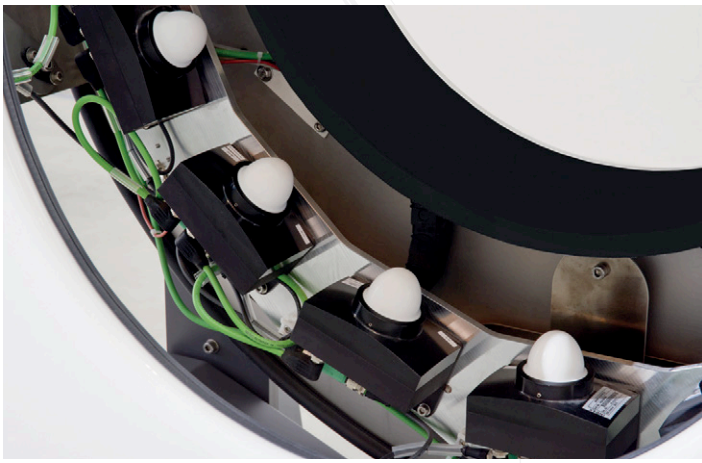

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IMAGE: DIETMAR WALSER

Above: Drainage pipe, which was later floated into Lake Constance, was welded in Agru's production hall

The project was undertaken due to frequent breaks in the city's existing 50-year-old force main. The new pipe will enable the force main to be repaired.

Boosting production

Battenfeld-Cincinnati has supplied a new extrusion line to Mexican pipe extruder Policonductos – allowing it to make pipes up to 1,600mm in diameter.

"We are enthusiastic about the range of options offered by this new line," said Homero Garza, general manager at Policonductos. "We have been able to expand our product range to include large-diameter pipes and can now also produce pipe dimensions to individual customer specifications without any problems."

The line includes a SolEx 120 NG extruder, as well as all upstream and downstream components such as gravimetric metering, EAC internal pipe cooling, vacuum tanks, spray cooling baths, haul-off and cutting saw.

Policonductos reaches an output of up to 2 tonnes/hour on the line. It makes HDPE pipes with a colour stripe for fresh water supply, sewage disposal and mining applications, with dimensions ranging from 406 x 12.5mm to 1.651 x 97.1mm.

The new line expands the range of Battenfeld-Cincinnati's fast dimension change (FDC) systems. Before, they could produce pipe in three size ranges, with the largest being 400-630mm.

Another key feature of the line is a pipe die, which comes with "the largest adjustable melt gap ever produced". Battenfeld-Cincinnati says this enables the production of pipes in a wide range of different diameters without conversion. For large pipes, such as those produced by Policonductos, a die change would be necessary on a conventional line. The adjustable die saves cost and time – while also enhancing safety, says Battenfeld-Cincinnati.

Sewage upgrade

Agru of Austria has supplied what it says is the country's "largest PE 100-RC pipe", in a lake in the provincial capital of Bregenz.

Bregenz is securing its sewer system against flooding, which involves relocating a 900m long emergency overflow from the wastewater treatment plant. In addition, it is adding a new flood pumping station, which will pump 4,000 litres per second when finished.

Agru has supplied 280m of large-diameter pipe – with an outside diameter of 1800mm in SDR 26 – to the project.

During installation, the lake section of Agru's drainage pipe was floated into Lake Constance and sunk the next day by professional divers to depths of 16m. Prior to this, contractor I+R welded together 22 prefabricated polyethylene (PE 100-RC) pipe rods – with a diameter of 1.8m – and attached concrete half-shells to the seams of the total 280m long pipe. These served as ballast during floating – and as pipe supports after lowering.

There are several reasons why the lake portion of the pipe was made in plastic.

"PE has a much longer service life than reinforced concrete or fibreglass," said Markus Ebster, head of the XXL Pipe Systems business unit at Agru. "It is also corrosion-resistant, less expensive and easier to install."

In addition, he said it is more flexible, so can withstand a swell during installation and any vibrations or settlements at the bottom of the lake later on.

Agru has also supplied PE 100-RC pipes for a district cooling project in Vienna. The pipes transport water from the River Danube to a new district cooling centre – where it is cooled. It is then transported directly to consumers via a separate network. Afterwards, warm water is then pumped back into the river.

Agru supplied several hundred metres of pipes – with outside diameters of 560-710mm – as well as providing an electrofusion welding machine, a round pressing device and peeling chain.

The new district cooling centre, built by Wien Energie, will supply buildings over an area of 300,000 sq m.

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- **www.uponor.com**
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Piping hot: recent advances in PEX

Recent PEX products include a home renovation project carried out by an experienced installer – while new research reveals details about chemical leaching from PEX pipe

Cross-linked polyethylene (PEX) pipe projects are usually carried out on behalf of others on a large scale – such as fitting out new office buildings or factories. However, one recent project shows that experienced fitters can also do it themselves.

Minnesota, US-based Justin Johnson, who has worked for many years as an installer of plumbing and heating systems, recently installed AquaPEX plumbing from **Uponor** in a renovation project in his new home. Johnson has frequently installed Uponor PEX systems for plumbing, hydronic distribution, and in-floor radiant heating applications.

"After using in-floor radiant heating on a number of projects, I had to have radiant for our new home," he said. "The elimination of dust and dry air through in-floor heating makes for a healthier home."

The radiant system featured Uponor's Wirsbo HePEX tubing, which has an oxygen barrier to prevent corrosion of ferrous system components.

The installation involved loops of tubing stapled down to foam insulation on a concrete slab. In addition, the heating system incorporated multiple zones throughout the structure – including the garage.

The heating design – created by Uponor Construction Services – segmented the floor plan into seven zones, each with its own manifold. The entire layout included 27 heating circuits. (There can be more than one PEX loop in a given zone.) The in-floor radiant installation process, involving nearly 5,500 ft of Wirsbo HePEX tubing, took two days – with Johnson and a colleague doing all the work.

They arranged the tubing in typical fashion and stapled it to 2in R-10 polystyrene foam. Once in place, they air-tested the PEX and filled the system with a glycol solution. The glycol solution runs through a heat exchanger to heat a snow-melt system outside the home.

Main image: Experienced fitter Justin Johnson has installed Uponor PEX for a radiant heat system in his home

The plumbing system was designed in a trunk-and-branch layout. This involved arond 800ft of AquaPEX in diameters of 0.5-1.25in, and featured hot-water recirculation.

One advantage of PEX that it allows higher flow velocities than copper or CPVC pipe. This allows plumbers to replace size-for-size despite a smaller inside diameter. PEX generates water around 15% faster than a same-sized CPVC system and 30% faster than copper.

American expansion

Uponor is to increase manufacturing capacity in North America by expanding its two facilities in Minnesota. It says the expansions are needed to meet growing customer and market demand for PEX pipe.

The company will add 25,000 sq ft to its Hutchinson manufacturing facility, which opened in 2018. The US$5 million renovation is scheduled for completion by May 2022. At the same time, the company will add 57,000 sq ft to its Lakeville distribution centre. The US$5 million project is due to be completed by June 2022.

"As we enter the post-pandemic business climate, Uponor is positioning itself to increase capacity and productivity," said Bill Gray, president of Uponor North America.

Uponor says this will be its 12th and 13th expansions in North America since 1990. The most recent include a US$18m million, 90,000 sq ft expansion in 2016, and a US$17m, 58,000 sq ft expansion in 2017.

After completion of both expansions in 2022, the Uponor North America's total building area will exceed 1 million sq ft.

VOC measurement

Research from Finland shows that volatile organic chemicals (VOCs) can leach from PEX pipe – especially when left to stagnate overnight.

The researchers, who were mainly from the Wander Nordic Water and Materials Institute at **Satakunta University** of Applied Sciences in Vantaa, spent five years studying water samples from PEX-a drinking water pipes in a new office building. Both pipe material and water samples from hot and cold-water pipelines were analysed.

Migration of VOCs was seen to decrease rapidly during the first months, after which PEX-a materials

began to deteriorate – due to the wearing down of organic antioxidants that were added during pipe manufacture.

The stagnation time of drinking water in contact with the PEX-a material before a sample was taken had a major effect on the analysed migration of organic compounds. This shows that the amount of organic compounds that can migrate into the water will increases when stagnation time increases.

"In this study, water samples were taken after overnight stagnation – whereas in normal use it is advisable to run water properly before drinking it," said the researchers. "Instructions will be needed for the average user to avoid harmful health effects."

The research was published in the journal *Materials*.

Chemical leaching

Meanwhile, research led by **Northeastern University** in the USA has concluded that lifecycle analysis (LCA) of PEX piping should include results from chemical leaching during the usage phase of the pipe.

"LCA is increasingly being considered in material selection decisions for residential drinking water piping," said the researchers. "However, chemical leaching during the use phase has typically been excluded – even though delivery of safe water is the core function of water distribution infrastructure."

The researchers measured the toxicity contribution of leached organics from eight PEX pipe brands. Upstream emissions from PEX pipe production were combined with empirical total organic carbon (TOC) data from leaching tests.

The total mass of organic contaminants ingested over a pipe's lifetime was estimated by fitting leaching data with kinetic models and integrating leaching concentrations and daily water use over time. Potential human toxicity from use-phase ingestion was evaluated using a range of human effect factors.

New, non-carcinogenic human toxicological effect factors were derived for around half of the 62 leached organic compounds that were identified. Results showed that potential human toxicity from upstream pipe production tended to exceed toxicity during the use phase toxicity.

"But leached contaminants can be a substantial

Right: A snow-melting project in Utah used around 36,000 ft of Rehau's Raupex O_2 barrier PEX pipe

contributor to overall life cycle toxicity, depending on the PEX brand – particularly for carcinogenic effects," said the researchers, in a paper published in *Science of the Total Environment*.

Ageing behaviour

Separate to this, French researchers have studied the ageing of silane-crosslinked PEX that has been stabilised with an excess of phenolic antioxidant (Irganox 1076, from BASF). The researchers, from Ensam in Paris, focused on thermal ageing in air at temperatures between 87°C and 130°C.

"The purpose was to investigate the role of an anti-oxidant excess in the stabilisation process of the polymer," said the researchers, in a paper published in Polymer Degradation and Stability.

Comparing oxidation induction periods at 130°C showed that antioxidant excess helps polymer stabilisation during thermal ageing, the researchers concluded.

Freeze resistance

The **Plastics Pipe Institute** (PPI) has published a new technical report on the break-resistance of PEX pipe when fluid inside it becomes frozen.

The report (PPI TR-52) explains how proper installation and protection of piping can prevent freezing of fluids inside PEX, how the inherent material properties of PEX can delay freezing of water, and how PEX can resist breaking if the fluid inside does freeze.

"The flexibility of PEX gives excellent freeze-break resistance," said Lance MacNevin, director of engineering for PPI's building and construction division. "If water or fluid-filled PEX pipe freezes, its elasticity typically allows it to expand without cracking or splitting –then to return to its original diameter upon thawing."

However, he said there are installation variables that can cause PEX to fail in certain situations, which are described in the report.

"The relatively low thermal conductivity of PEX material reduces heat transfer through the pipe wall," he added. "For similar material thickness, PEX is 68 times less conductive than copper, which can delay the freezing of fluids within PEX tubing – potentially preventing freeze events."

PEX tubing remains flexible enough to be bent at temperatures below -40F (-40°C).

"Since water expands upon freezing, this elastic property is beneficial during a freeze event – as the pipe can expand with the water," he said.

TR-52 includes excerpts from Canadian and US model plumbing and mechanical codes about protecting all pipes from freezing, as well as PPI's recommendations to protect pipes in specific applications.

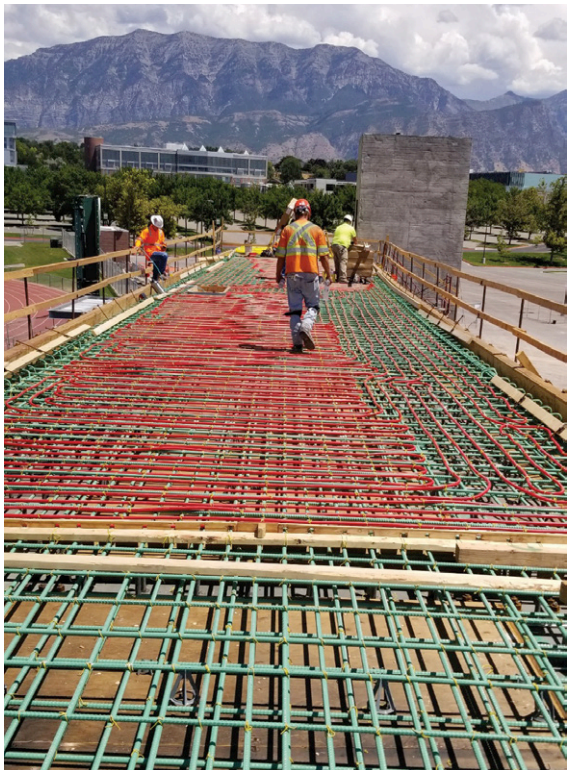

IMAGE: PPI

Winning project

In its latest awards, PPI recognised a snow-melting project that makes extensive use of PEX pipe. In the project, Raupex O_2 barrier PEX pipe from **Rehau** was used as part of the 'snow melting' system at a university campus. The system, at the Utah Valley University in Orem, Utah, melts snow on a large pedestrian bridge – which connects the university campus with student housing on the other side of a busy freeway.

These types of system are common, and work by running warm glycol through pipes in order to melt surface snow. This latest project was complicated by the fact that the system needed to be incorporated into a bridge.

The project is a 'hybrid' snow-melt installation because it uses both PP-RCT and PEX. In total, 36,000ft of PEX was installed in a 'grid' on the bridge, along with 1,900ft of PP-RCT – in diameters of 2.5-4in.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.uponor.com**
- **www.samk.fi**
- **www.northeastern.edu**
- **www.basf.com**
- **www.ensam.eu**
- **www.plasticpipe.org**
- **www.rehau.com**

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Commercial Head
Starlinger & Co.

Adrian Griffiths
CEO
Recycling Technologies

Silke Einschuetz
Consultant – Recycling & Sustainability
AMI

Giorgio Santella
General Manager
CMG Granulators

Lucy van Keulen
Commercial Director
Umincorp

Thomas Baldt
Sales Representative
DACH
ZenRobotics

* Please note places are limited and Starlinger reserves the right to deny participation in the open house.

IMAGE: AMI

Plastics extrusion expo makes its Essen debut

We look ahead to the Plastics Extrusion World Expo which is taking place at Messe Essen in Germany later this month

The Plastics Extrusion World Expo makes its European debut at Messe Essen in Germany on 29-30 September 2021.

Organised by AMI, the free-to-attend exhibition and its focused conference are running alongside the Compounding World Expo, Plastics Recycling World Expo and Polymer Testing World Expo. In total, there will be more than 200 exhibitors and 100 speakers across the four expos and five conference theatres.

It will be Europe's first major plastics industry event for 18 months and will provide an opportunity to reconnect with suppliers and customers, as well catch up on what's been happening and discuss what lies ahead. To register for your free ticket click **here**.

"When we launched the Compounding World Expo and Plastics Recycling World Expo in Essen in 2018, we had over 4,000 visitors, including large numbers from extruders of pipe, profile, tubing, film and sheet," said Andy Beevers, events and magazines director at AMI. "So when we next ran the exhibitions in the USA, we added the Plastics Extrusion World Expo, which proved very popular. We're now pleased to bring it to a European audience".

Over the following pages we preview the free conference programme and look at a selection of just some of the companies you'll be able to see at Messe Essen. Click **here** to view the full list of all 200+ exhibitors.

Main image: Conference sessions are a key part of the event

Register for free

It is free to attend the Plastics Extrusion World Expo and its conference theatre. You will also have access to the plastics compounding, recycling and testing exhibitions and their conference sessions, which are running at Messe Essen on the same dates. To register for your free ticket visit: **https://www.ami.ltd/ami-plastics-expos-eu**

PLASTICS EXTRUSION WORLD EXPO

Dates: September 29-30
Entry is free

Venue: Messe Essen, Essen, Germany

Opening hours:
9am to 5pm on both days

Online registration:
CLICK HERE

IMAGE: AMI

US-based **Advanced Blending Solutions** (ABS) designs and supplies material handling, blending, and controls for the plastics industry. With representatives throughout the USA and the world, ABS is a fast-growing company committed to providing the best products and services to meet the unique needs of its customers.
› **https://adv-blend.com**

AGC Chemicals Europe is a fluoropolymer manufacturer and leader in ETFE production. It produces Fluon PTFE and ETFE as well as marketing other fluorinated products, including Fluon PFA and AFLAS fluoroelastomers. The product range offers protection against heat, chemicals and corrosion, and has applications in a range of industrial areas – including automotive, aerospace and oil and gas.
› **www.agcce.com**

AMI is the leading provider of market intelligence, databases, magazines and events for the global plastics processing industry. Its teams of consultants, researchers, writers and event organisers understand the global plastics processing industry – including how markets have changed, and where they are heading. It helps to identify market opportunities, new customers and innovative technologies to help business growth, with reports, conferences and magazines.
› **www.ami.international**

Amut specialises in extrusion and recycling. Its extrusion division provides extruders, downstream equipment and turnkey lines for producing foils, stretch film, sheets, waterproofing membranes, pipes and profiles. Amut Ecotech offers material recovery facilities from post-consumer waste, plastic recovery facilities from post-consumer plastics, industrial and household waste sorting and recovery facility and equipment.
› **www.amutgroup.com**

Avient, which in 2020 posted revenues of US$3.8bn, provides specialised and sustainable material solutions. Its offerings include polymer formulations (such as vinyl powders), polymer additives and colorants, thermoplastic elastomers and advanced composites. In addition, it distributes more than 3,500 grades of engineering and commodity resins.
› **www.avient.com**

Catch up at the conference

There will be a free-to-attend focused conference at the Plastics Extrusion Expo at Messe Essen on 29-30 September 2021. The busy two-day programme has been put together by AMI, which has extensive experience of organising conferences on all types of extrusion, including pipe, profile and tubing production.

There will be a debate on the future for plastics pipes featuring the following panellists: Zoran Davidovski, head of R&D and sustainability at **Pipelife**; Christian Apel, international projects manager of **Polyplastic**; and Carsten Janiec, head of sales management for fire protection systems at **Doyma**. The debate is chaired by Andy Beevers of AMI.

Technical presentations for pipe producers will include a look at progress in inline plastic pipe measurements by Dr Jan Hendrik Petermann, product manager at **iNOEX**. The importance of cooling for extrusion processes will be addressed by Davide Chiavinato, export area manager at **EuroChiller,** while Johannes Lorenz, key account manager at **Dynisco**, will discuss inline viscosity measurement. In addition, Angelo Paganizza, area sales manager at **FB Balzanelli**, will cover the added value of pipe packaging.

There will also be presentations of interest in the other four conference theatres focused on plastics compounding, recycling and testing. For example, the Polymer Testing World Expo conference theatre will host a talk on improved specimen geometries for evaluating the performance of butt-fusion joints in PE pipes, delivered by Amir Khamsehnezhad of **TWI**.

Download the conference brochure featuring the full conference programmes for all five conference theatres **here**. And register for your free ticket at:
https://www.ami.ltd/ami-plastics-expos-eu

Speakers include (from left) Zoran Davidovski, Andy Beevers, Davide Chiavinato, Jan Hendrik Petermann, Johannes Lorenz, Christian Apel, Angelo Paganizza, Amir Khamsehnezhad

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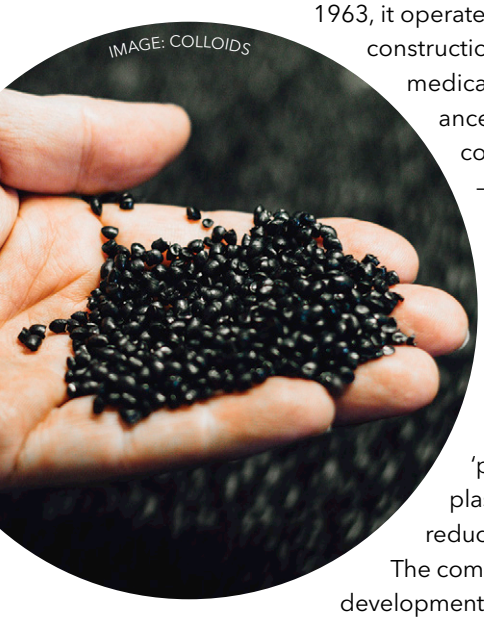
Azo offers raw material and bulk handling systems for many sectors, including plastics. Its solutions help companies to strengthen their competitive edge, with machinery that is easy to operate and maintain, while offering high connectivity and user protection. An example is its extensive range of products – including conveyors and mixers – for PVC dryblend.
› **www.azo.com**

Baerlocher is a leading supplier of additives for the plastics industry, with a history stretching back nearly 200 years. It employs more than 1,150 people in its production sites and joint ventures, which are located across the world. The company is a global partner for all PVC processing needs – with leading-edge technology for solid calcium-zinc and calcium organic stabiliser systems.
› **www.baerlocher.com**

Benvic is a European leader in PVC compounds, biopolymers, bespoke polymeric materials, medical compounds and components. Founded in 1963, it operates in 60 countries for applications in construction, infrastructure, packaging, medical, electric and electronic appliances, consumer and automotive. The company has eight production sites – and 470 employees – across Europe.
› **www.benvic.com**



Above: Colloids is well known as a supplier of masterbatches

Biofiber Tech is a Sweden-based start-up, founded in 2016. Its patented technology is used to modify wood fibres, to make them 'plastic-like', so they can be used in plastic product manufacturing to reduce reliance on fossil-based plastics. The company specialises in research and development, and commercialisation of modified wood (or other plant fibre-based materials) for use in applications including automobile, household products, furniture, packaging and construction.
› **www.biofibertech.com**

Brabender develops, produces and distributes instruments and equipment for testing a range of material properties. The range extends from laboratory equipment through to small-scale production. Its product portfolio provides applications of many industrial segments in food, chemicals and pharmaceuticals. Its instruments are used in quality control as well as R&D.
› **www.brabender.com**

Brenntag is a global player in chemical and ingredients distribution. As well as marketing process chemicals, it is focused on speciality products, value-added services and customised solutions. Its Polymers division offers customers in thermoplastics processing a portfolio of high-performance polymers, engineering thermoplastics and polymer additives. Core competencies are developing, producing and marketing of customer-specific material solutions for applications in many end markets.
› **www.brenntag.com**

Cabot is a US-based producer of speciality chemicals and performance materials. It is a leading producer of black masterbatch and conductive compounds. Its unique formulations – and extensive expertise – helps its customers to differentiate themselves. Cabot formulates highly dispersed carbon black solutions to satisfy application requirements such as UV protection, tinting strength, colour and shade.
› **www.cabotcorp.com**

Collin Lab & Pilot Solutions develops intelligent pilot and laboratory lines in modular system for plastic processing companies and research institutes. The owner-managed company has been in business for more than 45 years and sets worldwide technical and quality standards. Collin solutions are used for the development and production of plastic products, material analysis, test series and pilot tests – which allow scale-up to production scale.
› **www.collin-solutions.com**

Colloids is a UK masterbatch company that offers advanced polymer solutions for the engineering sector. Its has bespoke and standard solutions for colouring polymers such as automotive interiors and under-bonnet applications. Selecting the correct polymer and colour formulation allows functional properties such as anti-friction, electrical conductivity, UV protection and chemical resistance to be enhanced.
› **https://colloids.com**

Dr. Gupta Verlags is a family-run specialist publishing house for the polymer industry based in Ratingen, Germany. The portfolio includes German-language and international trade magazines for the industries related to polyurethane, rubber and thermoplastic elastomers. In addition, Dr. Gupta Verlags offers specialist books and various services on request.
› **www.gupta-verlag.com** ›

Dynisco has more than six decades of experience in helping customers provide a true "window into the process" with its range of products and solutions for indication and control for critical plastic process measurements including, pressure, temperature and polymer rheology. Harnessing these parameters help plastics processors to reduce lot-to-lot variations, cut scrap, raise productivity and integrate recycled materials into their process without sacrificing product quality.
› **www.dynisco.com**

EngView Systems provides solutions for the PVC and aluminium extrusion industry. It specialises in quality control and measurement systems for inspecting profile geometry. Scan Fit & Measure is a 2D flatbed scanner system for automated measurement and inspection of profile geometry for both aluminium and plastic extrusion. MCaliper is an innovative way of adding traceability to measurements done with the most commonly used manual tools in manufacturing.
› **www.engview.com**

Erema, based in Austria, specialises in developing and manufacturing plastics recycling systems and components. Founded in 1983, the company has supplied around 6,500 recycling systems worldwide. With subsidiaries in the USA, China and Russia, and around another 50 representatives elsewhere, it has a network to implement custom plastics recycling solutions around the world.
› **www.erema.com**

Eurochiller, founded in 1990, was acquired in 2019 by Atlas Copco – operating under its Oil Free Air division in the Compressor Technique business area. Eurochiller's headquarters in Italy house both production and a customer centre. It has another product company in Slovakia and two customer centres in France (Eurochiller France ECF) and in the UK (IsoCool). The company designs, manufactures and services industrial cooling products and temperature control units as well as related systems used in industrial manufacturing processes. It is a specialist in providing cooling solutions in industrial processes, especially in the plastic sector.
› **www.eurochiller.com**

ExxonMobil Chemical is a leader in the technology, innovation and supply of petrochemical products, and among the largest producers of performance polymers. Its Vistamaxx products are a cost-effective way of allowing greater use of low-cost, recycled content – while targeting high-value applications.
› **www.exxonmobilchemical.com/rethinkrecycle**

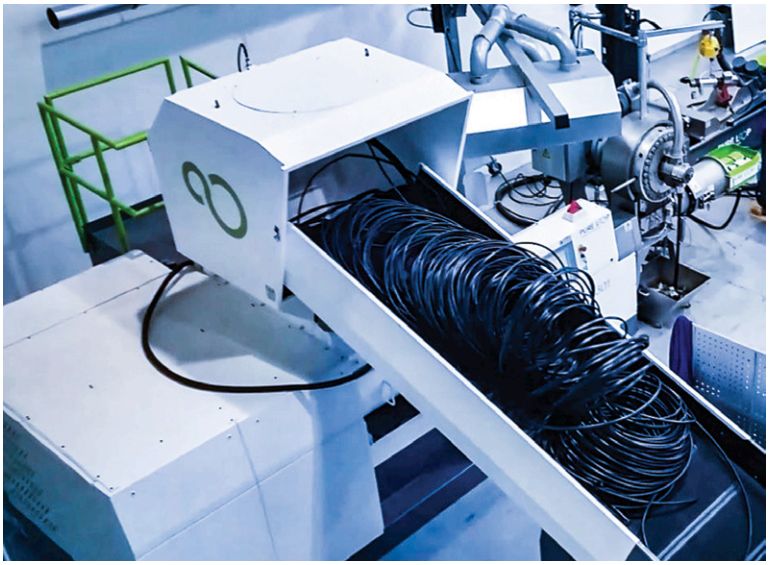


IMAGE: EREMA

Above: Erema's Pure Loop shredder-extruder has been used to recycle pipe back into plastic granules

FB Balzanelli produces automatic and semi-automatic coilers. These include automatic solutions for packaging pipes, as well as automatic palletising systems (which can serve more than one line). These are developed according to its commitment to technology, innovation, quality and customer care. Constant innovation offers a technical solution to each pipe coiling, packaging and palletising need. A focus on customer care helps to ensure correct, reliable operation of all systems.
› **www.fb-balzanelli.net**

Filtec is a family company, founded in 1993 and based in Italy. It develops and sells solutions for polymer pelletising. Its range of products includes water ring and underwater pelletisers, screen changers, water filters, horizontal and vertical centrifuges and vented vibrating screens. Its CA range of screen changers – with single or double plate – filter molten plastic in a range of applications including the processing of tubes and profiles.
› **www.filtec.it**

Gabriel-Chemie specialises in the refinement and colouring of plastics. In 2020 it celebrated its 70th anniversary as a masterbatch provider on a national and international level. When developing new products, it focuses on sustainability and innovation for the production of durable plastic articles. It has 630 employees in nine European locations.
› **www.gabriel-chemie.com**

› **Gamart** produces and distributes innovative products and technologies in the plastics industry.

It was established in 1996 in Poland and has expanded to more than 120 engineers and specialists. Its activities are based on four areas: large-sized PE fittings (including bends), with diameters of 315-1200 mm; advanced rainwater collection systems that boast high quality; production and renovation of machinery for plastics processing (including extrusion lines and plastification systems); and distribution – via 15 stores in south-east Poland, through which it offers products from local and international partners.
› **www.gamart.pl**

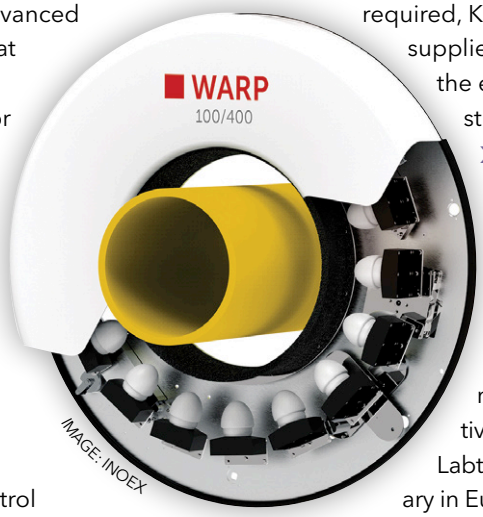


IMAGE: INOEX

Right: The Warp series of products from Inoex uses radar sensor technology to make inline pipe measurements

Inoex is an integrated solution provider of measuring and control technology for pipes, tubes, film and profiles. Since its foundation in 1984, the company has gone through constant growth. The company delivers smart, innovative solutions and services that create added value for customers. An example is its Warp series of products that use radar sensor technology to make inline pipe measurements.
› **www.inoex.de**

KraussMaffei is a leading supplier of machines, systems and solutions for the production and processing of plastics and rubber. KraussMaffei's range of products and services covers all aspects of extrusion and reaction technology, and is complemented by a wide range of digital services. The company is in the process of bringing all its extrusion businesses under a single roof in Germany.
› **www.kraussmaffei.com**

Below: KraussMaffei is bringing all its extrusion technologies under one roof at a new facility in Germany

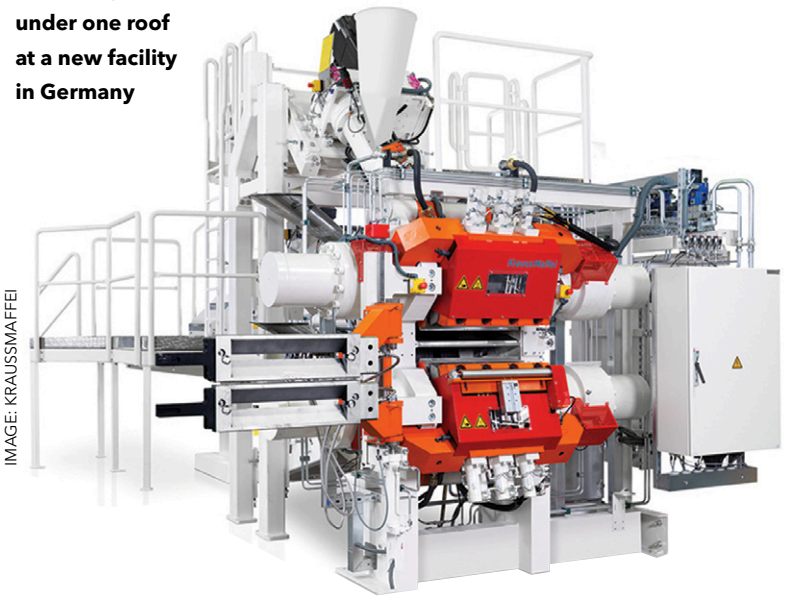


IMAGE: KRAUSSMAFFEI

Kuhne Maschinenbau is a family business that sets benchmarks and provides plastic converters worldwide with equipment for sheet and flat film extrusion and several other extrusion processes. If required, Kuhne can be a single-source supplier of a production line – from the extruders all the way downstream to the packer.
› **www.kuhne-group.com**

Labtech Engineering is a Thai-based laboratory equipment manufacturer for polymer processing. It specialises in high-performance equipment with attractive quality/price correlation. Labtech has established a subsidiary in Europe to reinforce the contact, sales and service to customers in that region.
› **www.labtechengineering.com**

Luigi Bandera supplies complete extrusion lines for blown film (packaging and converting sector) and flat die foil and sheet (rigid thermoformed packages). The company is a leader in PET rigid film dry-less extrusion technology and in agri-geo blown film technology. Its R&D centre, completed in 2014, was recently expanded by 3,000m². Industrial tests and complete line wet trials are now available at the company headquarters in Busto Arsizio, Italy. Bandera aims to maximise the efficiency of the recycling processes concerning extrusion and pelletising including pre- and post-treatment of the flake with the option to incorporate additives or fillers. The capability of upgrading material characteristics to a comparable virgin material level is one of the priorities towards circular economy needs.
› **www.luigibandera.com**

Maag is a leading manufacturer of gear pumps, pelletising systems, filtration systems and pulverisers for demanding applications in plastics and other industries. It develops, manufactures and distributes innovative, customised solutions for complete pump and pelletising systems. It also has expertise in plastics recycling, through its Ettlinger subsidiary.
› **https://maag.com**

Mixaco has been a leader in mixing technology for more than 50 years. Its goal is to guarantee mixing quality while improving handling-related processes. Many of its inventions and patents have become standard applications. It continues to push

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Right: Motan-Colortronic offers a wide range of materials handling technologies

these developments, while continuing to develop new ideas and processes for improved mixing.
› **www.mixaco.com**

Motan-Colortronic is a global manufacturer of peripheral units and systems for handling bulk solids. Its offering is based on in-depth expertise spanning the while process chain. The company develops solutions for plastics compounders, processors and for the chemical industry. Its systems are tailored to real-world applications, which helps to improve customers' efficiency, productivity and competitive advantage.
› **www.motan-colortronic.com**

NGR machines are used to recycle the waste generated by plastics processing companies and give the plastics a 'second chance' at the end of their life. The company has been building plastics recycling machines in Austria for more than 20 years. The machines turn plastics waste into high-quality pellets. A network of distribution partners and service representatives help customers to extend the lifetime of NGR machinery.
› **www.ngr-world.com**

Nordson is an expert in polymer processing solutions and its systems are used worldwide to melt, extrude and pelletise polymers. It has designed its products – from gear pumps to valves and coextrusion dies – to enhance the performance of polymer processes. Its BKG and EDI products and solutions help to enhance efficiency in polymer extrusion.
› **www.nordson.com**

Below: NGR's recycling machines boast high throughputs for processing internal plastic waste

Norner is a leader in industrial R&D services in polymers. Based in Norway, it operates an advanced technology centre for development and testing. It offers clients a full-service portfolio of

R&D, laboratory and strategic advice based on 40 years of industrial experience. Its pilot centre includes catalyst and polymerisation reactors, compounding extruders, thermoforming, and a variety of plastics extrusion lines.
› **www.norner.no**

Plas Mec manufactures equipment and accessories for mixing plastic materials (including PVC, PE, PP and ABS), technical and special polymers (including PA, PU, PET and PTFE), powder coating resins, wood-plastic composites, masterbatch, additives and pigments. It is also an expert in mixing systems for plastic powders. After more than 50 years in business, it has built and delivered more than 6,000 machines across the world.
› **www.plasmec.it**

Plastic Systems produces advanced plastic solutions – including dryers, dosers, granulators and mixers – for a wide range of industries and applications. For instance, its VLM series of single-phase feeders convey plastic granules to processing machines. It also offers several types of doser – including volumetric, single-gravimetric and loss-in-weight – and dryers in a variety of sizes.
› **www.plasticsystems.it**

Pontacol develops and sells thermoplastic adhesive films for industrial applications in the textile, composite, electronics, ballistic protection and personal care markets. The company extrudes and produces technically sophisticated adhesive films – not just for its own needs, but also as a contract manufacturer for third-party companies.
› **www.pontacol.com**

Sappi is a globally diversified wood-fibre company

that provides dissolving wood pulp, specialities and packaging papers, graphic/printing papers, as well as biomaterials and biochemicals to its direct and indirect customer base.
› **www.sappi.com**

Scholz Dosiertechnik is an expert in continuous gravimetric and volumetric feeding of granulates, powders, recycled material and liquids. It is a medium-sized company, based near Frankfurt, that offers problem-solving expertise. Its equipment is modular, flexible and reliable. The company offers short delivery times, reasonable prices and comprehensible solutions.
› **www.scholz-dosiertechnik.de**

Sikora manufactures and supplies measuring, control, inspection, analysis and sorting systems for industries including hoses and tubes, optical fibre and plastics. It employs more than 300 people worldwide, and has 14 international offices. It provides customers with innovative product solutions and individual service, from its headquarters in Bremen, Germany.
› **https://sikora.net**

IMAGE: SIKORA

Tecnova specialises in the production of extrusion lines for plastic recycling, including in-house, industrial scraps and post-consumer scraps from washing lines. It can offer solutions for all the main thermoplastics materials, in whatever form they appear – such as film, regrind, fibre or foam. The quality, reliability, ease of use and simplicity of maintenance of its machines have helped it become a global reference.
› **www.tecnovarecycling.it**

Above: Sikora says that its measuring technology can help to save on materials – and reduce costs

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IMAGE: AMI

New expo puts focus on polymer testing

The first Polymer Testing World Expo takes place in Essen this month. We take a look here at some of the highlights at the free-to-attend conference and exhibition

The Polymer Testing World Expo makes its debut at Messe Essen in Germany on 29-30 September 2021. The free-to-attend conference and exhibition is intended to provide a new forum for scientists and researchers that develop, test, and analyse polymer materials, formulations and finished products.

Organised by *Pipe and Profile Extrusion* magazine publisher AMI, the Polymer Testing World Expo runs alongside the Compounding World Expo, Plastics Recycling World Expo, and Plastics Recycling World Expo. In total, there will be more than 200 exhibitors and more than 100 speakers to choose from across the four exhibitions and their five focused conference theatres.

"When we ran the Compounding World Expo and Plastics Recycling World Expo in Essen in 2018 we had 4,024 visitors, and more than 40% of these – 1,722 to be precise – were involved in R&D and materials testing," says Andy Beevers, AMI's Events Director. "We therefore decided to add an area within the event focused specifically on polymer testing and analysis, where visitors can explore new lab technologies and stay up to date with best practices and the latest standards."

Conference programme

The dedicated conference programme for the Polymer Testing World Expo features two days of expert presentations covering a range of developing testing technology topics and providing useful practical advice and tips.

Speakers from some of Europe's leading research centres will lay out their latest findings in the area of lifetime prediction and failure analysis for plastic materials and components. For example, Christoph Zekorn from **IKV** will discuss failure analysis of plastics with a particular reference to instrumental techniques. In addition, Arjen Boersma from **TNO** will focus on assessing degradation behaviour of polymers and its impact on their lifetime. Accelerated ageing of polymers will be covered by Wilma Hahn from **SKZ**, who will speak about high-pressure autoclave testing, while Kim Bini from **Elastocon** will focus on developments in

Main image: The free conference theatres at the Essen expos are expected to prove popular

Speakers at the Polymer Testing World Expo conference include (clockwise from top left): Christoph Zekorn, Head of Microscopy at the IKV Centre for Analysis and Testing of Plastics; Wilma Hahn, Project Manager at SKZ; Kim Bini, Laboratory Manager at Elastocon; Jessica Wiertz, Applications Manager at Brabender; Fresia Alvarado, Sustainable Plastics Researcher at Wageninger Food and Biobased Research; and Ole Jan Myhre, Market Manager at Norner

stress relaxation and lifetime estimation of rubber.

Quality control testing will be another major focus of the Polymer Testing World Expo conference programme. Testing of plastics according to specific ASTM and ISO standards will be addressed by Georg Font from **Schütz + Licht,** while the use of optical inspection and measurement techniques for polymer quality control will be detailed by Oliver Hissmann and Oliver Kraushaar from **OCS Optical Control Systems.** Gilad Roter from **Inspection Technologies** will explain an innovative solution for in-line sorting of pellets and **Aimplas** will cover combined analytical techniques for analysis of foreign particles and defects in plastic parts and films.

Two presentations will cover some of the most recent developments in polymer characterisation. Alexander Sagidullin from **Oxford Instruments** will focus on advances in bench-top NMR instruments, while Marco Grundler from **ZBT** will examine methods for the characterisation of compounds with high thermal and electrical conductivities.

Testing of biobased materials is another topical subject being addressed. Jessica Wiertz and Matthias Mayser from **Brabender** will be looking at product and process development of biobased polymers using lab-scale extrusion systems, while Fresia Alvarado from **Wageningen Food and Biobased Research** will cover the use of in-line rheology in development of starch-based mixtures.

Staying in the area of sustainability, the analysis of recycled plastics will be another major theme of the conference. Ole Jan Myhre from **Norner** will present on quality analysis and improvement strategies for recycled material, while Michael Soll from **Frontier Lab** will look at analysis of recycled materials, covering polymers, additives and RoHS relevant contaminants. The sensor-based polymer identification of PET flakes will be addressed by Michael Perl of **Sesotec**.

A number of speakers at the Polymer Testing World Expo will discuss the testing of specific materials for particular applications. For example, Amir Khamsehnezhad from **TWI** will present a paper covering improved specimen geometries for evaluating the performance of butt-fusion joints in PE pipes. Moritz Grünewald of **SKZ** will explore the latest research into oil-filled microcapsules for self-lubricating plastics, while Kees van Leerdam from **Nouryon Chemicals** will focus on polymer film structures.

To download the full conference programme for the Polymer Testing World Expo, plus details of the speakers in the additional conference theatres focused on plastics compounding, recycling and extrusion, please click **here**.

Exhibitor line-up

Exhibitors at Messe Essen will include suppliers of a wide variety of materials testing and analysis products. Examples include Aboni, Brabender, Dynisco, Fontijne Presses, Frontier Lab, Konica Minolta, Lauda Scientific, Nouryon, OCS Service, Oxford Instruments, PSL Rheotek, Richard Hess MBV and Schütz + Licht.

In addition, a number of Europe's leading research and testing organisations have booked stands at the expos and will be available to discuss their capabilities and projects. These include IKV/RWTH Aachen, Kunststoff-Institut Lüdenscheid, London South Bank University, Norner, SKZ and TNO. Several exhibitors will also be highlighting lab-scale processing equipment, such as extruders and compounding lines. These include Collin Lab & Pilot Solutions, Eurotech Extrusion Machinery and Labtech.

You can view the full list of the 200-plus exhibitors at the Essen expos **here**.

Register for your free ticket

To register for your free ticket to the Polymer Testing World Expo, which will also give you access to the other three expos and all five conference theatres, please visit: **www.ami.ltd/ami-plastics-expos-eu**

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ABOUT THE EXPERT

Geoff Small has worked in the polymers and composites industry for more than 35 years, holding technical and commercial senior positions including "Head of Research and Development: Energy at Victrex plc".

He has worked with a wide range of polymer materials and applications with a focus on the Energy Sector. He has a particular interest and expertise in degradation and lifetime prediction.

Most recently, Geoff set up his own consultancy business working with clients across the O&G and Renewable Energy Industry.

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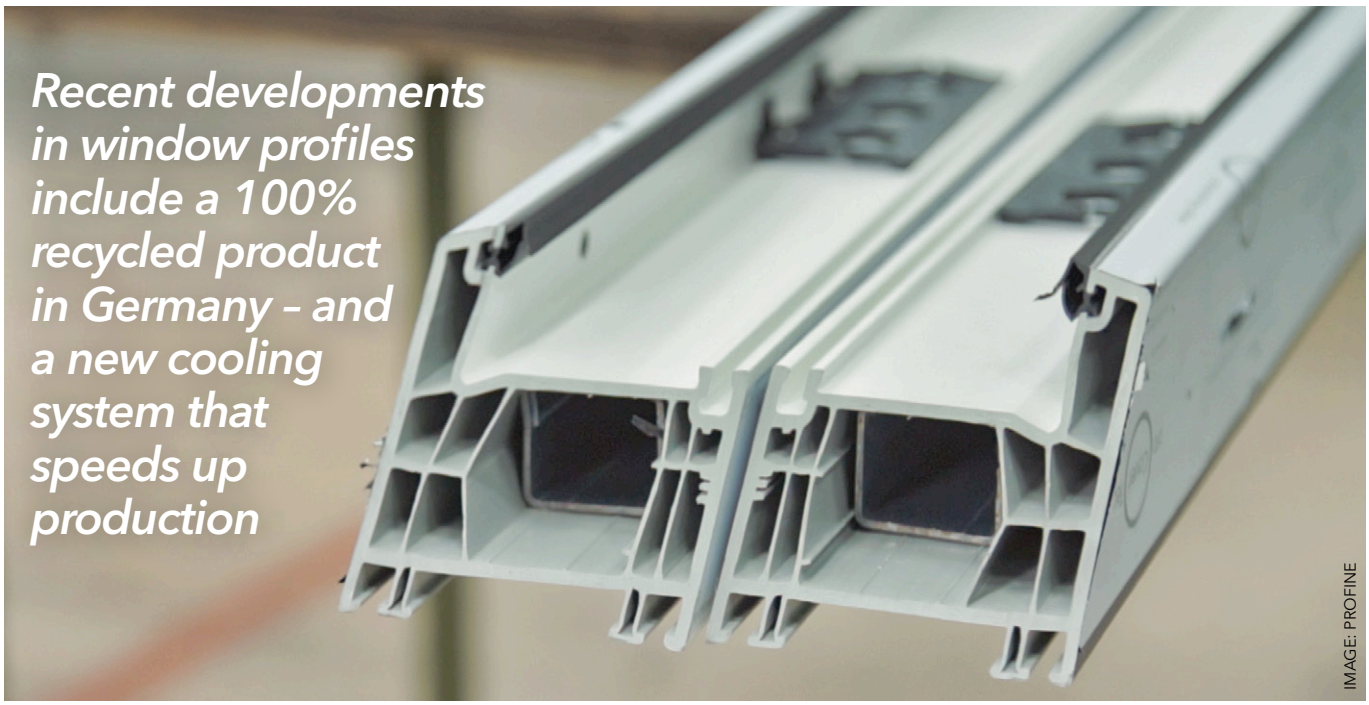
In the frame: innovations in PVC window profiles



Recent developments in window profiles include a 100% recycled product in Germany – and a new cooling system that speeds up production

Main image: ReFrame profiles from Profine are made from 100% recycled PVC

Window profiles are a key extruded product, as PVC windows continue to replace other materials such as wood and aluminium. This means that new designs and production methods are continually being developed.

Profine of Germany has developed a window system for **Lixil** – a Japanese supplier of water and housing products. The sliding system is specific to the Japanese market, and forms part of Profine's efforts to expand internationally.

Lixil chose Profine as a partner because of its Kömmerling brand, as well as the system concept of the window, it said.

A demanding development process led to a specific sliding window system that has high thermal insulation – and uses a high percentage of recycled material.

"The cooperation with Lixil opens up new markets," said Peter Mrosik, CEO of Profine. "Our partner benefits from our know-how in the development of energy-efficient window systems."

Recycled windows

The company has also supplied window frames – made completely from recycled PVC – for a building project in Germany.

The ReFrame windows have been supplied for a children's day-care centre in Moenchengladbach, with its project partner Rolladen Müllers.

"ReFrame windows – part of our Kommerling brand – are the first to be made entirely of recycled PVC and have the same functional properties as conventional PVC windows" said Friedhelm van den Berg, area sales manager for Germany at Profine. "They have a UV-resistant surface, good technical properties and a high thermal insulation value."

Müllers has manufactured 57 ReFrame windows and doors of the Kommerling 76 double seal system and will install them in the day-care centre. Construction of the centre should be complete in the summer.

A second building project – an apartment building with a daycare centre on the ground floor – will also be equipped with ReFrame window profiles.

ReFrame windows are finished with Profine's ProCoverTec surface technology to give them a high-quality appearance. ProCoverTec also improves technical properties such as UV resistance and IR reflection, says Profine.

Material developments

Benvic of Italy is developing a number of material grades for use in window profiles.

IMAGE: REHAU

Above: Rehau has invested in a new window profile recycling facility in the UK

The company already supplies a number of materials – including recycled PVC – in this area. However, it is now ramping this up with further grades. Later this year, for instance, it expects to add a brand recyclate-derived grade to its ProVinyl range of PVC compounds.

Its acquisition of some of Celanese operations in Italy earlier this year has added the prospect of polyolefin-PVC innovation within window profiles. These new polymers are expected to be introduced in the medium-to-long term.

Its new polyolefin-based materials – marketed under its Xtended range – include several TPE lines used in footwear that could be repurposed into seals and linings in the building sector. It also has a range of self-extinguishing polyamide resins – mainly used in the automotive business – that could complement its PVC compounds for the window profiles.

UK investment

Window profile manufacturer **Rehau** has invested £10 million (US$14m) in its PVCR recycling subsidiary in the UK – setting up a new facility in Runcorn in the north of England.

PVCR claims to be the largest U-PVC recycler in the region, collecting and processing 1,000 tonnes/month of post-consumer polymer windows and doors. The company aims to recycle 24,000 tonnes/year of old PVC window frames by 2024 – which is twice the amount it currently handles.

"The UK public is becoming more familiar with the benefits of PVC windows, but more work needs to be done to raise awareness of recyclability beyond single-use plastic," said Martin Hitchin, CEO of Rehau in the UK.

Cool technology

US-based **Innovative Plastic Products Inc** (IPPI) has developed a new cooling technology – for use in the production of extruded window profiles.

IPPI says that its Innovative Cooling Technology (ICT) can overcome cooling limitation problems and increase line speed. It is particularly useful for complex PVC window lineals and requires only minimal modification to existing tooling – and no extra equipment, utilities or manpower.

"ICT is fundamentally different from other cooling methods used today," said Randy Brown, president of IPPI.

Until recently, cooling technologies used the metal ridges in the calibrator to freeze the extruded plastic part, while maintaining the necessary calibrations. The various channels on PVC window lineals – such as those for the glazing bead and weather strip – are the most difficult to cool, so they control the overall cooling rate of the line. To solve this, ICT's calibrator design allows for more efficient sizing of complex extruded shapes by applying cooling exactly where it is needed. Metal ridges in the sizing calibrator are replaced with cooling passages that use high velocity cooling fluid. This improves heat transfer from the hot PVC (or other plastic) – freezing the interior of the channel into the desired shape earlier in the process, while maintaining critical gaps and calibration.

This technology can improve line speeds by an average of 25% when calibration is the limiting factor, which helps to increase yields and profits. ICT enables quicker string-ups, allowing less experienced operators to get the line started quickly and easily. Because there are fewer metal ridges to create drag in the calibrator, ICT puts less stress on the parts and causes fewer jams in the system. It is also less sensitive to process variability and gives higher yields without having to invest in additional equipment, says IPPI.

"With ICT, the method of cooling in the calibrator can be selectively changed – increasing cooling where it is needed most in complex plastic profiles," said Brown. "This gives manufacturers complete control over the calibration process – including shrinkage rate and final part dimensions."

The technology – which is patent-pending – has already been proven in a plastic slot wall product and several other complex profiles. ICT is available through IPPI or **Bryan Hauger Consulting**.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.profine-group.com**
- **www.lixil.com**
- **www.benvic.com**
- **www.pvcr.co.uk**
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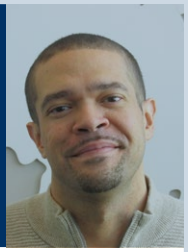

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STRUKTOL: INNOVATIVE ADDITIVES

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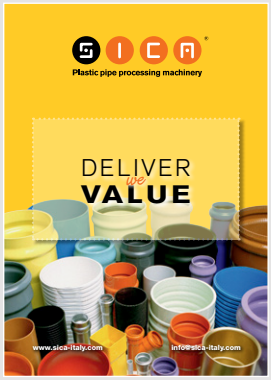
SICA: PIPE PROCESSING



This brochure from Sica covers the company's full range of performance pipe finishing equipment including its novel TRS-W cutting and chamfering, Unibell electric belling and robotised packaging machines.

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MIXACO: MIXING TECHNOLOGY

Mixaco has been driving innovation in PVC mixing technology for more than 50 years and has 7,500+ machines installed worldwide. This brochure explains some of the details that make its HM and KMH heating cooling mixers stand out.

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DAVIS-STANDARD: PIPE & PROFILE

Davis-Standard supplies a wide range of extruders and extrusion systems for pipe, profile and tubing applications, including medical tubing. This brochure details the range of equipment available and key performance benefits.

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NDC: PRECISION GAUGING

The Accuscan Pro series single-axis diameter gauges are the latest addition to the NDC Technologies precision on-line measurement product line. Learn more about performance and features in this four-page brochure.

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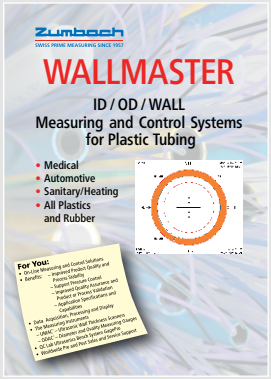
ZUMBACH: MEASUREMENT CONTROL



This eight-page brochure details the main features of Zumbach's Wallmaster measurement and control system for improving product quality, process stability and data capture in plastic tube and pipe extrusion applications.

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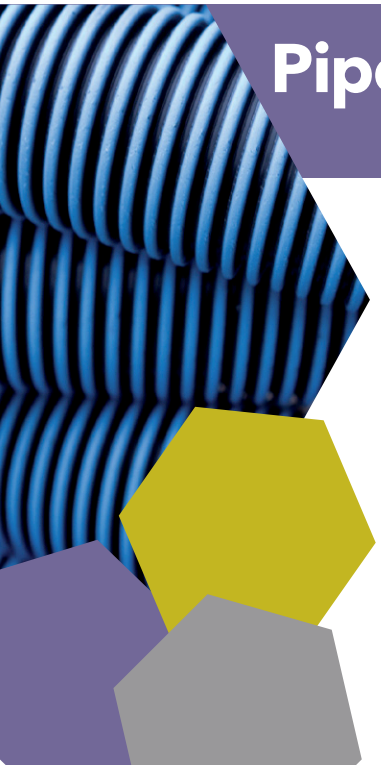
If you would like your brochure to be included on this page, please contact Claire Bishop claire.bishop@ami.international. Tel: +44 (0)1732 682948

Teraplast

Head office:	Saratel, Romania
Director general:	Alexandru Stânean
Founded:	1896
Ownership:	Public (traded on Bucharest stock exchange)
Employees:	Around 680 (in 2020)
Sales (2020):	RON396 million (around US$95m)
Profile:	Teraplast, founded in the late 19th century as a manufacturer of ceramic tiles, has since developed into a manufacturer of pipes (in PVC, PE and PP) and profiles (in both PVC and aluminium). In addition, the company produces a wide range of PE-based flexible packaging. Other branches of the company also make PVC granules, as well as recycling PVC. Its main focus, however, is the construction market – especially its complete pipe systems that include accessories and fittings.
Product lines:	The company supplies pipes for a variety of applications. One range includes pipes for housing – such as PVC plumbing pipe and PP pipes and fittings for sound absorption). Its domestic drainage pipe includes products such as guttering. On a larger scale, its water and gas transport pipe is used in infrastructure projects – and requires high strength – while it also offers electrical conduit pipe. This includes corrugated pipe (to protect electrical cable) and solid pipe for fibre optic cable or buried cables, for instance.
Factory locations:	The company has eight manufacturing locations – all in Romania – with a total area of more than 300,000 sq m and around 80 production lines. Teraplast says it aims to become the largest plastics processing company in Eastern Europe (excluding Poland).

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



Pipe and Profile EXTRUSION FORTHCOMING FEATURES

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

October 2021
PVC-O pipe
Pipe inspection
Materials handling
PEWE N America preview

November/December 2021
Wood-plastic composites
Pipes in infrastructure
Extruder wear protection
PEWE N America review

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

For information on advertising in these issues, please contact:
Paul Beckley: paul.beckley@ami.international +44 (0) 117 311 1529

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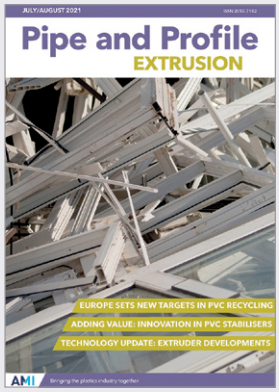

Pipe and Profile
July/August 2021
The July-August edition of Pipe and Profile Extrusion dives into PVC with a report on new recycling targets in Europe, plus the latest developments in PVC additives. Other features are on extruder investments and developments, and materials patents.

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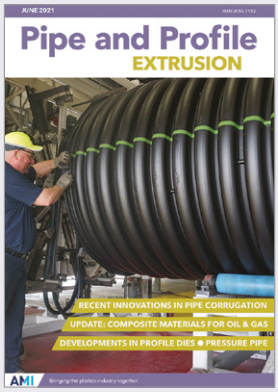

Pipe and Profile
June 2021
Features in the June issue of Pipe and Profile Extrusion cover recent innovations in corrugated pipe technology, plastic pipes in the oil and gas sector, pressurised pipe applications and profile extrusion dies. Plus a review of the Chinaplas 2021 exhibition.

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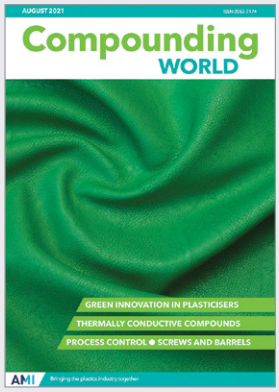

Compounding World
August 2021
The August edition of Compounding World looks at the latest developments in PVC plasticisers. It also explores the latest innovations in thermally conductive compounds, process control and performance alloys and coatings for screws and barrels.

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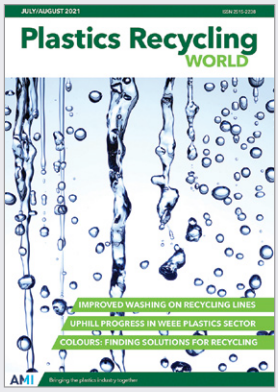

Plastics Recycling World
July/August 2021
The July/August edition of Plastics Recycling World looks at the latest developments in washing systems technology and waste water treatment. It also explores investments and innovation in recycling of waste electrical equipment (WEEE) and investigates colouring of recycled materials.

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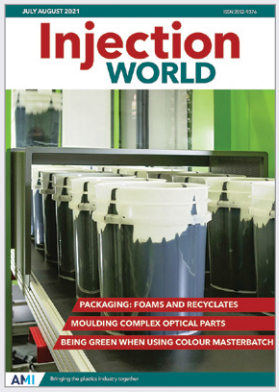

Injection World
July/August 2021
The cover story in the July-August issue of Injection World looks at how foams and recyclate are increasingly being used to mould sustainable packaging. Other features are about meeting the demands of complex optical parts and the latest in colour masterbatch.

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Film and Sheet
July/August 2021
The July-August issue of Film and Sheet Extrusion magazine has features on research and development work in bio-based polymers, re-engineering plastic pouches for sustainability and what's new in stretch and shrink film.

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	21-23 September	Plastics, Printing & Packaging, Dar-es-Salaam, Tanzania **POSTPONED**	www.expogr.com/tanzania/pppexpo
	29-30 September	Plastics Extrusion World Expo Europe, Essen, Germany	https://eu.extrusion-expo.com
	12-16 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
	26-28 October	Plastic Print Pack Nigeria, Lagos, Nigeria	www.ppp-nigeria.com
	3-4 November	Plastics Extrusion World Expo North America, Cleveland, USA	https://na.extrusion-expo.com
	8-12 November	Plastico Brasil, Sao Paolo, Brazil **CANCELLED**	www.plasticobrasil.com.br
	15-18 November	Arabplast, Dubai, UAE	www.arabplast.info
2022	**25-28 January**	Interplastica, Moscow, Russia	www.interplastica.de
	17-21 February	PlastIndia, New Delhi, India	www.plastindia.org
	8-10 March	JEC World, Paris, France	www.jec-world.events
	8-11 March	Plastimagen, Mexico City, Mexico	www.plastimagen.com.mx
	5-8 April	FIP, Lyon, France	www.f-i-p.com
	26-30 September	Colombiaplast, Bogota, Colombia	www.colombiaplast.org
	3-7 October	Plastex, Brno, Czech Republic	www.bvv.cz/en/plastex
	1-3 December	Plastic Print Pack West Africa, Accra, Ghana	www.ppp-westafrica.com

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5-6 October 2021	Medical Tubing & Catheters, Cologne, Germany
26-27 October 2021	Oil & Gas Non-Metallics, London, UK
26-28 October 2021	Polyolefin Additives Europe, Berlin, Germany
16-18 November 2021	PVC Formulation Europe, Cologne, Germany
1-2 March 2022	PVC Formulation North America, Cleveland, USA
19-20 July 2022	PVC Formulation Asia, Bangkok, Thailand

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