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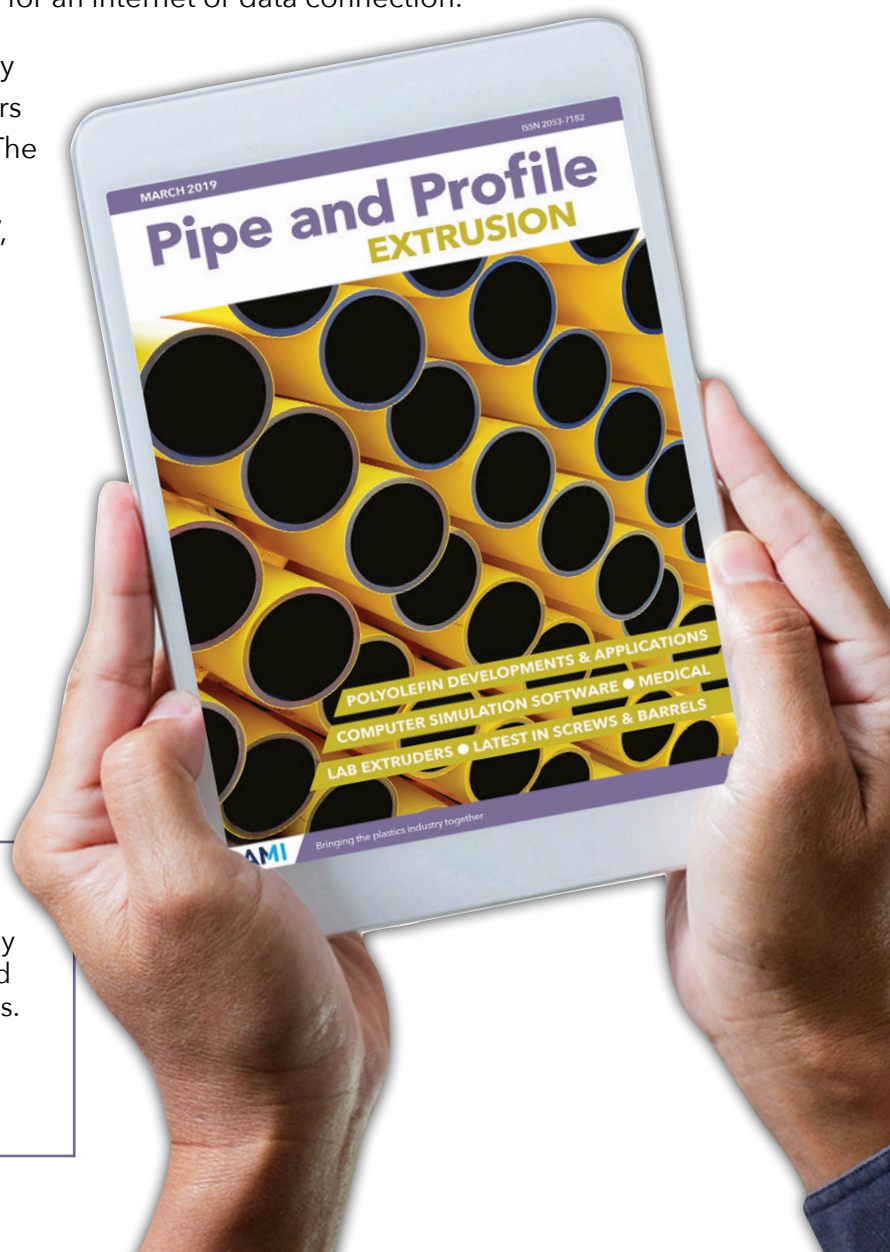
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# Pipe and Profile EXTRUSION

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COVER PHOTO: MESSE DÜSSELDORF, CONSTANZE TILLMANN

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# Sales up, profits down at Aliaxis

Belgian pipe manufacturer Aliaxis reported increased sales in 2022 – though a reduction in net profit.

The company posted a turnover of €4.3 billion (US\$4.6bn) in 2022, an increase of 11% compared to the previous year. However, net profit in 2022 fell by around 7% to reach €371 million (US\$398m). After adjustment for non-recurring items, it said this would be a 3% increase.

“In 2022, we matched the great performance of 2021 – despite significant inflation,” said Eric Olsen, CEO of Aliaxis.

Sales in the Americas rose by

nearly 13%. In North America, this was due mainly to a “robust housing market, together with infrastructure and irrigation investment”. Here, the first half of the year was strong, but the second half slower – due to high inflation, increased interest rates and a tight labour market.

In the EMEA region, sales rose 5% driven by a strong start to the year – though the war in Ukraine, higher energy prices and inflation caused sales to slow later in the year.

In Asia, sales rose nearly 18%, but a strong start was undermined by volatile material pricing, which affected

margins. There was also reduced demand – especially in agriculture.

The Pacific region saw strong growth – with revenue up 11% – driven by the Australian building and infrastructure segments and New Zealand building segment.

During the period, Aliaxis made a number of acquisitions, including US fittings producer Harco, and Italian pressure pipe manufacturer Lareter.

The company expects “moderate market headwinds” this year, in North America and Europe but “positive growth for the year overall”.

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

## India to boost UAE exports

Plexconcil, India’s plastics export council, has signed a deal to boost trade with the United Arab Emirates (UAE) and the rest of the Middle East.

It said that exports of plastic products from India to UAE reached US\$626 million in 2021-2022. This is about 7% of UAE’s total plastic imports of US\$9 billion.

“The Middle East – especially UAE – is an important export destination for Indian plastics,” said Hemant Minocha, chairman of Plexconcil. “India has the potential to increase exports to around US\$5bn.”

Products with potential for export to UAE include film and sheet, consumer and houseware products, and medical items.

➤ [www.plexconcil.org](http://www.plexconcil.org)

## New products and cost savings help Polypipe raise 2022 sales

UK-based Genuit Group – which trades as Polypipe – raised sales by nearly 5% last year.

Sales grew to just over £622 million (US\$756m), while ‘underlying’ pre-tax profits were flat at around £91m (US\$111m).

Sales in the residential systems market – which comes mainly from the UK – rose by nearly 6% to £394m (US\$479m). Underlying profit in the division rose by 8%, exceeding £79m (US\$96m).

Growth here was helped by new product developments and cost savings, said the company.

Results in the commercial and infrastructure sector were more modest: revenue increased by almost 3% to £227m (US\$276m) while underlying profit fell by 14% to £19m (US\$23m). Reasons for these results included a tougher operating environ-



**Polypipe said growth was helped by new product developments and cost savings**

ment and a cyber attack in Q2 – which caused temporary disruption to manufacturing and sales in April and May 2022.

While the company has invested in multi-layer extrusion technology to help it boost the use of recycled materials, its use of recycle fell slightly in 2022, to nearly 49% of total material use. However, it

said the investment will help it meet its target of 62% recycle use by 2025.

“While short-term market instability will likely remain through 2023, our self-help measures and investment for growth should help us deliver our financial and strategic commitments,” said Joe Vorih, CEO of Genuit.

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

# Uponor improves sales through higher prices

Uponor, the Finnish pipe manufacturer, says it had a "good year" in 2022 - with a modest increase in sales but a fall in profits.

Net sales for the year were nearly €1.4 billion (US\$1.4bn), a rise of nearly 6%. Comparable operating profit was nearly €154m (US\$164m), a fall of more than 4% compared to 2021.

Sales growth was mainly driven by higher pricing and currency effects, but negatively affected by a cyberattack at the end of 2022 - which pulled sales down in Q4. The cyberattack also affected profitability - as did the write-down of Russian operations, said the company.

In Q4, sales fell by 16% to



**Rauterkus: "Despite a volatile market environment, we did well in 2022"**

€277m (US\$296m), while comparable operating profit more than halved to around €11m (US\$12m).

Building solutions in Europe saw a 6% rise in sales for the year, but a 33% dip in profitability, while the

same division in North America saw sales rise by nearly 3% as operating profit dipped by 8%. The company's infrastructure division raised sales by more than 9%, while profitability grew by around 43%.

Although the USA remains the largest sales region for Uponor, its share of sales fell to 28.3%, from 33.8% in 2021. The next largest market is Sweden, with a 12.9% share of sales.

For 2023, Uponor expects net sales of between €1.3bn and €1.4bn (US\$1.4-1.5bn).

"Despite a volatile market environment, Uponor did well in 2022," said Michael Rauterkus, president and CEO of Uponor.

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

## ADS third quarter sales fall

US-based pipe extruder Advanced Drainage Systems (ADS) saw reduced sales but higher profits in the third quarter of 2022.

The company reported sales of US\$665 million for the period - a decrease of more than 8% compared to the same period in 2021. At the same time, net profits rose nearly 12% to US\$83m.

For the first three quarters overall, ADS saw a 17% increase in sales to nearly US\$2.5 billion, and an 87% rise in net profits to US\$425m.

"We executed well in the fiscal third quarter despite a challenging demand environment," said Scott Barbour, president and CEO of ADS.

"Business was down, primarily due to weakness in the non-residential and retail businesses."

ADS expects full-year sales of around US\$3bn.

➤ [www.ads-pipe.com](http://www.ads-pipe.com)

## NPE floor space selling quickly

The US-based Plastics Industry Association has sold more than 1 million sq ft of space for the NPE show - to more than 1,100 exhibitors.

The space was sold at an in-person Space Draw event. NPE takes place on 6-10 May 2024 in Orlando, Florida.

"We're thrilled to see this

level of commitment, 14 months ahead of the show opening," said Matt Seaholm, president and CEO of the association.

➤ [www.npe.org](http://www.npe.org)

## Plastics associations fight against pellet loss

Two European plastics associations have launched a certification scheme to prevent pellet loss.

Plastics Europe, which represents resin producers, and EuPC - the association for European plastics converters - say that the certification to Operation Clean Sweep (OCS) will help companies tackle pellet leakage through a series of recommendations and tools. It will set common minimum

requirements (based on the six pillars of the OCS pledge) that will be audited regularly.

"The OCS Europe certification scheme is an important step to further improve the impact of the OCS programme and help our members prevent pellet loss," said Hervé Millet, director of climate and production, Plastics Europe.

The certification scheme was developed with input from policymak-

ers, certification bodies and industry - and recommendations from a public consultation.

Geoffroy Tillieux, technical director of EuPC, added: "We can now tackle the issue of pellet loss with a practical toolbox. Companies in plastics masterbatching, compounding and converting can now demonstrate how they prevent environmental pollution."

➤ [www.opcleansweep.eu](http://www.opcleansweep.eu)

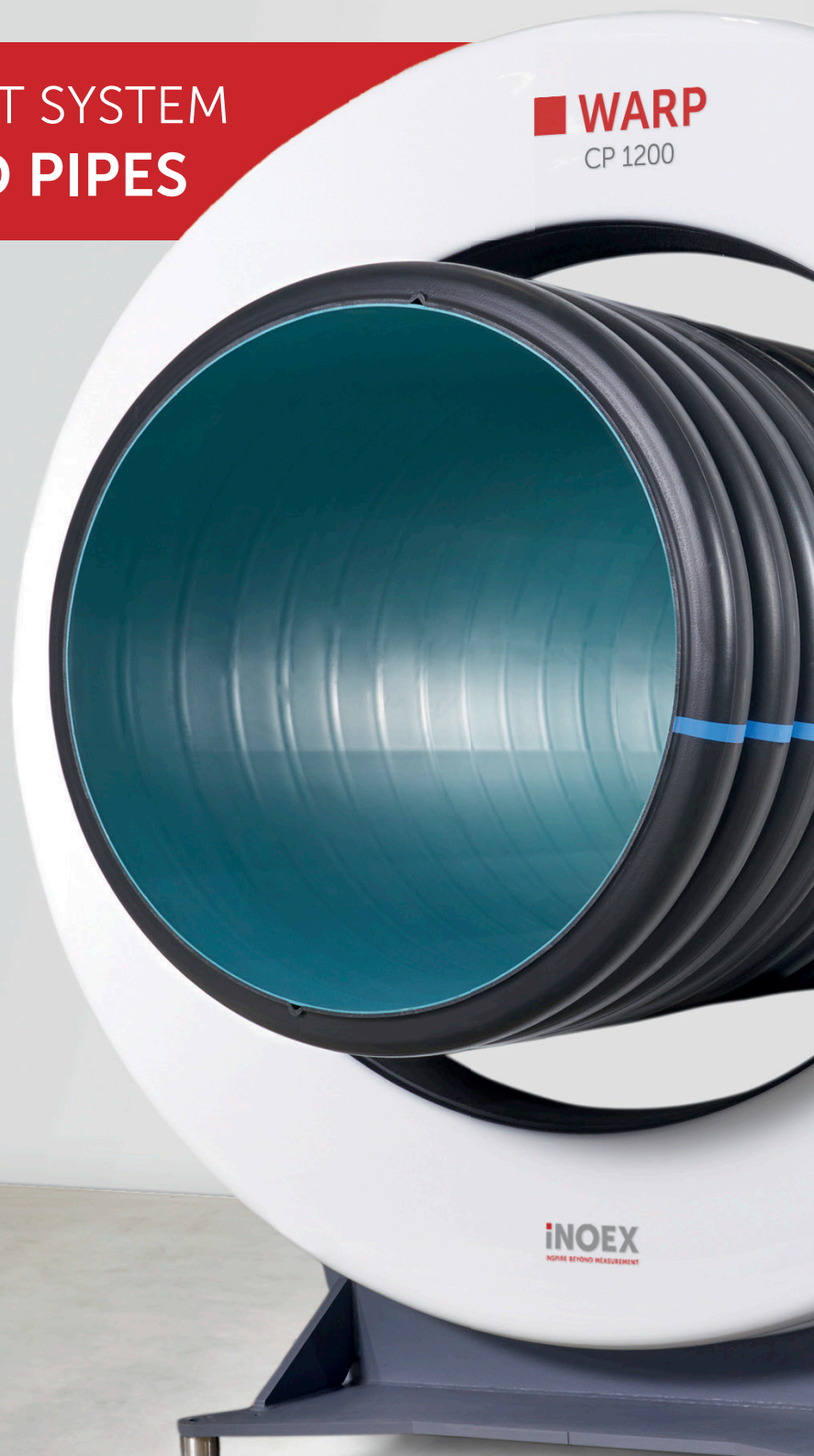


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# Trex sales decline in 2022

Sales at US-based plastic decking manufacturer Trex fell by 8% in 2022, to just over US\$1.1 billion.

This came on the back of a Q4 decline of 37%, ending in sales of US\$192 million for the quarter. Net profit for the quarter declined by 60% to around US\$10m, giving a full-year profit of US\$185m - and fall of around 12%.

The company said this was down to a cautious sales channel rather than a drop in end-market sales.

"The sales channel is being very conservative regarding the amount of inventory it's willing to hold," said

Bryan Fairbanks, president and CEO of Trex. "We were producing at a US\$1bn level - but weren't selling at that level for the last six months of the year. The channel is not leaning as heavily into normal early buying as it has in the past."

At the very end of 2022, Trex divested its Commercial Products division - which accounted for sales of around US\$47m.

"This reflects our decision to focus on driving the most profitable growth strategy through the execution of our outdoor living strategy," said Fairbanks. "With the sale complete, we

will dedicate our resources to accelerating conversion to composites from wood and further strengthening our industry leadership."

In the first quarter of 2023, Trex expects net sales of US\$230m to 240m - a 27% decline on the equivalent period in 2022.

"In the first two months of 2023, our plants were building to an annual revenue rate of one US\$1bn," said Fairbanks. "However, if demand is different than expected, we have the ability to quickly flex our production level."

➤ [www.trex.com](http://www.trex.com)

## Pipes grow at Georg Fischer

Georg Fischer says that its piping systems division reported a sales growth of nearly 10% in 2022 - breaking CHF2 billion (US\$2.2bn) for the first time.

The division reported sales of almost CHF2.2 billion (US\$2.3bn) for the year. For the same period, profitability (EBIT) rose nearly 28% to CHF291m (US\$315m).

Strong organic growth in the Americas (up 21%) and Europe (up 5%) helped the company to overcome the effects of Covid-19 lockdowns in China and reduced demand for building technology in China and Europe.

Price increases were also passed on, which contributed to growth, said the company.

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

## Orbia: flat sales in Wavin division

Orbia, the Mexican chemicals company, reported increased sales in 2022 - though its Wavin pipes business performed relatively poorly.

Sales in Wavin were flat for the year at US\$2.9bn. At the same time, profitability also suffered - with operating profit down 32% to US\$193m. It said this was due to lower volumes and ongoing cost increases, especially in Europe.

Orbia has two other extrusion-related businesses: US conduit maker Dura-Line and Israeli pipe irrigation company Netafim. At



IMAGE: NETAFIM

Above: Netafim is a specialist in irrigation systems

Dura-Line, full year sales rose 38% to US\$1,370m, while operating profit more than trebled to US\$321m, due mainly to increased demand for fibre infrastructure. In Q4, sales rose 7% and profits more than doubled.

Netafim's sales dipped by 4% for the year, to around US\$1bn, while profits fell by 58% to US\$19m. In Q4, sales fell by 14%, and the division posted a loss of around US\$29m.

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

## Deceuninck boosts sales in 2022

Belgian profile extruder Deceuninck's sales reached record levels last year.

Sales grew 16% to €974m (US\$1bn), despite lower volumes. The increase was driven by price increases to compensate for rising

material and energy prices, it said.

Adjusted EBITDA grew 4% to €102m (US\$109m). However, net profit slumped by 79% to around €8m (US\$8m), due in part to "impairment of equipment

in Russia" and higher income taxes.

Sales in Europe - which accounts for nearly half the company's turnover - rose by more than 11% to €458m (US\$489m).

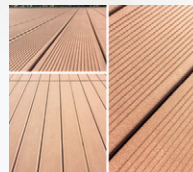
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# Chinaplas returns to Shenzhen for 2023 event

The Chinaplas show will run again this year, following last year's cancellation due to the country's 'Zero Covid' policy.

The event is held at the Shenzhen World Exhibition and Convention Center (SWECC) in Shenzhen on 17-20 April 2023.

Adsale, the show's organiser, expects more than 3,900 exhibitors to be at the event, including many from overseas. In addition, it says there are nine overseas 'country pavilions' - from countries including France, Germany, Italy, Japan, the UK and the US.

In addition, China has relaxed its travel restrictions - which have, in the past few years, prevented most foreign visitors from



**Chinaplas 2023 will have a strong focus on green technology**

attending the show. This year, Adsale says only a negative PCR test is required. There is no quarantine on arrival.

The show will have a strong focus on sustainability - with a series of special events and presentations on the topic.

One example is its

Recycling & Circular Economy Conference and Showcase, which takes place on 16 April - the day before the show opens.

During the event itself, Tech Talk sessions will showcase a number of sustainable technologies and applications.

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

## Dyka pipe sales rise in 2022

Tessenderlo, the Belgian industrial group, saw increased sales in 2022 due in part to results in its Dyka pipe extrusion division.

Full-year sales in this part of the business grew by nearly 19% to €733 million (US\$799m). The company said this was due to improved product mix, a contribution from a newly acquired production plant in France, and higher sales prices. Profit, in the form of adjusted EBITDA, rose nearly 10% to €85m (US\$93m).

Tessenderlo expects to see more economic uncertainty in 2023.

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

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

# Sales increase at UK-based Eurocell

UK-based profiles manufacturer Eurocell posted a 12% rise in sales in 2022.

The company reported a turnover of more than £381 million (US\$458m) for the year.

At the same time, pre-tax profits dipped by 5% to around £26m (US\$31m) in 2022.

In its profiles division, it reported a 15% increase in sales to around £162m (US\$195m). Operating profit exceeded £19m (US\$23m) in 2022, a fall of around 7%. In building plastics - which includes PVC foam products - sales rose 10% to around £220m (US\$264m), though profits fell 13% to around £11m (US\$13m).

Production volumes fell by 5%, to just over 54,000 tonnes. Eurocell used almost the same amount of recycle

as in 2021 (around 16,700 tonnes), but it now accounts for 29% of consumption - up from 27%. Overall equipment effectiveness (OEE) rose from 68% to 71%, due to improved efficiency and labour availability across operations, said Eurocell.



**Kelly: "Price was the significant driver of sales growth in 2022"**

In common with other extrusion companies, Eurocell was subject to a cyberattack in 2022, which caused some disruption - including a hit to sales volumes.

"Price was the significant driver of sales growth in 2022," said Mark Kelly, CEO of Eurocell. "We experienced margin pressure in the second half [of 2022], reflecting lower volumes and not all cost inflation being fully recovered until early 2023."

In anticipation of weaker markets in 2023, Eurocell completed a restructuring programme in Q4, which the company says will help to cut operating costs by around £5m per year.

Kelly retires as CEO later this year, and will be replaced by Darren Waters, currently COO of UK-based Ibstock.

> [www.eurocell.co.uk](http://www.eurocell.co.uk)



# German converters lift sales by 13% but fear energy price rises

GKV, the trade organisation that represents German plastics processors, reported a rise of nearly 13% in turnover last year.

However, the organisation said that the sector was under pressure from rising energy prices and falling earnings – as many companies find it difficult to pass on increased costs to their customers.

“The future of plastics processing companies in Germany stands and falls with the possibility of passing costs on to customers,” said Helen Fürst, president of

## German plastics converting, 2022

	Sales 2022 (bn€)	% Change
Domestic	46.2	+7.6
Export	32.7	+19.7
<b>Total</b>	<b>78.9</b>	<b>+12.6</b>

Source: GKV

GKV. “With the dramatic price increases for electricity and gas, there are clear doubts as to whether this will be possible this year.”

GKV said sales rose to €79 billion (US\$84bn) in 2022, up almost 13% in comparison with 2021. Over 41% of sales (€33bn, or US\$35bn) were from exports – an increase in

value of nearly 20%. At the same time, domestic sales rose by nearly 8%, to account for more than €46bn (US\$49bn).

Despite the increase in turnover, processing volumes fell by around 3% to 13.6 million tonnes of plastic. Of this, 2.4m tonnes was recyclate – a rise of 9%. In the same period, the industry’s

workforce rose by around 1% to exceed 326,000 people. In addition, the number of processing plants rose by a similar amount to just over 3,000 facilities.

Figures are not broken down into specific processes (such as extrusion). The packaging sector – which is most relevant to film and sheet extrusion – saw a near-5% decline in the amount of material processed (4.2m tonnes). However, turnover in the sector rose 13% to nearly €19bn (US\$20bn), it said.

➤ [www.gkv.de](http://www.gkv.de)

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IMAGE: AQUATHERM



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*From potable water to sewage drainage, and hot water to gas transport, polyolefin has proved to be a durable and adaptable material for a variety of pipe systems*



IMAGE: AQUATHERM

# Networking benefits: polyolefin advances

Polyolefin pipe - in its many forms - continues to find use in a broad spectrum of applications.

Recently, polypropylene pipe from **Aquatherm** was used to provide HVAC and drinking water to Orsalina28, an arts centre in Moncalvo, Italy. Orsalina28 is situated among vineyards in a rural location and includes a number of glamping domes - which are supplied with water and air conditioning.

The pipes boast lower CO<sub>2</sub> emissions than steel pipes. The buried variant - with rigid PUR foam and a casing pipe made of PE - is suited to transport water over longer distances. Aquatherm green pipe was used for the drinking water supply. The corrosion-resistant pipe ensures that the drinking water quality is maintained. The company says that

production of the pipe requires less energy than for metal piping - and releases around 83% less CO<sub>2</sub>.

To transport drinking water from the main house to individual domes, the installer used the buried version of the system for around 630m. The carrier pipe is insulated with PUR rigid foam and enclosed in a PE casing pipe to protect it from damage by the surrounding soil.

"With these piping systems, there are no mechanical joints," said AS Impianti, the installer company. "Instead, the pipes are joined together by heating and fused into a homogeneous unit for maximum safety and durability."

Aquatherm's blue pipe was used to connect to the HVAC system, including a new condensing boiler. The pipe has high temperature- and



**Above: Upponor says its PP-RCT pipe will help meet demand for commercial domestic water systems**

pressure-resistance. More than 1000m of this pipe were used.

“Since the PP pipes are significantly lighter than metal pipes, logistics on the construction site were simplified,” said AS Impianti.

### Double benefit

Union Pipes Industries is using HDPE from **Borouge** to make double-wall corrugated (DWC) pipes for the sewage network on Jubail Island in the United Arab Emirates (UAE).

Jubail Island is currently undergoing a real estate development project and Abu Dhabi Sewerage Services Company (ADSSC) is building the sewage network.

The DWC pipes are mechanically joined, easily transported, and resistant to corrosive gases, chemicals and infiltration.

Hazeem Sultan Al Suwaidi, Chief Executive Officer, Borouge, said, “Borouge is proud to be playing a key role in helping build the infrastructure of Jubail Island.

“ADSSC’s requirements created a clear starting point for our team to contribute to the DWC piping system, which will transform the infrastructure of the island,” said Hazeem Sultan Al Suwaidi, CEO of Borouge.

The development project includes the installation of a mock-up network: HDPE structural manholes of 1600mm diameter, with 5m depth and a 117mm solid wall, connection coupling and 500mm diameter DWC pipe.

### In hot water

**Upponor** North America has introduced PP-RCT hot potable water pipe and fittings for domestic applications.

It says the pipe will help meet the demand for commercial domestic water systems.

“The momentum for Upponor PP-RCT is continuing to build, and the industry is recognizing the benefits of an all-polymer piping system - which includes our PEX-a pipe and ProPEX fittings” said Michael Nicholson, business director for PP-RCT at Upponor. “By including hot potable in our PP-RCT offering, we are well-positioned to provide a complete polymer solution.”

To further address demand, the company is pursuing a multiple-source model that will offer a consistent supply of Upponor PP-RCT for customers and future commercial projects.

“While we have a secure supply of current offerings, including hot potable, we are working to establish a multiple-source model that will expand our portfolio in the future, including larger-diameter PP-RCT pipes and other products,” said Nicholson.

### Bimodal resin

**Dow** has introduced its Fingerprint DFDA-7555 NT bimodal polyethylene resin for micro irrigation applications.

The material - made with Unipol technology - can be used for micro irrigation tape and profile extrusion. Tape made using the resin can be given a higher stiffness - while also incorporating post-consumer resin (PCR).

“We are committed to helping our drip irrigation customers and growers create strong solution to benefit their production and sustainability efforts,” said Stephanie Giles, customer and application development manager at Dow.

The new Fingerprint grade - part of a larger portfolio - can help producers make micro irrigation tape with downgauged wall thickness, with better draw-down characteristics. The grade also has a good balance of extrusion ease and toughness - and both high tensile and elongation properties.

Rachel Anderson, a research scientist at Dow, added: “Beyond durability, there is a growing demand for sustainably made irrigation systems.”

### Renewable pipe

At K2022, **Borealis** showed an application of its ISCC Plus-certified Borenewables range of materials.

Italian pipe manufacturer Nupi has used polypropylene (PP) from the range to make its Niron Beta PP-RCT pipe. The pipe is used for domestic plumbing, heating and HVAC systems that are designed to perform under higher stress conditions and temperatures. The material offers the same performance as virgin PP.

Borealis says this helps Nupi prepare for when legislation will require the use of renewable





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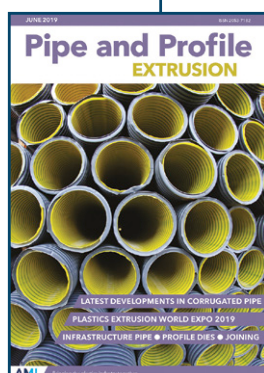
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**Right: Nupi's Niron Beta PP-RCT pipe will be made using Borenewable materials from Borealis**

materials in pipe production - and makes it the first Italian pipe supplier to use the material.

"By using Borenewables PP for our new pipes, we are reducing the carbon footprint of our products - and staying ahead of more stringent regulations by which the use of renewable feed-stock may soon become mandatory for plastic pipes," said Roberta Brusi, quality director at Nupi.

The accreditation is based on a mass balance accounting process that allows Borealis and Nupi to prove and quantify the renewable content at each manufacturing step.

John Webster, global commercial director for infrastructure at Borealis, added: "The use of certified renewable polymers is an instrumental lever to accelerate the transition from a linear to a circular plastics economy."

Borealis has also supplied its Borenewables polypropylene to **Rehau**, which uses the material to make furniture edgebands.

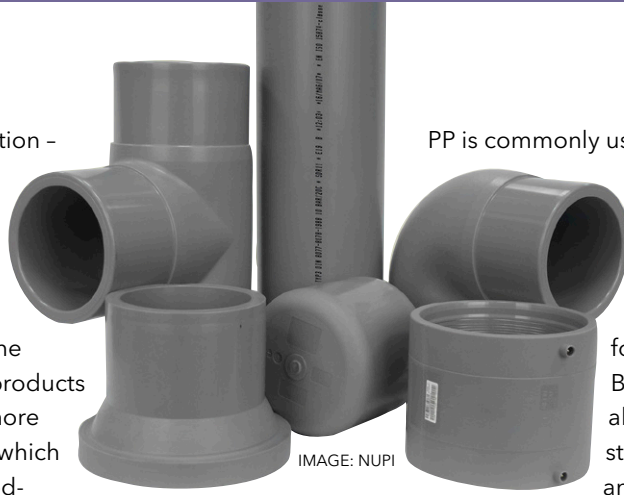


IMAGE: NUPI

PP is commonly used to make edgebands due to its chemical and heat resistance, and its wide range of processing opportunities. As drop-in replacement for standard PP, the Borenewables material is also suitable for use on standard edgebanders and contour processing

machinery due to its colour-stable chemistry and flexibility.

"We appreciate how important it is for the furniture industry to have a range of renewable-based and recycled material solutions in order to lower their own carbon footprint," said Webster.

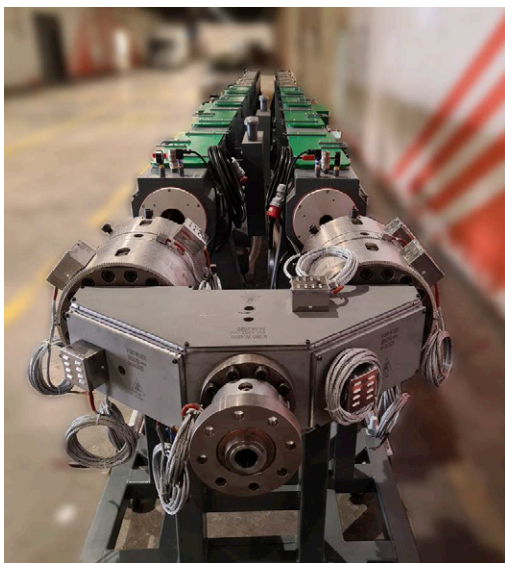
**Stiffness increase**

Researches in France and Lebanon have shown how inorganic fillers can further enhance the stiffness of PP block copolymers for gravity sewage pipe applications.

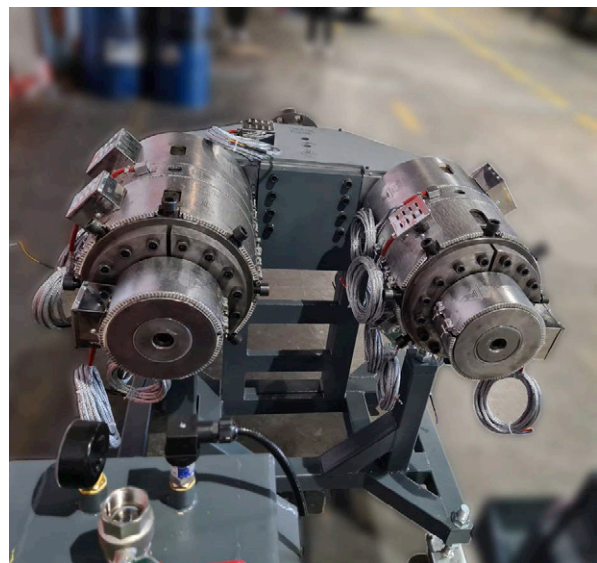
"Incorporation of inorganic particle fillers is an effective way to improve mechanical properties of

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a PP matrix and/or to reduce costs," said the researchers, most of whom are from the **Troyes University of Technology (UTT)** in France. "Reinforcements, which are much stiffer and stronger than the polymer, generally improve its modulus and strength. Consequently, the modification of mechanical properties can be regarded as their main function."

In the study, three grades of talc-filled PP - and one of glass fibre-filled PP - were tested and characterised for use as a middle layer in a three-layer sewage pipe. The results showed increases of 100% and 250% in tensile and flexural modulus through the use of 30-50wt% talc-filled PP and 30wt% glass fibre-filled PP, respectively.

This high increase in rigidity would allow the manufacture of pipes with higher ring stiffness, said the researchers. Composites filled with 30wt% talc or glass fibre showed good filler-matrix interaction and good filler distribution and dispersion. However, reduced filler-matrix interaction was seen in the composite filled with 50wt% talc.

The research was published in the *Journal of Applied Polymer Science*.

### Pipe vision

At the same time, researchers in China have identified and classified defects in PE gas pipelines using a neural network image recognition system.

"Traditionally, automatic classification of images is carried out using extracted image features, which are used to represent unclear information in the original pixel values," said the researchers, in a paper published in *Applied Sciences*. "Convolutional neural networks (CNN) have taken the place of that approach in recent years."

The researchers, from **Xinjiang University** and elsewhere, began by performing preliminary screening of acquired images. Images of defective PE gas pipelines were pre-processed.

Then, edge detection of the defective images was performed using an improved version of the Sobel algorithm. Finally, the defect images were morphologically processed to obtain binary images. These binary images were processed using a neural network model called VGG16 - to help to 'train' the classifier to recognise defects.

Part of the approach was to convert the colour images to 'grayscale' - which helps to characterise the brightness and darkness of an image. It also uses less memory and enable faster computing, compared to colour images.

"For the defective PE gas pipeline images, contrast was enhanced using gamma transform, and noise was removed using the dual filtering method."



**Right: Rehau is using Borealis polypropylene to make furniture edgebands**

### Pipe ageing

Also in China, researchers have assessed the degradation and characterisation methods used on PE gas pipes after natural and accelerated ageing.

"Solving the divergence between natural and accelerated ageing behaviour is the core for the lifetime prediction of polymeric materials," said the researchers from **Beijing Jiaotong University**.

In a paper published in *Polymer Degradation and Stability*, the degradation of PE pipes was evaluated by accelerated tests with exposure time up to 10,000 hours. At the same time, the ageing behaviour was also evaluated for PE pipes in operation after long-term service.

To characterise the effect of thermo-oxidative ageing, methods including tensile testing, scanning electron microscopy, differential scanning calorimetry, infrared spectroscopy and a new technique - nano-indentation - were performed. The results showed that degradation of PE pipes under oxidative conditions has time-dependent properties and spatially heterogeneous oxidation profiles.

"The current engineering-based prediction of PE pipe failure or lifetime lacks consideration of diffusion-limited oxidation and in-depth discussion of degradation mechanism," said the researchers. "This indicates it is too early to estimate the lifetime or the remaining lifetime of the PE pipes in operation."

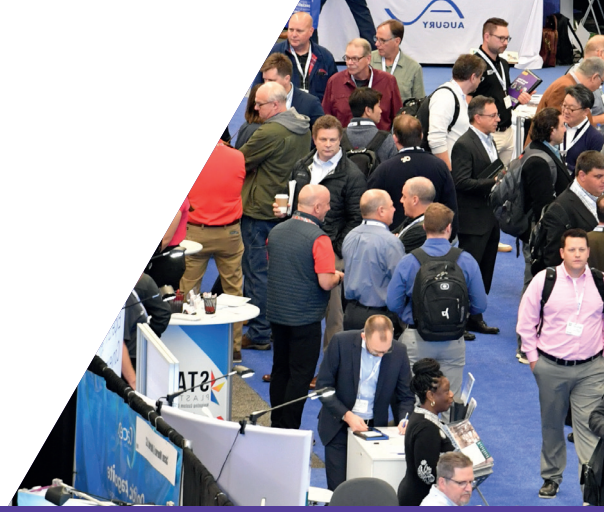
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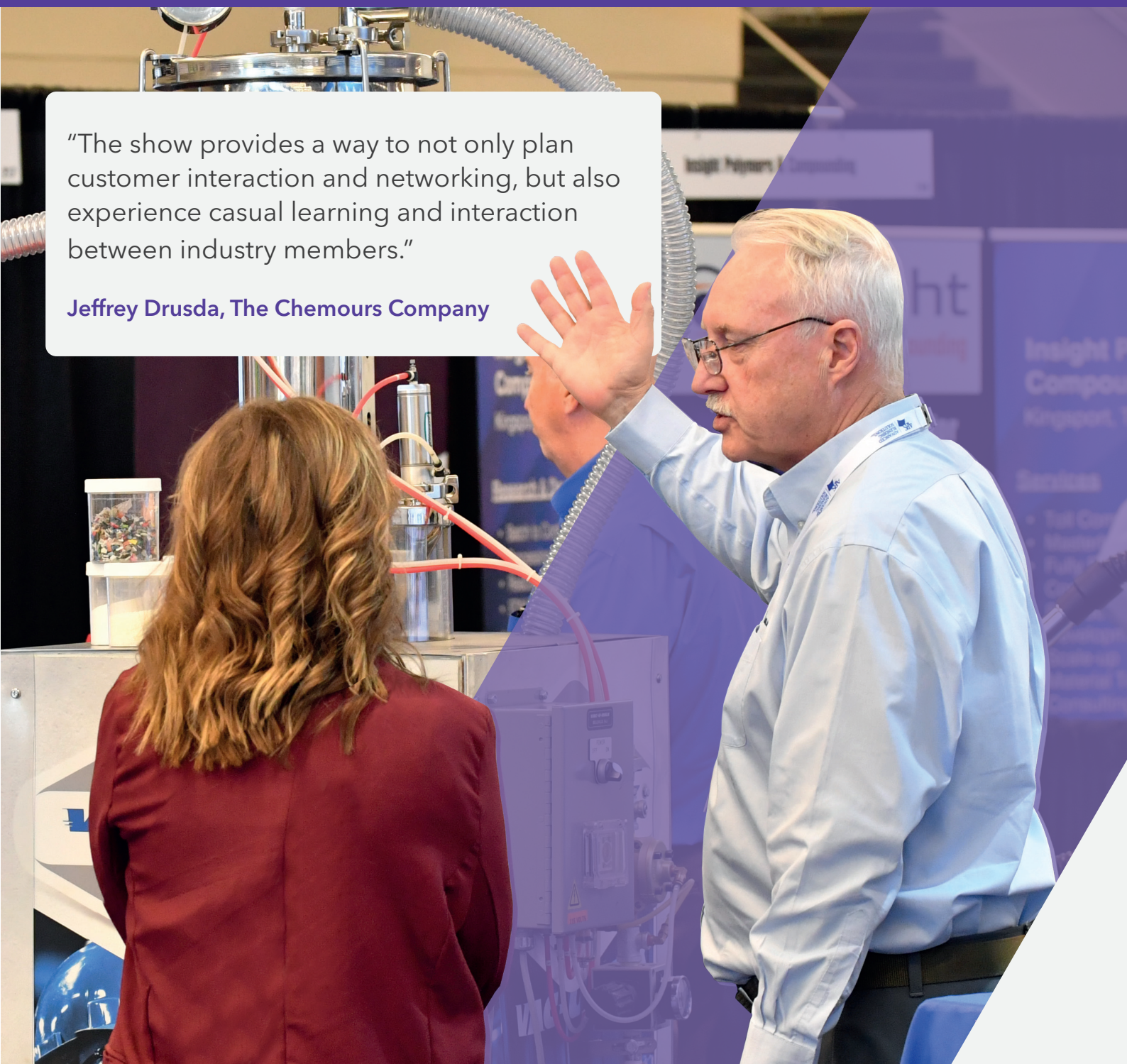
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*Wear measurement for screws and barrels - and making corrections depending on the results - helps to ensure that extruders work at optimum efficiency*

# Wearing out: latest in screws & barrels

Screws and barrels are critical to correct extruder functioning - but it's sometimes forgotten that both are subject to wearing out.

At K 2022, 3S - part of **Erema** - presented innovations in wear measurement and screw production.

It demonstrated how a new type of cylinder enables ultrasonic wear measurements - and a new screw manufacturing technology leads to more efficient production. The company is a specialist in the manufacture of extruder screws for plastics and recycling, and each year processes between 1,500 and 2,000 screw and cylinder orders.

The company has developed a new type of cylinder that enables ultrasonic wear measurement of the extrusion screw and cylinder while the machine is running.

"This saves the customer from having to shut down and restart the plant, remove and reinstall the parts, then clean and measure them - which would usually mean one to two days of machine downtime," said Alois Anreiter, managing director at 3S.

In another highlight, it showed a new screw

manufacturing technology. In a special machine, profile grinding can be used to shape materials that would be too hard for conventional production methods. This allows the geometry and outer diameter of screws and other components to be ground in one pass, without re-clamping. Further hardening treatment is no longer needed. When parts are removed from the machine, they are finished and through-hardened - with no final polishing required.

The technology is being used to make discharge screws for Laserfilter 406, an Erema filter system.

"Extruder screws have up to 30 parts, each of which is manufactured individually," said Anreiter. "We attach great importance to always being up to date in terms of our production technology."

## **Austria plant**

**Extreme Coatings**, a US-based supplier of wear-resistant coatings, has a new manufacturing facility in Gmunden, Austria.

The plant is for the production of high-performance coatings for feedscrews in extrusion and

**Main image: Measuring wear on extruder parts such as screws is needed recommended once or twice per year**

IMAGE: EREMA



**Above: Erema subsidiary 3S demonstrated its screw production technology at K2022**

injection moulding applications.

The company has established a European subsidiary, Extreme Coatings GmbH, and signed a licensing agreement with engineering services business FS Maschinenbau, which will provide engineering and manufacturing services.

Increased capacity in Europe should reduce lead times and delivery costs, and act as a local supply for the company’s customer base in Europe, says the company. The new 15,000 sq ft facility will add to the company’s existing operations in India, South Korea, and Chile.

“Market demand for our wear-resistant coatings has shown exponential growth in several key application areas,” said Scott Caplan, executive vice president of Extreme Coatings. “We’ve expanded our global footprint to break the logistical logjam and ensure stable supply to all key European regions.”

Extreme Coatings’ thermal spray technology applies wear- and corrosion-resistant CarbideX protective coatings – based on tungsten or chromium carbide – to new or repaired feedscrews. The process provides a crack- and porosity-free coating within thicknesses ranging from .004in to .017in

per side and hardness values over 60HRc. CarbideX Proline formulations deliver like-new performance and at least two to three times longer equipment life, says the company.

**Twin-screw expansion**

Meanwhile, US-based machinery manufacturer **Entek** is close to completing the first phase of a new 30,000 sq m facility at Henderson in Nevada. Around US\$15m has been invested in the facility, which the company says will allow it to develop its wear parts division – which makes replacement screws and barrels for both Entek and non-Entek twin-screw extruders.

Entek is also developing its largest twin-screw extruder to date – a 160mm machine that is expected to be ready in Q4 2024. Though Entek’s current largest extruder is a 133mm model, it produces replacement parts for extruders up to 250 mm.

“We’ve been making replacement wear parts for this size of machine for almost 20 years for other brands of twin-screw extruders,” says Linda Campbell, VP of extrusion sales at Entek. “We have seen the market demand for this size and recognised the gap in our machine line-up.”

**Energy savings**

Germany-based **Extruder Experts** recently helped a customer reduce energy consumption in its extrusion process – in part due to changes in screws and barrels.

Extrusion systems consume lots of power, through a combination of drives, high heating capacities, screw designs and cooling systems that dissipate energy, says the company. With rising energy costs, many extruder operators have been forced to deal with this directly.

Extruder Experts helped its customer carry out a number of energy-saving ideas. To improve energy efficiency, it changed from heating trays to heating cartridges. In process control, optimising the

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cooling channels raised efficiency.

Adding highly wear-resistant exchangeable sleeves to the barrels helped to save resources. The process was also optimised by adding extra degassing barrels - to make the extruder more flexible in use.

As well as requiring design expertise, the project also needed a high degree of manufacturing precision, said the company.

"In previous projects, customers have reported savings of 8-15% during heating and operation of the system," it added.

In addition, the company says it offers a 'wear and fair' offer to customers. It says measuring wear on extruder parts is necessary once or twice per year. After measuring screw and barrel wear, the company provides both video images and graphical results.

"The smallest indications of wear are detected at an early stage, allowing customers to decide calmly what needs to be done and when," it said.

On this basis, it says the actual condition of screws and barrels can be determined - including an accurate estimate of the correct time to carry out a service or renew parts. It adds that it will refund part of the cost of this if it is later commissioned to supply spare parts.

### Alignment advice

In a recent blog post, **Davis-Standard** recommended 10 habits that extrusion companies should adopt "in order to achieve peak equipment performance" - and these included: a review of maintenance checklists; and aligning extruders.

The extruder is a good place to start when reviewing maintenance checklists, it said - and has produced a PDF guide to the quarterly tasks that should be carried out.

"We suggest checking 10 extruder components as part of a healthy maintenance plan," it said in the blog.

For the feedscrew and barrel, advice included: cleaning and inspecting the pressure gauge transducer; measuring and recording feedscrew flight and barrel diameters (on an annual basis); conducting Liquid Penetrate Non-Destructive Test (NDT) for cracks on the feedscrew and barrel (also yearly); and cleaning and inspecting both feedscrew and barrel.

In addition - for barrel heaters - it recommended: measuring and recording heater amperage and resistance; cleaning and inspecting barrel heater fins; checking all thermocouple and heater terminal connections; and measuring and recording blower fan motor temperatures.

Davis-Standard added that a poorly aligned



IMAGE: MESSE DÜSSELDORF, CONSTANZE TILLMANN

extruder can lead to excess wear and tear on both screw and barrel.

"The longer the extruder barrel, the more significant alignment becomes," said the company. "We've seen misalignment cause costly and unnecessary damage - including premature wear, bent and broken screws and unstable barrels.

First, the barrel must be aligned to the driving mechanism - which is the drive quill of the gearbox. Trying to determine alignment by levelling is inaccurate, as it is not indicative of the drive quill - and only measures the vertical plane.

"The correct procedure involves using an optical or laser alignment scope inside the drive quill to align the barrel to a fixed centre line by rotating the drive quill," it said. "The barrel and feed throat are then aligned to that centre line by adjusting the barrel supports, or the mounting faces of the feed throat."

Using a barrel support system is important, but several factors must be considered. The barrel must be able to expand freely - and without distortion - through the support as it is heated. It should never be locked down by a support that completely surrounds it - which prevents the barrel from having the room to slide when expanding. Also, the support joints must be made from non-corrosive materials, such as brass, to prevent 'freezing' of the support.

Finally, the entire barrel support must be rigid enough to maintain its position - and not tip over as the barrel expands: a 4.5in barrel will grow more than 0.3in when heated to typical temperatures.

**Above: Screw design can be vital to extrusion efficiency**

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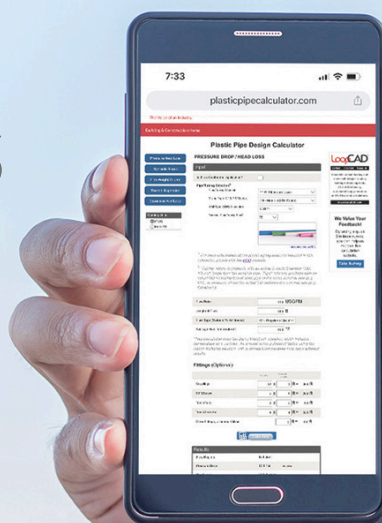
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# Modelling job: software for plastics extrusion



*Simulation software can be applied to many extrusion applications - from reducing die swell to estimating how much damage an earthquake might cause to the PVC water pipe network*

In plastics extrusion, modelling software is typically applied in areas such as die design - but there are many other simulations that can help plastics extruders to make better products.

The US-based **Plastics Pipe Institute (PPI)**, for instance, has updated its Plastic Pipe Design Calculator - a free software tool for the design of plastic pressure pipe and tubing systems in a variety of materials.

The calculator is for use in applications including plumbing, water service, fire protection, radiant heating and cooling, geothermal ground loops and district heating. It covers the use of CPVC, HDPE, PEX, PE-RT, PP-R and PP-RCT.

The updates in Version 3.0 of the calculator include: more than 50 new pipe sizes; methanol as a fluid choice for geothermal designs; sodium chloride and calcium chloride brine solutions as fluid choices for chilled water; and a new Static Water Column Pressure function.

This new function is the sixth tool available in the calculator and will help designers to estimate the pressure inside piping at the bottom of a geothermal borehole or at the bottom of a multi-story plumbing, fire protection, or hydronic system.

"With the addition of Static Water Column

Pressure, the calculator helps designers determine a potentially overlooked aspect of piping design - the internal pipe pressure that is created by the column of fluid in a tall vertical pipe," said Lance MacNevin, director of engineering in PPI's building and construction division. "This new function allows the user to select the fluid, the temperature, and the elevation of the water column."

The calculator allows the user to select either IP/US or Metric/SI working units, as well as multiple fluids. Fluid temperatures and mix ratios are chosen by the user. Results can be viewed, printed, or emailed.

## Reduced swelling

A Netherlands-based researcher has developed a simulation model that helps to reduce the problem of die swell.

When plastic is extruded through a die, it tends to expand due to internal stresses in the material. The problem is usually solved by trial-and-error - but it is time-consuming and can create large amounts of waste material.

In her PhD thesis, *Modeling and optimization of polymer extrusion*, Michelle Spanjaards - a member of the Polymer Technology research group at

**Main image:**  
**PPI has updated its free software tool for the design of plastic pressure pipe and tubing systems**

IMAGE: IANUS



**Above: Ianus of Germany is part of the EU-based Extra project to develop a simulation-based assistant for plastics extrusion**

**Eindhoven University of Technology** - has developed a numerical model to predict the shape of the extrudate. It allows the shape of the die to be optimised, to produce an extrudate of the correct dimensions.

Spanjaards developed a transient 3D finite element model for viscoelastic fluids emerging from complex dies - and combined it with a real-time active control scheme. This solved the inverse problem of three-dimensional die design for extrudate swell.

"The results obtained on extrudate swell and die optimization have shown the potential of the numerical model developed in this thesis," she wrote in her summary. "The numerical framework has been set up in a general manner and can be used to investigate polymer extrusion for fluids with different rheological properties and different die shapes."

**Material alternatives**

Researchers in Japan have developed a machine learning method to identify sustainable alternatives for composite materials.

Their findings were published in the journal *Science and Technology of Advanced Materials: Methods*.

The researchers, from **Konica Minolta** and the **Nara Institute of Science and Technology**, say that their model "rapidly searches through large numbers of materials" to do this. Their results might be applied to areas within pipe and profile extrusion, such as finding new materials for composite pipes or wood-plastic composites.

"Finding a new composite material that achieves the same performance as the original - using human experience and intuition alone - takes a very long time," said Michihiro Okuyama, assistant manager at Konica Minolta. "You have to evaluate countless materials while also taking into account the interactions between them."

The researchers developed a new type of machine learning method - which can quantitatively evaluate interactions between component materials to reveal how much they contribute to overall composite performance. It then searches for replacements with similar performance to the original material.

The researchers tested their method by searching for alternative materials for a composite with three components: resin, filler and additive. They experimentally evaluated the performance of the substitute materials and found that them similar to the original material.

"Our method removes the need to test large numbers of candidates by trial and error, saving both time and money," said Okuyama.

**Extra data**

Germany-based **Ianus** is involved in a European research project called Extra - which will develop a simulation-based assistant for the plastics extrusion process.

It will combine expert knowledge about plastics processes with live computer simulations to generate data that will help towards process optimisation.

The research will use different methods - including fuzzy-logic, machine learning and deep learning - to interact with data being collected from various equipment, such as extruders and dies. This will help the machine user find the best way of using the data using simulation.

This project is being funded by the European Union and the German state of North Rhine-Westphalia.

**Damage limitation**

Researchers in the Philippines have used simulation to estimate the possible extent of earthquake damage to the country's water distribution network.

Quezon City is crossed by the West Valley Fault System (WVFS) that could generate a magnitude 7.2 earthquake (known as 'The Big One'). The water distribution network would suffer extensive damage from such an earthquake.

The researchers, from the **University of the Philippines** and the city's water authority, used line-element modelling to estimate possible damage to the underground PVC water network.

They did this by using appropriate empirical repair rates (RR) and developing 'fragility curves'. The appropriate empirical RR equation was determined by comparing the results of selected PVC RR equations and the line-element modelling.

The PGV ranges from 23.10 cm/s to 64.49 cm/s as determined using the Boore and Atkinson



(2008) ground motion prediction equation. Using the results from the empirical and simulations methods, the equation by the American Lifelines Alliance (2001) was determined to be the appropriate empirical RR equation for the study area.

The expected average repair rate of PVC was 0.05 repairs per km length of pipe - or an estimated 84 total PVC pipe repairs across the city. Three fragility curves were generated showing the relationship of peak ground velocity (PGV) and RR - an important tool in estimating underground pipe damage.

One limitation of the research was the fact that only PVC pipes in diameters of 25-400mm were modelled in the study.

### FEA for pipe

Finite element based interfacial failure analysis of PVC and laminated FRP composite pipe socket joints subjected to internal pressure

A study from India has used finite element analysis (FEA) to analyse PVC and composite pipe joints that are subjected to internal pressure.

The researchers, from the **Indian School of Mines** in Dhanbad, developed various FEA-based codes in **Ansys**. They used stress-based failure

criteria including parabolic yield criteria and Tsai-Wu failure criteria - as well as strain energy release rates (SERRs) - to simulate the onset of failure and its growth.

The bonded PVC and FRP pipe socket joints were modelled in the Ansys Parametric Design Language (APDL) interface of Ansys 19.1. The 3D brick elements can separate the total SERR into individual components - and can be used for FE mesh generation in both PVC and composite FRP pipe.

"Stress and failure analysis suggested that the pipe-adhesive interface at the junction of the joints was the most vulnerable location for failure under internal pressure," they wrote in the *International Journal of Adhesion and Adhesives*.

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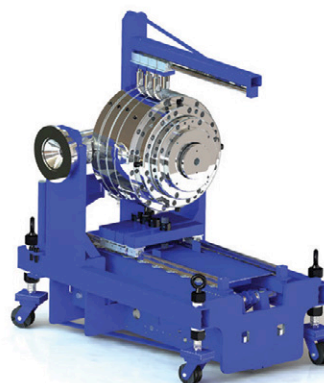


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IMAGE: PPI

# Hundred club: developments in PE100 pipe



*Recent developments in PE100 pipe include a major installation in Spain, its use in irrigation pipe by a sugar manufacturer and a pipeline renewal project in the UK - replacing GRP pipe*

**Main image: A new ASTM standard covers PE4710 pipe for HDD installation**

PE100 is one of the main grades that specifiers choose for demanding pipe applications. It can be used in a variety of industries - from gas to water transport - but in each case is typically selected for its high level of robustness.

Recently, Kier Infrastructure installed more than 13km of **Aliaxis** PE100 pipe in a UK pipeline renewal project.

The project will replace existing glass-reinforced pipe (GRP) - which tended to rupture and leak - with GPS PE Blue pipe from Aliaxis. The pipe will upgrade the connection from a pumping station to a reservoir to deliver potable water to residents of the Cotswolds.

PE100 pipe, 1200mm in diameter, will replace the GRP pipe, which was originally installed around 20 years ago - and had consistently failed. The design of the new pipeline started around eight years ago - which included advice on the installation and benefits of PE100.

"It was decided to lay the majority of this

replacement pipeline in PE due to its flexibility and speed of installation," said Nigel Gascoyne, key account manager at Aliaxis UK. "We're the only company in the UK that can produce PE100 pipe to 1200mm sizes."

Andy Muncer, project director at Kier, added: "While we considered a steel pipe, we selected the GPS PE Blue as a proven, economic solution. There is an agreed call-off schedule, for which Aliaxis is storing pipe at an airfield."

The offsite storage allowed Aliaxis to secure available raw materials and begin production early - and to manage a controlled delivery schedule with limited on-site space, he said.

## **Low-sag pipe**

**Politejo**, a pipe manufacturer based in Portugal, has selected a low-sag PE100 material from **Borealis** for a new pipeline project.

The material, BorSafe HE3490-SLS-H, has a tailored polymer architecture and low melt flow





IMAGE: ALIAXIS

The material's slow crack growth (SCG) resistance translates into faster installation and cost efficiency, says Borealis. Faster installation times can be realised because the pipe can be installed without sand-bedding around it. For drinking water applications, the formulation offers extra assurance of purity for the safe transport of potable water.

"Given our tight installation schedule, the material's high production rates and easy processing were key parameters," said André Maia, technical director at Politejo. "The superior mechanical performance characteristics, robustness and scratch resistance during transport and installation were decisive factors in our selection."

**Right: PE100 pipe from Aliaxis will replace GRP pipe, which was leaking**

rate (MFR) enabling production of pipe with high wall thickness and low sag. It will be used in the project - comprising both onshore and offshore sections - in the Galicia region of northern Spain.

Sagging is the tendency for a hot melt from the pipe extrusion die to flow downward due to gravity, resulting in uneven wall thickness and distribution. The resin's low-sag property makes the production process more efficient, with faster start-up in reaching the required dimension tolerances. It can also reduce waste and scrap rates.

For the pipeline project, pipes with diameters of 900mm and 1100mm will be used in the onshore section, while pipes with diameters of 1400mm diameter and 60 mm wall thickness will be used in the offshore section.

### Mass balancing

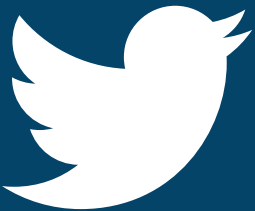
**Simona** has introduced its new ISCC Plus-certified product line, which will initially focus on the mass balance approach as well as bio-circular and circular raw materials.

Its ISCC Plus-certified pipes and fittings product line is based on the principle of mass balancing. The range was presented to the public for the first time at K2022. Simona has expanded its portfolio to include plastic products from climate-friendly sources, it says.

Initially, the ISCC-certified product line will be available for PE100 pipes and fittings. This will be extended to other products in the future.

The ISCC organisation provides certification for raw materials that comply with established sustainability regulations. Simona will initially focus on pellets of a bio-circular and circular origin - that is, the pellets used for plastics production originate from biological waste, for instance. ➤

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**Right: Politejo is using a low-sag PE100 material from Borealis in a new pipeline project**



IMAGE: POLITEJO

Because they are introduced prior to polymerisation, the properties of ISCC Plus-certified products are fully preserved, compared to pure fossil-based pellets, said Simona. The pipes and fittings are available with various proportions of ecological pellets - ranging from 20 to 100%, depending on customer requirements.

Simona has also come up with innovations in the area of digitalisation - in terms of monitoring plastic pipe performance. Its PE 100 PSC RC-Line range of protective-jacket pipes opens up the possibility of continuous leakage monitoring - by means of metal detectors fitted to the plastic.

**Fire protection**

**Agru** of Austria has expanded its range of FM-approved piping systems for underground fire protection systems.

The pipes are made from crack-resistant PE 100-RC, which Agru says can save costs during installation, and increase system safety and service life.

The company adds that the PE 100-RC FM-approved components achieve the highest pressure ratings of 218psi/15 bar (SDR 11) and 250psi/17.5bar (SDR 9). They can be used in any project where FM approved piping is needed for underground fire suppression systems.

The company makes pipes and fittings from OD 63mm to OD 630mm. The approval test carried out as part of the product expansion also made it possible to increase the pressure ratings for Agru's pipe systems in SDR 11 and SDR 9. This could mean cost advantages for installation compared to many pipes with FM approval, it said.

Its subsidiary, Agru America, has FM-certified pipe systems in Iron Pipe Size (IPS) dimensions commonly used in the USA, meaning that Agru can supply the full range in both metric and IPS

dimensions. The water supply of a fire protection system is often considered its most critical component, as it must move water from its source to the entrance of a building. Piping must be reliable enough to withstand internal and external stresses over long periods of time. PE 100-RC pipes and fittings can be welded together by heated tool butt welding or electrosocket welding. Welded joints are as strong as the pipe itself, providing a leak-tight system. In addition, PE 100-RC pipes do not corrode.

Agru offers two FM-approved product ranges for firefighting systems: one for maximum operating pressures of 218psi (15bar, SDR11 ); and one for 250psi (17.5bar, SDR9). System components are tested to handle 3.2 times the specified pressure - in case of water hammer - without failure.

**Sugar irrigation**

**Borouge** has supplied its PE100 material to a pipe manufacturer, for an irrigation system for a major sugar refiner.

Egypt-based Emirati Jenaan Pipes & Irrigations Systems company (JPIS) is using the material to manufacture irrigation pipe systems for one of the world's largest sugar refineries. The pipes are made using Borouge's BorSafe HE3490 LS PE100 materials - which eliminate water leakage from irrigation systems.

JPIS produces PE pipes of 32-600mm diameter, for more than 700 pivot systems. The water will be drawn from wells - drilled into the Nubian aquifer - to irrigate an area of 76,000 hectares, to produce 2.5 million tonnes of sugar beet per year.

Once operational, the refinery will produce up to 1 million tonnes of sugar. The project is important and strategic for Egypt, because it will help to reduce its reliance on sugar imports by 80%.

"We are delighted with the strategic partnership



between Borouge and JPIS, which facilitates exporting our products to local and global partners,” said Khalfan AlMuhairi, senior vice president for Middle East and Africa exports at Borouge.

### Test case

Testing specialist **CEIS** can now provide a suite of tests to assess the performance of PE100RC - which has high resistance to slow crack growth.

Revisions to two sets of UNE-EN standards allows the material to be used in applications including transport of gaseous fuels and pressurised water supply and sewage.

CEIS has reached an agreement with the **Polymer Technology Laboratory (Latep) at King Juan Carlos University (URCJ)** to provide testing of PE100RC materials. It will provide the complete test package to organisations - including manufacturers and certification bodies - for conformity assessment of water and gaseous fuel supply systems made with PE100RC.

It can now provide four tests: the Strain Hardening Test (SHT); the Cracked Round Bar Test (CRBT); the Accelerated Full Notch Creep Test (AFNCT); and the Accelerated Notch Pipe Test (ANPT).

SHT is carried out at 80°C to determine the gradient of the strain graph compared to the time at the final stage of hardening before the sample breaks. CRBT is a cyclic strength test under a constant load conducted on a cylindrical sample (Ø=14mm) notched in the middle to start a quick fracture. The sample must withstand a minimum number of cycles (1.5 x 10<sup>6</sup>) before breaking.

The other tests - AFNCT and ANPT - were previously included in the earlier revisions, but have since been modified for the high performance of PE100RC.

### New ASTM standard

**ASTM** has issued an updated standard for the use of HDPE pipe in horizontal directional drilling (HDD) projects.

ASTM F1962-22, *Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings*, was revised and updated in December 2022 by an ASTM subcommittee. It includes pipe made with PE4710 compounds.

In addition to ASTM, ASME and CSA standards, PE4710 has also been incorporated in AWWA (C901, C906, M55), FM 1613 and others. The pipe is used in force main, potable water and other projects.

According to the **Plastics Pipe Institute (PPI)**, PE4710 is the highest performance classification of

HDPE piping material for water applications.

“PE4710 compounds offer utilities and designers a greater level of performance,” said Camille George Rubeiz, senior director of engineering for PPI’s municipal and industrial division. “This means using HDPE with increased flow capacities plus increased resistance to surge pressure, fatigue and slow crack growth.”

The new standard focuses on maxi-horizontal directional drilling (maxi-HDD) that is typically used for longer distances and larger diameter pipes common in major river crossings.

Rubeiz cited several recent applications, including one in Atlantic City where a 32in diameter PE4710 pipe ran for 1,500 feet - 80 feet below the Beach Thorofare waterway. Here, the critical force main line project was performed with a drilling rig that had a pulling force capacity of 250,000 pounds and a torque capacity of 40,000 ft-lbs.

In another, 4,000 feet of 20in HDPE pipe was embedded 60 feet below Florida’s Biscayne Bay to deliver potable water, replacing a 25-year-old leaking cast iron transmission line.

“We encourage the use of F1962 - the only ASTM Standard for HDD,” said Rubeiz. “This - coupled with Pipeline Analysis & Calculation Environment and PPI-BoreAid free software programs - will provide the information for planning the design.”

### CLICK ON THE LINKS FOR MORE INFORMATION:

- > [www.aliaxis.co.uk](http://www.aliaxis.co.uk)
- > [www.politejo.com](http://www.politejo.com)
- > [www.borealisgroup.com](http://www.borealisgroup.com)
- > [www.simona.de](http://www.simona.de)
- > [www.agru.at](http://www.agru.at)
- > [www.borouge.com](http://www.borouge.com)
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- > [www.plasticpipe.org](http://www.plasticpipe.org)

**Below:**  
Egyptian  
pipemaker JPIS  
is using PE100  
from Borouge  
in a project for  
a sugar refiner



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## INFRASTRUCTURE

## Pipes use up to 65% recycle

UK-based Polypipe Building Services says it will now make its range of Terrain PVC pipes with up to 65% recycled materials.

These will be produced to British Standard EN1453 to ensure equivalent strength and durability.

"This maintains quality and performance while supporting a move to a circular economy that makes best use of construction waste," said Andy Cullum, UK managing director at Polypipe Building Services.

The launch follows extensive testing and an investment of more than £2.4 million (US\$3m) to allow the use of recycled material from PVC windows. Terrain pipes will be produced as a multi-layer product.

Polypipe's parent company, Genuit, intends to use 62% recycled materials in its products by 2025.

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

## PEX

## New PEX pipe produced from chemical recycling

Neste, Borealis, Uponor and Wastewise have teamed up to make cross-linked polyethylene (PEX) pipes from chemically recycled feedstock – derived from PEX pipe.

The partners believe this is one of the first implementations of chemical recycling of PEX.

The co-operation sees Wastewise use its pyrolysis-based chemical recycling technology to liquefy industrial waste from Uponor's PEX pipe production. It then breaks the polymer back into its building blocks, to create an oil-like raw material. This is then co-processed in Neste's oil refinery in Finland and upgraded into RETM – a drop-in feedstock for making new polymers. Borealis feeds the raw material into its steam cracker and polymerises it into polyethylene as part of its Borcycle C chemical recycling portfolio.

Finally, Uponor uses the PE to create new PEX pipe,

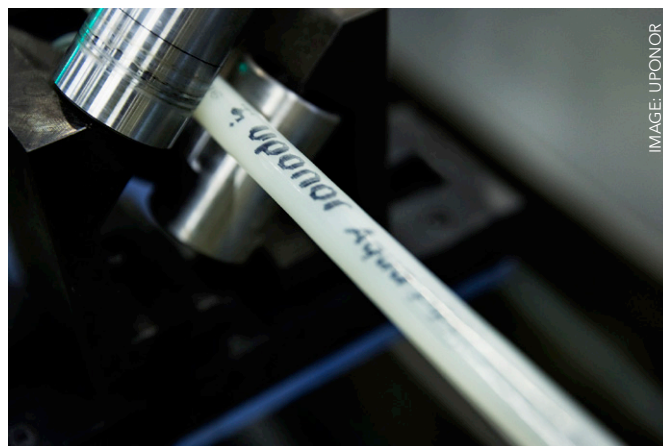


IMAGE: UPONOR

which is used in the construction sector for heating, plumbing and cooling purposes. It can even be used for sensitive applications with high requirements, such as drinking water systems.

"We are excited about this collaboration as it gives us a head start on our transition to circular materials," said Thomas Fuhr, chief technology officer at Uponor. "Our new long-term goal is to use 100% of our PEX waste as raw material through closed loop recycling."

Kaisa Suvilampi, manag-

ing director at Wastewise, added: "Through our processes, we were able to turn PEX into pyrolysis oil of sufficient quality to use it as input for a refinery – which in turn can process it into a high-quality cracker feed. This project strikes certain PEX off from the list of materials giving recyclers a headache."

Around six months elapsed between the start of the project and production of the first pipes.

➤ [www.neste.com](http://www.neste.com)  
 ➤ [www.borealisgroup.com](http://www.borealisgroup.com)  
 ➤ [www.uponor.com](http://www.uponor.com)  
 ➤ [www.wastewise.fi](http://www.wastewise.fi)

## COMPOUNDS

## PVC compounds with high recycled content

Alphagary has introduced a range of PVC compounds that use a high percentage of recycled content.

Its Infinitude series of PVC compounds is designed for both moulding and extrusion applications.

Grades formulated with up to 70% recycled content have been used by customers in applications including

irrigation and garden hoses.

"Based on our lab analysis and customer feedback, we found that these compounds function similarly to those formulated with all prime materials in how they process and perform in the end applications," said Angelica Fram, head of quality assurance at Alphagary in Colombia.

The launch is part of the company's larger PVC In Motion project with sister company Vestolit. The project aims "to find avenues where local processing companies separate and clean the material, and then process and ship it to us so we can incorporate into our compounds".

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

INSPECTION

# Detecting flaws with triangulation

LaserLinc's FlawSense dimensional surface flaw detection system uses high-speed laser line triangulation to inspect products such as pipes and profiles.

The company says it can detect lumps, gels, pits, slits and other surface defects - and perform the same functions as conventional laser micrometers, lump and neckdown detectors and camera-based systems. Manufacturing personnel can later review the defects in 3D for deeper analysis.

The system can perform 360° in-process inspection, regardless of product orientation in the measurement field.

"FlawSense is a high-performance inspection system that uses the most

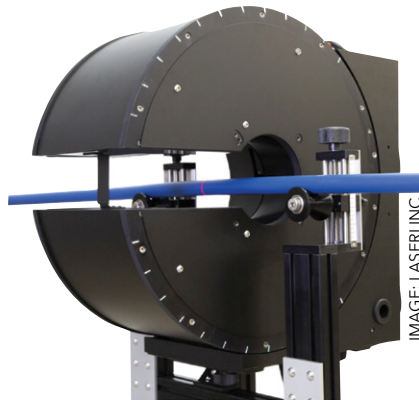


IMAGE: LASERLINC

advanced laser triangulation technology and is more accurate and capable than conventional inspection systems," said Chad Walker, product manager at LaserLinc.

LaserLinc says that traditional systems typically offer limited meas-

urement points per sensor, are unable to measure the full contour of the product or see false positives due to the presence of text and labels. FlawSense digitises thousands of individual measurement points around the contour of the product to reveal the smallest surface anomalies. It then produces a 3D point cloud image that can be manipulated for further analysis. The system can detect surface defects down to 5 microns - and claims 10 times better resolution than camera-based systems.

The system is suited for inspecting high-value products such as high-pressure hose for automobile and aerospace applications.

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

MARKING

# Printing with solvent resistance

Egeplast UK has used print heads from Timbermark to improve printing quality on its range of co-extruded PE pipes.

The new installation of 32mm piezo print heads uses UV curing ink to produce a mark on a curved surface that is both high-resolution and solvent resistant - which was a key requirement for the customer.

Egeplast had been using a continuous inkjet printer to print information on wastewater and drinking water pipes. However, it wanted to improve the quality of the mark and include its company logo. This was best achieved by switching to a high-resolution printer. In addition, the print needed to be resistant to solvents - specifically petrol.

Using UV-curing white ink, the system can produce an indelible mark, which includes the product specification, dimensions and Egeplast logo. The resulting print is sharp, accurate and solvent resistant. By using two printheads, both sides of each pipe can be marked.

The installation incorporates the inkjet printer and integrated UV controller. The printer and UV curing module are mounted 1mm from the curved surface of the pipe and produce a sharp print in white against the dark surface of the pipe. Non-contact marking is an essential feature. A contact wheel was considered - but was rejected, as it puts pressure on the pipe that could lead to 'ovality'.

> [www.timbermark.co.uk](http://www.timbermark.co.uk)



IMAGE: TIMBERMARK

CUTTING

# Distortion-free cuts for pipe

Conair says that its PipeMaster planetary cutters provide continuous, distortion-free cuts in extruded PVC and polyolefin plastic pipe.

The products work for pipe diameters from 0.630 to 24.9 in, at line speeds up to 82 feet per minute. The cutters are available in six sizes across the smaller MDT series and larger MTT series, according to Conair.

"The MDT and MTT planetary cutters combine rugged reliability, cost-efficiency and well-engineered controls," said Ernie Preiato, vice president of extrusion at Conair.

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



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## INOEX: WARP PIPE MEASUREMENT



The WARP contact-less radar-based pipe measurement system from Inoex uses terahertz technology to provide simple and effective multi-point dimensional control of thick and thin wall plastic pipes. Learn more in this brochure.

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## COPERION: PRORATE PLUS FEEDER



The new ProRate Plus feeder system from Coperion K-Tron offers a cost-effective and simple-to-configure gravimetric option for processors looking for reliable handling of pellets and free-flowing bulk powders.

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## MIXACO: MODULAR LAB MIXERS



The Modular HM Lab mixer from bulk mixing specialist Mixaco is designed to be the most flexible laboratory mixer available. The Modular HM Lab is available in four sizes from 5-20 litres and can take on all recipes.

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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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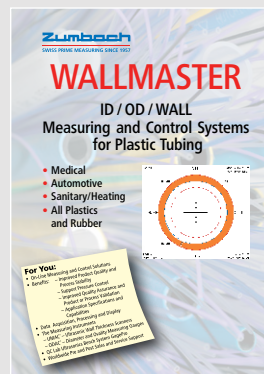
## NDC: PRECISION GAUGING



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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14-15 June 2023  
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### Ocean Plastic

20-21 June 2023  
Houston, TX, USA

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### Chemical Recycling

26-28 June 2023  
Frankfurt, Germany

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### Plastics Sustainability Strategies

12-13 September 2023  
Dusseldorf, Germany

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### Plastics Recycling Technology

10-12 October 2023  
Vienna, Austria

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### Plastics Recycling World Expo

15-16 November 2023  
Cleveland, OH, USA

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### Recycling Flexible Packaging

22- 23 November 2023  
Barcelona, Spain

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### Chemical Recycling

March 2024  
Houston, TX, USA



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**AMI**

## Alwasail Industrial

<b>Head office:</b>	Buraidah, Saudi Arabia
<b>Chairman:</b>	Abdul Rahman Abdullah Almushekih
<b>Founded:</b>	1979
<b>Employees:</b>	Around 550
<b>Ownership:</b>	Private
<b>Profile:</b>	Alwasail Industrial began as a producer of polyethylene pipes for agricultural irrigation, but soon expanded into providing pipes for a wider range of industries including drinking water, wastewater, sanitation, gas and telecoms. In addition, it offers a wide range of pipe fittings and irrigation accessories - as well as foam rubber production lines that make pipe insulation.
<b>Product lines:</b>	The company makes HDPE and LDPE pipe up to 1200mm in diameter. Typical products include smooth-walled pipe for applications such as water and gas transport, electrical conduits and telecoms ducts. Its potable water pipes are available in diameters of 63-160mm. Gas pipe is made from both PE100 and PE80, while industrial pipe is available in iron pipe size (IPS). Standard irrigation pipe, made from LDPE, includes a minimum 2% carbon black in order to protect against UV, while its microtube is aimed at micro-irrigation. As well as these single-walled pipe products, it also produces PP twin-walled corrugated pipe for wastewater drainage.
<b>Factory locations:</b>	Alwasail has five production facilities, of which three are dedicated to extrusion. One extrusion plant makes irrigation and communication pipes on 10 lines; the second plant, with 18 lines, produces communication pipe and coil-drum pipe; output at the third plant, also with 18 lines, includes pipes for water and sewage. Total extrusion capacity is around 300 tonnes/day.

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

## Pipe and Profile FORTHCOMING FEATURES EXTRUSION

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

### May/June 2023

Pipe corrugators  
Die developments  
Pressure pipe  
Materials recovery/granulators

### July/August 2022

PVC stabilisers  
PVC recycling  
Extruder technology  
Medical tubing

Editorial submissions should be sent to Lou Reade: [lou@pipeandprofile.com](mailto:lou@pipeandprofile.com)

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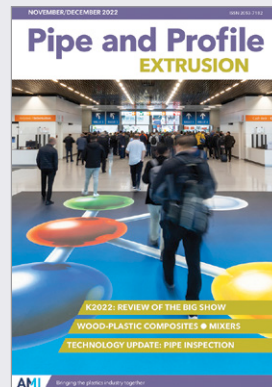
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## Pipe and Profile January/February 2023

The January-February edition of Pipe and Profile Extrusion has a cover feature on the diverse applications for pipes made with composite materials. The magazine also has features covering melt filtration, titanium dioxide and the latest in controls and instrumentation.

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## Pipe and Profile November-December 2022

The November-December of Pipe and Profile Extrusion investigates how formulations with high recycled content are making wood-plastic composites more sustainable. Other features look at what's new in pipe joining and batch mixing, plus there is a review of K2022.

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## Compounding World March 2023

The March edition of Compounding World looks at the latest special effect pigments which offer an enhanced sensory experience and improve handling and sustainability. Features also cover long fibre thermoplastics (LFTs), twin screw extruders, and clarifiers.

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## Plastics Recycling World January/February 2023

The front cover article of Plastics Recycling World's January-February 2023 edition dives into the world of recycling polystyrene and other styrenic polymers. Other features look at solutions in recycling film-based packaging waste, and innovations in pelletisers.

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## Injection World March 2023

The March 2023 edition of Injection World magazine looks at the challenging area of thin wall moulding. It also explores the latest developments in material drying and presents a case study on designing large parts for cost-effective injection moulding.

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## Film and Sheet March 2023

The March edition of Film and Sheet Extrusion takes a look at recent developments in thermoforming. It also explores some of the latest additives for film production and reviews new introductions in digital extrusion control and barrier films.

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## GLOBAL EXHIBITION GUIDE

2023	<b>28-30 March</b>	Plastic Print Pack Nigeria, Lagos, Nigeria	<a href="http://www.ppp-nigeria.com">www.ppp-nigeria.com</a>
	<b>28-30 March</b>	Expo Plasticos, Guadalajara, Mexico	<a href="http://www.expoplasticos.com.mx">www.expoplasticos.com.mx</a>
	<b>17-20 April</b>	Chinaplas, Shenzhen, China	<a href="http://www.chinaplasonline.com">www.chinaplasonline.com</a>
	<b>25-27 April</b>	JEC, Paris, France	<a href="http://www.jec-world.events">www.jec-world.events</a>
	<b>23-26 May</b>	Plastpol, Kielce, Poland	<a href="http://www.targikielce.pl/en">www.targikielce.pl/en</a>
	<b>30 May-2 June</b>	Equiplast, Barcelona, Spain	<a href="http://www.equiplast.com">www.equiplast.com</a>
	<b>5-8 September</b>	Plast 2023, Milan, Italy	<a href="http://www.plastonline.org/en">www.plastonline.org/en</a>
	<b>26-28 September</b>	Interplas, Birmingham, UK	<a href="http://www.interplasuk.com">www.interplasuk.com</a>
	<b>17-21 October</b>	Fakuma, Friedrichshafen, German	<a href="http://www.fakuma-messe.de">www.fakuma-messe.de</a>
	<b>7-10 November</b>	Plastimagen, Mexico City, Mexico	<a href="http://www.plastimagen.com.mx">www.plastimagen.com.mx</a>
<b>15-16 November</b>	Plastics Extrusion World Expo USA, Cleveland, USA	<a href="http://www.extrusion-expo.com/na/">www.extrusion-expo.com/na/</a>	
<b>28 Nov-2 Dec</b>	IPF Japan 2023, Chiba, Japan	<a href="https://www.ipfjapan.jp/english/">https://www.ipfjapan.jp/english/</a>	


## AMI CONFERENCES

<b>18-20 April 2023</b>	Masterbatch Europe, Munich, Germany
<b>26-27 April 2023</b>	Fire Retardants in Plastics North America, Philadelphia, USA
<b>16-17 May 2023</b>	Functional Fillers, Philadelphia, USA
<b>23-25 May 2023</b>	Polymer Sourcing & Distribution, Hamburg, Germany
<b>20-21 June 2023</b>	Polymers in Cables North America, Philadelphia, PA, USA
<b>12-14 September 2023</b>	PVC Formulation Europe, Cologne, Germany
<b>7-8 November 2023</b>	Medical Tubing & Catheters North America, Tampa, USA
<b>5-6 December 2023</b>	Polymer Engineering for Energy, London, UK

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

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