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Regular RECYCLING Section p. 55

Stein Profile Stacker



Profile length measurement during extrusion

Measuring sensors are used to determine the length of individual profiles before a profile layer is formed.

The measured length can be used to check and correct the cutting device of the extrusion line or for documentation (quality assurance) of the produced profile lengths.



Stacking of special profiles

Stein Maschinenbau offers technical solutions for stacking of heavy and large monoblock profiles.

Based on decades of experience, we can unusual profile geometries or special layer can be evaluated for their automated stacking.



Cassette spreader

With the help of a cassette spreader it is possible to realise the same packing density of the manual packaging.

Stein Profile Stacker



Weight determination during extrusion

With the help of special weighing units, individual profiles can be weighed before a profile layer is formed. The determined weight can be used to optimise the extrusion.

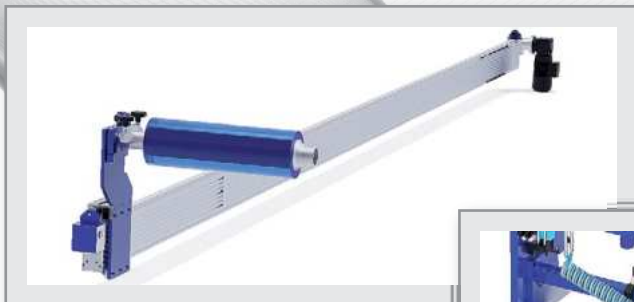


As a specialist in the field of special machine construction, we always find a solution!



Cassette handling

The handling system allows empty cassettes to be fed into the automatic stacker and the filled cassettes to be pushed out.



Profile interlayer

Endlessly laid as a foil between the profile layers or with individual strips laid on the layer.

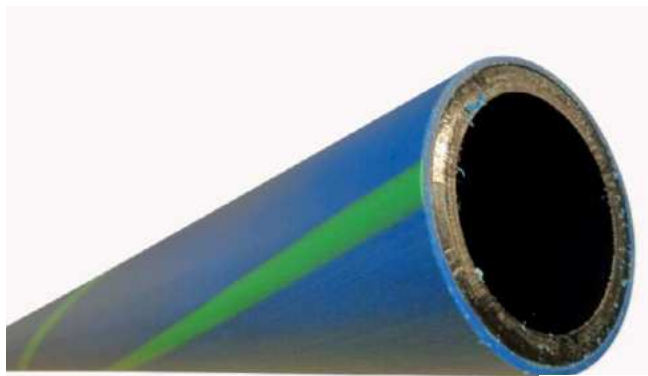


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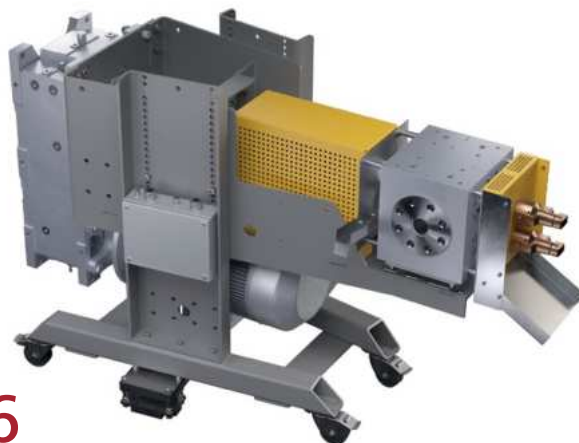
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CONEXTRU is an engineering & manufacturing company well known for standard as well for very special solutions out of standard manufactures especially for pipe. The following discussion provides a brief overview of the state of the art regarding tools used in pipe extrusion



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The MAAG Group is presenting a technological highlight at Fakuma 2026: The extrex⁶ EC is the first gear pump specifically designed for the continuous conveyance of challenging rigid PVC (polyvinyl chloride)



37

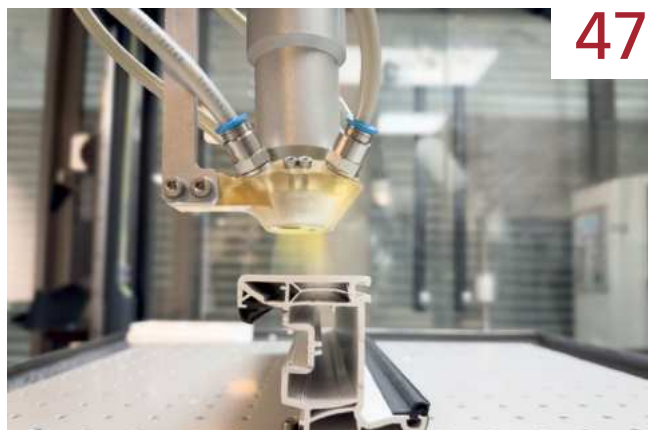
By expanding its production capacity, Kurucsai Plastic has taken an early step towards meeting the future requirements of the packaging industry. Since the beginning of 2025, the company has been producing PET sheet for food packaging on a Gneuss MRS extrusion line



40

Hosokawa Alpine has expanded its range of multi-processing systems to include the UPZ 100 III fine impact mill. Thanks to a newly developed universal mounting solution, it can now be seamlessly integrated

The plastics industry is facing ever-greater challenges due to rising quality requirements, new material combinations, the growing use of recycled plastics, and ongoing cost pressures. At Fakuma Plasmatreat will demonstrate how modern plasma surface treatment can address these challenges



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Moretto is a leading company in the development of automation systems for the plastics industry, confirmed by 171 international patents. This expertise will be showcased in the form of exclusive technological innovations at the upcoming Fakuma



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Shanghai / P.R. China
► www.interpack-cn.com

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17 – 20 November 2026
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► www.plasticsandrubberindonesia.com

wire India and Tube India 2026
30 November – 2 December 2026
Mumbai / India
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Dubai / U.A.E.
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USE 2027
20 – 23 April 2027
Düsseldorf / Germany
► www.USE-expo.de

NPE2027
03 - 07 May 2027
Orlando, FL / USA
► <https://e.plasticsindustry.org/>

Plastasia 2027
20 – 23 May 2027
New Delhi / India
► www.plastasia.in

Pipe Conference – PPXXIII
27 - 29 September 2027
Houston, Texas / USA
► <https://ppxxiii.com>



From left: Michael Forstner (President & CEO of ECON USA), Gerhard Hehenberger (CEO & Founder of ECON), and Dominik Kline (CEO of ECON Brasil) jointly cut the ribbon at the new location in Antônio Carlos in the Brazilian state of Santa Catarina (Photo credit: ECON)

New Subsidiary in Brazil Opened

ECON GmbH, an Upper Austrian company and international specialist in pelletizing systems for plastics processing, officially opened its new sales, service, and production subsidiary, ECON Brasil, in Antônio Carlos in the state of Santa Catarina on August 25, 2026. This marks another important step in the company's global expansion and lays the foundation for even closer support of its customers in South America.

The new location combines sales, service, assembly, and logistics. Spare parts and machine assemblies are stocked locally, ensuring significantly shorter response times for service and maintenance requests. ECON Brasil therefore provides an important base for the efficient implementation of plant projects in the South American market.

"South America, and Brazil in particular, is becoming increasingly important to our strategy. With our new subsidiary, we are closer to the market and can respond to customer requirements more quickly and effectively," says Gerhard Hehenberger, CEO & Founder of ECON.

Local expertise for the Brazilian market

Dominik Kline, CEO of ECON Brasil, is responsible for the new location.

He combines extensive international leadership experience and a strong technical background with in-depth market knowledge of Brazil and other South American countries. His command of German, Portuguese, Spanish, and English also facilitates direct communication with customers and partners across the region.

"We see significant potential in Brazil, particularly in the compounding sector. Our customers need stable and flexible processes for a wide range of materials. This is where our technology and local presence provide genuine added value. The combination of global innovation and local proximity is key," says Dominik Kline.

International network anchored by its technology center in Austria

With its own locations in the United States, China, India, and Brazil, ECON has established a broad international network. Austria remains the company's technology center: ECON's patented core technologies continue to be developed and manufactured at its headquarters to guarantee consistent quality standards worldwide.

Biodegradable Plastic Film Protects Roots from Cockchafer Grub Damage

In addition to climate-related stresses, feeding damage caused by cockchafer larvae and, increasingly, by the invasive Japanese beetle poses a significant threat to the success of large-scale reforestation efforts. The BioROOTGUARD research project therefore aims to develop a biodegradable plastic film that protects tree roots during the establishment phase, reducing the sometimes substantial regional losses caused by these pests while avoiding environmental impacts.

To achieve this goal, a consortium of industry and research partners, led by FKUR Kunststoff GmbH (hereinafter "FKuR"), brings together expertise in materials development, forestry science, and environmental research within the framework of the Bio-ROOTGUARD project. The project is funded by the German Federal Ministry of Agriculture, Food and Regional Identity (BMLEH) through the Agency for Renewable Resources (Fachagentur Nachhaltige Rohstoffe, FNR) under the Sustainable Renewable Resources funding programme.

Protection and biodegradability

The first step is to develop a plastic compound that biodegrades completely in forest soil without leaving any residues. The subsequent research will focus on how this material can be processed into a film. During the planting of young trees, the film will be placed around the root ball to provide protection while at the same time allowing healthy root development. Once the protection period has ended, the biodegradable nature of the film will eliminate the need for removal, avoiding additional labour and costs.

Beyond its purely mechanical barrier function, the new film is intended to discourage cockchafer grubs from approaching the root zone. To achieve this, natural repellents will be investigated within the project framework to reject these larvae in an environmentally friendly way.

Dr Antje Birkholz, Head of R&D and BioROOTGUARD project manager at FKUR, explains: "With BioROOTGUARD, we are developing a solution



The aim of the BioROOTGUARD research project is to develop a biodegradable plastic film that protects the roots of young trees and seedlings from damage caused by cockchafer grubs (© FKUR Kunststoff GmbH)

that provides protection during the phase when plants are particularly vulnerable in their root zone and then biodegrades naturally afterwards. In this way, we combine material innovation with the requirements of modern forestry and woody plant cultivation."

FKuR Coordinates the Development and Implementation Process

As the project consortium leader, FKUR is responsible for the overall coordination of the research consortium and the development of the bio-based and biodegradable plastic material. The company contributes its extensive experience in developing bioplastics with defined properties and supports the transfer of material development towards potential industrial applications.

Birkholz adds: "The development of a material that meets technical requirements while at the same time being able to return to natural cycles at the end of its service life will demonstrate the potential that modern plastics technologies can offer for new fields of application."

Interdisciplinary Research Consortium

In addition to FKUR, specialists from the fields of materials research, process engineering, forestry science, and environmental analysis are working together on the development and evaluation of the protection system.

First Global Sustainability Report Published

The new company-wide report, prepared in accordance with the European Sustainability Reporting Standards (ESRS), provides detailed insights into ESG performance, climate action commitments, and material innovations across KRAIBURG TPE's global operations.

With the publication of its first company-wide Sustainability Report, KRAIBURG TPE provides customers, partners, and other stakeholders with a transparent overview of its environmental, social, and governance (ESG) performance. The report covers all three production sites and outlines the company's sustainability strategy as well as its progress and achievements.

Prepared in accordance with the simplified European Sustainability Reporting Standards, it shows how sustainability is integrated into KRAIBURG TPE's business model—from product development and responsible sourcing to climate action, circular economy initiatives, and employee well-being.

Beyond environmental performance, the report also outlines KRAIBURG TPE's approach to responsible business practices, including governance, compliance and responsible supply chain management. During the reporting period, all relevant suppliers at the company's production sites signed the Supplier Code of Conduct, were covered by sustainability clauses and underwent CSR assessments.

The report presents several key milestones and commitments, including:

- EcoVadis Gold rating for all production sites
- Expansion of recycled-content, bio-based and ISCC PLUS-mass balanced TPE solutions
- Progress in Loop TPE take-back and reprocessing concepts
- 100% renewable electricity at production sites in Germany and the United States



KRAIBURG TPE has published its first company-wide Sustainability Report (Image: © 2026 KRAIBURG TPE)

For KRAIBURG TPE, sustainability is closely linked to material innovation and the transition towards a circular economy. The company continues to expand its portfolio of recycled-content, bio-based and ISCC PLUS-mass balanced TPE solutions while developing circular material concepts such as Loop TPE. Through this initiative, TPE materials processed by the customer can be taken back, reprocessed into TPE compounds and supplied back to customers, which can help conserve valuable resources.

In addition to developing more circular materials, KRAIBURG TPE supports customers with Product Carbon Footprint calculations, material selection consultancy and guidance on downstream processing and end-of-life options. Together with co-recyclability assessments for selected grades in PP and HDPE recycling streams, these services help customers make informed material decisions.

The full KRAIBURG TPE Sustainability Report 2025 is available for download from the KRAIBURG TPE website.

KRAIBURG TPE

► www.kraiburg-tpe.com

New Distribution Partner in the Netherlands

PiXARGUS, a leading manufacturer of inline inspection systems for quality control in extrusion, is consistently expanding its sales structures. In addition to successfully gaining new sales representatives for North America and Spain, the machinery and technology service provider Plastima Breda is joining the team as a strategic partner, strengthening PiXARGUS' presence in the Benelux region. With a joint demo tour for the new ProfilControl 7 XLine series, the new partners plan to make a strong impact in North-western Europe.

The machinery and technology service provider Plastima Breda has been a successful player in the plastics industry for over 70 years. The family-owned company, headquartered in Breda in the Netherlands, has a strong network in the plastics and rubber industry and understands the needs of customers in the Benelux region.

With a broad portfolio, Plastima supplies machinery for extrusion, injection molding, recycling and automation,

and is known for its long-standing partnerships with renowned customers. Its references include leading companies from the automotive, construction, packaging and medical technology sectors – precisely the industries in which PiXARGUS solutions also deliver high added value. As new partners, PiXARGUS and Plastima are connected by more than just their portfolios.

As PiXARGUS Sales Specialist Luc Despineux puts it: "We share the ambition to combine innovative technologies with excellent service."

Expert Consulting and Comprehensive Local Service

Tim van den Bosch, Extrusion and R&D Manager at Plastima Breda, is the main point of contact for PiXARGUS customers and prospects. With a degree in business administration, he represents the third generation in the family business,



A strong team on the same wavelength (from right to left): PiXARGUS Sales Specialist Luc Despineux and Plastima Breda Managing Director Robbert van den Bosch, as well as Tim van den Bosch, Extrusion and R&D Manager

is deeply rooted in the Benelux region, and is extremely well connected in the extrusion industry. "With Tim and Plastima Breda, we offer our customers high-end consulting and comprehensive local service," says the PiXARGUS

Sales Specialist. The Benelux region – comprising the Netherlands, Belgium and Luxembourg – is one of the beating hearts of plastic and rubber profile extrusion in Europe. "We see significant potential for new customers here," Despineux continues. "And we can score strongly with our forward-looking inspection solutions." The metrology manufacturer has just launched the smart new ProfilControl 7 XLine inline inspection series on the market. This system stands out for its high efficiency, easy integration and attractive price-performance ratio – a decisive advantage in economically challenging times.

Discover ProfilControl 7 XLine: Presentation Tour Showcases Latest Innovation

Plastima Breda and PiXARGUS will be presenting the new ProfilControl 7 XLine during a tour through the Benelux countries, offering exclusive insights into its concept, technology and application possibilities. Customers and prospects will learn first-hand how the solution helps to optimize processes and ensure lasting quality – and will gain valuable inspiration for making their own production workflows future-proof. Together, PiXARGUS and Plastima Breda look to the future with confidence – ready to meet the challenges of the market with innovation and commitment.

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U.S. Presence Strengthened

The Reifenhäuser Group has substantially expanded its capacity in the United States to best meet the needs of its local customers. The long-standing U.S. subsidiary Reifenhäuser North America combines deep regional expertise with the technological strength and quality of Reifenhäuser machinery. Over the past 12 months, the organization has been significantly reinforced with the hiring of six new experts across sales, service, and customer care, strengthening its ability to provide direct, knowledgeable, hands-on support close to customers' operations.

"For producers in the U.S. and Canada, local availability, technical know-how and fast response times are becoming increasingly critical," said Marcel Perrevort, Chief Sales Officer of the Reifenhäuser Group. "By expanding our North American team, we are reinforcing what customers need most: direct access to experienced people who understand their market, their production challenges and their performance goals."

Beyond its globally recognized extrusion technology, Reifenhäuser North America is a highly established local partner with 115 employees across the U.S. At its 60,000-square-foot facility located in Maize, Kansas, the company serves the U.S. market with dedicated sales and service teams. In addition, Reifenhäuser North America provides local development and manufacturing for high-quality screws, barrels, valves,

and end caps for extrusion and injection molding applications under its sub-brand Reiloy.

This robust local presence, established already in 1961, bridges the gap between European engineering and regional proximity. Customers based in the U.S. and Canada benefit from fast, reliable and highly responsive local support while maintaining access to the technology, application know-how and manufacturing quality of the Reifenhäuser Group, which has been family-owned since 1911.

The comprehensive portfolio includes the distribution of Reifenhäuser blown film, cast film, sheet and coating lines, alongside high-performance components from the Reifenhäuser subsidiaries Reiloy and Kdesign – the global market-leader for blown film cooling, measurement and calibration technologies. By looking at the entire value chain – from initial consultation and dedicated U.S.-based project management to local field service and spare parts – Reifenhäuser North America provides a holistic approach that goes far beyond mechanical engineering.

To further drive this commitment to the U.S. extrusion market, Reifenhäuser North America has recently welcomed six new team members who explicitly strengthen the region's service and sales capabilities.

Reifenhäuser Group

➔ www.reifenhauser.com

Reifenhäuser North America employs 115 people across the United States (Picture: Reifenhäuser)



Advanced Three-Layer PP Silent Pipe Plant Technology Introduced

Rajoo Bausano has introduced its advanced Three-Layer PP Silent Pipe Plant technology, designed to meet the growing demands of modern infrastructure and high-rise drainage applications.

Powered by advanced European extrusion technology and precision engineering, the plant is engineered to manufacture high-performance Three-Layer PP Silent Pipes that deliver exceptional noise reduction while maintaining superior mechanical strength, dimensional stability, and long service life.

The innovative three-layer pipe structure provides effective acoustic insulation, helping create quieter and more comfortable residential and commercial environments. The technology also enables manufacturers to customise acoustic performance based on specific application requirements, offering an effective noise reduction range from 10 dB to 22 dB.

Key Highlights:

- Advanced 3-Layer PP Silent Pipe Technology
- European Technology & Precision Engineering
- Energy-Efficient Production System
- Optimised Raw Material Utilisation with Reduced Wastage
- Stable & Consistent High-Output Performance
- Customisable Pipe Layer Configuration & Acoustic Performance
- User-Friendly Automation & Process Control
- Reliable Production for High-Quality PP Silent Pipes
- Designed for Long-Term Operational Efficiency
- Engineered for Modern Infrastructure Manufacturing Needs

Speaking about the technology, Mr. Sandip Bhuvu, CEO of Rajoo Bausano Extrusion Pvt. Ltd., stated that "advanced manufacturing today is not only about achieving higher productivity, but also about delivering smarter, more sustainable, and future-ready solutions. The technology has been developed to help manufacturers achieve consistent product quality, operational efficiency, and long-term reliability in an evolving infrastructure market".

With this advanced solution, Rajoo Bausano continues its commitment to supporting the infrastructure industry with innovative and efficient pipe extrusion technologies tailored for modern construction and drainage applications.

Rajoo Bausano Extrusion Pvt. Ltd.

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New Requirements for the Plastics Industry

August 12, 2026, marks an important milestone for the European packaging industry. However, with the entry into force of key provisions of the new Packaging and Packaging Waste Regulation (PPWR), it is not only packaging manufacturers that are in the spotlight. Numerous companies in the plastics industry must also correctly identify their position within the supply chain and subsequently meet new requirements in the future.

PPWR Establishes Uniform Requirements Across Europe

With the PPWR, the European Union aims to make packaging more sustainable, resource-efficient, and transparent. For the first time, the regulation establishes a largely uniform legal framework for packaging in the European single market.

Starting August 12, 2026, producers must demonstrate compliance with certain substance restrictions – such as those for PFAS and heavy metals – and provide a corresponding declaration of conformity. Additional requirements, including those related to registration and producer responsibility, will take effect starting in 2027. In the years that follow, requirements regarding recyclability, the use of recycled materials, and the reuse of packaging will also be introduced.

What role does your company play?

For many companies, the biggest challenge is correctly identifying their own role within the packaging life cycle. The PPWR distinguishes in particular between suppliers, producers, manufacturers, and importers. The respective obligations and responsibilities depend on this classification.

Suppliers provide packaging or packaging materials and must supply relevant information for the conformity assessment. Producers manufacture packaging or packaged products and are responsible for demonstrating compliance. Manufacturers are those entities that first make packaged products available in an EU member state and will, in the future, also be subject to extended producer responsibility. Importers first place packaging from third countries on the EU market and must ensure that it complies with the requirements of the PPWR.

Special Considerations for Transport Packaging

Particularly in the case of transport packaging, the question of who actually qualifies as a producer often cannot be answered at first glance. Companies that produce transport, service, or primary production packaging in its final form and place it on the market for the first time are generally considered producers under the PPWR. They are therefore specifically responsible for conducting the conformity assessment as well as for preparing and providing the EU Declaration of Conformity.

In addition, it must always be determined whether the criteria for the role of an importer are met in the case of



On August 12, 2026, key requirements of the EU Packaging Regulation (PPWR) will take effect. The SKZ is helping companies implement these requirements (Photo: Luca Hoffmannbeck, SKZ)

imported packaging. This is particularly the case when a company established in the Union procures packaging or packaged products from a third country and makes them available on the Union market for the first time. In this case, companies are also subject to the specific obligations of an importer/producer under the PPWR.

As a general guideline: producers of rigid empty transport packaging, such as crates or pallets, are generally classified as producers. For flexible packaging such as stretch film or strapping, the PPWR often provides for a different allocation of roles. Since these materials often do not take their final form until they are used by the customer, the producer of the packaging material is usually considered a supplier. The company that packages or fills the product, on the other hand, regularly assumes the role of producer and, where applicable, also that of manufacturer.

Depending on the business model, multiple roles may apply simultaneously—for example, as a supplier as well as a producer or importer. A careful analysis of one's own supply and value chain is therefore crucial.

Lay the Groundwork for Implementation Now

The effective date of August 12, 2026, marks the start of the practical implementation of the PPWR. Additional requirements regarding design for recycling, the use of recycled materials, chemical recycling, reusable packaging obligations, and producer responsibility will take effect gradually through 2030 and beyond.

Companies in the plastics industry should therefore assess early on what types of packaging they use, what role they play within the supply chain, and what requirements arise from this. The SKZ provides support in this process through role and impact analyses, the compilation of the necessary technical information for PPWR conformity assessment, training, and expert guidance on implementing the regulation.

In-Region Biphenol Supply Enhanced to Meet Rising Demand Across Asia-Pacific

SI Group, a leading global developer and manufacturer of performance additives, process solutions, and chemical intermediates, and Shengxiao Group, a global leader in liquid crystal polymer (LCP) monomers and specialty chemicals, announced the formation of a joint venture to accelerate additional capacity of Biphenol in China.

Based in Sichuan, China, Shengnova Advanced Materials combines Shengxiao Group's established Biphenol manufacturing asset and regional market access with SI Group's proprietary technology and global Biphenol expertise. By bringing these capabilities together, the joint venture is designed to increase local supply of this unique molecule.

Biphenol is an important monomer used in liquid crystal polymers (LCP), polyphenylenesulfone (PPSU), and other applications. The venture positions both partners to support growing demand across sectors including electronics, automotive, and medical, where high-performance materials are essential to next-generation applications.

"We are pleased to partner with SI Group to form Shengnova Advanced Materials to supply Biphenol to customers in Asia," said Guo Xiaozhong, Chairman of Shengxiao Group. "As a leading supplier of monomers for liquid crystal polymers (LCP), Biphenol is



a key component of our portfolio. Our customers appreciate in-region supply and bringing SI Group's Biphenol expertise to China will benefit the growing end markets in the region."

"This joint venture advances SI Group's growth strategy and strengthens our ability to serve customers in key markets around the world," said David Bradley, President and CEO of SI Group. "Through the formation of Shengnova Advanced Materials, we are expanding our ability to competitively supply Biphenol to customers in Asia while continuing production at our Newport, Tennessee

Photo Caption: Representatives from Shengxiao Group and SI Group at the joint venture signing ceremony on June 25

see facility. This positions SI Group to better serve global customers, support growing regional demand, and reinforce security of supply through a multi-region production footprint."

SI Group

➔ www.siigroup.com/

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Blown Film Extrusion Business Unit Positioned for the Future

Since 1 May, the Blown Film Extrusion business unit of Hosokawa Alpine AG has been under new management: Michael Heinecker has taken up the position of Senior Vice President Blown Film Extrusion at the Augsburg-based engineering company. In doing so, Hosokawa Alpine is focusing on continuity and future-proofing, as Heinecker, an experienced blown film expert, has an excellent network within the industry and brings a deep understanding of customer requirements.

With Heinecker's appointment, the company is setting the course for further growth and a consistent focus on its customers' needs. "With his comprehensive technical know-how and deep understanding of our customers' expectations, Michael Heinecker is making a decisive contribution to our strategic objective of sustainably enhancing the customer experience by consistently prioritising and reliably meeting customer needs," said Michael Kuhnen, CEO of Hosokawa Alpine. At the same time, Heinecker's expertise strengthens market penetration in existing markets and supports the development of new business areas. In line with the guiding principle "Focusing all our efforts on the future", the Blown Film Extrusion business unit will in future place even greater emphasis on partnership-based collaboration, innovative approaches and digital solutions in order to offer customers comprehensive, cutting-edge solutions and empower them to create sustainable value.

Developer of the Alpine die head series X

Michael Heinecker joined the company in 1998 and initially worked in development. In the following years, he rose to become Head of Development, and then, in 2018, Technical Director of the Blown Film Extrusion business unit. After a brief hiatus, he is now returning to Hosokawa Alpine as Senior Vice President Blown Film Extrusion and will take over as Head of the Blown Film Extrusion business unit. Heinecker played a key role in the development of the die head series x, which continues to set the standard today with the fastest material changeover times on the market. With his in-depth process engineering expertise, he is a highly regarded expert in the industry.



*Michael Heinecker, Senior Vice President
Blown Film Extrusion at Hosokawa Alpine*

Consistent further development of the Blown Film Extrusion business unit

A wide range of challenges and responsibilities await Heinecker at Hosokawa Alpine – from automation solutions to technical innovations: "My aim is to systematically develop the Blown Film Extrusion business unit in line with customer needs, whilst making targeted use of the potential offered by automation and digitalisation," says Heinecker. "Through innovative solutions and close, collaborative partnerships, we aim to offer our customers measurable added value, make their processes more efficient and achieve sustainable growth together. The key lies in combining technological progress with a clear customer focus." Hosokawa Alpine's recently extensively modernised blown film test centre also contributes to this, where customers can work with Alpine experts to develop their optimal film formulation. With Michael Heinecker as the new head of the Blown Film Extrusion Business Unit, Hosokawa Alpine is underlining its commitment to consistently combining innovation, customer focus and a forward-looking approach, and is further strengthening its position as a reliable partner in a dynamic market environment.

Integration Process Continues

Hosokawa Alpine AG, headquartered in Augsburg/Germany, is continuing its ongoing transformation process. In response to changing market requirements and the company's strategic development, the German Hosokawa Solids Solutions GmbH will be integrated into the parent company effective October 1, 2026.

The aim is to further deepen collaboration within the group and provide customers with even more comprehensive and integrated solutions in the field of mechanical process engineering by combining expertise and resources. At the same time, this step will strengthen the

economic foundation for the company's sustainable development.

As a result, the Augsburg headquarters will gain further importance. In the future, the sales and service expertise of Hosokawa Solids Solutions GmbH will also be consolidated and further developed there. This will enable the group to create the conditions necessary to implement projects more quickly and offer customers turnkey systems with integrated solutions from a single source. As a result, Hosokawa Alpine AG's grinding, classification and compaction technologies will be brought together under one roof with

Hosokawa Solids Solutions GmbH's storage, conveying, weighing, and dosing technologies.

A large proportion of the workforce in Schwabmünchen will be given the opportunity to continue their professional careers within the Hosokawa Group at the Augsburg site. For the remaining employees, individual solutions will be developed that take their personal and professional circumstances into account. The Spanish subsidiary Hosokawa Solids S.L. is not affected by these changes, and the Hosokawa Solids brand will continue to exist.

Hosokawa Alpine AG

➔ www.hosokawa-alpine.com

Distribution Mandate Expanded

Milar, part of the Biesterfeld Group, one of the internationally leading distribution and service companies in the field of polymers, rubber, specialty chemicals and ingredients, has expanded its distribution mandate for the MOLYKOTE® specialty lubricants portfolio from DuPont in Poland. Effective 1 August 2026, the distribution business for the MOLYKOTE® portfolio in Poland will be consolidated under Milar. Customers will benefit from a streamlined distribution structure with Milar serving as their dedicated point of contact for the complete MOLYKOTE® portfolio.

The MOLYKOTE® portfolio comprises a comprehensive range of specialty lubricants, including anti-friction coatings, compounds, dispersions, greases, oils & fluids, and anti-seize pastes. Designed to meet demanding technical requirements, the products help reduce friction and wear, protect components against corrosion, extend service life, and improve the reliability of equipment operating under challenging conditions. With its broad technology platform and application-specific solutions, MOLYKOTE® addresses virtually every lubrication challenge across industrial manufacturing and maintenance.

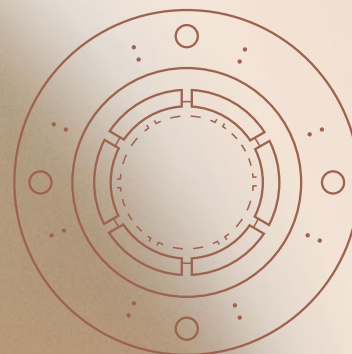
The products are used across a wide range of industries, including automotive, industrial manufacturing, food processing, energy, electronics and general engineering. Typical applications include bearings, gears, chains, valves, electrical components, compressors, plastic and elastomer parts, threaded connections and high-temperature assemblies.

Dr. Jacek Polewski, Global Business Director Industrial at Biesterfeld, comments: "The expansion of our distribution mandate and the consolidation of the distribution business represent an important next step in the development of our Industrial business in Poland. For many years, Milar has been actively distributing MOLYKOTE® products in Poland and has built extensive product knowledge, technical expertise and a strong understanding of local customer requirements. Most importantly, our customers will benefit from continuity and can rely on experienced local contacts, technical support, proven logistics capabilities and reliable access to the full MOLYKOTE® portfolio through a dedicated local team with extensive product knowledge and technical expertise."

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New Leadership Team Expands Technology Portfolio

With an expanded technology portfolio, Lukas and Magnus Buske and their teams are positioning Plasmatreteat to meet future demands in industrial surface treatment. AURO-RA-Plasma supplements the existing Openair-Plasma and PlasmaPlus portfolios with a low-pressure plasma solution for challenging applications in, for example, the medical technology and electronics industries. During the Plasmatreteat Innovation Days in Birkenfeld, the company showcases its role as a technology and development partner, demonstrating how it supports customers in addressing surface treatment challenges with its portfolio of solutions.

Plasmatreteat reflects on its key strategic developments from the past few months. With Lukas and Magnus Buske assuming full operational responsibility and the expansion of the technology portfolio to include the new low-pressure plasma solution, AURO-RA-Plasma, the family-owned company has set a clear course for its future development.

Since mid-2025, Lukas and Magnus Buske have served as managing directors, each overseeing their respective business divisions. They have both held operational man-



From left to right: Lukas and Magnus Buske are positioning Plasmatreteat to meet future demands in industrial surface treatment by expanding their product portfolio (Pictures, Copyright Plasmatreteat GmbH)

agement positions at Plasmatreteat for many years and played a key role in shaping the company's technological and international growth. Over the past few months, company founder Christian Buske has gradually handed over operational responsibility to his sons. This transi-

tion symbolizes both continuity and new momentum.

Strategic Expansion of the Portfolio

One visible result of this development is the introduction of AURO-RA-Plasma, Plasmatreteat's new low-pressure plasma technology. Since early 2026, it has complemented the existing Openair-Plasma and PlasmaPlus portfolios, expanding the possibilities of industrial surface treatment. Consequently, Plasmatreteat now offers an even broader range of plasma technologies to meet a wide variety of research, development, and series production requirements. These solutions can be tailored specifically to respective industries and applications.

With AURO-RA-Plasma, Plasmatreteat is responding to the growing demands of many industries. The technology operates in a defined vacuum process chamber and is ideal for complex geometries, porous materials, and applications requiring the highest levels of uniformity and full-surface treatment. The multi-frequency approach and flexible use of different process gases allow for

Openair-Plasma allows for the selective treatment of surfaces, such as adhesive grooves, in line with the manufacturing process



precise tailoring of plasma properties to the material, component, and application.

New Opportunities in Future-Oriented Industries

Plasmatreat sees great potential in technology-intensive markets because there is no single "best" plasma technology that works for all of them. The key factors are the specific process requirements and the desired surface function. Different processes are used depending on the geometry of the components, their material properties, production speed, and quality requirements.

For users, the expanded product portfolio means greater flexibility above all else. They now have access to a range of technologies, from atmospheric-pressure plasma to functional nanocoatings and low-pressure plasma. Process control, re-

producibility, and efficiency are key aspects in this context. Plasmatreat takes these aspects into account in every technology area. Thanks to its comprehensive portfolio, Plasmatreat can provide technology-neutral consulting and collaborate with customers to develop optimal solutions for specific applications.

From Technology Provider to Strategic Partner

By expanding its portfolio, Plasmatreat demonstrates its commitment to providing customers with not only individual technologies but also support throughout the entire development and production process. These offerings include feasibility studies, process development, application validation, and integration of stable production processes. Plasmatreat also develops custom OEM solutions for machine builders and integrators

across various industries that can be integrated into existing or new plant designs.

This is supported by a global network of technology centers, sales and service companies, and application experts.

Innovation as a Shared Path to the Future

This year's Plasmatreat Innovation Days will focus on how industrial surface treatment processes will evolve in the coming years, as well as the technological requirements that will arise, particularly in the fields of medical technology, electronics, and sustainable production. The event took place on September 23–24 at the Plasmatreat sales office in Birkenfeld, near Stuttgart.

Plasmatreat GmbH

www.plasmatreat.com

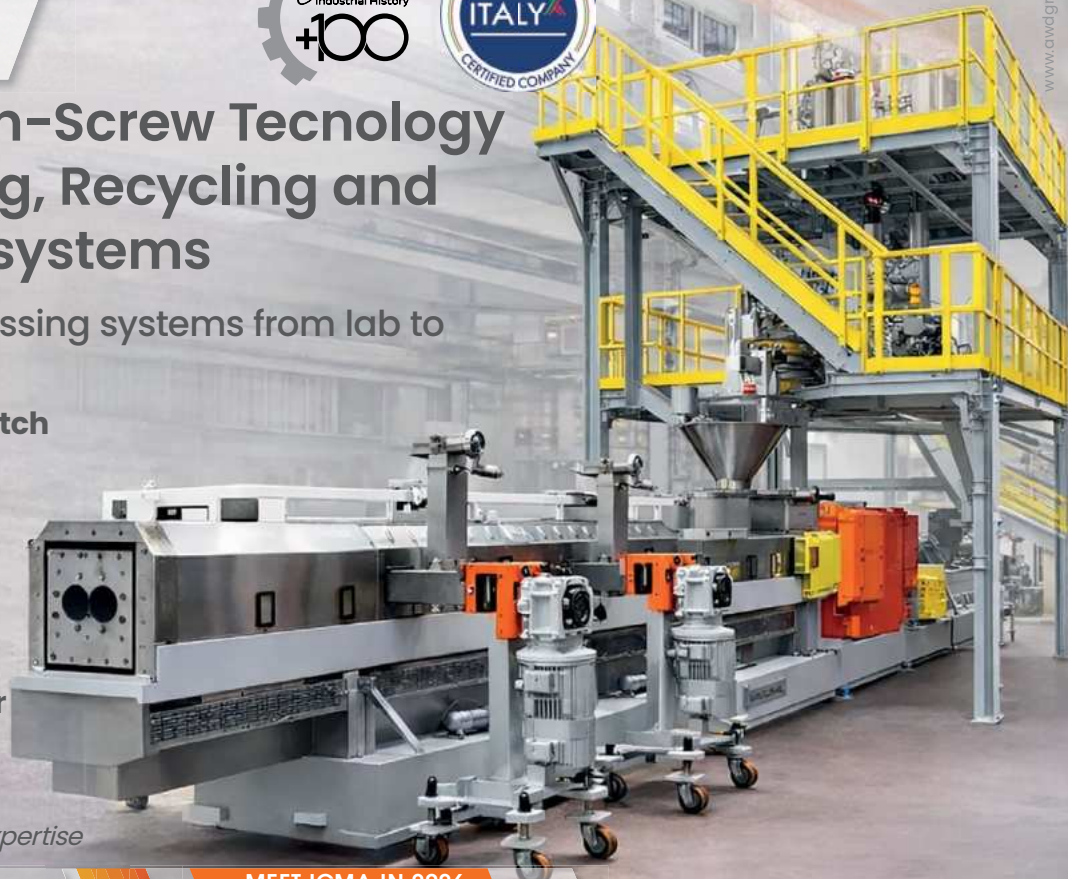


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Range of Plastics Processing Capabilities Expanded

The SKZ Plastics Center is receiving an S2KRC kneading system on loan from Kurimoto Ltd. With this addition, the institute is expanding its range of plastics processing capabilities in the areas of materials, compounding, and extrusion.

On June 22, the big day finally arrived: The team led by Overseas Marketing Strategy Manager Shigeaki Okamura and Chief Representative Rieko Ishii was delighted to hand over the S2KRC kneader to SKZ Division Manager Dr.-Ing. Johannes Rudloff and his team in Würzburg. The kneader can process a wide variety of material systems in a continuous process step. In addition to processing thermoplastic, thermosetting, or elastomeric plastic systems, it is also suitable for paints, adhesives, battery compounds, and food products. Depending on the material, throughput rates ranging from 5 to 50 kg/h are possible. This makes the system an excellent fit for the SKZ's pilot plant environment.

"Kurimoto's loan of the kneader represents a valuable addition to the SKZ's technical equipment. With this technology, we can specifically expand our research and service portfolio and provide even better support to companies in the development of innovative and sustainable plastic products," says Rudloff.

For Kurimoto, too, this collaboration represents an important step. The company sees the partnership as an opportunity to further tap into the potential of its technology in the European market and to intensify the exchange between science and industry. "We are very pleased that the kneader is being used at the SKZ," says Rieko Ishii of Kurimoto. "The SKZ's expertise in the fields of processing and plastics engineering provides the ideal conditions for



*Group photo of Kurimoto and SKZ at the handover of the S2KRC mixer at the SKZ Technical Center
(Source: Luca Hoffmannbeck/SKZ)*

collaborating with interested parties to explore new applications and demonstrate the benefits of kneading technology for a wide variety of processing methods."

The system will be integrated into the SKZ's research and development activities and will be available in the future for both publicly funded projects and industrial research collaborations.

The SKZ Plastics Center
Dr. Johannes Rudloff
➔ j.rudloff@skz.de

EcoVadis Committed Badge Accreditation Achieved

Nexus Packaging is proud to announce that it has been awarded the internationally recognised EcoVadis Committed Badge, marking an important milestone in the company's ongoing sustainability journey.

This accreditation recognises Nexus Packaging's commitment to responsible manufacturing practices, sustainability and continuous improvement across all areas of its operations. As a specialist extrusion blow moulding manufacturer, the business acknowledges the importance of maintain-

ing strong environmental, ethical, and social governance standards throughout the organisation.

Quality Manager, Jim Jack explains: "At Nexus Packaging, we continually challenge ourselves to improve and to build a more sustainable business for the future. Achieving the EcoVadis Committed Badge required us to critically assess and strengthen our policies, right through to sustaining the correct practices across the organisation. This recognition provides our customers with the assurance that they are partnering with a socially aware and responsible manufacturer. As a relatively young manufacturing facility, we view this achievement as an important first step in our wider ambition to make a meaningful positive impact, both environmentally and through the strong sustainable practices we continue to embed throughout the business."



Nexus Packaging Ltd
➔ www.nexpack.co.uk

Used Worldwide for Certified Quality

SKZ monitors production facilities worldwide and, as an accredited inspection body, ensures reliable quality in plastic products and piping systems through independent on-site audits. One example is its collaboration with Q+ Swiss Quality to meet particularly high Swiss quality standards.

Quality knows no boundaries. Plastic products – and pipe systems in particular – are manufactured and used worldwide today. To ensure that manufacturers, certifiers, and users alike can trust in the safety and reliability of these products, independent monitoring of production processes is a crucial component of modern quality assurance.

The SKZ supports numerous internationally active certification organizations by conducting independent product monitoring at production sites worldwide. As an accredited inspection body in accordance with DIN EN ISO/IEC 17020, SKZ experts conduct regular audits and monitoring activities directly on-site at manufacturers' facilities. This involves verifying that production processes, in-house quality controls, and products consistently meet the defined requirements.

"Our task is to work with our partners to ensure that certified products continue to meet the promised specifications over the long term. Through regular surveillance directly at production sites, we foster transparency and trust regardless of whether production takes place in Europe, Asia, or other regions of the world," explains Christian Winkler, Group Leader for Pipe Systems at SKZ.

In the field of plastic pipe systems, the SKZ has been collaborating with renowned certification organizations for many years. Its global monitoring activities are conducted, among others, on behalf of certification bodies from various European countries and cover applications such as drinking water, wastewater, gas, and heating pipe systems, as well as fittings.

SKZ's experienced auditors possess extensive expertise in materials, production processes, testing requirements, and international regulations. In addition to evaluating production processes, the focus is particularly on continuous quality assurance, test plans, documentation, and the implementation of specific product requirements.

One example of the special requirements of international markets is the collaboration with Q+ Swiss Quality. This Swiss quality organization aims to ensure the quality of products and systems in the fields of drainage and building services engineering beyond the requirements of international standards. Q+ is based on European and international standards but supplements them with specific Swiss requirements derived from national regulations, legal provisions, and Swiss installation, operation, and maintenance practices.

For manufacturers, Q+ certification therefore signifies not only compliance with general European standards but also proof of product quality specifically tailored to the Swiss market. Monitoring of production facilities by an independent body ensures that these requirements are consistently met.

"The Swiss market has traditionally been synonymous with the highest quality standards. With Q+, we aim to give manufacturers and users the assurance that products are not only developed and manufactured in accordance with standards but also in line with the specific requirements of Swiss



SKZ Collaboration with Q+ Swiss Quality
(Photo: SKZ/Luca Hoffmannbeck)

practice. Independent monitoring by experienced partners such as SKZ is a key component in building trust and ensuring quality," says Anne-Marie Hänggi of Q+ Swiss Quality.

The requirements for plastic products are constantly increasing. Sustainability, long-lasting product properties, and safe use over decades are becoming increasingly important. Consistent third-party monitoring of production facilities is therefore a key component of modern certification systems.

With its international experience, comprehensive plastics expertise, and independent position, the SKZ supports certifiers and manufacturers in making quality visible and traceable worldwide.

The SKZ Plastics Center
Alexander Ebenbeck
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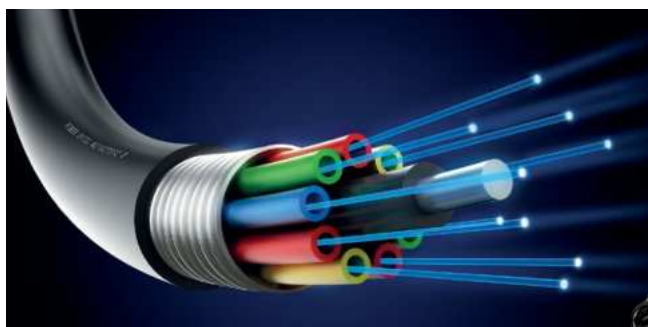


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New Medical Crosshead from Markeet Leader Features Patented Single-Point Concentricity Adjustment



Guill Tool & Engineering introduces the new Micro Medical, an extrusion crosshead that uses micro-fine adjustment screws for precise concentricity adjustment. The precision of concentricity reaches 0.008" or finer per revolution. This single point concentricity adjustment is a unique Guill innovation for the extrusion of thin-walled and precision ID/OD medical tubing. One adjustment bolt controls 360° of adjustment.

Features of the Micro Medical crosshead include a patented cam-lock deflector for quick changeovers, with a res-



Rendering

idence time of one minute at .5 lb/hr material flow, optimized usage with extruders measuring ½" and ¾", and a max die ID of .250."

Additionally, the Guill Micro Medical crosshead offers great flexibility to its users. It not only accepts both vacuum and micro-air accessories, but is also ideal for pressure and sleeving applications. Fluoropolymer designs are available upon request.

Guill Tool & Engineering
Jacob Marcure,
Senior Design Engineer
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Peter Leary,
Technical Sales Engineer,
Extrusion Division
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DURAST® POM Fine Powder is Adopted for Innovative Stick-Form Lubricant

High Performance Polymers (HPP) SBU of Daicel Corporation (formerly Polyplastics), a global leader in engineering plastics, has announced that its DURAST® POM fine powder has been adopted for use in an innovative stick-form lubricant produced by Japan-based Maia Co. Ltd. This groundbreaking solid lubricant, utilizing newly launched DURAST® POM fine powder, resolves issues such as dripping, splattering, and waste caused by over-application, bringing a dramatic transformation to maintenance processes.

Maia's unique manufacturing technology, called Sol.Mid™, delivers a product that is typically packaged in a stick-shaped container and can also be molded into custom shapes to meet customer needs. The performance of Sol.Mid™ is underpinned by the chemical properties of DURAST® POM. This product is formed by mixing ultra-high molecular weight poly-

ethylene (UHMW-PE) with grease. DURAST® POM acts as an interlayer between the PE and the grease and plays a crucial role in maintaining compatibility.

With the stick format, there is no risk of leakage like with liquids, and because it is easy to carry, it offers greater convenience at maintenance sites for office equipment and industrial machinery. For maintenance of office equipment, it can reduce the use of conventional maintenance oil by approximately 80%.

Previously, the processing of general-purpose resins into uniform powder using conventional grinding methods was extremely difficult. Daicel overcame this challenge by developing a proprietary manufacturing process for DURAST® POM, which features a distinctive shape and a controlled, fine, and sharp particle size distribution.



This stick format solution utilizing DURAST® POM is scheduled for full-scale commercialization by targeting maintenance applications for major office equipment manufacturers, in addition to industrial sectors such as industrial machinery repair, bicycle maintenance, and conveyor systems.

DURAST® is a registered trademark of Daicel Corporation in Japan and other countries.

DAICEL High Performance Polymers SBU
► <https://hpps.daicel.com>

New Container Series – Three Functions – One Interface – Easy Integration

Roller-container in three sizes: 120 l, 200 l and 215 l
(Image source: Siloanlagen Achberg,
AI notice: Background generated using AI)

Achberg is expanding its product portfolio with a new roller-container series featuring enhanced functionality, specifically designed to meet the requirements of modern plastics processing operations. The solution combines several key functions within a single system while significantly reducing the effort required to integrate it into existing control systems.

In day-to-day industrial operation, interface issues often arise when individual components such as locking systems, level sensors and warning lights need to be combined. This is where Achberg's new solution comes in: the advanced roller-containers combine several key functions that are pre-installed, pre-wired and ready for use straight from the factory.

The functional scope includes an electromechanical cover lock, an integrated level sensor and a red warning light, whose function can be assigned as required. All signals are bundled through a 10-pin connector and made available to the higher-level control system of the central material handling system. The current range comprises two round roller-containers with capacities of 120 litres and 215 litres, as well as one rectangular container with a capacity of 200 litres.

"Our objective was to transform the container from a passive transport container into an active component of the process chain," explains the company. "Users benefit from simplified integration, a clearly defined interface and a significant cost advantage compared with using individual components."

By combining multiple functions within a single system, planning, coordination and installation efforts are significantly reduced. At the same time, the solution offers an attractive economic advantage, as separate components, additional wiring and individual adaptation work are no longer required.

The material container is particularly suitable for plastics processing applications where process reliability and transparency are critical, for example in injection moulding and extrusion operations.



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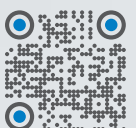
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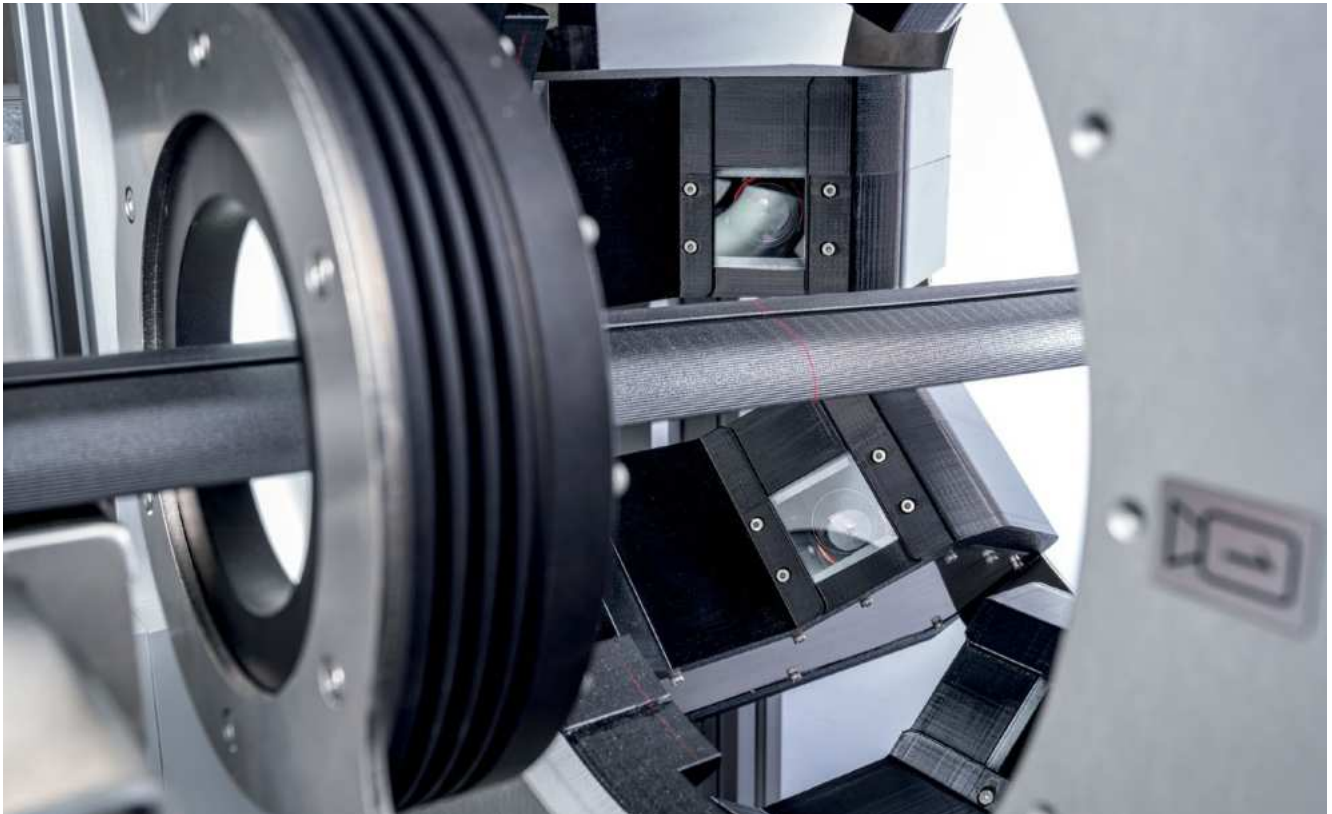
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ProfilControl 7 RubberFlex – Pinpoint Quality Checker for Rubber Extrusion Lines



Slim. Flexible. Economical: With its new inline inspection system, ProfilControl 7 RubberFlex, PiXARGUS is launching an inline inspection system focused exactly on the specific requirements of rubber extrusion. The new design is both flexible and cost-efficient, thus making the system the ideal solution for the dynamic requirements of today's production processes. ProfilControl 7 RubberFlex inspects even highly complex profile geometries and surfaces with excellent reliability, combining high inspection performance with a lean design concept – at an extraordinarily attractive price.

ProfilControl 7 RubberFlex is the specialist for inline inspection of rubber profiles out of PiXARGUS' new ProfilControl 7 XLine series. Adopting a highly innovative approach, PiXARGUS has poured the essence of 25 years of ProfilControl 7 technology into a modular design and created a new family of systems, based on the consideration of what inspection tasks are really needed in the respective applications and industries. The hardware of the new XLine series has been

streamlined, the software strengthened and condensed. ProfilControl 7 RubberFlex has been tailored precisely to the specific challenges of the rubber extrusion industry and designed to provide both maximum performance and maximum efficiency. As PiXARGUS Sales Manager Michael Frohn puts it: "ProfilControl 7 RubberFlex provides just the perfect blend of hardware and software to meet the challenges of rubber extrusion processes – not more and not less."

Smartly designed, economically produced: ProfilControl 7 RubberFlex for rubber extrusion

ProfilControl 7 RubberFlex is designed to cope with the highly exacting quality requirements of the automotive industry. It handles the quality control of elastic, variable and filigree rubber profiles of simple to high complexity with ease. The new, modular design of the sensor head dispenses with a complete housing and a hinged cover. The open sensor plate with

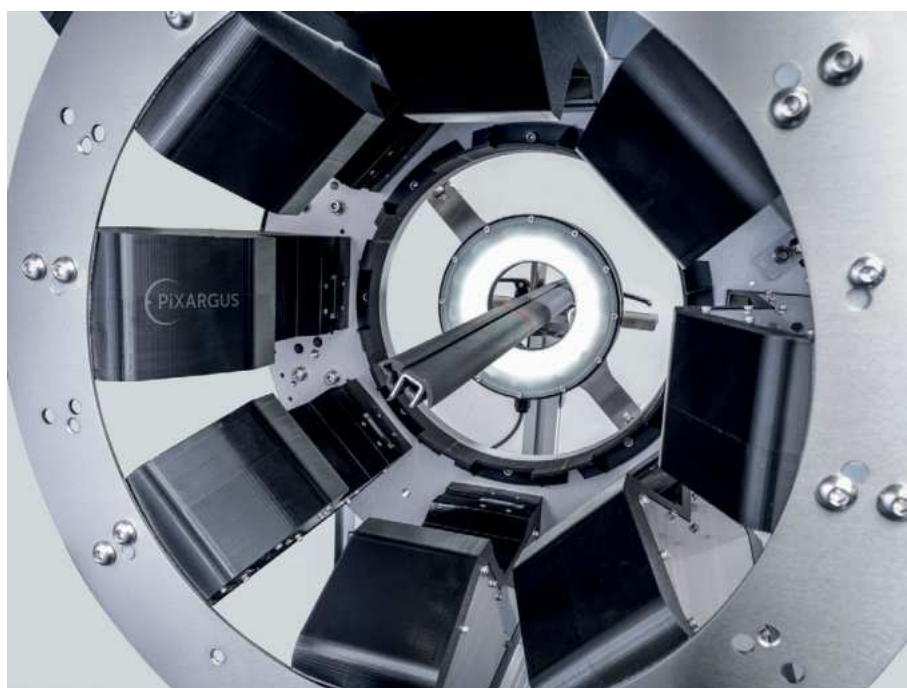
a predefined hole pattern makes it possible to flexibly position the optical sensors and freely configure it with up to 8 highly specialized cameras. Thus, all areas of the profiles that will later be visible can be continuously and completely captured during the inspection process.

A high-performer for impeccable surfaces and perfect dimensional accuracy

While up to 700 high-performance LEDs produce a homogeneous illumination field with maximal light yield, the ProfilControl software reliably filters out any interfering external light effects. ProfilControl 7 RubberFlex checks the contour, distances, angles, radii, heights, widths and clamping dimensions, and detects even the smallest specks, holes, scratches, bubbles, cracks, color deviations, etc. In addition, the PiXARGUS-developed MultiArea functionality, which uses virtual cameras, makes it possible to inspect various areas of view in parallel. The system recognizes defects and defect sources in the production process at a very early stage, minimizing the risk of out-of-spec production. The clear aim is to achieve impeccable surfaces and perfect dimensional accuracy.



Efficiency is the ace: As a pinpoint specialist for rubber extrusion products, ProfilControl 7 RubberFlex expertly handles the reliable inspection of elastic, variable and filigree rubber profiles. This innovative inspection system is not only ready to cope with the exacting quality requirements of the automotive industry, but it now also provides a cost-efficient inspection solution for technological rubber profiles used in air conditioners, refrigerators, windows and numerous other applications



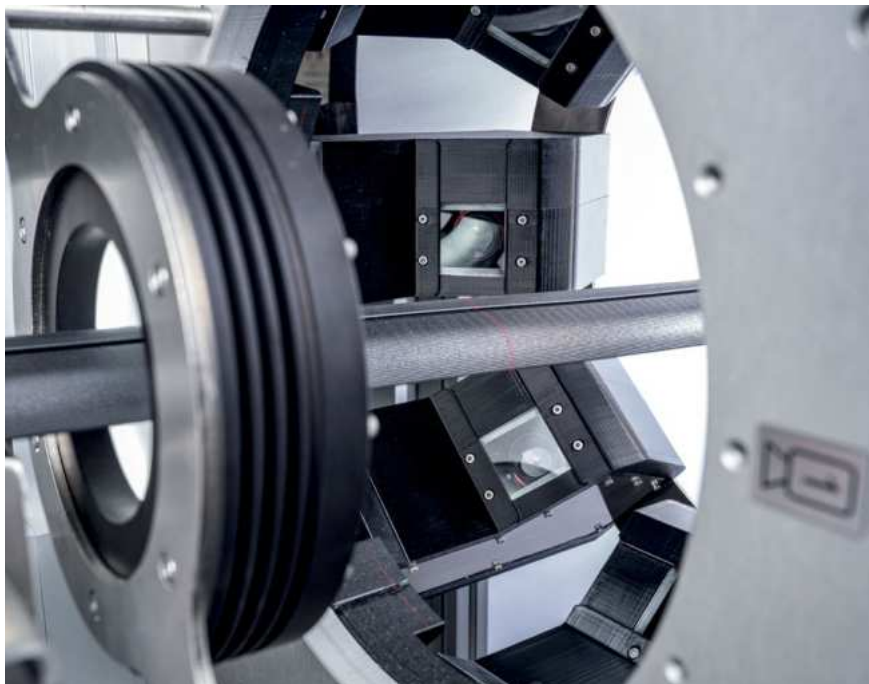
As much as necessary, as little as possible: The modular sensor head of ProfilControl 7 RubberFlex has a cost-optimized design

Quality assurance in the smartest way

The system's intelligent software is key in making ProfilControl 7 XLine a high-performer. It forms the basis for the intuitive operation of the system and the performance of time-saving automated inspection processes. Focused analysis functions enhance the effectiveness of defect tracking. Also on board: Various new smart assistance functions, such as a function that supports the operator in setting up the inspection processes for products with varying surfaces. The system, for example, now proposes the optimal roughness value, eliminating the manual effort for the operator.

Now also for technological profiles: Economic inline inspection with 1-8 optical sensors

Thanks to the new modular design of the sensor head, ProfilControl 7 RubberFlex can now provide customized setups for a wide range of EPDM products and applications. The smart inline inspection system is freely configurable with 1 to 8 cameras, as needed, and can be exactly tailored to the inspection tasks and quality requirements of the application. This makes ProfilControl 7 RubberFlex the solution of choice not only for classical sealing profiles used in the automotive industry, but it now also provides a cost-efficient solution for the inspection of technological rubber profiles for air conditioners, refrigerators, windows, and numerous other applications.



ProfilControl 7 RubberFlex is freely configurable with up to 8 multi-area cameras. The cameras can be flexibly positioned so that all areas of the profiles that will later be visible can be continuously and completely captured. No chance for deformations – perfect dimensional accuracy is guaranteed all the way through

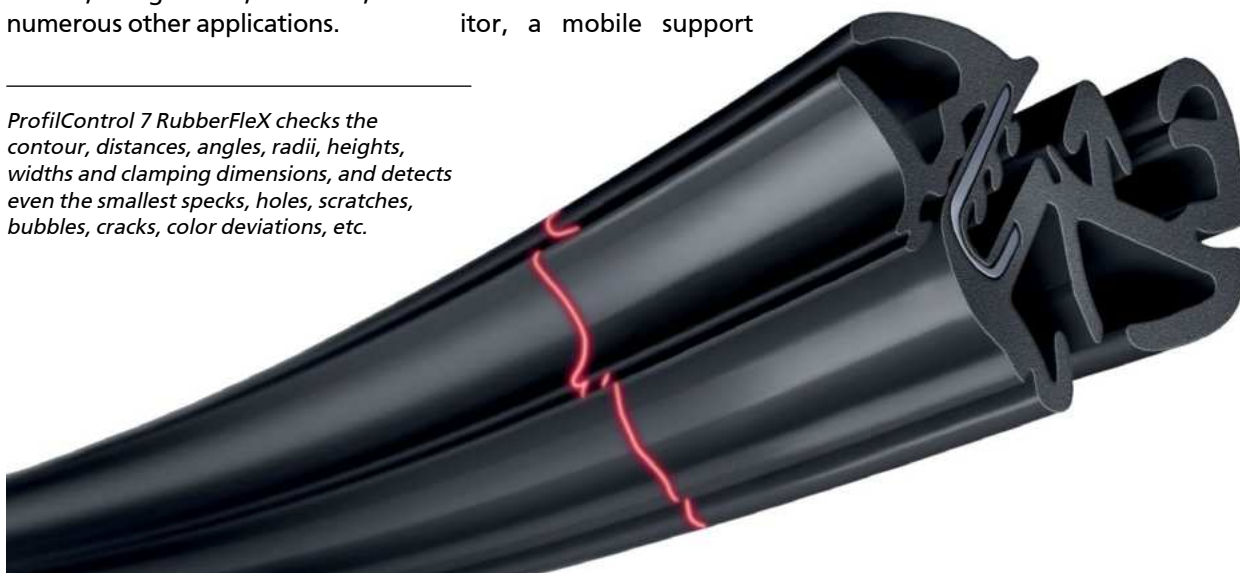
Surface. Dimension. DualVision

ProfilControl 7 RubberFlex is available as a turnkey system for standard applications in rubber profile extrusion and designed to be flexibly extended. Depending on what the customer wishes, the inline system is laid out to perform dimension measurement or surface inspection – or both functions combined, as an All-in-One solution for complete all-round inspection. The standard equipment includes an external 21.5" multi-touch monitor, a mobile support

frame, and the encoder. The system is also available on request for numerous special applications, such as smart hole and flocking inspection, variable extrusion, and defect density management (DDM).

PIXARGUS GmbH
A CITEX Group Company
Monnetstraße 2
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www.pixargus.com

ProfilControl 7 RubberFlex checks the contour, distances, angles, radii, heights, widths and clamping dimensions, and detects even the smallest specks, holes, scratches, bubbles, cracks, color deviations, etc.



Rotation in Extrusion Tools

CONEXTRU GmbH / Austria is an engineering & manufacturing company well known for standard as well for very special solutions out of standard manufactures especially for pipe. The following discussion provides a brief overview of the state of the art regarding tools used in pipe extrusion with a rotating die and/or mandrel.

Die rotation of parts in extrusion tools is not a new invention, but not much used in practice. The short abstract is a review of products produced with rotational parts in the extrusion tool. We can find die rotation in blown film lines, in extrusion lines to produce plastic nets also foamed and in pipe extrusion lines. In blown film line the whole die is rotating, this to distribute thick wall spots along the bobbin. One solution is to rotate mandrel rotation. To make nets also the mandrel is oscillating needed in order to get the lines welded to each other.

"Shaping" refers to creating a specific shape, such as twisted grooves, and "orientation" refers to creating a specific structure in the melt, such as the orientation of fillers.

Applications

PVC pipes with spiral ribs on inside for in house sewer pipes - to increase flow down on vertical installed pipes and to reduce noise - the water gets a rotation due to the spiral.

PE / PP: Cable ducts - The pipe has grooves in oscillation arrangement to reduce the friction between cable and pipe inner surface. This leads to longer pushing through length of the cables for installation. The pipe can be also a multilayer pipe with slippery inner layer.

PE-RT Geothermic pipe with ribs inside - oscillation



PO 63 R MD

Geothermal pipes having spiral ribs on inside surface to generate turbulent flow - to increase thermal conductivity between the fluid and the pipe. This leads to more energy transfer, as well as less pumping energy.

Colour stripe in spiral shape for indication of a special type of pipe

Additionally, there are examples which were investigated, generating benefits:

Pipes with hollow profile in spiral shape - to increase ring stiffness of the pipe; pipes with glass fibre layer in spiral shape - to increase pressure resistance; dredging pipes with spiral ribs inside, to bring the mud in rotation, to reduce or distribute the wear on the pipes inside surface.

PE or PP pipes to generate a certain molecular structure to increase crystallinity and strength of the pipe. Pipes with filler - to bring the filler like glass fibre or Talcum in a preferred direction to increase thermal conductivity or to increase strength.

There are some positive as well as some unrequested effects given due to the rotation.



PVC hollow profil pipe with spiral ribs inside

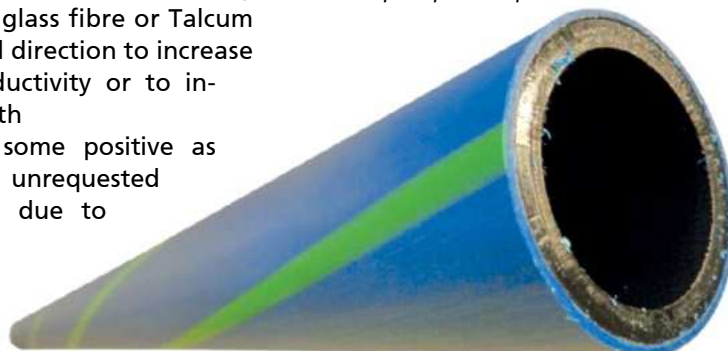
Rheological situation in der die gap

Before we look at the rheological situation in the die gap when the die or mandrel rotates, we have to divide the materials into two groups. The first group includes materials that stick to the walls, such as PE and PP. The second group includes materials that glide along walls, like PVC and ABS.

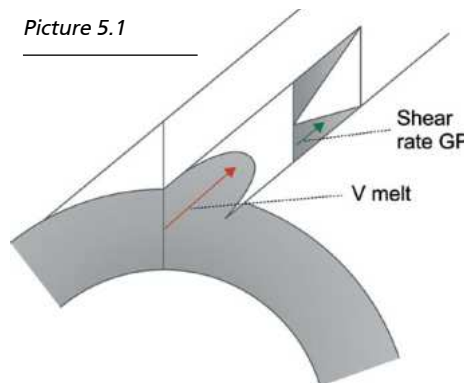
The polymers that stick to the metal surface in the die are good for making ribs and also for creating a shear force that can arrange the filler or macromolecules. The most interesting situation is the effect that pipe properties have on materials that stick to walls.

The three pictures show the correct analysis of what happens in the die gap.

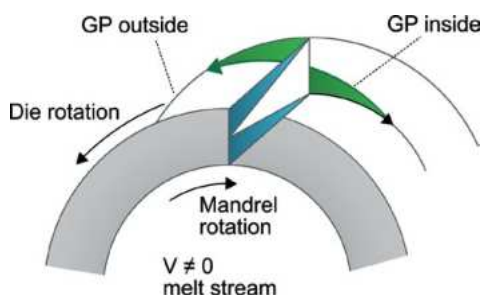
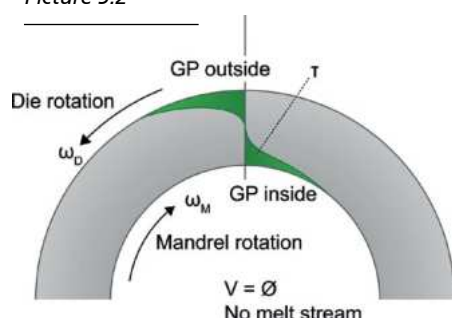
Color strip in spiral shape



Picture 5.1



Picture 5.2

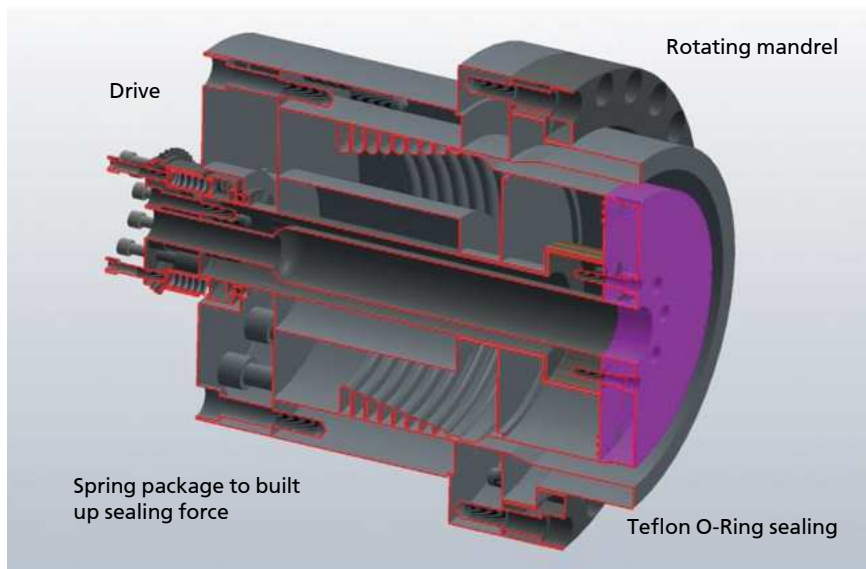


Picture 5.3

Picture 5.1 shows the normal flow with shear rate and melt velocity profile over die gap. **Picture 5.2** shows what happens if there is no melt flow, but the die and mandrel are rotating. **Picture 5.3** shows the combination of the both situations. This creates a 3D shear that is generated by the flow and rotation.

Influence of rotation to properties

It was reported that die and mandrel rotation leads to reduced pressure drop, eliminates melt fracture, homogenised and oriented filler distribution, moderate increase in strength and elongation at break, enables the control of orientation of short glass fibres, up to 40% increase on circumferential tensile strength for PP with short glass fibres



Pipe head PO 400 with rotatable mandrel tip

Negative effects due to rotation

The die/mandrel rotation has some negative effects, in addition to the positive effects. These are the limits for the rotation speed. At higher speeds, the die swells changes shape. This means that after reaching a certain rotation speed, you have to redo the die centering. Again, the die rotation doesn't correct any eccentricity.

Technical solution

CONEXTRU uses either helical or radial spiral technology for polyolefin pipes, or a combination for multilayer pipes, for the pipe head concept itself.

The rotation is achieved by independently turning the die and mandrel at different speeds using servo motors. The rotation speed depends on the diameter, line speed, and the expected effect, such as the pitch of the ribs or the orientation.

Making rotation possible through mechanical is quite challenging. On the one hand, the rotation should not require a high level of torque from the drive. Torque is influenced by backpressure due to the mandrel's shape and the closing force required for a seal between the fixed and rotating parts of the mandrel. The viscosity of the melt within the die and mandrel gap must also be considered. A seal is needed between the rotating part and the non-rotating part. Experience has shown that Teflon O-rings are the best option for seals because Teflon

has good gliding properties and is temperature resistant.

The picture 6 shows a 400 mm die with a rotating mandrel – a short front part with grooves that create ribs inside the pipe later on. The front part of the mandrel turns and is connected to a shaft that extends backwards to the end of the head. There is a unit that generates the closing force, which is adjusted by springs. This force can be adjusted by tightening the springs using screws.

Outlook

Tubes with internal ribs represent the state of the art, and there is nothing more to add – as demonstrated by numerous practical examples. However, the influence of orientation due to rotation still requires further research. It is evident that an increasing number of scientific institutions are investigating the influence of rotation on tube properties. So far, however, this has no practical relevance. It would be worthwhile to pursue further research in this area, as there is potential to improve product properties.

By J. Dobrowsky

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Going Beyond Average Properties to Validate Reactive Extrusion Upcycling

By Lucivan Barros, Ph.D., Senior Applications Scientist, Thermo Fisher Scientific

Polypropylene (PP) is among the most widely used polymers, and much of it gets wasted when compared to the amount that is recycled. It degrades during reprocessing, then gets written off as fit only for downcycling. Chain scission lowers molecular weight and cuts performance, so recycled PP lands in low-value parts.

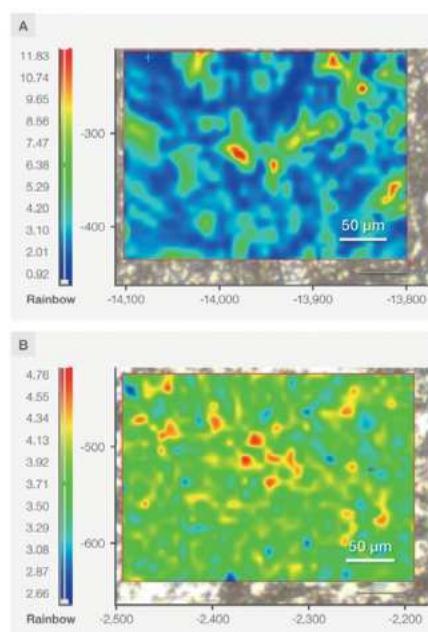
Upcycling through reactive extrusion offers a way forward, giving this waste a second life. Instead of reprocessing PP waste, this approach blends PP waste into a matrix driving chemical reaction at the matrix phase interface inside the extruder. Proving it worked is the harder problem, and that takes chemical analysis that goes beyond average properties, because averages are where an upcycled blend hides its weak spots.

Why a recovered tensile number alone is not proof of upcycling

We tested this on recycled PP and polyamide 12 (PA12), using polypropylene grafted with maleic anhydride (PP-g-MA) as a compatibilizer. The anhydride groups react with the amine end groups of PA12, forming a di-block copolymer at the interface that lowers interfacial tension and holds the phases together.

A non-reactive 50/50 blend lost tensile strength, dropping to about 32 MPa against roughly 42 MPa for neat PA12. This indicates a weak interface between phases, acting as weak point where the part fails under low mechanical load. In contrast, the reactive blend recovered to nearly 42 MPa while carrying 50% recycled content due to the effective interfacial adhesion. A material that is half waste performed like a virgin high-performance polymer.

That is why I want to challenge how the industry reads success. A recovered tensile number is necessary, but it does not alone prove upcycling. In an immiscible blend, the interface is where the part lives or dies, and a single average tells you almost nothing about it. To evaluate the improved mechanical properties the morphology needs to be looked closer.



Chemical maps of the non-reactive blend (A) and reactive blend (B), demonstrating significantly less blending variation in the reactive blend sample



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What FTIR mapping reveals about blend homogeneity

Infrared imaging exposes the morphology of the blends. Micro-ATR Fourier transform infrared (FTIR) reads the polymer surface with spatial resolution, giving a map rather than one averaged spectrum. PA12 and polypropylene have distinct infrared bands, so we calculate a local PA12-to-PP ratio at every point in a specific measured area.

Across more than 1,000 spectra per region, the reactive blend held a PA12-to-PP ratio range of 2.6 to 4.8. The non-reactive blend ran from 1 to 12. Same material, same recycled loading, very different homogeneity due to the interface stabilization during upcycling with PP-g-MAH. The PA12-to-PP ratio range shows how the morphology domain composition varies across the material. The non-reactive blend held near-pure PA domains and near-pure PP domains, whereas the reactive blend has a more homogeneous composition throughout the material.

No single instrument settles it. Rheology showed a higher storage modulus and a longer linear viscoelastic region, both signs of a stable interface. When rheology, mechanical data and infrared imaging agree, that agreement explains why the material performs and predicts how it behaves in a part.

Why development belongs on a benchtop twin-screw extruder

This takes equipment built for iteration. Recycled feedstock varies batch to batch, so development means running many formulations

and in many combinations of process parameters, including screw configurations. A commercial line cannot do that cheaply, since it needs a large charge of material to run and a screw-configuration change can take a week. A benchtop twin-screw system, like the Thermo Scientific™ Process 11 Parallel Twin-Screw Extruder, runs the same trials on a handful of material and changes screw design and conditions quickly.

Developing on a full production line, before conditions and screw design are settled, generates more waste than it saves. Settle the process window and compatibilizer loading on the bench, then transfer the proven parameters to a larger line.

Moving validation in-line with process Raman

The same benchtop setup can carry a real-time monitor. An in-line process Raman analyzer, such as the Thermo Scientific™ MarqMetrix™ All-In-One Process Raman Analyzer, tracks reaction progress inside the extruder. Raman gives the process-time view, and FTIR mapping gives the final distribution, closing the gap between the barrel and the finished part. That shortens validation, one of the real barriers to adoption.

Reactive extrusion upcycling will scale when the industry treats it as a materials engineering problem with measurable, repeatable value, not as an environmental gesture. That means validating upcycled feedstock as a material system, not certifying a recycled-content percentage. The mechanical properties get



Lucivan Barros, Ph.D.,
Senior Applications Scientist,
Thermo Fisher Scientific

the attention, but the distribution, dispersion and stabilization behind the morphology is the real proof the material will perform in the field.

Author

Lucivan Barros, Ph.D., is a senior applications scientist at Thermo Fisher Scientific. He specializes in polymer processing, reactive extrusion, rheology, injection molding and material development. Barros has more than 10 years of experience developing and optimizing advanced polymer systems, including nanocomposites and polymer blends, across research, processing and application. He holds a Ph.D. in macromolecular science and engineering from Case Western Reserve University.

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Twin-Screw Extruder with water
bath and VariCut pelletizer setup



AI in Extrusion Manufacturing – *Hype, Tool, or the Next Industrial Revolution?*

By: Dariusz Kozlowski

Artificial Intelligence has become one of the most discussed technologies in manufacturing, but separating genuine industrial value from marketing hype is not always easy. In the extrusion sector, however, AI is beginning to move beyond theory and pilot projects into practical applications that can deliver measurable benefits.

Extrusion processes generate vast amounts of data every second. Temperatures, pressures, screw load, drive power, line speed, cooling performance, material feed rates, dimensional measurements, and quality inspection data are all continuously recorded by modern control systems. Historically, much of this information has been used only for monitoring and troubleshooting. AI offers the ability to turn that data into actionable process intelligence.

Unlike conventional automation systems that operate using predefined rules and control loops, AI systems can uncover relationships between variables that may not be obvious, even to experienced process engineers. As a result, AI has the potential to improve process stability, reduce waste, lower energy consumption, and support more consistent product quality.

The long-term significance of this technology may ultimately be comparable to the industry's transition from analogue controls to PLC-based automation during the 1980s and 1990s.

Why Extrusion Is Well Suited to AI

Extrusion is inherently a multivariable process. A change in one operating parameter often influences numerous other process conditions.



Dariusz Kozlowski talking to customers

For example, a variation in raw material characteristics may affect melt viscosity. This can influence die pressure, motor load, dimensional control, cooling efficiency, and ultimately finished product quality. Experienced operators learn these interactions over many years of production experience, but monitoring them simultaneously is challenging.

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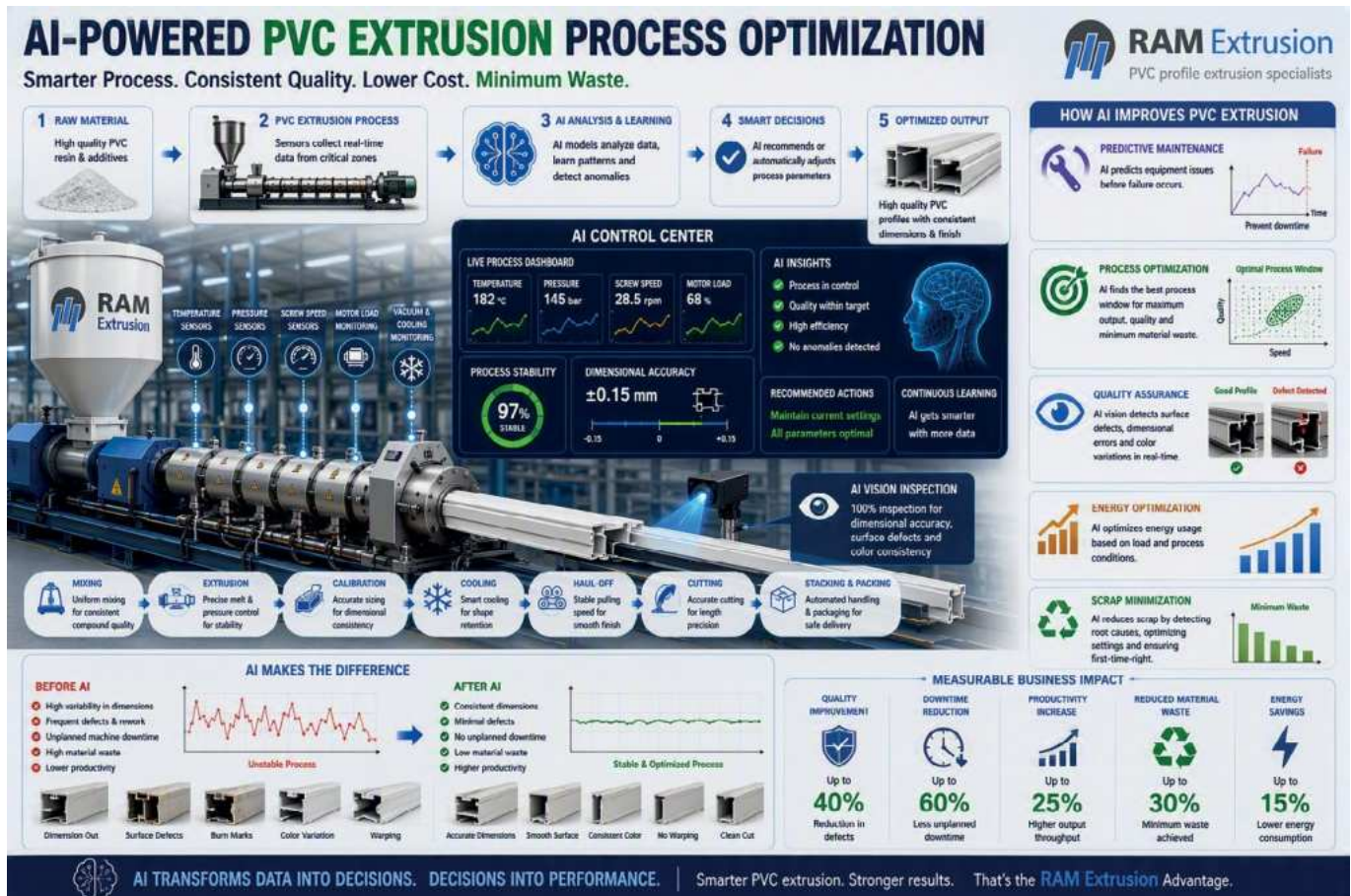
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AI systems excel in environments where large numbers of interconnected variables influence process performance. For example, a slight variation in polymer moisture content or melt flow index may initially appear insignificant, yet it can influence pressure stability, melt temperature, dimensional control and product appearance further downstream. Machine learning algorithms can identify these relationships far earlier than conventional trend analysis, allowing process engineers to make informed decisions before quality issues become visible.

This capability is particularly valuable in extrusion operations where production conditions continuously fluctuate due to changes in raw material batches, ambient conditions, tooling wear, and equipment aging.

A Practical Observation from the Shop Floor

Anyone who has spent time troubleshooting an extrusion line will recognise how often process instability originates from factors that are difficult to quantify. Operators frequently develop an instinct for identifying subtle changes in machine behaviour. A slight change in motor sound, a variation in melt appearance as it exits the die, or a gradual increase in pressure fluctuation may signal a problem long before conventional alarms are triggered.

One production manager once described this as "knowing the line is having a bad day before the data shows it." While that intuition is difficult to teach, it is often remarkably accurate. What AI offers is the ability to capture and quantify some of that intuition. Rather than replacing operator experience, it creates a frame-

work for turning tacit knowledge into measurable process indicators that can be monitored consistently across multiple shifts and production sites.

In many respects, the most valuable AI systems may be those that help preserve knowledge as experienced operators retire and new generations enter the workforce. Decades of practical production experience are difficult to replace, and digital tools can help prevent that knowledge from being lost.

From Process Control to Predictive Process Control

Most extrusion lines today already incorporate sophisticated control systems. Temperature controllers, gravimetric feeders, pressure monitoring and Statistical Process Control (SPC) systems are widely used throughout the industry. The limitation is that these systems are largely reactive.

An SPC alarm typically indicates that a parameter has already drifted toward a specification limit. By the time operators respond, some quantity of non-conforming product may already have been produced.

AI introduces a predictive layer above traditional control. By analysing historical production data, machine learning models can identify combinations of conditions that frequently precede quality deviations. Rather than waiting for an out-of-specification condition to occur, the system can warn operators or initiate corrective actions before product quality is affected.

The practical benefit is not necessarily revolutionary process changes, but rather incremental improvements

in stability, consistency and scrap reduction across thousands of production hours. On a typical HDPE pipe extrusion line processing around 900 kg/h, even a 1% reduction in scrap can represent several tonnes of material saved each month and tens of thousands of pounds in annual savings.

The challenge is rarely developing the AI model itself. In most cases, the biggest obstacle is obtaining reliable, high-quality process data from existing equipment, particularly on older extrusion lines where sensor coverage and data collection capabilities may be limited.

Lessons from Other Industries

The extrusion sector is not the first manufacturing industry to explore predictive process control. Steel producers, semiconductor manufacturers and automotive component suppliers have spent years developing machine-learning systems capable of identifying process deviations before defects occur.

A useful lesson from these industries is that the greatest benefits often come from solving relatively small problems. Manufacturers have reported significant annual savings simply by reducing process variation enough to lower scrap rates by a small percentage. This highlights an important reality: AI projects do not need to deliver dramatic breakthroughs to generate substantial commercial value.

In high-volume extrusion operations, a one-percent improvement in efficiency rarely attracts headlines. Yet over months and years of production, small gains accumulate into substantial reductions in material consumption, downtime, energy costs and quality-related losses.

Understanding Self-Optimising Extrusion Lines

One of the most ambitious applications of AI is the development of self-optimising extrusion systems. The term is sometimes misunderstood. It does not mean the extrusion line operates without people. Instead, it refers to a manufacturing system capable of continuously adjusting process conditions to achieve specific performance objectives.

A self-optimising line combines several technologies:

- Real-time process data collection
- Advanced process models
- Machine learning algorithms
- Automated control systems
- Feedback from quality measurement devices

The system continually compares current operating conditions against production targets such as:

- Throughput rate
- Product dimensions
- Surface quality
- Mechanical performance
- Energy consumption
- Scrap generation

If performance begins to drift, the AI model determines whether changes to screw speed, temperature profiles, haul-off rates, feeder settings, or cooling parameters could improve the process.

Unlike traditional control systems, which generally optimise one parameter at a time, a self-optimising platform evaluates the interaction between multiple variables simultaneously.

Consider a pipe extrusion operation producing HDPE pressure pipe. An AI model might detect a gradual increase in die pressure combined with rising motor torque and minor dimensional variation. Historical production data may show that similar conditions frequently lead to wall-thickness instability within the next 20 to 30 minutes.

Rather than waiting for the deviation to occur, the system can recommend or automatically implement small process adjustments. In many cases, operators may never notice that the correction has taken place because the process remains stable throughout production. The objective is not to eliminate human expertise but to provide thousands of small optimisation decisions that would be impractical to perform manually.

A Realistic Operational Scenario

Consider a polyethylene pipe manufacturer running a continuous 24-hour production schedule. Traditionally, an experienced operator might notice a gradual increase in die pressure late in a production run and make small adjustments based on experience. An AI-assisted system could recognise that the same pressure pattern has historically led to dimensional instability within the next production hour and recommend corrective action immediately.


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The difference may seem minor, but over a year of continuous production, avoiding just a handful of quality incidents can prevent significant material losses, customer complaints and unplanned downtime.

One of the most common misconceptions surrounding industrial AI is that value comes only from major breakthroughs. In reality, competitive advantage often comes from preventing the small process disruptions that occur every day but rarely attract attention. The cumulative effect of these improvements can be substantial.

Digital Twins and Virtual Process Development

Many advanced AI projects are built around digital twin technology. A digital twin is essentially a dynamic virtual representation of the extrusion process. Using live production data, the model continuously predicts how the line is expected to behave under different operating conditions.

This allows engineers to evaluate changes in:

- Throughput
- Energy consumption
- Product dimensions
- Melt temperature
- Pressure profiles
- Material performance

before applying those changes to the actual production line.

For processors producing high-value products, the ability to test process modifications in a virtual environment can significantly reduce development costs and technical risk.

What We Can Learn from Industry Leaders

Some of the most advanced examples of AI-assisted manufacturing have emerged outside the extrusion sector. Organisations such as Siemens have demonstrated digital twin technologies capable of modelling entire production systems, while major materials producers including BASF, Dow and Borealis continue to invest heavily in advanced process analytics and data-driven manufacturing strategies.

Although these operations function at scales far larger than most extrusion facilities, the underlying principle remains remarkably similar: collect reliable data, build accurate process models, and use that information to support better decisions.

The extrusion industry does not necessarily need to reinvent the wheel. Many of the technologies and implementation strategies being adopted today have already been tested in sectors ranging from chemicals and automotive manufacturing to aerospace and semiconductor production. The challenge is adapting those lessons to the practical realities of extrusion processing.

The Reality of Implementation Costs – An Unpopular Opinion: AI Is Not the Biggest Challenge

A common assumption is that adopting AI requires sophisticated algorithms or expensive specialist soft-

ware. In practice, many extrusion facilities face a more fundamental challenge. The greatest barrier is often data quality.

Companies exploring AI projects frequently discover that critical process data is incomplete, inconsistent, or stored across multiple systems that do not communicate effectively. It is difficult to train advanced machine-learning models when sensors have not been calibrated regularly, process records contain gaps, or production reporting still relies heavily on manual spreadsheets.

In many facilities, improving instrumentation, standardising data collection and establishing stronger process discipline will deliver more immediate benefits than deploying AI itself.

The organisations achieving the strongest results with industrial AI are often those that first invested in operational fundamentals. The software itself is rarely the largest expense.

In practice, the biggest investment is usually creating the infrastructure needed to generate reliable data. Many extrusion facilities still operate equipment that was never designed for advanced analytics. Additional sensors, communication networks, data historians and integration work are often required before AI projects can begin delivering value.

For a single extrusion line, an initial analytics project may cost between £20,000 and £100,000, while fully integrated closed-loop optimisation systems can require investments ranging from several hundred thousand pounds to well over £1 million, depending on complexity.

The economics therefore depend heavily on production volume, product value, scrap levels and existing digital maturity. Facilities with high material costs, tight dimensional tolerances or frequent downtime events generally achieve the fastest return on investment.

A More Realistic View of the Future

Despite the enthusiasm surrounding AI, fully autonomous extrusion plants remain some distance away. Many extrusion operations still struggle with inconsistent data quality, incomplete sensor coverage, legacy equipment and limited process standardisation. These challenges must be addressed before advanced AI systems can function effectively.

The most successful projects today are not replacing process engineers. Instead, they are helping engineers make faster and better-informed decisions. AI can identify patterns hidden within millions of process data points, but it still lacks the practical understanding that experienced extrusion personnel develop over years of troubleshooting, product development and process optimisation.

The most effective manufacturing environments will therefore combine human expertise with machine intelligence rather than viewing one as a replacement for the other.

Over the next decade, the industry's greatest gains are likely to come from AI-assisted process optimisation, predictive maintenance and automated quality analysis rather than entirely unmanned manufacturing. Companies that establish robust data collection and process monitoring systems today will be in the strongest position to adopt more advanced AI technologies as they mature.

The Human Factor Remains Critical

One surprising observation from many early AI implementations is that the technical solution is often easier to deploy than the organisational changes required to support it. Skilled operators can be understandably sceptical when software begins making recommendations about a process they have managed successfully for many years.

The most successful projects involve operators from the beginning, positioning AI as a decision-support tool rather than an automated replacement for human expertise. When experienced personnel can see how recommendations are generated and validate them against real production conditions, acceptance and adoption improve significantly.

This reinforces an important principle: manufacturing excellence has always depended on people. AI may provide powerful analytical capabilities, but its effectiveness still depends on the knowledge, judgement and experience of the individuals responsible for running the process.

In fact, some of the most successful AI deployments in manufacturing have strengthened rather than reduced the role of experienced personnel. Instead of spending time reacting to routine process issues, engineers and operators are free to focus on higher-value activities such as optimisation, innovation and continuous improvement.

Conclusion

Artificial intelligence should not be viewed as a replacement for extrusion expertise. The most effective implementations combine machine learning with the knowledge of experienced operators, technicians and process engineers. When supported by accurate process data and well-designed control systems, AI can help manufacturers reduce scrap, improve energy efficiency, increase equipment availability and achieve more consistent product quality.

The future of extrusion is unlikely to be defined by fully autonomous factories. Instead, it will be shaped by smarter manufacturing systems capable of learning from process history, predicting problems before they occur and supporting operators in making better decisions.

Companies that begin investing in data quality, process monitoring and digital infrastructure today will be best positioned to benefit from future AI developments. As with every major technological shift in manufacturing, competitive advantage will not come from simply adopting the technology, but from understanding how to apply it effectively.

In that respect, AI's greatest value may not be replacing people, but enhancing the expertise that already exists within modern extrusion operations. The manufacturers that succeed over the coming decade will not necessarily be those with the most advanced algorithms. They will be the organisations that combine strong engineering fundamentals, reliable data, experienced people and intelligent technology into a single, continuously improving production system.

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First Gear Pump for Rigid PVC

The MAAG Group, a global leader in the development of conveying and processing systems for the plastics industry, is presenting a technological highlight at Fakuma 2026 (Hall A6, Booth 6202): The extrex⁶ EC is the first gear pump specifically designed for the continuous conveyance of challenging rigid PVC (polyvinyl chloride). The Swiss machine manufacturer has thus succeeded in overcoming a long-standing technological hurdle in PVC processing. Initial practical use at the REHAU Group confirms the enormous potential of the new pump system for the circular economy.

The Challenge: Reliably Conveying Rigid PVC

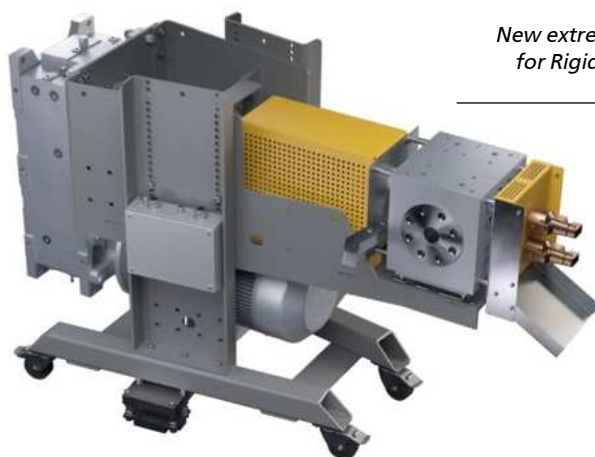
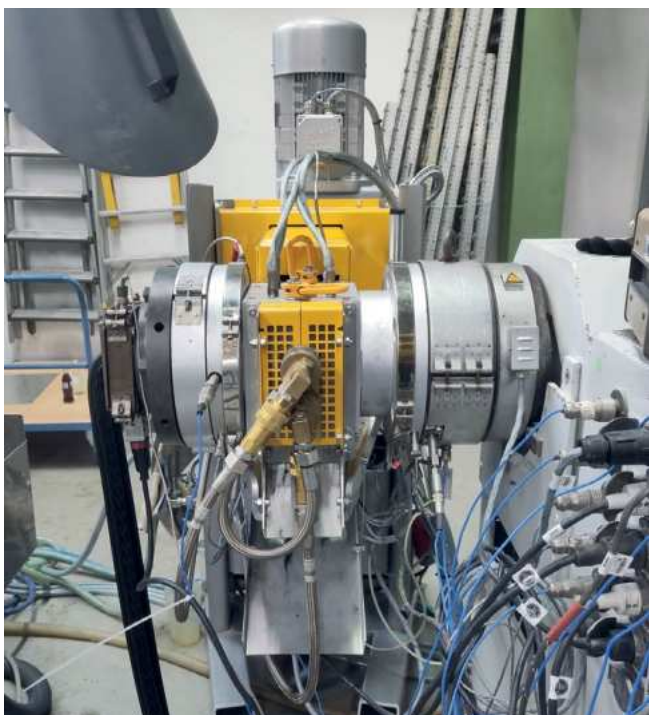
Due to its extreme thermal sensitivity and tendency to degrade, rigid PVC is considered one of the most challenging materials to convey in extrusion. Conventional gear pumps often reach their limits in this context: the material remains in gaps and dead spaces for too long, which inevitably leads to deposits, material burning, and process instabilities.

The MAAG Group developed the extrex⁶ EC specifically to address this problem. Its gap-free design without dead spaces effectively prevents polymers from adhering to and accumulating inside the pump. This significantly reduces the thermal stress on the PVC and eliminates the risk of degradation.

Technological Highlights of the extrex⁶ EC

- Gap-free design with no dead spaces: Prevents prolonged residence times and material burning, ensuring a clean process.

The MAAG Group PVC pump in use at the REHAU technical center in Germany



New extrex⁶ EC for Rigid PVC

- Increased extruder efficiency: Uniform, pressure-stable conveying significantly reduces the load on the extruder. Depending on the application, material throughput can be significantly increased, or energy savings of up to 20% can be achieved in the extruder while maintaining constant throughput.
- Reduction in process temperature by up to 10 °C: The optimized temperature control reduces the thermal stress on the melting process. This eliminates the need for expensive stabilizers in some cases.

Successful Practical Application and Cost Benefits in Recycling at REHAU

The results of a multi-year development partnership with the REHAU Group demonstrate just how effective the system is under real production conditions. Following intensive testing at REHAU's technical center between 2022 and 2024, a final prototype was successfully tested with a production profile in early 2025. By optimizing the pump's thermal balance, MAAG was able to ensure that the temperature increase through the pump did not exceed 6 °C – even with a melt temperature that was already 10 °C lower.

The extrex⁶ EC particularly demonstrated its strengths when using cost-effective recycled PVC material with inherently inhomogeneous batches. Pressure fluctuations at the die were minimized by the gear pump's constant output, resulting in a massive improvement in the product quality of the profiles. At the same time, the load on the extruder decreased by up to 20%, promising a longer service life for the system and noticeable cost sav-

ings in the maintenance cycle. In all trials with recycled material, no discoloration occurred, and no additional stabilizers were required. REHAU thus achieves a clear economic and environmental advantage, as expensive virgin material can be replaced with recycled one.

Global Implementation on the Horizon

The new PVC pump has since been successfully installed for production purposes at a REHAU plant in Spain. An extended lease agreement now provides the necessary time to gradually implement the innovative pump system across the plastics processor's global fleet of facilities.

Martin Schwanck (Process Engineering, REHAU Industrial Solutions SE & Co. KG) offers an all-around positive assessment: "The development of the melt pump into

the current, near-production prototype was handled professionally and driven forward with great dedication by all involved. The necessary steps were coordinated in a spirit of partnership and on an equal footing. After commissioning and training at our production facility, our employees were immediately able to operate the pump independently – thanks in part to the very clear instructions. The robust design and wide process window meant that operators quickly gained confidence in the machine and came to appreciate it as an important contribution to stabilizing production."

Maag Pump Systems AG
Aspstr. 12, 8154 Oberglatt, Switzerland
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Fakuma 2026: A6-6202

From PP to PET – *MRS Technology Enables Energy-Efficient Processing of Recycled PET*

By expanding its production capacity, the Hungarian thermoforming specialist Kurucsai Plastic has taken an early step towards meeting the future requirements of the packaging industry. Since the beginning of 2025, the company has been producing PET sheet for food packaging on a Gneuss MRS extrusion line. The investment was made to increase material flexibility, reduce energy consumption during extrusion and create the basis for processing food-grade recycled PET.

Originally established as part of an agricultural business, the company initially produced thermoformed packaging for its own fruit and vegetable products. Today, it also supplies customers throughout the food industry. As production capacities continued to expand, the company gradually converted its sheet production from polypropylene (PP) to polyethylene terephthalate (PET). This transition was driven by increasing requirements for recyclable packaging and the growing use of recycled content within the European circular economy. At the same time, the company aims to become less dependent on raw material availability and price fluctuations.



Production of PET thermoforming sheet at Kurucsai Plastic, Hungary



Gneuss OMNI extrusion line with MRS extruder and RSFgenius melt filtration system

tuations by being able to process a wide range of PET feedstocks.

The change to PET, however, introduced a major processing challenge. PET is hygroscopic and readily absorbs moisture from the surrounding environment. In conventional extrusion processes, the material must therefore be dried before processing to ensure consistently high sheet quality – particularly when recycled material is used.

The company therefore looked for an extrusion solution capable of processing different PET feedstocks without upstream material drying while maintaining maximum energy efficiency. The choice was a Gneuss MRS 110 extruder with a through-

put of up to 600 kg/h of PET. Since its commissioning in early 2025, the system has successfully met both requirements.

At the heart of the system is the patented Multi Rotation System (MRS) technology. Multiple satellite screws dramatically increase the melt surface area, enabling highly efficient devolatilisation and decontamination of the PET melt. As a result, virgin resin, bottle flakes and in-house production regrind can all be processed flexibly without the need for energy-intensive pre-drying.

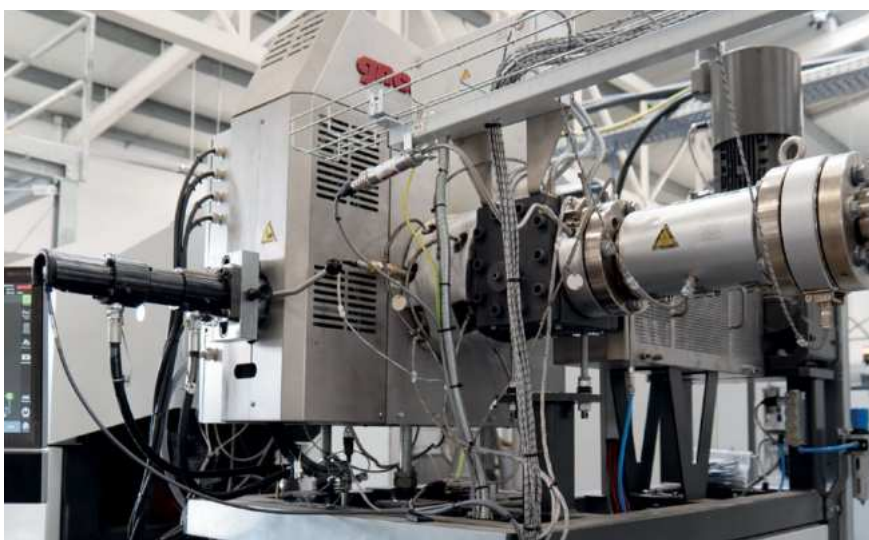
The extrusion process has received FDA approval for the production of recycled PET intended

for food-contact applications. In addition, EFSA approval for the customer-specific process has been applied for, with approval expected during 2026. This will enable the company to use food-grade recycled PET for international food packaging markets.

A gravimetric dosing system allows different material streams to be blended with high precision. A Gneuss RSFgenius rotary filtration system continuously removes solid contaminants from the melt, ensuring consistently high sheet quality. The sheet is then fed directly into the thermoforming lines via an energy-efficient inline process.

Since entering production at the beginning of 2025, the extrusion line has proven itself in daily operation. The combination of flexible raw material selection, elimination of energy-intensive material pre-drying and the energy-efficient inline process reduces overall energy consumption while increasing flexibility in raw material sourcing. As a result, the company now has the technical capabilities to increase the recycled content of its food packaging according to market requirements and to respond flexibly to future market developments and the evolving demands of the European circular economy.

Gneuss RSFgenius rotary filtration system with integrated backflush technology



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ZSK Twin Screw Extruders for the Production of High-Performance Engineering Plastics

Dongguan Baier Plastic Co., Limited, a leading provider of high-performance engineering plastics based in China, has acquired three ZSK Mc¹⁸ compounders from Coperion. With these twin screw extruders, the company is expanding its production capacity for high-performance engineering plastics such as PA6/PA66, PEEK, PEI, PAI, PPS, PPO, PPA, PA9T, PA10T, LCP, and PA46, which are primarily used in the automotive industry, the electrical and electronics sector, and mechanical engineering.

The processing of high-performance engineering plastics places the highest demands on production technology and the compounding process. Drawing on its extensive experience accumulated over many years and numerous successful references, Coperion has designed the set-up of the three ZSK extruders and the suitable screw designs for the required high process temperatures. Combined with the high specific torque, the ZSK Mc¹⁸ extruders ensure an efficient and product-gentle operation, achieving highest throughput rates while maintaining excellent product quality.

The new extruders will enhance the production capacity and expand the product portfolio of Dongguan Baier Plastic, which has successfully operated a ZSK Mc¹⁸ twin screw extruders from Coperion for several years.

ZSK Extruders: Tailored for the Highest Demands

High-performance engineering plastics are characterized by their ability to maintain their mechanical properties over long periods, even at extreme temperatures above 400°C.

The compounding of these plastics requires specially configured production technology. Extruders used for processing high-performance plastics must be significantly more powerful than those designed for standard plastics and must withstand high process temperatures. Coperion is recognized as an expert in extrusion systems in this field. With extensive know-how, Coperion has designed the process sections of the three ZSK Mc¹⁸ extruders for Dongguan Baier Plastic both mechanically and electrically for melt temperatures of up to 450°C.

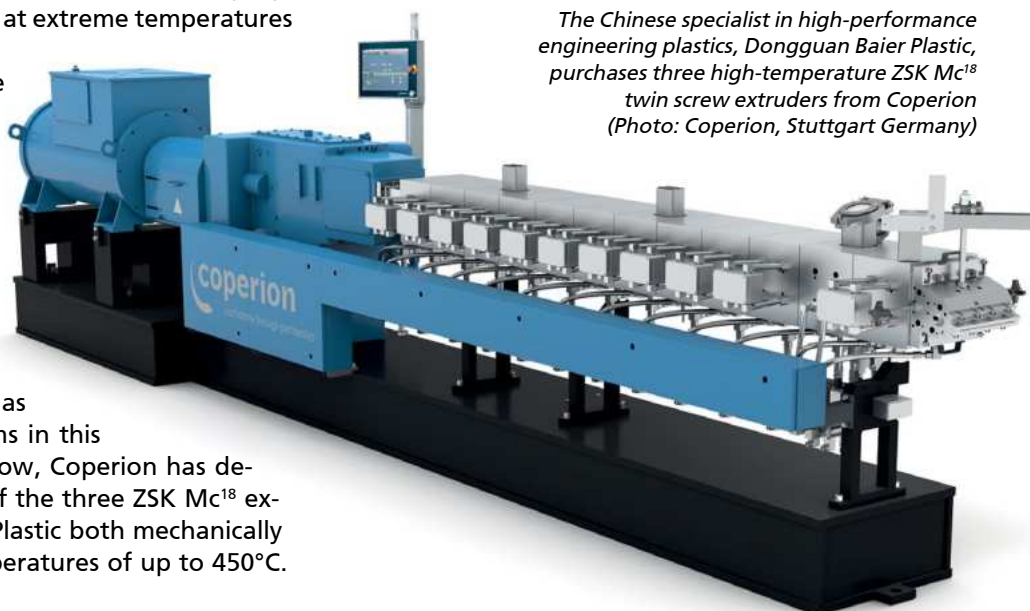
The extruders are equipped with powerful heating cartridges and effective thermal insulation to maintain the required temperatures consistently.

The twin screws are individually configured for the processing of high-performance engineering plastics, and both the screws and the barrels are equipped with special wear and corrosion protection.

The high specific torque of the ZSK extruders, combined with the specially designed twin screws, ensures a short residence time of the highly viscous melt in the process section at a very high filling degree. The result is very high throughput rates and outstanding product quality. Additionally, the side degassing units ZS-EG reliably and stably degas the plastic melt, further enhancing the product quality of the high-performance engineering plastics.

Additional intelligent features on the ZSK extruders ensure quick recipe changes. Both the side feeders ZS-B and the side degassing units ZS-EG are in easy design,

The Chinese specialist in high-performance engineering plastics, Dongguan Baier Plastic, purchases three high-temperature ZSK Mc¹⁸ twin screw extruders from Coperion (Photo: Coperion, Stuttgart Germany)



allowing them to be detached from the process section particularly quickly. This minimizes downtime during recipe changes and increases the OEE (Overall Equipment Effectiveness) of the production systems. To fully exploit the performance potential of the ZSK Mc¹⁸ extruders, the ZS-B side feeders are equipped with the patented Feed Enhancement Technology (FET). In the feeding zone there is a porous, gas-permeable wall section to which a vacuum is applied externally. The result of FET technology is a significant increase in throughput and improved cost-effectiveness of the compounding system.

"We are very proud to support Dongguan Baier Plastic in their expansion with three additional ZSK Mc¹⁸ extruders. We are confident that the company is ideally positioned for the future with these compounding systems. We wish Dongguan Baier Plastic all the best and look forward to further collaboration," says Joanne Shen, General Manager Engineering Plastics at Coperion.

Coperion GmbH
Theodorstraße 10, 70469 Stuttgart, Germany
www.coperion.com

Multi-Processing Systems Expanded

Hosokawa Alpine AG has expanded its range of multi-processing systems to include the UPZ 100 III fine impact mill. Thanks to a newly developed universal mounting solution, it can now be seamlessly integrated. The company thus guarantees maximum flexibility in the development of new products whose grinding properties cannot be reliably predicted in advance.

Seven mill types on a single system periphery

As product development often involves switching between different mill types or, for example, integrating a classifier or a classifier mill into the process, the use of several separate systems impairs the efficiency of the production process and also requires a great deal of space. "Our multi-processing systems

have proven to be the ideal solution for these requirements in practice," explains Andre Voges, Head of Sales Pharma at Hosokawa Alpine. This is because these mobile and extremely flexible system concepts integrate different types of mills into a single system periphery. Hosokawa Alpine thus implements different grinding processes on a single platform – flexibly, efficiently and in a space-saving manner, as the required units can be changed quickly and easily. The multi-processing system has so far enabled up to seven different mill types to be connected to a single system periphery. With the integration of the UPZ 100 III fine impact mill, Hosokawa Alpine has now expanded the range of applications for the multi-processing system to include a further option.



Hosokawa Alpine's multi-processing system: by combining different mill and process modules, new products can be developed more quickly and production concepts can be scaled up reliably

Ultraplex UPZ 100 III fine impact mill for fine grinding

The Ultraplex UPZ 100 III fine impact mill is used for particle sizes ranging from 50 µm to 5 mm and for grinding soft to medium-hard materials up to a Mohs hardness of 3. It can be operated as a screenless pin mill or as an impact mill with an impact disc, pendulum beaters or plate beaters. Material is fed centrally via a mill door that swings open wide, facilitating easy tool changes and quick cleaning.

Significantly expanded range of applications

The UPZ 100 III is now an integral part of the multi-processing system and significantly expands its range of applications, from standard applications to demanding processes involving toxic or potentially explosive products in the food, chemical and pharmaceutical industries, as well as temperature-sensitive raw materials. Its integration enables testing on a laboratory and pilot scale and provides reliable data for subsequent production design. At the same time, the system remains future-proof, as additional process modules and mill types can be easily retrofitted as required. Hosokawa Alpine's multi-processing system concept is scalable and covers the entire spectrum – from research and development through pilot applications to industrial production.



The UPZ 100 III fine impact mill is now available as an addition to Hosokawa Alpine AG's flexible multi-processing systems

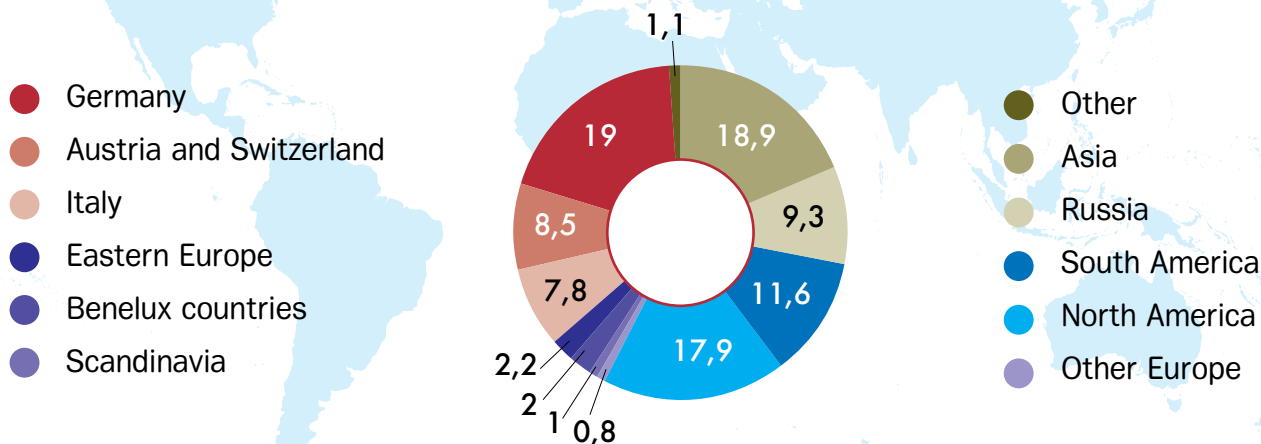
Hosokawa Alpine AG
www.hosokawa-alpine.com

EXTRUSION GLOBAL

The only website collecting information about smart technologies of extrusion

39.600 + average monthly visits

Geographic distribution of Smart_Extrusion readers, %



Fakuma 2026 – *A Multifaceted Programme for the Anniversary Event*

The entire world of plastics – plus much more – is on the agenda for the 30th Fakuma which will take place daily from 12th through 16th of October, 2026. The Friedrichshafen Exhibition Centre will host an enormous family celebration for five days to mark its anniversary. On the one hand, it will serve as a showcase for the entire world of plastics – from injection moulding, forming and extrusion technology, as well as 3D printing, masterbatches and raw materials, right on up to tooling, process technology and recycling. On the other hand, it will provide a unique platform for communication, discussion, knowledge-sharing, awards and career planning.

Fakuma Innovation Award Performance and Competence in Six Thematic Categories

Above all, Fakuma focuses attention on the future, and on solutions that will enable the industry to meet today's and tomorrow's challenges. And this is why trade fair promoters are presenting the Fakuma Innovation Award. It's intended to furnish ground-breaking impetus for the



plastics processing industry in technological, environmental as well as economic terms. Companies are offered an international platform on which to present their latest innovations to an interested specialist audience, and to showcase their innovative strength. Entrants can submit their projects in one of the six categories including injection moulding, extrusion, recycling, tool and die making / thermoforming, compounding and materials, as well

as plastic technology enablers (peripheral equipment). In this way, the competition reflects the entire value chain for plastics technology – from materials and processing methods, right on up to ancillary technologies. As an important condition of entry, it must be possible to showcase the submitted project live at Fakuma 2026 – as a production-ready product, as a working prototype or as a live demonstration of a technology. Participation is free of charge. Entries can be submitted online up through the 6th of September, 2026. All entries will be reviewed and assessed by an independent expert jury. The winners will be honoured at an award ceremony on the first day of the trade fair.

2026 Highlight: Presentation of the First "Paul Eberhard Schall Medal"

"We're looking forward to a very special Fakuma anniversary event where professional networking, discussion and knowledge-sharing join forces with the exhibition to create a valuable all-round package," says Bettina Schall. "Of course we'll also



look back at how it all began 45 years ago. But above all we're looking to the future and focusing on solutions that will help us tackle the challenges currently faced by the industry." For example, the third edition of the "Fakuma Round Table" discussion series will focus on the topic of "Building on Our Strengths – How is the European Plastics Industry Enhancing its Resilience?". The presentation forum will provide suppliers as well as users with inspiring, forward-looking ideas. All in all, the trade fair's extensive range of topics provides the plastics processing industry with vital support in remaining successful on the market. Last but not least, Fakuma 2026 has yet another surprise in store: "To mark this year's anniversary edition of Fakuma, we,



as the trade fair promoters, will present the Paul Eberhard Schall Medal for the first time to a company that has played a pioneering and influential role in the industry," says Bettina Schall. "We want to acknowledge the company's exceptional techno-

logical standing in the further development of plastics processing, as well as its close ties to our trade fair organisation."

P.E. Schall GmbH

www.fakuma-messe.de

Integrated Process Technologies and Lifecycle Services

PiovanGroup will participate in the 30th Fakuma international trade show for plastics processing, taking place October 12–16, 2026, at Messe Friedrichshafen, Germany. The Group will exhibit in Hall A3, Booth 3102, where its Piovan, Piovan Fdm, Pelletron, and Thermal Care brands will showcase an integrated portfolio covering conveying, dedusting, drying, dosing, quality control, industrial cooling, temperature control, process supervision, and lifecycle services.

"We see the injection molding market in Germany and Central Europe becoming increasingly focused on measurable operational performance. Processors are looking for solutions that can improve energy efficiency, production consistency, material quality, and traceability while integrating effectively with their existing operations," said Paolo Nicosia, Managing Director Business Unit Polymers – Sales at PiovanGroup. "Fakuma gives us the opportunity to discuss these priorities directly with customers and demonstrate how our latest technologies can address them across the entire production process."

Key Fakuma Innovations for Greater Efficiency, Quality, and Process Control

The new E-Dryer is a compact, desiccant-wheel dehumidifier designed for small production batches. Its integrated hopper configuration minimizes the unit's footprint. It provides a stable dew point of up to -40°C and does not require compressed air or a



E-Dryer – Compact wheel-type dehumidifier

cooling water connection, simplifying installation and maintenance.

Designed for central conveying systems operating under permanent vacuum, the new Multilink automatic coupling station supports configurations with up to



Multilink – Automatic coupling station for permanent central vacuum systems

27 inlets and 20 simultaneous outlets. Its modular design allows the system to be expanded as production requirements evolve. By automating source-to-destination connections, Multilink enables reliable changeovers without manual intervention.

For the production of plastic medical devices and pharmaceutical packaging, Quantum Med combines high-precision gravimetric blending with a design optimized for cleanability and rapid material changeovers, while supporting compliance with Good Manufacturing Practice (GMP) requirements. Easily removable components, stainless steel contact surfaces, and integration with Piovan's Winfactory 4.0 process supervision software support error-proof setup and batch traceability.

The Accuchiller NQ Series is Thermal Care's new generation of portable and packaged industrial chillers, integrating a compact footprint, low-GWP refrigerants, PLC-based control, high-performance scroll compressors, and compact microchannel condensers into a single system.

Integrating Global Innovation Through the Expertise of Piovan, Piovan Fdm, Pelletron, and Thermal Care

Under the theme Integrating Global Innovation, PiovanGroup will also showcase the following technologies at its booth in Hall A3, Booth 3102:

- Piovan's HandlinkEvo, a manual coupling station featuring RFID identification and LED operator guidance to support error-proof operation;
- Piovan Fdm's FG200 Series, a configurable range of vacuum receivers featuring different filtration systems for free-flowing granules, flakes, and microgranules;



Quantum Med – High-precision gravimetric blender for medical applications

- Pelletron's XP15 DeDuster®, designed to remove dust and streamers from plastic pellets in plastics manufacturing and compounding applications;
- Piovan's Modula, a multi-hopper drying system that independently adjusts airflow and operating parameters for each connected hopper;
- Thermal Care's Easytherm range for temperature control, including the pressurized Easytherm EP and open-system Easytherm EW models; and
- Piovan's Winfactory 4.0, process supervision software supporting automatic recipe management, batch traceability, KPI monitoring, and long-term data retention.

Furthermore, the medical technology area will feature the DPA compressed-air dryer in a medical configuration, paired with MoistureMed for moisture measurement, as well as a Pureflo filterless vacuum receiver combined with Ryng for real-time monitoring of material consumption and production throughput.

For recycling applications, Piovan will showcase InspectaBe for benzene detection and VOC Minder for real-time, in-line monitoring of volatile organic compounds (VOCs).

PiovanGroup will dedicate a specific area of its booth to the Services and support available throughout the

equipment lifecycle. Services delivered locally include installation and commissioning, on-site operator training, technical help desk support, rapid spare parts delivery, preventive and predictive maintenance, instrument calibration, and equipment overhauls.

"Being close to our customers means being able to support them wherever they operate, with the right expertise at every stage of a project. Through Piovan GmbH, our team of 40 specialists provides sales, service, and engineering coverage throughout Germany—from application analysis and system design to commissioning, maintenance, and long-term optimization," said Stefan Viehweg, General Manager at Piovan GmbH. "This local presence, established in 1988, allows us to respond quickly and build lasting partnerships based on trust and technical excellence."

Fakuma will also provide the setting for the presentation of PiovanVista, the evolution of SmartForesight, Piovan-Group's cloud-based predictive maintenance service. In addition to cloud-based asset condition monitoring, continuous remote diagnostics, machine health analysis, and proactive alerts, the new release enables multiple devices to be connected to a single edge device while maintaining the highest level of cybersecurity. Its enhanced user interface also makes it easier to visualize, interpret, and understand the behavior of monitored systems.

Pelletron Demo Days: Live Dedusting Tests During Fakuma Week

In addition to the equipment on display at Fakuma, Pelletron Europe will open its Bodnegg facility to visitors by appointment during Fakuma week. Located approxi-



*Accuchiller NQ Series –
Portable & packaged industrial chillers*

mately 20 minutes from the Friedrichshafen exhibition center, the facility will host live dedusting tests in Pelletron's laboratory using either customer-supplied materials or selected materials already available on-site.

Advance booking is required.

PIOVAN S.p.A.

www.piovan.com

Fakuma 2026: A3-3102

Save Material, Ensure Quality, Control Processes Intelligently

At Fakuma 2026 PROMIX Solutions will present innovative process technologies for mixing, foaming, cooling and process monitoring in plastics processing at Hall A6, Booth 6108. The focus will be on the proven PROMIX Microcell Technology for significantly reducing material consumption, as well as the Visco-P inline viscometer for real-time monitoring and control of extrusion processes. A notable new feature is the availability of the Visco-P with a closed-loop control system and direct connection to metering systems. This allows raw material flows to be automatically

controlled based on the viscosity measured in the process. A typical example is the automatic control of the IV value in PET processing.

Up to 50% Material Savings Through Physical Foaming with Microcell

Since raw material consumption accounts for the largest share of the CO2 footprint in extrusion, material efficiency is becoming increasingly important. This is where PROMIX Microcell Technology comes into play: The precise addition of environmentally friendly atmospheric gases creates a fine microcellular

foam structure within the polymer. Depending on the application, this can reduce the product weight by 20 to 50%.

In addition to significant material and cost savings, Microcell Technology provides opportunities for product optimization. Depending on the application, properties such as reduced weight, improved thermal and acoustic insulation, enhanced shock absorption, and attractive visual and tactile effects can be achieved. The technology is successfully used in the production of films, sheets, foam-core pipes, profiles and cable jackets, and is suitable for nearly all common

polymers. A new field of application is the foaming of monofilaments. Together with an industry partner, PROMIX is currently developing foamed monofilaments for artificial grass applications. Microcell technology, which is available for both new installations and retrofits, has now become widely adopted worldwide. More than 350 industrial Microcell systems are already in successful use, and numerous machine manufacturers integrate the technology into their equipment as standard.

Setting New Standards for PET Foams and Foam Films

The PROCELL foam and nucleating additives have been expanded to include a new grade for PET foams. This is an endothermic blowing agent that does not release water and is therefore perfectly suited for PET. It enables fine cell structures and, at higher dosages, can also be used as a standalone foam additive.

After years of development and optimization, the PROMIX annular die for the efficient production of foam films made from PP and PS is now ready for the market. This innovative technology combines more than 20 years of experience in foam die design and sets new standards in the production of foam films. Thanks to the patented die design, foam density and film thickness tolerances can be further reduced. This leads to substantial material and cost savings as well as higher product quality. The innovative flex-lip design enables precise and reproducible adjustment of film thickness. Even when the die is opened and closed, the set lip geometry is maintained, eliminating time-consuming readjustments and significantly reducing setup times.

Measuring, Monitoring, and Controlling Viscosity in Real Time

The increasing use of recycled materials and raw materials from



The "Visco P" inline viscometer is now available with a complete control loop and, when combined with a dosing unit, enables the control of an additive based on the viscosity measured during the production process

various sources poses ever-greater challenges for extrusion plants. Fluctuating material qualities make it difficult to maintain consistent product quality and stable processes. With the Visco-P inline viscometer, PROMIX offers a solution for continuously monitoring the melt directly within the production process. The system measures the actual viscosity under real processing conditions directly in the melt stream, without a bypass and without material loss. The maintenance-free measuring module reliably homogenizes the melt and prevents clogging, deposits, or material degradation. This makes the system particularly suitable for recycled materials, filled compounds, and shear-sensitive materials.

At Fakuma, PROMIX will demonstrate the automatic control of the intrinsic viscosity (IV) value during PET extrusion. If the measured IV value falls below the specified setpoint, the system automatically

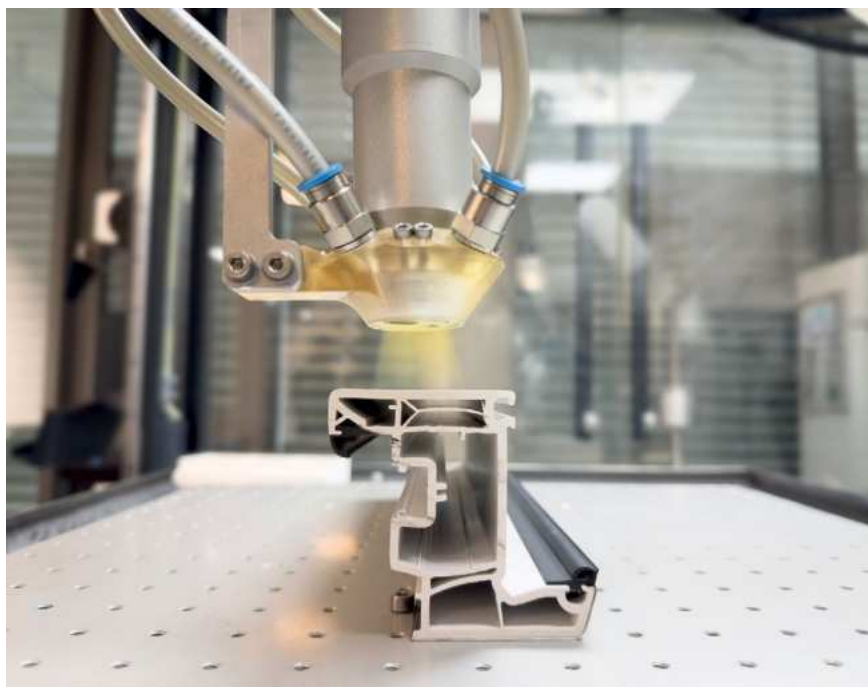
controls the dosing of an IV enhancer until the desired melt quality is restored. The same principle can also be applied, for example, in PP recycling through the metered addition of suitable chain extenders. Additional trend analyses, statistical functions, and reporting features enable comprehensive documentation of process data. User-definable thresholds automatically trigger warning messages in the event of deviations and assist the plant operator in quickly optimizing the process. The Visco-P is compatible with all common extruder types and most thermoplastic materials and can be easily integrated into existing systems. All standard communication interfaces are available for integration into modern production environments and Industry 4.0 concepts.

Promix Solutions AG

» www.promix-solutions.com

Fakuma 2026: A6-6108

Surface Finish Determines Process Success



RD1004C: Rotating nozzle for the environmentally friendly coating of wide plastic surfaces and profiles to improve adhesion during bonding (Pictures, Copyright: Plasmatrete GmbH)

The plastics industry is facing ever-greater challenges due to rising quality requirements, new material combinations, the growing use of recycled plastics, and ongoing cost pressures. Often, a material's surface properties determine the quality and reliability of subsequent processes. At Fakuma, 2026 Plasmatrete will demonstrate how modern plasma surface treatment can address these challenges in Hall A1, Booth 1320.

In many applications, plastics' natural surface properties are insufficient to ensure stable production processes. Insufficient adhesion can lead to quality issues during bonding, printing, painting, coating, or injection molding. At the same time, the demand for efficient, reliable, and flexible manufacturing processes is increasing.

Plasma surface treatment enables the targeted activation, cleaning, or functional coating of plastic surfaces. This improves adhesion properties and reliably prepares materials for subsequent production steps.

Plasma for Demanding Plastics Applications

At Fakuma, Plasmatrete will present solutions for industrial applications throughout the plastics value chain.

Visitors will gain insights into current applications in plastics processing and learn how plasma supports stable, reproducible processes. Plasmatrete's entire technology portfolio – from atmospheric-pressure plasma to low-pressure plasma – is designed to deliver process-controlled, reproducible results. The focus is not on the technology alone, but on the customer's specific needs and the right solution for each application.

Fakuma Highlights: Openair-Plasma and AURORA-Plasma

A key focus of the trade show presentation will be Openair-Plasma technology. This technology is used for the automated, in-line treatment of surfaces directly within the production process. On display will be plasma activation to improve adhesion properties, as well as the

new RD1004C plasma jet. This rotary jet applies coatings of environmentally friendly adhesion promoters to wide plastic surfaces or profiles – such as window profiles – to ensure better adhesion during bonding. Plasmatrete's atmospheric pressure plasma portfolio includes a wide variety of jet heads, plasma jets, generators, and other system accessories. This enables precise addressing of economic requirements and a broad range of industrial applications, from simple pretreatment tasks to demanding, fully automated, 24/7 series production.

Additionally, Plasmatrete will present a system from its new AURORA-Plasma product portfolio for the first time at Fakuma. This system operates under low-pressure conditions with 2.45 GHz microwave excitation in a vacuum process chamber. This enables surface modification for complex 3D geometries. It is particularly suitable for applications in medical technology, lightweight construction, and electronics. Different process gases and gas combinations can be used to tailor cleaning, plasma etching, and activation processes specifically to the material, component geometry, and application.

One example is the targeted, batch-process treatment of products made from high-performance polymers such as PEEK, PTFE, FEP, and PEBA. Increasing the surface energy allows coatings, adhesives, and lubricant systems to adhere more effectively without subjecting sensitive component geometries to thermal or mechanical stress.

At Plasmatrete, reliable process control is as important as having the

right plasma technology for each application. To this end, the company has developed the PCU (Plasma Control Unit) in the past. The PCU monitors and regulates key process parameters and detects deviations in the plasma process early on. This ensures consistent treatment results for both Openair-Plasma and AURO-RA-Plasma. Consequently, users gain greater transparency into the ongoing process and a better foundation for stable, documentable production workflows.

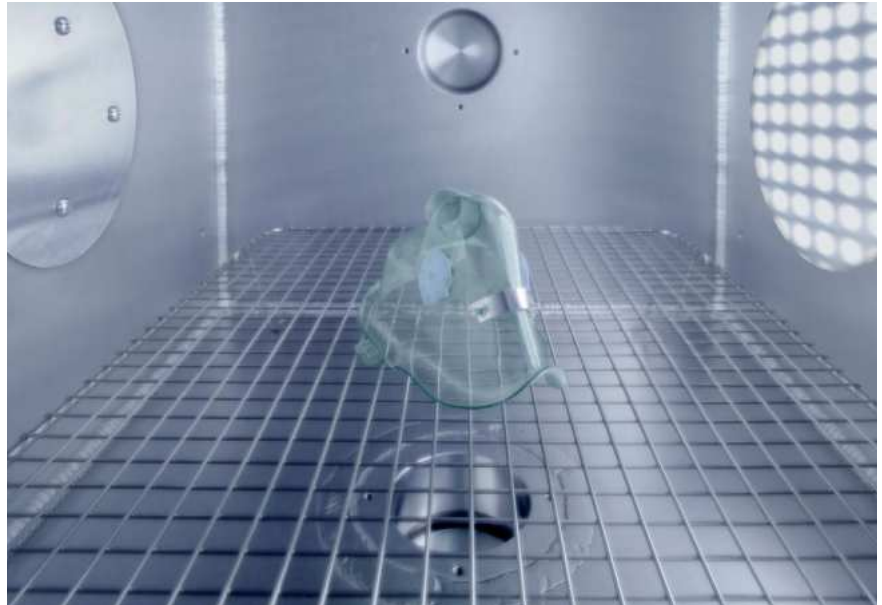
Experience Plasma Live and Test Your Own Components

Another highlight of the Plasmatreat booth is the live plasma demonstration. There, visitors can experience the effects of plasma for themselves. They can bring their own components or material samples to evaluate with application specialists on-site.

Concrete examples demonstrate how plasma works on surfaces and how the wettability of various plastic materials can be enhanced. Various analytical methods can be used to make the effects of plasma treatment visible. This transforms technical possibilities into tangible solutions for real-world applications.

Focus on Sustainability and Recycling

As the importance of recycled plastics increases, so do the de-



AURORA-Plasma for the surface treatment of medical products using a low-pressure process

mands place on their further processing. Different material compositions can complicate printing, bonding, or coating processes.

Plasma technology can activate and prepare surfaces for subsequent process steps. In certain applications, it can replace chemical or mechanical pre-treatment methods. This improves process reliability and contributes to more resource-efficient manufacturing.

The Right Process for Every Challenge

"The requirements for plastic surfaces are becoming increasingly specific. With our broad technology portfolio, we can address a variety of challenges and select the most

cost-effective process for each application," says Norman Haas, Sales Manager for Germany at Plasmatreat GmbH.

Visitors to Fakuma 2026 are invited to discuss their current challenges directly with Plasmatreat's application experts and experience the technologies firsthand.

Plasmatreat GmbH

 www.plasmatreat.com

Fakuma 2026: A1-1320



Plasma activation of plastic surfaces for improved adhesion properties

More Recycling, Fewer Process Steps

At Fakuma, KraussMaffei Extrusion will present the new ZSA UltraCycle, a side-feed system for twin-screw extruders developed specifically for recycling. It enables the direct and reliable processing of light, low bulk-density materials such as plastic flakes and fibers without additional pre-compaction. The integrated compaction of the material allows multiple process steps to be combined. This simplifies the recycling process, reduces energy consumption and capital expenditure, and can significantly increase the cost-effectiveness of processing.

The ZSA UltraCycle is specifically designed for fluffy recycled materials that pose challenges for conventional feeding systems due to their low bulk density of 10 kg/m³ or more and their high volume. These include, for example, thin-walled flakes, film scraps, or plastic fibers from consumer waste, as well as fibers from textile recycling. Typical materials include PET, (LD)PE, and PP flakes, as well as fibers and fabrics made of PA and polyester. Although the twin-screw extruder used has sufficient processing capacity, the material feed often limits the achievable throughput with these materials. The ZSA UltraCycle creates the conditions necessary to reliably utilize the extruder's existing processing capacity.

Directly into the process—without any additional pretreatment

The new ZSA UltraCycle compacts the lightweight and the low-bulk density recycled materials during feeding, enabling continuous and reliable feeding of the twin-screw extruder. This eliminates the need for additional pre-treatment steps such as compacting or agglomeration. At the same time, material feeding, melting, com-



The new ZSA UltraCycle side feeder from KraussMaffei Extrusion enables the direct and reliable processing of lightweight and low bulk-density recycled materials such as plastic flakes and fibers which were previously considered difficult to feed and not economically viable for recycling

pounding, degassing and filtration can be combined in one continuous process. This reduces the number of process steps and lowers both equipment and energy requirements.

Efficient compaction, flexible screw design

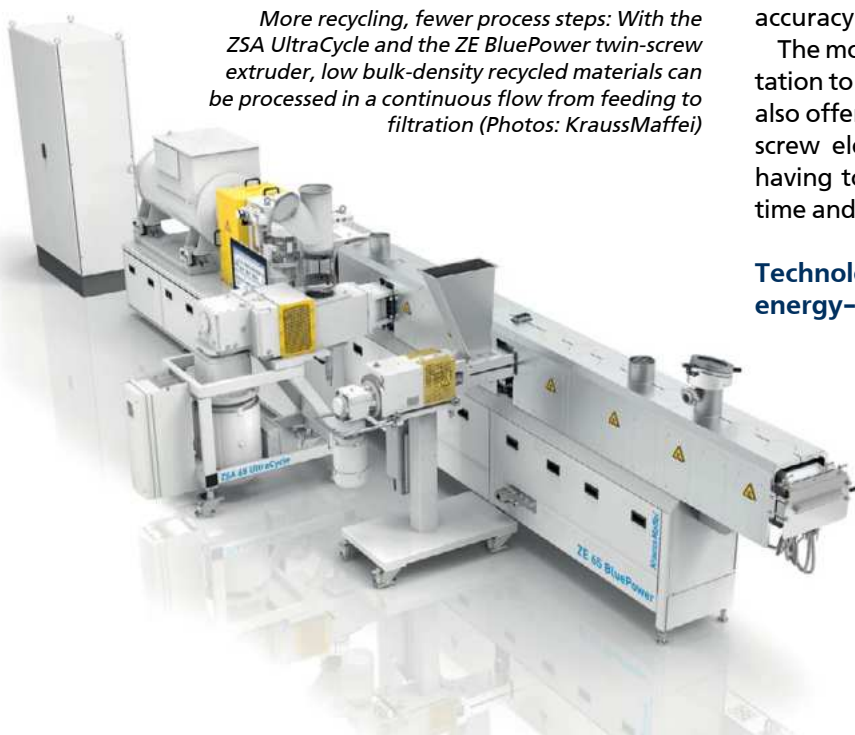
At the heart of the newly developed side-feeding system are two screws, whose special design ensures efficient compaction of the material. This allows even large quantities of light recycled materials with a low bulk density to be reliably conveyed into the feed zone of KraussMaffei Extrusion's ZE BluePower twin-screw extruder without compromising gravimetric dosing accuracy. The result is consistent throughput, high recipe accuracy, and stable process control.

The modular screw design also allows for flexible adaptation to different materials and applications. The design also offers advantages when it comes to wear: Individual screw elements can be replaced selectively instead of having to replace the entire screw. This reduces downtime and lowers maintenance and spare parts costs.

Technology Center confirms energy-saving potential

Trials conducted at the KraussMaffei Extrusion Technology Center in Laatzen/Germany confirm the potential of the new solution. By eliminating additional pre-compaction steps and enabling the direct processing of low bulk-density recycled materials, energy consumption and operating costs can be significantly reduced. At an exemplary throughput of 1,000 kg/h, this results in potential savings of up to 400,000

More recycling, fewer process steps: With the ZSA UltraCycle and the ZE BluePower twin-screw extruder, low bulk-density recycled materials can be processed in a continuous flow from feeding to filtration (Photos: KraussMaffei)



kWh of electricity, or approximately 60,000 euros per year, assuming an energy price of 0.15 €/kWh.

With the ZSA UltraCycle, KraussMaffei Extrusion makes the processing of lightweight and high-volume recycled materials easier, more efficient, and more cost-effective. The new solution reduces the number of pro-

cess steps and energy consumption, thereby opening up additional potential for recycling materials that were previously difficult to process.

KraussMaffei Extrusion

➔ www.kraussmaffei.com

Fakuma : Hall A7, Booth 7303

New Competitive Advantage for Plastics Processors

At Fakuma in Friedrichshafen (October 12 to 16, 2026), LEHVOSS is putting the spotlight on a dimension of its Smart Resourcing concept that currently decides who wins orders for many processors: price. In typical projects, customers save 10 to 20 percent on material costs with Smart Resourcing – with no change in quality, security of supply, or the technical service they are used to.

This is made possible by a core principle of Smart Resourcing: LEHVOSS draws on a portfolio of proven, mature compound formulations built up over decades. What has proven itself in countless applications in the market does not have to be redeveloped for every project. That reduces development effort and project lead times – and this advantage goes straight into the price. The price advantage is created not in the material, but in development.

"For Lehmann & Voss, this is a new business field – not a change of course," says Harald Hunke, Commercial Director Europe, LEHVOSS Compounds. In the high-end segment of high-performance compounds (LUVOCOM®), the company is the global leader and will continue to expand this position. In engineering and recycle-based compounds (LUVOTECH® and LUVOTECH® eco), LEHVOSS has likewise achieved a leading position in recent years. This is precisely what the new offering draws on: the formulation portfolio that makes attractively priced solutions possible today is the product of decades of highly demanding development work.



Work light with thermally conductive plastic housing

"Our customers are facing tough international competition. They are fighting – and we are fighting at their side," Hunke continues. "That is why we offer proven compound quality at prices that hold their own in global comparison. This applies to running applications, where switching materials now pays off, as well as to new projects – where our customers decide for themselves whether the advantage goes into the price or into better material properties for the same budget."

Blowing agents – less weight, shorter cycles, lower energy costs

Just how far Smart Resourcing extends into the processing stage is demonstrated by the blowing agent masterbatches of the LUVOBATCH® product family. In injection molding applications they reduce component weight by up to 25 percent without

compromising properties such as impact resistance or stability.

Product highlights and exhibits at the trade fair booth

The Compounds business unit of LEHVOSS will once again present itself at Fakuma 2026 as a pioneer of innovative polymer solutions in the spirit of Smart Resourcing. The trade fair presence centers on real-world applications that impressively demonstrate the performance of the LUVOTECH®, LUVOTECH® eco, and LUVOCOM® grades used.

Work light: sustainable high-performance compounds for the circular economy

A further exhibit is a work light made of LUVOTECH® eco TC, the sustainable product line of thermally conductive plastics. With a thermal conductivity of up to 18 W/mK and a carbon footprint reduced by up to 60% compared with virgin material, these materials are ideally suited to demanding applications in the lighting industry and in thermal management. The sustainable compounds – produced from mechanically recycled raw materials using 100% green electricity – help companies meet the requirements of the European Green Deal and future circular economy regulations today. At the same time, they enable resource-saving, economical, and high-performing product solutions for modern technical applications.

Lehmann&Voss&Co. KG

➔ www.lehvoss.de

Fakuma 2026: B1-1109

Laboratory Services, Compounds and Digital Tools

At Fakuma, Meraxis will present its expanded portfolio to an international trade show audience for the first time. Since the beginning of the year, the global polymer distributor has been producing its own compounds and offering material testing services. Meraxis has taken over the REHAU Group's compounding plant in Velen, North Rhine-Westphalia (Germany), as well as its accredited testing laboratories in Rehau, Upper Franconia (Germany). With these additions and its continuously expanding range of digital solutions, Meraxis now covers not only material procurement, but also formulation development, standards-compliant testing and compounding.

When plastics processors are looking for a material for a new application, they often require customized solutions. The process typically starts with formulation development, followed by the production of samples that are tested and documented in a series of trials. These steps generally involve several different service providers.

Compounds from Meraxis' Own Production

Meraxis has been producing customized compounds at its own plant since January 2026. With an annual capacity of 50,000 tons, the facility supplies plastics processors across a range of industries, including applications in the automotive and furniture industries, medical technology and household appliances. The PP portfolio includes mineral- and glass fiber-reinforced grades, elastomer-modified variants and flame-retardant solutions. Fillers such as talc, chalk, glass beads and glass fiber can be combined to achieve filling degrees of up to 70%. For flexible PVC, compounds are available with Shore hardness values ranging from A 45 to 98 and up to D 50, including crystal-clear, cold-flexible, flame-retardant and blowing-agent-containing vari-

ants. The portfolio also includes TPEs, ABS, SAN, ASA, PA, PS, PC, PMMA, HDPE, LDPE and PP/PA blends. The plant processes both PIR and PCR recyclates, with recycled content of up to 100% of the polymer component depending on requirements. Emission-optimized variants are also available on request.

Comprehensive Testing Methods and Recognized Standards

Before a product made from a new material enters series production, it must undergo the relevant testing – and the requirements are becoming increasingly stringent. A growing number of customers, including automotive manufacturers, require proof of compliance with their own OEM specifications. In the packaging industry, statutory recycled-content quotas are increasingly driving the switch to recycled materials. Since the material properties of recyclates tend to fluctuate more widely, the need for testing and validation is also increasing. The Meraxis laboratory network offers more than 500 testing procedures, including 64 accredited methods in accordance with DIN EN ISO/IEC 17025:2018. Across approximately 1,250 m² of laboratory space, its capabilities range from chemical analysis and physical-mechanical testing to weathering and climate testing, microscopy and surface characterization. Plastics, compounds, composites, recyclates and coated components can all be qualified.

Digital Tools Along the Value Chain

Alongside the Meraxis team, deep-tech company Polymerize will also be represented at the Fakuma booth. Through Polymerize, Meraxis customers and partners have access to a materials informatics platform. The AI-supported solution evaluates experimental and production data, identifies correlations between formulations and properties,



Dominic Tilgner, Director Advanced Materials and Applications: "We bring together raw material expertise, material development, compounding, and accredited material and component testing, shortening the path from initial idea to finished product. Processors decide for themselves which of our capabilities they want to use. By combining several steps with Meraxis, they have fewer points of contact to coordinate and can save time and costs with every interface eliminated."
(Source: Meraxis)

and recommends formulations and process parameters. The software can accelerate formulation development while reducing development costs and resource requirements, helping products reach market readiness faster.

Meraxis has been continuously expanding its digital offering for several years. Its customer portal, for example, brings together order and delivery information, provides CO₂ footprint reports for materials and transportation, and suggests recycle alternatives with lower CO₂ emissions. The "Track & Trace" function also allows deliveries to be tracked in real time, providing greater transparency across the supply chain.

Meraxis

► www.Meraxis-group.com/
Fakuma 2026: A6-6323

New Atmospheric Plasma Solutions at Fakuma

Ferrarini & Benelli will be exhibiting at Fakuma, one of Europe's leading events for plastics processing, bringing together professionals and companies active in injection moulding, extrusion, thermoforming, raw materials, machinery, surface treatment and automation.

At the show, Ferrarini & Benelli will present its latest innovations in atmospheric plasma treatment, a technology designed to improve surface properties and enhance adhesion in industrial processes.

The solutions on display will include In Air Plasma, featuring a combination of nozzles for treatment distances of up to 40 mm, In Air Plasma Spark, designed for applications with treatment distances of up to 80 mm, and In Air Plasma XL, designed for distances ranging from 25 to 70 mm.



These technologies provide flexible solutions for different materials and process requirements, helping to improve adhesion, surface cleanliness and overall performance before subsequent processes such as bonding, printing, coating or painting.

The company's cobot (collaborative robot) will be showcased: the cobot is able to reproduce the speed and power conditions of any customer's production line, in order to evaluate the best settings to achieve flawless bonding. In our laboratory, we specialise in substrate testing and can customise our systems to fit the customers' requirements.

Ferrarini & Benelli
www.ferben.com
 Fakuma: A7-7503

Focus on Efficiency and Flexibility

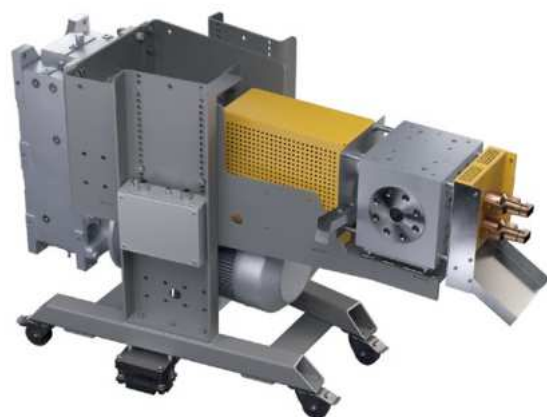
MAAG Group, a manufacturer of processing systems for the plastics industry, will present new solutions for polymer processing at this year's Fakuma in Friedrichshafen, Germany. The company will showcase exhibits aimed at higher process reliability, energy savings, and flexibility.

New extrex⁶ EC Gear Pump for Rigid PVC Extrusion

With the extrex⁶ EC, MAAG presents the first gear pump specifically

designed for the continuous conveying of rigid PVC (polyvinyl chloride). The new development addresses the thermal sensitivity of the material through a gap-free design without dead spaces. This effectively prevents the material from sticking and stagnating in the pump, which significantly reduces thermal stress and counteracts the risk of degradation.

The uniform, pressure-stable conveying relieves the extruder during



New extrex⁶ EC for conveying rigid PVC

operation. Depending on the application, this allows either material throughput to be increased or, at a constant throughput, energy sav-



The PURITY CONCEPT V laboratory system inspects and analyzes pellets, flakes, and test plates

ings of up to 50% to be achieved in the extruder. In addition, the design enables optimized temperature control in the melt process. Since this lowers the thermal stress on the material, the use of expensive stabilizers can be partially reduced, representing a direct economic advantage for the processor.

PRIMO 60 E Strand Pelletizer for Flexible Production

As another exhibit, MAAG is showing the field-proven PRIMO 60

E strand pelletizer. This machine was designed for the flexible processing of a wide variety of polymers. It is aimed particularly at manufacturers of masterbatch and compounds, as well as processors of specialty polymers, whose daily production routine includes frequent product changes, smaller batches, and varying material properties.

Fast cleaning, easy accessibility, and short tool-change times were the primary focus during design. Product Manager Alexander Helm explains the approach: "In masterbatch and compound production today, maximum throughput is not the only factor that determines cost-effectiveness. It is equally important how quickly a system is ready for production again after a product changeover. With the PRIMO 60 E, we offer users a flexible pelletizer tailored precisely to these requirements."

Fast Sample Inspection with the PURITY CONCEPT V

In addition to the conveying systems, MAAG Group will present the PURITY CONCEPT V offline testing system from SIKORA at the booth. The system is used for random sampling and analyzing pellets, flakes,



PRIMO 60 E, strand pelletizer for maximum production flexibility

and test plates. Using an optical camera, it detects contamination such as black or colored specks and discoloration from a size of 50 µm. The analysis takes less than a minute and directly delivers a test certificate and an HSV color map of the detected color deviations, contributing to the assurance of product quality.

MAAG Gruppe

 www.maag.com

Fakuma 2026: A6-6202

Smart Solutions for the Plastics Industry

Always synonymous with research and technological innovation, Moretto is a leading company in the development of automation systems for the plastics industry, confirmed by 171 international patents. This expertise, developed over 45 years in business, will be showcased in the form of exclusive technological innovations at the upcoming Fakuma trade fair.

Loadmatik – The advanced system for plastics material conveying

Loadmatik represents a revolution in the plastics material conveying. Loadmatik automatically recognises and applies the conveying parameters: once the source and destination are specified, the system inde-

pendently calculates the parameters, regardless of the distance or quantity. Loadmatik consists of three exclusive technologies:

- The smart server One Wire 6 Plus monitors and manages conveying parameters. By interacting with the system's components, it automatically ensures maximum performance without the need for operator input.
- The X-Loader is an innovative receiver designed for next-generation conveying systems. It provides active support for the automatic detection of load values, recognising and adjusting system parameters in real time using integrated "Sentry+" technology.
- KruseiControl. A dynamic granule speed control system that actively manages operating pressures, adapt-

At Fakuma the visitors will have the chance to experience first-hand the extraordinary efficiency of Loadmatik seeing a full-scale conveying system in action.

Delphy – The manual manifold with RFID control

Thanks to stainless steel construction of the connectors, Delphy manual manifold guarantees safe, contamination-free transport. Delphy incorporates an RFID recognition system, which checks the correct source-to-destination connection every second. A system of coloured flashing LEDs assists the operator with configuration. This automation eliminates the risk of error, ensuring significant advantages in terms of traceability, verification and validation of the material.



Delphy – The manual manifold with RFID control

X Comb dryer – Performance and continuous innovation

The super compact X Comb dryers' range has been recently expanded with the introduction of four new models – from X Comb 17 to X Comb 20 – designed for guaranteeing high-quality dehumidification regardless of environmental conditions and processing techno polymers at production rates of up to 60 kg/h.

The new models are fully electric and guarantee:

- An ultra-compact footprint of just 0,6 mq.
- New functional and design innovation.
- High-quality performance.

Safe storage and always tracked materials

To preserve the physical properties of plastics, prevent contamination and guarantee a defect-free finished product, it is essential to act at the origin of the transformation process, i.e. to ensure proper storage. Moretto offers a complete range of storage solutions that ensure a safe and fully traceable workflow. Each batch is identified and monitored from arrival at the plant to the processing machine.



New X Comb dryer

ing the material's conveying speed to actual operational needs.

Self-learning algorithms continuously analyse operating data such as granule speed, operating pressures, pipe emptying time and receiver loading level to manage the entire path of the granules.

Mowis: the scalable and modular system supervisor

All Moretto systems can be connected to Mowis, the integrated, self-configuring supervising system that simplifies the management of complex system and provides an immediate overview of the plant status. Through Mowis, operators can monitor equipment status, track material usage and manage production batches in real time, as well as modify process parameters. The system records comprehensive historical data, schedules workflows, and generates real-time performance reports. Moreover, it supports bidirectional communication with existing MES (Manufacturing Execution System) solutions via the standard OPC UA protocol. Mowis is built on modularity and scalability, and it can be extended over time by adding modules and implementing existing ones.

Moretto S.p.A.

► www.moretto.com

Fakuma 2026: B3-3208

#5-2026

RECYCLING

Regular Section
in EXTRUSION INTERNATIONAL Magazine



Mix of Technologies Required to Recycle Engineering Plastics

A mix of recycling technologies is necessary to ensure that a broad variety of plastics can be recycled. Unlike high-volume commodity plastics such as the polyolefins used in packaging, specialty plastics often require recycling technologies tailored to their specific properties and applications. This applies, for example, to compounded polyolefins, polyurethanes and polyamides. These materials are designed for demanding uses, such as automotive applications, where standard plastics often do not provide the required performance. This is the subject of a recent article by BASF researchers in the prestigious U.S. academic journal *Accounts of Materials Research*.

Achieving circularity for plastics from heterogeneous waste streams requires two things: scalable sorting processes and the right mix of recycling technologies. The suitable approach depends on the material itself as well as on the composition of the waste stream. "There is not one single standard technology for recycling engineering plastics," emphasized lead author Dr. Bernhard von Vacano, head of the Plastics Circularity Research Program at BASF. "Instead, it is crucial to have an intelligent mix of various complementary technologies adapted to particular plastic waste streams. The aim is to produce high-quality recycled materials and achieve a closed loop for engineering plastics."

Various paths for plastic recycling

The most common technology is mechanical recycling, in which plastics are sorted, crushed and melted. This process is energy-efficient but does not work with all plastic types and requires clean and homogenous waste streams. Mechanical recycling is particularly well suited for packaging waste materials with large volumes of relatively pure polymers and limited amounts of additives. Nevertheless, quality and hygiene requirements can restrict the use of mechanically recycled materials in new packing products. There are limits to mechanical recycling for plastics used in technically demanding applications, as suitable waste streams are often scarce and plastic products frequently contain complex polymer compositions.

In contrast, solvent-based recycling is suitable for more complex waste plastics. In this process, a solvent is used to selectively dissolve, separate and clean one type of plastic. For example, polyamides can be recovered from scrap vehicles and used again in the manufacturing of new components.

Another important recycling technology is depolymerization. Here, plastics are broken down into their building blocks and put back together again. BASF researchers have developed loopamid®, an innovative



process that enables circular textile-to-textile recycling of polyamide 6. Waste textiles can thus be transformed back into polyamide fibers with the same high-quality standards as conventional polyamide 6. In early 2025, BASF started up its first commercial loopamid production facility at its Caojing site in Shanghai, China.

Plastics from very heterogeneous waste streams, which often end up in incineration plants, can be recycled in thermochemical processes, such as pyrolysis or gasification. These technologies require a lot of energy. In pyrolysis, the long-chain polymers of the plastics are broken down into short hydrocarbon chains, which can then be utilized again as a raw material (pyrolysis oil). Gasification produces syngas, which can be deployed as a chemical feedstock in production.

Supportive regulatory frameworks are key for the scale-up

Numerous BASF pilot projects have demonstrated that many recycling processes for polyurethanes and polyamides are technically feasible and can convert waste plastics back into virgin-quality feedstock. "However, two key conditions must be met before these technologies can be deployed at scale and to enable business cases for large scale investments. First, we need effective waste management systems that keep plastics in the loop over the long term. Second, policymakers need to provide clear and reliable regulatory frameworks that support recycling," said Dr. Jens Hamprecht, co-author of the publication and Vice President in BASF's Performance Materials division.

Plastics Recycling Remains a Long-Term Growth Market

Despite challenging market conditions, the EREMA Group remains focused on the ongoing development of its recycling technologies and committed to producing in Austria. Since 1983, the Group has sold around 9,200 systems and components with an annual global capacity for recycling over 26 million tonnes of plastic waste.

The EREMA Group defied the difficult market conditions in the 2025/26 financial year to post a positive result. To increase the percentage of recyclates in plastic products, the family-owned business continues to invest in research and development. Global demand for plastic is rising fast. As a result, the Group's management expects a sharp increase in demand for high-performance recycling technologies too. In addition, recycled plastic is also gaining importance around the world as a secondary raw material.

Profits despite lower revenue

For the third year in succession, the plastics recycling market finds itself under considerable pressure. It is having to cope with high energy costs, slack demand for recyclates and intense international competition. According to Manfred Hackl, CEO of the EREMA Group, these challenges are felt particularly by businesses based in Europe: "In Europe we have created a cost structure that puts industrial companies at an increasing disadvantage in the international marketplace."

The EREMA Group also felt the effects of current market trends. In the past financial year, which ended at the end of March, the recycling specialists posted revenue of EUR 235 million – a drop of 28 per cent compared to the previous year. "Many customers are postponing their investments," says Horst Wolfgruber, CFO of the EREMA Group. "We feel the effects of that straight away. That the EREMA Group was able to close the past financial year with a profit in these challenging mar-



Manfred Hackl (CEO) and Horst Wolfgruber (CFO) are leading the EREMA Group through a period of challenging market conditions. Although investment in the plastics recycling sector has fallen, the family-owned business posted a profit for financial year 2025/26 (Photos credit: EREMA Group)

ket conditions fills me with pride and gratitude. We achieved it thanks to our structure as a stable, family-owned business, to keeping a tight rein on costs and to the dedication of our employees."

Sharp rise in global demand for plastic

Because the EREMA Group operates internationally, it can compensate for the lower demand in Europe to some extent with orders from other parts of the world. Europe nevertheless remains the company's biggest market. "This is the traditional home of recycling," explains Manfred Hackl. That said, other regions are catching up: "Asia is making great strides and America is also gaining ground, chiefly with the recycling of production

The EREMA Group regularly invites international guests to its headquarters in Ansfelden/Linz, Austria, to demonstrate new solutions for plastics recycling and pass on practical expertise



waste. Africa is some way behind in fourth place, but it is here that we will see the sharpest rise in the demand for plastic, and therefore for recycling solutions, in the coming years."

According to the OECD, the global demand for plastic will triple, from 460 million tonnes in 2019 to 1.2 billion tonnes in 2060. If a greater percentage of this demand is to be met by recyclates, expansion of recycling infrastructure will be necessary, as will investment in high-performance recycling technology. Currently, the OECD estimates that in 2060 only 17 per cent of plastics will be recycled.

Technology is ready for plastics recycling

"Contrary to what is often believed, plastics recycling already works amazingly well for many applications," Hackl says. "The key question for the future is how we can keep more, and more demanding, material flows in the loop while constantly maintaining high quality."

When input materials vary enormously, robust systems are essential. Filtration, degassing and a thorough understanding of the process are central here. And it is precisely these that are the EREMA Group's greatest strengths. Says Hackl: "Our recycling systems' excellent decontamination performance guarantees the quality while their robustness ensures a consistent output. In addition, energy-efficient solutions keep our customers' operating costs to a minimum."

Ultimately, the circular economy is achieved when the material's design, collection, sorting, washing and extrusion are compatible and the recyclate is subsequently used in new products of equal quality. Thanks to the engineering partnership between EREMA and Lindner Washtech, customers receive a complete solution that is fully integrated, from the secondary feedstock to the resulting recyclate. The perfect dovetailing of the processes improves the quality, throughput and cost-efficiency of the entire system.

The EREMA Group is also beginning to focus on new lines of business. In October 2025, the company made an investment in BlockTexx®. The Australian pioneer has developed a process for extracting polyester and cellulose from blended fabrics – an important step towards recycling textiles. The PET fibre industry is three times as big as the PET bottle industry. Currently, only around one per cent of polyester is recycled.

Plastics recycling as part of a modern raw materials strategy

To increase the role of recycling in meeting the rising demand for plastic in future, a set of reliable rules is required that makes investment possible. Regulations such as those for packaging (PPWR) and end-of-life vehicles (ELV) in the European Union are important milestones. "The most important thing, however, is that the rules are clear, reliable and implemented consistently all over Europe," says Hackl. "If they are not implemented consistently, no one will invest. We need a standardised system to make recyclates more attractive. Only then will recycling be able to establish itself as part of a long-term raw materials strategy."

Important growth regions like China and India are also beginning to recognise the importance of the circular economy for supplying raw materials and staying competitive. Both countries are expanding their recycling industry with their own regulations and initiatives. The EREMA Group has been active in these markets for around three decades, founding a facility in Shanghai in 2001 and opening EREMA India together with Lindner Washtech in February 2026. The company also has sites in North America, South Africa and Thailand.

With its presence on the international stage and ongoing investments, the EREMA Group is well placed to profit from this growth.

EREMA Group

➔ www.erima.com

Much More than a Business Partnership

Following a major fire, Plastika Kosovo is back in production – with double the recycling capacity and a new washing line from technology partner Lindner Washtech.

A fire brought Plastika Kosovo's recycling operations to a standstill in spring 2024. Equipment and stored material were destroyed, production came to a halt, and around 40 jobs at the site in the Drenas Industrial Park were affected.* The new washing line has been running since December 2025 – and the plant is more capable than before. The foundation for this was the long-



The washing line supplied by Lindner Washtech covers the entire recycling process at Plastika Kosovo – from shredding through washing and drying to extrusion (Images copyright © Lindner)



The stationary single-shaft shredder Micromat 2000 reliably shreds the input material, creating the basis for stable downstream recycling processes



Thanks to its long-standing partnership with Lindner Washtech, Plastika Kosovo achieved a technologically sound restart of its recycling operations in a remarkably short time following the major fire. The new plant is designed for double the recycling capacity – at consistently high output quality

standing, trusting partnership with Lindner. Thanks to close coordination and fast decision-making on both sides, the new line was realised within a short time-frame: ordered in November 2024, commissioned in December 2025. For Plastika Kosovo, this meant significantly reduced downtime – customer relationships were maintained and jobs were secured.

A powerful fresh start

The new Lindner washing plant is designed for double the recycling capacity while delivering consistently high output quality. This allows larger volumes of plastic streams to be processed that had previously gone unused in the region. Equally important is the flexibility gained: the plant now handles a wider range of input materials, including more heavily contaminated fractions. This broadens Plastika's sourcing base and makes the company less dependent on the availability of individual supply sources.

The line delivered covers the entire process end to end, from shredding through washing and drying to extrusion. The stationary single-shaft shredder Micromat 2000 ensures consistently sized material and thus provides a stable basis for every downstream step. All components come from a single source and are matched to

one another: one point of contact, no interface losses, faster commissioning.

"The customised plant has significantly accelerated our reconstruction phase while at the same time creating a solid basis for our further development. Our close cooperation with Lindner Washtech shows what is possible when partnership goes beyond day-to-day business," say Ardit and Arian Shabani, Managing Directors of Plastika Sh.p.k.

"We don't see this project as simply the installation of a new washing line. It is a commitment to standing by our partner at a difficult moment," says Tomas Kepka, Sales Manager at Lindner Washtech. "Plastika is the first recycler in this region and has built something up over decades. The fact that this business continues is about more than one company's history – and that is exactly what we stand for as a family business."

* Source: Kosovo Investment and Enterprise Support Agency (KIESA), report on the fire at the Drenas Industrial Park, kiesa.rks-gov.net

Lindner-Recyclingtech GmbH

➔ www.solids-recycling-technik.de

24,000 Tons of Recycled Bottle-Grade PET Per Year

Installed at the Novatex facility in the Quaid-e-Azam Business Park near Lahore, Pakistan, the recoSTAR PET 215 art bottle-to-bottle recycling system supplied by Austrian recycling technology specialist Starlinger has been commissioned in November 2025.

PET producer Novatex Ltd. has expanded its product portfolio by investing in bottle-to-bottle recycling of collected post-consumer PET

bottles. "By producing bottle-grade recycled PET we want to support our partners PepsiCo, Coca-Cola and others to meet their circularity

targets. The produced rPET has all the necessary food-contact certifications and is being used by all major brands. In addition, the govern-

ment of Pakistan is pushing hard to eliminate single-use plastics and plastic waste,” said Rizwan Diwan, CEO at Novatex Ltd.

With the new Starlinger bottle-to-bottle recycling system, Novatex is able to produce up to 3,000 kg of food-contact rPET per hour, which amounts to an annual production output of more than 24,000 tons. Novatex sources the post-consumer PET bottles mostly from municipal kerbside collection across Pakistan.

The produced rPET chips are used in the company's own PET preform production or sold on the local and international market. Pakistan does not yet have a national mandatory recycled content quota for plastic packaging comparable to the EU's Packaging and Packaging Waste Regulation (PPWR); thus, brand owners – in Pakistan mainly PepsiCo – are leading the path for rPET inclusion.

Roadmap to reduce plastic waste

Studies and surveys estimate that Pakistan generates around 3.12 million tons of plastic waste annually, of which only 4 to 9 percent is recycled.¹ With plastic use increasing by 15 percent annually – largely driven by single-use products – and plastics making up almost 40 percent of the solid waste in the Indus river, the country is confronted with environmental and public health challenges.²

Pakistan's efforts to tackle plastic waste, however, are still evolving; a fully consolidated framework with binding national laws has not yet been established. In the last year, the country has moved from plastic bans and pilot initiatives in individual provinces toward a more coordinated national approach, but implementation remains uneven. In April 2025, the Government of Pakistan, together with the United Nations Development Programme and the World Economic Forum,

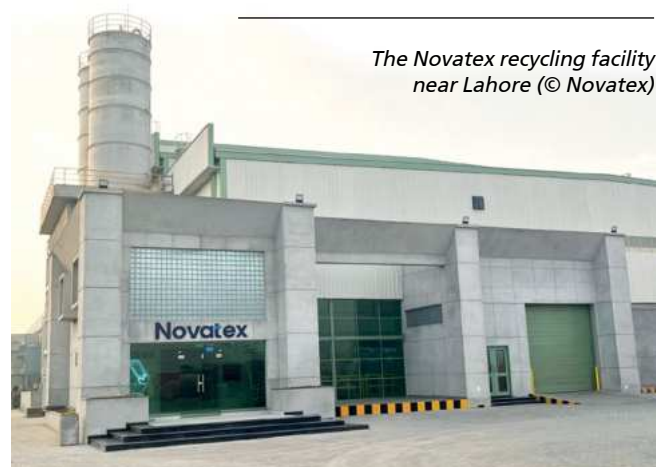


Starlinger's recoSTAR PET art bottle-to-bottle recycling system produces up to 3,000 kg food-grade rPET per hour (© Novatex)

launched the National Plastic Action Partnership (NPAP) Roadmap, which is currently the most important framework for plastics waste management on national level. The roadmap aims to reduce plastic pollution, improve waste collection and recycling, expand circular plastic solutions, integrate informal waste pickers, promote public awareness, and encourage sustainable packaging and business models.³

National ERP framework

To this effect, Pakistan is moving towards a national system to make companies responsible for the waste created by their packaging. Food and beverage companies, NGOs, recyclers and packaging producers have formed the so-called CoRE Alliance and, in 2025, joined government representatives in calling for a national Extended Producer Responsibility (EPR) framework. Under such a model, companies bear the cost of collecting, recycling and safely disposing of their packaging waste. The producer responsibility organizations for handling this, however, have yet to be established.⁴



The Novatex recycling facility near Lahore (© Novatex)

Starlinger recycling technology
Furtherstr. 47a,
2564 Weissenbach, Austria
www.recycling.starlinger.com

<https://www.gatronova.com/our-businesses#id-1>

¹United Nations Pakistan. "ILO and partners call for greener and more inclusive recycling systems on World Environment Day." UN Pakistan, 05.06.2026, <https://pakistan.un.org/en/316974-media-update-3-united-nations-pakistan-5-june-2026?utm>. Retrieved 27.07.2026

²UNDP. "National Plastic Action Roadmap launched by UNDP, Government of Pakistan, and World Economic Forum to Reduce Plastic Pollution in Pakistan." UNDP, 24.04.2025, <https://www.undp.org/pakistan/press-releases/national-plastic-action-roadmap-launched-undp-government-pakistan-and-world-economic-forum-reduce-plastic-pollution-pakistan>. Retrieved 04.07.2026

³Ibid.

⁴"Pakistan's plastic reform push hinges on integrating informal recyclers." Pakistan Today, 24.04.2026, <https://www.pakistantoday.com.pk/2026/04/24/pakistans-plastic-reform-push-hinges-on-integrating-informal-recyclers>. Retrieved 27.07.2026

New Plastics Recycling Regulations Drive Growth in Latin America

New regulations in Chile, Colombia and, most recently, Brazil are introducing mandatory recycling and extended producer responsibility targets, reshaping the economics of the plastics industry across the region. In Chile, Recupac, part of the Coipsa Group, demonstrates how advanced technology, process control and strategic partnerships can transform post-consumer plastic waste into high-quality recycled raw materials.

The Latin American plastics recycling industry is undergoing a major transformation, driven by a structural shift: the growing number of regulations requiring manufacturers and importers to return the plastic they place on the market back into the production cycle. In October 2025, Brazil enacted Decree No. 12,688/2025, regulating the reverse logistics of plastic packaging and establishing two key targets: a recovery rate, measuring the collection and proper treatment of plastic packaging, and a recycled content index, introducing a mandatory minimum recycled content of 22% from 2026 onwards, with non-compliance subject to fines of up to BRL 50 million.

Brazil is following a path already established by its neighboring countries. Since 2016, Chile has enforced the REP Law (Law No. 20,920), targeting a 32% plastic recovery rate by 2026, while Colombia adopted Law 2232 in 2022, requiring PET bottles to contain a minimum of 50% recycled content, increasing to 90% by 2030. The regional trend is clear: increasingly ambitious recycling targets and legally driven demand for recycled materials are creating new opportunities for companies such as Chile's Recupac and technology partners like Lindner Washtech.



From Waste Management to Material

Recupac, the waste management division of the Coipsa Group, has spent more than 35 years building its role in Chile's circular economy. The company serves approximately 500 customers and manages more than 150,000 tonnes of waste annually. Its latest milestone is its LDPE recycling facility in San Bernardo, with a production capacity of 500 tonnes per month, where recycled pellets already replace approximately 40% of the virgin resin used in new plastic film production.

"At Recupac, we play a well-defined role within Chile's circular economy by helping our customers become more competitive through integrated waste management focused on maximizing material value with full traceability and a circular approach," explains Macarena Hadad, Business Development Deputy Manager at Recupac. According to her, the LDPE project emerged from the realization that simply managing this material was no longer enough. "We saw an opportunity to go one step further by transforming

*Eugenio Bascuñan,
Industrial Manager at Recupac*

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Lindner Recyclingtech)*

it into a new recycled raw material capable of re-entering manufacturing processes."

The Key to Consistent, High-Quality Recycled

Transforming post-consumer plastics-heterogeneous, contaminated materials from highly variable sources-into consistently high-quality recycled pellets requires rigorous process control at every stage: from collecting materials directly from customers, through sorting and baling operations, to secondary quality inspection and the recycling line itself, including shredding, washing, drying and extrusion.

"The key is understanding that quality does not depend on a single processing step, but on the entire integrated process. Quality is built step by step through proper pre-sorting, efficient cleaning, process stability and close control of operating parameters at every stage.



And Lindner enables us to operate a highly efficient and stable washing process, which is essential when processing post-consumer materials, where contamination and variability are inherent challenges." Eugenio Bascuñan, Industrial Manager at Recupac

The washing stage creates a clean and homogeneous material stream that integrates seamlessly with the downstream Erema extrusion line, Lindner's long-standing technology partner in plastics recycling. "The quality of the final pellet depends on how well both processes work together. It is not simply about achieving excellent washing or extrusion individually, but about maintaining a fully integrated, continuous and controlled process from start to finish using state-of-the-art technology" he summarizes.

According to Recupac, the results are reflected in both product consistency and operational reliability.

"The implementation of this recycling line has represented a significant step forward. Today, we operate a far more stable process with higher cleaning efficiency, more consistent pellet quality and greater operational efficiency" says Bascuñan, emphasizing that these improvements provide greater confidence in meeting increasingly demanding customer and industrial application requirements.

Lindner Expands Its Presence in Latin America

Beyond the technology itself, both Recupac executives emphasize the importance of the close partnership established with Lindner throughout the project. "Local support has been essential. I would describe our collaboration with Lindner as one built on mutual cooperation and continuous support."

The Recupac project reflects a broader strategic direction at Lindner and Lindner Washtech, a spe-

cialist in plastics washing technologies that continues to expand its portfolio of solutions to meet the increasing quality requirements of recycled plastics.

To support this growth throughout the region, the company established Lindner subsidiary in 2025, with headquarters in São Paulo, Brazil, under the leadership of Frederico Hartmann.

The new subsidiary strengthens Lindner's regional presence by providing local technical support, project development, commercial assistance.

As the circular economy continues to expand and regulations increasingly promote the use of recycled content across Latin America, Lindner reinforces its commitment to serving as a strategic partner for the regional recycling industry.

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