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# PLASTISCOPE

The Official Journal of the Organization of Plastics Processors of India

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• January 2025

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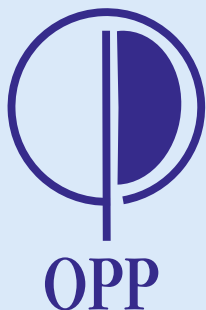
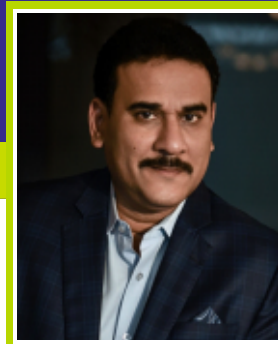
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# FROM THE PRESIDENT'S DESK

Mr. Pradeep Rathod



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Dear Members,

Greetings for the New Year 2025!

The Union Budget 2025 – 2026 will be presented by the Finance Minister on 1st February 2025.

I expect the following proposals to be introduced in the Union Budget 2025 – 2026:-

- Increase in the customs duty on the import of plastic products from 10% to 20%.
- Generating demand through income tax cuts, higher public spending and job creation by providing a thrust to small businesses.
- Reduction in personal tax on income up to Rs. 20 lakh to generate more demand and also slash the excise duty on fuel to cool down inflation.
- Government's thrust on public capex on physical, social and digital infrastructure to maintain the growth momentum.
- Ease of credit flow to MSMEs.
- Skilling and making life easier through presumptive tax mechanism for small businesses.

OPPI has organized visit to CIPET, Chennai and also to the plant of Shibaura Machine India Pvt. Ltd., Chennai on 11th April 2025. The objective of this visit is to ease the process of sourcing the Plastic Engineers / Technologists. CIPET conducts various courses to meet the requirement of Plastic Engineers / Technologists. I appeal to all members to participate in this visit and seize this opportunity of visiting CIPET, Chennai.

At Shibaura, the participants will be able to observe best practices in manufacturing and automation. They will also gain first-hand exposure to various innovative and good practices that augment the quality and adapt technology to suit the needs in India.

OPPI has also organized delegation to Qatar from 20th April 2025 to 24th April 2025. The advantages of establishing plastic processing factories in Qatar were mentioned in my December 2024 message.

With Best Wishes,

**Pradeep Rathod**  
President

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Editor: **DEEPAK LAWALE**





OPP

Organization Of  
Plastics Processors Of India

Delighted to inform you that OPPI is organizing a Business Delegation to Qatar from 20<sup>th</sup> to 24<sup>th</sup> April 2025.

OPPI has done a comprehensive study of the various Gulf Countries to ascertain the most favorable destination country to establish Plastic Processing Factories.

It has been observed that the following parameters make Qatar the most favorable country for establishing Plastic Processing units beyond the shores of India:-

**Qatar is located in the heart of the Gulf, at the intersection of three continents**

Population	3 million
GDP(PPP) per capita	-USD97,000 among the world's richest
Internet penetration	99%of total population among the world's highest
Natural gas production	170 billion m3 among the world's largest LNG exporters
Healthcare system	77.4 doctors per 10,000 population among the world's best
Credit rating	Aa2 (Moody's) QAR pegged to USD at a rate of 3.64

• **QatarEnergy** has the mandate for the supply /distribution of the products produced by its subsidiaries including QAPCO.

• **Qatar Free Zones (QFZ)** can support with the provision of infrastructure facilities and regulatory framework for establishment of the companies and businesses in Qatar Free Zone.

• **Cost of land and also the lease for the same.** QFZ starting lease rate for industrial land in Um Al Houl Free Zone site is Qatari Riyals10/sqm/-year. Lease duration 20-25 years.

• **Tariff of Power Supply.** QR 0.13/ kwh or ~3.6 US cents/kwh as per Qatar General Electricity and Water Corporation (Kahramaa) tariff rates for industrial consumers. Investors will enter into electricity and water supply / SPA agreement directly with Kahramaa. QFZ provides 11 KV / 50 Hz power supply connection at the battery limits of the allocated plot.

• **Minimum and maximum plot size.** Typical min. size: 10,000 sqm. approx., maximum plot area will depend upon project requirement and availability of developed land.



- **Availability of water and tariff for the same.**

Desalinated water (potable water quality) is supplied by Kahramaa. Water connection tie in point will be at battery limits of the plot. End user will enter in direct agreement with Kahramaa.

Kahramaa's current tariff for water is QR 5.4/ m3 or ~1.5\$/ m3.

- **Availability of storm water drainage system.**

Each plot has access / connection to potable water, foul domestic sewerage, fire water, storm water upon completion.

- **Availability of skilled manpower.**

Qatar has invested in the knowledge economy's four pillars to attract the best companies and brightest talent in the world.

Qatar has attracted companies like Google, Microsoft and Thales.

Knowledge-based economy is built on four pillars: human capital; digital infrastructure; an enabling regulatory environment; and a critical mass of existing innovation hubs and clusters. Qatar has created an economy that is capable of growing the industries of tomorrow.

- **Nearness to sea port with all infrastructure.**

Strategically Located: Qatar sits in the heart of the Gulf with access to GCC and the wider Middle East, and over 60% of the world's population within eight hours fly-time. Qatar Free Zones connect the investors to key global markets and supply chains through Qatar's award-winning air and seaports, which are both on the doorstep of Free Zones.

- **Availability of education, healthcare, residential houses.**

Ranked the safest country in the world with extremely low crime rates, coupled with world-class schools and universities, cultural attractions, great recreational facilities, and a global cuisine by leading restaurateurs from around the world.

- **Corporate Taxation Structure**

Qatar State tax obligations including withholding tax does not apply to free zone entities and there are no corporate tax filing requirements in the QFZ. QFZ entities currently enjoy a 20-year corporate income tax benefit, which may be extended subject to the approval of the Council of Ministers.

With respect to custom duties, as per QFZ Law, QFZ entities are exempted from custom duties when importing into the QFZ and exporting outside Qatar. However, goods and products exported from the QFZ to the local market within Qatar will be subject to applicable custom duties.

I write to cordially invite you to join the delegation. May I request you to confirm your participation through the attached registration form. For registration and further information, kindly contact the undersigned.

To defray part of the secretarial expenses, we are obliged to charge a "Delegate Fee (Per Person)" of INR 28,000 + 18% GST. This "Delegate Fee" is meant for meeting a part of the organizational costs only. All travel related expenses- Airfare/ Personal/ Local Travel-related, and others have to be borne by the delegates themselves.

**DEEPAK LAWALE, SECRETARY GENERAL** ORGANIZATION OF PLASTICS PROCESSORS OF INDIA



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## STUDY MISSION TO CIPET AND SHIBAURA MACHINE INDIA PVT. LTD., CHENNAI - FRIDAY 11<sup>TH</sup> APRIL 2025

### VISIT TO CIPET, CHENNAI

All Plastic Companies have to recruit persons with background in Plastics Engineering and Technology at different levels. Central Institute of Petrochemicals Technology – CIPET has state of the art laboratories. The centre is an ISO 9001: 2015 certified institution for its Academic and Technology Support Services and the Plastics Testing Centre is accredited by NABL as per ISO/IEC 17025:2005 for Quality Control and Testing of raw materials and products of plastics.

CIPET conducts Post Graduation Programmes in CAD/CAM; Under Graduate Degree Programme; Post Graduate Diploma Programmes; Diploma in Plastics Mould Technology etc.



### VISIT TO SHIBAURA MACHINE PVT. LTD., CHEMBARAMBAKKAM, CHENNAI

In the post lunch session the delegation will visit plant of Shibaura Machine India Pvt. Ltd.

Shibaura Machine India Pvt. Ltd. (abbreviated as SMI), is among the leading high-end plastic injection moulding and auxiliary equipment manufacturers in India. SMI is a wholly owned company of Shibaura Machine Company of Japan.

- Learn best practices in manufacturing and automation.
- To gain first-hand exposure to various innovative and good practices that augment the quality and adapt technology.

To defray part of the administrative expenses, the participation fees will be Rs. 4600+GST @18%.

The registration will be confirmed on the receipt of the participation fees and the duly completed application.



Registration will be on first come first serve basis. Please fill up the Application attached herewith and mail to:-

**Deepak Lawale, Secretary General – ORGANIZATION OF PLASTICS PROCESSORS OF INDIA**



404/405, Golden Chambers, New Link Road, Andheri (West), Mumbai – 400053. INDIA



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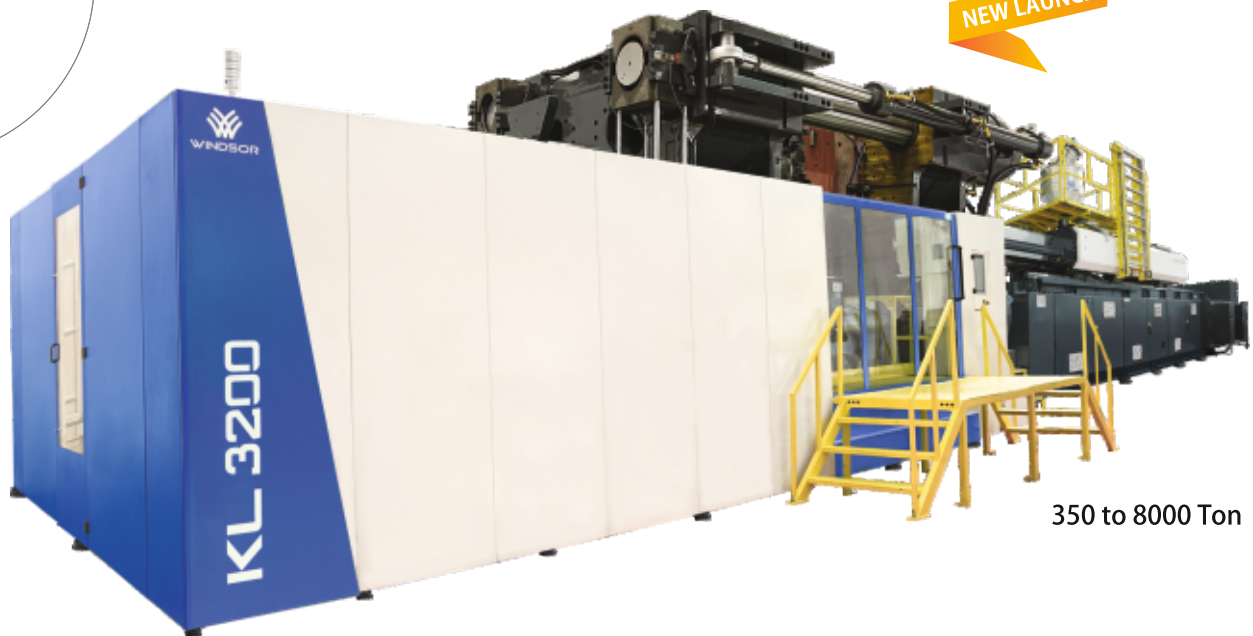
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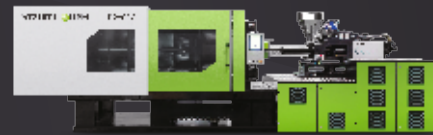
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To know more, follow [fnpindia.com](https://fnpindia.com)



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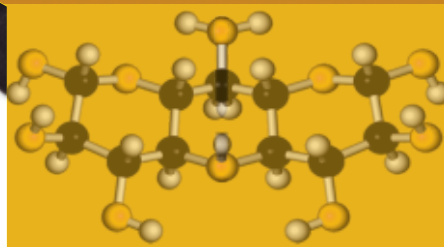
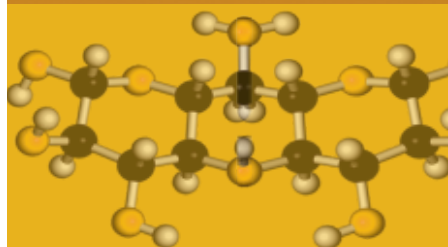
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## The 37<sup>th</sup> International Exhibition on Plastics and Rubber Industries

CHINAPLAS 2025 - April 15-18, 2025  
at Shenzhen World Exhibition  
and Convention Center  
(Bao'an), PR China.



Coming up next is CHINAPLAS 2025 - The 37th International Exhibition on Plastics and Rubber Industries - to be held at Shenzhen World Exhibition and Convention Center (Bao'an), PR China from 15th to 18th April 2025.

**The delegates will be taken for a visit to YIZUMI plant at Foshan, China.**

Organization of Plastic Processors of India has tied up with Tibro Tours Pvt. Ltd. for CHINAPLAS 2025 packages. All Companies booking Tibro Packages CHINAPLAS 2025 through Organization of Plastic Processors of India will be eligible for discount.

Please find attached herewith Tibro's Standard Launched packages based on hotel options. Kindly write to us to secure your travel arrangements on confirmed basis.

Deepak Lawale, Secretary General,  
Organization of Plastics Processors of India

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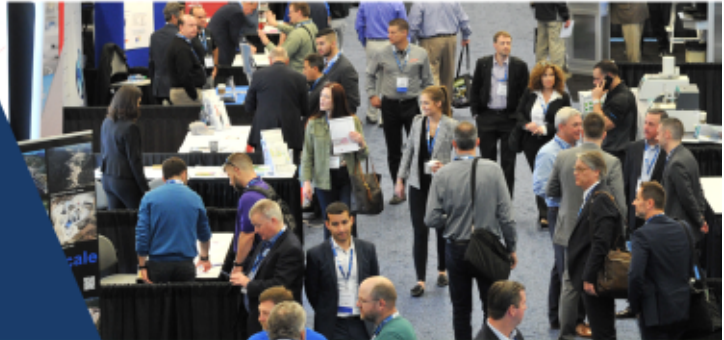




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4<sup>th</sup> to 7<sup>th</sup> JUNE 2025

Hanoi International Center for  
Exhibition (I.C.E) Hanoi, Vietnam

### EXHIBIT PROFILE

Plastic & Rubber Machinery, Chemical & Raw Materials, Machinery Auxiliary Industry, Heat & Control Equipment, Mould, Hydraulic & Pneumatic, Recycling, Dosing equipment, Mixers, Silo systems, Software

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Exhibitors  
220

Exhibitors  
From  
13 Countries

Visitors  
7,832

Space  
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Form is attached. Kindly email the scanned copy of duly filled Space Application Form to [secretarygeneral@oppindia.org](mailto:secretarygeneral@oppindia.org)

**GET IN TOUCH** Deepak Lawale, Secretary General, ORGANIZATION OF PLASTICS PROCESSORS OF INDIA



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## Aiming to Produce 5 mn Tonnes of Green Hydrogen by 2030, Says PM Modi

Describing the state as a "land of possibilities and opportunities", Modi said the time has come for it to become a centre of new futuristic technologies.



Prime Minister Narendra Modi on Wednesday said as part of National Green Hydrogen Mission, the country is aiming to produce 5 million tons of green hydrogen by 2030. After virtually laying the foundation stone and launching projects worth over Rs 2 lakh crore here, Modi said two green hydrogen hubs will be set up in the country out of which one will come up here.

"The country launched the National Green Hydrogen Mission in 2023. Our aim is to make 5 million metric tons of green hydrogen production (annually) by 2030. As a first step, two green hydrogen hubs will be set up, out of which one is in Visakhapatnam," he said.

He further said as part of "Swarnandhra Pradesh", by 2047, Andhra Pradesh is aiming to become approximately a USD 2.5 trillion economy and the Center will work with the southern state in realizing that vision.

Describing the state as a "land of possibilities and opportunities", Modi said the time has come for it to become a centre of new futuristic technologies.

Earlier, the PM virtually laid the foundation stone and launched a number of projects, including a green hydrogen hub in Anakapalli.

Among others he laid the foundation stone for a railway zone here and dedicated to the nation various projects in the rail and road sectors.

The green hydrogen hub coming up in Anakapalli district, near here, is a joint green energy ecosystem initiative between NTPC Green Energy Ltd and the New & Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP).

Modi virtually laid the foundation stone for Krishnapatnam industrial hub, a Rs 1,518 crore project coming up on a 2,500-acre land parcel in the first phase. It is expected to generate employment opportunities for 50,000 people.

Foundation stone was also laid for a Rs 1,877 crore bulk drug park in Nakkapalli. Entailing an investment of Rs 11,542 crore, the drug park coming up on 2,002 acres of land is expected to provide jobs for 54,000 people.

AP Chief Minister N. Chandrababu Naidu and Deputy CM Pawan Kalyan were also present at the event. Earlier, the three leaders took out a grand road show upon Modi's arrival in this city.

People gathered in large numbers, showered flowers on the leaders as they travelled atop an open vehicle, waving back at the public. The entire stretch was decked up with the party flags of TDP, BJP and Janasena.

Starting from Sampath Vinayak temple in the port city, the roadshow reached Andhra University's engineering college ground, where a public meeting has been scheduled.

This was Modi's first visit to the state after he assumed the office of the Prime Minister for the third consecutive term in 2024. The NDA alliance in Andhra Pradesh consisting of TDP, BJP and Janasena played a key role in forming the union government.

(Source: Business Standard / 08.01.2025)

### Cracker of an Expansion: Nayara's \$8 bn Petrochemical Plan

Rosneft-backed Nayara Energy is looking to invest ₹68,000 crore (\$8 billion) to set up a 1.5 million tonne per annum (mtpa) ethane cracker at its 20 mtpa refinery at Vadinar in Gujarat, according to people aware of the development.

This will be the first substantial investment by an overseas company in the Indian petrochemical segment. "Nayara has commenced work on frontend engineering for the petrochemicals project," said a senior industry executive.

Nayara Energy didn't respond to queries. The company said in its FY24 annual report that it had "adopted a phase-wise asset development strategy in 2018 to enter into the petrochemicals sector and is well-positioned to become a strong petrochemical player due to its unique advantages in terms of opportunity of integration with the refinery, proximity to the port and location of the refinery in western India which is the largest petrochemical consumption region of the country".

In the past year, Gail India, Indian Oil Corp, Bharat Petroleum Corp and others have announced investments of over 1.5 lakh crore to expand petrochemical operations. Adani Enterprises subsidiary Adani Petrochemicals announced on Monday that it has formed an equal joint venture with Thailand's Indorama Resources to foray into the refinery, petrochemical and chemical business.

India's petrochemical capacity is projected to increase to 46 million tons in 2030 from 29.62 million tons now, according to the ministry of petroleum and natural gas.

An ethane cracker breaks down the hydrocarbon, a component of natural gas, into ethylene-the key chemical used in making plastics, adhesives, synthetic rubber and other petrochemicals.

Traditionally, petrochemical companies have been using naphtha as primary feedstock, but demand for ethane has been picking up over the past few years. Cracking ethane can yield over 80% ethylene against 30% from naphtha.

Reliance Industries imports 1.6 mtpa of ethane for its ethane crackers in Dahej and Hazira in Gujarat and Nagothane in Maharashtra.

Last year, state-run Gail India announced plans to set up a 1.5 mtpa ethane cracker project at Ashta in Madhya Pradesh, with a product slate of various ethylene derivatives, at an investment of Rs 60,000 crore.

State-controlled refiner Bharat Petroleum is investing close to \$6 billion to develop an ethane-fed-cracker at its 156,000 barrels per day Bina refinery in Madhya Pradesh.

Nayara Energy runs India's second largest, single-location refinery in Vadinar with a capacity of 20 mtpa. A Rosneft-led consortium acquired Essar Oil in 2017 for \$12.9 billion and renamed the company Nayara Energy.

The company is expanding capacity to enhance its presence in the petrochemical and alternate energy sectors. Nayara has already set up a polypropylene unit at Vadinar.

"Like other refiners, Nayara Energy is working on diversifying its product portfolio and becoming a prominent player in the high-growth petrochemical industry," said a person aware of Nayara's plans. "These expansions will help it meet the rising petrochemical demand in India as well as globally." The government, alongside public sector units like ONGC and BPCL a non-state companies like Haldia Petrochemicals, is looking at investments of nearly \$45 billion in petrochemicals. India is a net importer of chemicals and petrochemicals. It gets 45% of the petrochemical intermediates required from overseas. Demand for chemicals is predicted to nearly triple and the petrochemicals industry in India may reach \$1 trillion by 2040, according the ministry.

(Source: The Economic Times / 09.01.2025)



## Cosmo First Introduces Revolutionary Paint Protection Films to Safeguard Vehicle Exteriors with Lifetime Warranty

Cosmo First, a leading global manufacturer of specialty films for packaging, labelling, lamination, and more, is set to transform vehicle protection with the launch of its innovative Paint Protection Films (PPF), designed to preserve and enhance automotive exteriors. The company will now begin market trials for the product.



Cosmo PPF offers vehicle owners a comprehensive solution to maintain their car's pristine appearance. Key features of Cosmo PPF include advanced scratch resistance, innovative self-healing technology, hydrophobic properties, and comprehensive UV and chemical protection. The product line features two distinct variants tailored to different protection needs.

The Cosmo PPF Platinum, the premium offering, stands out with its impressive 8-mil thickness and an unprecedented lifetime warranty. This top-tier variant provides deep scratch resistance, maximum durability and flexibility in application, protecting vehicles against environmental challenges including stains, scratches, and harmful UV rays, and maintaining their unmatched elegance.

Complementing the Platinum line, the Cosmo PPF Gold offers long lasting protection with a 5-year warranty. The self-healing properties of Cosmo PPF ensure enhanced aesthetics, strengthening Cosmo First's commitment to delivering superior automotive protection solutions. Engineered with high-quality Thermoplastic Polyurethane (TPU) technology and best-in-class advanced pressure-sensitive adhesive, the films are designed to maintain a vehicle's showroom-like finish, repelling environmental contaminants and preventing paint degradation.

"As the automotive landscape evolves, we're seeing an unprecedented rise in premium vehicle ownership, with discerning customers investing significant resources in their dream cars," said Mr Pankaj Poddar, Group CEO, Cosmo First. "Our Paint Protection Films are more than just a protective layer – they're a precision-engineered solution that meets the expectations of modern car enthusiasts who view their vehicles as valuable assets. Cosmo PPF transforms car care from a maintenance task to a premium value addition, ensuring that every vehicle's paint maintains its showroom brilliance even against environmental challenges."

The launch comes in response to growing consumer demand for long-lasting, effective paint protection solutions. Vehicle owners can look forward to experiencing the Cosmo PPF difference when the product becomes widely available.

(Source: Newsmantra / 20.12.2024)

## UFlex Partners with IIP to Advance Recycling and Circular Economy Initiatives

This collaboration aims to unite practitioners and scholars to enhance awareness of sustainable packaging.



Jeevaraj Pillai, Director - Sustainability, President - Flexible Packaging and New Product Development, UFlex Limited, along with Dr. Tanweer Alam, Addl. Director and RO, IIP Delhi, inaugurating the Ideation Zone at IIP Delhi.

Uflex has partnered with the Indian Institute of Packaging (IIP) Delhi to promote recycling, circular economy, and sustainability. The Ideation Zone at IIP will serve as an innovation hub, engaging students,



professionals, and the public in sustainable practices awareness. This collaboration aims to unite practitioners and scholars to enhance awareness of sustainable packaging and technologies supporting recycling.

### Showcasing circular economy principles



The Ideation Zone is built using recycled materials like multi-layer plastic and aseptic packaging waste, showcasing circular economy principles in sustainable structures. Currently, each of these sites returns approximately 30,000 MT of plastic waste back to the environment in Poland, Mexico, and India.

As part of this partnership, leading industry personalities and sustainability specialists will conduct workshops and seminars at the institute. These sessions will focus on recycling, the latest innovations, and how R&D contributes to sustainability in the packaging market.

(Source: ManufacturingToday / 10.01.2025)

### India Unveils Roadmap to Advance Flexible Packaging Circular Economy



The development aims to improve the management of flexible packaging waste in the country. Credit: 3d\_man via Shutterstock. - Packaging Gateway

The Confederation of Indian Industry (CII), in partnership with a consumer packaging company and the Embassy of Finland, has unveiled a roadmap for India's flexible packaging industry.

Outlook Business has reported that the new strategy aims to foster a circular economy for India's flexible packaging industry, focusing on improved management and recycling practices.

The new roadmap is based on the 'Design for Recycling Guidance for Films and Flexible Packaging' guidelines, developed by the CII-India Plastics Pact (IPP) initiative last December.

The guidelines are intended to increase the use of mono-material designs in the Indian market and offer technical advice to domestic organizations transitioning to recyclable packaging solutions.

The roadmap also describes the responsibilities of each stakeholder within the country's plastic value chain, outlining specific areas of intervention and corresponding timelines.

Key stakeholders in the chain include the IPP secretariat, retailers, consumers, converters, recyclers and waste management entities, nongovernmental organizations (NGOs), investors, and the national government.

Key areas of focus for the roadmap are the design of packaging, appropriate segregation and collection of waste, enhancement of recycling processes, and the development of markets for recycled materials. The overall objective is to improve the market for flexible packaging waste in India significantly.

The IPP, managed by CII, is a business-led initiative that aims to establish a circular economy for plastic packaging by uniting businesses and NGOs within India's plastics value chain.

"India unveils roadmap to advance flexible packaging circular economy" was originally created and published by Packaging Gateway, a GlobalData owned brand.

(Source: yahoo!finance / 10.01.2025)

## Centre - Sponsored 10 Plastic Parks Poised to Spur exports, Create More Jobs

The Centre's Department of Chemicals and Petrochemicals has approved 10 Plastic Parks, which are at different levels of implementation across various states, aimed at enhancing investment, production and exports as well as employment in the country, according to a year-end review released recently.

Under the scheme for setting up plastic parks, the Department promotes the setting up of need - based plastic parks with requisite infrastructure and enabling common facilities. The objective is to consolidate and synergize the capacities of downstream plastic processing industries. The new scheme for petrochemicals also includes a scheme for setting up Centres of Excellence and the Petrochemicals Research & Innovation Commendation Scheme.

With regard to Centres of Excellence (CoEs), the objective is to provide grants-in-aid to educational and research institutions to improve existing technology and promote the development of new applications.

The emphasis of the Scheme is on the modernization and upgradation of existing manufacturing processes as well as improving the quality of products. 18 CoEs have been approved so far, according to the official statement. Under the Petrochemicals Research & Innovation Commendation Scheme, the government felicitates meritorious innovations and inventions in the field of petrochemicals, products, processes and other related areas.

The scheme seeks to improve research and development in the petrochemical sector, leading to more efficient energy consumption, plastic waste management, and the development of new products.

(Source: Popular Plastics & Packaging)

## Himachal Pradesh Partners with Ambuja Cements to Tackle Non-Recyclable Plastic Waste

The Rural Development Department of Himachal Pradesh has joined hands with Ambuja Cements Ltd. to combat the growing menace of non-recyclable

plastic waste in the state. A Memorandum of Understanding (MoU) was signed between the two parties, paving the way for a sustainable solution to manage plastic waste effectively.

Under this initiative, Ambuja Cements will co-process non-recyclable plastic waste in its cement kilns. The process involves utilizing advanced technology to dispose of plastic waste in an environmentally sound manner, reducing its harmful impact on the ecosystem. This collaboration is seen as a significant step toward achieving a clean and green Himachal Pradesh.

The non-recyclable plastic waste generated from 29 operational Plastic Waste Management Units across districts like Chamba, Kangra, Shimla, and Solan will now be sent to Ambuja Cement's plant for processing. This initiative will not only help in reducing landfill use but also curb environmental pollution caused by plastic waste.

## Plastic Waste Crisis in Himachal Pradesh; The Importance of Recycling and Sustainable Disposal

Himachal Pradesh, like many states, faces mounting challenges from plastic waste, particularly non-recyclable plastics that persist in the environment for decades. Improper disposal of such waste contributes to soil and water pollution, harming biodiversity and public health.

The state has been proactive in setting up Plastic Waste Management Units, yet the increasing production and consumption of plastic demand innovative solutions. Recycling and co-processing emerge as critical strategies to address this issue. Recycling ensures the reuse of plastics while co-processing non-recyclable plastics in cement kilns minimizes their environmental footprint.

Recycling plastic waste not only conserves resources but also reduces the energy required for new plastic production. Sustainable disposal methods, such as those employed by Ambuja Cements, ensure that non-recyclable waste does not end up in landfills or waterways. These measures are vital for preserving the ecological balance of Himachal Pradesh, a state renowned for its natural beauty.

The Director of the Rural Development Department emphasized the significance of this collaboration, stating, "This partnership with Ambuja Cements is a meaningful step toward sustainable waste

management practices. It ensures non - recyclable plastic waste is disposed of responsibly, contributing to the vision of a cleaner Himachal Pradesh.”

A spokesperson for Ambuja Cements reiterated the company's commitment to sustainability, adding, “We are proud to support Himachal Pradesh in its waste management goals. This initiative reflects our dedication to fostering sustainable development.”

As Himachal Pradesh tackles its plastic waste problem, this collaboration sets an example of how public-private partnerships can address environmental challenges effectively.

(Source: TheNewsHimachal/ 05.12.2024)

## New Rules Proposed on Packaging Waste Management, Set to Take Effect in 2026

The Environment Ministry's draft Extended Producer Responsibility (EPR) Rules, 2024, set to take effect in 2026, will hold producers accountable for managing packaging waste, promote recycling, and incentivize eco - friendly practices.



The new regulations proposed align with the Plastic Waste Management Rules and support the Swachh Bharat Mission.

### In Short

- Environment Ministry proposes new rules for packaging waste management
- Draft rules aim to enforce Extended Producer Responsibility (EPR)
- Rules target waste collection, recycling, and resource conservation accountability

In a significant step to revolutionise packaging waste management, the Environment Ministry has introduced the draft of Environment Protection (Extended Producer Responsibility for Packaging) Rules, 2024. These rules, notified on December 6, are scheduled to take effect on April 1, 2026.

The proposed regulations focus on Extended Producer Responsibility (EPR), requiring producers, importers, and brand owners (PIBOs) to oversee the entire lifecycle of packaging materials, including paper, glass, metal, and sanitary products. From production to recycling and disposal, PIBOs will bear the responsibility for managing packaging waste sustainably.

The rules set strict targets for waste collection and recycling, encouraging accountability among all stakeholders. The rules drafted urge people to use recycled materials and sustainable packaging designs to reduce environmental impact and conserve resources.

Incentives for adopting eco-friendly materials and innovative recycling technologies are included to help industry player's transition toward greener practices. These regulations align with the Plastic Waste Management Rules and support the Swachh Bharat Mission by addressing India's unique waste challenges and involving both formal and informal sectors in recycling efforts.

PIBOs will also need to submit regular reports on their waste management initiatives and recycling compliance. This ensures transparency and enables monitoring of progress toward creating a cleaner and more sustainable environment.

(Source: INDIA TODAY/ 11.12.2024)

## India, Expansion of NU-VU Conair Pvt. Ltd. Production Site

**Last December 3, Nu-Vu Conair Private Limited opened its new plant in Ahmedabad (Gujarat, India):** an operational area of more than 60 thousand ft<sup>2</sup> (square feet) that actually increases the plant's efficiency and production capacity as it will house new assembly lines and the logistics center for shipping.

The expansion of the existing area corresponds to a definite growth path that will enable Nu-Vu Conair to meet increased demand and the need to reduce delivery times, while fully complying with high product quality standards. Maintaining the trust of



customers is crucial for the Group. Customer focus has always been in the DNA of Piován Group, which at the beginning of 2024 achieved a collective 51% stake in Nu-Vu Conair Private Ltd.



Nu-Vu Conair Private Ltd today represents a benchmark in the Indian market and beyond. The company is active in the design, production, and sale of innovative and competitive automation solutions for the production of technical polymers in India, a country undergoing rapid modernization. The Indian industry is, in fact, improving in efficiency, competitiveness, quality and safety. The technological leadership of and the wide range of Piován Group products in the field of industrial automation for storage, conveying, and processing of polymers, bio resins, and recycled plastics enables Nu-Vu Conair Private Ltd to provide innovative and high-quality solutions.

Customers, partners, and the entire team have laid the groundwork for the realization of this expansion, which also confirms the Group's desire to strengthen its presence in the Asian market, particularly India considered a key area for the future.

(Source: Press release/ 12.03.2024)

## TRELLEBORG Invests in a New Marine & Infrastructure Facility in India

The TRELLEBORG Group has decided to invest in a new manufacturing facility in India that will specialize in marine systems and infrastructure. The country represents a robustly growing market, and the investment is part of TRELLEBORG's strategy to strengthen its positions in attractive and profitable industrial segments and geographic areas.

"As one of the largest markets in the world, India is expected to experience healthy growth for many years to come. This progress drives an increasing need to upgrade and construct new infrastructure, such as

commercial ports – a demand we are set to meet with our upcoming facility," says Peter Nilsson, President and CEO of TRELLEBORG.

The manufacturing facility will be constructed near Ahmedabad, where TRELLEBORG already has a Marine & infrastructure engineering and innovation center. The new facility will be adapted to future requirements for efficient production processes, reducing its environmental impact through efficient water management and steam production from solar heaters. The start of production is planned for late 2026 and the Group will invest a total of SEK 75 M from 2025 to 2026.

TRELLEBORG has operated in India for over 40 years and sales in the country totaled nearly SEK 700 M in 2023. The company already operates in sealing solutions, automotive boots, cable protection for telecom equipment, and anti - vibration solutions for industrial applications, rails, and rolling stock. TRELLEBORG's IT and engineering centers, which provide technical support for TRELLEBORG's global offices, are also located in India.

(Source: TRELLEBORG/18.12.2024)

## New EPR Guidelines Double down on Packaging Waste

The Ministry of Environment, Forest and Climate Change of India introduced a new draft of EPR guidelines, expected to be effective by April 2026.



India generates around 9.3-million tonnes of plastic waste each year, which is about one - fifth of the world's total plastic waste.

The Ministry of Environment, Forest and Climate Change of India introduced a draft of the Environment Protection (Extended Producer Responsibility for Packaging) Rules, 2024. These rules are scheduled to take effect on 1 April 2026.

The goal of this amendment, among other things, is to reduce packaging waste and encourage a circular economy. This does involve following some of the R's — reuse, recycle, and recover. This regulatory push is likely to create more green jobs, innovations in packaging waste management, and more economic opportunities.

The rules have a renewed focus. They require brand owners, importers, and producers to keep an eye on the life cycle of the packaging materials they use — including paper, metal, sanitary products, and glass. These entities will be held responsible for managing packaging waste sustainably.

Brand owners, importers, and producers will also be required to submit periodic reports on their waste management efforts and compliance with the recycling guidelines. This is to ensure transparency and track the progress of various organisations.

(Source: WhatPackaging? / 16.12.2024)

## PAG to Acquire Manjushree Technopack

Asia - Pacific focused alternative investment firm PAG will acquire a majority stake in Manjushree Technopack, India's largest rigid plastic packaging solution company for Rs. 8,400-crore.

The US - based private equity investor, Advent International, will be selling its stake in the company to PAG, said people aware of the development. Currently, Advent holds 97% stake in Manjushree while 3% is held by other public shareholders.

The deal to acquire Manjushree will be the largest for PAG in India thus far and will be the third USD 1-billion transaction it has completed globally this year.

Earlier, Advent had filed papers with India's capital markets regulator, SEBI, to dilute its stake through an initial public offering. At the beginning of this month, SEBI issued its final observation for Manjushree Technopack's Rs 3,000 - crore IPO. However, with the latest deal, the IPO plans will be put on hold.

Led by Nikhil Srivastava in India, PAG has deployed over USD 1.7-billion in the country since founding its office in 2019. It currently manages over USD 3-billion in assets across multiple strategies and business sectors in India, and has been investing in the country since 2009.

The transaction marks PAG's seventh private equity investment in the country, including Nuvama Wealth Management, Acme Formulations, a leading contract development and manufacturing outsourcing company, RK Pharma Inc and Sekhmet Pharmaventures.

Established in 1978, Manjushree manufactures jars and bottles, multilayer containers, PET hot-fillable bottles, and pre-forms used in the food, beverage, pharmaceutical, cosmetic, agricultural chemicals, and allied sectors. It serves about 110,000 clients through its 20 manufacturing facilities across the country.

Manjushree reported a revenue of Rs 2,130-crore in FY24, which grew from Rs 1,474-crore in FY22.

The company has an installed capacity of over 1.90 lakh tonne per annum, and counts Reckitt Benckiser, Dabur India, Mondelez India Foods, Britannia, P&G, ITC, Castrol, Hindustan Coca Cola Beverages, PepsiCo India and Bisleri among its customers.

(Source: PrintWeek? / 25.11.2024)

## Mamata Machinery Gets Massive 195x Subscription for Successful IPO

MAMATA Machinery, a leading manufacturer and exporter of plastic bag and pouch-making machines, packaging machinery and extrusion equipment recently went in for an IPO with its pure offer for sale (OFS) compromising up to 7.38 million shares by promoters and existing shareholders.

Mamata Machinery shares were listed at Rs. 600 per share on the BSE. The IPO, opened for subscription from December 19 to December 24, received a whooping subscription rate of nearly 195 times.

## Natnov Bioscience, Odisha Startup Turns Seafood Waste into Sustainable Bioplastics

An Odisha-based startup, Natnov Bioscience, located in Balasore, has converted seafood waste into bioplastics. The company uses seafood waste to create biopolymers, the raw material for bioplastics, which have applications in packaging, agriculture and functional food industries.

Siddhartha Pati, the Scientific Director of Natnov Bioscience, emphasized the environmental benefits of bioplastics, stating, "Bioplastics offer a promising solution to mitigate the environmental damage caused by traditional plastics. They provide a practical and sustainable alternative to conventional fossil fuel - based plastics. Our proprietary bioconversion process transforms food waste into biopolymers."

The startup has already processed 5,000 metric tonnes of seafood waste within a year to produce biopolymers. These biopolymers are used in agriculture for bio-stimulants, in the pharmaceutical industry for medicines and for manufacturing bioplastics. Recognized by Startup India and supported by the Odisha government's agriculture and farmers' empowerment department, Natnov Bioscience has also expanded its reach globally, exporting biopolymers to countries including Turkey, Vietnam, China, Thailand and the United Kingdom.

Pati further highlighted the environmental impact of traditional plastics, which are derived from fossil fuels and result in about 80 percent of the produced plastic ending up as waste in landfills and ecosystems. The startup's innovation not only addresses this pressing issue but also provides a sustainable solution to food and plastic waste challenges.

Natnov Bioscience Pvt. Ltd. is also recognized under Startup India and supported by the Odisha govt's agriculture and farmers' empowerment department. Its revenue in 2023 was estimated to be \$110 million. The startup has already produced biopolymers from 5,000 metric tonnes of seafood waste in a year. As per their website, currently they are actively exporting their products to several countries across the world, including Thailand, Israel, Malaysia, Singapore, South Korea, Canada and USA.

Pati told "Agriculture and pharmaceutical industries procure the biopolymer for manufacturing medicine and bio-stimulant, respectively. Most importantly, it can be used for making bioplastics,"

"The company specializes in transforming food waste into biopolymers using a proprietary bioconversion process. Our product looks like conventional plastic. We are yet to release the bioplastic items in the market," he added.

(Source: Popular Plastic & Packaging)

## SHUBHAM Extrusion Launches its Mega Factory

On 10th August, 2024, SHUBHAM Extrusion celebrated the grand opening of its blown - film machine manufacturing facility... a 3,00,000 sq. ft. of total space, making it the biggest shop floor for smart blown film manufacturing setup in a single location in India.

Guests included global stakeholders who praised SHUBHAM's commitment to innovation and collaboration. The event highlighted the company's dedication to continuous improvement and sustainability, marking a significant milestone for future growth.

(Source: POLYMERS Communique)

## India's Green Investments to Grow 5 -Fold to Rs. 31 Trillion by 2030: CRISIL



India's investments in green infrastructure and energy projects will grow five-fold over the next five years to Rs. 31 trillion, according to market intelligence firm CRISIL.

"Based on government announcements, plans of corporates and on-ground progress, we estimate green investments of nearly Rs. 31 lakh crore between 2025 and 2030, led by renewable energy (RE) with Rs. 18.8 lakh crore, followed by oil and gas (Rs. 3.3 trillion) and transport and automotive (Rs. 4.1 trillion)," said S&P Global company in its infrastructure report for 2025.

India's NDC commitments include a 45 per cent reduction in the carbon intensity of its GDP by 2030 from 2005 levels, and an increase in the share of cumulative installed power capacity from non-fossil-fuel-based energy resources to 50 per cent.

(Source: Business Standard / 15.01.2025)



# PLASTIC PRODUCTS AND NEW TECHNOLOGIES



## BMW Group Vehicle to Adopt 3D Printed Center Console

A vehicle coming to market in 2027 will include a center console carrier manufactured through polymer robot - based large - format additive manufacturing (LFAM).



The winning center console carrier was on display at Formnext 2024 in the Hans Weber booth, alongside a live 3D printing demo. The 3D printed part weighs about 4 kg and measures  $300 \times 300 \times 1,000$  mm.

In June 2024, the SPE Central Europe Automotive Award honored a 3D printed component for the first time in its history. The year's grand award winner was a center console carrier created for a BMW Group vehicle, which is headed for production in 2027. The console is one of the largest 3D printed polymer components to be used in a commercial automobile to date, and stands to significantly reduce both the manufacturing complexity and carbon footprint of the overall vehicle.

The 3D printed version of the center console consolidates seven parts from the conventional assembly down to just one part produced through large-format additive manufacturing (LFAM). Rather than rely on injection molding (requiring a large, expensive tool) for the main body of the console and subsequent assembly work of parts from various suppliers, BMW can produce these new consoles in one piece with robot-based 3D printers supplied by the additive division of Hans Weber Maschinenfabrik. Each console can be 3D printed in about 3 hours and 40 minutes on the latter's DXR platform MEX or LSP systems equipped with a single-screw Weber AE 20 extruder; only minimal machining is required before the component can be finished and installed.



Hans Weber demonstrated 3D printing of this component during Formnext 2024, using its own extruder technology coupled with an industrial robot

Notably, the design integrates two air ducts that would otherwise need to be manufactured separately through a tooling-based molding process. 3D printing enabled integrating these air ducts in a more ideal route through the console, while also reducing overall manufacturing and assembly operations.



The conventional center console carrier (foreground) is seven components and incorporates multiple molded and sheet metal fabricated pieces. The 3D printed version is just one 3D printed piece, including the air ducts. Source: Hans Weber Maschinenfabrik GmbH.

About 18,000 3D printed center console carriers will be needed annually. In production, the components will be 3D printed in-house by BMW, using Hans Weber robotic 3D printers and Akromid Pa11 material from Akro-Plastic. Unlike smaller fused filament fabrication (FFF) 3D printers, Hans Weber's large-scale DXR printers operate through fused granulate fabrication (FGF) or "direct extrusion" which enables 3D printing with readily available pellet materials, the same as those used in many molding processes, as opposed to filaments or powders created specially for additive. The Akromid material contains 40% recycled carbon fiber and renewable raw materials.

The material choice and design help to reduce the weight of the center console by 30% compared to the assembled version, which will enable better energy efficiency. The combination of recycled and renewable material, reduced weight, and overall optimization represented by the center console has resulted in a savings of about 70 kg of carbon for the entire vehicle.



The 3D printed center console with finishing touches; about 18,000 of these components will be 3D printed per year for BMW Group's small-run vehicle. Source: Hans Weber Maschinenfabrik GmbH

(Source: Plastics Technology/ 15.01.2025)

## HEXCEL Supports Boeing's Development of the MQ-25 Stingray with Innovative Honeycomb Core Solution

In a collaborative effort, HEXCEL has partnered with Boeing to test a critical component for the U.S. Navy's MQ-25 Stingray unmanned aerial refueling aircraft – the recently launched Flex-Core® HRH-302 honeycomb core. This new material is being evaluated for use in the structure surrounding the high-temperature exhaust nozzle on the engine powering the MQ-25.

The MQ-25 Stingray is designed to provide much-needed aerial refueling capabilities to extend the range of carrier-based fighter jets like the F/A-18 Super Hornet, EA-18G Growler, and F-35C. When this aircraft becomes operational, it will significantly enhance the combat radius of the U.S. Navy's carrier air wing, according to the U.S. Navy.

The benefits of incorporating lightweight and durable composite materials into the design of any aircraft, particularly in a UAV like the MQ-25, are considerable, according to Bobby Rowe, Vice President, Product Management, Core & Engineered Products at Hexcel.



"In the case of the MQ-25, composite materials could allow for extended range and endurance, as well as increased payload capacity," said Rowe. "Lighter UAVs can carry more fuel, which is particularly important in the vast expanse of the Pacific, where distances between operational areas and carriers can be significant. By reducing the weight of the UAV itself, more capacity could also be available for mission-specific payloads, such as sensors and other communications equipment."

Understanding these operational benefits is core to the work of Hexcel's product management team, added Rowe.

"When we develop composite materials for our military customers, we always keep the end in mind, and that is their mission. If products like our honeycomb core can provide our military customers an operational advantage, we know it will ultimately protect the men and women who go into harm's way," he said.

Over the past year, product managers and manufacturing and operations teams from the HEXCEL Casa Grande, Arizona and Pottsville, Pennsylvania facilities have been collaborating closely with Boeing engineers to develop a honeycomb product that could provide weight savings, cost savings, and reduced manufacturing and delivery lead times compared to other materials, without sacrificing the performance requirements for the aircraft.

"The flexibility and thermal performance of HRH-302 make it ideally suited for the complex curvatures and increasing heat loads found in next-generation aircraft nacelles, and as we continue our testing on this product, we believe it can help our customers achieve their goals of improving the performance and affordability of the MQ-25 system," said Rowe.

The HRH-302 honeycomb core material is currently under evaluation for Boeing's stringent design and mission performance imperatives, according to Clark Miller, a Senior Manager of Boeing Programs for Hexcel.

"One of the things that has been so gratifying about our collaboration with Boeing has been the ability to prototype a solution in near real time," he said. "We were able to quickly respond to their needs

and provide a lightweight, high - temperature solution for the exhaust nozzle, which has been fantastic."

Hexcel's vertical integration and expertise in advanced composite materials is a key discriminator for Hexcel, added Miller.

"By producing the honeycomb core at the Casa Grande facility and then shipping it to Pottsville for machining, we streamlined the supply chain and enabled rapid prototyping and production for this new honeycomb material offering for our customer."

HEXCEL announced the development of the Flex-Core® HRH-302 honeycomb core earlier this year during the annual Composites and Advanced Materials Expo (CAMX), an event which showcases the latest advancements in state - of - the - art composites and advanced materials.

Flex-Core® HRH-302 is designed to sustain service temperatures up to 450°F, bridging the gap between traditional phenolic-based materials and high-cost polyamide solutions. Leveraging the expertise HEXCEL has in thermoplastic resins, the product offers improved thermal capabilities while maintaining similar mechanical properties to existing honeycomb materials.

"HRH-302 represents our commitment to staying a generation ahead and delivering products that meet the demands of our customers," said Rowe. "We're excited to work closely with our customers to demonstrate the benefits of this new material on critical military and commercial programs."



During a June 2021 flight test, the MQ25 T1 test asset transferred fuel to an F/A-18 Super Hornet. This historic flight marked the first time for an unmanned aircraft to refuel another aircraft during flight. (Boeing Photo)



The recently launched Flex-Core® HRH -302 honeycomb core is being evaluated for use in the structure surrounding the high-temperature exhaust nozzle on the engine powering the MQ-25. (HEXCEL Photo)

(Source: HEXCEL/ 19.12.2024)

## Sleepers Made from Recycled Plastic Could Make Railways More Eco - Friendly



Railways, the most climate-friendly mode of transport bar long-distance buses, are bound to play an important role in the fight for net zero. The total emissions of railway travel are currently 31 grams of CO2 equivalents (CO2e) per passenger kilometer, half the amount as for the most economical electrical vehicles.

But the carbon emissions of railway traffic can be further reduced, shows a new study in *Frontiers in Sustainability* by authors in Finland. This is because typical construction materials such as steel and concrete are energetically costly to produce, transport, handle, and maintain. Even on the busiest train lines, these costs amount to 30% of total emissions, and this percentage increases sharply as the traffic volume decreases.

“Here we show that recycled plastics could be used as the material for railway sleepers and that overall emissions would be reduced. A smaller carbon footprint is achieved when currently incinerated waste streams are used as material,” said Dr. Heikki Luomala, the study's first author and a project manager at Tampere University.

“We estimate that the CO2 reduction by repulping the available waste stream in Finland could amount to the heating emissions of 1,200 households, that is 3,610 tCO2e (tons of CO2 equivalents) per year.”

### Two Types Of Plastic Tested

Luomala and colleagues studied the feasibility and GHG emission savings resulting from gradually phasing out the wooden and concrete railway

sleepers in Finl and and replacing them with recycled plastic. The lifespan of a sleeper is between 10 to 60 years and decreases with increasing traffic intensity, due to mechanical damage.

An important source of plastic waste is the packaging sector, which uses up approximately 40% of the total plastic production. Within this industry, so-called liquid packaging board (LPB) – a mix of polyethylene, polypropylene, ethylene vinyl alcohol, and polyethylene terephthalate – is the fastest growing product. Another important source of plastic waste is electronic and electrical equipment, accounting for approximately 6% of total plastic usage. Its main plastic component is acrylonitrile butadiene styrene (ABS).

In the past, plastic waste was often exported from Finland to the Far East, but in recent years the 'ALL-IN for Plastics Recycling' (PLASTin) initiative was launched to make Finland a leader in plastic recycling.

Luomala et al. produced specimens of railway sleepers (0.15m thick, 0.25m wide, and 2.6m long) made from LPB and ABS and subjected these to a battery of mechanical tests. Their intent was to test if the prototypes confirmed to international standards for the plastic and railway industries.

### Implementation in the Real World is on Track

Specimens made from both types of plastic passed the strength and bending tests. But only recycled ABS was able to withstand the maximum tested temperature of 55°C without significant softening during hot summers.

“Recycled ABS is much more suitable as railway sleeper material than recycled LPB: the strength and stiffness properties of ABS are approximately three times higher and closer to that of wooden sleepers,” said Luomala.

Plastic railway sleepers offer several advantages, for example easy formability, low cost, light weight, and resistance to environmental conditions. The use of recycled plastic also allows greater design flexibility for sleeper shape.

The Finnish Transport Infrastructure Agency has already shown interest in the study's findings.

“When it comes to the implementation of recycled ABS for use as railway sleepers, further tests should first be conducted at full scale. Their long-term behavior, for example in terms like UV resistance, should also be tested,” warned Luomala.

(Source: frontiers/11.12.2024)

### **TORAY Creates Stretchable Film with High Dielectric Constant and Resilience that Helps Cut Actuator and Sensor Weight and Energy Consumption**

TORAY Industries, Inc., announced that it has augmented its REACTIS® brand of high-recovery film technology by innovating a stretchable c film with a high dielectric constant and recoverability.

Applications should include dielectric components in dielectric elastomer actuators (DEAs) for robots, sensors for reducing weight and saving energy, flexible sensors suitable for curved 3D curved surfaces and energy harvesters. TORAY will set up a sample distribution system for users and strive to swiftly commercialize this breakthrough.

Recent years have seen attention focus on soft robots to interact with people in such fields as healthcare, eldercare and food production. Conventional robots require many sensors and complex controls. In contrast, “soft” robots comprising compliant materials instead of rigid links and which can operate safely and autonomously are attracting considerable interest, as are dielectric elastomer actuators as power sources for these devices.

A dielectric elastomer actuator comprises an elastic dielectric film with stretchable electrodes on both sides. Applying a voltage between the electrodes generates a compressive force proportional to the dielectric constant of the film, deforming the actuator and producing an output (see diagram).

These films currently employ such elastomers as silicone and acrylic. Materials with higher dielectric constants are necessary, however, to deliver the high outputs vital for practical applications. High

resilience is vital for fast responses. Existing materials and methods present trade-offs between these characteristics, which necessitated the development of new materials.

The REACTIS line has diverse applications. TORAY enhanced its technology based on that range to attain a relative dielectric constant of 12, more than double the level of conventional elastomers, while maintaining a 100% recovery rate. The company has confirmed that a dielectric elastomer actuator employing this new film delivers more than four times greater output than conventional actuators using silicone film.

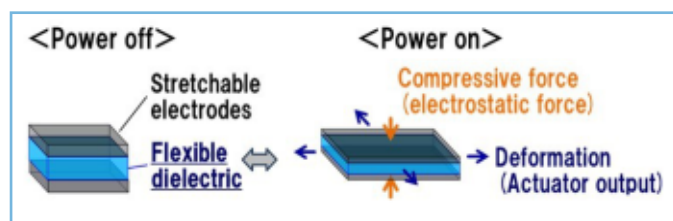
Another benefit is a high dielectric constant without employing materials that could harm the environment, such as halogens and inorganic particles.

Applying this new film to dielectric elastomer actuators could enhance the responsiveness of soft robots in applications that improve the quality of life in the healthcare, medicine and industrial fields. Using the film as a dielectric material in capacitive sensors could lead to flexible sensors that can measure on 3D curved surfaces and accommodate large deformations.

TORAY will keep leveraging its core technologies of synthetic organic and polymer chemistry, biotechnology and nanotechnology to pursue R&D into groundbreaking materials that can transform the world in keeping with its commitment to delivering new value and contributing to social progress.

#### **Glossary:**

A dielectric elastomer actuator (DEA) converts electrical energy into kinetic energy by using electrostatic force to attract positive and negative charges to each other.



**Dielectric elastomer actuator structure**

(Source: TORAY/11.12.2024)

## Graphene Nanotubes for Conductivity in PET Fibers:

### Functionality and Aesthetics

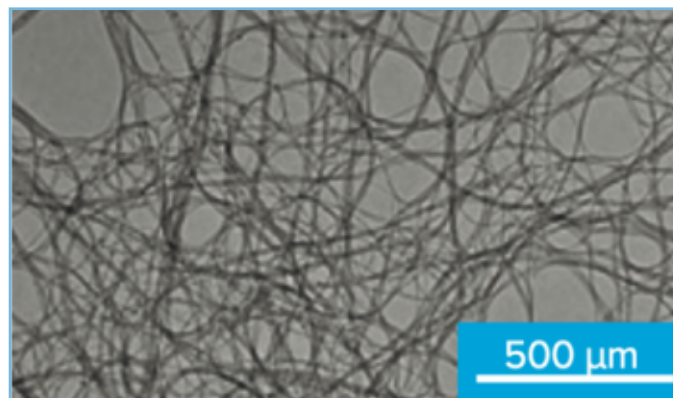
- Graphene nanotubes give PET fibers stable, permanent electrical conductivity meeting safety standards for electronics, clean rooms, and work wear.
- Compared to previous - generation additives, nanotubes offer superior functionality and maintain flexibility, durability, hypoallergenic properties, and customizable color options.
- Expected further applications for innovative PET fibers include foldable electronic components, wearable tech, and protective clothing.

Polyethylene terephthalate (PET) fibers, valued for their high strength, low weight, and resistance to moisture, UV radiation, and chemicals, are essential in various high-performance applications. But electronics, clean room environments, and industrial workwear demand an additional functionality for insulative fibers: electrostatic discharge protection. Traditionally, metal wires or carbon black were used to achieve conductivity in thermoplastic polymer fibers, which often limited design options, could cause allergic reactions, and could result in difficulties with color fastness, especially under rigorous testing standards such as AATCC TM61. More importantly, the physical properties of carbon black-based conductive fiber are insufficient for this purpose; the fiber must be processed into a composite yarn before weaving.



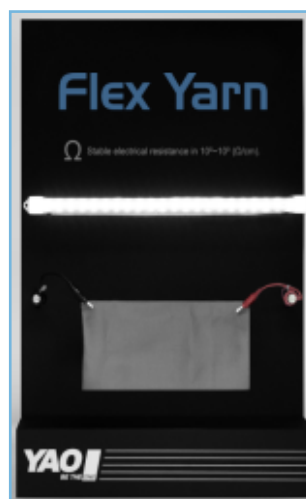
Taiwan-based YAO I Fabric Co., Ltd., a prominent manufacturer of specialty fibers, has unveiled innovative conductive PET fibers with the brand name FLEX™ Yarn that are enhanced with

TUBALL™ graphene nanotubes from OCSiAl. With a nanotube dosage of just 0.001 to 0.05 wt.%, FLEX™ Yarn exhibits stable electrical resistances of  $105 \sim 106 \Omega/\text{cm}$  and  $102 \sim 103 \Omega/\text{cm}$ , while retaining its flexibility, color vibrancy and hypoallergenic properties. Ready-to-use nanotube-based solutions drive streamlined production by allowing nanotube integration in unique carbonization fusion technology (CFT) spinning processes, saving both time and cost for customers.



“The ultralong structure of graphene nanotubes allows them to form a 3D network inside the material throughout its entire volume, ensuring uniform conductivity across the fiber without carbon release. This enhances anti-static and electromagnetic interference (EMI) protection without compromising color or comfort,” said Ray Lu, Senior Manager, YAO I Fabric Co., Ltd.

“The series of FLEX™ Yarns with graphene nanotubes offers a sustainable solution, combining the durability and recyclability of PET with the high efficiency of TUBALL™ at an ultralow dosage. The enhanced functionality of this fiber makes it a multipurpose material for high-tech applications,” added Otis Wang, General Manager, YAO I Fabric Co., Ltd.



Graphene nanotube-enabled PET fibers are an ideal material for use in foldable electronic components, wearable tech, and protective clothing,” commented Albert Lin, Sales Director Taiwan, OCSiAl Group. “These fibers deliver a unique combination of aesthetic appeal, comfort, and functional performance for modern industrial needs.”



**About OCSiAl:** Headquartered in Luxembourg, OCSiAl is the world's leading manufacturer of graphene nanotubes, also known as single wall carbon nanotubes. OCSiAl produces high-purity graphene nanotubes on an industrial scale under the TUBALL™ brand name. OCSiAl has developed and is marketing globally a wide range of nanotube products for electrochemical power sources and various polymers and creates fundamentally new products based on them.

**About YAO I:** Founded in 1973 in Taiwan, YAO I Fabric Co., Ltd. is a leading manufacturer of high-performance monofilaments and technical textiles. Its diverse product range includes fishing lines and sports string, industrial yarn, pet mats, automotive seat covers, sound-absorbing and stretch materials, and textiles for electronics and footwear. With factories in Taiwan, China, and Vietnam, YAO I serves industries from automotive to electronics, delivering durable, eco-friendly textile solutions.

(Source: Ocsi Ai/ 03.12.2024)

## LG Chem and Reifenhäuser Agree to Collaborate on Establishing Competitive MDO PE Films for Sustainable Packaging

South Korea's leading global chemical company LG Chem and the extrusion machine manufacturer Reifenhäuser have signed a Memorandum of Understanding (MOU), confirming further extensive cooperation.

The aim is to further develop and market competitive Machine Direction Oriented (MDO)-PE blown films and flat films for recyclable packaging. The partners are building on a successful track record: In May 2024, the companies had presented the world's first MDO-PE film only 18 micrometers ( $\mu\text{m}$ ), which had been produced on an EVO Ultra Stretch blown film line from Reifenhäuser with specially developed PE materials (Polyethylene).

Bernd Reifenhäuser, CEO of the Reifenhäuser Group, says: "The demand for flexible mono-material packaging is growing rapidly. But MDO-PE films must be stable and economical to produce in order to make the leap from a niche to a broad market. With LG Chem and Reifenhäuser, we have found the perfect match of raw material, extrusion technology and

process know-how that will pave the way. For the first time, processors will be able to produce recyclable MDO-PE films at competitive production costs in a stable process that can be optimally further processed."

Dr. Lee Choong Hoon, Vice President and Head of NCC/PO Business Unit at LG Chem, adds: "We are very pleased to have found an experienced technology partner in Reifenhäuser to successfully combine sustainability and profitability. Our combined technology has achieved unprecedented records in downgauging MDO-PE film – and that was just the beginning. We will continue this path together to accelerate the recyclability for flexible packaging."

### Further Downgauging for Competitiveness

With perfectly coordinated system technology and formulation, processors will in future receive a tried and tested, complete package for immediate market access in the field of flexible mono-PE packaging. LG Chem and Reifenhäuser are also working on further reducing material consumption by downgauging towards the level of conventional PET-PE laminates and thus making the production of MDO-PE films more profitable. Technically, this is achieved due to the different densities of PET film and MDO-PE film by replacing the standard 12  $\mu\text{m}$  PET film with a 16 to 17  $\mu\text{m}$  MDO-PE film. With the reduction to 18  $\mu\text{m}$ , the partners are already very close to achieving this goal. However, the experts see further potential: "The downgauging limit has not yet been reached," says Christoph Lettowsky, Technical Sales Manager at Reifenhäuser Blown Film. "Thanks to the patented position of our MDO Ultra Stretch unit directly in the line's haul-off, the film is stretched from the first heat. This makes the process particularly stable, which is otherwise often the limiting factor for material reduction. We therefore see even more scope, which we will use in combination with further recipe developments for even thinner films in the future."

The 18  $\mu\text{m}$  MDO PE film without PFAS additives was produced stably and reproducibly over many hours in test runs at the Reifenhäuser technical center and then printed and processed into finished pouches. The demand for PFAS-free materials is growing mainly in Europe as PFAS does not decompose in nature and has negative impacts on the environment. International guests were able to see the reliability of the process and the performance of the film for themselves at an open house on November 7.



Dr. Lee Choong Hoon, Vice President and Head of NCC/PO Business Unit at LG Chem (left), with Bernd Reifenhäuser, CEO Reifenhäuser Group (right) after signing the Memorandum of Understanding.

## Novel Line Turns Fluff to Blown Film

Processor Bioflex of Mexico is utilizing Reifenhäuser Blown Film's EVO Fusion technology to integrate postindustrial and postconsumer recycled materials into products.

At an open house event held at Bioflex's facilities in Mexico, Reifenhäuser Blown Film showcased for the first time in the Americas one of its latest technological advancements — EVO Fusion. This line aims to reshape the landscape of film processing with more sustainable and efficient production methods.



Jose Lozano, Bioflex General Director, and Ulrich Reifenhäuser, Reifenhäuser Group general director. Source: PT

Reifenhäuser says EVO Fusion technology is set to shift paradigms in the industry. Traditionally, the use of postconsumer recycled materials (PCR) in film production has faced challenges due to quality inconsistencies. PCR quality can vary significantly

between batches due to the heterogeneous mix of plastic types and the constant presence of impurities.

Notes Dr. -Ing. Christoph Lettowsky, technical manager of Reifenhäuser's Blown Film Unit: "The first batch may be good, but the second or third might not be." These inconsistencies have historically led to processing difficulties and final products that could not compare to those made from virgin materials.



EVO Fusion system processes postindustrial recycled materials (PIR), enabling the recovery of production floor waste such as barrier films with printing and lamination.

However, EVO Fusion addresses these challenges by reducing dependency on material quality. It enables efficient use of PCR, even from low-quality plastics derived from postconsumer waste, integrating them directly into the production process without pelletization. This capability not only broadens the range of applications but also reduces energy costs by up to 40%, significantly enhancing both the economic and environmental appeal of using recycled materials.

In addition, the EVO Fusion system processes postindustrial recycled materials (PIR), enabling the recovery of production floor waste such as barrier films with printing and lamination. These materials can be fed directly into the shredder, cut into small pieces or fluff, and added directly to the EVO Fusion twin-screw extruder. The ability to add these wastes directly into the extruder without prior pelletization streamlines the process and further reduces the environmental footprint.

By facilitating the use of recycled materials in high-quality film production without traditional cost and energy barriers, these technologies make adopting sustainable practices both feasible and profitable for film manufacturers.

It is also worth noting that as sustainability reshapes market expectations, there is growing acceptance of recycled films. What was once deemed undesirable due to aesthetic considerations is now becoming a hallmark of environmental commitment. Both brands and consumers increasingly value the “recycled look,” which visibly communicates a commitment to environmental stewardship.

According to Ulrich Reifenhäuser, director of Reifenhäuser Group, the plastics and recycling industries will soon become one interconnected sector. The market urgently needs to facilitate the integration of recycled materials across all processes and markets. EVO Fusion stands out as a technology that aims precisely in this direction.

### **Tapes Made from Recycled Carbon Fibers for Lightweight Construction.**

Due to their excellent mechanical properties and low weight, carbon fiber reinforced plastics (CFRP) are increasingly being used in lightweight construction applications where high strength and rigidity combined with minimal weight are crucial.

However, the growing use of CFRP is also accompanied by large quantities of carbon fiber waste. So far, only processing routes that significantly reduce the properties of CFRP and thus limit the fields of application have been established. The German Institutes of Textile and Fiber Research Denkendorf (DITF) have developed highly oriented tapes made from recycled carbon fibers (rCF) suitable for reuse in high-performance applications such as structural components in the automotive sector.

Carbon fibers are usually produced from petroleum-based raw materials in an energy-intensive process that emits large amounts of CO<sub>2</sub>. The material has a global warming potential of around 20 - 65 kilograms of CO<sub>2</sub> equivalents per kilogram. Nevertheless, the production of CFRP continues to increase and with it the amount of CFRP waste. This is because, depending on the processing method, up to 50 percent offcuts are generated during production. In addition, there are large quantities of CFRP waste in the form of components that have reached the end of their service life. In Europe alone, around 8,000 passenger aircrafts with considerable CFRP content are expected to be taken out of service by 2030.

Currently, only 15 percent of CFRP waste is recycled. The remaining 85 percent of these CFRP components end up in waste incineration plants or landfills at the end of their service life. Incineration can generate energy in the form of heat or electricity. However, recycling carbon fibers would contribute far more to climate and resource protection.

In recent years, various recycling processes for CFRP, such as pyrolysis or solvolysis, have therefore been further developed in order to recover high-quality carbon fibers.

Compared to virgin fibers, the possible uses of recycled carbon fibers are significantly limited. In a virgin fiber product, carbon fibers are usually present in filament strands of technically unlimited length and oriented in the direction of the load. In this way, the carbon fiber unfolds its full potential, as it has its maximum strength in the fiber direction. Recycling inevitably results in a shortening of the carbon fibers to lengths in the micrometer to centimeter range. In addition, the orientation of the carbon fibers is lost and the fibers are initially in a tangled position.

The DITF have been successfully working for around 15 years on adapting classic spinning processes to the new fiber material rCF. The aim is to develop a new category of rCF semi-finished products and improve their mechanical properties so that they can actually replace virgin fiber material in structural applications. Only then will carbon fiber-based composite materials be truly recyclable.

In order to produce an oriented semi-finished product similar to a carbon product from virgin fibers, it is crucial to eliminate the tangled position of the rCF and to align the fibers parallel to each other. One promising way of achieving this is the production of highly oriented tapes.

In a first step, the carbon fibers are opened and mixed with thermoplastic matrix fibers (polyamide 6). The fiber mixture is then further separated and oriented in a carding process modified for the processing of carbon fibers. At the outlet of the carding machine, the fiber card web produced in the carding process is combined into a fiber sliver and deposited in a can. This rCF/PA6 fiber sliver is the starting material for the subsequent tape forming process and already has a pre-orientation of the carbon fibers. The orientation of the fibers can be increased in the subsequent drawing process. By



drawing the fiber tape, the fibers are moved in the direction of draft and aligned longitudinally. The final process step is tape formation, in which the fiber tape is under tension formed into the desired shape and then fixed into a continuous tape structure. During fixation, the thermoplastic fibers melt partially or completely and then solidify.

This technology developed at the DITF for the production of highly oriented rCF tapes was used as part of the "Infinity" research project (O3LB3006) to demonstrate a sustainable and fiber-friendly recycling cycle for CFRP. Based on the "Infinity" tapes, a composite material was developed that achieved 88 percent of the tensile strength and tensile modulus of a comparable virgin fiber product. In addition, a life cycle analysis showed that the global warming potential is reduced by approx. 49 percent when using pyrolysis fibers and by approx. 66 percent for rCF from production waste.

The findings thus illustrate a way towards true substitution of virgin fiber CFRP with recycled CFRP instead of downcycling to low-orientation materials and the associated loss of mechanical properties.



(Source: Press Release/ 05.12.2024)

### 3D Printed Spine Implants Made From PEEK Now in Production

Medical device manufacturer Curiteva is producing two families of spinal implants using a proprietary process for 3D printing porous polyether ether ketone (PEEK).

Polyether ether ketone (PEEK) has been used in medical implants for more than three decades. The thermoplastic offers biocompatibility and mechanical properties similar to bone, making it suitable for spine cages, bone plates, orthopedic implants and more. As an added benefit, the material is radiolucent, meaning it does not appear in an X-ray — making it easier for the surgeon to monitor the patient's healing post-surgery.



Curiteva's 3D printed implants are made from PEEK, a polymer with radiolucency that enables a clear view of healing on an X-ray. Source: Curiteva

But until recently, most PEEK implants were produced through machining or molding, which placed constraints on the geometry of these medical devices. Porosity is desirable in many implants, as it can enable the patient's own cells to grow into the device as the body heals, leading to better outcomes. Some porosity can be achieved by compression molding of PEEK, but this process does not allow for precise control of the geometry and material properties all throughout the part.

3D printing offers an alternative. Huntsville, Alabama-based medical device company Curiteva now manufactures two different product lines of 3D printed PEEK implants for the spine. Its "Inspire" line of products for cervical and lower lumbar spine features porous structures achieved through lattice-based designs, and compressive strength throughout that is developed through the printing process, Fused Strand Deposition (FSD).

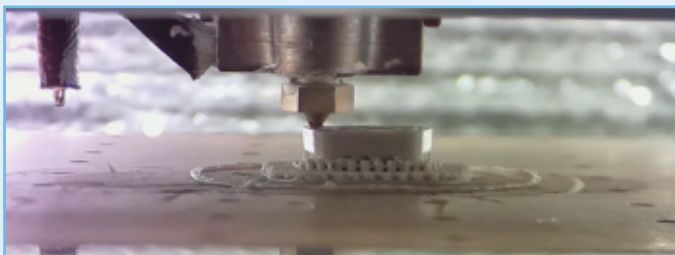
Curiteva achieved FDA clearance for its first 3D printed Inspire device, the cervical spine implant in the foreground, in 2023. In 2024, the company cleared a second family of lower lumbar implants, examples of which are shown here.



### A 3D Printing Process Just for PEEK

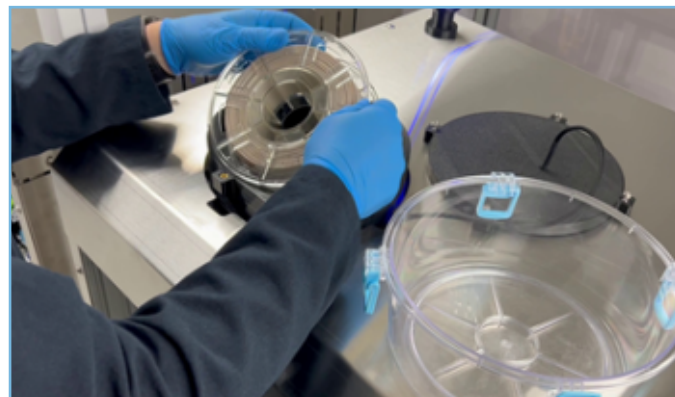
PEEK's semicrystalline structure provides desirable mechanical and thermal properties, but also makes it more difficult to 3D print compared to molding, in which all the material is heated and solidified all at once. To 3D print PEEK, it must be heated a little at a time to temperatures above 400°C so that the material can be extruded from the printer nozzle. As the polymer cools after deposition it forms the crystalline structure that provides its strength, a process that can also result in significant warping or shrinkage.

To take advantage of PEEK's material properties and counter their downsides, Curiteva uses a modified form of fused filament fabrication (FFF) or material extrusion 3D printing called Fused Strand Deposition. FSD is a proprietary process that was originally developed by Todd Reith under his company, Fossil Labs. Curiteva, which produces medical implants through multiple manufacturing processes, acquired Fossil Labs and its IP in 2020 in order to use FSD to produce its own products in-house. Reith joined the company as well, and serves as vice president of emergent technologies and additive manufacturing. While FSD is similar to the more common FFF technology, it has been tailored to both enable and take advantage of PEEK's unique material properties.



Curiteva develops and manufactures the 3D printers capable of performing fused strand deposition with PEEK. Each build begins with a raft of material which elevates the implant from the platform. Source: Curiteva

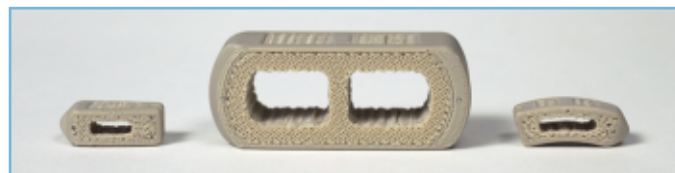
"One of the most difficult things about printing PEEK is the large delta between the glass transition temperature and the melt temperature," Reith says. "The glass transition temperature is around 140 to 150° Celsius, and the melt starts around 350 to 380°C. Because of that, the material wants to move quickly into a crystalline state. We have tailored our technology around the deposition so that we can slow down this crystallization process. We're actually pulling strands, much like you would glass or other materials."



The PEEK filament undergoes a drying step before it is loaded into the 3D printers to produce implants. Source: Curiteva

While standard FFF deposits filament at a consistent rate and diameter, the company's FSD printers actually stretch the softened PEEK filament as it is extruded. This action allows for more control over the crystallization, enables better bonding between layers, and gives the polymer strands the chance to properly align themselves, Reith says. The pulled-strand approach also creates tension inside each layer that improves the printed material's strength and durability.

"Each layer can be put in compression," says Erik Erbe, chief scientific officer at Curiteva. "It is a toughening and strengthening mechanism. We achieve a compressive strength six times what is required for physiologic loads because of this 3D printing approach."



3D printing enables each layer to be put in compression as it is deposited through FSD, and also makes possible novel porous structures that support osseointegration.

The FSD 3D printing process enables Curiteva to take advantage of PEEK's unique material properties as well as apply this polymer in new geometries. The layer-by-layer method of manufacturing allows for novel porous structures that can extend throughout an implant, better enabling bone in-growth and healing.

### 3D Printed Implants in Production

Curiteva achieved FDA clearance for its first 3D printed PEEK product, the Inspire line of cervical spine implants, in 2023. About 30 different sizes and configurations are offered. These devices are used in patients with cervical disc generation or cervical spinal instability, and the 3D printed product was demonstrated to be equivalent to a predicate cervical interbody fusion system that the company machines from PEEK.

Achieving 510(k) clearance for the cervical spine implants took more than 18 months and close collaboration with the FDA because of the new manufacturing method. In the first year since clearance, around 50 surgeons have adopted the devices; more than 2,000 Inspire devices have been implanted in about 1,000 patients (with some having two or more implants), with no revision surgeries.

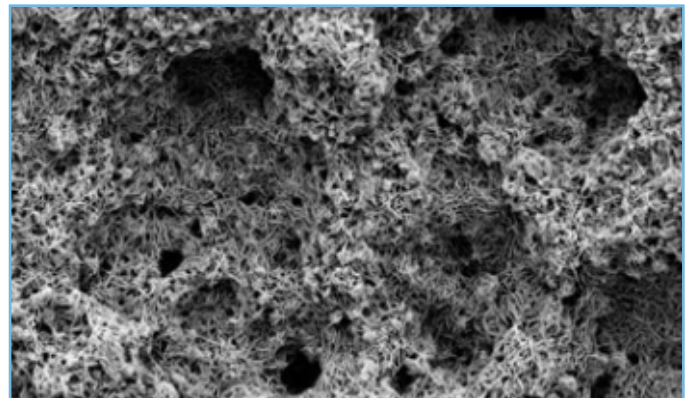
In early 2024, the company achieved clearance for a second product line of implants for the lower lumbar spine, this one consisting of more than 1,300 SKUs; because of the groundwork laid with the earlier cervical line, the new lower lumbar implants were cleared in just 57 days.

Curiteva manufactures both spine implant lines at its production facility in Huntsville, Alabama, through FSD printers housed in a cleanroom environment. Each implant is printed one at a time to maintain precise control over its thermal history on FSD machines produced by Curiteva, using PEEK filament from Evonik. After printing, support structures are removed (consisting primarily of a "raft" that holds the part slightly above the build plate) and the parts are cleaned with isopropyl alcohol and annealed for stress relief.



Minimal finish machining is performed on the printed PEEK spine implants. Only about 2% of the material is lost as scrap. Source: Curiteva

Because the PEEK material is radiolucent and invisible to an X-ray, the next step in the manufacturing process includes machining to finish surfaces and to drill holes in each implant to install titanium marker pins for visibility. (One side effect of 3D printing versus machining PEEK is that there is far less material waste and expense. Curiteva sees only 2% waste from machining of these implants, which means that almost all of the PEEK it is purchasing as filament is used in the final part.)



To support osseointegration, the hydrophobic PEEK receives a coating of hydroxyapatite (HA, shown here close up) to make it more hydrophilic. Source: Curiteva

After another round of cleaning and laser marking, parts leave the cleanroom to depart to a supplier for a hydroxyapatite coating — a step necessary to make the naturally hydrophobic PEEK more hydrophilic, and therefore better able to support osseointegration. Finally, implants return to Curiteva for sterile packaging and are held in inventory until ordered.



Curiteva currently runs two 10-hour shifts per day, five days a week to meet its 3D printing production needs. Its nine production-qualified FSD 3D printers are enough to fulfill demand for the implants at the moment. However, the cleanroom can hold up to 20 printers, and the company anticipates scaling up in the near future.



3D printed implant production takes place almost entirely inside this cleanroom at Curiteva's Huntsville, Alabama, facility. Parts leave to be coated in HA at a supplier, and then return for sterile packaging and storage. Nine FSD 3D printers can support the company's implant production, but the cleanroom has space for as many as 20 of these machines.

(Source: Plastics Technology / 25.12.2024)

### Thermal Insulating Sheet Targets Highly Stressed Molds

Hasco's Z12120/... thermal insulating sheets prevent uncontrolled heat dissipation from injection and compression molds into the platens.

Hasco's rectangular thermal insulating sheets Z12120/... were especially designed for highly stressed molds with strong insulating properties, resulting in high process reliability. Featuring outstanding thermal properties, the sheets have a low coefficient of thermal conductivity in combination with high thermal compressive strength to make them well suited for heat insulation in demanding production processes. In addition to insulative properties, the sheets also provide high chemical resistance for long service life and reliability in extreme conditions.

Hasco's Z12120/... thermal insulating sheets have a coefficient of thermal expansion similar to that of the steel molds they insulate. Source: Hasco

In addition to the thermal resistance of the Z12120/..., which boosts process reliability, the sheets also provide a reduction in energy consumption. Hasco says use of this thermal insulating sheet can result in energy savings of up to 50%.

Made of high-grade glass fiber fabric and high-temperature resin, the Hasco thermal insulating sheets offer good dimensional stability, in addition to high temperature resistance. The coefficient of expansion of the sheets is comparable with that of steel, ensuring a reliable fit even under extreme temperature conditions.

(Source: Plastics Technology / 25.12.2024)

### BOSTIK and BRÜCKNER MASCHINENBAU Partner to Deliver Full-Service Approach to Lidding Films

BOSTIK, the adhesive solutions segment of Arkema and BRÜCKNER MASCHINENBAU (BRÜCKNER), a global cast extrusion line manufacturer, have partnered to help film producers develop a coextruded, peelable, BOPET lidding film that addresses demands for streamlined production efficiencies, improved consumer ease of use and reduced end of life impact when used with optimized equipment.



This partnership is driven by the need to offer a full-service approach to manufacturing lidding films. It entails providing film producers with raw materials, such as resins and adhesives, as well as training on how to optimize equipment settings to produce a direct food contact compliant, BOPET lidding film efficiently and effectively.

To do this, the companies combined BOSTIK's know-how in specialty copolyesters design and formulation with BRÜCKNER'S expertise in designing

cast extrusion lines. To simplify processes, film producers can coextrude the resins and adhesives to manufacture the film in one pass, which reduces overall energy usage compared to other film production that require multiple steps.



Additionally, the finished film exhibits peelable behavior that addresses consumer preferences for ease of use as well as seal safety for meat, dual ovenable, produce and fruit fresh cuts packages and more. Moreover, converters can reduce complexities and associated costs, as they do not have to modify the film via a coating process with a seal/peel layer once they receive it.

Finally, as a full PET-based product, the film helps enable a mono-material package design and can be recycled with PET thermoform trays.

Thanks to this full-service approach, BOSTIK and BRÜCKNER may also provide film producers with training on how to best utilize the equipment, in order to reduce downtime, including associated waste and energy costs, and quickly deliver quality films to converters.

(Source: BOSTIK/17.12.2024)

### **Berry Global and VOID Technologies Collaborate to Launch High-Performance, Sustainable Film for Pet Food Packaging**

Berry Global Group, Inc. and VOID Technologies are excited to announce their successful collaboration to commercialize a new high-performance polyethylene (PE) film designed for pet food packaging. This innovative film delivers superior strength, toughness and puncture resistance, enabling an all-PE solution suitable for store drop-off recycling while helping eliminate problematic non-recyclable materials.

The collaboration leverages VOID's patented VO+™ technology, utilizing its 1300 Series PE Voiding Agents and Berry Global's proprietary film formulation and MDO process knowledge. This unique combination creates cavitated micro-scale air pockets in the film, reducing plastic density and boosting opacity. This technology allows manufacturers to produce high-performance films with less plastic, helping reduce CO2 emissions and waste while maintaining compliance with direct food contact standards in North America and Europe.

The VO+ cavitated film structure significantly improves toughness for high-abuse, demanding applications in flexible packaging. VO+ also enables plastic reduction, density reduction, and high opacity without pigments, creating higher-yield PE-based films that provide more sustainable technical solutions for mono-material recycle-ready packaging.

Berry and VOID continue working to expand the impact of their collaboration while exploring other market applications.

(Source: Berry/17.12.2024)

### **Fast Leak Tester for 'Tricky' Applications**



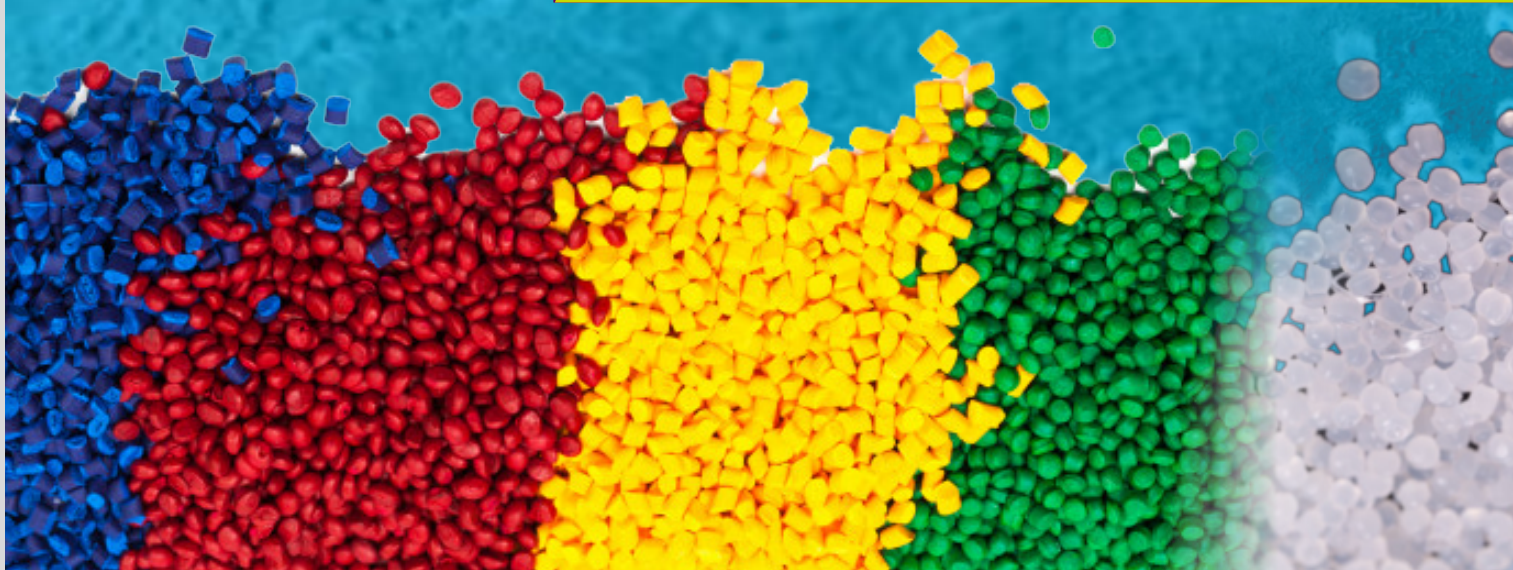
BottleStop multihead leak tester for up to 65 containers/minute. Source: ALPS Inspection.

New BottleStop leak tester from ALPS Inspection handles large, angled-neck and trouble-prone HDPE

containers at up to 65 per minute.

The latest automatic leak tester from ALPS Inspection is the BottleStop system for "tricky" applications like HDPE angled-neck containers, large containers and ones prone to choked-neck defects. Target applications include household toilet bowl cleaners and containers for industrial chemicals and automotive fuel additives. The new unit inspects up to 65 containers per minute with two, three or four heads. Container diameter or length can be 1 to 13 inches.





## DOW Transforms the Comfort Experience with Production of VORANOL™ WK5750 at Freeport Polyol Plant

DOW (NYSE: DOW) announced that VORANOL™ WK5750, a cutting-edge polyether polyol, is set to be produced at its Freeport polyol plant, marking its continued commitment to high application performance. With its unique design and ability to produce soft and hypersoft foams, VORANOL™ WK5750 aims to transform the comfort experience in products such as mattresses and furniture. Its ability to serve as a powerful cell opener further extends its utility to viscoelastic and high resiliency foam applications, offering unprecedented softness and resilience. As a critical enabler of specialty slabstock flexible foam applications, VORANOL™ Wk5750 also offers:

Enhanced reactivity, ensuring superior cross-linking for a broad spectrum of applications. Optimal viscosity, providing a good range of 1000-1500 cSt at 25 °C to balance ease of processing and quality performance. High standard of purity and quality, delivering a maximum water content of 0.06 Wt %. Aesthetic appeal with a maximum color specification of 50 APHA, ensuring products maintain visual quality.

## OLIN to Enter Polyvinyl Chloride Business

Olin stated that the company intends to enter the polyvinyl chloride (PVC) business. Olin already produces vinyl chloride and ethylene dichloride (EDC), two key PVC raw materials, and says the US is the least expensive place to make PVC because of low-cost shale gas. The company says its options include forming partnerships with existing PVC producers, entering the field through acquisition, and building its own PVC plant on the US Gulf Coast. It already has a deal to ship EDC to the European PVC producer Kem One and sell the resulting polymer in North America.

## Scientists Develop 'Environmentally Friendly' Plastic that Dissolves in Sea Water

Whether its food packaging from a shop, or drinking juice from a plastic bottle, single-use plastics are a common part of life for many people.

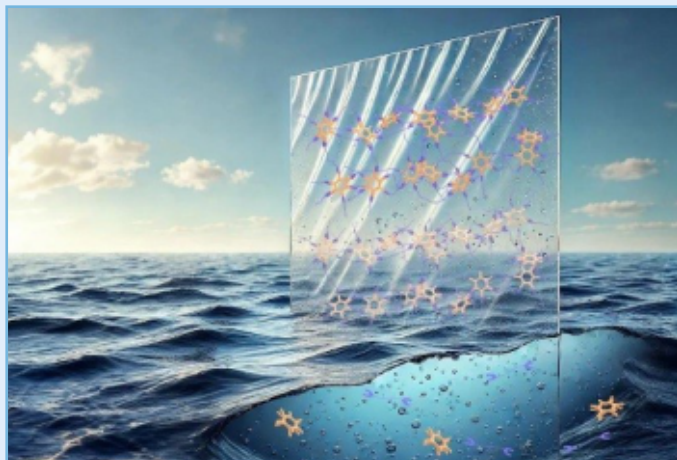
But it's a big issue for nature and the environment.

Each year millions of tons of plastic ends up in the sea, most of which isn't biodegradable. That means it doesn't break down over time, like paper or food, so instead it can hang around in the environment for hundreds of years.



And, when larger pieces of plastic such as drinks bottles do break down, they can turn into much smaller pieces, called a micro plastics, which can be swallowed by wildlife.

Scientists and manufacturers have been looking for environmentally friendly alternatives to conventional plastic and researchers in Japan say they have now developed a version of the material that will fully dissolve in the ocean.



An artist's impression of the new plastic, which breaks down in soil and salt water

### How was the recyclable plastic discovered?

While some recyclable plastics do exist, the main problem is what happens when they enter the sea, as they don't break down in water. In fact, some plastic waste can take more than 500 years to break down at all.

To solve the problem, scientists at the Riken research institute in Japan worked to develop a plastic that would remain strong but would be able to fully break down in environments such as soil and sea water, without leaving any micro plastics behind.

Tests showed that the new plastic would start to break down within hours when placed in salt water. And, when put into soil, the sheets of the new plastic degraded in 10 days and supplied a chemical similar to fertilizer, which helps keep soil healthy.

Takuzo Aida, who led the study, said: "With this new material, we have created a new family of plastics that are strong, stable, recyclable, can serve multiple functions, and importantly, do not generate micro plastics."



Child picking up plastic bottle



Bottles at the bottom of the sea

(Source: BBC/24.11.2024)

## SABIC Polycarbonate Copolymers Resistant to Chemical Exposure

Specialty materials for mobility, electronics, industrial and infrastructure markets.

SABIC has introduced LNP Elcres CXL polycarbonate (PC) copolymer resins, featuring chemical resistance. According to the company, these specialty materials are well suited to help customers in the mobility, electronics, industrial and infrastructure markets address increased exposure to harsh chemicals that can cause environmental stress cracking and premature failure. In addition to providing high chemical resistance, LNP Elcres CXL copolymer resins can enhance part durability and reliability with low-temperature impact resistance and weatherability.

SABIC's internal testing revealed that LNP Elcres CXL copolymer resins are highly resistant to diverse chemicals found in the mobility, industrial,

infrastructure and electronics sectors. Representative mobility and infrastructure chemicals were tested. They included gasoline, antifreeze, caustic soda (5% solution) and a number of related chemicals. For industrial applications, testing against typical chemical exposures included tar remover, brake fluid and many other substances. In cases where consumers interact with mobility, industrial and infrastructure devices, LNP Elcres CXL copolymer resins can offer improved chemical resistance to the components found in hand creams, sunscreens, insect repellents, cleaning solutions and hand sanitizers.



SABIC says its new PC resins are suited to electronics and mobility markets. Source: SABIC

The new SABIC CXL portfolio offers a wide range of products, including opaque and transparent non-flame retardant (FR) grades, opaque, thin-wall FR grades and glass-reinforced options. These materials also deliver nonbrominated / nonchlorinated FR at thin gauges, low-temperature ductility (down to -60°C), high flow for easy processing and good colorability to meet aesthetic requirements. They can meet both ultraviolet (UV) and water immersion requirements (f1 rating) for outdoor suitability under UL 746 C.

To help provide a path toward carbon neutrality, SABIC offers ISCC Plus-certified bio - renewable versions of the new materials, supplied under the LNP Elcres CXL brand. They use bio-based alternative feedstocks with a lower carbon footprint compared to traditional feedstocks. These bio-based grades can reduce carbon dioxide (CO<sub>2</sub>) emissions compared to traditional materials, while delivering the same performance. These grades are new additions to the company's Trucircle program.

(Source: Plastics Technology / 24.12.2024)

## HROC: Elevating Plastics Performance with Innovative Additives

H. R. Organo Chem Pvt. Ltd. (HROC) offers plastics additives for PVC, engineering plastics, biopolymers and thermosetting resins.

Plastic additives that they offer, help you to make your products better - whether it be impact resistance, processing improvements, toughness or other benefits. The company focusses on application specific technology to help one choose the right additives for the process.

From acrylic and methacrylate butadiene - styrene (MBS) impact modifiers to acrylic processing aids, their full range of additives will overcome the expectations for the reinforcement and the processing of thermoplastics and for the toughening and the processing of thermosetting resins.

Their plastic additives - including impact modifiers, processing aids, lubricants, rheology modifiers and gloss modifiers will boost performance of PC (and alloys), PVC, CPVC, PLA etc.

With a proven track record across applications worldwide, these additives will help the customer improve their products while meeting and exceeding customers' needs.

## Steel Yourself: Quicker, Better Processing for Strong Plastics

### Industrial Chemistry and Materials:

A strong and impact - resistant plastic that is comparable to steel could be on its way to more efficient processing thanks to new strategies introduced and tested by researchers based in England.

They published their results on 18 Oct 2024 in the journal Industrial Chemistry & Materials.

The team proposed and tested four approaches to improve the melt processibility — the process of melting a liquid material and reforming it into a solid shape or structure — of the material known as ultra-high molecular weight polyethylene, or UHMWPE. Melt processibility can become complicated when the material has high melt viscosity, meaning the liquid is thick and resists flow, according to corresponding author Dermot O'Hare, professor of chemistry at the University of Oxford.

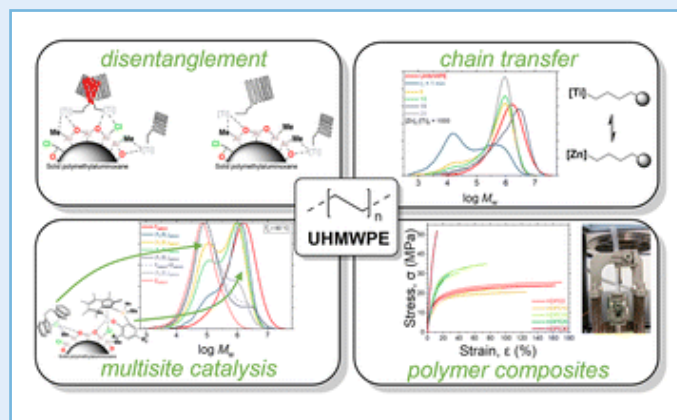


Image: Four strategies to enhance the processability of UHMWPE are explored using Heterogenised Metallocene Catalysts to produce polymers with decreased melt viscosity and excellent mechanical performance.

“UHMWPE, defined by a molecular weight in the millions of Daltons that indicates the molecule's large size and complex nature, is a specialty grade of polyethylene considered an important engineering plastic due to its desirable properties,” O'Hare said, noting applications exist for UHMWPE in the biomedical, maritime, aerospace and ballistics sectors. “However, due the long chains comprising the molecule creating entanglements, UHMWPE can be difficult to process. We investigated four strategies to improve UHMWPE melt processability, which is the chief limiting factor to applications of this high-performance polymer.”

The team first used active site engineering, which can accelerate and enhance material reactions, and found that it could substantially disentangle the large, complex molecule. By again targeting the chains comprising the material, the researchers next employed chain transfer agents, or molecular modifiers, to change the polyethylene's weight and distribution. They also found that introducing small molecules into the UHMWPE improved the material's processability without sacrificing the desired mechanical properties. Finally, the researchers determined that blending UHMWPE with high-density polyethylene helped improve processability.

“These approaches and combinations thereof are considered crucial to expanding the applicability of UHMWPE,” O'Hare said.

Next, the researchers said they plan to further investigate how combining various processing approaches may enable development of materials with novel properties.

Other co - authors are Clement G. Collins Rice, Alexander Evans and Zoë R. Turner, Chemistry Research Laboratory in the University of Oxford Department of Chemistry; and Jirut Wattoom, SENFI UK Ltd., Centre of Innovation and Enterprise, Begbroke Science Park, and SCG Chemicals PLC. Collins Rice is also affiliated with SENFI UK Ltd., Centre of Innovation and Enterprise, Begbroke Science Park.

SCG Chemicals PLC and the Engineering and Physical Sciences Research Council Impact Acceleration Account supported this research.

(Source: EurekAlert!/ 16.12.2024)

## Gevo and LG Chem Extend Joint Development Agreement for Bio-Propylene

Gevo, Inc. (GEVO) and LG Chem, Ltd. (KRX: 051910), leading global chemical companies committed to producing sustainable products, are extending their joint development agreement (the “Agreement”). The agreement extension enables LG Chem to assess existing assets for deploying Gevo's Ethanol-to-Olefins (“ETO”) technology while accelerating commercialization activities, considering project scale and end-product markets.

Gevo's patented ETO technology can target carbon-neutral or carbon-negative drop-in replacements for traditional petroleum-based building blocks. These are core olefins that can be used for renewable fuels and chemicals, including sustainable aviation fuel and bio-propylene. ETO technology is just one of multiple patented technologies that Gevo is bringing to bear on the challenges of developing cost-effective bio-based renewable fuels and chemicals.

Because it can replace fossil-based products as a renewable raw material for various plastic products, bio-propylene is expected to play a pivotal role in the rapid growth of the bioplastic market and circular economy. Once commercialization is achieved, bio-propylene could be used as a drop-in replacement for use in a range of products from auto parts to flooring to diapers to replace petroleum products with bio-based materials with a low or negative carbon footprint.

(Source: gevo/ 12.12.2024)





## Fixed Tank Dual Shaft Mixer / Pressure Reactor

This mixer is said to be well suited for processes that require meticulous control over mixing, temperature and pressure in a compact and portable module.

Built to handle a wide range of formulations and viscosities, the ROSS FDA-50 Fixed Tank Dual Shaft Mixer is a custom-designed agitated pressure reactor that's said to be well suited for processes that require meticulous control over mixing, temperature and pressure in a compact and portable module. The stainless steel type 316 dished bottom vessel and removable dished cover can accommodate internal pressures up to 100 psi, stamped according to ASME Section VIII, Div. I.

The mixer/reactor is equipped with two agitators. The high-speed disperser features two 6" sawtooth blades — one fixed at the bottom and one adjustable along the shaft. It is driven by a 5-hp explosion-proof motor up to 1,760 rpm, creating a vortex into which dry ingredients can be delivered for fast wetting. The disperser is belt-driven with removable drive motor, belt and guard. The two-wing anchor agitator is direct-driven by a 5-hp explosion-proof removable gear motor up to 45 rpm, designed with a heavy-duty triangular cross section and removable Teflon sidewall scrapers.



Source: ROSS

The anchor feeds product toward the high - speed disperser blades and ensures that the batch contents are never stagnant in any one area. Dry - running single mechanical seals compatible with various solvents are utilized

on the mixer shafts. All product wetted surfaces are polished to 320-grit finish.

The FDA-50 also includes a 2" flush tank discharge ball valve with a sanitary outlet connection, and an assortment of sanitary inlet ports on the cover. The mobile mixer stands on four splayed stainless steel legs with foot pads and no marking urethane casters — two rigid and two locking — for stability and easy movement.

## ARBURG at Mecspe 2025

Mecspe in Bologna is Italy's leading trade fair for the manufacturing industry. From 5 to 7 March 2025, Arburg and its sales partner Guberti will be at Stand B34 in Hall 36 presenting the new electric Allrounder 720 E Golden Electric, whose slim design and attractive price are sure to impress.

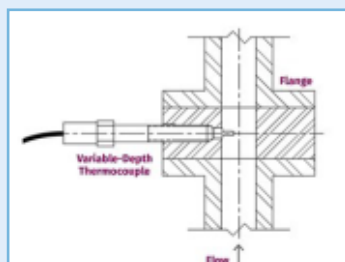
The exhibition highlight is an Allrounder 720 E Golden Electric. This electric injection moulding machine, with a clamping force of 2,800 kN and injection unit 800, extends the product range of the eponymous electric series upwards. Its main advantages are its streamlined design and price. The exhibit is equipped with a 16 - cavity hot runner mould from Ewikon, which features new lateral needle-type shut-off technology, making it possible to achieve compact mould dimensions without compromising on the number of cavities. This is of particular interest for the efficient series production of small parts, such as those used in the medical, pharmaceutical, cosmetics and packaging sectors. The production of thin - walled medical test tubes made of PS will be demonstrated at Mecspe by way of example.

(Source: ARBURG/15.01.2025)

## What You Need to Know About Melt - Temperature Measurement in Single - Screw Extruders

Measuring the discharge temperature is not so simple, especially when using thermocouples positioned in the transfer line just upstream of the die.

To be profitable, a single-screw extruder must operate at the maximum rate while discharging at a specified pressure and temperature. Measuring the rate and discharge pressure from an operating extruder is easy and straightforward. Measuring the discharge temperature, however, is not so simple, especially using thermocouples positioned in the transfer line just upstream of the die. This configuration is used widely for commercial extrusions. The difficulty occurs due to the high thermal conductivity of the surrounding metal and the low thermal conductivity of molten resins.



**Figure 1:** Schematic of a variable - depth thermocouple positioned in a flange of a transfer line. Source: Mark Spalding

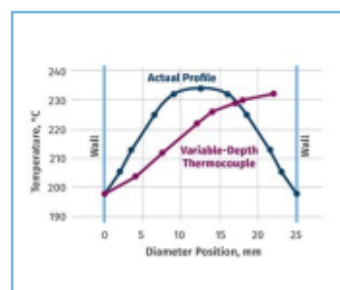
For example, a variable depth thermocouple positioned in a transfer line and through a flange is shown in Figure 1. The thermocouple measures the temperature at the

junction at the tip of the probe. The temperature at the tip of the probe depends on thermal conduction and convection in the local region. The sheath of the probe is typically made from stainless steel while the transfer line is constructed from carbon steel. The thermal conductivity for stainless steel is  $17 \text{ W / (m}^\circ\text{C)}$  and for carbon steel it is  $52 \text{ W / (m}^\circ\text{C)}$ . The molten plastic flowing in the transfer line, however, has a thermal conductivity of about  $0.25 \text{ W / (m}^\circ\text{C)}$ .

Thus, the thermal conductivity for the surrounding metal is between 70 and 200 times higher than that for the molten resin. Because of this wide difference in thermal conductivities, the junction of the thermocouple is highly influenced by the transfer line temperature and to a lesser level from the molten resin.

This measurement problem is clearly identified with a series of experiments. These experiments were performed using a 1.25 - inch diameter single-screw extruder connected to a 25-mm diameter transfer line. The conditions of the extruder were held constant with a rate of 15 lbs/hr. of LDPE at a screw speed of 60 rpm. The transfer line pipe was maintained at either  $183^\circ\text{C}$  or  $220^\circ\text{C}$ .

The temperature profile of the flowing resin in the transfer line was measured using a plastic bridge constructed using a high - temperature resin (not shown). The bridge was positioned across the flow stream, and it was designed to eliminate energy conduction through the thermocouple device. It was positioned in the middle flange in Figure 1. Thus, the bridge device contained several thermocouples and measured the actual temperature of the flow, and virtually eliminated the thermal conduction problem.



**Figure 2:** Actual temperature profile and the profile measured using a variable depth thermocouple positioned in a transfer line. The transfer line pipe was controlled to a temperature of  $183^\circ\text{C}$ .

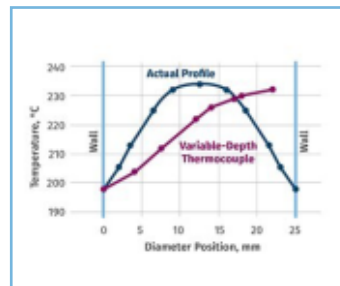
The bridge was too fragile to be used in commercial operations. The transfer line carbon steel pipe was controlled at a temperature of  $183^\circ\text{C}$ . The radial temperature profile from the bridge device is shown by the "actual profile" line in Figure 2. Here the profile is parabolic with the lowest temperature

being at the wall at 198°C, and the temperature at the center of the pipe at 233°C. This profile occurred because the extruder was discharging at a temperature near 233°C, and the transfer line was in a cooling mode with the pipe temperature at 183°C. The flow velocity in the downstream direction was parabolic and symmetric to the pipe axis.

Next, a variable-depth thermocouple was positioned in the transfer line as shown in Figure 1. The temperature at the junction was measured as a function of the insertion depth, as shown by Figure 2. Here, the measured temperature increased as the probe was inserted deeper into the transfer line. The maximum temperature was at an insertion depth of 22 mm at 232°C. Commercially, melt temperature measurements are obtained using probes that are flush mount to the wall. For this experiment, the temperature near the wall was measured at 198°C. This measurement is clearly in error as the bulk of the material is at a temperature near 233°C.

Moreover, the actual temperature from the bridge device at 22 mm into the stream was measured at 213°C. A high level of thermal conduction through the sheath of the variable - depth thermocouple, however, provides an incorrect measurement at 232°C at the probe junction. At 22 mm into the stream, the conduction through the sheath, however, provided a good estimate of the bulk temperature. Insertion of a thermocouple 90% across a flow stream is commercially impractical, especially for larger diameter pipes. The forces from the viscous flow can be high enough to bend the probe.

The transfer line pipe temperature was then increased and controlled at 220°C. The operation of the extruder was unchanged and thus the extrudate should be at the same temperature as before. The actual temperature profile was measured using the bridge device and it is shown in Figure 3. The inside wall temperature was 229°C, and the actual temperature profile was parabolic with the maximum temperature of 234°C at the center. The profile is considerably flatter than that shown in Figure 2 with a pipe temperature of 183°C. It is obvious that the thermal gradients are very small. A pipe temperature of 220°C did not induce the high level of cooling that was observed for a pipe temperature at 183°C.



**Figure 3:** Actual temperature profile and the profile measured using a variable depth thermocouple positioned in a transfer line. The transfer line pipe was controlled to a temperature of 220°C

The variable-depth thermocouple measurements were nearly linear from 229°C at the wall to a maximum temperature of 235°C at a depth of 22 mm. For a commercial transfer line with a flush - mount thermocouple, the temperature would be reported at 229°C, a temperature close to the bulk temperature of 233°C. A variable-depth thermocouple that would be inserted 4 mm into the flow would report a temperature of 230°C. The probe experiences less thermal conduction from the transfer line pipe, and it provides a better measurement of the resin flow.

The transfer line should not be used as a method to decrease the discharge temperature from an extruder. As shown in Figure 2, a considerable level of thermal gradients was developed in the flowing resin during cooling. The gradients will affect the viscosity of the resin and possibly distort the shape or thickness of the product coming out of the die. Instead, the transfer line should be controlled near the bulk temperature of the extrudate, minimizing thermal gradients at the die. Because the bulk temperature of the extrudate is typically not known, it should be occasionally measured using a handheld thermocouple in the extrudate exiting the die. The transfer line pipe temperature should be controlled near this temperature.

(Source: Plastics Technology / 30.12.2024)

### ENGEL Group Enters Strategic Partnership with EPM to Expand Indian Market Presence

THE ENGEL Group, Europe's leading supplier of injection moulding technology, has entered a strategic partnership with Electronica Plastic Machines (EPM), a renowned Indian manufacturer of hydraulic injection moulding machines. By acquiring a stake in EPM, the company becomes part of the ENGEL Group, creating opportunities for closer cooperation in the Indian market.



# CIRCULAR ECONOMY/ BIO-PLASTICS/ RECYCLING



## Dubai Bans Single - Use Plastics in a Push toward Net Zero Emissions by 2060

Dubai has expanded its list of banned plastic items, effective January 1, 2025, as part of its efforts to achieve Net Zero Emissions by 2060. The newly banned items include plastic straws, stirrers, cotton swabs, table covers, cups and expanded polystyrene foam food containers commonly used for takeaway meals.

Hamdan bin Mohammed, the Crown Prince of Dubai, announced a phased approach to regulating single-use plastic products in the Emirate. Plastic bags were banned starting January 1, 2024, followed by single-use plastic bags on June 1, 2024. Now, single-use plastic products are included in the ban beginning January 2025. The prohibition has been extended to include tablecloths, cups and food containers made of Styrofoam.

The third and final phase of the plastic products ban is set to take effect on January 1, 2026. It will include plates, food bowls, and plastic cutlery. The resolution prohibits the manufacturing, trading, and wholesale and retail sale of these items in local markets.

However, certain exemptions are outlined in the resolution. Exempted items include thin bag rolls used for packing meat, fish, vegetables, fruits, grains, bread, garbage bags and products intended for export or re-export outside the country.

Business units involved in the production, handling, warehousing, and retailing of these banned single-use plastic items were given sufficient time to implement the prohibition. The initial announcement was made in December 2023, ahead of the United Nations Framework Convention on Climate Change (UNFCCC) 28th Conference of Parties (COP28), held from November 30 to December 13, 2023, in Dubai. Notably, the Emirates has committed to achieving carbon neutrality by 2060.

## LG Display, Hanwha Solutions Collaborate to Develop Eco-Friendly Packaging with Recycled Plastic



LG Display's employees introduce the company's eco-friendly packaging made with recycled plastic in this photo released by the display maker, Monday. Courtesy of LG Display

LG Display said on Monday (23rd December 2024) that it developed eco-friendly packaging for electronic components using post-consumer recycled plastic in collaboration with Hanwha Solutions.

Post - consumer recycled plastic is a sustainable material derived from recycled plastic products previously used by consumers. By repurposing these materials, post-consumer recycled plastic enhances resource circulation and lowers carbon emissions.

The new packaging material is made from post-consumer recycled plastic certified by Control Union, a global environmental certification organization, and meets the Global Recycled Standard.

To ensure the new packaging solution would meet the quality of conventional materials, LG Display and Hanwha Solutions conducted two years of joint research. LG Display concentrated on optimizing design and verifying performance, while Hanwha Solutions focused on refining and processing raw materials.

According to LG Display, the new packaging is expected to reduce carbon emissions by approximately 520 tons annually, which represents about 40 percent of the previous carbon output.

The company will start using this sustainable packaging for its automotive display panels in January next year, with plans to gradually expand its use across other product lines.

"We will continue to innovate in eco-friendly materials to contain negative impacts on the environment and provide our customers with differentiated value," Kwak Tae-hyoung, head of LG Display's material research division, said.

(Source: TheKoreaTimes/23.12.2024)

## Doğa Opens PET Bottle - to - Bottle Recycling Facility in Türkiye

PET bottle - to - bottle recycling is picking up momentum in Türkiye: Istanbul - based construction corporation-- Doğa has set up a PET recycling facility in Kırklareli and recently commissioned two Starlinger PET bottle-to-bottle recycling lines.

The recycling site, operated under the name of DOĞAPET, is located in the city of Kırklareli in Marmara province close to the Bulgarian border and features sustainable construction and the use of renewable energies and resources. The two Starlinger recoSTAR PET 165 HC iV+ PET recycling lines have been commissioned during the fourth quarter of 2024 and reach a combined output of 3.6 tons of bottle-grade recycled PET pellets per hour, amounting to a total capacity of 28,000 tons per year. The Starlinger PET bottle-to-bottle recycling process has been approved for food-grade applications by national and international authorities such as FDA and EFSA as well as by important brand owners.

Currently, the use of bottle-grade rPET obtained from mechanical recycling for food applications is not permitted in Türkiye; only rPET produced by means of chemical recycling may be processed into new beverage bottles or food containers. However, bureaucratic procedures permitting the use of mechanically recycled PET for bottle - to - bottle applications are expected to finish in the course of 2025, together with the implementation of a deposit system for plastic bottles.

DOĞAPET currently sources the post-consumer PET bottles for recycling in Türkiye. Like in many other countries, plastic scrap collection and presorting of the material is in the hands of the private sector, although the government is preparing to implement measures such as the afore-mentioned bottle deposit system. "The pre-sorting processes for used PET packaging in Turkey are really good, and consequently also the quality of the material", explained Gerlikhan. "In addition to the raw materials which we currently source through the separate waste collection system we will be able to obtain input material also through the PET bottle deposit system once it is in place. When we are ready to increase capacities, we will also process material from outside Türkiye if necessary."

DOĞAPET is going to supply the bottle-grade rPET to global beverage and water companies that are important brands in their sectors.

### About Doğa

With a strong focus on sustainability – "Doğa" means "Nature" – the corporation which was founded in 1968 is quite diversified, being active in the fields of construction and real estate, renewable energy and



textiles production, as well as in the defense industry. In 2023 the company DOĞAPET was founded, adding the business field of PET recycling to the corporation's varied portfolio of activities.



Doğapet operates two Starlinger recoSTAR PET 165 HC iV+ PET bottle-to-bottle recycling lines with an output capacity of 1.8 tons per hour each.



Starlinger's food-grade PET recycling process has been approved by FDA, EFSA and many international brand owners.

(Source: Starlinger/12.05.2024)

### Optical Sorting for Color Flexibility in Recycled Plastics

Aaron Industries added optical sorting to its operation, expanding capabilities to meet the color needs of customers.

Aaron Industries, a compounder of recycled materials including recycled PS, PP and PE from postindustrial and postconsumer sources, was able to enhance its flexibility and product offerings by implementing an optical sorter.

Aaron serves customers in a wide range of industries, from housewares to agricultural. The company buys recycled granules from outside partners that process plastic waste by grinding, elutriation, sink/float sorting and wash. Aaron pre-blends different regrinds using a proprietary process to hit the customer's desired mechanical or aesthetic properties.

Recycled materials are often a blend of different colors that end up as a black or gray. For some customers and some applications, that's not a problem. But for many consumer goods, color is very important. Color can set a brand apart and add shelf appeal, influencing buying decisions. Therefore a supplier of recycled compounds can extract more value from a given material stream by improving color management.

"Customers have always and will always ask for colors — or natural, because they want the flexibility of coloring it whatever they want," says Todd Marchand, vice president at Aaron Industries.



Plastic granules, before and after undergoing Aaron's optical sorting process. Source: Aaron Industries.

In response to customer needs, Aaron Industries purchased and implemented an optical sorting machine last year. The new equipment uses a color camera and LED lighting to separate granulated material by color. Recently, Aaron began using the system at full-scale, commercial truckload volumes.

For certain streams, the sorter expands what Aaron can do, turning a mixed stream into a stream that is closer to a particular color, or closer to white or natural. "We're not matching colors to an actual Pantone," Marchand explains. "It just opens up the palette for what we can do with that particular stream."



Each sort brings the material closer to a desired color, not eliminating the other colors entirely but bringing them to a level that makes the resin more usable. The new sorting equipment enables Aaron to produce variations of red, blue, green, yellow, orange, white and even lighter shades.

A recycled stream will not typically be sortable to a pure natural, for example, it can be mostly natural with a hue to it, which can be colored or matched to an application. "It's tough to sort something to 100%, so a lot of the products we make will have a greenish or bluish hue to them that can be colored over, or won't matter much if the customer is going to make blue or green anyway," Marchand says. "But it certainly provides more options to the end user."

After sorting, sometimes with multiple iterations, materials go on to one of Aaron's six extrusion lines for blending and pelletization. Finally, postblending assures the customer receives a uniform and consistent product.

The FDA has issued letters of no objection to Aaron for recycling of polyethylene and polystyrene, which enables their use in food contact applications. These materials can also be enhanced by the sorting system, enabling Aaron to work with a customer to offer a compound that includes recycled material in a color that will work for their application.

The company also works with virgin materials, offering mixed content compounds to customers that want to incorporate recycled materials but also need the virgin content for more stable processing and better mechanical properties. Aaron has a minimum batch size for optically sorted material of just 1,000 lbs, with no maximum.

(Source: Plastics Technology)

### Indian Govt Opposes Regulating Production of Primary Plastic Polymers

This statement came as a global meeting in South Korea's Busan to finalise a legally binding treaty to combat plastic pollution ended without an agreement.

India on Sunday said it did not support any measures to regulate the production of primary plastic polymers as it could impact the development rights of nations.



Press Trust of India - New Delhi

This statement came as a global meeting in South Korea's Busan to finalise a legally binding treaty to combat plastic pollution ended without an agreement.

At the closing plenary of the fifth meeting of the Intergovernmental Negotiating Committee, tasked with drafting the treaty, India said some suggestions from countries, including its own, were not reflected in the draft text. It sought assurances from the chair that countries would have the opportunity to include their views in future discussions.

India's lead negotiator, Naresh Pal Gangwar, said the treaty's scope should focus solely on addressing plastic pollution and avoid overlaps with other international agreements or bodies. He requested that this clarity be reinstated in the draft text.

"India would like to state its inability to support any measures to regulate the production of primary plastic polymers as it has larger implications in respect of the right to development of member states," Gangwar said.

India further said some articles in the draft could have trade implications, which required careful consideration. The country also opposed the inclusion of timelines for phasing out plastics "at this stage".

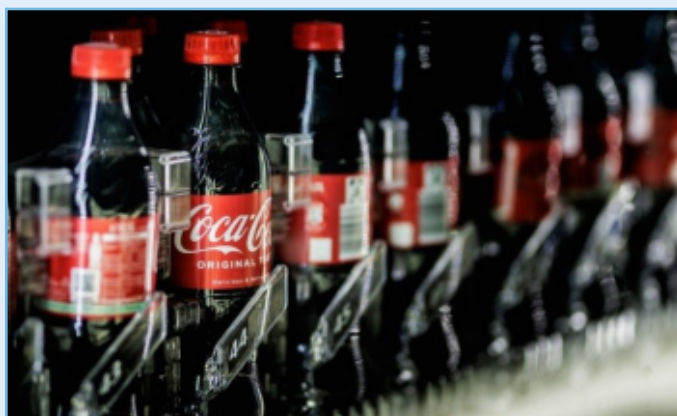
India called for financial and technical assistance, including technology transfer, to support developing nations in implementing the treaty's provisions. It proposed the creation of a dedicated multilateral fund to help these countries cover compliance costs. It also stressed that the treaty must account for national circumstances, uphold the right to development, and recognize the differing responsibilities of countries based on their capacities.

The talks to finalize a treaty to combat plastic pollution ended without an agreement on Sunday as countries failed to thrash out a deal on critical issues such as capping plastic production and finance. The weeklong talks exposed deep divisions between the countries calling for limits on plastic production and harmful chemicals and those focusing only on managing plastic waste.

Negotiators from nearly 200 nations held closed-door discussions on Saturday to bridge differences on key issues but the draft released on Sunday left most concerns unresolved. The countries have now agreed to reconvene next year to continue the negotiations.

(Source: Business Standard / 01.12.2024)

## Coca - Cola is Dramatically Scaling Back its Plastic Promises



Coca-Cola changed its "voluntary environmental goals" this week. Florian Gaertner / Photothek / Getty Images

Coca-Cola is scaling back its packaging sustainability goals, igniting outrage from environmental activists.

The beverage company, which has long been criticized for being one of the world's top producer of plastic pollutants, changed its "voluntary environmental goals" this week. It now aims to use 35% to 40% recycled material in its packaging by 2035 — a drastic reduction from its previous goal of 50% by 2030.

Coca-Cola explained in a press release that its "evolution is informed by learnings gathered through decades of work in sustainability, periodic assessment of progress and identified challenges."

Coke is also changing its recycling goal. In 2018, Coca-Cola announced that by 2030 it wanted to recycle the plastic equivalent of every bottle it put out into the world. That's been reduced to "ensure the collection" of 70% to 75% bottles and cans entering the market every year without naming a specific timeline.

Pollution from single-use plastic remains a major problem. A recent report from the Minderoo Foundation found that companies are producing record amounts of plastic despite stated efforts to be more sustainable. Plastic is problematic because it's mostly made from polymers created from dangerous fossil fuels.

"We remain committed to building long-term business resilience and earning our social license to operate through our evolved voluntary environmental goals," Bea Perez, executive vice president for sustainability and strategic partnerships for the Coca-Cola Company, said in a press release. "These challenges are complex and require us to drive more effective and efficient resource allocation and work collaboratively with partners to deliver lasting positive impact."

In response, environmental group Oceana bashed Coca-Cola for its "short-sighted, irresponsible" changes that are "worthy of widespread condemnation by its customers, its employees, its investors, and governments worried about the impact of plastics on our oceans and health."

"The company's new and weak recycling-related pledges won't make a dent in its overall plastic use," Matt Littlejohn, Oceana's senior vice president of strategic initiatives, said in a statement. "Coca-Cola's investors and governments around the world should take notice and take steps to hold the company accountable."

Earlier this year, Coca-Cola rolled out new bottles for all versions of Coke sodas (i.e. zero sugar, diet, original, etc.) that are made from 100% recycled plastic. The company estimated that the new bottles will reduce 83 million pounds of plastic used in its US supply chain, the equivalent of two billion bottles.

Coca-Cola was named as the world's top plastic polluter for the sixth-consecutive year in 2023 by the environmental organization Break Free from

Plastic. Its waste count was 33,830, out of 537,719 pieces of plastic waste the non-profit audited across 40 countries, with Coca-Cola bottles being the most common item found discarded, often in public spaces such as parks and beaches.

In a statement, Break Free from Plastic that Coca-Cola's "latest move is a master class in green washing, ditching previously announced reuse targets, and choosing to flood the planet with more plastic they can't even collect and recycle effectively."

(Source: CNN/04.12.2024)

### Automatic Plastic Recycling Market Forecasted to Grow to US\$40.7 Billion by 2034 Amid Strong Push for Sustainability | Transparency Market Research, Inc.

Automatic plastic recycling technologies are revolutionizing waste management globally, offering efficient and precise methods to sort, clean, and process plastic waste into reusable materials. Backed by advancements in robotics and sensor technology, these solutions are gaining widespread adoption, aligning with stringent regulations and growing investments in sustainable recycling practices.

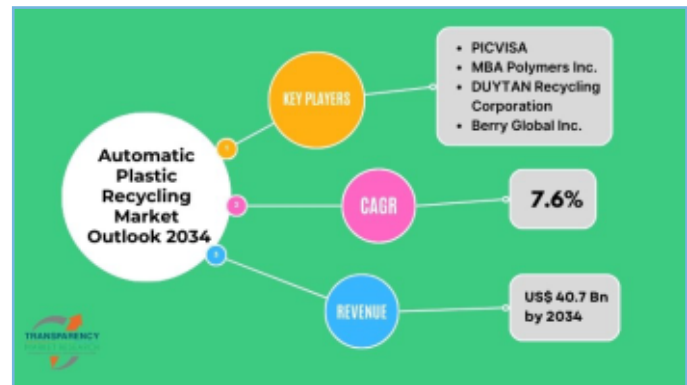
The global automatic plastic recycling market is projected to grow significantly, from US\$ 15.0 billion in 2023 to US\$ 40.7 billion by the end of 2034, with a compound annual growth rate (CAGR) 7.6%. This growth is driven by advancements in recycling technologies, including near-infrared (NIR) sorting, robotics, and self-cleaning filters to efficiently process plastic waste. These systems ensure accurate polymer identification and enhance the quality of recycled materials, meeting the increasing demand for eco-friendly products.

#### Key Market Drivers:

##### 1. Technological Advancements in Recycling Machinery

Innovations in automated recycling systems, including robotic arms, AI-based sorting and self-cleaning mechanisms, are streamlining plastic waste

management. NIR sorting technology, for instance, accurately identifies and segregates polymer types, reducing contamination in recycled plastic output.



These advancements not only boost recycling efficiency but also lower operational costs for recycling facilities. The incorporation of automated systems has made large-scale recycling more viable for industries, including packaging, automotive, and construction.

#### 2. Rise in Investment in Recycling Infrastructure

Governments and private sectors are investing heavily in recycling technologies to combat growing plastic pollution. For example, the European Union introduced new packaging regulations in April 2024 to promote sustainable practices and reduce waste. Such measures are expected to accelerate the adoption of automated recycling systems globally.

Additionally, the increasing trend toward extended producer responsibility (EPR) frameworks compels manufacturers to enhance recycling efforts, further driving demand for automated solutions.

#### 3. Stringent Environmental Regulations

Countries worldwide are implementing strict regulations to curb plastic waste and encourage recycling. Policies such as bans on single-use plastics and mandatory recycling targets are pushing industries to adopt advanced recycling technologies.

Regions such as Europe and North America are leading the way with comprehensive policies and investments, while Asia Pacific is emerging as a key growth area due to the region's significant plastic consumption and waste generation.



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M-950



Cross section image of pail container showing filling done with recycled material



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