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PLASTISCOPE

The Official Journal of the Organization of Plastics Processors of India

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• Issue No. 10

• Mumbai

• April 2026

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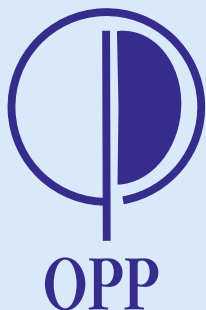
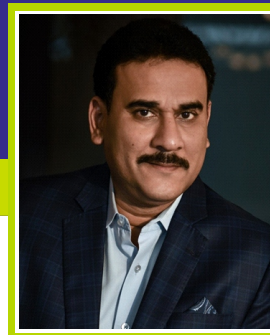
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FROM THE PRESIDENT'S DESK

Mr. Pradeep Rathod



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Dear Members,

Greetings from Organization of Plastics Processors of India !

The financial year 2026-2027 has begun in a very uncertain environment. Even as on date the status of the West Asia Crisis is not clear.

In order to reduce the impact of the West Asia Crisis on the Plastic Processing Industry, Department of Revenue issued a notification pertaining to exemption from payment of Customs Duty on 40 Petrochemicals and Plastic Polymers till 30th June 2026.

OPPI has also submitted a Representation to GST Council and its members to reduce GST Rate on Plastic Polymers and Plastic Value added products from 18% to 5%.

OPPI Secretariat has been following up with the Ministry of Petroleum and Natural Gas to ensure adequate supply of Commercial/ Industrial LPG to the Plastic Processing Plants, which depend on LPG to a large extent.

Seminar on "APPLICATION OF AI IN PLASTIC PROCESSING INDUSTRY" AND "SHAPING NEW GENERATION SMART FACTORIES" is scheduled on Thursday 21st May 2026, at The Club Mumbai, D.N. Nagar, Andheri West, Mumbai from 9:00 AM To 5:00 PM.

Application of AI in Plastic Processing Industry

The Plastic Industry has always been driven by precision, efficiency, and innovation. Today, with the integration of Artificial Intelligence, we are entering a new era of smart manufacturing, where machines don't just operate - they learn, predict, and optimize.

Plastic processing involves complex variables - temperature, pressure, material flow, cooling time - all of which must be perfectly controlled to achieve high - quality output. Traditionally, this has relied heavily on human expertise and trial-and-error methods. However, AI is now changing this completely.

Shaping New Generation Smart Factories

It refers to transforming traditional manufacturing into intelligent, connected, and highly efficient production ecosystem— often aligned with industry 4.0.

A smart factory is a digitally integrated manufacturing environment where machines, systems, and humans communicate in real time to optimize production.

All OPPI Members are requested to participate in the Seminar scheduled on 21st May 2026 and understand the Core Technologies driving Smart Factories.

With Best Wishes,

Pradeep Rathod,
President, OPPI

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Editor: **DEEPAK LAWALE**



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SEMINAR ON

"APPLICATION OF AI IN PLASTIC PROCESSING INDUSTRY" AND "SHAPING NEW GENERATION SMART FACTORIES"

On **Thursday 21st May 2026**, At The Club Mumbai, D.N.Nagar,
Andheri West, Mumbai From 9:00 AM To 5:00 PM

SEMINAR OBJECTIVES

➤ "Application of AI in Plastic Processing Industry"

The plastics industry has always been driven by precision, efficiency, and innovation. Today, with the integration of Artificial Intelligence, we are entering a new era of smart manufacturing, where machines don't just operate — they learn, predict, and optimize.

Plastic processing involves complex variables — temperature, pressure, material flow, cooling time — all of which must be perfectly controlled to achieve high-quality output. Traditionally, this has relied heavily on human expertise and trial-and-error methods. However, AI is now changing this completely.

➤ "Shaping New Generation Smart Factories"

It refers to transforming traditional manufacturing into intelligent, connected, and highly efficient production ecosystems—often aligned with Industry 4.0.

A smart factory is a digitally integrated manufacturing environment where machines, systems, and humans communicate in real time to optimize production.

➤ Core Technologies Driving Smart Factories

- Artificial Intelligence & Machine Learning
- Digital Twins
- Big Data & Analytics
- Internet of Things (IoT)
- Cloud Computing

➤ Applications in Plastic Processing Industry

➤ Future Trends

- Hyperautomation
- AI-Driven Autonomous Plants
- Green Smart Factories
- 5G-enabled Manufacturing

PARTICIPATION FEES

- Fees per participant – Rs. 4000/- +GST @ 18%.
- Registration fee includes training documentation, lunch, tea/coffee during the training.
- Payment is required with registration.

GROUP DISCOUNT

10% DISCOUNT TO OPPI MEMBERS

- If 3 or more delegates register from the same company 10% discount will be applied. If 5 delegates register from the same company, 6th delegate registration is FREE

DEEPAK LAWALE, SECRETARY GENERAL ORGANIZATION OF PLASTICS PROCESSORS OF INDIA

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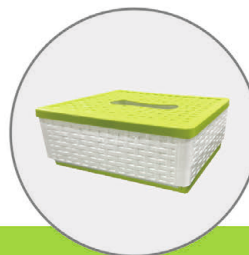
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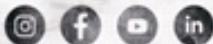
Howling with joy,
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**PLASTIC SAVES LIVES
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Plastic saves lives, protects nature and contributes to humanity's progress like no other material can. It's time to acknowledge this without making light of its daily abuse. Let's honour the true potential of this extraordinary material by committing to **Reduce, Reuse, and Recycle**.

To know more, follow fnpindia.com



Fight Pollution Not Plastic - A Reference Initiative, supporting Indian Centre for Plastics in the Environment (COPE) to eradicate plastic pollution and creating awareness about responsible use of plastics.



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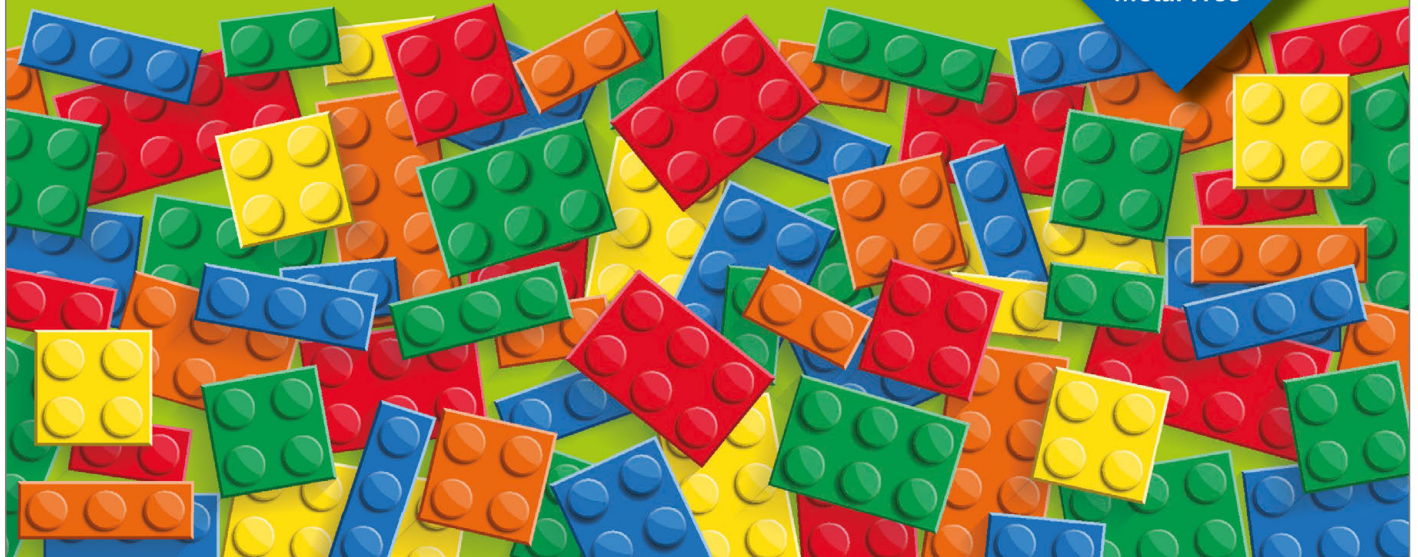
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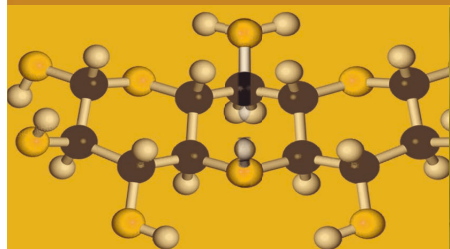
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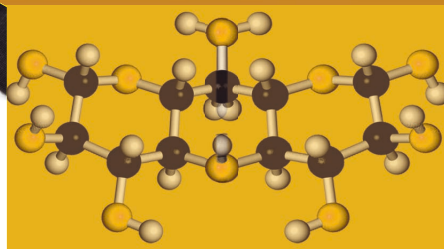
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BIO PLASTICIZERS | ESBO

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vLCCP | LCCP | MCCP | SCCP

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Interplas attracts more than 12,000 attendees, including key buyers from companies such as 3M, Bentley, Jaguar Land Rover, GSK, Delonghi, Honda, Bepak, Thales, Unilever, Nissan, GKN Aerospace, BAE Systems, Boots and Rolls Royce – all with a mission to find the latest plastics technology and materials.

In 2026, the show will be back with new and exciting features, bringing together perspectives from all corners of our amazing industry. This continued development is set to ensure it remains the leading UK event for the international plastics industry for the short, medium and long term.

The UK is an important market for plastics. The latest figures suggest the UK has a turnover of £27 billion with almost 6,000 companies engaged in the plastics industry and over 162,000 people directly employed by the industry.



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2nd June 2026
to
4th June 2026

WHY THE UK MARKET IS KEY TO PLASTIC BUSINESS?

Plastics Industry
turnover is over
£28.7 BILLION

UK produces 1.57
million tonnes of
Plastic Raw
Materials annually

5,800
TONNES
COMPANIES

PARTICIPATION FEES

Shell Scheme Stands:

- £446 per sqm (Standard Rate).

One Off Fee for Insurance and Marketing

- £229 Per Stand.

The above would be for a full shell scheme build including carpets, walls, ceiling grid, fascia name board, strip light and electric socket.

Form is attached. Kindly email the scanned copy of duly filled Space Application Form to secretarygeneral@oppindia.org

Deepak Lawale, Secretary General, ORGANIZATION OF PLASTICS PROCESSORS OF INDIA,
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HanoiPLAS

The 14th Hanoi Int'l Plastics & Rubber Industry Exhibition

1 - 4 July 2026

Vietnam Exposition Center (VEC) 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

Show Report of 2025

8,410
Visitors

9,000
Gross
Space

200
Exhibitors

11
Countries
&
Regions

Rubber & Plastic Industry in Vietnam

In 2023, Vietnam ranked fifth globally in plastics & rubber machinery imports at US\$904 million, underlining strong demand.

Plastics

Production exceeded 10 million tons in 2023, reached 10.92 million tons in 2024, projected at 11.84 million tons in 2025, and poised to maintain an 8.44% CAGR through 2029 (~16.36 million tons by 2029).

Rubber

In 2024, export value hit US\$3.45 billion (+18%), with output rising 24.9% YoY.

The Vietnam Rubber Association forecasts US\$11 billion in export revenue for 2025 (+10%).

Rubber market revenue is forecasted to grow at 4.2% CAGR from 2025 to 2030, rising from US\$500.7 million (2024) to **US\$639.3 million (2030).

Standard Booth:

USD 310 / sqm (Min. 9 sqm) = USD 2,790

Standard Equipped: Wall Partitions, Carpet, Company Fascia, 3 Folding Chairs, 3 LED Light, 1 Reception Table, 1 Round table, 1 Dustbin, 1 Single Phase 5 amp/220v Plug.

Raw Space:

USD 280 / sqm (Min. 18 sqm)

Corner fee :10% surcharge

5% VAT will be applicable on invoice

Form is attached. Kindly email the scanned copy of duly filled Space Application Form to secretarygeneral@oppindia.org

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Cambodia PLASPRINTPACK

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13-16 AUGUST 2026

Diamond Island Convention and Exhibition Center



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Cambodia's Economic Outlook For 2025 Reflects A Positive Trajectory, With Various Institutions Providing Growth Projections:

Gross Domestic Product (GDP) Growth

The Cambodian government anticipates a growth rate of 6.3% for 2025, driven by expansions in key sectors:

- Industrial Sector: Projected to grow by 8.6%.
- Service Sector: Expected to increase by 5.6%.
- Agricultural Sector: Forecasted to rise by 1.1%.

Manufacturing Sector Expansion

In 2024, the number of manufacturing enterprises in Cambodia reached 2,316 as of November, marking a 10% increase from the previous year. This expansion reflects the sector's robust development and the establishment of new manufacturing facilities.

Rising Machinery Imports

Government Initiatives and Economic OutlookThe Cambodian government has implemented policies aimed at diversifying the industrial sector and promoting investment in manufacturing. These efforts are expected to further boost the demand for machinery and equipment. The Asian Development Bank projects Cambodia's economic growth at 5.8% for 2024 and 6.0% for 2025, indicating a favorable environment for continued industrial expansion.

Event Information



August 13 (Thu.) - August 16 (Sun.), 2026



09:00 - 17:00

(Last day will close at 15:00)



Diamond Island Convention and
Exhibition Center,
Phnom Penh, Cambodia

Participation Fees

Standard Booth:

- USD 240 / sqm (Min. 9 sqms) = USD 2,160

Standard Equipped with:

- Carpeting, 3 folding chairs, 1 round table, 1 information desk, 1 waste basket, wall partitions, fascia name, 2 spotlight, 1 fluorescent light, one 5-AMP power point

Raw Space:

- USD 210 / sqm (Min. 18 sqms)

Corner fee: 10% surcharge

Total amount should be added 5% VAT.



Form is attached. Kindly email the scanned copy of duly filled Space Application Form to secretarygeneral@oppindia.org

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Vietnam PLAS

09-12/09/2026

Saigon Exhibition and Convention Center
SECC | HCMC



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Ministry of Industry & Trade -
Vinexad National Trade Fair &
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SHOW FACTS FOR 2024

20 countries and regions
700 exhibitors
1,100 booths
23,000 square meters
20,390 visitors

OFFICIAL SUPPORTER

- Ministry of Industry & Trade
- Vietnam Rubber Association (VRA)
- Vietnam Waste Recycling Association (VWRA)
- Taiwan Mold & Die Industry Association (TMDIA)
- Ho Chi Minh Rubber Plastic Manufacturer Association (RUPA)
- Vietnam Association of Mechanical Industry (VAMI)
- Ho Chi Minh City Automation Association (HauA)
- Taiwan Plastic Industry Association (TPIA)
- Taiwan Association of Machinery Industry (TAMI)



9th September 2026
to
12th September 2026



Saigon Exhibition & Convention Center
(SECC), 799 Nguyen Van Linh, Tan My
Ward, Ho Chi Minh City, Vietnam.

EXHIBIT PROFILE

Plastic & Rubber Machinery, Chemical & Raw Materials, Machinery Auxiliary Industry,
Heat & Control Equipment, Mould, Hydraulic & Pneumatic, Recycling and Others.

PARTICIPATION FEE

Standard Booth USD 350 / sqm (Min. 9 sqms) = USD 3150

Standard Equipped with Wall Partitions, Carpet, Company Fascia, 3 Folding Chairs,
3 Spotlights, 1 Reception Table, 1 lockable counter, 1 Dustbin, 1 Single Phase 5 amp/220v Plug.

Raw Space USD 320 / sqm (Min. 18 sqms)

Corner fee: 10% surcharge

Total amount should be added 5% VAT.

Form is attached. Kindly email the scanned copy of duly filled Space Application Form to secretarygeneral@oppindia.org

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Vietnam PRINTPACK

16-19/09/2026

Saigon Exhibition and Convention Center
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THE 24TH VIETNAM INTERNATIONAL PRINTING & PACKAGING INDUSTRY EXHIBITION

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Ministry of Industry & Trade - Vinexad National Trade Fair & Advertising J.S.C (VINEXAD)
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OFFICIAL SUPPORTERS

- Ministry of Industry & Trade
- Printing Association of HCMC
- Vietnam Waste Recycling Association (VWRA)
- Ho Chi Minh City Automation Association (HauA)
- Taiwan Association of Machinery Industry (TAMI)
- Vietnam Printing Association (VPA)
- Vietnam Association of Mechanical Industry (VAMI)
- Vietnam Paint & Printing Ink Association (VPIA)
- Taiwan Mold & Die Industry Association (TMDIA)
- Printing and Printing Equipment Industries Association of China (PEIAC)



16th September 2026
to
19th September 2026



Ho Chi Minh City Vietnam ,Saigon
Exhibition & Convention Center (SECC)

WHY VIETNAM?

Vietnam's gross domestic product (GDP) will rise to 5.1 per cent in the third quarter (Q3) of 2023, a substantial increase from the 4.1 per cent recorded in the preceding quarter. Retail sales growth for September is expected to reach 8.2 per cent, and industrial production is slated to increase by 3.2 per cent.

★ Printing Industry

The growth of the Vietnam printing market is influenced by several key drivers. Firstly, the rapid growth of the advertising and media industry in Vietnam has led to increased demand for printed materials, such as brochures, banners, and posters, for marketing and promotional activities. Secondly, the packaging industry's expansion, driven by the growth of e-commerce and consumer goods sectors, has further fueled the demand for printing services for product packaging. Additionally, technological advancements in the printing sector, such as digital printing and automation, have enhanced the efficiency and capabilities of printing companies. The Vietnam printing market has experienced substantial growth in recent years, driven by the country's expanding advertising and packaging industries, increasing demand for printed materials, and technological advancements in the printing

★ Packaging Industry

The packaging sector is expected to increase by more than 13% each year, with packaging for the food industry growing on average by 15-20%; plastic packaging alone has seen growth rates of up to 25%. Vietnam's paper packaging market is anticipated to reach around \$3.1 billion by 2027 at a CAGR of 7.5% during 2021-2027, including Internet packaging, biodegradable packaging, digital printing packaging, and nanotechnology packaging. Due to the relatively high degree of economic openness in the Vietnamese economy, the packaging sector has to import 80-90% of input materials.

PARTICIPATION FEE

Standard Booth: USD 330 / sqm (Min. 9 sqms) = USD 2970

Standard Equipped with: Wall Partitions, Carpet, Company Fascia, 3 Folding Chairs, 3 Spotlights, 1 lockable counter, 1 Round table 1 Dustbin, 1 Single Phase 5 amp/220v Plug.

Raw Space: USD 300 / sqm (Min. 18 sqms)

Corner fee: 10% surcharge

Total amount should be added 5% VAT.

Form is attached. Kindly email the scanned copy of duly filled Space Application Form to secretarygeneral@oppindia.org

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**ORGANIZATION OF PLASTICS
PROCESSORS OF INDIA**

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

MOB:- +91 9322591715,

Tel.: +91-22-66923131/32

Email: secretarygeneral@oppindia.org





A Distinguished Punjab IAS Officer Mr. Tejveer Singh Takes Over as Secretary (Chemicals & Petrochemicals)



Mr. Tejveer Singh

Mr. Tejveer Singh, IAS from the 1994 Punjab cadre has taken over as the Secretary of the Department of Chemicals and Petro - Chemicals under the Ministry of Chemicals and Fertilizers. This prestigious posting underscores his exemplary service and dedication over the years, marking yet another milestone in his illustrious career.

Over the years, he has held a variety of key roles in the Punjab government, showcasing his ability to navigate complex administrative challenges with precision and foresight.

Mr. Singh has earned a reputation as a dynamic and effective leader in governance.

His experience in handling critical portfolios at the state level has undoubtedly prepared him for this new role at the national level. The Department of Chemicals and Petro-Chemicals is integral to India's industrial growth, overseeing policies and programs that drive innovation, sustainability, and economic development.

As Secretary of the Department of Chemicals and Petro-Chemicals, Mr. Tejveer Singh will play a pivotal role in steering India's efforts to strengthen its chemicals and petro-chemicals sector.

Milacron Names Mr. Suraj Thodimarath as Managing Director for India Operations

Milacron has appointed Mr. Suraj Thodimarath as Managing Director, Milacron India, effective March 2026, marking a strategic step in strengthening its leadership for the next phase of growth in the region.



Veteran Industry Leader Brings Over 30 Years of Experience To Drive Growth Across Injection Molding and Extrusion Businesses.

In his new role, Suraj will lead Milacron's injection molding and extrusion businesses in India and play a key role in advancing growth across select international markets, driving profitable growth, scaling market presence, and delivering differentiated, customer - centric solutions.

With more than 30 years of experience, Suraj has held senior leadership positions across global engineering and technology organizations, where he has led large-scale operations and driven measurable business outcomes.

Most recently, he served as Managing Director at Wittur Group, where he managed complex international operations while strengthening supply chains, broadening market access, and building robust R&D and engineering capabilities.

His appointment reflects Milacron's continued emphasis on strengthening leadership depth and accelerating growth in key markets.

Shri Sumit Basu has Taken Charge as Executive Director (Polymer) at Indianoil Corporation Ltd.



Profile of Shri Sumit Basu, ED (Polymers)

Shri Sumit Basu is the Executive Director and Head of the Polymer Group at Indian Oil Corporation Limited and a pioneer in India's polymer industry. With over 30 years of distinguished experience

in the petrochemical sector, he has made seminal contributions across technical services, application development, sales and marketing, and production support. He has also successfully led Indian Oil's Production Application and Development Centres, driving innovation, product excellence, and customer-focused solutions.

A respected industry leader, Shri Basu is actively associated with premier professional bodies including the Indian Plastics Institute, Indian Institute of Packaging, and the Plastindia Foundation. He is an alumnus of the University of Calcutta, where he graduated in Polymer Science and Technology, and holds a post-graduate degree in Plastics Technology from ICT, Mumbai.

A visionary in sustainability and circular economy, Shri Basu played a pivotal role in conceptualizing and establishing IndianOil's post consumer recycle brand, Cycloplast, and sustainable merchandize brand Unbottled further reinforcing the organization's leadership and long - term commitment to sustainable polymer solutions.

RIL's Strategic Expansion Into the U.S. Energy Market: Significance and Impact

The planned entry of Reliance Industries Limited (RIL) into the U.S. refinery sector marks a major milestone in its evolution from a domestic energy leader to a global refining powerhouse. By investing in a large-scale refinery project in the United States, RIL aims to strengthen its international footprint while leveraging its world-class refining expertise developed at Jamnagar.

One of the key advantages of this move is direct access to the U.S. energy market and abundant shale oil resources. This ensures long-term feedstock security and reduces dependence on traditional crude sourcing regions such as the Middle East. At the same time, it allows RIL to diversify its supply chain and operate closer to one of the world's largest fuel consumption markets, improving operational efficiency and market reach.

The investment also serves as a geopolitical and economic hedge. With increasing global uncertainties - such as supply disruptions and price volatility - having a presence in both India and the United States enables RIL to balance regional risks and optimize refining margins. Additionally, the project strengthens India - U.S. economic ties, positioning RIL as a significant contributor to U.S. energy infrastructure and enhancing bilateral cooperation.

From a business perspective, the refinery supports value chain integration, allowing RIL to manage the entire process from crude sourcing to refining and global distribution of petroleum products like gasoline, diesel, and jet fuel. Its expertise in complex refining further provides a competitive advantage in processing a wide range of crude types efficiently, ensuring higher profitability and flexibility.

The project is also expected to generate long-term revenue stability, backed by large-scale production and sustained demand for refined products. However, it comes with challenges such as regulatory approvals, environmental considerations, and exposure to fluctuations in global oil demand and shale economics.

In conclusion, RIL's entry into the U.S. refinery sector is a strategically transformative move that enhances global presence, strengthens energy security, and creates long-term growth opportunities. While risks remain, the initiative positions the company as a key player in the global energy landscape with the capability to influence future refining and trade dynamics.

Indorama Ventures to Consolidate Indian Packaging Business in US\$ 2 Billion Deal

Billionaire Alok Lohia-controlled Indorama Ventures Ltd, an industry-leading global sustainable chemical company, has decided to merge its Indian packaging business unit, Indovida India, with US private equity giant Blackstone-backed EPL Ltd in a US\$ 2 billion deal. The proposed merger comes a year after Indorama Ventures acquired an initial 24.9 percent stake in EPL from Blackstone for Rs 1,900 crore (US\$ 219 million).

Rebranded as EPL Ltd in October 2020, EPL, formerly Essel Propack Ltd, is a global leader in specialty packaging, specializing in the manufacturing of laminated and extruded plastic tubes for industries such as oral care, cosmetics, pharmaceuticals, and home care. Bangkok-based Indorama Ventures has diversified international businesses integrated across the petrochemical value

chain. The company's footprint spans manufacturing operations at 114 locations in 32 countries, with market-leading positions in Asia-Pacific, Africa, Europe, and the Americas.

Alok Lohia, Group CEO of Indorama Ventures, said in a statement, "Combining Indovida with EPL is the logical next step and enables us to extend that foundation across formats and markets. With our combined scale, supply chain resilience, and sustainability capabilities, the merged entity is well positioned to deliver long-term value to customers and shareholders alike."



Post-merger rejig

The proposed merger is subject to regulatory and shareholder approvals and is expected to be completed within a year. Indorama Ventures will hold a 52 percent stake in the combined entity after the merger, which is expected to be completed within a year. Blackstone will own 17 percent, while the remaining shares will be held by public and institutional investors.

The merged company will combine EPL Ltd's expertise in flexible packaging with Indovida's PET (plastic bottle) packaging business. Together, the new entity is expected to generate about US\$ 1 billion in annual revenue and will focus on growth in emerging markets, according to Indorama Ventures.

Customer touch

Indorama Ventures delivers indispensable chemistry to its customers, including major household brands, to produce daily consumer necessities that touch billions of lives every day. The company's business segments - combined PET and packaging, Indovina, and fibres - serve customers across diverse growth

markets, including food and beverages, automotive, pharmaceuticals, textiles, home and personal care, and agrochemicals. In 2024, the company recorded revenue of US\$ 15.4 billion.

Indorama Ventures is the world's largest producer of PET bottles by volume, with a total of 114 manufacturing operations across 32 countries. By 2022, it processed 15.4 billion recycled PET bottles annually and employed approximately 25,000 people.

Associate business

His older brother, Sri Prakash Lohia, one of Indonesia's wealthiest individuals, is the chairman of Indorama Ventures as well as privately held Indorama Corporation, a maker of fertilizers and polyolefins used in plastics manufacturing.

With a market capitalization of US\$ 1.2 billion, India-listed EPL Ltd manufactures plastic laminates and tubes for customers in the pharmaceutical and fast-moving consumer goods industries. Formerly part of the Essel Group and now owned by Blackstone Inc, EPL is the world's largest specialty packaging company, producing over 8 - 9 billion tubes annually.

With over 21 manufacturing facilities across 11 countries, including the United States, Mexico, Germany, Egypt, China, and India, Mumbai-headquartered EPL produces laminated tubes, plastic tubes, caps, closures, and dispensing systems, among other products. The company focuses on sustainable packaging, including recyclable tubes (Platina) and post-consumer recycled (PCR) content.

WACKER Expands Production of Silicone Emulsions in India

- Second phase of expansion at Panagarh, India, successfully completed.
- GMP-certified production facility to supply high-quality silicone emulsions for the cosmetics and personal care industry.

- WACKER Executive Board member Christian Kirsten: "Panagarh will soon be producing top-quality, high-purity products for India's growth markets."



WACKER has achieved yet another milestone in the expansion of its silicone capacities in India. A new production complex for manufacturing silicone emulsions went into operation at WACKER's Panagarh site. The facility produces GMP-certified silicones for the cosmetics and personal care industries. The new plant will increase the Group's silicone emulsion production capacities in India significantly. The expansion will create 60 new jobs at the site.

The goods manufactured at the 15,000-square-meter complex fully comply with the good manufacturing practice (GMP) guidelines of the European Federation for Cosmetic Ingredients EFfCI. "Our facilities in Panagarh are truly world-class and will produce top-quality, high-purity products which are in great demand, in particular in the cosmetics and personal care industries," announced WACKER Executive Board member Christian Kirsten at the commissioning ceremony.

For WACKER, the personal care industry is one of the main pillars of its silicone business in India. WACKER's fully consolidated joint venture Wacker Metroark Chemicals (WMC) is a leading supplier of silicone raw materials for cosmetic products, shampoos, and personal - care applications. In addition to local manufacturers, the company's customer base also includes international consumer goods companies.

“The demand for our silicone products remains unabated, and we expect to see further significant growth in India,” said Tom Koini, head of WACKER's Silicones division. “By expanding our production in Panagarh, we are ideally positioned to meet this rising demand and to support the growth of our customers.”

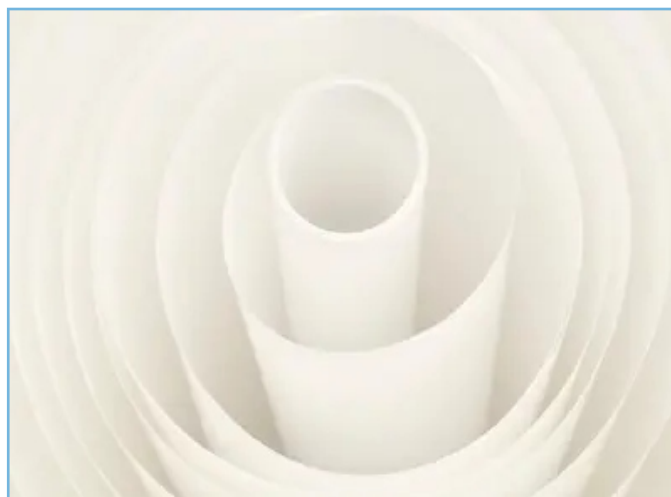
WACKER began its silicones production in India in 1999. At the Amtala site near Kolkata, the company has been manufacturing silicone fluids, emulsions, and silicone rubber compounds among other silicone products. In 2022, WACKER began operations at its 165,000 square meter site in Panagarh. Here, the company has been producing silicone rubber and ready-to-use silicone compounds for the electromobility, medical technology, and electrical power supply industries.

Following the commissioning of the second expansion phase, WACKER's Panagarh site now represents a second mainstay for producing silicone emulsions in India. Through further expansion measures, WACKER aims at making the site assume a leading role in the regional silicones supply chain. In future, Amtala – hitherto the hub of silicone fluids and emulsion production in India – will increasingly focus on product and process development. “The successful completion of the expansion work in Panagarh is key to our future success in India,” declared Sascha Büchel, Managing Director Wacker Metroark during the opening ceremony. “Our main site in Amtala has played an outstanding role. But Amtala is increasingly being stretched to its limits. Panagarh provides us the space, infrastructure, and flexibility we need to continue our success story in India.”

UPM Strengthens Presence in India with A New Adhesive Materials Terminal Near New Delhi

UPM Adhesive Materials, a global supplier of innovative self-adhesive label materials, will expand its footprint in India with a new slitting and distribution terminal near New Delhi. The investment enhances UPM Adhesive Materials' service

capability in Northern and Eastern India and reinforces its commitment to the entire Indian market.



The Indian economy is expanding rapidly, driven by megatrends such as urbanization, digitalization and infrastructure development. To match the pace of the market, local label converters need reliable label material supply and shorter lead times.

The new terminal will feature state-of-the-art slitting capabilities and a tailored label material inventory designed to meet regional customer needs. It complements UPM Adhesive Materials' Mumbai terminal, opened in February 2024, extending service across the country.

“We are excited to strengthen our presence in India with a new terminal near New Delhi. This investment supports the growth ambitions of our customers in the Northern and Eastern regions and deepens our engagement with the dynamic Indian market,” says Harri Janhunen, Vice President, Strategy, India & Middle East, UPM Adhesive Materials.

The terminal is expected to begin operations during Q3 2026.

SIEGWERK to Acquire Hi-Tech Inks, Strengthening Leadership in India's Flexible Packaging Market

SIEGWERK, a global leader in printing inks and coatings for packaging applications announced the signing of a definite agreement for the acquisition

of Hi-Tech Inks, a prominent Indian producer of flexographic and gravure printing inks. The move will significantly strengthen Siegwerk's position in the fast-growing Indian flexible packaging market, making the combined business the largest player in the country with over 20 percent market share.

The acquisition underscores Siegwerk's long-term commitment to India and the broader Asia region, one of the company's most important strategic growth markets. By bringing together complementary strengths, expanded production capabilities, and a wider product offering, Siegwerk is set to deliver greater value, innovation, and supply reliability to packaging converters and brand owners across the country.

Hi-Tech Inks will add a robust portfolio of solvent- and water-based inks, metallic and special-effect inks, varnishes, and over print varnishes (OPVs) to Siegwerk's global portfolio. The integration will enhance Siegwerk's manufacturing footprint in India with dual sites in Bhiwadi, Rajasthan and Vapi, Gujarat - improving capacity and operational resilience. The combined organization will employ approximately 1700 people across India, further boosting Siegwerk's ability to serve converters and brand owners with more robust capability and responsiveness.

Revolution in Flexible Packaging: Bajaj Polymers' METALLOCAL

In an industry where every micron of film and every gram of polymer counts, Bajaj Polymers has unveiled a breakthrough that could reshape the economics and sustainability of packaging. Their patent pending innovation, METALLOCAL, is the world's first advanced polymer enhancer masterbatch designed for multilayer blown film applications.

At its core, METALLOCAL asks a provocative question: "What if your multilayer blown film needed less polymer?" The answer is a technology that not only reduces reliance on expensive LDPE and

mLLDPE but also enhances key mechanical properties - improving dart impact strength and elongation while maintaining puncture resistance, tear strength, seal integrity, and more.

Why It Matters

- **Cost Efficiency:** Partial replacement of costly polymers translates into significant savings.
- **Performance Balance:** Films retain critical mechanical properties, ensuring no compromise in quality.
- **Sustainability Edge:** Reduced polymer usage, compatibility with PIR/PCR, and lower carbon footprint make it a responsible choice for manufacturers.

Applications Across Industries

From atta and detergent packaging films to stand up pouches, heavy duty shipping sacks, container liners, agricultural films, and even milk packaging, METALLOCAL is versatile enough to serve the full spectrum of flexible packaging needs.

Additional Advantages

- Reduced need for white masterbatch / TiO₂
- FDA compliant and food grade safe
- Enables down gauging for material efficiency
- Seamless incorporation into existing formulations and machinery
- Compatible with PIR and PCR materials
- Helps reduce carbon footprint
- No adverse impact on screw and barrel performance

Technology Foundation

Built on specialized calcium carbonate, METALLOCAL is suitable for opaque, translucent, and - depending on application - transparent films. It represents a breakthrough in balancing cost, performance, and sustainability in flexible packaging. In a sector under pressure to balance cost, performance, and sustainability, Bajaj Polymers has positioned itself at the forefront of transformation.

Being a leading supplier of masterbatches, Luk Plastcon Limited. Luk Plastcon Limited is a leading manufacturer of masterbatches, excelling in speciality enhancers for both flexible and rigid packaging. They provide a wide range of Specialty Enhancer Masterbatches for multilayer blown film applications

For further information contract:

LUK PLASTCON LIMITED Plot No., D-5/1, MIDC, Hingna Industrial Area - 440016

For Purchase Inquiry: +91 9158999537

Tel: 7770027816/9371773955

Email: info@bajajpolymin.com

d.ajay@bajajngp.com

BALRAMPUR Chini Mills Bags First Institutional Order from Lucknow Cantonment Board



BALRAMPUR Chini Mills Limited's (BCML) PLA vertical, Balrampur Bioyug, has secured its first official institutional order from the Lucknow Cantonment Board (LCB), marking a significant milestone for India's emerging biobased materials ecosystem. The order includes compostable garbage bags (in two sizes), 300 ml PLA bottles, 3D-printed PLA compostable pens, and PLA folders - all manufactured from renewable, biobased polylactic acid (PLA), a 100% compostable material with a low carbon footprint that leaves no microplastics behind.

Lucknow Cantonment, spread across 2,735 hectares, is administered by the Lucknow Cantonment Board, a statutory body functioning under the administrative control of the Director General of Defence Estates, Ministry of Defence, Government of India, and is located within the Lucknow Cantonment area.

With this procurement Lucknow Cantonment Board reinforces its commitment to structured, sustainable governance, becoming one of the first defence-linked institutions to formally integrate compostable PLA solutions into operational use. The order builds on LCB's sustainability roadmap, including its partnership with IIT Kanpur to develop a waste - and carbon - neutral ecosystem and its active participation in the nationwide Swachhata Hi Seva campaign.

Significantly, the order comes ahead of the commissioning of India's first domestic industrial - scale PLA manufacturing unit built by Balrampur Chini Mills at Kumbhi, Uttar Pradesh, to be commissioned in October 2026, reflecting institutional confidence in indigenous biobased innovation. The move builds upon the legacy of the Defence Research and Development Organisation (DRDO) and its research arm DFRL, which developed India's first PLA water bottle in Mysuru in September 2023.

HPCL Strengthens Petrochemical Portfolio With Pachpadra Complex

The Pachpadra Refinery and Petrochemical Complex, developed by Hindustan Petroleum Corporation Limited (HPCL), represents a major transformation in India's downstream oil and gas sector. Located in Pachpadra (Balotra district, Rajasthan), this project is among India's largest greenfield **integrated refinery-cum-petrochemical complexes**, designed to shift HPCL's focus from traditional fuels to high-value petrochemicals.

The project is being executed through a joint venture, HPCL Rajasthan Refinery Limited (HRRL), with HPCL holding a 74% stake and the Government of Rajasthan holding 26%. With a refining capacity of **9 million metric tonnes per annum (MMTPA)** and petrochemical production of about **2.4 MMTPA**, the complex reflects a strategic move toward **refining - to - chemicals (R2C)** integration - a global trend aimed at maximizing value from crude oil.

A key highlight of the Pachpadra complex is its high petrochemical intensity (~26%), which is significantly higher than conventional refineries. It will produce major polymers such as

polypropylene (PP) and **polyethylene (LLDPE and HDPE)**, along with aromatics like benzene and toluene. These products are essential raw materials for industries such as packaging, automotive, consumer goods, and infrastructure. This integration ensures **higher profitability and reduced dependence on volatile fuel markets**, strengthening HPCL's long - term business sustainability.

With a revised investment of approximately **₹ 79,000+ crore**, the project has seen substantial cost escalation due to delays, design upgrades, and increased petrochemical integration. Despite these challenges, it is expected to be commissioned around **2026**, marking a significant milestone in India's petrochemical expansion.

Strategically, the Pachpadra complex plays a critical role in **reducing India's dependence on imported petrochemicals**, especially polymers, where domestic demand has been rising rapidly. For the plastics processing industry, this means improved raw material availability, stable pricing, and enhanced competitiveness. The project is also expected to stimulate the development of a **petrochemical hub in Rajasthan**, attracting downstream industries and boosting regional economic growth.

In addition to industrial benefits, the complex is driving infrastructure development, employment generation, and logistics improvements in the region. It aligns with India's broader goals of **energy security, import substitution, and manufacturing growth under initiatives like "Make in India."**

In conclusion, the Pachpadra Refinery and Petrochemical Complex is not just an expansion project but a **strategic pivot for HPCL and India's energy sector**. By integrating refining with petrochemical production, it strengthens HPCL's portfolio, enhances value creation, and positions India as a more competitive player in the global petrochemical industry.

Day Before Inauguration by PM, Blaze at Raj Refinery

PACHPADRA / JAISALMER / NEW DELHI: A day before PM Narendra Modi was scheduled to inaugurate Pachpadra refinery in Balotra. district

of Rajasthan, a massive fire engulfed its core processing units prompting authorities to order a probe.

Fire broke out in the vicinity of the crude distillation unit (CDU) at HPCL Rajasthan Refinery Limited (HRRL), ministry of petroleum and natural gas said in a post on X. "An investigation has been initiated to ascertain the cause(s) of the incident and to undertake necessary remedial measures. A revised date for the dedication will be announced in due course," it said.

The ministry said the fire was brought under control promptly by the refinery's emergency response team with support from the local administration, and there were no reports of any casualties or injuries.

Prima facie, the fire appeared to have been caused by the leakage of hydrocarbons from a valve or flange in the heat exchanger circuit, officials said. They added that the blaze remained localised to the heat exchanger stack within the CDU section. The crude distillation unit, vacuum distillation unit and other associated units were quickly isolated, and all are structurally safe and unaffected. No other part of the refinery complex suffered any impact.

Most of the 200-odd workers engaged in the units were having lunch when the fire broke out, said an official at the refinery. "More than 100 fire tenders were deployed to contain the massive blaze. By 2.30 pm, the raging fire was brought under control," said a witness.

The HRRL refinery is a joint venture between state-owned Hindustan Petroleum Corporation Limited and Rajasthan govt, with equity participation of 74 per cent and 26 per cent respectively. The Union cabinet had, earlier this month, approved the cost escalation of the greenfield integrated refinery - petrochemical complex from Rs 43, 129 crore to Rs 79,459 crore, and had said commercial operations were likely to start from July 1.

The inauguration had been postponed from March 19 to April 21. It could have ended the cost escalation that the project had seen since its foundation stone was first laid by Sonia Gandhi in 2013, and then for a second time by PM Modi in 2018.

PLASTIC PRODUCTS AND NEW TECHNOLOGIES



The Craemer Group, A Leading Global Manufacturer of Durable Logistics Solutions, is Launching the New “Canpal German” Plastic Pallet



Reliable load carriers are essential for producing, filling, storing and transporting beverage cans. The industry predominantly relies on pallets with special dimensions that are precisely tailored to its requirements – whether for can manufacturing, beverage production, logistics centres or export. These industry - specific solutions are precisely adapted to the stacking dimensions, conveyor lines and lorry loading patterns of the beverage industry and play a central role along the entire process chain. The Craemer Group, a leading global manufacturer of durable logistics solutions, is launching the new “CanPal German” plastic pallet. This innovative, patented product offers an

exceptionally robust pallet block design for the safe and sustainable transport of cans. This traditional, family-run company specialises in metal forming, plastics processing and tool making. Based in Herzebrock - Clarholz, Germany, it will be presenting its new CanPal German pallet for the first time at the Interpack 2026 trade fair.

The Craemer Group has almost 70 years of experience in manufacturing plastic products. As early as 1958, the company added plastics processing to its metal forming business. Initially, Craemer manufactured large plastic injection - mould containers. In 1967, the company developed the world's first one - piece injection - moulded plastic pallet. Today, the portfolio comprises plastic pallets for various requirements and a wide range of transport and storage containers – from stacking boxes, round containers and tubs to pallet boxes. All Craemer plastic products are made from high - quality, durable, recyclable plastics to ensure maximum stability and a long service life.

In addition to the modern production facilities, an in - house technology centre unites research & development and toolmaking under one roof, ensuring consistently high quality. Thanks to their sophisticated design, Craemer plastic pallets are highly functional and ideal for intensive use. Craemer can also provide customised solutions to meet individual requirements.

Technically sophisticated in every detail

The base body of the Craemer CanPal has external dimensions of 1250 x 1180 x 133 mm – with optional spacers, its dimensions are 1265 x 1180 mm. To provide even greater protection and stability when securing loads — Craemer has specially reinforced the lower edge of the upper deck above the entry openings with ribbing. The pallet is made from robust polypropylene (PP), ensuring extra robustness: this material is durable and resistant, has a tare weight of only 22.5 kilograms and is 100 % recyclable. The new Craemer can pallet has a load capacity of up to 10000 kg for static loads and up to 1250 kg for dynamic loads.

Optimised design for maximum stability

The Craemer CanPal is the result of extensive research and development. Although the new pallet is designed as a multi-part system in line with industry standards, it has significant advantages over conventional models. Rather than using a single-piece injection-moulding process, it is deliberately made up of two parts – an upper part and a lower part – that are firmly connected to each other. The Craemer experts have specifically optimised the known weak points of multi-part pallets. For example, the connection between the upper and lower decks in the area of the blocks is usually highly susceptible to breakage when falling from a great height or colliding with forklift tines, but this has been specifically counteracted. Despite its multi-part construction, the design ensures an extremely stable unit that is by no means inferior to a single-piece solution.

Sophisticated design thanks to simulation

The design of the new pallet for all types of cans is based on a sophisticated investigatory process. Craemer's designers used cutting-edge simulation methods to analyse and optimise the geometry of the runners and deck. Finite element modelling (FEM) is a virtual method of analysing strength and deformation. FEM allows to simulate physical reality without the effort, time or risk involved in creating real prototypes. The result is a pallet that strikes the perfect balance between functionality – with robust and rigid runners and a matching deck – and carefully thought-out design.

Patented manufacturing process

The design of the CanPal is based on Craemer's patented manufacturing process, which involves inseparably connecting the upper deck and runners. The result is an extremely robust construction which is as stable as a one-piece pallet, and which far surpasses conventional multi-piece systems. The pallet blocks retain their shape and function even under high loads, impact or deformation. The result is significantly increased break resistance and a long service life, which are both essential factors for cost-effectiveness and sustainability in everyday use.

Flexible equipment as required

Optional spacers on the lower edge of the outer blocks on the long sides of the pallets prevent them from touching each other when stacked and held together by protruding pallet collars or interlayers. To improve slip resistance of picked up pallets or while the load is lifted by forklift tines, four Palgrip® anti-slip clips can be retrofitted to each of the CanPal's upper and lower decks. Retrofitting with transponders is also optional: To this end, there are two diagonally opposite slots in the upper deck, above the outer right blocks on the long sides, that can hold Smartrac Dogbone RFID inlays. Moreover, the outer blocks on the long sides provide space for hot stamping of lettering or logos. The CanPal German pallet is available in the standard colour of light grey (other colours available on request). It also impresses with its high temperature resistance, which ranges from –30 °C to +40 °C, and even up to +90 °C for short periods.

Craemer Group at the Interpack 2026 fair

The CanPal German Pallet is set to make its debut at Interpack 2026, an international trade fair showcasing the latest innovations in the packaging and related process industries. From 7 to 13 May 2026 in hall 10 at stand C40, the Craemer Group will present its innovative can pallet to a broad specialist audience for the first time in Düsseldorf.

ALPLA has Developed a Special Packaging Solution for the Cosmetics Brand La Biosthétique



ALPLA has developed a special packaging solution for the cosmetics brand La Biosthétique. The jar, closure and liner for the Velvet Finish Paste are made from 100 per cent bio-based material. The sustainable system is ready for series production and scalable.

The vegan Velvet Finish Paste from La Biosthétique nurtures natural beauty. The blend of white clay, ginseng extract, wax myrtle and carnauba wax leaves hair with a velvety, matte shine. Free from colourants, sulphates and silicones, the styling cream is predestined for packaging that is as natural as it is attractive. As a pioneering partner, ALPLA has created an environmentally friendly special format. The jar, cap and liner are made entirely from bio-based material.

This innovative solution proves how quickly and easily the right packaging can underline sustainable brand values and quality standards. It relies on renewable raw materials, making the promise of naturalness visible to all. Of course, all this would be worthless if the alternative packaging failed in practice or was not accepted by consumers. The limited edition of Velvet Finish Paste has dispelled both concerns.

Quality is rewarded

The bio-based complete system consisting of a jar and lid appeals to all the senses and scores highly in terms of its carbon footprint. It looks good, feels good and fits comfortably in the hand. The cream is safely stored and stays fresh for a long time. The choice of materials is reflected in the

ecological footprint: the packaging made from renewable raw materials consumes only half as many emissions as a comparable solution made from conventional new plastic.

What do people in the target group of hairdressers and salon owners think about the packaging? They attach great importance to environmentally and climate-friendly packaging, are convinced by the solution presented and, for the most part, are even willing to pay a little more for it. This was the result of a survey conducted by La Biosthétique among 70 professional users of the special edition.

Perfect match: content and packaging

With the Velvet Finish Paste from La Biosthétique, the contents and packaging harmonise in two ways. This is because the contents also determine how suitable bio-based plastic is for the product. "The lower the water content, the higher the potential. Styling cream is perfect for this – as are numerous other cosmetic products. We carry out tests in advance to determine what is technically feasible and then develop tailor-made solutions. In the premium segment in particular, packaging must also be aesthetically appealing. We achieve this through a diverse range of materials," explains Nadine Wild, Product Development Manager at ALPLA. La Biosthétique opted for a material containing a filler made from wood flour derived from industrial by-products.

Whether high-gloss or wood-effect: ALPLA offers a range of colours and options. Materials developed in-house and suitable for modification by the ALPLA Group are also available. Regardless of the material, ALPLA already manufactures the bio-based standard jars and closures, including liners, in small series on existing production lines. "The technology is mature and can be quickly scaled up for small series of up to 40,000 units. Anyone who wants to break new ground on a large scale can shorten the path to market launch with us," emphasises Nadine Wild. There are numerous options for liners: in addition to the bio-based version, conventional liners made of foam, aluminium and cardboard as well as peelable liners are also possible.

"We have been pioneers in the field of sustainability since the 1980s. With the new plant-based jar for our Velvet Finish Paste, we have teamed up with ALPLA to launch a fully bio-based material – and the initial feedback from our customers about the product has been overwhelmingly positive."

Dr Christian Ader, Member of the Management Board and COO, La Biosthétique

Factbox

- 100% bio - based packaging in accordance with EN 16640*
- Over 50% fewer CO₂ emissions compared to PP packaging**
- Liner variants: peel - off liner, foam liner, aluminium liner, cardboard liner, etc.

*excluding adhesive & decoration

**excluding liner, adhesive & decoration, according to ALPLA Carbon Footprint Calculator

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BASF Demonstrates that Pressure - Sensitive Adhesives for Labels can be Fully Compatible with Today's Recycling Processes for Pet Bottles



BASF's UV - curable acrylic hotmelt acResin® UV 3532 has been approved by RecyClass for use on PET bottles, confirming its full compatibility with established European PET recycling processes under typical conditions as used in the assessment. During standard recycling operations, labels using acResin UV 3532 as pressure - sensitive adhesive (PSA) can be removed reliably, enabling clean PET streams and supporting high - quality recycle. With the RecyClass approval of acResin UV 3532, BASF demonstrates that existing PSAs can also meet demanding recycling requirements while maintaining high performance in label applications.

The cross - industry initiative RecyClass is a leading authority for recyclability assessment helping packaging producers align with Design for Recycling guidelines. Technical details of the RecyClass assessment can be found under this link.

Enabling high - clarity filmic labels conforming to Design - for - Recycling criteria

New regulatory guidelines, growing sustainability expectations from consumers, and complex material streams are reshaping the packaging industry. As a result, recycling – along with reducing packaging waste and increasing reusability – has become one of the biggest challenges this industry is facing today. The RecyClass approval marks an important step from a regulatory perspective, as it aligns the label system with established Design-for-Recycling criteria under current EU guidance. In view of the upcoming implementation of the EU Packaging and Packaging Waste Regulation (PPWR) and its mandatory recycled content targets, acResin UV 3532 helps brand owners and converters meet future legal requirements.

Opening up new opportunities for designing recyclable PET packaging

In packaging design, the use of high - performance filmic PSA labels has long been considered incompatible with achieving clean PET material streams and the required high - quality recycle. “Now, acResin UV 3532 opens new opportunities for recyclable PET packaging: high - clarity filmic labels that fully wash off during recycling,” says Mike Zott, Global Senior Marketing Manager in BASF's adhesives business. To achieve this milestone, the team has been building on the product's successful track record with recycling-friendly, high - clarity labels on glass bottles. “We are demonstrating how innovative adhesive solutions can help brand owners and converters comply with regulations such as the EU's PPWR while maintaining design freedom and performance”, he adds.

How BASF is contributing to a sustainable circular economy

acResin UV 3532 is one example of how BASF supports customers' green transformation and advances a sustainable circular economy in accordance with the European Union's Clean Industrial Deal.

To help reach the target of climate neutrality, BASF became a founding member of the cross-industry coalition CELAB (Toward a Circular Economy for Labels) in 2020. The global network is working on solutions to reduce the environmental impact of the labeling industry and to promote a circular economy for self-adhesive labels in all industries.

BASF at Interpack 2026

A wide range of BASF's solutions for the packaging industry will be showcased at the Interpack trade fair taking place from May 7–13 in Düsseldorf, Germany. You can meet BASF's adhesive team at booth A44 in Hall 10.

Klößner Pentaplast Launches Kp Infinity® HP3, its Largest and Most Robust Hotpacs® Yet



Klößner Pentaplast (kp), a global leader in rigid and flexible packaging and specialty film solutions, has launched the kp Infinity® HP3, the largest and most rigid addition to its award-winning Hotpacs® range.

Developed in response to customer demand, the Hp3 is purpose-built for hearty, generous portions of food-to-go that have stretched existing formats to their limits – until now. Manufactured in the UK, the HP3 supports operators seeking locally made, reliable packaging solutions.

Foodservice operators serving loaded fish and chips, burgers and chips, jacket potatoes, and popular Asian noodle-based dishes require a bigger, more robust pack; one that can handle the larger

portions and varied textures that make these dishes such firm favourites with consumers. The HP3 is kp's answer.

Like all kp Infinity® Hotpacs® packaging, the Hp3 is manufactured from Expanded Polypropylene (EPP), a recyclable material not subject to the UK's ban on EPS/XPS single-use foodservice packaging. Its monopolymer construction means it is recyclable in existing PP waste streams, and every pack carries prominent, embossed 'Recycle Me' messaging to guide consumers at point of disposal.

Recycling code 5 on every unit confirms compliance and recyclability at a glance. By producing the HP3 in the UK, kp further supports national recycling efforts and shortens supply chains for foodservice operators.

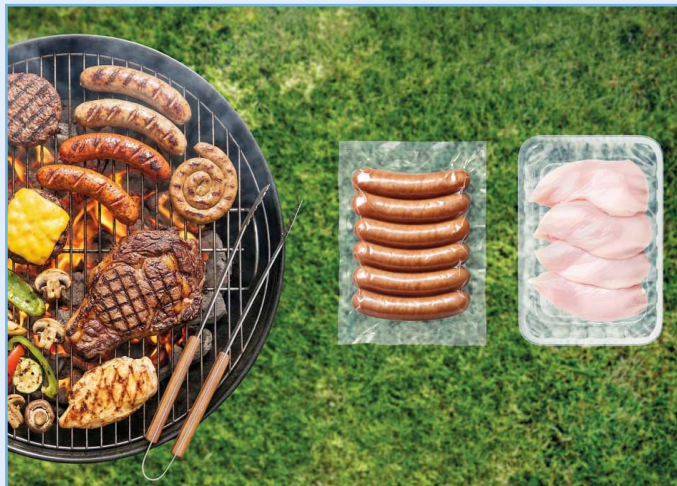
The performance credentials of Hp3 are as strong as ever. It keeps food more than 10°C hotter than alternative packaging solutions, while its exterior stays cool and comfortable to handle. It is naturally waterproof and resistant to hot oils, acids and alkalis; critical properties for the loaded and often sauce-based dishes the HP3 is designed to carry. It is also microwaveable, giving consumers the added convenience of reheating at home.

"The kp Infinity® Hotpacs® range was built on listening to what the foodservice market actually needs. The Hp3 is the clearest example yet of that principle in action" said Austin Schwarz, Sales Director, UK&I at kp Food Packaging.

"Our customers are telling us they need a larger, tougher pack for some of the most-loved dishes on today's menus. We've designed exactly that, without compromising on recyclability, performance, or the quality that kp customers expect. And by producing the Hp3 here in the UK, we can deliver this solution with speed, assurance and a reduced environmental footprint."

The kp Infinity® Hotpacs® Hp3 is available for delivery at the end of April through kp's network of distributors and wholesalers, offering operators a compliant, high-performance, fully recyclable solution built for the realities of today's foodservice market.

High - Quality Packaging Solutions for Meat and Sausage Products from Sudpack



High - quality packaging solutions for meat and sausage products play a key role in extending shelf life, preserving freshness, and enhancing food safety. However, once the PPWR enters into force, packaging materials will also need to become significantly more sustainable. The most effective steps to achieve this are twofold: first, reducing resource consumption and the carbon footprint through smarter packaging design, greater material efficiency, and effective recycling of the plastic fractions already in circulation. Second, stepping up the use of recycled material, recyclable mono - materials, and bio - based alternatives. SÜDPACK's product and service portfolio demonstrates that, even in challenging times, the shift to more environmentally friendly concepts is achievable and – above all – a real economic opportunity.

As a family - owned company and a leading film manufacturer, SÜDPACK has been raising the bar for decades with its innovative high - performance films and packaging concepts. Headquartered in Ochsenhausen in Upper Swabia, SÜDPACK set a clear course toward sustainability early on and has positioned itself as a driver of the circular economy in the packaging industry. As a result, its film portfolio is fully aligned with today's requirements – and SÜDPACK is a go - to partner for ambitious, customer - specific product development.

One - stop shop for holistic film concepts from a single source

SÜDPACK's outstanding extrusion expertise – combined with state - of - the - art technology, deep project experience, and a consistent focus on the customer – underpins its success.

Today, SÜDPACK offers a broad range of conventional reusable laminates as well as material - efficient, recyclable material structures, covering a wide range of packaging designs and product and machine requirements. The portfolio includes perfectly matched top and bottom webs – from rigid and flexible films for MAP and vacuum packaging to film solutions for the production of a wide variety of pouch systems.

All product developments meet demanding retail, sustainability, and consumer requirements. They deliver maximum product protection, extended shelf life, and a high level of process reliability.

Longer shelf life. Less food waste. Greater economic profitability.

Key point: Plastic packaging – whether made from laminate structures or recyclable mono - materials – extends the shelf life of fresh ground meat, steaks, roasts, chops, spreadable and cooked sausage, ham, cold cuts, and frankfurters. It also protects the product until it's eaten, helping preserve its aroma and freshness, and preventing spoilage. This makes it an important lever for reducing food waste.

The excellent processability of this packaging material enables manufacturers and packagers to boost efficiency and throughput, reduce scrap and downtime, and – an often overlooked benefit – achieve consistent, reproducible results. Even very thin, recyclable PP - or PE - based material structures typically run smoothly on standard packaging machines. SÜDPACK adds an extra advantage with perfectly matched top and bottom webs designed to ensure maximum process and packaging reliability.

SÜDPACK's high - performance films from its sustainable product range also deliver the same performance as conventional film laminates, thanks to their outstanding sealing behavior and integrated high - barrier properties. In addition, they offer significant benefits across the entire value chain in terms of the eco - balance, driven by lower use of resources, lighter weight, and reduced logistics and disposal costs.

Customized packaging solutions for meat and sausage products

For cold cuts, SÜDPACK developed a packaging concept for MAP applications consisting of a PP-based – and therefore recyclable – top web and bottom web from the Pure-Line product family. The bottom web offers excellent thermoformability and high stability, while the peelable high-barrier top web delivers long shelf life and clean opening behavior.

The thermoformable Multifol® line keeps ground meat, roasts, frankfurters, and chops reliably protected thanks to its high puncture resistance. Both the conventional and recyclable laminate structures in this product family are among the bestsellers in the SÜDPACK portfolio. In addition to their excellent sealing properties, they also offer high transparency for an appealing presentation at the POS.

With SafePeel Clear NT, SÜDPACK now offers a next-generation, highly transparent lidding film that seals exceptionally well to mono-PP trays – and, at 37 µm, is more than 25% thinner than its predecessor. Thanks to reliable sealing even when the seam is contaminated, delicate, perishable foods such as chicken, steaks, and self-service products stay well protected. At the same time, an innovative peel solution makes the package easy and convenient for consumers to open.

By contrast, the PP- and PE-based mono-materials in the CarbonLite® series can be used, for example, as a lightweight PP flow pack for ground meat or as a stable, self-standing PE doypack for salami sticks. Key features include a high barrier for optimal product safety, process reliability at high cycle rates, recyclability, and low use of materials.

New Label System from Securikett Enables Secure Tray Sealing without Heat Sealing



A new labeling technology from Securikett provides packaging solution manufacturers with additional options for secure and efficient tray packaging. The system combines multiple functions in a single label, enabling secure sealing of packages without the previously standard heat-sealing process.

This multifunctional label solution integrates several technologies: structured adhesive coatings, built-in VOID technology, precisely applied silicone coatings, and custom die-cutting. The interaction of these components creates a packaging solution that unites security, functionality, and regulatory compliance in a single design.

The tamper-evident seal immediately indicates if a package has been opened or tampered with, thanks to an integrated VOID effect. At the same time, functional elements such as ventilation holes or viewing windows can be directly incorporated into the label.

A key innovation lies in the sealing method: instead of a traditionally welded lid, the tray is securely closed by the label itself. The label can be applied automatically using labeling or dispensing systems, offering a new approach to secure packaging solutions.

“We have combined multiple technologies so that they work together within a single label,” explains Vanessa Mitterer-Kling, Head of Research and Development. “This creates a packaging solution that is not only tamper-evident but can also be

efficiently integrated into existing production processes. While tamper-evident security solutions have been used for years, for example in cash transport pouches, this development now introduces comparable security mechanisms for tray and cup packaging for the first time.”

20 Microns Presents K STOFF Slip & Antiblock Additives



K STOFF Slip & Antiblock Additives by 20 Microns Limited are a specialized range of performance additives designed to enhance the surface properties, processability, and functionality of polymer films, rubber, and plastic products. These additives belong mainly to the **amide and wax-based chemical family**, widely used in polyolefins, elastomers, and packaging applications.

Product Overview

The **K STOFF** range includes additives such as **K STOFF O (Oleamide)**, **K STOFF E (Erucamide)**, and other variants that function as **slip agents, antiblocking agents, mold release agents, and processing aids**. These additives are engineered to improve both manufacturing efficiency and end-product performance.

Slip additives reduce friction between polymer surfaces, while antiblock additives prevent unwanted sticking (blocking) of films — especially in high-speed packaging and extrusion processes.

Key Functions & Benefits

1. Slip Enhancement (Low Coefficient of Friction – COF) K STOFF additives reduce friction between film layers and processing equipment, ensuring

smooth movement during extrusion and packaging operations. Even small dosages (around 0.1%) can significantly improve slip performance.

2. Antiblocking Performance

Antiblock additives create microscopic surface roughness, preventing polymer films from sticking together. This improves film handling, stacking, and opening properties.

3. Improved Surface Properties

These additives enhance surface smoothness, gloss, and scratch resistance, resulting in better aesthetic and functional quality of films and molded products.

4. Processing Efficiency

K STOFF additives act as internal and external lubricants, improving flow behavior, reducing melt friction, and enabling faster production cycles.

5. Mold Release & Non-Stick Properties

They facilitate easy release of molded parts, reducing defects and improving productivity in rubber and plastic processing.

Types of K STOFF Additives

- **Oleamide - based (K STOFF O):** Fast blooming, excellent slip properties, widely used in packaging films.
- **Erucamide - based (K STOFF E):** Better high-temperature performance and controlled migration, ideal for PP films and printing applications.
- **Other variants:** Include multifunctional processing aids, dispersants, and lubricants for specialized applications such as cables, footwear, and masterbatches.

Applications

K STOFF Slip & Antiblock Additives are widely used across industries:

- **Packaging Films (PE, PP, multilayer films)**
- **Food & Consumer Packaging**
- **Automotive Components & Rubber Goods**
- **Footwear & EVA Compounds**
- **Printing Inks & Coatings**
- **Wires, Cables, and Industrial Plastics**

Advantages for Industry

- Ensures **smooth processing in high - speed production lines**
- Improves **product durability and surface finish**
- Enhances **clarity and reduces haze in films**
- Offers **cost - effective performance at low dosage levels**
- Compatible with a wide range of **polymers and processing techniques**

Amcor Launches Next Generation of Flip Top Closure for Sauce Market

Amcor (NYSE: AMCR, ASX: AMC), a global leader in developing and producing responsible packaging solutions, has unveiled a new closure targeting applications such as mayonnaise, ketchup and sweet sauces. The 55 mm Flava Flip Top Closure 38/400 is a lightweighted upgrade compared to previous versions.

The new generation of the 38 / 400 neck finish range is designed for circularity to help brand owners meet and exceed their sustainability goals. Amcor has achieved an absolute weight reduction of 1.9 g bringing the new cap's weight down to 8.5 g, an 18.7% relative reduction compared to the earlier generation of 55mm Flip Top Closure. The monomaterial cap, available in a variety of orifice sizes and circular valves, is recyclable - ready with PET, HDPE and PP bottles, where the appropriate recycling infrastructure is in place.

The Flava closure is available in a variety of colors, while the closure can also be paired with a range of PET and HDPE bottles from Amcor's portfolio.

"The new Flava Flip Top Closure will help customers reach their carbon reduction targets thanks to its lighter design," said Peter Briggs, UK sales director, food and beverage, at Amcor. "However, while weight saving is critical in reducing the carbon impact of the closure, it does not compromise performance. Getting this balance right is crucial for consumers. They can be reassured that the product can be dispensed cleanly and easily."

Bottles that the Flava can be paired with include the Eurosqueeze range in HDPE, the 520ml Mercury PET and the 400ml Force Oval PET.

Peter Briggs added: "This is a lightweight design that combines functionality, customer convenience and recycle - readiness, supporting the circular economy while providing improved usability for a wide range of applications.

"In addition, we are a trusted supplier ready to tailor each solution to the precise needs of our customers. Historically, we have a long and proud history of supplying this type of closure and we are excited to bring the next generation to market. Our Flava closure will benefit a wide range of brands requiring a more sustainable solution, and our collaborative approach enables on - time turnaround and fast delivery."

Automation in Motion: Rethinking Roll Handling for Flexible Film Processors

Learn how to overcome roll - handling bottlenecks in film processing with AMRs, robotics and integrated systems that enhance efficiency and safety.

In the world of flexible packaging, many film processors have invested heavily in extrusion lines and slitting systems to increase throughput and product consistency. Yet a persistent bottleneck remains: handling the massive, unwieldy rolls of film that move between production steps. These rolls vary widely in size and format, and automating their handling presents both a technical challenge and a strategic opportunity.

When people in the plastics industry hear "automation," they often think of robots unloading parts from injection molding machines. In film processing, automation takes a different form; it may involve transporting a 300 - pound roll from a slitter to a storage area, or safely staging multiple finished rolls for inspection, wrapping or shipping. These tasks remain labor intensive in many plants, and the opportunity to improve efficiency, safety and data visibility is significant.

Inside the Slitter/Rewinder Workflow

In a typical flexible film processing facility, large bulk rolls (sometimes called jumbo rolls) are the output of an upstream process such as extrusion, printing or lamination.

These jumbo rolls are loaded into a slitter, which cuts them into narrower, shorter lengths suitable for final packaging. A rewinder then creates multiple saleable rolls from the original jumbo roll.



Finished flexible packaging rolls vary widely across dimensions, requiring adaptable automation for safe transport

Automation can make a significant impact in handling finished rolls, which may range from 10 to 300 pounds. Their outer diameters, widths and core sizes can vary significantly. Some may even be coreless. The slitter may produce one roll or 20 simultaneously, and to maintain line efficiency, those rolls need to be cleared rapidly to make way for the next cycle. Delays here can reduce uptime on expensive, high-speed slitters.

The Complexity of Handling Film Rolls

Flexible film operations require automation systems that can manage a broad spectrum of product configurations. A single machine may be called upon to handle a wide range of SKUs, roll sizes and packaging formats. Designing automation to support this variability is a complex engineering challenge. Lightweight rolls often can be managed by compact robotic systems, while heavier rolls, sometimes exceeding several hundred pounds, may require the use of gantries, lifts, or custom handling solutions with very different mechanical and spatial requirements. These variations influence everything from payload capacity and speed to reach, footprint and integration strategy.

At the same time, automation does not eliminate the need for human interaction. Operators must still be involved during material faults, maintenance tasks or quality checks. Systems must be designed with safe and efficient manual accessibility in mind. For example, suspending a roll overhead with a gantry may improve throughput, but it introduces new risks if operators must intervene mid-process. The type of automation selected must align not only with product variability, but also with how much human oversight the process still requires.

Opportunities in Transport and Transfer

Moving jumbo rolls to the slitter remains one of the most labor-intensive steps in roll handling, due to their size, weight and awkward geometry. Operators have traditionally used carts, hoists or lift-assist devices — tools that are often slow and ergonomically demanding. Newer solutions, such as autonomous mobile robots (AMRs), are beginning to streamline this process and reduce operator strain.



Robotic roll-handling system lifts and positions a finished film roll using a core-grip, end-of-arm tool, reducing manual handling and improving repeatability in downstream processing.

Unlike traditional automated guided vehicles (AGVs), AMRs can adjust routes in real time, navigate complex environments and avoid obstacles — a capability known as dynamic motion planning. This makes them especially valuable in production areas with high foot traffic or narrow pathways. With AMRs, film processors can reduce reliance on carts and hoists while improving throughput and worker safety.

Downstream Integration and Inspection

Beyond the slitter, automation can also support the steps required to prepare rolls for shipment or downstream processing, including labeling, palletizing, stretch-wrapping and bagging, each of which presents an opportunity for integrated automation.

Inspection can be automated as well, using vision systems or sensors to verify proper winding, label placement or surface integrity in real time. Incorporating these checks into the workflow reduces reliance on manual review and helps ensure more consistent product quality.

Designing for Flexibility and Institutional Knowledge

Successful automation design demands a working knowledge of day-to-day operations on the plant floor. Operators often develop informal routines or adjustments that aren't captured in process documentation, yet play a critical role in keeping production running smoothly.



Industrial robot integrated with a roll-handling fixture demonstrates automated transfer from a slitter / rewinder cell to adjacent processes, supporting higher throughput while minimizing operator strain.

Capturing these undocumented practices during the system discovery phase ensures that automation systems can either replicate them or safely eliminate the need. For instance, something as simple as applying extra tape to secure a roll may seem inconsequential, but it could be essential for

protecting product during handling. Engaging floor personnel throughout the design phase helps identify these operational details and avoids costly oversights once the system is live.

Looking Ahead: Where Automation Is Headed
Slitter technology is advancing, particularly in the rewinder area. For example, turret rewinders allow machines to continue operating while finished rolls are automatically changed out to minimize downtime. This increases throughput but also places new demands on downstream automation, which must keep pace by quickly clearing completed rolls and preparing for the next cycle without delays.

To match these performance improvements, roll handling must evolve as well, not only for product transportation but also for roll staging, orientation, inspection and preparation for shipping or further processing. Automation that supports this full scope (roll variability, manual backup needs and integration with existing workflows) can help processors reduce

manual intervention, minimize errors, and increase consistency across a wide range of SKUs and roll formats.

As automation systems become more capable, integrating advanced motion control, safety and inline inspection, roll handling is becoming increasingly compatible with automation. Film processors that proactively modernize these systems can turn a traditional bottleneck into a highly efficient process. Partnering with a system integrator experienced in roll-based automation can help film processors modernize operations while ensuring compatibility with both legacy equipment and evolving production demands.

PLASTIC RAW MATERIALS



ADK TRANSPAREX™: Expanding Polypropylene's Potential with Ultimate Transparency



ADK TRANSPAREX™, developed by ADEKA Corporation, is an advanced clarifying agent designed to significantly enhance the transparency of polypropylene (PP). Traditionally, PP has been limited by its natural haziness, restricting its use in applications requiring high clarity. TRANSPAREX™ overcomes this limitation by enabling PP to achieve near glass-like transparency, making it comparable to materials such as PET and polystyrene.

The key innovation of TRANSPAREX™ lies in its ability to reduce haze and improve optical clarity at very low dosage levels, resulting in cost efficiency and improved processing performance. It also enhances the overall material properties of

polypropylene, including better moldability and mechanical strength. This allows manufacturers to produce high-quality, transparent products without significantly increasing production costs.

One of the most important contributions of ADK TRANSPAREX™ is its role in material substitution. By making PP highly transparent, it enables industries to replace more expensive or less sustainable materials like PET, PS, and even glass in certain applications. This not only reduces costs but also supports sustainability, as polypropylene is easier to recycle and suitable for mono-material packaging solutions.

The additive also aligns with global environmental goals by reducing additive usage and supporting recycled PP applications, thereby contributing to a circular economy. Additionally, it complies with food safety regulations, making it suitable for food packaging, medical devices, and cosmetic containers.

ADK TRANSPAREX™ is widely applicable across industries, including food packaging, healthcare, cosmetics, automotive, and household products. Its introduction is expected to expand the use of polypropylene into high-value segments where clarity and aesthetics are critical.

In summary, ADK TRANSPAREX™ represents a major advancement in polymer technology by transforming polypropylene into a high-clarity,

cost - effective, and sustainable material, thereby unlocking new opportunities and applications across multiple industries.

Volatile Corrosion Inhibitor Masterbatches by Kandui Industries



Volatile Corrosion Inhibitor (VCI) Masterbatches by Kandui Industries are advanced additive masterbatches designed to provide **corrosion protection to metal components** during storage, handling, and transportation. These masterbatches are incorporated into polymer products such as films, bags, and packaging materials, enabling them to actively protect metal surfaces from rust and oxidation.

Product Overview

VCI Masterbatches are formulated using **corrosion-inhibiting chemical compounds** dispersed in a polymer carrier (typically PE or PP). When processed into films or molded products, these additives release **volatile corrosion-inhibiting molecules** that form a protective layer on exposed metal surfaces.

Kandui, a global manufacturer of masterbatches, offers a wide range of additive solutions engineered for consistent dispersion, optimized dosage, and compatibility with various polymers.

Working Principle

VCI technology works on a **vapor - phase mechanism**:

- The additive releases **active inhibitor molecules** into the surrounding air.
- These molecules migrate and **adsorb onto metal surfaces**.

- A **thin invisible protective film** is formed, preventing moisture, oxygen, and corrosive elements from reacting with the metal.

This ensures protection even in **hard - to - reach** areas, unlike conventional coatings or oils.

Key Features & Benefits

1. Effective Corrosion Protection

Provides long - term protection against rust, oxidation, and environmental corrosion during storage and transit.

2. Clean & Dry Protection

Eliminates the need for oiling or greasing of metal parts, reducing cleaning costs and maintenance efforts.

3. Easy Processing

VCI masterbatches can be easily incorporated during **film extrusion, injection molding, and blow molding** processes — similar to other additive masterbatches.

4. Uniform Dispersion

Ensures consistent performance due to homogeneous distribution of active ingredients in the polymer matrix.

5. Multi - Metal Protection

Suitable for protecting ferrous and **non - ferrous metals** such as steel, iron, copper, and aluminum.

6. Cost - Effective Solution

Requires low dosage levels, making it an economical alternative to traditional corrosion protection methods.

Applications

VCI Masterbatches are widely used in:

- **Protective Packaging Films (VCI films & bags)**
- **Automotive & Engineering Components Packaging**
- **Electrical & Electronic Equipment**
- **Metal Parts Storage & Export Packaging**
- **Machinery & Spare Parts Protection**
- **Tooling & Industrial Components**

These masterbatches are particularly valuable in industries where **export packaging and long - term storage** are critical.

Processing & Compatibility

- Compatible with polymers like **LDPE, LLDPE, HDPE, and PP**
- Suitable for processes such as:
 - Blown film extrusion
 - Injection molding
 - Thermoforming
- Designed to maintain **mechanical properties and clarity** of the final product

Masterbatches in general are engineered to deliver desired properties at **optimum loading levels for cost efficiency and performance consistency**.

Advantages Over Traditional Methods

Traditional Methods	VCI Masterbatch Solution
Greasing / Oiling required	Clean, dry protection
Labor-intensive	Easy integration in plastic processing
Limited surface coverage	Vapor-phase protection (complete coverage)
Post-cleaning required	No cleaning needed

New System Aims to Detect Percentage of Recycled Plastic in Plastic Products

RECYCLED plastics are promoted on everything from water bottles and fleece jackets to shopping bags and yogurt cups. Verifying such claims, however, is another matter because there is no quick and reliable way to measure how much recycled plastic these products contain.

University at Buffalo researchers are addressing this problem by combining several scientific tests, as well as artificial intelligence, to create a new method for differentiating recycled plastic from new plastic. Described in a study published today in Nature's Communications Engineering, the method aims to help companies, regulatory agencies and other organizations better monitor plastic recycling.

"Our goal is to create a quick and reliable tool that can be used to verify recycled material content, as well as enforce recycling regulations," says

corresponding author Amit Goyal, PhD, SUNY Distinguished Professor and SUNY Empire Innovation Professor in the UB Department of Chemical and Biological Engineering.

The tool, he says, aims to "improve the quality of plastic products and help reduce plastic waste, which will support a more circular economy where plastic pollution and its associated health and environmental risks are reduced."

Why it's difficult to tell recycled plastic from new plastic

When plastic is recycled, it is melted, cleaned and remolded. The end product looks just like new plastic and it has a very similar chemical makeup. But there are subtle differences, such as microscopic impurities and broken polymer chains, found in recycled plastics.

To spot these differences, the research team employed four sensing techniques. They are:

- **Triboelectric testing.** This measures how plastic gains and holds an electrical charge when surfaces touch – in other words, static electricity. Recycled plastics often hold a charge longer due to structural defects from repeated processing.
- **Dielectric/impedance spectroscopy.** This technique applies an electric field to measure how a plastic stores and loses energy. Recycled plastics show lower energy storage and higher energy loss.
- **Capacitance analysis.** This tracks how quickly plastic charges and discharges in a circuit. Differences in timing can reveal changes in electrical properties caused by recycling plastic.
- **Mid - infrared spectroscopy.** This shines light on the chemical structure of plastics, and it can show fragmented polymer chains found in recycled plastic.

Machine learning analyzes data, predicts recycled content

Researchers tested the method by examining new and recycled PET, or polyethylene terephthalate, which is a common plastic used to make juice bottles, peanut butter jars and other goods.

To analyze and combine data from these tests, the researchers utilized machine learning, which is a type of AI. Their machine learning model studied the

test results and learned to recognize patterns in the data that correlate with recycled plastic percentages. The system was more than 97% effective at determining the percentage of recycled content in PET samples that contained anywhere from 0% to 50% recycled material.

"This is an ideal example of combining cutting-edge innovation in science and engineering with AI for social good, and to potentially realize significant societal impact," said Goyal.

Team's future work aims to create a portable device

Goyal says the team's future work will involve combining the method's different sensing techniques and machine learning model into a portable device. "By fabricating such a device, we hope to enable widespread, real-time monitoring of recycled plastics in commercial products," he says.

The work's relevance will grow, he says, as more states and countries adopt regulations that require plastics to be made with some recycled materials. Such regulations are expected in the near future given ongoing work of the Intergovernmental Negotiating Committee – a United Nations-led initiative – to finalize an international legally binding agreement to end plastic pollution.

HMEL offers Polymer Portfolio with Advanced Production Facilities

HPCL - Mittal Energy Ltd. (H MEL) is a joint venture between Hindustan Petroleum Corporation Ltd. (HPCL) and Mittal Energy Investments Pte. Ltd. H MEL is dedicated to energising a brighter tomorrow for millions of Indians with superior petroleum and petrochemical products.

H MEL operates an integrated, state-of-the-art complex comprising an 11.3 MMTPA crude oil refinery, a 1.2 MMTPA dual-feed cracker, 1.2 MMTPA polyethylene (PE) and 1.0 MMTPA polypropylene (PP) plants.

The company produces PP impact copolymer, random copolymer and speciality terpolymer along with homopolymer variants in the PP unit. The swing plants produce a wide range of HDPE and LLDPE grades for various applications including

the metallocene LLDPE for flexible packaging. The dedicated HDPE unit offers a wide range of HDPE grades, with the very special attribute of large blow moulding grades.

H MEL's Customer Services & Development Centre (CSDC), Noida, is positioned as an advanced polymer research and product development facility. With NABL accreditation, BIS recognition and DSIR approval, CSDC promotes sustainable innovation and industry – academia collaboration.

Researchers to Develop Ten Microalgae-Based Solutions for Five Key Sectors

AIMPLAS is participating in the European MULTIPLY project, an initiative launched in June 2025 that seeks to transform industry through the use of microalgae. Funded by the Horizon Europe program, the project brings together 17 strategic partners to develop and scale up ten biological solutions for five key sectors, thereby accelerating the arrival of these sustainable ingredients on the mass market.

By replacing ingredients derived from fossil and food sources with bio-based alternatives, MULTIPLY not only reduces the environmental footprint of everyday products but also promotes the sustainable and profitable cultivation of microalgae across Europe.

The consortium works with five species of microalgae – diatoms, *Arthrospira* (Spirulina), *Tetraselmis*, *Nannochloropsis* and *Chromochloris zofingiensis* – to develop ten high-value-added products. These applications are aimed at sectors as diverse as food (natural colorings and protein-rich ingredients), animal feed (salmon feed components enriched with microalgae compounds), cosmetics (oils and esters for personal care), lubricants (bio-based esters for high-performance applications) and biomaterials and packaging (compostable films, paper coatings and packaging solutions based on algae oils and starch).

AIMPLAS is developing sustainable solutions and materials from compounds and polymers extracted from microalgae for different packaging applications. Activities include the formulation of recyclable barrier coatings for paper substrates, with water and grease resistance, as an alternative to conventional paper/PE multilayer structures.

AIMPLAS is also participating in the development of an active cosmetic packaging that integrates materials derived from microalgae, including functional compounds, encapsulation matrices and structural materials, to improve product stability and reduce the need for preservatives in cosmetic formulations.

"The idea that microalgae will drive a circular future sums up our approach. We focus on specific products and sectors where algae can replace conventional ingredients, backed by data on their performance, sustainability and scalability," said Marta Paiva, project coordinator at A4F, during the latest project review meeting in Berlin.

In the coming months, the project will launch pilot activities for nutrient recovery and test a new monitoring tool. It will also deliver the first algae extracts and oils for product development, key steps in bringing these solutions to market. At the same time, the consortium will advance sustainability and market acceptance studies, laying the groundwork for a future generation of algae - based products in Europe.

Groundbreaking Discovery Turns Household Plastic Recycling into Anti-Cancer Medication

A GROUNDBREAKING discovery led by the University of St Andrews has found a way to turn ordinary household plastic waste into the building block for anti - cancer drugs. Household PET (polyethylene terephthalate) waste, such as plastic bottles and textiles, can be recycled in two main ways: mechanically or chemically. Chemical recycling breaks down PET's long polymer chains into individual units called monomers or into other valuable chemicals.

[Graphic showing PET Waste (plastic bottles, textile) being processed via Ru H₂ RO (TON up to 37,000) into EHMB, which then leads to Pharmaceuticals, New Polymers, and Insecticide. PET waste, Credit: Amit Kumar]

Published on Thursday 18 December in *Angewandte Chemie International Edition*, researchers discovered that by using a ruthenium - catalysed semi - hydrogenation process, PET waste could be depolymerised into a valuable chemical, ethyl - 4 - hydroxymethyl benzoate (EHMB).

Remarkably, EHMB serves as a key intermediate for synthesising several important compounds, including the blockbuster anticancer drug Imatinib, Tranexamic acid, the base for medication that helps the blood to clot, and the insecticide Fenpyroximate.

Currently these types of medication are created using fossil - derived feedstock, often using hazardous reagents producing significant waste. This groundbreaking research offers substantial environmental benefits compared to conventional industrial methods for producing EHMB as confirmed by a comparative hot - spot analysis in a streamlined life cycle assessment approach, this means quickly pinpointing the parts of a product's life cycle that cause the most environmental impact so it's known where improvements will matter most.

Additionally, researchers discovered that EHMB can be converted into new and recyclable polyester. Lead Author of the paper, Dr. Amit Kumar from the School of Chemistry at St Andrews, said: "We are excited by this discovery, which reimagines PET waste as a promising new feedstock for generating high - value APIs (Active Pharmaceutical Ingredients) and agrochemicals. Although chemical recycling is a key strategy for building a circular economy, many current technologies lack strong economic feasibility. By enabling the upcycling of plastic waste into premium products instead of reproducing the same class of plastics, such processes could meaningfully accelerate the transition to a circular economy."

The lead of the collaborative partner organisation, TU Delft in the Netherlands, Professor Evgeny Pidko, said: "For catalytic upcycling to become practical, the catalyst must operate efficiently at low loadings and maintain activity over long periods. All catalysts eventually deactivate, so understanding when and how this happens is critical to pushing turnover numbers to levels relevant for real applications. In this study, we combined detailed kinetic and mechanistic analysis to understand catalyst behaviour under the reaction conditions and used this knowledge to optimize the system towards record turnover numbers of up to 37,000. This emphasizes the importance of fundamental mechanistic insights to optimize catalyst durability and overall process efficiency."

Dr Benjamin Kuehne and Dr Alexander Dauth from collaborative partner organisation, the chemical and pharmaceutical company Merck KGaA, said:



INJECTION MOLDING: Improving Barrel-Temperature Measurement and Control

Proper thermocouple placement and contact area are crucial, as is wire maintenance. But remember that barrel temperature and melt temperature are not the same



This shows a piece of a barrel with the typical thermocouple well and a thermocouple. Note how small the contact area is. How much pressure holds it in place? The spring mechanism not with standing, you might find your thermocouple in the middle of the hole not touching anything. In other words, it is measuring only air temperature.

There are hundreds of processing variables to control in injection molding, and the temperature of the plastic has to be among the top five in importance. No arguments here: Temperature control is critical, and you should duplicate the plastic temperature shot-to-shot, run-to-run, and machine-to-machine.

But what bothers me is that many molders do not differentiate between the actual plastic temperature and the temperature reported or shown on the temperature-control screen. They are not the same and can differ by as much as a 50° C (90° F). The true melt temperature is difficult to measure during production. Most molders interrupt the cycle and purge plastic into the air to take a measurement, a procedure that is fraught with problems. What's really needed is a way to measure melt temperature while the machine is on cycle.

For now, let's start with improving barrel-temperature measurement and control. Certainly, barrel-zone temperatures influence melt temperature. Most agree that about 20% of the energy to melt the plastic comes from the heater bands, and they are critical for startup. So what can you do to make sure you are reading barrel temperature correctly?

Measuring barrel temperature seems simple enough: Use a thermocouple to measure the steel temperature and control the heater band with an ambient-temperature - reference PID (Proportional Integral Derivative) controller. Nothing new here. You can use J- or K-type thermocouples (TCs), as both have the same accuracy (the greater of 2.2° C/4° F or 0.75%) through the temperature range most molders run: 23 to 490 C (70 to 900 F). Both J & K can go to well over 600 C (1100 F).

Make sure that the wires are in good shape - no splices - and are routed so that molten plastic does not get on them. It drives me nuts that 95% of the machines I see have the TC and electrical wires hanging down from the barrel, and 60% of the time gobs of plastic are hanging from them. This costs big money in downtime, wire replacement, safety, and hassle. There is no reason you cannot take some time to tie them up on the non-operator side. You know it will save you more time later, so do it now.

Next is thermocouple placement and contact area. All barrels have thermocouple wells drilled into the steel for each zone. TCs are slid into these holes and usually secured with a spring mechanism to assure the TC is in contact with the steel with some slight pressure on it. A little investigation leads to a couple of questions. How big is the hole? Often a lot bigger than it needs to be. How much contact area does the TC have with the steel? Yikes, not much!

Figure 1 shows a piece of a barrel with the typical thermocouple well and a thermocouple. The contact area is essentially that of a ballpoint pen tip touching steel. Anybody see a problem here? Most, 99.9%, do not; I do. Note how small the contact area is. How much pressure holds it in place? Sure, there is a spring mechanism holding the TC, but is it set correctly? Check yours: My bet is you will find a few with the thermocouple in the middle of the hole not touching anything. In other words, it is measuring only air temperature.

Is there a better way? The rest of the world seems to understand heat transfer better than we do, and it is time we get our act together. In such cases as this, they often use thermal paste to ensure good thermal conductivity and hence a better TC reading. So what should you do?

My suggestion is to fill the thermocouple well one-quarter to half-full of thermal paste. If this is too expensive for you, find the can of copper anti-seize grease in your shop. Since it consists of copper flake, a great heat conductor, and grease, it is something of a thermal paste. The grease will evaporate or char, but you are left with mostly copper and it

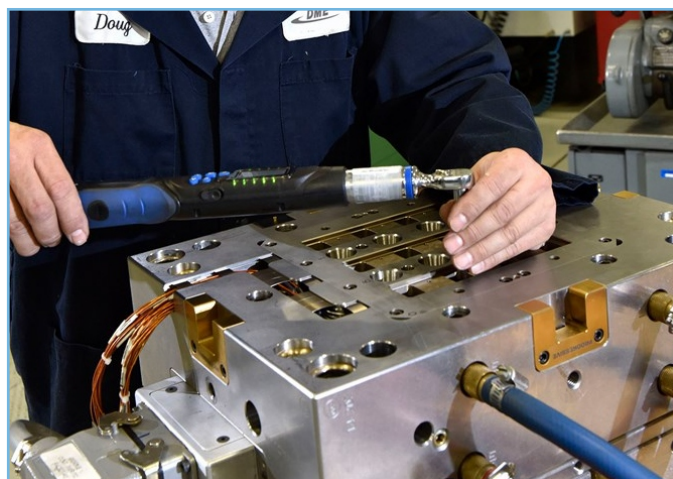
will help transfer the heat. Both of these pastes will provide an improved heat - transfer mechanism to allow the TC to read more correctly.

Sure, TC placement and contact area are picky details, but Dr. Deming and others have tried to show us that details make the difference between profit and loss. You and your machinery suppliers need to get this right.

(Author : Mr. John Bozzelli, Founder, Injection Molding Solutions)

Smarter Mold Care for Lasting Injection Performance

Integrating proactive cleaning, real-time monitoring, precision motion control, advanced lubrication and compact actuation extends mold life, improves product quality and boosts overall injection molding efficiency.



Evolving molding demands efficiency and precision, making it vital to address cooling, lubrication, actuation and plate control for longer-lasting tools.

Injection molding technology continues to evolve, demanding greater efficiency, precision and reliability from moldmakers and processors alike. Recent technical discussions have highlighted practical solutions for addressing persistent challenges in cooling, lubrication, actuation and mold plate control. This article breaks down these themes into actionable insights to help manufacturers achieve better performance and longer tool life.

Optimizing Cooling Channel Performance

Cooling is one of the most critical yet underestimated aspects of injection molding. Even the best - designed channels can accumulate scale, rust or iron oxide over time. This buildup insulates the channels, reduces flow and slows heat transfer - directly impacting cycle times and part quality. To prevent these problems, it is essential to establish baseline flow rates when a mold is new and to monitor them throughout its lifespan. Any deviation from the original values can reveal emerging blockages that require attention.



Cooling is critical; buildup slows heat transfers and hurts quality. Establish and monitor baseline flow rates to detect emerging blockages

When cleaning becomes necessary, relying on cavitation - based processes provides far more consistent results than traditional acid flushing or manual approaches. Cavitation creates controlled implosions inside the channels that scrub away rust and scale, especially when combined with heat and the proper cleaning agents.

Cleaning should also be treated as a regular part of preventive maintenance rather than a last resort. Incorporating this process into scheduled mold care helps maintain reliable flow rates, keeps cycle times stable and minimizes the risk of costly downtime.

Monitoring Cooling with Real-Time Data While cleaning restores performance, monitoring ensures that issues are identified before they escalate. Flow, temperature and pressure monitoring at the manifold or mold level provides a live view of channel health. Operators can quickly see when values drift outside normal ranges and respond before part quality suffers.



Real-time data speeds troubleshooting by revealing whether defects arise from venting, runner imbalance, cooling or dropped flow rates and pressures.

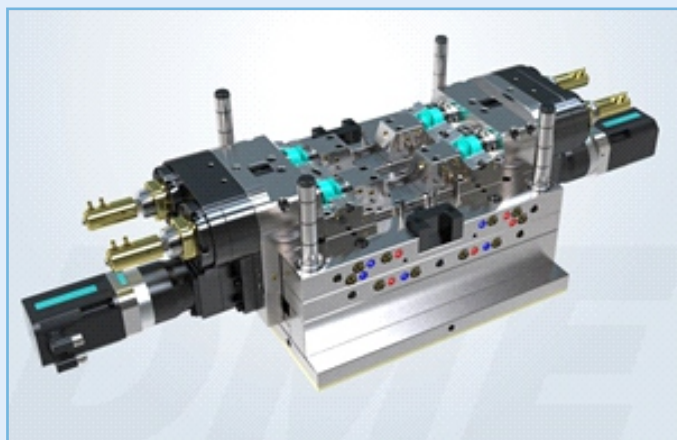
Real-time data also helps shorten troubleshooting. Instead of speculating whether defects stem from poor venting, imbalanced runners or cooling issues, molders can confirm whether flow rates or pressures have dropped. Configuring alerts for out - of - range conditions enhances monitoring effectiveness, facilitating timely intervention without the need for constant manual checks. Integrating these tools into a broader maintenance program not only protects cycle times but also ensures a consistent standard of part quality across shifts and production runs.

Four Keys to Reliability Injection molding success depends on more than part design - it requires disciplined mold care and smart component choices.

- Begin by documenting baseline flow rates and scheduling preventive cleaning to keep cooling channels efficient.
- Add monitoring tools to catch deviations early, reducing downtime and scrap. For complex motion, involve engineers early to integrate servo systems or latch locks that guarantee precise sequencing.
- Match lubricants carefully to heat and application needs, applying sparingly for maximum effect.
- Finally, choose robust actuation like block cylinders for compact, leak-resistant power. Together, these practices extend mold life and improve productivity.

Complex part geometries often require sophisticated mold movements, such as unscrewing or plate rotation. Servo-driven systems bring precision and flexibility to these applications, offering programmable control that eliminates the variability common with hydraulics. Because each mold has unique torque and motion requirements, it is crucial to involve application engineers early in the design phase. This ensures that the servo system is properly sized and integrated, avoiding the need for redesign later.

Servo technology is especially valuable in cleanroom environments such as medical or food production, where eliminating hydraulic fluids reduces contamination risks. Compact servo designs also help conserve mold space. Pairing the mechanical system with its dedicated controller simplifies programming and makes startup smoother, since control algorithms can be written specifically for the chosen drive. Together, these attributes make servo-driven mechanisms a strong choice for molds requiring exact, repeatable motion.



Achieving Reliable Plate Control

Precise sequencing of plates during opening, runner stripping or ejection is essential in multi-plate molds. Latch lock mechanisms provide this control, but selecting the right design for the application is critical. Three-plate systems, stripper plates or two-stage ejection setups each demand different latch configurations. Early selection prevents costly and time-consuming retrofits.

Modern configurator tools simplify this process by enabling designers to select the correct latch based on application details, such as stroke length and sequence type. These platforms also generate CAD

files, which can be dropped directly into mold designs, reducing the likelihood of ordering errors or misapplication. Reliable sequencing becomes especially important when collapsible cores or sequential ejection are involved, since even minor deviations can result in part damage or premature mold wear.



Selecting the Right Lubricant for High - Heat Applications

Lubrication is often overlooked until failures occur, but its role in extending pin life and ensuring smooth motion cannot be overstated. In high-heat environments, standard greases may break down quickly, leading to premature pin breakage or contamination of the cavity. Advanced greases, formulated for extreme temperatures, embed into the surface of the metal, resist oxidation and stay in place without migrating.

To maximize their effectiveness, pins must be thoroughly cleaned before application. Residual oils or debris reduce the grease's ability to bond, so wiping with mineral spirits or mold cleaner is recommended. Application should be minimal - just enough to coat the surface - since overuse wastes material and increases the risk of contamination.

While these lubricants are more costly than conventional options, their ability to extend maintenance cycles and dramatically increase the number of shots between failures often justifies the investment, particularly in demanding production environments.

Improving Actuation with Block Cylinders

Hydraulic cylinders remain a cornerstone of mold actuation, but traditional tie-rod cylinders can be bulky, leak-prone and limited in pressure capacity. Block cylinders offer a more streamlined alternative.

Constructed as a single robust body, they support higher pressures while occupying less space. Their compact form allows them to be embedded directly into the tool, rather than being mounted externally, which reduces clutter and improves safety.

Tech Snapshot: Key Technologies for Injection Molding Reliability

- **Cooling Channel Management & Cleaning**

Advanced systems like CoolingCare and cavitation cleaning ensure efficient heat removal, prevent scaling, and maintain consistent mold temperature.

- **Flow Monitoring & Validation**

FloSense® enables real-time tracking of coolant flow, helping detect blockages or deviations early and reduce downtime.

- **Servo - Driven Mold Mechanisms**

Servomold® provides precise control for complex actions such as unscrewing and plate movement, improving accuracy and repeatability.

- **Mold Plate Control Systems**

EZ-LATCH systems and configurators ensure safe, reliable, and synchronized mold plate operations.

- **High - Heat Lubrication**

Krytox™ grease offers excellent thermal stability and low wear, making it ideal for demanding molding environments.

- **Hydraulic Actuation**

AHP Merkle® block cylinders deliver compact, leak-resistant, and high-force actuation for robust mold performance.

In high-heat molding or die-casting environments, block cylinders can be equipped with cooling jackets to protect seals and hydraulic fluid from degradation. Designers also have the option of routing cooling channels through the rod mount to provide even greater thermal protection.

When standard sizes do not meet a project's needs, custom block cylinders can be engineered to fit the application, ensuring that space constraints or unique motion requirements do not compromise functionality.



Integrated cleaning, monitoring, lubrication, actuation and motion control creates a proactive, precise approach that boosts mold performance, extends tool life and protects quality.

Building a Holistic Approach to Mold Care

Each of these solutions - advanced cleaning methods, real - time monitoring, servo - driven mechanisms, latch lock systems, specialized lubricants and robust actuation - offers its own set of benefits. When combined, they create a comprehensive approach to mold performance and longevity. Proactive cleaning prevents cooling issues before they affect production.

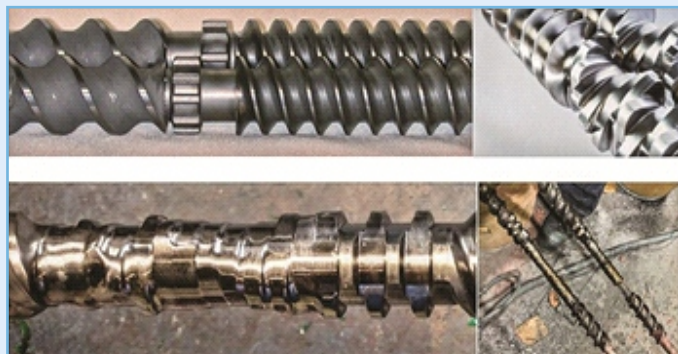
Monitoring ensures deviations are caught quickly. Servo systems and latch locks improve precision in complex motion. High - performance lubricants safeguard moving parts under extreme heat, while block cylinders provide compact and reliable actuation.

By integrating these practices, moldmakers and molders can do more than solve isolated challenges. They can establish consistent standards of care that extend tool life, protect product quality and improve operational efficiency across the board.

Debunking Common Myths in Twin-Screw Compounding

Twin-screw extruders, workhorses in compounding for over a century, are often misunderstood. Here are five common myths and misperceptions that can create scaleup and manufacturing challenges.

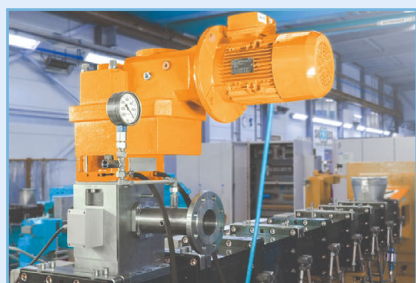
Virtually every plastic part is processed from a polymer formulation that has been mixed by a twin-screw extruder (TSE). The mixing characteristics associated with a TSE have resulted in this machine dominating other types of batch and continuous mixers due to both economics and the inherent trait of a TSE to extrude consistent and repeatable products.



Screws don't need to look like what's displayed in the top images. But don't let them get like what's depicted in the bottom.

Developed more than 100 years ago for natural rubber/plastics compounding applications, twin-screw technologies were greatly advanced in the 1950s and '60s. Although current TSEs have more torque, turn faster and utilize advanced controls, the core technologies and operating principles are essentially the same as then. That being said, there are also myths and misperceptions that cause scaleup and manufacturing deficiencies. The purpose of this article is to provide insight to debunk those myths and improve TSE operations and performance.

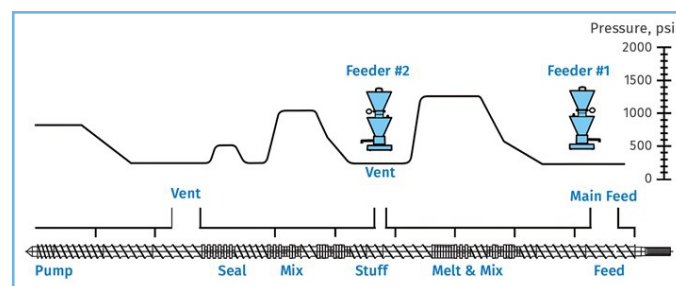
Myth 1: TSE Performance is Always Very Sensitive to Wear



Vent stuffers are useful for polymer formulations with an unmelt material that tends to accumulate in the vent due to high vapor velocities. But it would be wrong to assume that these devices always fix vent flow problems.

Twin-screw extruders are generally less sensitive to wear than single - screw extruders. The corotating twin - screw geometry provides a more positive forward conveying compared to a single - screw extruder because of the self-wiping effects inherent with the opposing surface velocities in the intermesh region. Twin-screw extruders move material forward by having one screw move material to the adjacent screw, and then back again in a semi-regular cycle. This is why twin screws can handle a very wide range of viscosities and perform special processes like mixing polymer with more than 50% oil. The single-screw extruder depends purely on drag flow to move material forward.

It's often possible to have more than 3-5% wear of the diameter of the screw elements and/or barrel liners partially because screw rpm can be increased independent of rate to accommodate the mixing effects in the overflight gap. Single - screw extruders are typically limited to screw wear of 1-2%, depending upon the polymer being processed. Another difference between twin- and single-screw extruders is that the TSE utilizes a modular construction for screws and barrels. Abrasive wear is usually localized in shear-inducing and pressure zones, which typically comprise 25-30% of the overall process section. Only those parts are typically replaced.



Screws must be designed for zero pressure at vents and downstream feed points. A non-optimized screw design or a backup in the pumping zone will cause the melt to pump up and into the vent stack and cause process problems.

The rough rule of thumb for allowable wear on screw elements' OD is a maximum of 3-5% of the diameter. It's worth noting that screws need to be replaced more frequently than barrels, with barrels typical wearing about 25% as fast as the screw

elements. This is because the element tip is always in contact with the barrel, but the barrel is in contact with an element only roughly 25% of the time.

There are several caveats related to the wear limit for a specific process and specific machines:

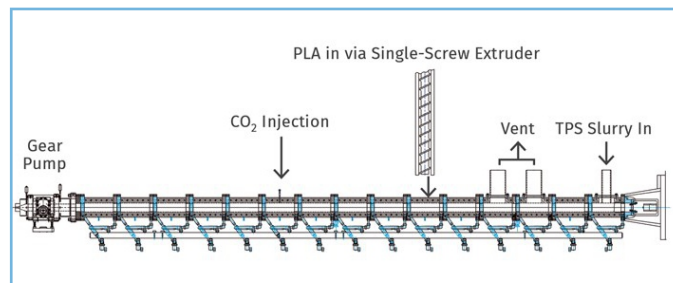
- **Metallurgy:** Both elements and barrels can be a single material or a bimetal composite with a harder wear surface. In the case of some surface treatments (like ion - nitriding), the thickness of the wear layer is only 0.3-0.5 mm thick. In the case of oval liners for barrels, the liner thickness can be 5-20 mm. In either case, once the wear layer is penetrated, the metal loss of the underlying material will happen very quickly.
- **Material sensitivity to degradation:** Certain materials (notably, polyamides and related materials) can adhere to any worn parts (usually on barrels). Over time, because these worn surfaces are no longer self-wiping, the material will degrade and create black specks of material contamination.
- **Floating shafts:** In the case of extreme wear, it's possible for the screw shafts to be floating around. As the screws are supported by material only (no end bearings), one screw shaft can crawl on top of the other and lock up the machine. This only happens when the combination of barrel and element wear is more than 10% of the machine diameter.

Wear patterns are vastly different, depending upon the formulation. When mixing fillers and fibers, it's good practice for the screws and barrels to be inspected every three to six months, for non-abrasive applications once a year may be adequate. Screw Ods (and IDs) and barrel Ids should be measured and tracked.

Myth 2: A Twin-Screw Vent Stuffer Always Fixes a Vent Flow Problem

Vent stuffers are sometimes specified as a "Band - Aid" to address vent flooding issues, needlessly over complicating the system. Vent stuffers were introduced in the 1970s on top-vented barrels to

address vent flow issues inherent with food extrusion processes with steam coming off at a high velocity and poor adhesion of starch/protein materials to the screws, resulting in vent buildup and process problems.



A non-optimized TSE screw design or a backup in the pumping zone will cause the melt to pump up and into the vent stack and cause process problems. Vent stuffers will not solve this issue, which should instead be addressed with an optimized screw design and process setpoints.

Vent stuffers are useful for polymer formulations with an unmelt material (i.e., fillers) that tends to accumulate in the vent due to high vapor velocities. Vent stuffers can be top- or side-mounted and utilize corotating twin-screw intermeshing augers that "push" the material back into the TSE process section and forwarding screw elements that cause a zero pressure underneath the vent.

The path of the screw elements in a vent stuffer are open lengthwise, so vapor will vent and particulates will be conveyed back into the TSE process section. Different flighted elements in the vent stuffer are used to balance vapor openness vs. pushback of solids. This is a balancing act.

Some considerations when operating a vent stuffer include:

- Closely matching vent stuffers with the TSE screw diameter with high OD/ID ratio
- Evaluating different types conveying elements, including single and bilobal
- Not operating vent stuffers at high rpm, as empty screws will tend to rattle and wear

- Using a liquid temperature control unit (TCU) to set the temperature (hot or cold) of the stuffer barrel - which is typically cored or jacketed - but only when needed
- Controlling the vacuum level to minimize vent flow

Vent stuffers don't help when TSE discharge pumping length is insufficient, which causes the melt to back up and out of the vent. It's also not uncommon that the backup length that worked yesterday does not work today because of:

- Wear on screws and/or barrels in the pumping section
- Lack of cooling in the TSE barrels in the pumping zone
- Higher discharge pressure in the extruder due to blocking of screens, plugged die holes or too low of a gear pump rpm
- Poor upstream mixing, resulting in a lower viscosity
- Top stuffers located over the intermesh area of the screws where there is material reorientation and increased venting area / efficiencies
- Side stuffers vent material located in the root of the conveying screw element, which is marginally less efficient than a top stuffer.
- A side stuffer mounted on a roll - around cart is easier to install (no hoist) and remove for maintenance purposes.
- Side vent stuffers can be used as a drain for high percentage moisture formulations, i.e., a fractional - melt PE with undried 65% wood fiber.

The bottom line: Vent stuffers are useful devices that should only be used to fix vent flow issues that cannot be managed via screw design and process parameter tweaks.

Scaleup Examples

	Screw Dia. (OD)	Rate kg/hr Reference	Screw Dia. (OD) Target + Similar OD/ID ratio	Scaleup Exponent	Expected Scaleup kg/hr	Comments
Small TSEs + High Heat Transfer	12	3.0	27	3	34	Volume-limited process, i.e., talc filled
	12	3.0	27	2.5	23	Typical mass transfer process, mixing or devolatilization
	12	3.0	27	2	15	Heat transfer limited, i.e., supercritical foaming
Typical Lab TSE	27	34.2	60	3	375	
	27	34.2	60	2.5	252	
	27	34.2	60	2	169	
Pilot Scale & Small Production	60	375.0	110	3	2,311	
	60	375.0	110	2.5	1,707	
	60	375.0	110	2	1,260	
Production Scale	110	2,310.8	200	3	13,889	
	110	2,310.8	200	2.5	10,300	
	110	2,310.8	200	2	7,639	

Myth 3: You Can Scale any Process From Lab to Commercial in One Step

A boundary condition is a term that refers to a process variable that limits the attainable rate of a TSE to compound and extrude a quality product, whether it's a pellet or extruded part. Commonly encountered boundary conditions include:

- Volume limited (volume in the screws / barrels related to the TSE free volume)
- Heat transfer (melt temperature control related to the perimeter melt)
- Mass transfer (mixing and devolatilization)
- Torque limited

The comparative surface-to-volume ratios of small to large TSEs make it challenging to accurately scale many processes, particularly without experience with similar formulations. The greater the difference in screw diameters, the less reliable the resulting calculations. A rule of thumb is that rates for lab or pilot scale rate tests should be no less than 1/10 the target output for a full-scale production system. Less than that is generally deemed impractical.

Processes that are volumetrically limited scale to the cube, as compared to a heat-transfer-limited process that scales to the square - that's a big difference. Most processes are in between. Once the boundary condition is understood, a simple scaleup formula for different screw diameters (OD) with similar OD / ID ratios may be used:

Volumetric-limited scaleup: $Q_{\text{target}} = Q_{\text{reference}} \times [(OD_{\text{target}}) / (OD_{\text{reference}})]^3$

Heat-transfer-limited scaleup: $Q_{\text{target}} = Q_{\text{reference}} \times [(OD_{\text{target}}) / (OD_{\text{reference}})]^2$

Most other processes scaleup: $Q_{\text{target}} = Q_{\text{reference}} \times [(OD_{\text{target}}) / (OD_{\text{reference}})]^{2.5 (\pm \text{TBD})}$, where:

Q = throughput rate

OD = screw outside diameter (each)

As rates are increased, different boundary conditions are encountered. The scaleup exponent is often an educated guess based upon experience with similar processes and formulations. For volume - limited processes the comparative free volumes of lab vs. production TSEs can also be used, i.e., 10 cc / diameter vs. 100 cc/diameter would result in 10 times the rate. Upstream material handling of low-bulk density materials is very important to optimize rates for volume-limited applications.

To address a heat-transfer boundary condition, the cooling efficiencies for a lab TSE are sometimes purposely impeded to make scaleup more representative. Torque and mass transfer boundary conditions must be considered too. Die and downstream equipment can also limit attainable rates.

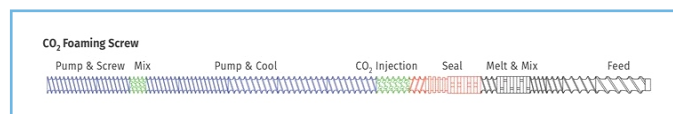
The trick is understanding that different boundary conditions are encountered during process optimization and to adjust parameters accordingly to optimize the rate and quality of the extrudate. Advanced formulas and computer modeling based on rheological characterization can help.

Scaleup of a TSE process is complicated ... and is not yet addressed by artificial intelligence.

Myth 4: Liquid Injection Is Difficult on a TSE

It's possible to inject more than 70% of liquid into a polymer on a commercial scale. Important factors are viscosity of the liquid being injected

and solubility in the polymer. It's also possible to make a stable suspension of a polar additive (like anti - stats) into non - polar polymer like LLDPE.



Optimum TSE screw design showing melting, mixing, supercritical CO₂ injection, cooling and pumping.

The TSE continuously mixes pellets, powders and liquids for many process scenarios. Different types of injection pumps are available for use with a TSE, i.e., gear pump, piston pump, peristaltic pump, diaphragm pump and screw pump. The pump is chosen based on the properties of the liquid as part of an injection system that can be equipped as follows:

- Controls: volumetric, loss-in-weight and mass-flow meter
- Ambient, heated or chilled (for supercritical fluids)
- Tank agitation
- Nitrogen (purge or pressurized reservoir)
- FDA and XP environments / classification

Wide-ranging formulations with liquid components are possible. For instance, the mixing of complex, high-liquid phase formulations (i.e., more than 70%) requires sequentially staged injection points to prevent pooling in the screw channels. Once mixed, the formulation is devolatilized, cooled and pumped into a die or gear pump.

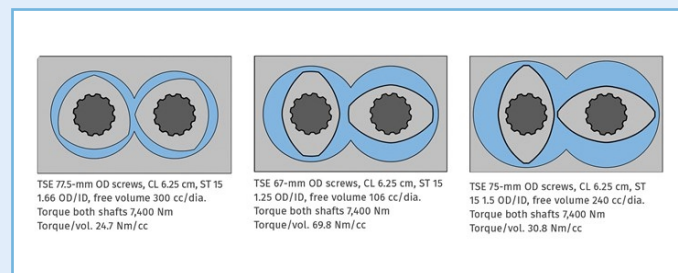
An example would be a plasticizer injection via an insert at the feed throat that sprays a mist into a free-falling solids feedstream (i.e., flexible PVC pre-mix) to maintain feedstock flowability during material handling and/or to increase attainable percentage of liquid in the formulation.

Supercritical injection systems introduce a chilled, high - pressure injection stream into a melt to facilitate foaming. The TSE screw design utilizes a dynamic seal, high distributive mixers and low-energy flighted elements to cool and pump the melt. Supercritical fluid injection into a TSE can also be utilized as a stripping agent, to cool the melt or for plasticization effects.

It's also possible to melt and pump a polymer into the TSE process section with a single (or twin) screw extruder to create unique, complex blends and alloys. For an example of a system with three injections into a TSE, a TPS thermoplastic styrenics block copolymer slurry can be metered into the TSE at the main feed throat with downstream melt injection via a second extruder, followed by a high-pressure supercritical injection.

Carefully and sequentially staging process steps in the TSE process section allows the integration of liquid injection systems to create unique formulations and products.

Myth 5: Specific Torque Is the Most Important Torque - Related Parameter



Corotating, intermeshing TSEs utilize segmented screws that are assembled on shafts. The cross-sectional area of each shaft, the shaft design, metallurgy and the manufacturing method all play a role in optimizing attainable shaft torque. The shaft-torque rating is measured in Newton meters (Nm) and is what limits the power that can be transmitted by the motor into the gearbox, shafts and rotating screws that impart shear and energy into the process.

A common torque-related benchmark that's been extensively referenced is referred to as the specific torque (ST) of the shafts. ST is calculated based upon the shaft centerline as follows:

$$ST = Md \div a^3$$

Md = Max. torque for one shaft; a = centerline of the shafts in cm

Note: ST is also referred to as torque density (TD); the terms are interchangeable.

The corresponding free volume (FV) is dependent upon the OD/ID ratio of the screws and is not reflected in this calculation. For a given ST value, varying FVs are possible in the process section (measured in cc/dia.), depending upon the OD/ID ratio of the screws.

Two New BOY Ltd Machine Models to Debut at Interplas 2026



BOY Limited has revealed that its all-new BOY 20E and BOY 35 Electric machine models will debut in the UK at Interplas 2026 (2-4 June). The former carries on the line of BOY 15 and BOY 22 machines, while the latter boasts an integral hydraulic pump system ensuring hydraulic core pull can be used in cleanroom environments. Event attendees can find BOY Ltd in Hall 11, Stand E50.

In addition to the two new machine models, BOY Limited will also be showcasing a selection of other moulding machines and ancillary equipment at the show. Attendees will also find an array of experts at the company's stand, including two team members from Dr Boy GmbH & Co KG, manufacturers of the BOY Machines, as well as colleagues from its ancillary suppliers in Italy.

Key features of the BOY 20E

- Features a new, robust design and is a good entry option for energy - efficient servo motor pump drives.
- Highly efficient even through low machine hour rates.
- Offers generous mould mounting dimensions with additional mounting options.
- Clamping force of 200 kN, and a maximum shot volume of 64.3 cm³ (theoretical).
- Maximum daylight between platen stands at 400 mm, with a 254mm distance between tie bars.

Key features of the BOY 35 Electric

- Offers parallel movement without double pump and comes fitted with ALPHA 6 control.
- Boasts the compactness of a two-platen machine (requires 2.29m² floor space) and improved synchronised movement during ejection.
- Features a lubricant-free tool installation area.
- Clamping force of 350 kN, and a maximum shot volume of 76.5 cm³ (theoretical).
- Maximum daylight between platen stands at 500mm, with a 280 x 254 mm (h x v) distance between tie bars.
- Choice of 12, 14, 18, 22, 24, 28 or 32mm diameter plasticising units

Energy - efficient PE breathable film production line for personal care products.

In the modern personal care industry, quality, sustainability, and efficiency are no longer optional - they are essential. One of the most critical materials driving innovation in this sector is PE breathable film, a high-performance, air-permeable membrane widely used in diapers, sanitary napkins, and other hygiene products.



In the modern personal care industry, quality, sustainability, and efficiency are no longer optional - they are essential. One of the most critical materials driving innovation in this sector is PE breathable film, a high - performance, air-permeable membrane widely used in diapers, sanitary napkins, and other hygiene products. As global demand for environmentally responsible and high - quality personal care products rises, manufacturers are increasingly turning to energy-efficient PE breathable film production lines to reduce operational costs, improve product consistency, and meet international standards. Jwell Machinery is a high performance film extrusion equipment factory, that has energy-efficient PE breathable film production line for personal care products.

What is PE Breathable Film and Why it Matters for Personal Care Products

PE breathable film, also known as micro-porous polyethylene film, is a type of plastic membrane that allows air to pass through while blocking liquids. This unique combination of permeability and water resistance makes it an essential component in products such as: Baby diapers, Adult incontinence pads, Sanitary napkins and Medical protective clothing

The micro-porous structure ensures that the skin remains dry and comfortable, reducing irritation and improving overall product performance.

In addition, modern production technologies allow manufacturers to create sub-nanometer pores, resulting in films that are lightweight, flexible, and highly durable.

The Role of Energy - Efficient Production Lines in Modern Manufacturing

Traditional PE film production often consumes significant energy, contributing to operational costs and environmental impact. In contrast, energy-efficient PE breathable film production lines leverage advanced extrusion casting and roller stretching technologies to minimize electricity usage while maintaining high output quality.

Key energy-saving features include:

- Optimized extruder design to reduce heat loss
- Advanced motor control systems that regulate power consumption
- High-speed roller stretching mechanisms that maximize throughput without excessive energy usage

By adopting these technologies, manufacturers not only lower operating expenses but also position themselves as environmentally responsible suppliers, a critical advantage in the competitive global personal care market.

Core Components of a PE Breathable Film Production Line

A typical energy-efficient production line for PE breathable films consists of several interlinked components designed for high precision and reliability:

- **PE Air-Permeable Plastic Granules Feeding System:** Automated feeding ensures consistent material flow; Supports modified PE with inorganic fillers for improved film properties
- **Extrusion Casting System:** Melts and mixes raw materials uniformly; Flat die design enables consistent film thickness
- **High-Speed Roller Stretching Unit:** Achieves sub-nanometer micro-porous structure; Adjustable stretching ratios to suit different product requirements
- **Cooling and Winding Section:** Rapid cooling maintains film stability; Precise winding systems prevent film damage and ensure uniform roll quality
- **Automation and Control Panels:** Integrated PLC systems allow remote monitoring and production optimization; Energy-saving modes automatically adjust speed and temperature

The combination of these components ensures high product quality, low energy consumption, and minimal waste, which are critical for both environmental compliance and cost efficiency.

CIRCULAR ECONOMY/ BIO-PLASTICS/ RECYCLING



**UBE Corporation (President: Yuki Nishida;
Head Office: Minato-ku, Tokyo; hereinafter,**



U-BE-INFINITY
Blooming a sustainable future

"UBE" announced that it has newly certified two recycled nylon materials, recently developed from discarded fishing nets, for its environmental product brand U-BE-INFINITY®.

There are two certified items, both newly developed recycled nylon materials made from discarded fishing nets. One was developed by UBE, and the other by UBE Chemicals (Asia) Public Company Limited (President: Anusara Suthikulavet; hereinafter, "UCHA"), a member of the UBE Group.

Recycled Nylon Made from Discarded Fishing Nets

These newly developed, sustainable recycled nylon materials are made from post-consumer recycled (PCR) nylon 6 derived from discarded fishing nets. Leveraging UBE's long-established nylon technology, the materials combine reduced environmental impact with reliable and consistent performance.

UCHA, which has its manufacturing facility located in Rayong Province, Thailand, collects discarded fishing nets from the region and recycles them into high value-added nylon materials, contributing to the development of a circular economy. By building an end-to-end value chain that connects raw material collection through to final product manufacturing, UCHA is expanding new applications for recycled nylon. The materials have already been adopted for apparel products in a collaboration with the Thai fashion brand PIPATCHARA.

UBE has also developed glass fiber-reinforced recycled nylon that delivers physical properties equivalent to conventional virgin glass fiber-reinforced nylon while offering significant potential for reducing greenhouse

components and electrical and electronic parts. The company also plans to expand its use across a wide range of fields, including construction materials, furniture, household goods, and fashion, by tailoring the material to the specific requirements of each application.

These newly developed materials aim to contribute to carbon neutrality throughout their entire lifecycle.

The UBE Group is focusing its efforts on three of today's major environmental challenges: climate change (carbon neutrality), circular economy, and nature positivity. The Group is promoting the development and practical application of environmentally friendly products and technologies. By providing these solutions to more customers, the Group aims to contribute to solving global environmental issues and fulfill its 2030 vision: "A specialty chemicals company that contributes to the global environment, human health, and an enriched future society."

Röhm Invests in Chemical Recycling



At the Worms site, Röhm is using an innovative and in-house developed technology for the first time on an industrial scale. It enables the processing and upgrading of chemically recycled methyl methacrylate (MMA). The starting material is polymethyl methacrylate (PMMA), which becomes high - quality MMA again through depolymerization.

PMMA is a versatile plastic that can be found in vehicle taillights, medical devices and numerous other applications. Due to its chemical structure, the material is particularly suitable for efficient, high-quality recycling processes, achieving more than 90% yield in depolymerization processes.

The new technology can be easily integrated into the existing MMA production in Worms. With this investment, Röhm is creating the basis for a closed and scalable material cycle. Starting summer 2027, the recycled MMA will be used for manufacturing sustainable proTerra products throughout Röhm's Verbund structure.

The scale-up of the technology to industrial scale is Röhm's contribution to the European Recycling Alliance for PMMA, which was founded together with partners at the end of 2024. The aim of this network of companies is to significantly increase the recycling rate of end-of-life PMMA across Europe and to establish a completely closed material cycle. The alliance partners take on various tasks: Pekutherm collects and sorts around 5,000 tons of PMMA waste throughout Europe every year. MyRemono processes these quantities into technical rMMA by means of depolymerization. At Röhm in Worms, this technical rMMA is finally upgraded into MMA in virgin material quality.

"With rMMA, we are creating a real cycle in the PMMA value chain," says Lukas Dössel, Director Circular Economy at Röhm. "This way, we can support our customers in meeting future legal requirements. This is a decisive step towards sustainable material flows in Europe and a reduced dependence on fossil raw materials."

Röhm's investment is funded and supported by the German Federal Ministry for Economic Affairs and Energy. The funding program helps industrial companies in Germany to save energy, conserve resources and reduce emissions. "With this investment, we are taking responsibility for a mindful and circular use of plastics. We don't just want to be part of the change – we want to actively drive it forward," says Dössel.

TOMRA Marks 30 Years of AI Sorting and Unveils New Deep Learning Solutions at Ifat 2026



Global sensor - based sorting technology provider TOMRA Recycling will strengthen its position as the leader in AI solutions for recycling when the company reveals its latest technology portfolio at IFAT 2026 (May 4 – 7 in Munich, Germany). TOMRA experts will be in Hall B6, stand 339 to highlight the 30th anniversary of its AUTOSORT™ system. Under the theme "30 years of AI sorting," TOMRA will demonstrate the technical progression from early optical AI sorting to today's fully integrated systems, while also unveiling new deep learning and AI-enabled solutions at the show.

From rule - based sorting to full integration and connectivity

Since the introduction of the first AUTOSORT™ 30 years ago, TOMRA has led the industry transition from pioneering automated sorting to fully integrated, connected systems. Visitors to the booth will learn about the evolution of the AUTOSORT™ and the broader history of sensor and AI - based sorting through the various editions of the system launched since its debut.

The journey began with the 1996 edition, which introduced high - capacity automated sorting supported by smart optics and early AI principles. Over the years, hyperspectral imaging and software - based flexibility enabled adaptation to new material streams, optical upgrades enhanced illumination and made black material detection possible and advanced AI - driven material intelligence expanded accuracy and material range. A critical milestone came in 2019 with

the integration of GAINnext™, the first deep learning technology on the market. As an add - on to AUTOSORT™, it unlocked entirely new sorting applications and solved long - standing challenges, such as food - grade plastics sorting.

Today, AUTOSORT™ is recognized as the most powerful sorting system on the market, combining AI, multi - sensor technology and advanced image processing with enhancements such as GAINnext™, waste analysis and other digital tools for real - time monitoring, data - driven optimization and seamless plant integration – making it the connected core of high - quality recycling operations worldwide.

Intelligent, interconnected and user - friendly ecosystems

Lars Enge, EVP and Head of TOMRA Recycling, comments: "For three decades, the AUTOSORT™ brand has set the benchmark for performance in the recycling industry. IFAT 2026 offers us the ideal stage not only to reflect on our history, but also to share a clear vision of what comes next. We will introduce several new, impressive deep learning and AI solutions that help bridge the gap to true circularity. These innovations enable sorting plants to move beyond high - speed detection toward truly intelligent, interconnected and user - friendly ecosystems."

Next - generation sorter control and analytics

Alongside the AUTOSORT™ and its award - winning GAINnext™ technology, TOMRA's focus for IFAT 2026 is its brand new and intuitive software platform. TOMRA Local Control allows operators to manage all sorting machines from a single interface on the plant network. It provides full visibility of every machine on the line, delivering updates every second on machine status and performance trends. Operators can adjust configurations, activate sorting plans and create custom programs remotely from the office – a real game changer that transforms plant control into a faster, more efficient and data - driven experience.

Visitors to TOMRA's booth will also meet the team from PolyPerception, whose AI - powered waste analysis technology brings a new layer of intelligence to modern sorting plants. Its deep learning waste analyzer delivers full transparency and traceability across the entire line, providing real - time insights into material composition, recovery and purity.

By turning continuous stream data into reliable, actionable information, PolyPerception enables operators to boost efficiency, optimize performance and make confident, data - driven decisions – further strengthening TOMRA's vision of a smarter, more connected and future - ready recycling ecosystem.

New deep learning and AI solutions

TOMRA's plans for the show also include the launch of various new deep learning and AI solutions that will be presented to the public for the first time. Experts will be available to discuss these latest developments in deep learning, along with the company's broader portfolio of sensor - based sorting solutions.

Oldenburg University Researchers Aim to Make Bioplastics out of Organic Waste

TURNING green waste, hay and algae into fully biodegradable plastics for use in medical products, car components, insulation and packaging is the goal of a new Junior Research Group at the University of Oldenburg in the northwest of Germany. Led by chemist Dr Melanie Walther, the team will combine eco - friendly and application-oriented approaches to develop a cost - effective, energy - efficient technology for making innovative plastics based on polybutylene succinate (PBS) which are made entirely out of organic waste. The Federal Ministry of Research, Technology and Space (BMFTR) is providing around 2.7 million euros in funding for the EcoPBS project.

Making bioplastics fully recyclable and competitive

PBS resembles the conventional plastics polypropylene and polyethylene in terms of robustness and processability, with the major advantage of being readily biodegradable. However, scientists have yet to produce an entirely bio - based material that is fully recyclable, and the manufacturing processes are not yet suitable for use in the chemical industry. "For a high yield, you need microorganisms that are easy to grow and stable enough to be efficient in low-cost, low - energy processes," Walther explains.

In three sub - projects, the Junior Research Group will therefore investigate how to turn a biological substrate consisting of garden cuttings and crop waste into Bio - PBS. The team's first step will be to

optimise the fermentation process: in a newly developed biotechnological process they will assess how effectively the organic material can be converted into bioplastics using different types of microorganisms. A key factor here is that two different fermentation processes – Acetone - Butanol - Ethanol (ABE) fermentation and succinic acid fermentation – will be tested.

New manufacturing processes for bioplastics

The second sub - project will focus on "downstreaming" – the process of removing foreign substances from the converted material. The goal here is to convert the organic compound n - butanol into 1,4 butanediol, a bivalent alcohol and important raw material for plastics. With the help of simulations and machine learning they will look for ways to improve the material and energy balances of this process.

A new chemical substance is also needed to remove contaminants and thus produce the first fully biodegradable BPS. The team has already developed a basic blueprint for this substance and applied for a patent. In the third sub - project it plans to further refine the technology. Another goal is to use the residues from the production of bio - PBS to generate renewable electricity and heat that can be used to operate the laboratory facilities. In the final step, the researchers aim to manufacture the first products for industrial use – for example, packaging and medical materials – using digital 3D models and fully bio - based PBS.

Artificial metabolism turns waste CO2 into biodegradable plastics

IN a breakthrough that defies nature, Northwestern University and Stanford University synthetic biologists have created a new artificial metabolism that transforms waste carbon dioxide CO₂ into useful biological building blocks.

In the new study, the team engineered a biological system that can convert formate — a simple liquid molecule easily made from CO₂ — into acetyl - CoA, a universal metabolite used by all living cells. As a proof of concept, the engineers then used the same system to convert acetyl - CoA into malate, a commercially valuable chemical used in foods, cosmetics and biodegradable plastics.

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