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The Official Journal of the Organization of Plastics Processors of India

Volume No. 12

• Issue No. 11

• Mumbai

• May 2024

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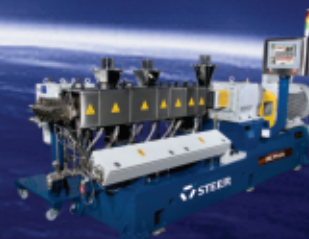
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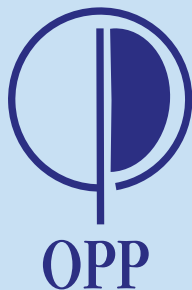
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FROM THE PRESIDENT'S DESK

Mr. Dilip Parekh



Dear Members,

Greetings from Organization of Plastics Processors of India!

In the last few years highly efficient Startups have come up. Currently in India alone there are approx. 1.25 lakh Startups.

These startups have resulted in lot of time, money and effort savings. These Startups require innovative thinking on part of Founders.

We have invited Mr. Sasha Mirchandani as the Chief Guest at our 40th Annual Meet scheduled on Friday 09th August 2024 at Jio World Convention Centre, BKC. He will be delivering a talk on "Ecosystem of Start-ups".

Mr. Sasha Mirchandani is Managing Director and Founder of Kae Capital and Co-founder of Mumbai Angels. Previously, he was at BlueRun Ventures as Managing Director for the India operations. Before joining BlueRun Ventures he was CEO and Founder of Imercius Technologies. Earlier he was at Mirc Electronics (Onida) where he was Head of Corporate Affairs and new business. His investments include Inmobi, Healthkart, 1 Mg, Myntra, Porter and Fractal Analytics. Mr. Sasha sits on the Boards of Zee Entertainment, Hathway Cable and Datacom Limited, Nazara Technologies Limited, Healthkart and Mumbai Angels Ventures Mentors among others. Previously he was on the Boards of Fractal Analytics, Myntra and Ador Welding.

Mr. Sasha Mirchandani completed his Business Administration from Strayer University and MMDP program at IIM, Ahmedabad. He is a Charter Member at TiE Mumbai and was inducted into their 2019 Hall of Fame as an Outstanding Angel Investor. He is also Past President of Entrepreneurs Organization (EO) Mumbai.

The Invitation Card will be sent to you in due course. The Invitation Card will be for one nominee of the company. If you desire to bring your colleagues for the event, you are welcome to do so. The participation fees will be Rs. 2000/ + GST per additional person.

I hereby appeal to all OPPI members and their next GEN to confirm their attendance with the OPPI Secretariat.

Look forward to meet you in person on 09th August 2024.

With Best Wishes,

Dilip Parekh
President

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Printed, Published and Edited by:

DEEPAK LAWALE on behalf of **ORGANIZATION OF PLASTICS PROCESSORS OF INDIA**, Printed at **DESIGN WORLD CREATIONS**, Unit No. 204, A-Wing, Suashish IT Park, Off. Dattapada Rd, Borivali East, Mumbai - 400 066 and Published from ORGANIZATION OF PLASTICS PROCESSORS OF INDIA, 404/405, Golden Chambers, New Link Road, Andheri (West), Mumbai 400 053.

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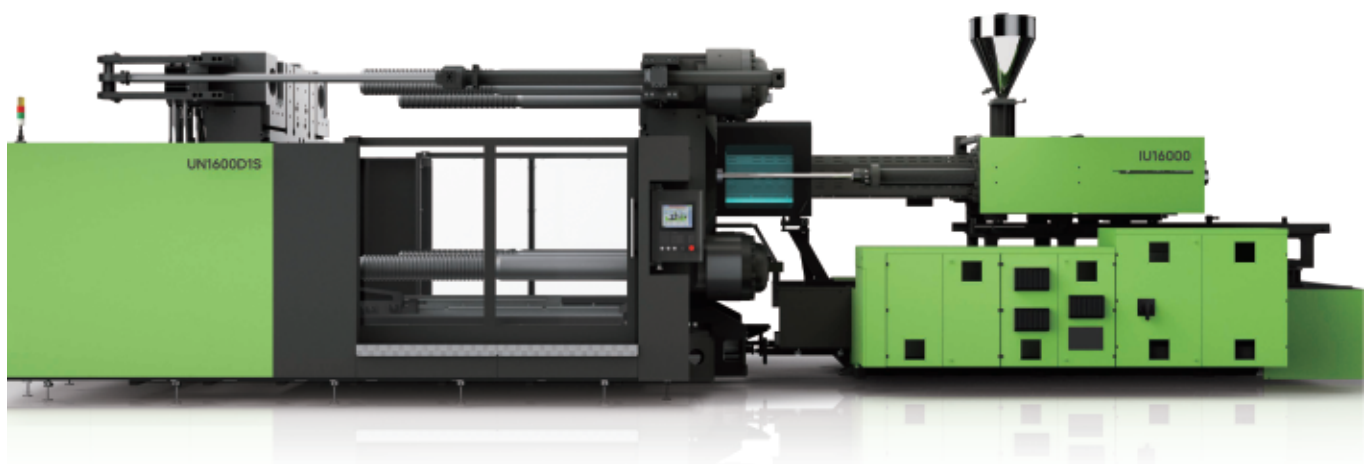
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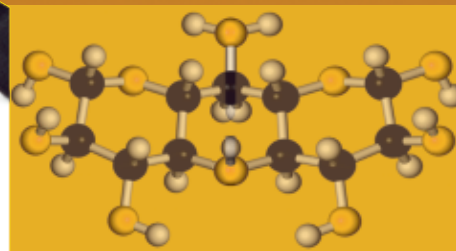
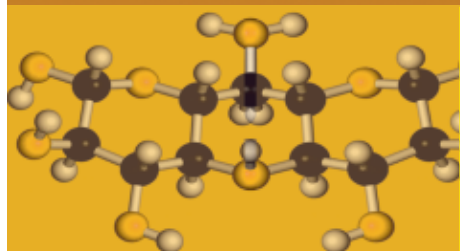
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2024 KEY FIGURES

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- **Plastic:** Plastic Bending Machinery, Blow Molding Machines, Extruding Machines, Plastic Compounding Equipment, Plastic Cutting Machines & Cutters, Die Cutting & Casting Machines, Plastic Dryers & Mold Heaters, Injection Molding Equipment, Mold Cleaning Equipment, Spin Casting Equipment, Thermoforming Machines.
- **Quality Detection Instrument and Equipment:** Measuring & Detection Equipment, Temperature Controller & Components, Electronic Automatic Instrument, Monitoring Device.
- **Machinery Parts and Accessories**
- **Packaging:** Converting Machinery, Packaging Machinery, Packaging Materials, Raw Materials & Auxiliaries, Fiberboard Packages, Paper Bags and Folding Cartons, Rigid Packages, Glass Bottles & Tin Cans. Flexible Packaging, Quality Control Systems, Dosing, Coding & Marking Systems, Physical Distribution Systems, Logistics, Research Centers, packaging Magazines & Associations.
- **Printing:** Printing Machinery & Accessories, Packaging Print & Process Systems, Printing Materials & Supplements, Post-Printing Machinery & Equipment, Coating Equipment.

PLASTIC

- ✓ Local annual sales is around TK28,000 crore (US\$3.25\$ billion)
- ✓ Export in the first 5 months of FY22 is %29.8 higher compared to the same period of FY21
- ✓ New investments focus on personal protective equipment, medical equipment and toys
- ✓ Government promotes industry-friendly policies to develop skilled manpower, attract foreign investment, ensure technological advancement and the overall development

PRINTING

- ✓ Printing market size in Bangladesh is around TK12,000 crore (US\$1.39\$ billion)
- ✓ Earnings from paper sector in the July - November period of FY22 is %15.3 higher than that of FY21
- ✓ Workplaces and educational institutions reopening after pandemic make the demand for paper and paper products increase
- ✓ The country's first printing industrial park will come into operation in 2024, expected to propose more new investments

PACKAGING

- ✓ Export surges bring in new possibilities for Bangladesh packaging market
- ✓ The budding e-commerce accelerates digital economic growth and supports corrugated packaging
- ✓ Packaging paper market revenue size is projected to grow at a CAGR of %5.2 during 2027-2021
- ✓ International leading packaging enterprises such as Tetra Pak and ALPLA plan to build factories in Bangladesh to seize market share and provide innovative packaging solutions in food & beverage, personal-care, and pharmaceuticals sectors

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|------------------------|-----------|
| GROSS SPACE | 23,000 M2 |
| EXHIBITORS | 625 |
| BOOTHS | 1,100 |
| COUNTRIES & REGIONS | 22 |
| VISITOR | 18,507 |
| EXHIBITOR SATISFACTION | 94% |
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NEWS FROM INDIA

IOCL Selects Lummus' Cumene Technology

Lummus Technology, a global provider of process technologies and value - driven energy solutions, announced Indian Oil Corp. Ltd. (IOCL) selected the Lummus / Versalis cumene technology for a 440 KTA unit in Paradip, India. The new cumene unit is part of a grassroots petrochemical and polymers expansion at Indian Oil's complex in Paradip.

"Our cumene technology will offer Indian Oil lower energy costs, reliability, operational efficiency and exceptional product yield, which will help them optimize their plant economics and support their growth initiatives," said Romain Lemoine, Chief Business Officer for Polymers and Petrochemicals, Lummus Technology. "We look forward to continue working with Indian Oil on another successful project and building on our long - time relationship."

Lummus' scope includes the technology license for the cumene technology, basic design engineering, proprietary catalyst, site services, advisory services, and training. Indian Oil has licensed multiple Lummus technologies, including naphtha

cracker, INDMAX FCC and polypropylene technologies at complexes across India. Lummus and Versalis have partnered to license cumene technologies since 2007. The cumene process is a liquid-phase alkylation technology using a proprietary zeolite catalyst and is characterized by a very high cumene yield, ultra - high purity cumene product and a long catalyst run length.

India Chooses to 'Regulate', Not Ban, Single - Use Plastic

In 2022, India brought into effect the Plastic Waste Management Amendment Rules (2021) that banned 19 categories of 'single-use' plastics

Ahead of week-long negotiations involving 192 countries held in Toronto, Canada on getting the globe to progress on eliminating plastic pollution, India is in favour of "regulating" and not outright eliminating single-use plastic, according to an analysis of various countries' public negotiating positions by the Centre for Science and Environment (CSE), a not-for-profit based in New Delhi.

In 2022, India brought into effect the Plastic Waste Management Amendment Rules (2021) that

banned 19 categories of 'single-use plastics'. These are defined as disposable goods that are made with plastic but are generally use-and - throw after a single use and include plastic cups, spoons, earbuds, decorative thermocol, wrapping or packaging film used to cover sweet boxes and cigarette packets, and plastic cutlery. It, however, doesn't include plastic bottles – even those less than 200ml — and multi - layered packaging boxes (like in milk cartons). Moreover, even the single - use plastic items that are banned are not uniformly enforced nationally with several outlets continuing to retail these goods.

The rationale behind banning certain kinds of plastic and leaving others out derives from a report by an expert committee on single - use plastics constituted by the Department of Chemicals and Petrochemicals. They scored different plastic goods on the basis of their utility and environmental impact, according to a report by the CSE. The current ban only addresses about 11% of single - use plastic in India, says the report.

Of the nearly 17 topics that countries deliberated upon, one of them involved "problematic and avoidable plastic products

including single - use plastics", which refer to sections of plastics that are likely to harm environment as well as human health.

The aim of negotiating countries is to implement global and national measures such as removing these products from the market, reducing production through alternate practices or non - plastic substitutes, and redesigning problematic items to meet criteria for sustainable and safe product design.

The CSE analysis says that India has opted for language in the current version of the negotiating document, called a 'zero draft', that vouches for "regulating" instead of "not allowing", the production, sale, import and export of problematic and avoidable plastic goods. It has, however, agreed to a "science - based criteria" for identifying such plastics.

Scott Bader India Manufactures Resin from Recycled Plastic Bottles

Scott Bader India has pioneered the use of rPET flake (chopped up PET plastic bottles) as a raw material in the manufacture of Espol resins for customers across India.

In 2023, Scott Bader India used 58 tonnes of recycled rPET flake into the manufacture of Espol resins. Incredibly, this is equivalent to approximately 1.75 million 1.5L plastic bottles.

The rPET flakes are converted to resin which is then incorporated into the final formulation. The resins are then used to manufacture GRP components

across India for markets such as building & construction, water parks and general purpose applications. These resins contain up to 50% recycled rPet content. Using rPET flakes gives fresh life to these previously single use plastic bottles, creating structures that last over 20 years and helping Scott Bader reduce its use of newly produced raw materials.

Saving 1.75 million plastic drinks bottles from the environment is another small step towards our 2036 vision of becoming a fully sustainable business with a net positive impact on the environment. It is initiatives like this that helped us achieve a Gold EcoVadis rating in 2023.

"It is amazing to think that due to the innovative approach to resin development here in Scott Bader India 1.75 Million plastic bottles have been prevented from either being sent to landfill or left to contaminate our oceans. We are always looking for new approaches to reduce our impact on the environment." said Jon Stowell, India strategy director. The resins produced using rPet flake are Espol 32.06 and 60.00/60.01.

Government Plans to Develop Plant for Recycling Lithium-ion Batteries, E - waste in Uttarakhand

The Technology Development Board (TDB) recently announced a partnership with startup Renine India to build a commercial plant for recycling lithium-ion batteries and e-waste in Uttarakhand. The agreement provides Rs 7.5 crore in financial assistance from TDB

for the Rs. 15 crore project, said the Ministry of Science and Technology.

"India is third in the world in terms of e-waste generation and significant efforts are required to curb the issue. TDB supporting this initiative would help to engage informal recyclers to connect with formal recyclers thereby contributing towards a circular economy," said TDB Secretary Shri Rajesh Kumar Pathak. The TDB comes under the Department of Science and Technology (DST).

The new recycling plant will be set up at Eldeco in Sitarganj's SIIDCUL Industrial Area in the Udham Singh Nagar district. The plant will utilize indigenous technology developed by the Centre for Materials for Electronics Technology (CMET) for efficient recycling.

'Growing use of lithium - ion batteries increasing e - waste.' The Science Ministry highlighted the growing use of lithium-ion batteries in electronics, electric vehicles, and renewable energy storage, leading to increased e-waste.

It noted that the rising "Imports of e - waste stemming from the disposal of spent Lithium - ion Batteries (LIBs) are driven by their growing utilization in portable electronics, electric vehicles, and global renewable energy storage systems".

"The potential for value creation through the retrieval of metals from spent LIBs has spurred interest in recycling e- waste generated by these batteries. The lithium-ion battery recycling market size is projected to reach \$14.89 billion by 2030, with a Compound Annual

Growth Rate (CAGR) of 21.6%, up from \$3.79 billion in 2021. Despite this, a significant 95 per cent of Li-ion batteries currently end up in landfills, while only 5% undergo recycling and reuse, the ministry added.

However, only 5% of lithium-ion batteries are currently recycled, with the rest ending up in landfills. The Ministry expressed concern about the dominance of the informal sector in e-waste management due to its potential negative environmental and economic impacts.

The project aims to address these issues by promoting efficient and eco-friendly recycling methods.

New Plastic Management Rules will Impact FMCG Companies: Analysts

India is the third - largest plastic producer globally. While these new norms will put India ahead in the global league, they will also impact packaging costs for consumer companies.



New mandatory norms for plastic recycling and reuse of plastic packaging will impact consumer goods companies like Nestle India, Britannia, and Colgate, according to analysts at brokerage firm Kotak Institutional Equities.

Under the new Plastic Waste Management rules, India will implement mandatory norms for

the recycling and reuse of plastic content for producers, importers, and brand owners of plastic packaging (excluding micro, small and medium enterprises, or MSMEs) in a phased manner starting from FY25.

India is the third-largest plastic producer globally. While these new norms will put India ahead in the global league, they will also impact packaging costs for consumer companies. The brokerage said that consumer companies, on average, spend 5-8 per cent of their revenues on packaging, while still heavily relying on plastics.

"We believe that Britannia, Colgate, and Nestle will be the most impacted, while Godrej Consumer Products, ITC, Jyothy Labs, and Varun Beverages will remain the least impacted by the new PWM rules," the brokerage said in its note.

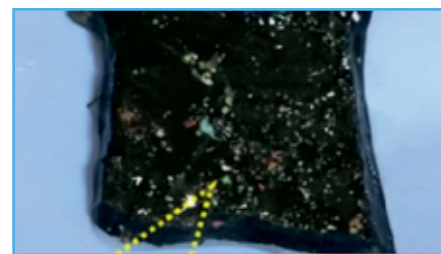
"Our assessment is based on relative overall revenue-based exposure of companies to five key variables: plastic, transparent plastic, food - grade plastic, flexible plastic, and multi - layered plastic (MLP)," it added.

Consumer companies are already working to reduce plastic packaging.

"Packaging is one of the key focus areas. We have undertaken several measures on this front, including optimising current packaging by reducing size, initiating the use of recycled content in secondary packaging, and moving towards easy - to - recycle packaging material," said a Nestle India spokesperson. The company has stopped using plastic for all promotional material since 2020.

Meanwhile, "plastic recyclers such as Ganesha Ecosphere and innovative packaging companies such as EPL, Uflex, and ITC, which can provide solutions for making plastic recyclable, will be the key beneficiaries of the rollout of the new PWM rules," analysts added.

IIS Scientists Develop Sustainable Hydrogel to Remove Microplastics from Water



Scientists at the Indian Institute of Science (IISc) have developed a sustainable hydrogel to remove microplastics from water, addressing the global issue of plastic pollution. Microplastics, particles less than 5 millimetres in size, are pervasive in oceans, soil, and even the air we breathe, posing a threat to human health.

The hydrogel, made up of a unique polymer network, can bind and degrade microplastics using UV light irradiation. Previous methods like filtering membranes have been unsuccessful due to clogging, making them unsustainable.

How it was Developed?

The IISc hydrogel, composed of three polymer layers and nanoclusters of a material called copper substitute polyoxometalate, has shown high efficiency in removing polyvinyl chloride and polypropylene microplastics from water.

As per IISc, the hydrogel consists of three different polymer layers – chitosan, polyvinyl alcohol and polyaniline – intertwined together, making an Interpenetrating Polymer Network (IPN) architecture. The team infused this matrix with nanoclusters of a material called copper substitute polyoxometalate (Cu-POM). These nanoclusters are catalysts that can use UV light to degrade the microplastics. The combination of the polymers and nanoclusters resulted in a strong hydrogel with the ability to adsorb and degrade large amounts of microplastics. The team plans to scale up their technology to deploy devices for cleaning up microplastics from various water sources. Additionally, the hydrogel can be repurposed into carbon nanomaterials capable of removing heavy metals from polluted water, making it a versatile solution to environmental contamination.

UFlex Inks an Agreement for the Supply of Renewable Power for its Packaging Films Plant in Karnataka



UFlex Limited has entered into a long-term Power Purchase Agreement (PPA) with Amplus Phoenix Private Limited to source renewable power under a group captive power policy. The plant will provide solar power to UFlex's Packaging Films manufacturing plant in Dharwad, Karnataka. In

line with UFlex's goal of being net zero by 2035, or earlier, this move will strategically reduce UFlex's carbon emissions by app. 19000 tCO₂e.

UFlex's Dharwad facility is home to a state-of-the-art packaging films plant, commissioned in Q2, 2022. Equipped with a BOPET line, a CPP line, and plasma-enhanced high-barrier metallizers, with a combined capacity of 93,000 TPA, the facility is an addition to UFlex's global manufacturing footprint - spread across nine countries. This agreement signifies UFlex's commitment to adopting renewable energy for its operations and fostering a sustainable future. This strategic agreement, under the group's captive power policy, aims to play a pivotal role in reducing the company's greenhouse gas emissions and is aligned with UFlex's overarching vision for sustainability.

Mr. Apoorvshree Chaturvedi, Director of Global Operations, UFlex Group, affirmed that the company's investment in renewable energy is a crucial and bold move toward reducing its carbon footprint and fulfilling its commitment to environmental stewardship. "UFlex has a robust and well-defined energy optimization transition strategy for reducing emissions. The organization believes that every company is responsible for adopting sustainable practices that are beneficial for the environment, long-term business success, and stakeholder value. UFlex is a pioneer in recycling multi-layer mixed plastics and aseptic packaging waste and has taken the onus to share its knowledge and expertise with

corporations and economies worldwide. The investment in renewable energy is a significant and positive step in the right direction for both the business and the planet, shaping a brighter and more sustainable future".

Shares of UFLEX Limited was last trading in BSE at Rs. 463.00 as compared to the previous close of Rs. 461.25. The total number of shares traded during the day was 3018 in over 233 trades. The stock hit an intraday high of Rs. 472.85 and intraday low of 459.05. The net turnover during the day was Rs. 1397333.00.

UFlex Bags the Second-highest Number of Printing & Packaging Industry Awards

UFlex Limited showcased its market-leading innovation by winning 10 prestigious awards at the SIES SOP Star Awards 2023. This remarkable achievement is a testament to UFlex's commitment to research-led innovative packaging solutions that exceed customer expectations. UFlex's packaging films business and holography business secured three awards each, followed closely by the chemicals business which won two awards. The flexible packaging business and printing cylinders business secured one award each.

The SIES SOP Star Awards recognize outstanding contributions by companies in the Indian packaging industry. The year 2023 witnessed a remarkable display of creativity and innovation from 36 companies and brand owners across India. UFlex secured the second-highest

number of awards, further strengthening its position as a forerunner in sustainable, groundbreaking, and innovative solutions in the packaging industry and underscoring the company's relentless pursuit of excellence and innovation.

The 7th Edition of the SIES SOP Star Awards witnessed over 200 award entries, with 47% of the total applications stemming from the packaging material manufacturer and converter segments. Other noteworthy companies that participated across categories and were named the winners include ITC Limited and HUL.

Anantshree Chaturvedi, Vice Chairman and CEO, Flex Films International, expressed his delight at the company's outstanding performance at the 2023 awards. He remarked, "We are honored to be named a winner across ten product categories. These awards are a testimony of our teams' hard work and focus on customer delight, innovation, and research. This recognition reaffirms our leadership in innovative packaging solutions and underscores our commitment to delivering high-quality products. Our focus on research and development remains unwavering as we push the boundaries of what is possible in packaging technology".

UFlex's outstanding performance at the 2023 awards includes the following awards across categories:

Packaging materials and components

- "F-POX" Excellent Oxygen and Moisture Barrier Transparent BOPET film for frozen and dry food packaging applications

- "F-PSX" High Barrier AIOx Polyester film for dried meat snacks, confectionaries, and microwavable packaging applications
- "F-AFR-M" Alu-Alu Replacement Metallized Polyester film for food packaging applications
- Epoxy Acrylate Oligomer (Flexcryl 4444) developed for UV & EB curable coatings and printing inks used in flexible packaging applications Flex Beam Matt Opaque white for shrink sleeve application

Labelling and decoration

- 3D Flipogram label for the perfume industry
- Registered holography pack for coffee packaging

Food

- Fully recyclable spout pouch using BOPP/PE films for Kissan Chotu pack
- GRS-certified recycled sequins film for the textile industry
- Carving effect on hard PVC through laser embossing For queries: corpcomm@uflexltd.co

Plastics Recycling Show (PRSI) to Debut in India this December

Media Fusion and Crain Communications, a leading global event organizer, announced the debut edition of the Plastics Recycling Show India 2024 (PRSI) slated to take place at the Hall 4, Bombay Exhibition Centre in Mumbai from 4 to 6 December

2024. A three-day expo, PRSI aims to unite stakeholders in plastics recycling from across India towards a sustainable future.



In 2023, India stood at a total market volume of 9.9 million tons, and is expected to reach 23.7 million tons by 2032 growing at a CAGR of 9.86% from 2024 to 2032.

The vast Indian plastics industry serves as a key economic growth driver across automotive, construction, electronics, healthcare, textiles, and FMCG sectors. With India's plastic recycling of average 13% surpassing the global average of 9%, the nation's recycling approach aims to inspire global leaders in combating plastic pollution.

Taher Patrawala, managing director, MediaFusion, said "As we witness a global shift towards sustainable practices, it's imperative for nations to address the pressing issue of plastic pollution. With the Indian government's proactive measures, including the ban on various single-use plastic items and the implementation of Extended Producer Responsibility (EPR) regulations, the stage is set for effective plastic waste management."

The three-day expo plastics recycling and sustainable packaging conference will unite delegates, thought leaders, innovators, and technology

providers in the plastics recycling industry. Suppliers, manufacturers, technology specialists, waste managers, consultants, and emerging players in the industry will convene to explore business opportunities under one roof.

On the sidelines, international experts will address key themes including circular economy principles, sustainable packaging, regulations, challenges, opportunities, innovations, technologies and trends, and share insights and experiences from across the plastics sector to promote a green future.

The unveiling of PRSI 2024 followed a roundtable conference on 27 February at Mumbai, which convened fourteen stakeholders from the Indian plastics industry. The agenda was to address the pressing challenges and opportunities in Indian plastics recycling. Esteemed panelists comprised representatives from the Bureau of Indian Standards, Alliance to End Plastic Waste, Indian Plastics Institute (IPI), Mumbai Sustainability Centre, Brihanmumbai Municipal Corporation and other influential stakeholders.

The discussion was centered on enhancing recycling infrastructure, incentivisation of waste management, deficiencies within the sector, streamlining regulatory frameworks, and fostering collaboration across the value chain, with a specific focus on Maharashtra.

Matthew Barber, global events director, Crain Communications said, "Globally, PRS is recognised for its expertise in bringing

together the entire plastics recycling value chain on one platform in Europe, the Middle East and South - East Asia. The PRS show has been growing since its inauguration in Europe in 2015. Building on the success of PRS in Europe and the Middle East, we are elated to bring PRS to India. With legislation mandating certain criteria, there is a pressing need to explore industry practices to meet this target."

BASF Expands E - Coat Manufacturing Facility in Mangalore, India



- Addressing the increasing demand from automotive manufacturers in India and beyond
- Introducing the latest generation of high - performance e - coats

Mangalore, India – April 29, 2024 – BASF's Coatings division announced the expansion of e - coat manufacturing facility at its Mangalore site. This strategic expansion is driven by the growing demand for e - coat solutions by local automotive OEM customers in India, as well as customers in the South Asian and ASEAN markets.

E - coat, also referred to as electrophoretic or cathodic dip coating, serves the purpose of safeguarding the car body's

surfaces, edges, and cavities from corrosion. Additionally, it effectively smooths out the roughness of pre-treated metal surfaces, creating an ideal foundation for the subsequent layers of paint to be applied.

With the expanded e - coat manufacturing facility in Mangalore, BASF will have the capability to manufacture the latest generation of e - coat products, such as CathoGuard 800 RE that offers lower consumption, increased efficiency, and higher reactivity for electric vehicles.

"India's automotive market is booming with opportunities. With a mix of international and local car brands, and evolving consumer behaviors, India holds immense potential for BASF," said Patrick Zhao, Senior Vice President, Global Automotive OEM Coatings, BASF.

"I'm incredibly proud of our strong growth in India and the region, thanks to our successful collaborations with customers and partners. But beyond the numbers, what makes me even more proud is our ability to leverage our innovations, passion for colors, and sustainability experience to serve the local market."

The BASF site in Mangalore has been in operation since 1996, and it is now BASF's largest production facility in South Asia. In 2022, the Coatings division expanded the Automotive Coatings Application Center, and has since been utilizing global resources to bring advanced expertise and methodologies to the market.

Loop™ Industries and Ester Industries Ltd. Announce Joint Venture Agreement to Build an Infinite Loop™ Manufacturing Facility in India



Photo: Arvind Singhania, Chairman and CEO of Ester Industries Ltd. and Daniel Solomita, Founder and CEO of Loop Industries at Loop's head office in Terrebonne, Quebec, Canada.

- **Leverages the existing Infinite Loop™ technology to target undersupplied US\$28 billion market for DMT and MEG**
- **High projected returns based on total capital investment of approximately US\$165 million, favourable industry pricing and low operating cost environment**
- **Construction of the facility is expected to be complete at the end of 2026 with commercial operations commencing in early 2027**

MONTREAL, QC / ACCESSWIRE / May 1, 2024 / Loop Industries, Inc. (NASDAQ:LOOP) (the "Company" or "Loop"), a clean technology company whose mission is to accelerate a circular plastics/fiber economy by manufacturing 100% recycled polyethylene terephthalate ("PET") plastic and polyester fiber, today concluded an agreement with Ester Industries Ltd. ("Ester"), one of India's leading manufacturers of Polyester Films and Specialty Polymers, to form a 50/50 India

joint venture ("India JV"). The purpose of the India JV is to build and operate an Infinite Loop™ India manufacturing facility which will produce a unique product offering of lower carbon footprint recycled dimethyl terephthalate ("rDMT"), recycled mono-ethylene glycol ("rMEG") and specialty polymers in India, using the Infinite Loop™ technology which offers significant advantages over traditional mechanical PET recycling.

Loop and Ester have a well-established working relationship, with Ester producing Loop™ PET for Loop's global brand customers over the last four years. The India JV leverages the complementary skill set of each partner by combining Loop's innovative technology and well-established global customer base with Ester's nearly 40 years of specialized polymer production, operational proficiency, and local expertise, including sourcing of PET plastic and Polyester fiber waste feedstocks.

The DMT and MEG specialty chemicals global market size is estimated at US\$28 billion and forecasted to grow at a 3.7% CAGR through 2033. The market is experiencing a global shortage of DMT due to recent plant closures in Europe, and low-carbon DMT and MEG are in high demand, but market options are limited and costly. The Infinite Loop™ India facility is expected to produce 70,000 tonnes of rDMT and 23,000 tonnes of rMEG annually and Ester will toll convert the rDMT and rMEG into various grades of specialty polymers. The planned facility in India can lower carbon emissions by up to 70% compared to virgin DMT and MEG manufactured from fossil fuels¹, offering chemical companies a

simple drop-in supplement and circular alternative that helps them achieve their sustainability goals.

The rDMT and rMEG product offerings manufactured at the Infinite Loop™ India facility represent a strategic product expansion in a low - cost manufacturing environment which complements Loop's existing PET plastic and polyester fiber manufacturing business and will fuel growth by addressing the large and growing demand in the market. This expansion enables the Infinite Loop™ technology to reach new markets and cater to a broader range of customers across multiple industries including the electronics, automotive, textile, cosmetics and packaging industries.

The India facility will leverage the Infinite Loop™ technology and existing engineering package which accelerates the lead-time towards groundbreaking, slated to occur by end of this year. Feedstock sourcing for the facility, in which there is abundant supply from textile waste in India, is well advanced and the partners have engaged an external firm to source and secure the land for the facility. Construction is expected to be completed by the end of 2026, with commercial operations commencing in early 2027.

The India JV offers attractive economic returns without the need for substantial sustainability-linked premium pricing. Total capital investment is estimated approximately at US\$165 million.

Arvind Singhania, Chairman and CEO of Ester Industries Ltd. commented "Ester and Loop have a long - standing working relationship with a deep alignment

of values and shared commitment to circularity and driving sustainable change. This partnership reinforces our dedication to advancing sustainable solutions in the polymer industry and by leveraging Loop's technology alongside our decades of polymer production experience, we will contribute to reducing the carbon footprint of our products, meeting the evolving needs of our customers."

Loop's Founder and CEO Daniel Solomita commented "Our partnership with Ester reflects a strategic alignment built on our shared values of sustainability and innovation and combines both companies' areas of expertise. The specialty chemicals market offers a unique opportunity to expand the reach of our Infinite Loop technology beyond PET and polyester fiber and provides our customers with a sustainability linked advantage in the specialty chemicals market. Customer demand for rDMT, rMEG and specialty polymers produced using our technology is robust due to very limited viable options available in the marketplace today.

The Infinite Loop India facility represents a great opportunity for Loop to be a part of the fastest growing economy in the world and capitalizing on operating in a low - cost manufacturing environment. We see India and this partnership with Ester as a tremendous growth opportunity for future expansion.

This approach allows us to optimize returns, expand our presence in key markets, and drive sustainable growth while maximizing shareholder value."

India is Rising: "A Hub for Global Partnerships in Injection Moulding, Blow Moulding, and PET Industries"

- India's Injection Moulding, Blow Moulding, and PET industry sectors are experiencing a significant boom, attracting Global interest in partnerships. As India emerges as a key player in these sectors, the World is eager to explore collaborative opportunities to leverage India's expertise, resources, and market potential. With its growing capabilities and strategic position in the Global market, India presents a compelling destination for forging partnerships and driving innovation in the industry.
- India's Rigid Plastic Packaging market is projected to reach **USD 21.35 billion** by the year 2028. The rapid expansion of the market is predominantly due to the rising demand and **India is leading this revolutionary growth and is the "best time and place"** to be in.

Dhunseri Poly Films Invests In New BOPET Film Production Line

In October 2020, the company, a wholly - owned subsidiary of Dhunseri Ventures, and Brückner Maschinenbau started to talk about the first joint project, unfortunately just in the Corona peak phase. But, a strong will to cooperate and modern videoconference technology made it possible to realise Dhunseri's first BOPET film production line at its new large site in Panagarh/ Durgapur successfully in the end.

Mr. Chandra Kumar Dhanuka, Dhunseri's chairman and managing director, said, "As a newcomer in the plastics film industry we were looking for an experienced partner and the best technology. Both we found with Brückner. Moreover, our two teams were a wonderful match from the very beginning."

The 10.5-m wide line is equipped with Brückner's unique multi-gap machine direction orienter, realising high temperature stretching technology for A grade film quality at a consistent level. Additionally, the advanced sliding chain track system "FOK 8.8" in the transverse direction orienter allows to operate the BOPET line constantly at high speed and also will reduce chain maintenance and refurbishment significantly – and thus, increase the uptime at reduced costs.

Johann Kreiling, head of sales Middle East, subcontinent at Brückner Maschinenbau is absolutely happy with the new partnership: "During the entire project, it was an honour to deal with such a professionally managed company like Dhunseri. We are, therefore, even more pleased that the cooperation continues with two upcoming BOPP film lines and are extremely happy to have got the chance to become Dhunseri's partner for very challenging projects."

Dhunseri Ventures is a major player in the petrochem business with plants in India and Egypt. Further, the company had entered into a 50:50 joint venture with Indorama Ventures Public Company, a global chemical producer. Dhunseri Poly Films was founded in 2020 for the implementation of the new project of manufacturing biaxially oriented films.

Tamilnadu Petroproducts Plans for Ambitious Carbon - Neutral Initiatives & Sustainability Goals

Tamilnadu Petroproducts Limited (TPL) is planning to develop an integrated carbon - neutral roadmap and adopt use of circularity and clean energy to achieve sustainability in its manufacturing.

The company said it has partnered with consultancy firm EY - Parthenon to support its carbon - neutral goals. TPL aims to establish internal reduction targets consistent with the Science-Based Targets initiative (SBTi) and devise an emission reduction plan primarily for Scope 1 and 2 emissions, a statement from the company said.

By implementing interventions such as clean energy substitution, process efficiency improvement, circularity, and digital automation, the company aims to move towards its goal of carbon - neutral manufacturing.

Mr. Ashwin Muthiah, vice-chairman of TPL and founder chairman , AM International, Singapore said TPL is taking proactive steps and embracing environmentally conscious practices in its operations. The collaboration with EY-Parthenon signifies a deliberate move towards this objective with a scientific, measurable. And time-bound approach, he said.

Smartphones Become India's Fourth Largest Export Item With 42% Growth

Smartphones have been a key success story of the government's production - linked incentive (PLI) scheme



The Eligible Companies for the PLI Scheme Include Apple's Three Vendors – Foxconn, Wistron India (Now Tata Electronics), And Pegatron – As Well As Samsung

Smartphones are now the fourth-largest export item from India with 42 per cent growth to \$15.6 billion in FY24, up by one notch in the ranking from the preceding year.

India started collecting data for smartphones separately from April 2022. While India's top export items are dominated by petroleum products, smartphones replaced motor gasoline to become the fourth - largest exported commodity in FY24.

According to commerce department data, the spike in smartphone exports was driven by a 158 per cent increase in shipments to the US at \$5.6 billion, followed by the United Arab Emirates (\$2.6 billion), the

Netherlands (\$1.2 billion), and the UK (\$1.1 billion). The value of mobile devices produced in India for both export and domestic markets in FY24 soared to Rs 4.1 trillion (\$49.16 billion), up at least 17 per cent year-on-year (Y-o-Y), according to preliminary estimates by the Indian Cellular and Electronics Association (ICEA), which represents most of the mobile players in the country.

Smartphones have been a key success story of the government's production-linked incentive (PLI) scheme, helping India become the second - largest mobile phone manufacturing country, after China. It has also been a key instrument in the China-Plus-One strategy, which is focused on leveraging the geopolitical tensions between that country and the US to woo companies manufacturing in China and persuade them to shift to India.

The eligible firms for PLI include Apple's three vendors — Foxconn, Wistron India (now Tata Electronics) and Pegatron — as well as Samsung.

Apple has led the charge in exports, with the value of outbound shipments of mobile devices expected to have crossed Rs 1.2 trillion (\$14.39 billion) in FY24, up 33 per cent from Rs 90,000 crore in FY23. Exports in FY24, based on the early estimates, accounted for nearly 30 per cent of the total output value, up from 25 per cent in FY23, according to ICEA data.



PLASTIC PRODUCTS AND NEW TECHNOLOGIES

Huntsman Launches New Shokless™ Polyurethane Systems to Help Protect Electric Vehicle Batteries

New technologies will be officially unveiled at the Battery Show Europe in June 2024

Tienen, Belgium – Automotive experts from Huntsman have added a series of new lightweight, durable polyurethane foam technologies to the company's battery solutions portfolio that have been developed for the potting and fixation of cells mounted in electric vehicle (EV) batteries. The new range also includes products that can be used as a moldable encapsulant in battery modules or packs.

The new SHOKLESS™ foam systems can offer a flexible choice for helping to safeguard the structural integrity of EV batteries in case of impact or a thermal event. The product family includes a range of low to high density foams that can be used via common polyurethane dispensing processes and can offer a wide processing window for extra handling flexibility.

These new solutions can help provide thermal as well as structural protection at a cell,

module, or pack level combined with fast processability compared to non-polyurethane alternatives. The moldable encapsulant version of the SHOKLESS™ system can further expand design and manufacturing options for EV battery manufacturers and OEMs. With robust mechanical properties, the new SHOKLESS™ systems can offer very good compression and tensile performance with high elongation to failure. Elastic performance can remain stable at different operating temperatures ranging from -35°C to 80°C*. The new systems have also been developed to be easy to work with thanks to their low viscosity and ability to cure quickly at low temperatures.

For more information about SHOKLESS™ systems, please email: polyurethanes_eu@huntsm an.com. You can also find out more at the Battery Show Europe by visiting Huntsman at 4-D80. The Battery Show Europe takes place from 18-20 June at Messe Stuttgart, Germany. Further information is also available here: <https://www.huntsman.com/products/shokless> * Based on DMA (dynamic mechanical analysis) tests conducted in Huntsman's R&D laboratory in Tienen, Belgium. First tests were performed in June 2023.

A New Digital Sampling Solution from Covestro Enables Customers to Realistically Visualize Product Designs at an Early Stage of Development



More speed from design to series production

- Early visualization of product designs saves time and resources
- Almost unlimited design possibilities within feasible creativity
- Imagio® CQ: new brand for digital sampling
- Simplified collaboration between cross - location teams

What would it be like if a customer could see the color combination of their future product not just as an abstract code, but could see the product realistically in

advance ? 3D printing is only of limited help here, as the prototypes do not have the same optical and mechanical properties as the finished product. A new digital sampling solution from Covestro provides a remedy. Its aim is to speed up the process from design to series production so that customers can realistically visualize product designs at an early stage of development and structure them in terms of surface.

The advantages are obvious: customers do not need to invest in expensive prototype tools and replacement materials or in complex color matching processes. Covestro expects that initial sampling loops can be carried out completely virtually to a certain extent – this saves time and material resources. In future, the company will offer all services related to sampling under the Imagio® CQ brand. The suffix "CQ" stands for Circular Intelligence and emphasizes that the technology makes its contribution to a circular economy in the form of significant material savings.

“Our strategy is to get in touch with our customers at an early stage of product design, when the first material specifications are being defined,” explains Dr. Tobias Rausch, Business Development Digital Sampling in the Engineering Plastics business unit at Covestro and head of the project. “We also want to facilitate collaboration between cross-site teams with new digital tools such as catalogs and material twins.”

Faster and more efficient - Customers' product development requirements are constantly growing: they want to be flexible

in their choice of materials and increasingly value a more sustainable origin. At the same time, they want to bring their products to market faster while increasing efficiency and saving costs. In addition, they often work in several teams across regions, which need to communicate effectively with each other and also exchange sample parts.

The optimal solution for these requirements is to involve Covestro and its Imagio® CQ program at an early stage. This enables customers to make a material decision more quickly and generate and visually evaluate sample parts in the early stages of Press Release Leverkusen, April 18, 2024 Covestro AG Communications 51365 Leverkusen Germany Contact Dr. Frank Rothbarth Telephone +49 175 30 25363 EMail Frank.Rothbarth@covestro.com Contact Markus Kleine-Beck Telephone +49 173 2320 686 EMail Markus.Kleine-Beck@covestro.com development. This saves time and costs during specification, and the suitability of more sustainable plastics can also be tested at an early stage. In the three-dimensional space of color, material and finish (CMF), the possibilities are almost unlimited.

The backbone of the digital solution is X-Rite/Pantone's Total Appearance Capture (TAC) technology, which captures optical properties such as color, gloss, transparency, translucency or texture of a specific material sample using an optical appearance measurement device. The data is stored in a special data format. This is supported by leading rendering software tools that Covestro customers

use for their design and marketing visualization. Covestro's Color & Design Centers (CDCs) in Filago, Italy, Newark, USA, and the Caojing and Guangzhou facilities in China are already equipped with the technology to create digital twins of materials.

A new tool for sales and marketing to search for color combinations – the Imagio® Color Finder (ICF) – also serves to achieve this goal. Overall, Covestro expects a shift from costly color matching requests in the CDCs to existing color codes with a better search experience.

The Imagio® CQ family has now been expanded to include a module called Imagio® Optical Material Data. The target group here are experts from the field of development and simulation of optical components, i.e. vehicle headlights and interior lighting, as well as general lighting. The module is already being tested with customers and will be the first Imagio® module to be available after the required registration. On the one hand, it will be possible to search specifically for optical material properties in our EP portfolio, and on the other, Covestro will provide the necessary data for optical simulation programs such as Ansys Speos, Optis LightTools or customers' own simulation solutions.

**Craemer Presents
Environmentally Friendly
Containers for Every Type
of Application and Waste
Scenario**

Robust and sustainable – large waste containers from Craemer meet these requirements. Since

the 1980s, the Craemer Group has been manufacturing plastic containers for the waste and disposal industry, for municipalities and industrial applications. The wide range of products is made from up to 90 % recycled plastic and is 100 % recyclable.



(Craemer large waste containers are made from up to 90 % recycled plastic. © Photo: Craemer Group)

As one of the leading manufacturers of high quality wheelie bins (also called MGB for German “Müllgroßbehälter”) and a longstanding supplier to the waste management industry, Craemer has developed a sustainable, practical, and economical product range for household and commercial waste with a take-back system. An example of innovative solutions for waste disposal are the 2- and 4-wheeled wheelie bins, mostly made of high - quality plastic regranulate.



(The new MGBneo⁴ 1100 litres is provided with a convenient “lid-in-lid” solution. © Photo: Craemer Group)

The MGBneo series (120 to 360 Litres) is a particularly stable choice in the standard noise-

insulated 2-wheelrange thanks to uniform wallthickness and all-round reinforcement. The 240, 340 and 360 Litre MGBneo bins are also available with a partition wall and a two-part lid (saloon lid) for collecting two waste fractions in one bin.

MGB in different versions - The MGBplus range of bins (120 to 240 Litres) is ideal for daily heavy-duty use, for example with fast emptying techniques – thanks to a uniquely shaped front area and the reinforced wheel case and axle housing. The Craemer Diamond transfer containers (DU for German “Diamond-Umleerbehälter”) with a front collar for picking up and emptying 2 - wheeled bins complete the Craemer range. With capacities from 60 to 240 Litres, these wheelie bins are ideal for use with side loaders thanks to their secure self-centring mechanism. The large 1100 Litre MGBneo⁴ with “lid - in - lid” is ideal for commercial and bulky waste. More ergonomic than round and sliding lids, the “lid-in-lid” does not fall back during filling. The large MGBneo⁴ is optionally available with RFID transponder, bottle insertion opening, paper insertion bonnet, gravity lock or special colours.

Durable and Recyclable

Craemer products are made from up to 90 % high-quality recycled material in a range of colours. At the end of their lifetime, Craemer takes back plastic products and converts them into high-quality raw materials in their own production facilities. These raw materials are then used to produce new, high quality large waste containers in its modern plastic injection - moulding plants.

In this way, the material and the product remain an integral part of the circular economy. On request, Craemer wheelie bins are available with the German ecolabel “Blue Angel”.

In addition to the tried and tested MGB range with special equipment and accessories, robust Craemer plastic pallet boxes are also suitable for waste collection. These include the UN-certified CB1 and CB3 for hazardous goods handling.

The Craemer Group, founded in 1912, with its German headquarters and three other European plants, will be exhibiting a selection of its waste disposal solutions at IFAT in Munich (13–17 May 2024), stand A5.215/314.

Beyond Prototypes: 8 Ways the Plastics Industry is Using 3D Printing

Plastics processors are finding applications for 3D printing around the plant and across the supply chain. Here are 8 examples to look for at NPE2024.

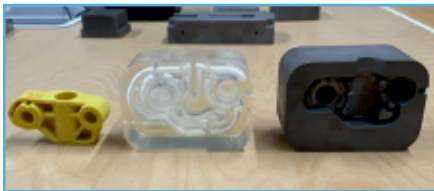
Once relegated to rapid prototyping, 3D printing technology has now advanced far beyond the design studio. Machines have improved and material options have widened. Today molders, moldmakers and OEMs alike are turning to this layer - by - layer production technology to save time, serve new markets and even fill supply chain gaps.

At NPE 2024: The Plastics Show, 3D printing and additive manufacturing (AM) suppliers are highlighted in the Advanced

Manufacturing Zone, while AM users will take to the stage for Wednesday's 3D Printing Workshop. But keep an eye out for promising developments and applications across the show floor, including:

1. Mold Tooling

Lead time delays for molded parts often originate from difficulties with sourcing tooling. 3D printing makes it possible to accelerate mold development and simplify design changes down the line. If a new design is needed, 3D printing offers a faster route to a new tool and even the chance to repair or modify an existing one. While metal 3D printing methods, such as laser powder bed fusion, have historically been the most common techniques applied to mold tooling, there are new innovations to explore in terms of more accessible metal printing methods and short-run molds made from other materials such as polymer composites.



The clear model in the center shows the conformal cooling lines inside the metal 3D printed mold on the right, used to produce the plastic part on the left.

2. Robot End Effectors

Cobots, pick-and-place robots and other automation can make plastics processing more productive, but in most cases these additions require specialized end-of-arm tooling (EOAT) and other fixturing. 3D printing can

be applied to produce vacuum grippers and other specialized end effectors for handling parts. These devices can integrate vacuum lines, wire harnesses and other features to simplify assembly, and tend to be lighter weight than conventional options.



This 3D printed EOAT incorporates air lines for vacuum and pressure into its design.

3. Fixtures



3D printed nests for CMM inspection can be created using the part's existing CAD model, similar to the process for designing a mold.

Affordable desktop 3D printers make it possible to create affordable items for plant use such as inspection fixtures, assembly tools and check gages. CMM nests, for example, can be developed using mold design tools to generate the inverse of the part and arrive at a 3D-printable fixture design. As an added bonus, once fixtures have been developed for 3D printing, they can be saved as digital files. Should one be damaged or go missing, it can be quickly replaced by simply printing another.

4. Prototyping and Product Development

3D printing still plays a valuable role for rapid prototyping, as it is often the fastest way to get a look-and-feel prototype or iterate design ideas. However, the technology has advanced to the point that, with the right material and printer, a prototype can often be used just like a production part. Brackets, electronics enclosures, ducts, components of medical devices and more have made this leap.



These smart ski goggles were developed with a 3D printed electronics enclosure. Originally meant as a prototype, the 3D printed assembly has since been used in sale units as well.

5. Bridge Production

The need for tooling adds automatic lead time to producing a new molded part, but 3D printing can enable a manufacturer to jump straight into production while waiting for that tooling. This means that new products can be launched into the marketplace sooner, and brand owners can get feedback before committing to the expense of a mold. The bridge need not start at the beginning of a product's life span, either — many companies are now turning to 3D printing to bridge gaps due to supply chain disruptions as well.



This air diverter for a youth motorbike was designed for injection molding, but bikes produced before the mold tooling was ready used 3D printed parts like this.

6. Mass Customization

The digital nature of 3D printing makes it possible to easily adjust a base product design via software to suit the specific customer or application. The technology can be applied to produce everything from custom medical devices such as splints and hearing aids to consumer products like shoe insoles and sporting equipment tailored to the buyer.

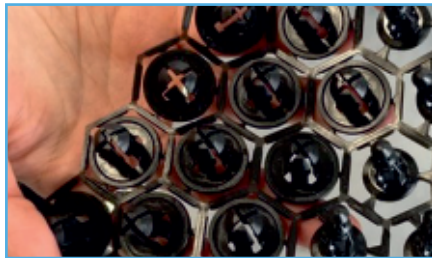


3D printing makes it possible to support custom geometry and tweaks to a product design like a forearm cast, so that each part can be tailored to the user.

7. Digital Inventory

Files for 3D printing are more easily stored than physical parts, leading major OEMs, military branches and government agencies to adopt the technology as a way of sourcing spare parts and items needed for system maintenance. Digital inventory

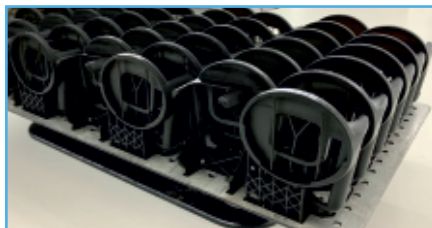
parts like clamps, clips and brackets can be 3D printed as needed, saving the hassle and expense of storing extras or keeping track of tooling. Even better, digital inventory can also be distributed. By working with manufacturing partners or placing printers at different facilities, organizations can produce these parts near where they will be used.



These auto body clips are 3D printed on demand in groups as an alternative to storing extras in physical inventory.

8. Serial Production

3D printing is a viable production choice for a variety of products, particularly where printing enables geometric complexity or other advantages. While 3D printing is capable of continuous production of tens of thousands of pieces, it is equally applicable to smaller batches of parts needed less frequently — with no minimum order quantity. Production use cases for this technology include brackets, phone cases, valves, medical implants, packaging solutions and much, much more.



These phone case components are 3D printed in a machine that can produce several hundred

of these parts per day; scaling production to higher quantities means simply adding additional machines.

Eastman, Sealed Air Partner to Develop Certified Compostable Protein Trays as an Alternative to Polystyrene Trays



Collaboration between industry leaders showcases value of a new sustainable innovation.

KINGSPORT, Tennessee, and CHARLOTTE, North Carolina

Eastman (NYSE: EMN) and Sealed Air (NYSE: SEE) are pleased to announce the launch of a compostable,¹ lightweight tray designed as a drop-in replacement for traditional polystyrene foam trays in protein packaging that can work on existing, industrial food packaging equipment. The tray is already successfully performing in several market applications. Sealed Air introduced its CRYOVAC® brand compostable overwrap tray to the market in January.

The new tray is made from Eastman Aventa™ Renew compostable materials, which are produced from sustainably sourced wood pulp² and acetyl sourced from a portfolio of recycled material.³ The tray can be composted in home and

industrial environments. Predominately containing cellulose acetate that is derived from wood pulp, these new trays are compostable by naturally occurring microbes. Aventa Renew material does not remain as micro plastics in the environment.

"One of the most exciting features of these trays is that they perform like traditional plastic in a challenging atmosphere and yet provide an end - of - life solution through composting — a "win-win" for the environment," said Jeff Carbeck, Ph.D., Eastman vice president of corporate innovation.

The collaboration that led to this new - to - the - industry application advances the circularity commitments of both companies. Aventa Renew is a unique compostable material that contains both bio based and certified recycled content.³ The tray has obtained home compostable certification from TÜV Austria and industrial compostable certification from Biodegradable Products Institute (BPI).

"Encouraging development of a circular plastics economy takes dedication and collaboration from all aspects of the value chain, including where we source our materials," said Tiffani Burt, Ph.D., Sealed Air's Executive Director of Strategic Marketing and Sustainability for the Americas. "Our CRYOVAC® brand compostable overwrap tray would not be possible without the ingenuity of the product we use from Eastman, and we are excited to partner with them to bring this innovative tray to the market."

"The work we've done with Sealed Air demonstrates the commitment of both companies to fulfill circular economy commitments," said Carbeck. "Aventa Renew and the CRYOVAC® brand combine uncompromising performance with environmental responsibility. We congratulate Sealed Air on this product launch, and we know it will help demonstrate Aventa Renew's status as a game changer for the food industry."

1. The tray is home and industrial compostable. Industrial composting facilities may not exist in all areas.
2. Eastman holds FSC® Chain of Custody certification, and all our suppliers hold FSC® and/or PEFC™ Chain of Custody
3. Contains up to 43% recycled content certified by ISCC PLUS (International Sustainability & Carbon Certification) via mass balance allocation process.

Good Wine Thanks to Hygienic Pallet Boxes from Craemer

Whether red or white – the winemaker family of a small winery in Rhineland Palatinate uses the Craemer Cb3 High pallet box for the hand-picked "gourmet wines" and sparkling wine from their own cultivation. In use since the "mega harvest" in autumn 2023, the large-volume plastic box in gray has provided "reliable support for a smooth and gentle process". The Sb3 pallet box with closed walls is also used at an Austrian winery in Styria Craemer.

Because of their delicately thin skin, grapes require special care and must be treated gently throughout the entire harvesting process. Whether Pinot Noir, Chardonnay, Silvaner, Pinot Blanc, Riesling, Pinot Gris or Sauvignon Blanc, the grapes in Rheinhessen are picked by hand, collected in small picking boxes or buckets and then emptied into pallet boxes to be transported to the processing site. The aim is to maintain the vineyards sustainably and to manage them in an environmentally friendly manner.



High-quality wine begins with the harvest: Recognized winemakers rely on food-safe, robust plastic pallet boxes from Craemer. Photo: Craemer Group

The sixth - generation winemaker with the values of "clarity, honesty, community and tradition" is "very satisfied" with the CB3 High. The 1,140 millimeter high Craemer Box, which holds around 1,000 liters, remains stable, does not deform and is very robust on the slewing ring. Thanks to closed walls, the juice from burst grapes also collects. The pallet box is optionally available with two open bung holes, as is the SB3. The Cb3 High pallet boxes and the closed or perforated SB3, all in industrial dimensions (1200 x 1000 mm) and with a robust skid connection, are manufactured in one piece and are therefore very durable. With nine feet (optional) they

also hold on uneven and steep ground. The 790 millimeter high, closed SB3 (610 liters) is used on the family winery in southern Styria. The Demeter Company operates according to organic principles and follows a modern circular economy. The SB3, Also ideal for viticulture: the 300-liter ET rotating stacking box (I.) and the completely closed hygiene box HB3 from Craemer. Photo: Craemer Group like the CB3 High, is made of odorless and tasteless polyethylene and is insensitive to mold and bacteria, and has proven to be particularly impact and shock resistant. The durable boxes are 100 percent recyclable.

Also ideal for viticulture: the 300-liter ET rotating stacking box (I.) and the completely closed hygiene box HB3 from Craemer. Photo: Craemer Group.

Depending on the area of application, other winegrowers also rely on other containers from the Craemer Group for hygienic, gentle harvesting, such as the Hygiene Box Hb3 and the ET Box.

From Passenger to Cargo Aircraft: Renowned NIAR Institute Relies on Fiberform Technology from Kraussmaffei

Window plugs made of thermoplastics composites – Significant weight reduction compared to metal solution – Short cycle time: 40 parts per hour – Joint NPE appearance. **(Parsdorf, April 24, 2024). When two specialists cooperate, the conversion of passenger aircrafts into cargo planes can be made much more efficient. The National**

Institute for Aviation Research (NIAR) at Wichita State University in the United States, is renowned for investigating how modern composite technologies can be safely and efficiently used in aviation. KraussMaffei adds its high-rate production expertise gained from supporting the needs of the efficiency - driven automotive industry. The result is a successful example for metal replacement.



There is even a separate word for this: preighter. Created during the coronavirus crisis, when hardly any people were traveling, it refers to a passenger jet used (temporarily) as a cargo plane. And the permanent solution is also common: aged airships that no longer offer the latest comforts still cut a good figure as cargo aircraft. Demand is high, as the purchase price is only a fraction of that of new aircraft.

Thermoplastic lightweight with FiberForm saves valuable cycle time - Amongst many other tasks, passenger to cargo conversions require replacing acrylic window plugs with metallic alternatives for ease of maintenance. This costly and time - consuming metallic solution can be further optimized by modern fiber - reinforced thermoplastic composites that offer the same stability at lower costs, less weight, and in a fraction of the time it would take to machine the metallic part. NIAR and KraussMaffei have been

combining their expertise for the development of a lightweight solution using the FiberForm technology. With FiberForm, a fully consolidated fiberreinforced thermoplastic sheet known as organosheet is inserted into the tool, formed and overmolded with a thermoplastic polymer.

In the case of the window plugs, this is done on a GXW 450-2000/1400 with a swivel platen. The window plug was designed with the oval-shaped geometry of the original with appropriate design modifications, ex., adding ribs to stiffen it to withstand pressure loads. In order to achieve the desired mechanical properties, the team of Dr. Waruna Seneviratne (NIAR) and Eugen Schubert (KraussMaffei) used high - performance plastics LM-PAEK reinforced with AS4 carbon fibers for the 16-ply organosheet and 30% chopped-fiber-filled PEEK for overmolding the ribs.

20 percent lighter than its metal counterpart - The short cycle time is one of the major advantages of fast injection molding compared to metal machining: 40 window closures can be produced within an hour. In addition, the thermoplastics used for FiberForm offer the possibility of welding components, have a high impact strength, are resistant to high temperatures, chemical and environmental influences and are also flame - retardant.

Compared to its metal counterpart (590 grams), the composite overmolded version of the window plug weighs 20 percent less. The team is already working on further optimizing the structure to make it about 40 percent lighter than the metallic

counterpart. The next step for the NIAR program is to subject the window plugs to further functional tests required for certification – for example with regard to durability – so that it is ready for series production.

NIAR and KraussMaffei have been partnering successfully for two years, and Dr. Waruna Seneviratne (Director NIAR ATLAS) points out: "KraussMaffei "has not only set up a machine with multiple capabilities, but has also been actively helping us on-site with process development. Our students also gain a tremendous amount of hands-on experience and get to interact with the supply chain for several new capabilities we introduced in recent years. Our goal is to transfer the efficient processes such as FiberForm from automotive production to aviation."

For more information:
www.kraussmaffei.com

SABIC, Napco and FONTE have Joined Forces to Launch First Bread Packaging Made with Fully Recycled Post-consumer Plastic in KSA

- Collaboration with Napco National and FONTE to promote the use of mass balance certified circular polyethylene made in KSA from SABIC's TRUCIRCLE portfolio for the production of sustainable bread bags
- Food - contact PE grades based on 100% feedstock of pyrolysis oil derived from advanced recycling of post-consumer used plastics



SABIC, a global leader in the chemical industry, has announced the successful roll-out of the first circular packaging project in Saudi Arabia as part of its TRUCIRCLE program to accelerate the implementation of a circular plastic economy. FONTE, a major player of the bakery industry in the Kingdom of Saudi Arabia (KSA), has introduced bread bags made with SABIC's certified circular polyethylene (PE) in their Oat Arabic Bread. The bags are made by Napco National, a vertically integrated Saudi manufacturer of flexible film and packaging products, using two food-contact certified circular polyethylene resin grades (LLDPE) from SABIC's TRUCIRCLE portfolio. Following the kick-off of the joint project in March 2023 and successful completion of the trial phase at Napco, FONTE has started to introduce the flexible bags to stores throughout Saudi Arabia.

The new FONTE bread bags incorporate 100% mass balanced certified content of recycled feedstock from mixed post-consumer used plastics, which is converted into pyrolysis oil in an advanced recycling process. SABIC then uses the oil in the production of new polymers with the same purity and quality as traditional virgin plastics at the company's plant in Jubail, KSA.

Sanjay Mishra, who heads the ETP and Performance Polymers business at SABIC, states: "With

our TRUCIRCLE program, we are pushing for innovative business models to transform our industry from a linear to a circular one and help prevent the valuable material of end-of-life plastic applications from being wasted. Within a relatively short time, this remarkable joint project has shown what can be achieved to make this vision come true if all players work together to maximize post-consumer plastic recycling and sustainability. Moreover, the project also addresses a major trend towards more sustainable food packaging in Saudi Arabia, and is the first circular packaging application of its kind in the country."

SABIC's circular materials are produced using mass balance accounting according to the International Sustainability & Carbon Certification (ISCC) PLUS program, which follows a set of predefined and transparent rules for tracking the material flow across complex supply chains from the feedstock to the final application.

Mohammed Binmahfoodh, CEO at Masdar Alhayat for Food Industries (FONTE), adds: "At Masdar, our strategic focus extends across the entire spectrum of Fast-Moving Consumer Goods (FMCG). Our mission to integrate quality and sustainability into every aspect of our operations aligns seamlessly with Vision 2030. As MASDAR's leading brand, FONTE is fully committed to addressing the plastic challenge that all food producers are facing.

While this new bread bag is just one of our products, it demonstrates how important value chain players can work together to bring about much

needed change. As the availability of high-quality recycled plastics in KSA is increasing, we look forward to transferring the success of this partnership project with SABIC and Napco as a role model to further packaging applications in our 'Saudi Made' food products offering."

Chadi Radi, Senior Director at Napco National, comments: "Napco is firmly dedicated to the advancement of sustainable packaging across various sectors in the plastic industry within the Kingdom of Saudi Arabia and throughout the Gulf region. We understand the pressing need to address environmental challenges and are committed to supporting our customers in achieving their sustainability objectives. Through our innovative approach, we strive to develop packaging solutions that minimize environmental impact, promote circularity and maximize the value of the plastic life cycle. At Napco National, we welcome the advanced recycling route offered by SABIC as an opportunity to contribute to the circularity of plastics in flexible packaging films. This collaboration has led to a successful implementation of circular plastic film in the food sector."

SABIC's certified circular polymers form part of the company's TRUCIRCLE portfolio and services. Besides certified circular polymers, this also includes design for recyclability, mechanically recycled products, certified renewable polymers from bio-based feedstock and closed loop initiatives to recycle plastic back into high quality applications and help prevent valuable used plastics from becoming waste.

LyondellBasell and AISN Collaborate to Create Innovative Lightweight Plastic Hood

LyondellBasell (LYB) announces a collaboration with Hunan Huda Aisheng Group (AISN), a leading automotive supplier in China. This relationship aims to create the first lightweight plastic engine hood applications for the NEV cars of premium domestic automotive brands, progressing the automotive industry towards integrated and lightweight designs. At the ChinaPlas 2024 International Plastics and Rubber Exhibition, the two companies held a grand launch ceremony for this new product.

"LyondellBasell is looking forward to working with AISN to drive a common mission of rapidly developing China's New Energy Vehicle market through differentiated solutions," said Rolf van Beeck, vice president of Advanced Polymer Solutions at LyondellBasell Asia Pacific and AfMEI, "In the future, we plan on further combining AISN's expertise in automotive technology with the LyondellBasell compound solutions, expanding the relationship to cover more body panel areas, and providing more automotive OEMs with innovation and development of automotive materials."

With the advancement of low carbon green policies worldwide, the domestic automotive industry is achieving energy saving and carbon reduction through various means. The development and application of lightweight automotive components has become one of the prominent ways to address this. As part of

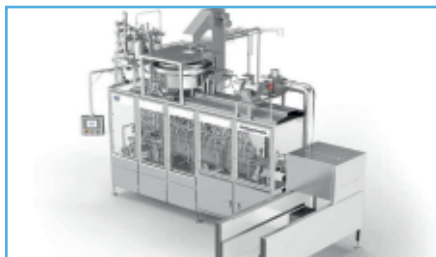
this collaboration, LyondellBasell is making full use of its revolutionary Hifax low linear coefficient expansion to provide an alternative solution to traditional metal engine hoods delivering:

- High rigidity to ensure structural integrity, and be less prone to deformation due to temperature, humidity, etc., thereby meeting stringent dimensional requirements;
- Achieve an aesthetic effect that is difficult to replicate with metal, allowing designers to explore more aesthetic possibilities while maintaining superior performance;
- Significantly reduce the total weight of the body panels through the use of plastic instead of steel.

As a global leader in polypropylene compounding, LyondellBasell has been focusing on the development of exterior body panels over the years and has successfully developed the Hifax and Sequel series products, accumulating a wealth of experience in material development and application. The company's extensive global production and operation footprint, as well as its expertise in regulations, risk management, and safety for sustainable products in the global automotive market, further supports the company's commitment to contributing to the development of the automotive industry.

The Hifax Low Linear Expansion Coefficient solution, and this plastic engine hood, was showcased at the ChinaPlas 2024.

SIG Launches Spouted Pouch System Featuring Innovative In-line Pouch Sterilization



SIG announced the launch of their new aseptic spouted pouch filling system, the SIG Prime 55 In-Line Aseptic. This innovative filling equipment for pre-made spouted pouch features inline pouch sterilization, removing the need for third-party pre-sterilization of spouted pouches. The resulting system reduces supply chain complexity and improves the overall costs to produce aseptically packaged products in spouted pouches. The new filling system has reached commercialization and was featured in conversations at the 2024 Anuga FoodTec exhibition in Cologne, Germany.

Christoph Wegener, Chief Markets Officer at SIG, celebrated the system release: "SIG has a considerable history in development of leading technology for aseptic packaging. Customers around the world look to SIG for the latest innovations to propel their brands into the future and the SIG Prime 55 In-Line Aseptic pre-made spouted pouch system is the next in a long line of those innovations." He continued: "This new filling system offers technological progress by

transferring SIG's expertise in aseptic filling technology with in-line sterilization, which has been successfully in use for decades in the field of carton packs, to spouted pouches. The breakthrough here is a new and unique way of sterilizing spouted pouches in-line, ensuring sterilant flow and coverage of the packaging while it's in the filling tunnel.

By eliminating the need for pre-sterilization of the pouches, we're able to give producers full control and flexibility of their production. This is an exciting time for SIG and an important step forward in our journey to enable brands to produce more nutritious foods for better. We are extremely proud that we will soon be trialing the system with recycle-ready SIG pouches. They will be a world first in our industry." "Aseptically packaged food and beverages retain their high quality and can be stored for a long period without refrigeration or preservatives. Resulting products like fruit puree, sauces, and baby food taste great and maintain nutritional value," explained **Massimo Annaratone, Global Business Line Director of Spouted Pouch at SIG**. "With the SIG Prime 55 In-Line Aseptic, we have further advanced the potential reach of better nutrition through a system that combines quality, SIG-produced spouted pouches with proven in-line sterilization technology delivering > log 5 reduction in production. The conversion from retorted and hot-filled products in cans, plastic bottles, and glass to convenient aseptic spouted pouches has never been more compelling."

Siegwerk's In-line Printable Barrier Coatings Enable the Switch from Multi- to Mono - material Pet Food Packaging with Same Packaging and Process Performance

Siegwerk, one of the leading global providers of printing inks and coatings for packaging applications and labels, today announced the successful development of a fully recyclable mono-PE bag for dry pet food using its CIRKIT functional coatings. Together with printing machine manufacturer Windmüller & Hölscher and bag making and machine producer B&B, the company jointly produced a new high - barrier mono - material packaging, which not only offers the same packaging and process performance as the multi-material structure commonly used for dry pet food but is also fully recyclable.

With all its new regulations and directives, the EU is increasing the pressure on brand owners and packaging manufacturers to rethink the design of packaging towards circularity. "New approaches are needed to meet the upcoming regulatory requirements for circular packaging," says Belal Habib, Head of Brand Owner Collaboration at Siegwerk. "The challenge is to find a recyclable design that also meets the respective performance requirements of the packaging." For example, pet food packaging does not only have to be food safe, but also requires certain

barrier properties, such as resistance to oils and fats, to keep the food fresh and maintain the packaging's structural integrity. For this purpose, complex multi-material structures with a metallized layer have commonly been used so far. "The problem: they are not recyclable," adds Habib. "This is where innovative barrier coatings applied in thin layers and in line with regular printing inks can help to switch from an incompatible multi-material structure to a fully recyclable mono-material solution in the sense of a Circular Economy."

By using Siegwerk's CIRKIT GreaseBar, an innovative inline printable grease barrier coating, and CIRKIT HeatGuard, a coating for high - end sealing process efficiency (heat resistance on film surfaces) that can also be applied in line with regular flexo or gravure machines, the newly developed recyclable mono - PE bag achieves the same packaging performance as non - recyclable complex multi-material systems but with the decisive advantage of being fully recyclable. Both CIRKIT coatings are solvent-based, fully deinkable after delamination and can be printed inline without any loss in print performance. Besides, full PU inks were used that are not only suitable for mechanical recycling but also offer a process performance comparable to NC/PU flexo inks in terms of printing speed and quality. All used inks and coatings comply with the latest recycling guidelines including the German Minimum Standard and RecyClass for recyclable packaging.

"This development success once again underlines the importance of collaborating along the

packaging value chain, combining the specialized know-how of industry experts," summarizes Habib. "Together, we have succeeded in developing an innovation that is circular, delivers on performance and maintains current process efficiencies due to inline and high - speed conversion. This shows that, by joining forces, we are in a position to make recyclable mono-plastic packaging a reality and thus counter the still wide presence of multimaterial laminated structures with future - oriented flexible packaging solutions made for circularity." From raw material selection to packaging recycling, Siegwerk bundles knowledge across all disciplines in the packaging lifecycle and can help redesign entire packaging structures to be sustainable according to existing guidelines.

LG Chem Enters the Automotive Switchable Film Market

Successfully Developed SGF for Smart Sunroof, Expanding into the e-Mobility Materials Business

On April 29th, LG Chem announced that it had successfully developed SGF (Switchable Glazing Film) and signed a nomination agreement with Webasto the German based company, which is the global market leader for sunroof systems. LG Chem plans to supply SGF films to Webasto. The Top 100 automotive supplier will use SGF films to build roof systems with integrated high-tech glass which will be installed in European OEMs. SGF film business is expected to generate hundreds of billions of won in

revenue over the next few years. SGF is a film that can control the amount of light and heat passing through by responding to electrical signals.

Primarily used in automotive sunroof glass, SGF is characterized by its opacity under normal conditions, but it becomes transparent when voltage is applied. Applying SGF to the sunroof makes it possible to differentiate the interior design. Drivers can divide the sunroof into different zones, choosing between transparent and opaque, and can freely customize specific areas to be transparent according to their preferences. With SGF it's possible to offer a privacy on demand function to the end customer. With the customized segmentation designs LG can offer different entertainment effects based on customer requirements. With the increasing adoption of premium vehicles and electric cars, SGF is expected to form trillions of won market within the next few years LG Chem has accumulated over 200 SGF-related patents globally through its liquid crystals, adhesive materials, precision coating and pattern formation technology expertise in the existing electronics materials business such as OLED displays and semiconductors. LG Chem's SGF is recognized for its reduced light dispersion and a clear view from any direction.

LG Chem has manufacturing facilities for SGF that can be applied up to 3 million automobiles annually. In the future, LG Chem aims to develop next - generation products with clear black and faster response speed, and to expand the application of SGF to windshields and side windows. In addition

to SGF, LG Chem plans to continue exploring various high-value-added materials for the display industry, such as transparent antenna films and adhesives for the automotive industry. Hak Cheol Shin, CEO of LG Chem, stated, "Based on our technological expertise in the electronics materials such as OLED displays and semiconductors, we will foster the mobility materials business, a future growth area, and create new customer value."

Bioresin for Injection Molding

Guide: How to Succeed with Bioresin for Injection - Molded Applications

Bioresins have become an increasingly popular alternative to the traditional petroleum-based resins used in the injection molding process, but pose a number of challenges for molders. It takes the right combination of knowledge, experience and technology to succeed.



Download our guide to learn how you can take advantage of the growing opportunity in bioresins.

The Guide Covers:

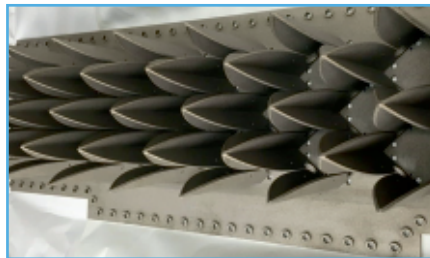
The booming market for bioresins

An overview of the bioresins used in injection molding

The challenges you will need to overcome

Best practices and Husky solutions to help you succeed

Innovation in Plating on Plastic



This 3-D printed radar array is PAEK plated using GreenPOP activation with plated layers of copper and electroless nickel. Source (All images): Alliance Finishing and Manufacturing

"There hasn't been a major evolution in metal finishing in over 60 years." Mark Hyman, president of Alliance Finishing and Manufacturing (Oxnard, California) and inventor of GreenPOP, a solution for plating on advanced plastics, has a way of getting your attention, right off the bat. He goes on to explain that much of the evolution in metal finishing involves the evolution of chemistries to address regulatory concerns or to improve esthetics.

Meanwhile, manufacturing is evolving at a rapid pace with the emergence of new materials and ways of making parts in addition to new demands on applications requiring electrical properties and connectivity.

"We are in what we call the semiconductor phase of our existence — everything we touch

runs on chips," Hyman says. "And the evolution of any technology you can think of is going to be based on the materials of its construction. I truly believe the future of metal finishing is not necessarily in metals."

Hyman's vision stems from a desire to leave a lasting impact on the industry, to usher in a significant improvement that would transcend the status quo of surface finishing. Plating on plastics isn't new. Electroplating on plastic typically involves the process of depositing a thin layer of metal onto a plastic substrate using an electrochemical process after first preparing the plastic in order for the metal to adhere. First, the substrate is subjected to processes such as degreasing, alkaline cleaning, and possibly etching to promote adhesion. Since plastics are typically non-conductive, they cannot conduct electricity required for the electroplating process. Therefore, a conductive layer must be applied to the surface of the plastic. This is often achieved through a process called activation.

Activation of a plastic substrate can involve various methods such as chemical treatment, flame treatment or plasma treatment. These methods essentially roughen the surface, creating sites for metal adhesion. Often, it is also necessary to then treat the activated surface with a chemical solution containing palladium or tin ion. Once the surface is properly prepared and activated, the plastic part can then be immersed in an electrolyte solution containing metal ions and effectively electroplated in the traditional manner: a conductive anode

made of the metal is also placed in the electrolyte solution, current is applied and metal ions from the electrolyte are attracted to the surface of the plastic substrate and deposited onto it, forming a thin metal layer. The thickness and properties of the metal layer can be controlled by adjusting parameters such as current density, plating time and composition of the electrolyte solution.

Hyman, however, recognized the need for something new. Advanced plastics such as polyether ether ketone (PEEK), polyetherimide (PEI, commercially known as Ultem), polycarbonate/acrylonitrile butadiene styrene (PC-ABS), polyphenylene sulfide (PPS) and composite materials used for high performance applications require more than decorative solutions.

“So, it's more than just plating on plastics,” Hyman says. He set out to create a new approach to plating on plastics based on four goals: the approach should be environmentally friendly, there should be a visual indication of success, it should be waste treatable, and it would not rely on precious metals.

Hyman would spend more than nine years of research and development working on his approach to plating on plastics. His goal was to find a way to get the substrate itself to hold a charge, rather than rely on an etching process and subsequent metallization prior to plating. He also hoped to provide alternatives to traditional methods reliant on palladium activators and hexavalent chromium, as well as improve adhesion and

performance, and also reduce waste and reliance on scarce resources. Ultimately, he named the chemistry GreenPOP.

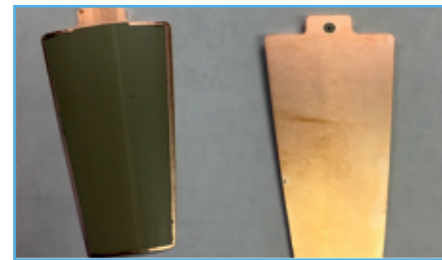
Chemical Adhesion vs. Mechanical



An injection molded PEEK connector plated with GreenPOP and copper layers meet thermal and electrical requirements for composite connectors per MIL-DTL-3899.

Green POP is an adhesional pretreatment technology for plating on plastics and composites parts. It revolutionizes the traditional approach to surface coating, offering a patented innovative metallizing process. Unlike its predecessors, Green POP eliminates the necessity for toxic chrome-based acid etchants, abrasive blasting or organic solvents.

Based on a commitment to environmental sustainability, Hyman aptly named the chemistry GreenPOP to encompass the plating on plastics, but also identifying the chemistry as eco - friendly. In addition, GreenPOP represents a departure from the reliance on precious metals for metallization of the substrate prior to plating, making it a more cost-effective approach.



These low - noise PEEK antenna parts have copper plating and masking.

Increased Adhesion and Temperature Resistance

GreenPOP enables the ability to employ direct electroplating methods to plastic substrates, providing improved adhesion on the primary plated layer, surpassing the results achieved through electroless metallization. This not only enhances the quality of the coated parts but also reduces production costs significantly. Moreover, GreenPOP offers unmatched thermal shock stability, meeting or exceeding the stringent requirements of MIL-DTL-38999 for composite plated connectors. The resulting parts exhibit good smoothness and dimensional stability, preserving the details and aesthetic qualities of the original plastic components. In terms of adhesion, achieving yields of up to 97% compared to 30% of previous methods.

The impact of GreenPOP could extend beyond traditional applications that employ plating on plastic. The solution is seeing use in diverse industries including aerospace, automotive and electronics. The ability to electroplate on lightweight composites and additively manufactured parts opens new avenues for innovation, making plating on plastic an option for enhancing functionality of parts in addition to providing esthetics.

Thermoformed Container Keeps Battery Cells Safe

Despite last - minute design changes and other unexpected roadblocks, thermoformer TriEnda works with a key supplier on innovative reusable shipping container.

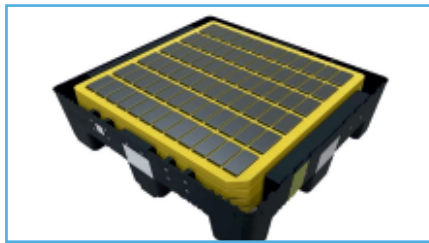
Lithium - ion batteries are ubiquitous, used in everything from children's toys to laptop computers. But nowhere have these common and important devices gained more ground than in an electrified vehicle (EV).

Keeping up with demand that's projected will require significant infrastructure investment, from charging stations and upgraded electrical grids to the manufacturing lines needed to turn out millions of battery electric vehicles (BEVs) annually. And with that comes the need to safely yet cost - effectively transport huge numbers of battery cells from the manufacturer to the automaker and, years later, to a remanufacturing or recycling center.

Because the cells used to construct EV battery modules are somewhat fragile, transporting the batteries is critical to BEV adoption. It's so critical that the United Nations has gotten involved, publishing a lengthy document titled UN Model Regulations on the Transport of Dangerous Goods, now on its 23rd revision.

These regulations provide a framework of globally recognized rules governing the shipping of hazardous materials, but it's the

UN3480 designation that keeps Jamie Noble awake at night. Noble is the vice president of engineering at TriEnda, a leading thermoformer serving the packaging, automotive and material handling markets based in Portage, Wisconsin. The project he's referring to is a reusable shipping container for a leading North American automotive supplier, one designed to meet the demanding UN criteria. Constructed of HDPE with a steel substructure for strength, the container is designed to support robotic loading and unloading of the 30-plus compartmentalized trays within, each carrying 15-20 relatively soft, liquid - filled battery cells for a total of 550-plus per container.



The HDPE container is designed to support robotic loading and unloading of the 30 - plus compartmentalized trays within, each carrying 15-20 relatively soft, liquid-filled battery cells. Source: TriEnda

These individual cells are then assembled into modules and, from there, into a complete pack, what EV owners would see if they were to peel back the sheet metal floor and peer inside.

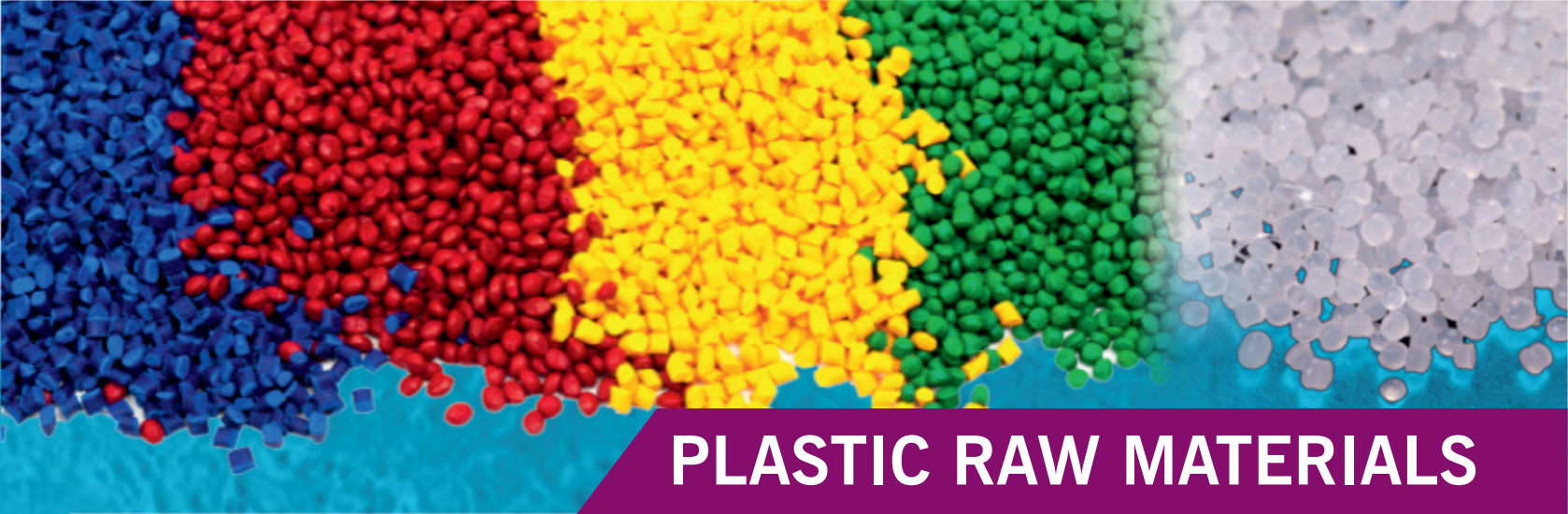
Noble had help on several fronts. TriEnda and its parent company, Kruger Family Industries (KFI), employ more than 800 associates in four locations across North America. Noble relied on support

from his team of skilled engineers, project managers and machinists, including Jeff Haun, senior design engineer.

It was Haun who first realized the battery trays were extremely difficult to manufacture as originally specified, which called for a height tolerance of ± 0.013 in. per tray. Recalls Haun, "The customer initially wanted to injection mold them from ABS, but we discovered there were only a few machines in the entire country with sufficient tonnage for that size workpiece. That's when I suggested we thermoform them."

The problem was that ABS is much more difficult to thermoform than HDPE. Undeterred, Haun and Noble agreed to build a prototype mold and test the process. "It worked like a charm," Haun says. "We presented it to the customer and they liked it, especially because it ended up saving them a lot of money, never mind the fact that they would have quickly run into a roadblock if they'd gone the injection molding route."

TriEnda then turned to longtime supplier Tooling Tech Group (TTG), Fort Laramie, Ohio, for the production tools. TTG — said to be the largest tooling provider in the U.S. — has worked with TriEnda and its sister company Penda (both part of KFI) for more than four decade. Notes Sales Manager Nate Ruhenkamp, "Our facility here specializes in thermoform tooling and has a long track record with KFI. We have a foundry in-house, which we use to create aluminum tools from — in this case, a customer-supplied pattern."



PLASTIC RAW MATERIALS

Biodegradable Breakthrough: Plastics that Don't Create Microplastics or Make us Sick

The University of California San Diego's study, which was carried out in conjunction with Algenesis, emphasizes the importance of biodegradable polymers in tackling the worldwide problem of plastic pollution. Urgent action is required in response to microplastics, which have detrimental consequences on ecosystems as well as human health. Plant-based polymers that fully biodegrade in less than seven months-even at the microplastic level - are the ground - breaking solution that the research presents. This invention not only slows the buildup of microplastics but also paves the way for the development of environmentally friendly material substitutes.

Under the direction of Professors Robert Pomeroy and Michael Burkart, the group stresses how crucial it is to create plastics that don't produce persistent microplastics over the course of their lives. Their polymers made of algae are put through a testing process, which confirms their exceptional biodegradability as compared to plastics made of petroleum. Knowing the science underlying biodegradability emphasizes how crucial it is to choose materials that support

environmental objectives. Although biodegradable plastics have potential, appropriate disposal circumstances are necessary for them to reach their full potential. People can help create a more environmentally friendly future by adopting biodegradable products and making sure that proper waste management procedures are followed.

Sirmax North America Showcased Flame - retardant PP Compounds at NPE 2024



Key Highlights:

- Sirmax North America highlighted its broad portfolio of flame - retardant polypropylene (PP) compounds at the NPE 2024 exhibition.
- The multi - family line of halogen - free FR PP materials carry UL Yellow Card certification and are available in a range of colours for electrical / electronics applications.

- The flame - retardant grades are also being considered as an environmentally friendly alternative to polyvinyl chloride (PVC).

Sirmax North America, a global supplier of polypropylene (PP) compounds, engineering polymers, post - consumer recycled compounds, and biopolymers for a broad range of industries, highlighted its broad portfolio of flame - retardant polypropylene (PP) compounds at the NPE 2024 exhibition. The multi-family line of halogen - free FR PP materials carry UL Yellow Card certification and are available in a range of colours for electrical/electronics applications.

Sirmax reports strong demand for its FR PP compounds in the U.S. as end users and processors move increasingly to non - halogenated alternatives. In addition, Sirmax sees growing business opportunities in the U.S. due to disinvestment by at least one main competitive producer of FR PP compounds.

"The movement to non - halogenated alternatives is unmistakable and we're positioned to meet the needs of the market with an extensive lineup of FR PP options that are versatile, easier to process than engineering plastics, and performance-driven," said

Lorenzo Ferro, U.S. country manager for Sirmax Group. The flame - retardant grades are also being considered as an environmentally friendly alternative to polyvinyl chloride (PVC).

Sirmax offers the Dafnelen family of homopolymer and copolymer FR PP compounds that are unfilled. They exhibit strong mechanical and electrical properties, with a UL flame retardant rating of V0 at 0,8 mm and 5VA at 1,6 mm. Dafnelen grades carry a UL Yellow Card certification and are available in a range of colours.

Meanwhile, the company offers the Dafneglass family of glass-reinforced FR PP materials with strong thermal, impact, and stiffness properties, while meeting the standards of the automotive and household appliance industries. Dafneglass grades have a UL V0 rating at a test thickness of 0.8-mm. They come in glass loadings of 10% -30% and are available in a range of colours.

The Isoplen family of unfilled FR PP compounds has a UL V2 rating at 1.5mm thickness. It is also available in all colours and targeted for less demanding end-use requirements. Sirmax is working closely with end users and processors on a range of applications including meter sockets, sensor housings, connectors, power tools, electrical housings, and appliance devices. The company can also customize FR products to meet specific application requirements.

NYCOA Launches Plasticiser - free Long - chain Polyamides at NPE 2024

Nylon Corporation of America (NYCOA) has announced the launch of NXTamid L, a long

- chain polyamide as a replacement for Pa11 and PA12. The company highlighted their new plasticizer - free and sustainable material at NPE 2024.



NYCOA has collaborated with some end users of long - chain polyamide resins to develop an alternate solution which offers "several advantages" over the traditionally imported resins. Over the decades, OEMs and processors have been forced to rely on imports from Europe and Asia which not only carry costly tariffs but have also been affected by shortages and supply chain disruptions.

Depending on the application, NXTamid L which is designed to deliver performance that is equivalent or better than traditional PA12 and PA11 resins, while also offering a range of customization options. The material has a higher service temperature than Pa12 while offering a degree of flexibility and chemical resistance. It is also more sustainable with some grades having bio content exceeding 50% of the material composition.

"Our customers approached us looking for alternate solutions every time there was a shortage or supply disruption of long-chain polyamides in the North American market," said Bill Baker, vice president of sales for NYCOA. "We've responded to our customers' needs and that of the market with an innovative solution that is not only a performance equivalent but also versatile and sustainable. Domestic OEMs and

processors can now be assured of stable supply to meet their production needs for various transportation, sporting goods, and industrial applications."

The biggest advantage of NXTamid L is that customers have an option to go completely plasticizer - free without compromising on mechanical properties. Plasticizers such as BBSA (N - Butyl Benzene Sulfonamide) are widely used by resin manufacturers and compounders to influence properties of base nylon resins to make them softer. The plasticizers being of lower molecular weight tend to migrate out during compounding / processing and well beyond during their service life especially at higher temperatures. This migration causes a change in the material's mechanical behavior as the plasticizer migrates out of the polymer, making it stiffer and also causing premature wear of seals and gaskets in the tubing industry.

Additionally, the plasticizer itself has raised environmental and health concerns. NXTamid L offers a plasticizer - free solution resulting in better long - term stability compared to other plasticized long-chain polyamides. NYCOA has received strong traction from multiple customers looking for next - generation plasticizer - free alternates, according to Baker. Plasticizer - free NXTamid L grades are already being supplied to multiple customers in commercial quantities.

Some of the other benefits of NXTamid L are higher melting temperatures, lower moisture absorption, and better dimensional stability than Pa12 and Pa11. The material's dimensional stability is another important characteristic that differentiates it from short - chain nylons such as PA6 and PA66.

NYCOA's NXTamid L portfolio consists of grades designed and optimized for various applications and processing technologies such as injection molding, extrusion, rotomoulding, and blow molding.

NYCOA also notes environmental benefits of sourcing material locally in North America. Studies have indicated that resin produced domestically can help save a significant amount of shipping related carbon emissions over those materials produced and shipped by sea from Europe and Asia.

BASF, SABIC, and Linde Celebrate The Start - up of The World's First Large-scale Electrically Heated Steam Cracking Furnace

- Demonstration plant with 6 megawatts input of renewable electrical energy to test material behavior and process on an industrial scale.
- Joint development and construction of electric steam cracking furnaces at BASF's Verbund site in Ludwigshafen.
- Technology with the potential to reduce CO emissions by at least 90 % compared to conventional steam crackers.

BASF, SABIC, and Linde have inaugurated the world's first demonstration plant for largescale electrically heated steam cracking furnaces. Following three years of development, engineering, and construction work, the regular operation of the demonstration plant is now ready to start at BASF's Verbund site in Ludwigshafen, Germany. In March 2021 the three companies signed a joint agreement to

develop and demonstrate solutions for electrically heated steam cracking furnaces.

Steam crackers play a central role in the production of basic chemicals and require a significant amount of energy to break down hydrocarbons into olefins and aromatics. Typically, the reaction is conducted in furnaces at temperatures of about 850 degrees Celsius. Up to now, these temperatures have been reached by using conventional fuels. The demonstration plant aims to show that continuous olefin production is possible using electricity as a heat source. By using electricity from renewable sources, the new technology has the potential to reduce CO emissions of one of the most energy - intensive production processes in the chemical industry by at least 90% compared to technologies commonly used today.

The demonstration plant, which produces olefins, such as ethylene, propylene, and possibly also higher olefins from saturated hydrocarbon feedstock, is fully integrated into the existing steam crackers in Ludwigshafen. The upcoming operation serves the goal of gathering data and experiences about material behavior and processes under commercial operating conditions for the final development of this innovative technology to industrial market maturity. In two separate demonstration furnaces, two different heating concepts will be tested.

While in one furnace, direct heating applies an electric current directly to the cracking coils, in the second furnace, indirect heating uses radiative heat of heating elements placed around the coils. The two electrically heated furnaces

together process around 4 tons of hydrocarbon feedstock per hour and consume 6 megawatts of renewable energy.

To support the development of the novel furnace technology, the project was granted €14.8 million by the German Federal Ministry for Economic Affairs and Climate Action under its "Decarbonization in Industry" funding program. The program is supporting energy - intensive industries in Germany in their efforts to achieve carbon neutrality.

"With the development of electrically operated steam cracking furnaces, we are getting our hands on a key technology that will help to significantly reduce greenhouse gas emissions in the chemical industry. It fills me with pride and joy that we have achieved this success together with our partners SABIC and Linde. The demonstration plant here in Ludwigshafen will provide us with valuable experience on the final step towards the industrial application of this technology", said Dr. Martin Brudermüller, Chairman of the Board of Executive Directors of BASF SE.

Abdulrahman Al-Fageeh, CEO of SABIC stated; "The e-furnace's technology holds huge potential for the sustainability of the global petrochemical industry. It can demonstrate the role that renewable electricity can play in higher efficiency and low-emission chemical processing. Through close collaboration, teamwork, intellectual property development, and advancing the best 2 2 technical solutions holistically, the teams at SABIC, BASF and Linde have brought this project to this key stage.



PLASTIC MACHINERY

Blending & Dosing

Blending Basics



What is blending?

Blending is an efficient, thorough and automated way to combine material ingredients, in pre-determined proportions, and then mix them together in preparation for the production of plastic parts or products. Materials to be blended may be metered into the blend by quantity (volumetric blending) or by weight (gravimetric blending).

For more on volumetric vs. gravimetric:

Dosing is the process of metering individual ingredients, which can be accommodated by a stand-alone 'feeder' on the throat of processing machine, or within a fully automated, multi-component blender. In either case, dosing can be employed by volume or by weighing.

Processors can blend basic plastic resins and additives/colorants in-plant, as needed, into recipes that are required by their process and the final product. This is typically

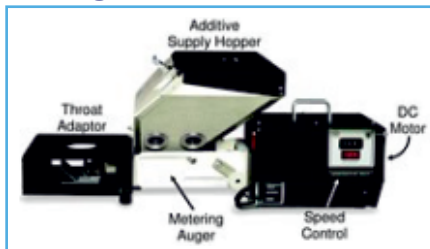
less expensive than purchasing pre-mixed material from a supplier.

Typical blending and dosing applications include:

- Coloring
- Stabilization (UV resistance, rigidity, chemical or electrical properties etc.)
- Consumption of Re grind(s)

The blending/dosing process can be employed from 1 to 8000 pounds of material per hour, in pellet, regrind, concentrate, powder, flake and even liquid forms.

Dosing Basics: How Dosing Works

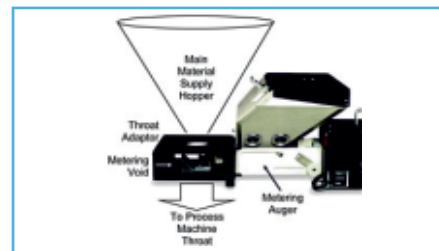


A Doser, or Feeder is designed to introduce minor ingredients to the flow of main ingredients at the throat of a processing machine. Common components include a throat adaptor, DC motor, a metering auger and speed / interfacing control.

Dosing is triggered or speed-governed by the processing machine itself. In injection

molding, as the machine cycles, a dose, calibrated to the shot size of the molding machine and amount of additive required is introduced into the gravity flow of the other materials by a rotating auger. In extrusion, as the machine operates continuously, constant dosing is provided at a certain rate, in step with the speed of the extruder.

In some cases, multiple dosing devices may be connected to a single machine throat for the introduction of multiple additives, or simply to provide rapid changeover ease with redundant dosing units already installed. In other cases, other materials, like regrind may be dosed into the flow in addition to or instead of additives. Often times, some form of mixer may be installed below the dosing device to enhance the blending of the newly introduced additives with the base resins.



The dosing device's throat adaptor is critical to assure:

- The ability to support the supply hopper(s) for base resins above it, as well as the dosing unit (typically installed into the side of the support

frame) with solid connection to the throat of the processing machine below it.

- The ability to readily calibrate the dosing unit to the additive or material it will be metering. Typically, calibration is accomplished by a catch and weigh procedure to align the performance of the doser to the material it is metering and the rate at which it will be metering.
- The adaptor must create a void in the base material flow through it, so that the dosed additive can readily join the flow of material and not be displaced by its flood feed through the throat.
- The adaptor may be required to allow installation of a mixing unit below it, without sacrificing structural integrity. In some cases, the mixer's housing can provide for the installation of a metering device directly, without the need for the dosing device's throat adaptor.

Program Provides Equipment Maintenance, Overhauls and Upgrades

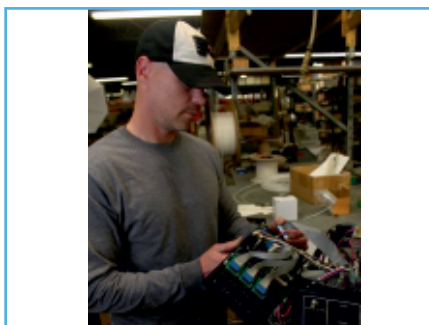
NPE2024: Program aims to ensure equipment remains at peak performance levels throughout its life cycle.

Maguire's new MOU (Maintain, Overhaul, Upgrade) program is designed to revolutionize how existing customers engage with their equipment, offering a comprehensive suite of maintenance, overhaul and upgrade solutions.

Maguire says the MOU program consolidates its commitment to providing unparalleled customer benefits. It ensures that customers' equipment remains at peak performance levels throughout its life cycle.

Highlights of the MOU Program include:

- 1. Maintain - Focusing on Long-Term Value:** Under the Maintain tier, Maguire emphasizes the importance of proactive maintenance and service, particularly within the 5-year warranty period. Customers access a wealth of maintenance resources through the MOU Program, including part libraries, exploded views, calibration / maintenance checklists and accredited service.



Source: Maguire Products

- 2. Overhaul - Built to Last Longer:** The Overhaul tier ensures that Maguire's equipment is built to last. With an effective overhaul, users can extend the life of their products by another 10 to 15 years. Maguire or local authorized distributors evaluate equipment, assess its condition and perform necessary repairs. Regardless of the condition, Maguire guarantees to restore the equipment to "as new" status, backed by a 1-year warranty.

- 3. Upgrade - Adding New Features and Capabilities:** The Upgrade portion of the program enables existing users to adapt their equipment as applications evolve. Whether upgrading controllers to the latest generation touchscreen controls, enabling remote controls, adding additional materials to a process, or updating hardware for high-temperature operating conditions, Maguire offers a broad range of upgrades for all equipment.

In addition to these comprehensive offerings, Maguire recognizes the importance of addressing shifts in applications and needs. Through collaboration with local distributors, the MOU Program provides competitive trade-in options on a case-by-case basis, ensuring customers can seamlessly transition to new products to meet their evolving requirements.

AirTECT Plastic Leak Alarm System



Where will you be when you get the call that a molding cell is down and production has stopped? Leaking Hot Runners and Machine Nozzles cause significant Down Time. Early plastic leak detection is the solution! The AIRTECT Plastic Leak Alarm System is a unique device that gives you 24 hour protection and peace of mind!

Features & Benefits

- Fast ROI (less downtime, greatly reduces repair costs)
- Easy installation in new or existing hot runner systems
- Total mold protection depending on configuration
- Direct plastic leak presence detection
- Programmable machine interlocks
- System uses a very sensitive pressure differential switch
- Calibrates pressure drop across all tubes at start-up
- Sensor tubes easily locate within existing wiring channels
- Leak location(s) displayed on LED or LCD clear text display
- Mold temperature monitoring

Streamlined Drying Process Speeds up Changeovers

NPE2024: Maguire demonstrating increase in productivity possible by vacuum drying. Maguire says its Ultra Dryers redefine the drying process, delivering significant time, energy and cost savings. They utilize minimal energy for material drying, resulting in substantial cost savings, reduced drying time and increased efficiency, the company says.

Maguire notes that the vacuum drying process employed by Ultra Dryers is exceptionally efficient. It ensures optimal moisture removal

and guarantees consistent, high-quality drying results. Ultra Dryers are said to accelerate the drying process, achieving drying speeds six times faster than traditional methods, thereby minimizing production downtime and maximizing operational efficiency.



At NPE2024, Maguire is unveiling two groundbreaking developments: "Pit Stop" and "Auto Batch." Pit Stop is said to revolutionize material changes by streamlining the drying process to achieve blends or material changes in as little as 20 minutes, thereby enhancing efficiency and reducing downtime. Auto Batch introduces a new level of automation, enabling operators to input desired throughput and automatically calculate material dispensing weight, optimizing energy efficiency and minimizing material in process during changeovers.

Maguire has launched a dedicated microsite to illustrate the tangible benefits and savings achievable with Ultra Dryers. The site offers a personalized journey and comprehensive insights into the tangible benefits and savings achievable with Ultra Dryers. Through energy - efficiency calculations, productivity benefits and valuable resources, the microsite highlights the advantages of Ultra materials drying, empowering visitors to make informed decisions about their drying processes. This initiative demonstrates Maguire's

commitment to delivering cutting-edge solutions and enhancing customer experience in the plastics industry.

Battenfeld - Cincinnati Showcases Quartet of Advancements at NPE 2024

Key Highlights:

- Battenfeld - cincinnati has expanded its solEX NG series by introducing a smaller model, the solEX NG 45. This addition offers high-quality extrusion for food - grade plastics like HDPE and PP, achieving up to 40% higher output with reduced energy consumption.
- The company's advanced extrusion technology, including the solEX NG series and OptiMelt static mixer, ensures efficient plasticization and high-quality production of these large pipes.
- The twinEX 93-34 extruder allows for direct dosing of chalk into PVC formulations, resulting in pipes with a high filler content that are cost - effective and environmentally friendly.

battenfeld-cincinnati adds small model to complete its solEX NG series

Next - generation extruders from battenfeld - cincinnati have long since established themselves in the market. High output rates at low screw speeds, effective melting performance with low melt temperatures plus a reduced pressure profile and consequently less wear on machines – these are the benefits provided by the high-

speed soLEX NG series. At NPE 2024, the extruder specialist is now rounding off this series downwards by adding a new soLEX NG 45 to the four existing models soLEX NG 60, 75, 90 and 120.

Expand



This latest and smallest model, soLEX NG 45, just like the larger models of the series, has a processing unit consisting of an internally grooved barrel combined with a matching screw geometry. The process technology advantages resulting from this combination ensure an extra-high-quality standard for the extruded semi-finished product. When processing HDPE, these extruders also achieve a 25 % higher output and for PP even of up to 40 %. And in addition to that with reduced melt temperatures of about 50 °F below those in conventional extruders.

Another advantage resulting from the innovative processing unit of the NG series is the reduction in energy consumption, which is around 15 % lower than the previous soLEX series. Consequently, this successful series offers advantages not only in terms of process technology, but in terms of higher energy efficiency as well. Large-diameter pipe line expertise

Giant pipes with a diameter of 106 inches can be produced with the extrusion lines recently sold

to north-east Africa. With its foray into the new dimension of 106 inches large PE pipes, the extrusion line manufacturer battenfeld - cincinnati has set a new record. These are the first complete lines capable of producing pipes of this size and quality. The design incorporates both the company's unique overall system expertise, which intelligently combines the individual components from the material dosing system to the cutting unit without interface problems, and its decades of experience in the construction of large-diameter pipe systems. Continuous optimization to reduce sagging and thus increase pipe quality speaks for itself, as do mechanical engineering aspects that simplify the transport and assembly of the large components.

With the new lines, the two customers will expand their product range to include large pipes with an enormous diameter of 106 inches and thus meet the increasing demand for high-performance fresh water and wastewater systems. Plastic pipes play a major role here, as they are easier to install due to their lower weight compared to concrete pipes, are resistant to corrosion and chemicals and cannot be damaged by tree roots in the ground. In other words, they are functional and durable.

In order to be able to produce pipes in these dimensions, high-performance extruders that can homogeneously plasticise the melt material are required. For some years now, battenfeld-cincinnati has been relying on the soLEX NG series, which achieves up to 25 % higher output compared to previous versions. Thanks to the process engineering design with

an internally grooved barrel and matching screw and grooved bushing geometry, the extruders operate with a reduced axial pressure profile, which ensures low wear. At the same time, high specific output rates at low screw speeds and temperatures reduced by around 10 °C guarantee effective but gentle melt processing. The OptiMelt static mixer, which is installed between the extruder and the die, achieves a further 10 °C reduction in temperature. The tool itself is a helix pipe head, which, with its two-stage concept, ensures optimum melt distribution with low pressure build-up. Finally, the effective internal pipe cooling supports the stable outlet of the melt from the die. The entire unit thus ensures minimised sagging effects, which is particularly important for large pipes and their logically high weight in order to guarantee optimum wall thickness distribution without ovality.

Needless to say, that the downstream components are also designed for the large dimensions and also meet the requirements for low energy consumption. The vacuum and spray baths work solely with frequency-controlled vacuum pumps, which consume around 50 % less energy than conventional systems. At the same time, a closed water circuit in the complete calibration system ensures minimized water consumption of just 4.41 gpm.

A brand new feature is that all downstream components are now only 4 m long, meaning that they can be easily transported to their destination and only need to be joined together. At the booth W3161, the team of experts will be providing information about

the specific advantages of large-diameter pipe systems and, if requested, will be presenting the Fast Dimension Change (FDC) system, which can be integrated into any pipe line and allows the pipe dimension to be changed automatically during ongoing operation. FDC systems give the pipe manufacturer maximum flexibility and therefore cost-effectiveness.

The High - Speed Extruder Celebrates its 20th Birthday

This year marks a special anniversary. Developed in 2003 and continuously refined since, the new generation of extruders, also known as Highspeed Extruders, is now globally recognised as a proven solution in the production of thermoforming sheet from PP or PS. Moreover, this type of extruder has found applications in the production of industrial boards or in the furniture industry, extending to the feeding of pyrolysis reactors for recycling post-consumer waste.

True to the motto "One size fits all," today, 6 types of extruders with the optimal screw diameter of 3 inches (75 mm) are built, differing only in screw speed and drive power. This ensures a wide range of applications, serving as a high-performance primary extruder or a suitable co-extruder, typically ranging from 400 to 4,000 lbs/h in output.

Since the drive power input directly translates to the melting of plastics during extrusion, no additional external heating is required. Thus, this extruder significantly and sustainably contributes to energy savings and the reduction of the carbon footprint in film production.

Operators particularly appreciate the ease of use, short start-up or changeover times, as well as simple maintenance. Despite its comparatively small size, this machine efficiently operates even at higher outputs without requiring additional floor space. Visitors to NPE2024 are welcome to congratulate the now matured birthday celebrant, showcased at Booth W3161.

Direct dosing of chalk supports sustainable extrusion process

Flexibility, process stability and minimised wear are only some of the advantages resulting from the production of PVC pipes with high filler content using the solution currently being presented by battenfeld-cincinnati. At its booth W3161, the extrusion specialist is showcasing the twinEX 93-34 parallel twin screw extruder model for processing up to 100 parts of chalk without premixing.



twinEX93R-34

High proportions of filler chalk make PVC pipes, which are primarily used as sewer pipes, not only cheaper, but also reduce the use of fossil resources. At the NPE 2024, battenfeld-cincinnati is presenting the ideal solution for manufacturing PVC pipes with a high filler content. A basic PVC formulation and the filler material are fed separately to the production line. The individual components are then

put together in a collection hopper and subsequently blended with each other in the cold mixer connected to it. After mixing, the finished formulation is passed on to the feed opening of the extruder via a vertical dosing unit. Both the mixing ratio and the entire material throughput are gravimetrically monitored and controlled. All containers along the chalk transport and chalk dosing line are equipped with agitators. Thus, the filler material is kept in motion along the entire route to prevent bridging.

A twinEX 93-34 parallel twin screw extruder serves as processing unit for the PVC formulation. The processing unit features a specially adapted screw geometry with anti-wear protection to transport and plasticise the blend evenly and homogeneously. The advantage of this solution is its chalk content variability ranging from 30 to 100 parts, which can be easily adjusted at any time and at short notice to the formulation required for the specific product. A further benefit of direct gravimetric chalk dosing is the enormous process stability, which ensures a high-quality end product. Finally, the process eliminates the need for premixing of PVC and chalk in a heating/cooling mixer. This process change involves several benefits. Central heating/cooling mixers can be kept smaller in size, or any mixing capacities which become free can be made available to other production lines. De-mixing during material transport can be prevented, since the filler material is fed to the production line directly after transport.

CIRCULAR ECONOMY/ BIO-PLASTICS/ RECYCLING

Carbios and Partners Celebrate Groundbreaking for PET Biorecycling Plant

Carbios held a groundbreaking ceremony for its project to construct a PET recycling plant. The plant will use a unique process involving the depolymerization of PET using enzymes. Participants included local authorities, partner brands and industrial partners. Located in Longlaville, in the Grand-Est region of France, the site will be Carbios' first commercial plant. The plant will have a processing capacity of 50,000 ton/yr of prepared waste when operating at full capacity. According to the company, work is progressing on schedule with significant quantities set to be delivered to customers in 2026.

The technology opens up new recycling streams for multilayered, colored and opaque trays made from packaging waste and polyester textile waste, which until now have been little or no recycled at all, giving them value and providing an alternative to fossil-based monomers.

"Our revolutionary enzymatic depolymerization technology marks the beginning of a new

era in plastic recycling, moving away from dependence on oil to a circular economy fueled by PET waste itself. Carbios continues its mission by collaborating with strategic partners around the world and embarking on a promising commercial and international deployment," says Emmanuel Ladent, Carbios CEO.

The plant is expected to create 150 direct and indirect jobs in the region. In October 2023, Carbios obtained the building and operating permits for the site. The factory is under construction on land officially acquired from Indorama Ventures in February 2024. Also, in February 2024, Carbios and De Smet Engineers & Contractors (DSEC) announced their collaboration to manage construction. Several feedstock supply agreements, notably with CITEO and Landbell Group, will secure the vast majority of the raw materials required. Close to the borders with Belgium, Germany and Luxembourg, the plant's location is strategic for access to nearby waste supplies.

As part of France 2030, Carbios will receive grants totaling €54 million from the French State and Grand-Est Region.

ExxonMobil Meerhout Polyethylene Plant uses Stretch Hood Packaging that Incorporates 30% Post-Consumer Recycled (PCR) Content while Maintaining Performance

Stretch hood film is used in ExxonMobil's Meerhout plant in Belgium for wrapping, protecting, and transporting all pallets of polyethylene resin produced there. Stretch hooding is amongst the most innovative palletization methods as it offers the potential advantages of low energy consumption versus shrink film, and high output for packaging.



With proper selection of PCR, a low-density Exceed™ XP 7 performance polymer-based formulation can help attain superior mechanical performance and:

- Retain physical property performance
- Improve end-of-life management options for the packaging film, helping to support a circular plastic economy. This polyolefin-based solution can improve recyclability* versus reference EVA-based film.

These industrial packaging films can help increase circularity in packaging for industrial film, as new Extended Producer Responsibility (EPR) schemes are expected to be implemented in 2025. Belgium implemented a scheme for EPR starting twenty five years ago for Commercial and Industrial (C&I) packaging, through its accredited organization, Valipac.

Valipac aims to promote the use of commercial and industrial packaging made from recycled plastic packaging. Those who manufacture and sell commercial and industrial plastic packaging made from at least 30% PCR in Belgium receive a reduction in EPR fees as long as the supplier is accredited.

Exceed™ XP 7 series performance PE with 30% recycled content incorporation offers beneficial attributes for stretch hood versus EVA-based standard virgin film:

- High holding force for load stability
- Comparable hooding performance
- Comparable tear resistance
- Sustainability benefit of the incorporation of PCR
- Designed for recyclability

EUMOS 40509** (a test method for load unit rigidity) was performed on the pallet with 11 layers of 25 kg bags, which all passed the 0.5 g test in LP and BP directions, demonstrating load stability and performance. Thanks to high retention forces, dart impact and tear propagation resistance, these innovative stretch hood films with 30% PCR incorporation enable stable load securing, and can reliably protect the pallet contents from tampering and theft.

Scientists Develop Innovative Technique to Transform Plastic Waste into Powerful Clean Fuel: [it] Could be Produced for Free

The University of California San Diego's study, which was carried out in conjunction with Algenesis, emphasizes the Importance of biodegradable polymers in tackling the worldwide problem of plastic pollution Urgent action is required in response to microplastics, which have detrimental consequences on ecosystems as well as human health. Plant - based polymers that fully biodegrade in less than seven months-even at the microplastic level-are the groundbreaking solution that the research presents. This invention not only slows the buildup of microplastics but also paves the way for the development of environmentally friendly material substitutes.

Under the direction of Professors Robert Pomeroy and Michael Burkart, the group stresses how crucial it is to create plastics that don't produce persistent microplastics over the course of



their lives. Their polymers made of algae are put through a testing process, which confirms their exceptional biodegradability as compared to plastics made of petroleum. Knowing the science underlying biodegradability emphasizes how crucial it is to choose materials that support environmental objectives. Although biodegradable plastics have potential, appropriate disposal circumstances are necessary for them to reach their full potential. People can help create a more environmentally friendly future by adopting biodegradable products and making sure that proper waste management procedures are followed.

UPM Raflatac Launches New RafCycle™ partner Program in the Americas

UPM Raflatac unveils its new RafCycle™ Partner Program, a groundbreaking initiative designed to enhance sustainability and circularity in the labeling industry. Building on the success of the RafCycle™ recycling service, this program invites businesses in North America to join a growing network of partners committed to reducing their carbon footprint and fostering a circular economy. Participation in the program enables converters to collect release liner waste from their customers and then leave the recycling to UPM Raflatac.

This value-added benefit helps brands avoid additional disposal costs, reduce their carbon footprint*, and meet their sustainability goals. Partners receive local, hands-on support, along with complimentary RafCycle material pickup from their central collection point. "We are excited to launch the RafCycle Partner Program, which represents a significant step forward in addressing many of the concerns that have held back release liner recycling in our industry," said Michael Garretson, Manager, RafCycle, UPM Raflatac Americas.



"Our goal is to make liner recycling easy, widespread, and accessible. Our converter partners are an integral part of this initiative. Together, we can make a substantial impact in making the labeling industry more sustainable." By transforming label release liner waste into new resources, the program supports companies in achieving their sustainability goals and creating compelling marketing stories that demonstrate their commitment to the circular economy.

Circular Economy and Mobility: Efficient Plastics Processing for a Green Future from ENGEL

The motto for this year's trade fair appearance is again "get connected". Besides a wide range of solutions for greater production

efficiency and circular economy applications, the Austrian injection moulding machine manufacturer is presenting a global premiere: the WINTEC series, which was specially developed for the Asian market is being expanded to include a new series".



ENGEL was an early adopter of China as a production and sales location and the first European injection moulding machine manufacturer to open a plant in Shanghai almost 20 years ago. After launch of the second brand, WINTEC – tailored to the needs of the Asian market – a second plant was opened in Changzhou in 2014. Since then, more than a thousand t-win series two-platen machines have been sold under the WINTEC brand. ENGEL is extending the WINTEC portfolio for Chinaplas, adding the t-win SE as a new series in the two-platen model portfolio; additionally, the launch of the e-win sees the first all-electric WINTEC model range enter the market.

This is an example of how the company's dual orientation, which has been tried and tested over many years, is bearing fruit: on the one hand, production takes place within a region for that region with a view to the local markets – and with local development and manufacturing expertise. On the other hand, ENGEL offers uniform quality standards, serving the entire world regardless of where the customer purchases the machine.

"We are taking our philosophy of providing both local and global solutions even further. We are currently establishing a global hub structure", says Stefan Engleder, CEO of the ENGEL Group. This means that each of the three regions, the Americas, Europe and Asia is made up of largely independent units, each comprising sales, order processing, and production and after sales. Each of the three hubs is in close contact with headquarters with a view to establishing and implementing global standards wherever required and appropriate. This creates ideal conditions for serving the Asian market in the future.

WINTEC t-win SE: new Two-Platen Machine for the Asian Market

- With more than 1,000 units sold, the t-win SE is the latest addition to the two-platen series, and specifically tailored to the needs of the Asian markets. "With the t-win SE as the new basic machine and the ENGEL duo series for demanding applications, we can now cover all levels of complexity in the Asian region with our two-platen injection moulding machines," says Engleder. Development and production of the t-win SE take place in Changzhou. Initially, the 6,500 kN, 10,500 kN and 18,000 kN sizes will be available for customers in Asia. A new WINTEC t-win SE 6500-2310 is showcasing an efficient system solution for the production of fog light surrounds made of polypropylene. The components are injected into a two-cavity mould created by a local mould maker and taken off by a WINTEC α-win linear robot.

In addition to the t-win SE, the all-electric e-win series is also celebrating its first showing at Chinaplas.

Precision for Optical Parts –

Three further exhibits see the company address the booming Chinese mobility sector. In line with the continuing swing from internal combustion engines to electric drivetrains, the classic radiator grille has become obsolete as the main identity-defining element for automotive brands – this role is now increasingly being fulfilled by the headlight signatures. The light guides required for this need to be manufactured with great care and precision to avoid irregularities or impurities in the melt impairing the required optical quality. The tie-bar-less ENGEL victory 120, in combination with the optimelt process, fully plays to its strengths in this application: plasticizing components for PMMA developed and manufactured in-house allow for gentle processing of the melt, preventing yellowing and burn marks. The tie-bar-less clamping unit supports precise moulding of long and thin parts thanks to its particularly homogeneous clamping force distribution. This makes it the machine of choice in the manufacture of particularly long light guides of consistently high optical quality. Further benefits: the tie-bar-less design means that even very large moulds can be used on comparatively small injection moulding machines – the exhibit on show is a victory with a clamping force of just 1,200 kN. Compared to this, a tie-bar

machine would need a significantly higher clamping force due to the space required for the mould.

Material composite parts for tomorrow's mobility - The third application from the automotive sector is a vertical injection moulding machine from the insert series, the insert 100. It is used to produce bipolar plates for fuel cells with a silicone seal in just one work step. The particularly small footprint of the vertical machine and its ergonomic work area ensure efficient production of complex material composite parts. The precise servo-hydraulic drives of the insert simplify overmoulding with complex geometries and part functionalization, even for materials which are difficult to process. The easily accessible mould area also allows for easy integration of upstream and downstream automation. An ENGEL easix 6-axis robot is used for parts handling in the application on show.

Green technologies for the logistics sector - ENGEL is consistently pushing forward with developments for the circular economy – the skinmelt process being a prime example of this. Skinmelt enables the use of recycled material in a wide range of plastic products without needing to compromise on the optical and mechanical quality of the parts. At Chinaplas, ENGEL is demonstrating how transport containers with a high proportion of PCR material can be manufactured using this process. The recycled material is hidden in the core of the logistics box and completely encapsulated with

virgin material – from the outside, end customers are unable to see the difference compared with a box made entirely of virgin material. The achievable recycled material content is at a high level of over 50%. The entire process can be easily and conveniently controlled by the CC300 control unit. This application is based on the duo 700 two - platen machine, with a viper 40 linear robot taking care of parts handling. The iQ weight control digital assistance program ensures process-assured plasticizing and injection of the recycled material monitoring the shot weight in real time and compensating for fluctuations in the material properties in a fully automated way. This ensures reliably constant filling of the cavity.

Efficiency and precision on a small footprint for the cleanroom -

The all-electric e-mac series by ENGEL is characterized in particular by its small footprint. Thanks to the new, optionally available cleanroom package for the e-mac, manufacturers in the medical technology sector can now also benefit from higher productivity per unit of area. Pipette tips made of PP are being produced at the stand using an eight-cavity mould by Chinese mould manufacturer Cartisan on an ENGEL e-mac 100. The precise, servo-electric drives are another benefit on top of compact dimensions. They enable the production of challenging, filigree components like these pipette tips with minimal energy consumption. Interested visitors can discover the full details of the exhibits at the ENGEL and WINTEC stand in Hall 5.1 / Stand C42.



plants in Europe, North America and Asia (China and Korea), and subsidiaries and representatives in more than 85 countries, ENGEL offers its customers the excellent global support they need to compete and succeed with new technologies and leading-edge production systems.



Fig 01: The insert 100's process optimization for overmoulding complex structures makes it easier to functionalize parts. Image: ENGEL

Fig 02: Promoting a circular economy with the duo 700 and the skinmelt process. Image: ENGEL



ENGEL AUSTRIA GmbH

ENGEL is one of the global leaders in the manufacture of plastics processing machines. Today, the ENGEL Group offers a full range of technology modules for plastics processing as a single source supplier: injection molding machines for thermoplastics and elastomers together with automation, with individual components also being competitive and successful in the market. With nine production

Covestro Collaborates with Automotive Partners on Car-to-Car Plastic Recycling

New Joint Program Aiming for Efficient, Sustainable Automotive Plastic Recycling

With increasing global environmental awareness and stricter regulatory requirements, the automotive industry is realizing the necessity of plastic recycling for sustainable development. In response, materials manufacturer Covestro, along with partners from the automotive value chain, is spearheading the concept of car-to-car closed-loop plastics recycling, which is emerging as a promising solution to tackle the challenges of plastic waste management in the sector.

Under a joint pilot program initiated by German federal enterprise GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), Covestro and partners will collaborate to establish closed-loop pathways for high-value plastics from end-of-life vehicles (ELVs). The goal is to create an efficient and sustainable automotive plastic recycling system, advancing the

more sustainable "transformation of the industry". The pilot program was announced at Covestro's booth during the CHINAPLAS 2024 international trade fair in Shanghai. Notable partners include leading automotive brand owners such as NIO of China and Volkswagen, Chinese recycling company GEM, and third-party certification bodies like TÜV Rheinland.

"We are proud to partner with like-minded value chain allies to pioneer closed-loop plastic recycling in the automotive sector," said Lily Wang, Global Head of the Engineering Plastics Business Entity at Covestro. "By leveraging our collective strengths and resources, we are confident in our ability to build a closed-loop for automotive plastics recycling, thereby reducing waste and carbon emissions at the source while improving resource use efficiency. Through this joint program, we aim to expedite the automotive industry's transition toward a more climate-neutral and sustainable future."

"The automotive industry stands as one of the most resource-intensive sectors globally, yet the potential of high-value plastics from ELVs remain largely untapped," said Martin Hofmann, Cluster Head in charge of Climate, Energy, Environment and Biodiversity at GIZ. "GIZ is steering an innovative endeavor to explore closed-loop pathways for high-value plastics from ELVs. I firmly believe that GIZ and our partners can forge a path towards the transition to a sustainable, circular economy."

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