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PLASTISCOPE

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FROM THE PRESIDENT's DESK

Mr. Mahendra Sanghvi

OPP

CONTENTS

Dear Members,

My personal greetings to you and your families for Dussehra and Diwali !

On 20th September 2022 Shri Mansukh Mandviyaji, Hon'ble Minister for Health & Family Healthcare and Minister for Chemicals and Fertilizers, had called meeting of 3rd Chemicals and Petrcochemicals Advisory Forum In New Delhi.

I attended the meeting and sent detailed Representation to the Minister stating therein Government Interventions required for all round development of the Indian Plastic Industry.

During this meeting I also interacted with the new Secretary, Department of Chemicals and Petrochemicals, Shri Arun Baroka Ji.

OPPI will ensure that the Government Interventions asked by us for the accelerated development of the Indian Plastic Industry are closely followed up.

The exporters of value added plastic products were complaining regarding delays in the exports procedures like not getting shipping berths for long periods, non - availability of containers and heavy shipping tariffs.

We had taken up these issues with the Concerned Ministries and Ministries of Commerce and Industry in various meetings held from time to time.

We are happy to note that the government has identified a pipeline of 81 Public Private Partnership projects worth ₹ 42,300 crores for developing berths and terminals across the major ports till 2024-25.

The shipping ministry is identifying new road alignments, up-gradation of existing roads and new rail projects to manage the sizeable freight traffic demand for future. We sincerely hope these projects get implemented at the earliest.

OPPI secretariat had informed all members regarding the arrangements done with Tibro for visit to K-2022 as early as January 2022. However a large number of members are not able to visit K-2022 in view of long waiting period for Schengen Visas. If any member requires any information from an exhibitor in K-2022 OPPI Secretariat will be happy to assist. The concerned members may contact Mr. Deepak Lawale in this regard.

With Best Wishes,

Mahendra Sanghvi
President

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Editor: **DEEPAK LAWALE**

OPP
Organization Of
Plastics Processors Of India

ORGANIZATION OF PLASTICS PROCESSORS OF INDIA

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Deepak Lawale, Secretary General
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OPP

Organization Of
Plastics Processors Of India

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With the fast changing business environment and the growing competitive world, it becomes important for all those connected with the Plastics Industry to increase the visibility of their activities.

Organization of Plastics Processors of India will be publishing Membership Directory 2023. The directory will be distributed to all OPPI members, Plastic Associations in India, Major Chambers of Commerce and Industry/Industry Associations in India and abroad, Trade Promotion Organizations, Financial Institutions and Diplomatic Missions.

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ORGANIZATION OF PLASTICS PROCESSORS OF INDIA

OPPI DIRECTORY – 2023

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2	Full Page B/W	Rs.12,000/-	US$ 250
3	Book Marks (4. Nos.)	Rs. 30,000/-	US $ 1000
4	Multi-Coloured Wrapper Strip (44 cms. length X 10 cms. Width	Rs. 20,000/-	US$ 640

GST @ 18% will be applicable

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Account Number	**415010100006330**
I.F.S.C Code for the Branch	**UTIB0000415**
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CALENDAR FOR 2022- 2023

Organization of Plastics Processors of India

Vietnam Plas 2022
23rd to 26th November 2022
Saigon Exhibition Center,
Vietnam

Myanmar PlasPrintPack 2022
9th to12th December 2022Yangon
Convention Center (YCC)
Myanmar

IPF Bangladesh 2023
22nd to 25th February 2023
International Convention City
Bashundhara

OMAN PLAST 2023
29th to 31st May 2023
Oman Convention & Exhibition
Center

Hanoi Plas 2023
8th to11th June 2023
ICE, HANOI VIETNAM

Plexconnect 2023
15th to 17th June 2023
NESCO, Mumbai

Contact:Deepak Lawale, Secretary General,
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NEWS FROM INDIA

Shri Arun Baroka Takes Over as Secretary, Department of Chemicals & Petrochemicals

Shri Arun Baroka has taken over as Secretary, Department of Chemicals & Petrochemicals.

Shri Arun Baroka is 1990 batch IAS officer of Union Territories cadre.

Shri Arun Baroka belongs to Haryana.

Since June 2016 he is on Central Deputation. He is B-Tech in Electrical Engineering and Post Graduation in Marketing Management.

Earlier Shri Arun Baroka was Special Secretary in the Ministry of Jal Shakti.

Reliance to Invest Rs 75,000 Crore in O2C Business

Over the next 5 years, Reliance Industries Limited (RIL) will invest Rs. 75,000 crore and expand capacities in existing and new value chains in O2C (Oil to Chemicals) business, stated Mr. Mukesh D. Ambani, Chairman & Managing Director, Reliance Industries Limited (RIL) while speaking at the 45th Annual General Meeting (Post-IPO).

“We are committed to maximize Oil to Chemicals integration and convert our advantageous feedstock streams to high-value chemicals and green materials, commented Mr. Ambani.

"First, in the Polyester value chain, we will build one of the worlds' largest single - train PTA plants of 3 MMTPA capacity at Dahej. We will also invest in a 1 MMTPA PET plant at Dahej. Both PTA and PET will be targeted for completion by 2026. We will also reinvest in Polyester Filament Yarn (PFY) and Polyester Staple Fibre (PSF). Polyester expansion with a capacity of over 1 MMTPA will be completed in phases by 2026," said Mr. Ambani.

"Second, in the Vinyl chain, we will more than triple our existing capacity by adding world-scale plants at Dahej and Jamnagar in India, and also in the UAE. We will aim to complete 1.5 MMTPA of feedstock integrated PVC expansion at Dahej and Jamnagar in phases by 2026. We will also add capacities to make EDC and PVC at Ruwais, in the UAE, as part of Ta'ziz Chemical Zone. The joint venture with ADNOC and ADQ will target the full domestic demand of the region. With these expansions, Reliance will rank among the Top 5 producers of PVC globally," commented Mr. Mukesh Ambani.

"Third, consistent with our vision for New Materials, we will build in phases India's first and one of the world's largest Carbon Fibre plants at Hazira with a capacity of 20,000 MTPA, based on Acrylonitrile feedstock. We will commence Acrylonitrile production next year and aim to complete the first phase of the carbon fibre plant in 2025," added Mr. Ambani.

"We will further integrate our composites business with Carbon Fibre to produce Carbon Fibre composites. Besides other applications, Carbon Fibre composites are also used to

meet the rapidly growing light-weight requirements of Mobility and Renewable Energy. Thus, Carbon Fibre promises to be a multi decade growth engine for O2C," said Mr. Ambani.

" We will strengthen our leadership position in PET recycling by more than doubling our bottle recycling capacity to 5 billion bottles a year " Mr. Mukesh Ambani said.

Reliance has commenced its journey to become net carbon zero by 2035 with a set of concrete actions. The company has extensively started consuming biomass as fuel to produce green energy at scale. Within a span of just one year, the company has replaced almost 5 percent of energy consumption at its Dahej and Hazira sites by green power and green steam.

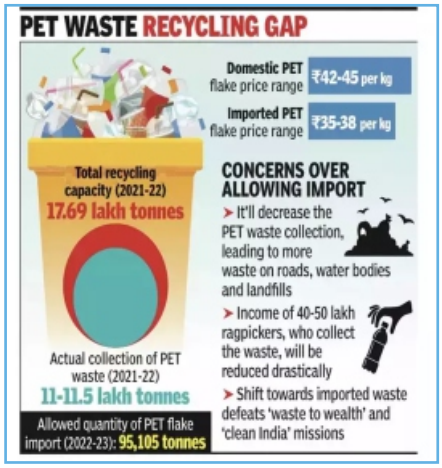
Government Allows Import of 95k Tonnes of PET Flakes.

NEW DELHI: After partially lifting the ban on import of plastic waste a few months back, the government has now finally allowed recyclers to import 95, 105 tonnes of PET flakes to feed their plants even as domestic waste collectors and environmentalists express concerns saying the move will actually dilute India's existing policy on dealing with plastic waste causing more littering and pressure on landfills.

PET (Polyethylene Terephthalate) bottles are a category of single-use plastic of which nearly 90% of the domestic supply is already recycled. The government had in 2019 imposed a ban on its import as an attempt to promote domestic waste collection and encourage recyclers to use plastic waste available within the country. The move was then seen as being supportive of rag - pickers as well as recycling industries.

The three-year ban was, however, partially lifted in March, allowing only PET flakes to be imported. Since the import was opposed by many stakeholders, including Recycle India Foundation and Mumbai-based Pandit Deendayal Upadhyay Smiriti Manch (PDUSM), the issue was referred by the environment ministry to a technical review committee which has now recommended import with certain specific conditions. The ministry accepted the recommendations, allowing import of 95,105 tonnes of PET flakes, on August 24. The committee argued that the decision kept in mind the need for sustaining a robust recycling chain to balance adequate availability of waste PET to recyclers. It also flagged that the recycling sector acts as an anchor for the collection agents, and without a robust recycling sector, the collection effort cannot be sustained.

Environmentalists and other stakeholders, however, don't buy this argument. "The move to allow import of PET waste dilutes the existing policy for plastic waste. Almost all the PET bottles in India are recycled to make polyester fibres. Polyester (textile) waste is not considered as plastic waste when it reaches the end of its life. So we are essentially talking about pushing plastic waste into the textile waste stream with zero accounting and accountability," said Siddharth G Singh, programme manager, Centre for Science and Environment (CSE).



Moreover, Singh apprehended, the plastic waste recyclers, who are the only stakeholders authorised to issue Extended Producer Responsibility (EPR) certificates, will now be able to issue certificates to companies without actually collecting PET waste that is generated within the country.

Before recommending import of PET flakes only (and not waste PET bottles) with certain conditions, the technical review committee (TRC) of the ministry claimed to have deliberated on the issue in detail and heard views of representatives from Recycle India Foundation (RIF), All India Recycled Fibre & Yarn Manufacturers Association (AIRFYMA) and the PDUSM. Raising their broader concerns, these organisations flagged that the decision to allow import will result in lower requirement of local PET waste. It'll adversely impact the livelihood of 40-50 lakh rag - pickers across the

country as they are dependant on PET bottle waste as their primary source of income.

The stakeholders also claimed that the ban on import of PET flakes and PET bottle waste had helped India achieve 85 - 90% recycling rate for PET, which is one of the highest in the world. They apprehended that the recycling rate will now be reduced significantly due import of PET flakes. They also argued that the move will affect 'clean India' mission as the locally generated waste will not be collected as the recyclers will shift towards imported waste. Besides looking at these concerns, the TRC also deliberated on recyclers' concerns who claimed that the domestic PET consumption and collection had suffered a serious setback in 2020-21 on account of covid, resulting in significantly falling down the capacity utilization of recyclers.

The committee in its recommendation to the ministry noted that the recycling sector acts as an anchor for the collection agents, and without a robust recycling sector, the collection effort cannot be sustained. “At the same time, unbridled imports shall certainly adversely affect domestic collection,” it said while expressing the need to arrive at a solution so that neither domestic collection, nor capacity utilization are hampered.

The TRC finally recommended allowing import of PET flakes only subject to following five conditions:

- A unit should be eligible for import only if it has used domestic waste to the extent of at least 70% of the capacity in the previous year (e.g production of 2021-22 to be considered for 2022 - 23 permissions).
- The imports for the year 2022-23 should be restricted to 20% of the production in the year 2021 - 22 and thereafter, 15% of the actual capacity utilised in the preceding year.
- An additional import up to 10% may be considered against exports of the products.
- Units would be eligible for import after at least one year of production.
- The decision may be reviewed after 1 year for continuation of import of PET flakes. The ministry has accepted these recommendations. Before the ban was imposed in 2019, India recyclers had been importing PET waste / flakes from China and many developed countries including the US, Canada, Germany, Italy and Japan.

(Source: TIMES OF INDIA, MUMBAI– 9th September, 2022)

GAIL Makes Highest Bid for JBF Petro at 1.8k Cr

GAIL has emerged as the highest bidder for JBF Petrochemicals with a Rs. 1,800 - Crore resolution plan that is the best of the three offers received for the bankrupt company at the expiry of the August 30 bid deadline, sources in the know told ET.

GAIL has outbid an ONGC - Indian Oil consortium and the Kolkata - based MCPI, the two other bidders.

ET had first reported on May 27 that seven expressions of interest had been received for JBF Petrochemicals including from Reliance Industries, Lakshmi Mittal HPCL JV, two Jindal companies, Haldia petrochemical group company MCPI, and consortium of ONGC and Indian Oil Corp.

Reliance industries, which was widely expected to bid for the company, has not come up with a concrete offer.

The three bid were opened at a meeting of the company's creditors on Thursday.

GAIL's resolution plan includes an upfront payment to lenders, a fresh infusion of funds into the company to revive its operations and tenuring of part the liabilities into longer- term debt, the sourced said.

As per the law the three final bidders could be allowed one more chance to better their bids.

GAIL and JBF petrochemicals resolutions professional Sundaresh Bhatt did not respond to ET's queries.

JBF Petrochemical owes an IDBI Bank - led group of lenders Rs. 4700 crore. KKR Jupiter Investors is also one of the lenders, though its loan of about Rs. 3000 crore is unsecured.

JBF Petrochemical was admitted for bankruptcy proceedings on January 28.

The lenders had attempted an out - of - court settlement with Reliance Industries in partnership with an asset reconstruction company Assets Care and Reconstruction Enterprise (ACRE)- before the company's admission into insolvency proceedings, but the attempts didn't fructify.

JBF Petrochemical has set up a 1.25 million tonne per annum purified terephthalic acid (PTA) Plant in Mangalore, Karnataka, at an estimated cost of $603.8 million. It is a backward integration project set up in partnership with private equity firm KKR to supply PTA to JBF industry. KKR had originally invested in JBF Industries and had planned to acquire JBF Petrochemical but that deal fell through.

PTA is an industrial chemical used for manufacturing textiles, food - grade plastics and bottles. It is also used as a coating in the paints and steel industries. Given its uses in consumption-driven sectors, it is in high demand.

(Source: THE ECONOMIC TIMES – 3rd September, 2022)

Technip Energies and Apchemi Announce They Have Entered Into a Cooperation Agreement to Commercialize Apchemi's Advanced Plastic Waste to High Quality Pyrolysis Oil Technology, in Conjunction with Technip Energies' Pyrolysis Oil Upgradation and Steam Cracking Technology.

APChemi's patented "Pyromax™" pyrolysis technology for recycling plastic waste closes the gap in the plastic supply chain by taking dirty and mixed plastic waste, including municipal solid waste segregated plastics and multilayer packaging, and breaking it down to produce high quality pyrolysis oil which can be chemically recycled into circular plastics. The process has a lower carbon footprint, as it displaces the need for crude-oil-based feedstocks for plastics manufacturing, while reducing the need for intensive plastic waste sorting.

Technip Energies is closing the circular loop from pyrolysis oil to polyolefins building blocks by bringing its ethylene furnace and steam cracker design expertise, along with the preparation and purification technologies. The Pure.rOil by T.EN™ purification technology ensures safe, reliable and optimized integration with crackers.

Bhaskar Patel, SVP of Sustainable Fuels, Chemicals and Circularity of Technip Energies, commented: "This strategic partnership with APChemi will provide Technip Energies' clients with an additional option in our growing plastic waste-to-olefins solution portfolio setup around our Pure.rOil™ technology. It will help to solve the puzzle of circular economy by offering a waste - to - olefins solution, reducing carbon dioxide emissions and end-of-life plastic pollution. The approach is a way to achieve recycled content targets, while continuing the use of current packaging materials."

Suhas Dixit, CEO of APChemi said: "We offer our full support to Technip Energies for extending this plastic waste to polyolefins solution. Our robust Pyromax™ technology would be an integral part of Technip Energies' efforts to eliminate plastic pollution. This strategic collaboration will help us extend our leadership in pyrolysis technology beyond India. APChemi also intends to utilize this collaboration for building world - class pyrolysis oil manufacturing facilities in India and abroad."

About Technip Energies

Technip Energies is a leading Engineering & Technology company for the energy transition, with leadership positions in Liquefied Natural Gas (LNG), hydrogen and ethylene as well as growing market positions in blue and green hydrogen, sustainable chemistry and CO2 management. The company benefits from its robust project delivery model supported by extensive technology, products and services offering.

Operating in 34 countries, our 15,000 people are fully committed to bringing our client's innovative projects to life, breaking boundaries to accelerate the energy transition for a better tomorrow.

Technip Energies is listed on Euronext Paris with American depositary receipts ("ADRs").

About APChemi:

APChemi Pvt. Ltd. is a leading pyrolysis technology company. APChemi has invented the Pyromax™ technology for production of high quality pyrolysis oil. APChemi has supplied 47 plastic and biomass to oil facilities to date. APChemi has an in - house technology research and product development facility, focusing on the development of sustainable pyrolysis technology for the conversion of plastic waste to oil that can be processed to plastics - Circular Economy, thus furthering the Energy Transition goals.

Green India Polymers Forays into UAE and Africa Markets

Waste recycling company Green India Polymers announced foray into the UAE and Africa markets. The company plans to produce and distribute sustainable PET flakes and PET bottles in these region apart from supplying bottles from Africa and UAE to the recycling centers across Europe and the US.

Commenting on the foray, Amit Mani, Founder & Managing Director of Green India Polymers, said, "Despite its long - term environmental consequences, plastic is an integral part of our day-to-day lives. Until we find a more sustainable replacement for it, it is important to identify and scale up ways to recycle as much plastic as possible. We would be happy to play a role in reducing plastic footprint from these regions to enhance the quality of life for people."

Launched in 2018, Green India Polymers is a leading exporter of PET flakes and PET Granules to countries like US, Canada, Mexico, Germany, South Africa, and the Middle East. The company has clients in over 15 geographies.

Tamilnadu Petroproducts Improves Revenue and Operating Profits

Tamilnadu Petroproducts Limited (TPL), Chennai based Petrochemical manufacturing company and part of AM International – Singapore, has announced its first quarter results for FY2023. TPL posted an increase of about 28 percent in its revenue in Q1 FY 22-23 over the preceding quarter and EBIDTA lower by 6 percent. Increase of crude oil price impacted the cost of Raw materials and Power & Fuel, which resulted in an increase of Total Expenses of about 30 percent in Q1 FY 22 - 23 over the preceding quarter. In comparison to the last quarter of the previous year, PBT and PAT for the quarter are higher by about 11 percent and 16 percent.

Ashwin Muthiah, Vice Chairman TPL and Founder Chairman, AM International, Singapore comments, “In spite of the current geopolitical volatility and resultant hike in input costs, TPL has been able to demonstrate revenue growth. We are committed to serving our customers with minimum disruption with a value - added approach. As a company, we remain focused on working towards carbon neutrality and introducing eco - friendly technology and processes in our manufacturing plants”.

Avro India Announces to Use Recycled Polymers

In a regulatory filing, Avro India announced that it is pioneering the use of 'regenerated' polymers as against the use of 'virgin' polymers which is the major raw material for the usage of plastic moulded furniture.

The step is estimated to save 2.5 kg of greenhouse gasses for each kilogram of regenerated plastic and contribute toward climate change, the filing added.

The company is working towards the new business model by collecting, upcycling and making final products of HDPE, LDPE and PP plastic which are some of the highest used plastics in India for self - consumption and commercial sale.

According to the filing, the company has used in - house innovation, started using plastic waste and has crossed 300 metric tonnes (MT) of regenerated polymer manufacturing by outsourcing in the first quarter of the financial year 2022 - 23.

It intends to gradually scale to 500 MT per month in FY23. The plan is to meet major annual requirements of polymers during the financial year 2022-23 by regeneration.

The move is likely to contribute significantly to its financial performance as the cost of raw material will decrease and the company will be able to improve its profit margin and bottomline in the coming fiscal years.

Advent Backed Manjushree Technopack Acquires Hitesh Plastics

Manjushree Technopack , manufacturers of rigid plastic backed by Advent International has acquired Bangalore based Hitesh Plastics. According to the Agreement MTL will acquire the business operation and manufacturing facilities of Hitesh Plastics.

Hitesh Plastics processes over 1200 tons of PP and PE annually to produce over 10 billion CSD, Hot - Fill, Warm Fill and Amul closures. It is a major supplier to PepsiCo, Tata - Himalayan, Amul and others.

Asahi Kasei to Present New Concept Car AKXY2 At K 2022 – Diversified Material Solutions for a More Sustainable and Comfortable Mobility

- Asahi Kasei's AKXY2 combines technology across its diverse businesses and will make its European debut at K 2022 (Hall 8a, Booth E23).

- A wide range of solutions for EVs will be on display, from polycarbonates that use CO2 as a raw material for its production to premium Dinamica® and innovative particle foam.

- An array of proprietary cellulose materials will be on display, including filler materials for plastics, additives for rubber and premium high - performance wipers.

Asahi Kasei, a diversified Japanese multinational company, will present its newest concept car AKXY2 for the first time in Europe at K 2022 from October 19-26 in Düsseldorf, Germany (Hall 8a, Booth E23). Utilizing a broad variety of materials and technologies, the vehicle showcases the company's cross - divisional expertise throughout the entire value chain. Other highlights at this year's booth will be innovative particle foams, bio-based filler materials and sustainable engineering plastics.

AKXY2 made its debut on May 25, 2022 in line with Asahi Kasei's 100th anniversary. It demonstrates how the company applies expertise across throughout the entire value chain, from raw materials and production technologies to the usage of recycled and recyclable materials. Virtually everything that can be seen, touched or felt in the vehicle is either manufactured or co-developed by Asahi Kasei. The car features technology that touches the senses, improves safety and ensures the highest functionality while proposing solutions to reduce the environmental impact of automobiles.

All windows are made of outsourced hard - coated polycarbonate through a manufacturing method developed by Asahi Kasei in 2002 that uses CO2 as a raw material for its production. Today, 15% of the global polycarbonate production uses this production technology. To enable polycarbonate for applications in automotive windshields, Asahi Kasei is currently developing a hard - coatin technology that equips polycarbonate with a UNECE R43*[1] compliant resistance to abrasion and weatherability. Replacing glass with this polycarbonate will significantly reduce vehicle weight and extend EV driving range.

The interior surfaces are covered by Dinamica®, a premium microfiber resembling suede partially made of recycled polyester - manufactured by Miko, an Italian subsidiary of Asahi Kasei Group company Sage Automotive Interiors. Sage Automotive Interiors can also provide other more sustainable fabrics utilizing raw materials that range from recycled PET, bio-based PET, natural blends, and ocean waste. An improved lifetime of materials is another way to achieve a greener mobility. All fabrics can be made anti-viral and anti-bacterial, as well as fluid-repellent and stain - resistant.

AZP™, a transparent optical polymer on the interior display features an ultra - low

birefringence[*2] and ensures a perfect screen visibility without rainbow effects. The interior is also featuring light technology, using semi - transparent and backlit fabrics made of PET, but also ultra - thin plastic - optical fibers woven into different surfaces.

Innovative Particle Foams for Battery Cell Holders and Structural Applications

Asahi Kasei will also present its SunForce™ family of innovative particle foams. Based on engineering plastics, all types are processable on standard foam molding equipment and open up new application fields for foams.

SunForce™ BE is based on modified polyphenylene ether (mPPE) and features an unmatched combination of lightweight, UI94 V-0 flame retardance, thin - wall moldability, thermal insulation and processability. At K 2022, Asahi Kasei will display 4680 and 2170 round cell holders made of this material. In this application the material allows for the precise fixation and alignment of round cells without the use of any adhesives. The material is also suitable for battery pack applications for any other kind of cell design like pouch-cells and prismatic cells.

SunForce™ AS is based on polyamide and features the typical properties of this engineering polymer. Its high stiffness and strength make it an ideal material for metal replacement in structural automotive components. This type also has the highest chemical and heat resistant properties in the product family.

Cellulose - Based Materials and Next - Generation Engineering Plastics

Asahi Kasei's expertise in the field of cellulose goes back 90 years to when it first started sales of Cupro fiber with the trade name “Bemberg.” The company is now adapting this know-how to other application fields and developing a cellulose - based nanofiber filler material (CNF). Featuring a substantially higher purity than conventional wood - based cellulose, CNF is derived from cotton - linter, a byproduct of cotton yield. As an alternative to glass fiber, CNF can be used in engineering plastics like polyamide 6, polyamide 66 and polyacetal with a ratio of up to 20wt%.

As a leading Japanese manufacturer of high - performance engineering plastics, Asahi Kasei will also display its LEONA™ SG grades - a family of semi - aromatic polyamides featuring excellent mechanical strength, processability and surface quality – as well as the modified polyphenylene ether XYRON™ for 5G applications. The company will also present the background about its renewable attributed polyacetal and polyphenylene ether at K 2022.

Asahi Kasei will exhibit in Hall 8a, Booth E23.

BASF Launches Thermoplastic Polyurethane Paint Protection Film from RODIM® for Improved Car Paint Protection

- **BASF offers long - term and solid quality assurance with its Thermoplastic Polyurethane Paint Protection Film**
- **Certified as official supplier of paint protection films for FAW-Volkswagen**
- **Now accepting online orders through the RODIM WeChat account and BASF's flagship store on Tmall**

RODIM®, a paint - related product brand of BASF, has launched its new invisible Themoplastic Polyurethane (TPU) Paint Protection Film (PPF) in Asia Pacific. It provides multifaceted and long - lasting protection for automotive coatings.

Car owners can expect to benefit from extra protection with the RODIM TPU PPF. The product has been proven to offer superior resistance against nature's elements, such as high temperature and extended exposure to the sun during an accelerated UV test lasting 3,000 hours. RODIM TPU PPF can effectively protect vehicles from tree sap, bugs, bird droppings, acid rain and more that can leave stains on the surface. Thanks to the use of TPU, the film features excellent

self - healing capability when there are light scratches or scuffs. It is also highly resistant to yellowing. The material is optically transparent enabling automotive surfaces to be preserved flawlessly for an extended period of time

"Due to the surging demand from our customers in China, BASF decided to make a new attempt by launching RODIM TPU PPF to broaden our product range and better serve the aftermarket automotive industry," said Terry Su, Director, Business Management, Automotive Refinish Coatings Solutions Greater China, BASF who underlined the strategic significance of PPF to the company.

The product was officially certified by FAW - Volkswagen in May 2022. RODIM TPU PPF is now supplied to nearly 2,000 Audi and Volkswagen distributors throughout China, which has helped to elevate their brand image and improve end - user satisfaction.

RODIM TPU PPF is available in a variety of thicknesses, colors and finishes including gloss or matte. Customized versions are also available to meet personal preferences.

Pappelina Launches The World's First Plastic Rug Made Of Bio - Attributed PVC BIOVYN™

- Pappelina selects bio-attributed PVC BIOVYN™ for the new bio edition of its iconic VERA design
- Certified by the Roundtable on Sustainable Biomaterials, BIOVYN™ delivers a reduction in carbon footprint of over 90%

Pappelina, the Swedish rug company, is celebrating the 20th anniversary of its iconic VERA design by launching an innovative new bio collection this autumn.

The VERA 2.0 Bio Edition is the world's first plastic rug made with BIOVYN™, the world's first bio - attributed PVC produced by INOVYN.

Certified by the Roundtable on Sustainable Biomaterials (RSB), BIOVYN™ is a next generation PVC made using 100% renewable feedstock, in this case from wood - based tall oil. The innovative product delivers a reduction in carbon footprint of over 90% compared to conventionally produced PVC.

Using BIOVYN™ is a deliberate choice by Pappelina as part of its strategy to move to a more sustainable and conscious portfolio of products.

To deliver its BIOVYN™ based VERA 2.0 Bio Edition collection, Pappelina will source PVC foil from experienced and long - term partner Gislaved Folie AB.

Comments Inna Jeschke, Business Unit Manager Polymers at INOVYN: “It is exciting to see more and more of our customers such as Pappelina using BIOVYN™ to produce new designs with very strong sustainability credentials, including a significantly lower carbon footprint. With its new VERA 2.0 Bio Edition, Pappelina is taking a further step forward in its sustainability journey, contributing to the circular economy.

Borouge's Pipe Solutions were used to Develop the Cooling System of the Barakh Nuclear Enery Plant Reactor

Borouge, a leading provider of innovative and differentiated polyolefin solutions has contributed to the safe and reliable infrastructure of the Barakah Nuclear Energy Plant, through its 'Made in UAE' polyolefin solutions, according to the company's CEO, Hazeem Sultan Al Suwaidi.

In an announcement to the Emirates News Agency (WAM), Al Suwaidi detailed that the polymer grade from Borouge is the first in its class universal beyond North America, premeditated in accord to the American Society of Mechanical Engineers (ASME), to be utilized for safety related channel in a nuclear plant.

The Barakah Nuclear Plant was planned in accordance with the Federal Authority of Nuclear Regulation (FANR) regulations, the international excellence of the International Atomic Energy Agency (IAEA), and other world-wide nuclear energy organizations.

To advance the cooling system at Barakah Plant, pre - compounded polyethylene polymers (PE100) from Borouge were used to produce pressure pipes by Union Pipes Industry, a manufacturer of large diameter pipes, Al Suwaidi said.

Al Suwaidi added that the pressure pipes are essential to the cooling of the nuclear reactors and fuel assemblies. The superior grade made using proprietary Borstar technology from Borealis, is a corrosion and chemical resistant pressure pipe compound, capable of resisting natural disasters, and challenging industrial conditions that vary from elevated levels of impact to abrasions and stress cracking.

Borouge's commitment

The pressure pipes were entirely manufactured in the UAE, demonstrating Borouge's commitment to promoting the country's industrial growth, economic diversification, UAE In - Country Value, and reinforcing the nation's position as a highest manufacturer of high quality and innovative industrial solutions, Al Suwaidi emphasized.

Al Suwaidi said that the team is pleased that Borouge has accomplished through the qualification of its material for critical projects such as the Barakah Nuclear Energy Plant. As a UAE industrial champion, the company considers that this would unlock novel prospects for them and their pre-compounded PE100 piping solutions in both the regional and international nuclear energy industry.

On completion, The Barakah Plant, created by the Emirates Nuclear Energy Corporation (ENEC), would supply enough clean electricity to meet 25 percent of the UAE's electricity requirements and is already the leading source of clean electricity in the region.

Once all four units are operational, the plant will avert 22.4 million tonnes of carbon emissions, the leading cause of climate change per annum.

New Circulenrenew Polymers for Primary Pharmaceutical Packaging Made by Röchling

LyondellBasell (NYSE: LYB), a leader in the global chemical industry, together with Röchling Medical, part of Röchling Group, known for producing high quality, secure medication packaging, have announced a step forward towards their ambition to advance the circular economy. The companies created eye drop containers made by Röchling Medical using CirculenRenew polymers.

LyondellBasell CirculenRenew polymers offer a variety of polypropylene (PP) and polyethylene (HDPE and LDPE) grades that are equivalent to virgin resin quality. LyondellBasell CirculenRenew grades support the use of renewable feedstocks from bio - based sources that are not in competition with food sources.

“We are very proud to work with Röchling Medical on this project. It's the first time we are supplying CirculenRenew grades for a primary pharmaceutical packaging application. This is an important milestone for us which also supports our ambitious goal of producing and marketing 2 million metric tons of recycled and renewable - based polymers by 2030,” says Mathieu Lecomte, marketing manager at LyondellBasell.

LyondellBasell and Röchling have collaborated closely to find the right grade for Röchling's eye drop containers. After several trials, the project team has chosen a Low Density Polyethylene (LDPE) not only because of its high purity, which is necessary for pharmaceutical applications, but also because it was ideal for use in blow molding.

“In such a highly regulated environment as the pharmaceutical industry, driving change towards more sustainable solutions for primary packaging is a challenge, ” says Grit Pasche, Röchling Group's global director quality & regulatory affairs. “Therefore, CirculenRenew was the right choice for us. These renewable - based polymers offer the same properties as fossil - based alternatives in terms of product performance.”

This advancement is possible via the principle of mass balancing. The International Sustainability and Carbon Certification (ISCC) Plus certification provides traceability of the renewable content along the supply chain and verifies that the mass balance accounting follows predefined and transparent rules. Customers can use these certificates to verify compliance with sustainability and traceability requirements. As part of an ISCC Plus certified supply chain, pharma customers are able to actively contribute to promoting sustainability and conserving resources, ultimately reducing the Co2 footprint of their products.

This recent project illustrates how value chain collaboration can lead to innovative solutions with sustainability goals in mind.

Together, LyondellBasell and Röchling are helping to unlock the circular potential of plastics.

WALLBOX Charging Cable Connector Made of Halogen Free Flame-Retardent Polyamide 6 from Lanxess

- Wallbox charging cable connector made of halogen - free flame-retardant polyamide 6 from LANXESS
- Highly flame-retardant
- Excellent tracking resistance
- Easy to process

In addition to their use in battery and electric powertrain applications, technical plastics also have great application potential in the charging infrastructure for electric vehicles. This particularly applies to wall-mounted charging stations. These wallboxes must be very safe because they are used inside buildings such as parking garages or private garages. The selection criteria for the materials from which they are made are correspondingly strict. One plastic that meets the high requirements is the halogen - free flame - retardant Durethan BKV20FN01 from LANXESS. The polyamide 6 compound is used to make charging cable connectors manufactured by Leopold Kostal GmbH & Co. KG, a global system supplier of automotive, industrial and solar electrics as well as electrical contact systems. The charging cable connectors are used in Kostal's own Enector wallboxes, which are distributed via Kostal Solar Electric, as well as in wallboxes from a leading German producer of industrial connector systems and charging solutions for electromobility.

High Glow - Wire Resistance

"The key arguments for using our material in this application were its high tracking resistance and high flame-retardance based on the halogen - free flame retardant package. It is also easy to process and produces components with a high surface quality," explains Dr. Bernhard Helbich, Technical Marketing Manager Key Accounts at LANXESS. The compound's level of flame - retardance is demonstrated by the UL 94 flammability test of the US Underwriters Laboratories Inc. testing organization. The polyamide passes the test with the top classification of V-0 at a test specimen thickness of 0.75 millimeters. Because wallboxes come under "unattended household appliances", the plastics used must comply with the international standard IEC/EN 60335-1. In particular, they must prove that they are flame - retardant in glow - wire testing. Durethan BKV20FN01 passes the GWIT test (Glow Wire Ignition Temperature, IEC 60695-2-13) at 775 °C with test specimen thicknesses of 0.75 millimeter and above. In the GWFI test (Glow Wire Flammability Index, IEC 60695-2-12), the thermoplastic achieves the top value for plastics of 960 °C (0.75 millimeter test specimen thickness).

Reduced Risk of Short Circuits and Equipment Defects

Strength of the material is its high tracking resistance. For example, it achieves the top rating of 600 in the CTI A test (Comparative Tracking Index, IEC 60112) and the top value of PLC 0 (Performance Level Category) in the similarly designed UL 746 test. "This reduces the risk of short circuits and defects caused by creepage currents in the wallbox. In addition, the electrical and electronic assemblies can be designed more compactly, resulting in a smaller device overall with higher power density," Helbich explains.

The compound, which is reinforced with 18% short glass fibers by weight, also has good strength, stiffness and toughness. The charging cable connector systems are therefore not susceptible to mechanical loads, particularly during assembly. The polyamide can also be economically processed in a stable injection molding process.

Trelleborg Launches Low Friction Lightweight Thermoplastic Composite Bearing

Trelleborg Sealing Solutions launches its latest lightweight thermoplastic composite bearing, the HiMod® Advanced Composite Bearing Plus, an enhanced dual - layer bearing with a low - friction modified PEEK layer that reduces friction and

increases wear performance for use in bearing, wear ring, and bushing applications.

Manufactured using Trelleborg's patented Automated Fiber Placement (AFP) technology, a thin low friction liner is bonded to the inner diameters and can be added to the outer diameters of the bearing to create a high-quality solution for use in a wide range of industries. HiMod® Advanced Composite Bearing Plus will not seize or gall, unlike metal bearings, to reduce the likelihood of pump damage in chemical processing applications, has a low coefficient of friction, and can withstand extreme temperature ranges.

Reid Hislop, Product Manager at Trelleborg Sealing Solutions, says: "Thermoplastic bearings offer high durability and toughness for demanding applications. The addition of a low - friction layer within our HiMod® Advanced Composite Bearing Plus provides up to 50% less sliding friction than with standard bearings, to increase performance and prevent damage to hardware components.

"These unique bearings can operate from an extremely low temperate of -156 OC to +274 OC / -250 OF to +525 OF and are capable of continuous service even when wet, with nearly zero water absorption. Unlike other non - metal bearings, these do not crack or swell in extreme conditions making them a reliable choice for a wide range of applications."

Trelleborg's AFP technology is part of a special continuous-fiber thermoplastic composite manufacturing process, which uses pre - impregnated unidirectional composite tapes to produce strong, light - weight composite bearings and other components. The manufacturing process utilizes In - Situ Consolidated (ISC) technology that requires no autoclave or other post processes to eliminate fiber wrinkling and offer an unlimited choice of fiber angles. Components are rapidly formed by a melt - bond process, which removes the need for adhesives, fasteners, or welding. ISC technology enables the bonding of different materials which can result in the creation of new, hybrid structures.

Hislop, continues: "Our low-friction PEEK liner doubles as a highly impermeable sealing surface to provide wide chemical compatibility including solvents and environmental contaminants, and unlike traditional thermoset composites, thermoplastic composites can be recycled at the end - of - life."

Trelleborg showcased its new HiMod® Advanced Composite Bearing Plus at Achema, in Frankfurt, Germany, on stand number C62 in Hall 8, from August 22 to 26, 2022. During the five - day event, attendees also learnt about Trelleborg's specialist technologies, with technical experts on hand to discuss individual application requirements.

The Benefits of Using Plastic Parts in Aerospace Applications

As new types of high - strength, high - quality plastics and polymers are developed, the use of plastic parts in aerospace applications continues to rise. While metal materials are still required in many situations, plastics are often used to make aircraft more lightweight while allowing for significant cost savings. A range of plastics is available for use in various aerospace applications, offering unique properties and benefits for this demanding sector.

Driving Efficiency in Aerospace

In recent years, plastic parts have replaced both metal and glass in many aerospace applications. Some of these applications include:

Aftermarket Components

Using plastic enables aerospace manufacturers to complete large, cost-effective production runs of replacement parts. Maintenance personnel can easily access a wide range of standardized aftermarket components from approved distributors. These plastic aerospace parts are fabricated from CAD designs, which can be easily shared by OEMs.

Aircraft Interiors

Plastics have replaced aluminum as a more affordable, more lightweight material option, useful for both the interior design and functionality of airplane cabins. Plastic can be used for everything from overhead luggage storage compartments to ductwork and to ventilation fan rotors. This can allow for a significant reduction in aircraft weight, improving fuel efficiency and creating additional cargo capacity.

Thermoplastics

Aircraft bodies traditionally contain thousands of metal - based structural components that can add significant weight and expense to the final aircraft. As aerospace manufacturers continue to modernize existing aircraft and development new, more efficient designs, thermoplastics are increasingly being used to replace metal brackets and other components in airframes.

Limitations of Plastics in Aerospace Applications

Although the use of plastic in aerospace applications has increased fourfold since the 1970s, the material still has certain limitations. One of the most notable problems is the low conductivity of plastic. Aircraft are at risk of lightning strikes, and must be able to absorb strikes without risk of critical failure. Plastic fuselages cannot offer this benefit unless they are supplemented with aluminum or copper coverings.

Plus, the longevity of plastics is still being explored in many aerospace applications, as some types of plastic are subject to deformation or may become brittle throughout extended service life. Therefore, it's crucial for aerospace manufacturers and MRO departments to understand the fatigue limits of the materials they choose.

The Future of Aerospace

Despite these limitations, there is little doubt that plastic use will continue to see steady growth in the aerospace sector. While aluminum alloys can often be created to achieve certain properties, plastic can do so much more cost - effectively.

The flexibility and customizable nature of plastics make them especially useful for demanding applications in the aerospace sector. Plastics can even be developed with specific properties in mind, such as thermal resistance, shock resistance, chemical resistance, high strength - to - weight ratio, flame retardancy, and low smoke and toxicity.

Berry Produces Lightweight Pack Solution for Cream Spreads

Berry has provided its EasySnacking™ on - the - go packaging solution for one of Croatia's most popular cream spread brands, ensuring at the same time that the pack meets the customer's sustainability requirements.

Podravka's Lino Lada is a top seller in its home market and the rest of the Adria region thanks to the company's continued product development. The new on - the - go variants for two of its products, Lino Lada Gold and Lino Lada Duo, both delicious chocolate - hazelnut cream spreads, were designed to meet consumer demand, as Maja Pezelj Stunja, Brand Manager at Podravka, explained:

"Following the rising trend of on - the - go products, we decided to offer our most popular flavours, Lino Lada Gold and Lino Lada Duo, as on - the - go options. Now, we have successfully launched a very appealing solution that gives consumers an easy way to enjoy our spreads whenever and wherever they like. It is an example of how Podravka achieves growth by continuing to add new products, flavours and packaging solutions to the Lino Lada product family."

Appealing solution through partnership

Berry has a long - standing track record as Podravka's packaging partner during which time the two companies have developed several successful projects together. Berry was therefore an obvious choice for Podravka's on-the - go solution.

"Our goal was to find a practical lightweight packaging solution made with as little material as possible," said Renata Tomerlin. "We found a perfect match in EasySnacking™ by Berry with an integral wooden spoon. It is, above all, practical and in line with our sustainability plans and need for packaging that is easy to recycle. Further, it has first - class image quality with in - mould labelling on the base and a PP self - adhesive label on top of the lid.

"We find Berry to be a reliable partner and great supplier of innovative packaging solutions taking sustainability into account," she continued. "We appreciate that they offer tailor - made solutions, react quickly to our demands, and are good collaborators."

Great market response

The market's response to the new packaging in Croatia is very positive and Podravka is highly optimistic about the prospects for its on - the - go products in the Adria markets, as well as in Western and Central Europe.

Lino Lada cream spread was first launched in 1998. Today, the product range includes five varieties: duo, milk, nougat, coconut, and Gold. All five work wonderfully well as delicious spreads on bread, but are also treats as fillings in pancakes, ingredients in cakes, toppings for ice cream, or simply as confectionery.

Coveris Introduces Next Generation, Sustainable Dairy Packaging at Fachpack 2022: Recyclable with Reduced Plastic

With several successful product launches now in the UK Coveris brings its latest dairy packaging developments to one of Europe's leading packaging events, FachPack 2022 in Nuremberg, Germany. Supporting market demands for sustainability, weight reduction, visual appeal and shelf- life protection, Coveris offers the show's visitors a complete range of packaging materials, from barrier films to pre - made packs, peelable to re - closable lidding films, thermoforming films and many more.

“Our mission is to deliver major sustainable benefits in line with customers' sustainable commitments as well as our own plastic and food waste reduction targets. That is why we offer real innovation with no downsides to freshness or performance for technically challenging, extended shelf - life products”, explained Eric Valette, BU Innovation Director at Coveris.

Fighting both food and packaging waste

Traditionally grated cheese has been packaged in mixed, nylon laminate pouches - one of the hardest to recyclable materials. Driven by Coveris' unrivalled R&D capabilities across extrusion, film and food science and conversion, it has developed a first - of - its - kind reduced plastic, recyclable PE barrier monolaminate for cheese under its leading MonoFlexBE brand.

Having launched with several leading retailers in the UK, including Tescos and Iceland, the packs offer significant material savings per pack. Most recently the lightweight packs have helped support Iceland's commitment to become the UK's first plastic - neutral supermarket with a total plastic weight saving of around 7 tonnes per annum, whilst 41 tonnes of plastic are now easily recyclable. A similar project was launched earlier with Tesco supermarkets in the UK, where Coveris helped deliver a total plastic weight saving of 32 tonnes.

Visitors at FachPack 2022 can also experience first - hand the benefits of Coveris reclosable and peelable films. Using PE, PP or PET co-ex films offers the same high - quality product protection, while increasing the consumer convenience and pack functionality thanks to burst peel layer and reclose options (up to 10 times).

Delivering tailor - made solutions

Another breakthrough in the dairy market presented at FachPack is a yoghurt die - cut lid film made of polypropylene. By replacing the standard aluminium foil, the lid can finally be recycled in the same stream as the rest of the yoghurt cup, increasing the recycling rate. What is more, this recyclable alternative offers the same barrier properties required by typical yoghurt films, is temperature - resistant, and ensures that the posts can be stacked and transported in a safe and stable way. As a result, the change from aluminum foil to polypropylene film does not affect the shelf life of the yoghurt cup while offering many sustainable benefits.

A major advantage for dairy brands is also the support of a network of industry - leading analytical R&D centers and labs, including its Food Science Lab in the UK and Film Science Lab network across the UK and Europe. Offering onsite analysis, testing and development, they also offer validation of mechanical and seal performance for all products. As a result, cheese brands can customise their solutions to answer both their customers' needs for enhanced convenience for opening and reclosing and reduced plastic use and ensure their performance in-line and on - shelf. Additionally, Coveris' wide team of experts is available both locally and regionally for training and everyday customer support.

"At Coveris we listen carefully to the needs of our dairy customers and use our long experience and unrivaled capabilities to provide optimal packaging solutions. As a result, we are proud to be the first to market grated cheese in the UK in fully recyclable and lightweight packs and hope to promote this technology in European stores as well", said Katja Killian, Sales Director Food at Coveris.

Sound TPE Solution for Hearing Aid Applications by Kraiburg

THERMOLAST® H - adherence to safety standards

KRAIBURG TPE's breakthrough THERMOLAST® H is the ideal material solution for healthcare and medical applications as well as hearing devices. TPE compounds can be easily processed by over molding or co-extrusion with most common thermoplastics, without requiring additional adhesives, and allowing for a faster and more cost - effective processing. The compound meets worldwide material requirements such as cytotoxicity according to ISO 10993-5, GB/T 16886.5, REACH and RoHS Directive, and are free of PVC, silicon, or latex. It can be sterilized at autoclave 121°C or by EtO.

The connector or TPE sealing will present a clean and sleek feel to the devices, thanks to its haptics and soft touch surface characteristic for outer sealing. Other characteristics of the TPE compounds that display good sealing performance including excellent compression set and resealing properties. They are also available in various hardness range, together with in - house pre - coloring options, subject to specific project requirements.

Additionally, our TPE compounds are customizable in meeting the customer's end needs and requirements.

Sustainability successes of our TPE

Besides the materials for hearing aids application, KRAIBURG TPE's recent sustainability innovations include a specially developed material solution for automotive, consumer, and industry applications comprising post - consumer recycled (PCR) and post - industrial recycled (PIR) content.

Armacell Launches Unique, Non - Combustible Aerogel Insulation Blanket

Armacell, a global leader in energy efficiency, announced today the launch of ArmaGel HTL, a unique, non - combustible aerogel blanket specifically engineered for industrial applications where non-combustibility, thermal performance and corrosion under insulation mitigation are essential.

Armacell's latest innovation repels water, but allows vapour to escape, keeping mechanical equipment drier for longer, and enhancing protection against corrosion under insulation. Plus, the wide choice of 5, 10, and 20 mm thicknesses gives customers more choice and faster installation.

Additionally, ArmaGel HTL is one of the simplest, fastest and most cost - effective means of improving energy efficiency. With its superior thermal performance this aerogel blanket enables an effective global response to climate change.

Liam Douglas, Armacell's Vice President APAC, comments:

" ArmaGel HTL is a gamechanger in the aerogel market. It brings beyond better value for our customers, saving up to 50 percent against comparable competitor aerogel blankets. Our unique solution combines high-temperature aerogel insulation with hydrophobic and corrosion under insulation mitigation properties. We strongly believe this is one of the best performing insulation materials available today".

Armacell creates this ultra-light, high - tech aerogel blanket technology on its new aerogel production line within Armacell's existing Cheonan facility in South Korea. Covering 21,206 square meters of land, the manufacturing facility close to Seoul is an important hub for industry - leading aerogel manufacturing solutions and lies at the heart of Armacell's vision to be the global leader in providing innovative, technical insulation solutions and components to conserve energy and make a difference around the world.

Röchling Expands Portfolio with Sustainable Vacuum Forming Materials for Railway Technology Applications

International plastics processor Röchling Industrial SE & Co. KG is expanding its portfolio of flame - retardant materials for use in railway technology applications with the two sustainable products, Maywoflamm® plus RC and Maywoflamm® NFPA RC. Both products can be manufactured using up to 70 percent recycled material, making it possible to increase sustainability in customer applications.

Interior fittings for rail vehicles: Maywoflamm® plus RC and Maywoflamm® NFPA RC with recycled content are particularly suitable for the manufacturing of deep - drawn seat shells for the railway sector.

Materials used in railway technology applications must meet stringent requirements. Fire protection plays an important role in ensuring the safety of passengers.

Röchling Industrial offers various materials made of thermoplastic and composites that meet such requirements. These include Maywoflamm® brand products, which are used in rail vehicle interior fittings, for instance in interior trim or the manufacture of rear seat shells.

Sustainable products meet fire safety standards

The plastics processor based in Bad Grönenbach in the Allgäu region is now adding two new sustainable products to its portfolio of high - quality plastics for railway technology applications. Both Maywoflamm® plus RC and Maywoflamm® NFPA RC can be produced with up to 70 percent recycled materials. Maywoflamm® plus RC complies with the European railway standard EN 45545 - 2 :2020, classification R6/ HL2; Maywoflamm® NFPA RC is tested according to NFPA 130 and BSS7239: 1988 and can therefore be used in the American region. Both materials are characterized by their low weight compared to metallic materials and their high mechanical strength.

A partner dedicated to the achievement of sustainability goals

“We have defined sustainability as one of the most important strategic areas for the future,” explains Franz Lübbers, CEO of Röchling Industrial. "It is important to us to take responsibility and contribute to a sustainable future. Of course, we have focused on the needs of our customers." The high recycled content helps customers achieve their sustainability goals. The use of high-quality recycled material conserves resources and closes loops.

“With the launch, we are offering our railway sector customers sustainable products that meet the relevant requirements for use in railway technology applications,” says Simon Kathmann, Head of Sales and Marketing at Röchling Industrial Allgäu. “

The Airplus® Bio Home Compostable Film Has Been Added To The Storopack Product Portfolio

Storopack's new air cushion film, AIRplus® BIO Home Compostable, increases the focus on sustainability, as it fulfills the definitions of bioplastics: it is partly bio-based, using the natural and renewable resource starch, and home compostable. The extremely lightweight air cushions not only reduce shipping weight, but also reduce plastic waste by closing the natural cycle. The film is certified by TÜV Austria for home composting and can be disposed of alongside organic waste on home compost heaps. In accordance with the DIN EN 13432 standard, on which the certification is based, at least 90 percent of the film degrades into natural resources within 365 days, leaving no plastics or toxic material behind. Depending on the temperature and microculture of the compost, microbes and heat fully convert the remaining 10 percent as well into carbon dioxide, water, and biomass. The certification ensures that the resulting biomass is plant and worm-friendly. Air cushions made from the innovative organic film boast outstanding packaging characteristics and aredesigned to reliably protect light to medium weight shipping goods.

PLASTIC MACHINERY

Proven, Successful Technology and a New Feeder Line: Coperion and Coperion K-Tron at Powtech 2022

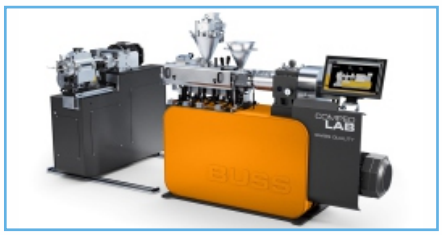
At this year's booth, Coperion is presenting the proven WZK two-way diverter valve that has impressed users for over 60 years with its reliability, serviceability, and versatility for use in a wide variety of applications. Furthermore, Coperion K-Tron is introducing the new ProRate PLUS line of feeders as well as the high-precision K3-V100 vibratory loss - in - weight feeder and the K3 pharma feeder with the P10 sanitary vacuum sequencing receiver. In the open area between Halls 4, 4A and 3A, Coperion will provide another opportunity for attendees to get to know their broad spectrum of rotary and diverter valves by visiting the Coperion Show Van. They will also experience the advantages in safe and economical bulk material handling equipment Coperion has to offer.

60 Years of WZK Two - Way Diverter Valve: Often Copied, Never Equaled

As a highlight at Powtech, Coperion is presenting the proven WZK two - way diverter valve. Thousands of these valves have been used over decades and still to this day, impresses users with its compact and serviceable construction that is suited for a wide variety of applications. It is designed for an operating pressure of up to +5 barg and can be used both for dilute or dense phase conveying lines as well as for gravity pipes. Its aluminum housing with stainless-steel pipe inserts keeps its weight low, making installation easy. To ensure straightforward operation, the diverter valve offers quick access to its internal parts, an advantage not only for maintenance tasks, but also for making cleaning easy.

The gentle deflection angle (+/- 35°) and more even cross section provide gentle product conveying. Moreover, the WZK is equipped with pressure-assisted seals, assuring that the diverter is sealed from one channel to the other as well as to the outside. With its one-of-a - kind construction, the seal adjusts to the conveying pressure with no need for additional utility air. Furthermore, it is suited for use in ATEX zones.

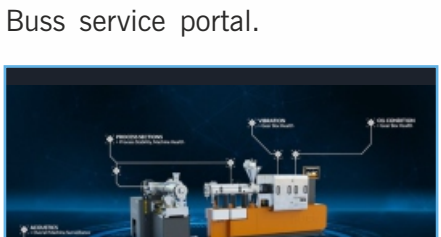
Versatile Co - Kneader for the Lab



At K 2022 Buss will show its new compact, user - friendly Compeo Lab compounder for throughputs of 50 to 100 kg/hr for development, process optimization and small production runs. Bus says it offers all the advantages of the large Compeo co - kneaders, including the combination of two-, three - and four - flight screw elements, and provides precise and reliable scale-up of process parameters to production conditions.

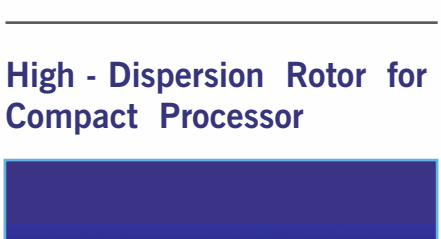
Meantime, Buss will be displaying its new condition - based monitoring service, called

the Sense HUB. Sensors for acquiring process section, vibration data or other metrics indicate the condition of the line at critical points on machines such as kneaders, discharge and dosing units, pelletizers, heaters and coolers. Following data analysis, the user can cal l up the visualized results in the SenseHUB dashboard on the Buss service portal.



This Buss service carries out monitoring, evaluation, and planning of any necessary repair work in direct consultation with the customer. Not limited to the compounding unit of the BUSS co-kneader, the SenseHUB service will be extended to additional sensor data for the evaluation of the machine health, ensuring maximized production uptime.

High - Dispersion Rotor for Compact Processor



Billed as ideal for processing fiber grade, high color carbon black, and color concentrates.

At K 2022, FARREL POMINI will introduce the High - Dispersion (HD) Rotor for use in the company's full line of Compact Processors. Designed specifically for applications requiring high dispersion, this rotor is billed as ideal for processing fiber grade, high color carbon black, and color concentrates.

The HD Rotor is a single stage rotor with an enhanced mixing area in a 10:1 L/D format. In addition to a mixing section that is double the length of the standard FARREL POMINI rotor, the HD rotor includes:

- A new concave feed flight design which increases the conveying efficiency at the infeed of the mixer using high rotor speeds aiding intake of lower bulk density materials.
- Once inside the mixer, the new partial double feed flight design with increasing pitch maximizes throughput rate and allows for even distribution of material over both rotor tips.
- The use of rotor cooling on the new double length mixing section increases the residence time of the material in the semi-molten state. The resulting higher material viscosity increases energy input to maximize dispersive mixing.
- A wider apex region increases material exchange between both rotors which better distributes material in the mixer to increase the homogeneity of the compound.
- New offset blister rings on each rotor with an adjustable dam are used to throttle material from the mixing section, allowing for the adjustment of residence time.
- A pumping section located downstream of the blister ring improves venting performance by efficiently moving material out of the mixer through the orifice.

New Efficient Solution for Simple Feeding Applications: ProRate PLUS Feeder Line

Coperion K - Tron will be introducing a representative of the new ProRate PLUS feeder line at the K show. This new gravimetric feeder line is a dependable, high - performance and efficient solution for feeding pellets and other free - flowing bulk materials in plastics applications, offering a good price - performance ratio as well as short lead times. The ProRate PLUS single screw feeders can be installed as individual units or in groupings of up to six feeders around a single process intake, depending upon the recipe. Its unique design enables very compact, space - saving configuration so that up to six feeders can be grouped together within a radius of 1.5 meters around one extruder intake. The three feeder models — PLUS -S , PLUS-M and PLUS L — cover a broad spectrum of feeder performance. Depending upon the material, the ProRate PLUS feeder can achieve rates of 3.3 to up to 4800 dm3/h. This line

of feeders distinguishes itself with simple assembly and easy access for cleaning and servicing purposes.

Broad Product Portfolio for Appropriate Feeding Solutions

Along with the ProRate PLUS line, Coperion K-Tron will be showing two more representatives from their broad product portfolio. The extremely precise K3-CL-SFS-V100 vibratory loss - in - weight feeder with a one-of-a-kind, patent-pending drive system and an advanced control unit achieves a level of precision that is 35% higher on average than that of conventional models. Vi-bratory feeders are ideal for gentle handling of a variety of materials, including brittle, abrasive materials, products with irregular forms and glass fibers.

For the ever-increasing demands of continuous processes in the pharmaceutical industry, Coperi-on K-Tron is showing its K3-PH-ML-D4-QT20 pharma feeder with the P10 vacuum sequencing sanitary receiver. Thanks to the trapezoid scale shape and significantly smaller footprint, the K3 pharma loss-in-weight feeder line is optimized for multi-feeder clusters around a process inlet. Furthermore, the modular construction simplifies and accelerates cleaning and servicing. The twin screw feeders are available in two sizes, QT20 and QT35. The P-Series vacuum sequencing con - veyors and central receivers are intended for a broad palette of bulk materials and fulfill the strict hygienic requirements of the food and pharmaceutical industries.

Innovative Degassing and Decontamination Technologies for Demanding Recycling Applications – Gneuss Presents New OMNI Recycling Machines

GNEUSS EXTRUSION TECHNOLOGY

New OMNI Recycling Machines for closed loop recycling of PET, PS and polyolefin post - consumer reclaim.

Gneuss' MRS Extrusion Technology has proven itself as an alternative for the reprocessing of contaminated materials like polyester, polystyrene, polypropylene or polyethylenes. In combination with the highly efficient Gneuss Rotary Filtration Systems and optimized vacuum technology, customizable recycling lines tailor - made for a specific material can be engineered. Several Letters of Non Objection (LNOs) from the FDA, EFSA conformity and local approvals in Latin America confirm the decontamination efficiency of the technology. Samples of polypropylene tubs for food applications made with 30 % post consumer PP and PS sheet made from 30 % post consumer PS, processed on Gneuss OMNI Recycling Machines with MRS extruders and RSF*genius* filtration systems, will be shown at K.

OMNI Recycling Machine for post - consumer fiber or thermoform reclaim

Gneuss will show its latest machinery innovations for today's and tomorrow's recycling needs with a complete **OMNI Recycling Machine** featuring a new **3C Rotary Feeder,** an **MRS *jump* 70 extruder,** a fully automatic melt filtration system **RSF*genius* 90** and an **online viscometer VIS**, for the processing of 200 kg/h (450 lbs/h) of undried and uncrystallized polyester (PET) thermoform reclaim.

3C Rotary Feeder

The newly developed 3C Rotary Feeder makes it possible to use low bulk density materials without any external processing steps. A conveyor belt feeds shredded reclaim material into the hopper, where a fast - rotating disc with knives cuts, compacts and pre-conditions the material. The knives add energy into the material and start the heating and degassing process before the material is automatically fed into the MRS*jump* extruder.

MRS*jump*

The MRS extruder is based on conventional single screw technology but is equipped with a multiple screw section for devolatilization. It enables very efficient and gentle decontamination of PET, whilst achieving the requirements for direct food contact standards. The MRS extruder permits the processing of R-PET directly into high quality end products such as packaging sheet, strapping tape or filaments without pre-drying by using a simple and rugged vacuum system. This is achieved by means of its unique and patented processing section. The Multi Rotation Section is a drum containing multiple satellite single screws, driven by a ring gear and pinion transmission.

The satellite screws rotate in the opposite direction to the main screw. This disproportionately increases the surface exchange of the polymer melt. A large opening for venting, exposing the full length of the satellite screws, is completely under vacuum. This provides excellent and unrestricted access to the polymer melt, the surface of which is constantly replaced at an extremely high rate by the action of the satellite screws in the multiple screw section. The surface area – and the surface area exchange rate – available for devolatilization are far greater than in other extrusion systems. As the thermal and mechanical stress on the polymer melt is minimized, PET processed on the MRS extruder has excellent optical and mechanical properties.

The new MRS*jump* has a longer, modified version of the Multi Rotation Section, which ensures both a longer residence time of the material and more surface area exchange under vacuum. The longer Multi Rotation Section, coupled with a powerful vacuum system operating at 1 mbar, can be used to boost the viscosity of R-PET and to hold it at a stable level in spite of variations in the input material. Therefore, there is no need for any liquid phase (LSP) or solid state polymerization (SSP). With the stabilization and/or increase of the intrinsic viscosity in the extrusion process, the MRS*jump* is especially well suited to recycling e.g. PET film waste or fiber reclaim – applications for which direct recycling with one single extrusion step was previously impossible due to low intrinsic viscosity or variable input viscosities. In combination with Gneuss' Rotary Filtration Technology, a high melt purity is guaranteed. Quality assurance can be provided with an online viscometer VIS for measuring melt viscosity.

As demand for PET bottle flakes outpaces supply and processors are looking for alternative feedstock (e.g. to fullfill recycled content mandates) the MRS*jump* offers an excellent solution for PET thermoform, film or fiber recycling, while the newly developed MRS cutter compactor makes it possible to use low bulk density materials. In parallel, with Gneuss' headquarters only about 200 km from the show, a complete PET sheet extrusion line with an OMNImax Recycling Machine – consisting of an MRS*jump* 70, Gneuss' deep vacuum system and a fully-automatic filtration system RSF*genius* 75 – and a sheet downstream with a 500 mm wide extrusion die will be running in Gneuss' technical center open to visitors.

Omni*boost* Recycling Machine Including Polyreactor JUMP

Additionally, an OMNIboost Recycling Machine with a polyreactor JUMP will be operating in Gneuss' technical center for an online demonstration. The JUMP can lift the IV value of a PET melt up to 0.95 dl/g.

In the JUMP the polymer passes over several slow turning elements which create a polymer film, the surface of which is constantly renewed. The reactor vessel is kept under vacuum, through which volatile substances are reliably removed. By regulating the residence time in the reactor, the vacuum, the fill level and the speed of rotation of the agitating devices, the polycondensation reaction can be altered to achieve the required product properties. The JUMP is a robust and reliable liquid state polycondensation system (LSP) and a compact, quick and efficient alternative to conventional solid state systems (SSP). It enables direct reintroduction of the polymer into the production process without the need to remelt the PET.

Gneuss Filtration Technology

Gneuss Filtration Technology will exhibit several different models of their patented Rotary Filtration Systems. These continuous filtration systems are characterized by a filter disk on which the screen cavities are located in a ring pattern. Screens can be changed on the part of the filter disk that is not active in the melt channel, while the production process continues to run without any interruptions or disturbances.

Gneuss' top model, the RSF*genius,* operates with an integrated back - flushing system offering self-cleaning for very demanding applications and highest quality requirements. Screens can be automatically re-used up to 400 times, and filtration finenesses below 10 microns / 1200 mesh are available. There will be an RSF*genius* 250 on display, with an active screen area of 1350 cm2/209 square inches, for throughputs of several thousand kilos per hour, depending on the type of polymer and the filtration fineness.

Retrofitting a fully - automatic RSF*genius* to an existing extrusion line, whether in a pelletizing, sheet, fiber or pipe application, permits the use of more contaminated (and often cheaper) material and / or the use of finer screens. Every retrofit is tailor - made and usually without the need to move any existing equipment.

There will also be an SF*neos* 150 and an SFX*magnus* 90 on display. These models are also continuous, pressure and process constant, but not backflushing, therefore these systems are for applications that don't require self - cleaning. The SF*neos* 150 offers an active filtration area of 450 square centimeters / 70 square inches for applications like foam sheet, battery separator or PVC. The SFX*magnus* 90, with its completely encapsulated design, offers an active filtration area of 350 square centimeters / 54 square inches for applications like PET or BOPP sheet or other sensitive materials.

Gneuss Measurement Technology

Measuring Technology for Extrusion – Flexible, Fast, Safe, Digital.

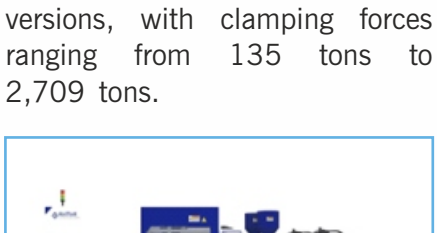
Gneuss provides flexible sensor solutions for pressure and temperature measurements, individually tailored to your application. Abrasion, corrosion, temperature, Gneuss offers the right solution for every challenge.

Gneuss delivers fast. Whether standard sensor or application-specific customized solution. The flexible manufacturing structure allows shortest delivery times. Gneuss creates safety. In addition to standard - compliant pressure monitoring, Gneuss offers the necessary quality assurance of the measuring equipment.

Gneuss is digital. The latest generation of Gneuss sensors and pressure monitors communicates completely digitally. Integrated RFID chips for digital gauge monitoring are available for all sensor models.

Absolute Haitian Rolls Out Second - Injection - Unit Versions of Hybrid IMMS

The servo - hydraulic Mars III and Jupiter III injection molding machines now come in Multi versions, with clamping forces ranging from 135 tons to 2,709 tons.



Absolute Haitian is now offering Multi versions of its servo - hydraulic injection molding machines, the Mars III, shown above, as well as the two-platen Jupiter III presses.

Absolute Haitian is responding to demand for parts that require more than one material or color by once again expanding its Multi portfolio.

The company, which last year began offering multiple - injection - unit versions of its all - electric Zhafir injection molding machines (IMMs), is rolling out the same capability for its Mars III and Jupiter III servo - hydraulic machines.

The new Multi versions range from 135 tons to 596 tons for the Mars III line, and from 843 tons to 2,709 tons for the Jupiter III line, a series of two - platen machines. Shot sizes range from 0.67 ounce to 45.7 ounces on Mars III Multi machines, and from 43.3 ounces to 89.8 ounces on the Jupiter III Multi machines.

The new IMMs leverage Absolute Haitian's experience not only with the Zhafir Multis but with a previous series of multi - component IMMs, the Iapetus. According to the company, the Multi versions of the Mars III and Jupiter III IMMs — known by their shorthand designations as MA III Multi and JU III Multi — are more efficient and offer more configurations and flexibility than the earlier Iapetus IMMs.

Offering general - purpose machines with multi - component capabilities as standard, rather than as custom options, helps customers, according to Frohring.

“It's not so much higher demand than it is a better way to do it,” he said.

Among molders with the greatest need for the capability are makers of automotive parts, Frohring said.

PLASTIC RAW MATERIALS

Evonik is Introducing a New Sustainable High-Performance Plastic to its Eco Product Line

Evonik introduced a new sustainable high - performance plastic to its eCO product line wherein 50 percent of fossil raw materials are replaced by a starting material obtained from chemical recycling of used tires. The production process uses only renewable energy which further reduces the carbon footprint by 42 percent.

The polyamide 12 elastomer (PEBA) VESTAMID® eCO E40, is a thermoplastic elastomer from the polyether block with high quality. VESTAMID® eCO E40 is an immediate alternative with improved eco - balance for the long - established conventional molding compound for sports shoe soles with high resilience. The soles exhibit excellent low-temperature impact strength, chemical resistance, and high elasticity, and are easy to colour, process and over-mold. Like the molding compounds of the VESTAMID® PEBA range, which have proven themselves for more than four decades, they can also be used in other demanding applications, such as in the automotive and medical technology industries, the company added.

Evonik will present VESTAMID® eCO and its other sustainable plastic materials under the motto "Next generation plastic solutions" at this year's K trade show in Düsseldorf.

Sabic Expands Chemically Resistant Lnp™ Crx Portfolio with Four New Sustainable, Thin - Wall Flame Retardant Copolymers for Healthcare and Consumer Electronics

SABIC, a global leader in the chemical industry, has expanded its portfolio of exceptionally chemically resistant LNP™ CRX polycarbonate (PC) copolymer resins with four new grades, featuring sustainability, thin-wall flame retardancy (FR), low-temperature ductility and ultraviolet (UV) stability, well-suited for healthcare and consumer electronics applications. There are two product pairs, each with a bio-based version that can further reduce environmental impacts and help lower carbon footprint. These high - performance materials can help meet customer demands for world - class resistance to chemicals ranging from the harsh disinfectants widely used in healthcare applications to sunscreen and hand creams that often come in contact with consumer electronics devices. The new LNP CRX grades also offer the potential to enhance regulatory compliance and design flexibility.

"SABIC is continuously improving our material families to deliver greater value to our customers, and our new LNP CRX products are excellent examples of this," said Joshua Chiaw, director, Business Management, LNP & NORYL, Specialties, SABIC. "These advanced technologies provide sustainability enhancements, including the incorporation of non - brominated / non - chlorinated flame retardants. They also comply with thin - wall flame retardant ratings, offering the potential to reduce part thickness and raw material usage."

All of these products support the European Union's Directive 2019/2021 under Point D, Annex II of the Ecodesign Regulations for Electronic Displays.

New Solutions for Industry Challenges

For the healthcare industry, the new LNP ELCRES™ CRX7412U copolymer and its bio - based version, LNP ELCRIN™ CRX7412UB copolymer, offer limited biocompatibility according to ISO 10993.[1] They are candidates for replacing incumbent PC, acrylonitrile-butadiene - styrene (ABS) and polyester / co-polyester materials in thin-wall applications such as housings, diagnostic and monitoring devices, and durable medical equipment.

Not only do LNP ELCRES CRX products demonstrate compatibility with the most aggressive disinfectants on the market—alcohols, peroxides and quaternary ammonium compounds — they also deliver excellent mechanical performance, notably a good balance of impact and ductility.

The other two grades, LNP ELCRES CRX7416U copolymer and its bio-based version, LNP ELCRIN CRX7416UB copolymer, are well suited for demanding consumer electronics and mobility applications such as mobile device housings and battery covers. These products can potentially meet stringent requirements for chemical resistance and low temperature ductility (-60°C) better than many competitive materials, including PC/ABS and polycarbonate /polybutylene terephthalate (PC/PBT) blends.

Signature Chemical Resistance

Frequent disinfection of hospital equipment can cause polymers to develop environmental stress cracking (ESC), which can lead to part degradation and failure. Similarly, repeated exposure to sunscreen, skin oils and lotions can cause ESC in smartphone cases and other consumer electronics applications. SABIC's LNP CRX copolymer resins address this problem by delivering improvements in chemical resistance over traditional materials such as PC or impact - modified blends. Using these new materials can help customers extend device life and avoid costly, premature replacement.

The new LNP CRX grades maintain this signature high chemical resistance while adding value through improved thin-wall FR capability. Thin - wall molding is becoming increasingly important in the design of smaller and lighter - weight applications like portable and hand - held medical equipment, as well as tablets, smartphones and wearable electronics. The new grades meet the UL 94 V0 standard at very thin gauges: 1.2 mm for LNP CRX7412U/B copolymers and 1.0 mm for LNP CRX7416U/B copolymers.

Bio - based Grades with ISCC+ Designation

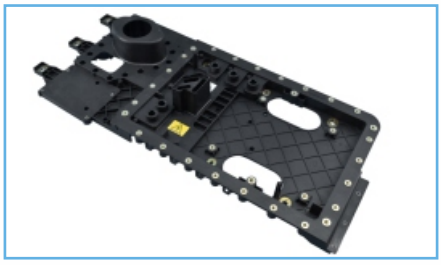
Bio - based LNP ELCRIN CRX copolymer resins help enhance sustainability through the incorporation of renewable feedstock derived from non - fossil waste materials that do not compete with the food chain. This content is compliant with the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)[2] regulation and the Restriction of Hazardous Substances (RoHS)[3] directive.

An internal life cycle analysis conducted in accordance with ISO 14040/14044 protocols revealed LNP ELCRIN CRX7412UB resin can offer reductions in carbon footprint of up to 36 percent when compared to the fossil - based version, LNP ELCRES CRX7412U resin, enabling the bio - based material to earn the International Sustainability and Carbon Certification Plus (ISCC+) designation.

LNP ELCRIN CRX7416UB resin can offer the same reduction in carbon footprint of up to 36 percent for consumer electronics and mobility applications. Critically reviewed SABIC primary data, combined with the latest manufacturing data and industry average estimates, was used in the cradle - to - gate comparison of these resins.

“The plastics industry has long struggled to develop solutions that maintain high chemical resistance with non - brominated / non - chlorinated flame retardants and also offer an improved sustainability footprint,” said Luc Govaerts, technology director, Specialties, SABIC. “Our scientists and engineers have overcome this challenge with the introduction of the new LNP ELCRIN CRX grades, demonstrating a major step forward in the development of advanced material technologies that incorporate bio - based content with outstanding durability. This combination gives customers a broader array of high - performance material solutions for a wide range of applications across multiple industries.

Sabic Launches New Short - Glass Fiber - Filled PP Compounds with Enhanced Performance for Automotive Structural Applications



SABIC has introduced SABIC® PP compound G3430X and SABIC PP compound G3440X grades, two new short - glass fiber - reinforced polypropylene (PP) compounds offering enhanced performance and processing for demanding automotive under - hood, exterior and interior applications. The two advanced grades surpass high - performing standard short - glass fiber materials in melt flow, tensile and flexural strength, and flexural modulus. SABIC PP compound G3430X and G3440X grades give customers new opportunities to raise the performance bar for automotive structural components such as brackets, seat structures and center consoles. Furthermore, thanks to their thin - wall capability, both materials can be used to design parts with lower mass and weight.

“SABIC's world - class development capabilities and dedication to continuous portfolio improvement have yielded these two exceptional materials, which can empower automotive customers to significantly increase the performance of end applications,” said Abdullah Al-Otaibi, general manager, ETP & Market Solutions, SABIC. “The launch of these new SABIC PP compounds is an excellent example of our proactive response to customers' emerging needs. We have set new industry benchmarks for robust performance and thin - wall capabilities in short glass fiber polypropylene, providing critical advantages in the face of escalating automotive requirements.”

Improved performance

SABIC PP compound G3430X grade, with 30 percent short glass fiber, and SABIC PP compound G3440X grade, with 40 percent, deliver superior physical properties vs. conventional short glass fiber PP materials and high melt flow for easy processing. Both grades deliver an excellent balance of stiffness and impact for optimal performance in structural parts, with SABIC PP compound G3440X providing a higher degree of stiffness and greater density than the SABIC PP compound G3430X grade. In addition to offering superior performance compared to other short glass fiber PP compounds, these materials may be candidates for the cost - effective replacement of long glass fiber PP in certain low - temperature applications.

Combined with exceptional stiffness and very good impact properties, the high melt flow of these materials offers opportunities to design thin - wall components to reduce weight without compromising overall part performance.

Besides helping to improve overall performance of the vehicle, reducing weight may also contribute to cost savings through the use of less material. Furthermore, cost benefits can accrue from higher productivity associated with faster cycle times, which can be enabled by higher flow.

Both SABIC PP compounds are available in standard black and natural and can be custom colored.

Creating More Environmentally Friendly, Heat Resistant and Transparent Plastics

Researchers in Japan have developed a new technique for creating polymers. This discovery is expected to lead to the development of plastics that are more environmentally friendly, heat resistant, and transparent.

Previous research, such as that performed by Nobel laureate Giulio Natta's group in the 1960s, created polymers using a technique called asymmetric cationic polymerization. However, their group could not control the molecular weight. Controlling the molecular weight of polymers, especially those used in the engineering of plastics, is important because it affects many of the properties of the plastics. Stiffer - flowing, high molecular weight polymers offer the best performance as they are tougher and more resistant to chemical and environmental damage.

A group that includes Lecturer Mineto Uchiyama and Professor Masami Kamigaito of the Graduate School of Engineering at Nagoya University, and

Professor Kotaro Sato of the Tokyo Institute of Technology, has successfully synthesized optically active polymers with controlled molecular weight. To develop the combination technique of asymmetric living cationic polymerization, they combined two existing techniques: their "living cationic polymerization" and Natta's "asymmetric cationic polymerization." This new technique creates polymers with controlled molecular weight and high optical activity that can be chemically controlled. Their findings are reported in the *Journal of the American Chemical Society.*

Monomers are the building blocks of polymers and come from various sources. To test their new technique, the group started with benzofuran, which can be derived from natural resources and is a precursor of the polymer polybenzofuran. Benzofuran forms rigid polymers with a high glass transition temperature and high transparency. It is also chemically recyclable. Its high glass transition temperature means that the polymer maintains its hard shape, even at extreme temperatures. Therefore, benzofuran is useful for the creation of sustainable transparent thermoplastics.

As Lecturer Uchiyama explains, "Our novel polymerization method could control both the chirality and the molecular weight of polybenzofuran, leading to unique optically active polymer materials with highly controlled structures. This research is expected to lead not only to the development of new precision polymerization reactions but also to the development of new functional polymer materials. Since polybenzofuran has the properties of a highly heat resistant plastic, it is expected to become a new material as a heat resistant resin with optical activity."

Furthermore, Uchiyama sees numerous uses for the compound. "Polybenzofuran has a structure similar to polystyrene, which is one of the main plastics used daily for various products, such as plastic containers, cases, and packaging," he says. "While polybenzofuran is not used as a commercially available plastic, it has a stiffer molecular structure and a higher glass transition temperature than polystyrene. We see it being used as a new plastic with good thermal properties. Furthermore, its unique optical properties could give additional functionalities."

Engineering Enzymes to Help Solve the Planet's Plastic Problem

Researchers from the Manchester Institute of Biotechnology (MIB) have developed a new enzyme engineering platform to improve plastic degrading enzymes through directed evolution.

To illustrate the utility of their platform, they have engineered an enzyme that can successfully degrade poly (ethylene) terephthalate (PET), the plastic commonly used in plastic bottles.

In recent years, the enzymatic recycling of plastics has emerged as an attractive and environmentally friendly strategy to help alleviate the problems associated with plastic waste. Although there are a number of existing methods for recycling plastics, enzymes could potentially offer a more cost - effective and energy efficient alternative. In addition, they could be used to selectively breakdown specific components of mixed plastic waste streams that are currently difficult to recycle using existing technologies.

Although promising as a technology, there are considerable hurdles that need to be overcome for enzymatic plastic recycling to be used widely on a commercial scale. One challenge, for instance, is that natural enzymes with the ability to break down plastics typically are less effective and are unstable under the conditions needed for an industrial - scale process.

To address these limitations, in a paper released today in Nature Catalysis, researchers from The University of Manchester have reported a new enzyme engineering platform that can quickly improve the properties of plastic degrading enzymes to help make them more suitable for plastic recycling at large scales. Their integrated and automated platform can successfully assess the plastic degradation ability of around 1000 enzyme variants per day.

Dr Elizabeth Bell, who led the experimental work at the MIB, says of the platform; “The accumulation of plastic in the environment is a major global challenge. For this reason, we were keen to use our enzyme evolution capabilities to enhance

the properties of plastic degrading enzymes to help alleviate some of these problems. We are hopeful that in the future our scalable platform will allow us to quickly develop new and specific enzymes are suitable for use in large-scale plastic recycling processes."

The accumulation of plastic in the environment is a major global challenge. For this reason, we were keen to use our enzyme evolution capabilities to enhance the properties of plastic degrading enzymes to help alleviate some of these problems. We are hopeful that in the future our scalable platform will allow us to quickly develop new and specific enzymes are suitable for use in large - scale plastic recycling processes.

Dr Elizabeth Bell

To test their platform, they went on to develop a new enzyme, HotPETase, through the directed evolution of IsPETase. IsPETase is a recently discovered enzyme produced by the bacterium Ideonella sakaiensis, which can use PET as a carbon and energy source.

While IsPETase has the natural ability to degrade some semi-crystalline forms of PET, the enzyme is unstable at temperatures above 40°C, far below desirable process conditions. This low stability means that reactions must be run at temperatures below the glass transition temperature of PET (~65°C), which leads to low depolymerisation rates.

To address this limitation, the team developed a thermostable enzyme, HotPETase, which is active at 70°C, which is above the glass transition temperature of PET. This enzyme can depolymerise semi - crystalline PET more rapidly than previously reported enzymes and can selectively deconstruct the PET component of a laminated packaging material, highlighting the selectivity that can be achieved by enzymatic recycling.

Professor Anthony Green, Lecturer in Organic Chemistry, said: "The development of HotPETase nicely illustrates the capabilities of our enzyme engineering platform. We are now excited to work with process engineers and polymer scientists to test our enzyme in real world applications. Moving forward, we are hopeful that our platform will prove useful for developing more efficient, stable, and selective enzymes for recycling a wide range of plastic materials."

The development of robust plastic degrading enzymes such as HotPETase, along with the availability of a versatile enzyme engineering platform, make important contributions towards the development of a biotechnological solution to the plastic waste challenge. To move this promising technology forward will now require a collaborative and multidisciplinary effort involving biotechnologists, process engineers and polymer scientists from across the academic and industrial communities. With the world facing an ever - mounting waste problem, biotechnology could provide an environmentally sustainable solution.

OMU Researchers Create Fumarate from CO2 by Artificial Photosynthesis

Researchers from Osaka Metropolitan University have managed to create fumarate using artificial photosynthesis on pyruvate and CO2. This fumarate can be used to make biodegradable plastic like polybutylene succinate, storing the carbon in a compact, durable, solid form. Currently, most fumarate used to make this plastic is produced from petroleum, so creating fumarate from CO2 and biomass - derived pyruvate is highly desirable.

Professor Yutaka Amao from the Research Center for Artificial Photosynthesis and Mika Takeuchi, a graduate student at the Osaka Metropolitan University Graduate School of Science, used the biocatalyst malate dehydrogenase (oxaloacetate - decarboxylating) to combine CO2 with pyruvate, derived from biomass, to produce L-malic acid. Subsequently, the biocatalyst fumarase was used to dehydrate the L-malic acid to synthesize fumarate.

"The biocatalysts were used to convert Co2 into a raw material for plastic. Based on our results, we will continue to construct better CO2 conversion systems with an even lower environmental impact; we are aiming for more efficient conversion of CO2 into useful substances, using light energy," said Prof Amao.

With this success, the team has already begun researching new methods of artificial photosynthesis with the goal of producing fumarate using light as energy. If this technology can be realized, it will create a new artificial photosynthetic system to synthesize useful macromolecules from CO2.

CIRCULAR ECONOMY/ BIO-PLASTICS/ RECYCLING

NEXTLOOPP Partnering with L'Oréal to Close The Loop on Polypropylene

NEXTLOOPP has welcomed another household name, L'Oréal, to its 47 strong consortium to create food - grade PPristine and INRT-grade recycled polypropylene (rPP) from post-consumer packaging waste.

NEXTLOOPP is an award-winning project launched by Nextek Ltd in October 2020. Its innovative tracer - based sorting trials and recently commenced production trials of food - grade compliant rPP has gone into more than 60 different products from NEXTLOOPP's four grades of Ppristine food compliant and INRT rPP grade resins.

Using a combination of cutting-edge technologies, developed by Nextek Ltd, to first separate food - grade PP from the rest, and then decontaminate the polymer to ensure compliance with food - grade standards in the UK, EU and the USA, NEXTLOOPP is able to identify and sort any number of pack variants from shower gel bottles to yoghurt pots in any plastic type.

Delphine Trillat, Materials Science Domain leader at L'Oréal, said: “We have been working for many years to develop packaging made from high quality post - consumer recycled polymers. Today, we are pleased to join the NEXTLOOPP Project Team in order to join efforts and boost the circular pathway for food - grade rPP packaging, with such a promising technology for the years to come.

Professor Edward Kosior, Founder and CEO of Nextek Ltd and NEXTLOOPP, added: "With L'Oréal joining our dynamic project we believe we have an excellent balance of expertise to drive our groundbreaking project forward. Thanks to L'Oréal's long-term commitment to sustainable packaging, it is the ideal participant to trial our high purity recycled Polypropylene resins. We look forward to closing the PP loop with them.”

This AI - Enabled Robotic Boat Cleans Up Harbors and Rivers to Keep Plastic Trash Out of the Ocean

Millions of tons of plastic trash float down polluted urban rivers and industrial waterways and into the world's oceans every year. Now a Hong Kong - based startup has come up with a solution to help stem these devastating flows of waste.

Open Ocean Engineering has developed Clearbot Neo – a sleek AI - enabled robotic boat that autonomously collects tons of floating garbage that otherwise would wash into the Pacific from the territory's busy harbor.

After a long developmental phase, its creators are planning to scale up and have fleets of Clearbot Neos cleaning up and protecting waters around the globe.

The United Nations estimates that as much as 95% of plastic pollution in the world's seas gets there via 10 major rivers, eight of which are in Asia.

And there are fears that the volume of plastic trash flowing into marine environments could nearly triple by 2040, adding 23 to 37 million metric tons into the oceans per year. That would be equivalent to about 50 kgs of plastic garbage per meter of coastline worldwide.

“If we clean up our rivers and harbors, we are helping to clean up our oceans,” says Clearbot Neo's co-creator Sidhant Gupta.

At just three meters long and pushed along by a solar battery - powered electric motor, the Clearbot Neo systematically moves up and down designated sections of water – much like how a household robot cleaner moves across a living room floor.

Unlike other and much larger marine trash collection solutions that are tackling pollution on the high seas, the compact nature of the Clearbot Neo makes it ideal for harbor, canal and river use.

It skims the surface and scoops up floating trash onto an on - board conveyer belt fitted near its bow between its dual hulls and into a holding bin near its stern.

Clearbot Neo uses AI to recognize and log the types of trash it collects.

It can bring in as much as a metric ton of refuse per day for recycling or disposal. And when fitted with a bespoke boom, it can tackle localized oil and fuel spills by collecting up to 15 liters of pollutant a day.

But this is more than just a simple clean - up machine. It also collects masses of data in the cloud using a two - camera detection system.

One camera surveys the water's surface so the bot can identify rubbish and avoid marine life, navigational hazards and other vessels – making it safe and versatile for river and harbor work.

The second camera photographs each piece of trash that lands on the conveyor belt and transmits its image and GPS location to the company's data compliance system, which is hosted on Microsoft's Azure platform.

When this data is put together with variables, like sea current and tide information, environmentalists and marine authorities have a head start on identifying the sources of the trash. Water quality data is also fed into the cloud.

Computer engineers Gupta and Utkarsh Goel founded their startup and began working on their Clearbot solution shortly after graduating from Hong Kong University in 2019.

Their inspiration came during a trip to the Indonesian vacation island of Bali where they witnessed how local workers would take to the water every day in small boats and even on surfboards to manually fish trash out of the sea to keep the shoreline and beaches safe and clean for tourists.

That got the two partners thinking: How could this slow and cumbersome process be automated?

Gupta and Goel developed a basic aluminum prototype in Bali and upon their return to Hong Kong, upgraded to a fiberglass version. A series of prototypes followed with the sleek Clearbot Neo being the latest model.

The most challenging part of the project was developing an AI model that could detect and identify waste in the water.

"We simply didn't have the computing power available to train, run and test the models," Gupta says. "This is exactly where Azure comes in. We ended up getting an AI for Earth grant from Microsoft in Spring 2020, and over the next year developed the AI model entirely on the Azure platform.

“It took a while because initially we didn't have enough data to reasonably train it, but very quickly we ended up building out a model. We then put it on the robot and started training it for path planning, collecting waste and generating data.”

With the aid of GPS, Clearbot Neo can simultaneously clear the trash and produce a data point for each and every item collected — information that includes location, size, type, material and weight. After every mission, Azure's AI capabilities have already classified the Clearbot Neo's haul and added it to a growing database.

The hard data is actually more valuable than the physical material that is being collected.

Only 20% to 40% of marine plastic waste in Hong Kong's waters can actually be recycled. Most of it is too contaminated or broken down to be usable.

But with Clearbot Neo and Azure, "We're finding out how the trash ends up in the water in the first place," Gupta says. "It adds a lot of transparency to the process of marine clean - up. We generate data about what's actually in the water, what's the make - up of the stuff that's there, how much of it is recyclable and what materials we should be focusing on."

With a wealth of information, Clearbot Neo and its target customers — companies, governments, non - government organizations and individuals — don't need to extrapolate about the scope of the problem in their waters. They can track the origins of marine waste, then tackle pollution at the source.

Recently Sino Group, a Hong Kong property company, acquired a model and will work with the Clearbot team on helping keep a yacht marina clean and testing the technology further. "Sino Group is committed to promoting sustainable living and green operation in the communities it operates and is keen to explore green and sustainable solutions for the property industry," says Andrew Young, who is associate director of the company's innovation department.

"We find the electric - powered Clearbot is a viable solution for the marina at Gold Coast Yacht and Country Club to automate waste collection from the water's surface with its AI and self-navigate function. It is a green solution with no noise or air pollution. So, we are pleased to collaborate with Clearbot by providing the marina as a testbed for the solution.

Toray Invents 100% Bio-Based Adipic Acid from Sugars Derived from Inedible Biomass, Scaling Up for Application to Eco-Friendly Nylon 66

Toray Industries, Inc., announced today that it has developed the world's first 100% bio-based adipic acid, a raw material for nylon 66 (polyamide 66), from sugars derived from inedible biomass. This achievement came from using a proprietary synthesis technique combining the company's microbial fermentation technology and chemical purification technology that harnesses separation membranes.

The company has started to scale up its capabilities in this area. It will test polymerization of nylon 66, develop production technology, conduct market research, and take steps to commercialize applications for this bio - based adipic acid by around 2030.

Nylon 66 has been used for many years in fibers, resins, and other applications due to its exceptionally durable, strong, and rigid properties. Pressures to develop eco-friendly nylon 66 have risen in recent years amid a growing awareness of the need to realize a sustainable society. One challenge is that conventional chemical synthesis for producing adipic acid, the raw material of nylon 66, generates a greenhouse gas called dinitrogen monoxide.

Toray was the first in the world to discover microorganisms that produce an adipic acid intermediate from sugars. The company reconfigured metabolic pathways within microorganisms to enhance production efficiency by applying genetic engineering technology, which artificially recombines genes to streamline synthesis in microorganisms. It also employed bioinformatics technologies to design optimal microbial fermentation pathways for synthesis. Quantity of the intermediate synthesized by microorganisms has increased more than 1,000-fold since the initial discovery, and the efficiency of synthesis has improved dramatically.

Toray is using reverse osmosis separation membranes to concentrate the intermediate in the purification process. This approach is more energy efficient than other methods that do not use these membranes.

This bio-adipic acid production technique is free of dinitrogen monoxide emissions, unlike the manufacturing processes for petroleum - derived adipic acid, and is expected to help combat global warming.

Toray is developing a process for producing sugars from crop residues and other inedible plant

resources. Sugars from this process could be used as raw materials for bio - based adipic acid. Toray would thus be able to create a total supply chain to make chemicals from inedible biomass, helping pave the way to a circular economy.

Toray's achievement is partly attributed to joint research with the National Institute of Advanced Industrial Science and Technology, and RIKEN, Japan's largest comprehensive research institution. That effort is part of two projects that the three partners are undertaking with funding from the New Energy and Industrial Technology Development Organization. The first project is “Development of Production Techniques for Highly Functional Biomaterials Using Plant and Other Organism Smart Cells”, and the second ongoing project is “Development of bio-based production technology to accelerate Carbon Recycling”.

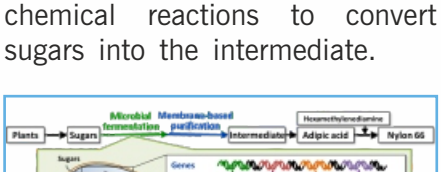
Under the Toray Group Sustainability Vision, the company aims to assist the international community pursue sustainable development by offering innovative technologies and advanced materials solutions. The new bio - adipic acid production technology is part of the Group's drive to become carbon neutral by 2050 and should help the world overcome challenges in achieving circular economy.

Toray will continue to offer solutions through innovative technologies and advanced materials for better, more diverse lifestyles and sustainable societies.

Technology Overview

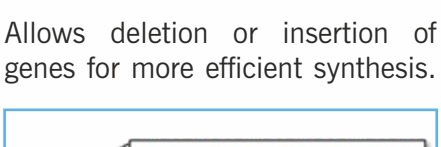
1. Microbial fermentation technology

Enzymes produced from microbial genes carry out chemical reactions to convert sugars into the intermediate.



(1) Genetic recombination technology

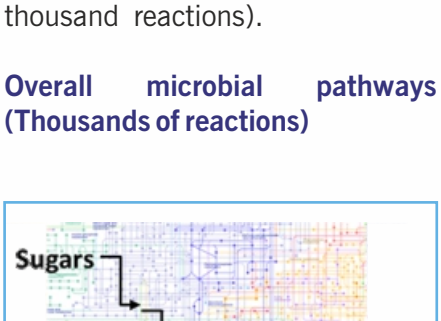
Allows deletion or insertion of genes for more efficient synthesis.



(2) Bioinformatics technology

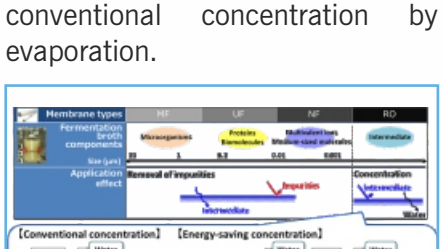
Designing the optimal fermentation pathway by selecting the most efficient chemical reactions from all the available microbial metabolic pathways (consisting of several thousand reactions).

Overall microbial pathways (Thousands of reactions)



2. Chemical purification technology using separation membranes

Microfiltration, ultrafiltration, and Nano filtration membranes separate and remove unwanted components in microbial fermentation broth. Reverse osmosis membranes concentrate intermediates. Use of RO membranes can reduce energy consumption compared to conventional concentration by evaporation.



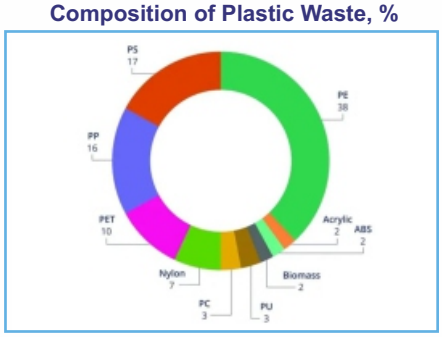
Anellotech Demonstrates New Direct Route to Light Olefins and BTX from Conversion of Mixed Plastic Waste

Anellotech has, for the first time, continuously processed solid, post - consumer plastic waste into light olefins and aromatics using its Plas-TCat catalytic pyrolysis technology. The waste consisted of a mixture of all major plastic types, with the exception of polyvinyl chloride (PVC).

The processing trial took place at Anellotech's TCat-8TM fully automated, 30 m-tall pilot plant near Houston, Texas. That plant's nameplate capacity is 0.5 tons per day, and Plas-TCat's scalable fluidized bed reactor design provides a path to larger commercial production plants capable of addressing substantial global recycling goals

Plas-TCat employs one thermal catalytic reactor to convert a broad range of mixed waste plastics into the same valuable chemical feedstocks used today to make virgin plastics. These include benzene, toluene and xylene (BTX) as well as ethylene, propylene and butylene (light olefins). Based on a proprietary catalyst and fluid bed reactor-regenerator system, Plas-TCat provides a new, direct route to light olefins and aromatics from heterogeneous plastic waste streams — without the need for steam cracker furnaces.

Composition of Plastic Waste, %



The technology can effectively process a wide range of waste plastics, alone or within composites. This includes polyolefins, polyamides (nylon), PET, polycarbonate and polystyrene. With the completion of these continuous process runs Plas-TCat is now at Technology Readiness Level (TRL) 6. Trials planned for later in 2022 will be run to confirm promising laboratory yields for Plas-TCat.

"Plas-TCat is advantageous due to its high olefin and aromatic hydrocarbon selectivity, high scalability, broad feedstock tolerance, as well as its substantial carbon dioxide emissions savings compared to industrial steam crackers," said David Sudolsky, president and CEO of Anellotech. "The TCat-8 unit will be used in future month-long 24/7 trials to prove the robustness of the process and generate process performance data over an equilibrated catalyst, which are required to design a commercial plant."

Recycling Challenges Become Opportunities with the Aid of New Technologies

Germany is widely acknowledged as the world leader in plastics recycling, so it will come as no surprise that recycling is a prominent theme at K 2022 show in Düsseldorf.

Of course recycling is also a major global concern, and the K Show is an international showcase of new technology. Governments and corporations are setting ambitious goals for plastic products and packaging recycling rates, which will require more and better recycling equipment to meet the necessary throughput. Many exhibitors serving recyclers see this challenge as an opportunity. Suppliers plan to demonstrate how their latest equipment handles more materials, is more efficient and produces higher quality output than ever achieved before.

All steps in the recycling chain will be on display. For those walking the mammoth show, it adds up to a tour of various recycling loops, from collected waste to new manufactured products. Visitors will see the continuing evolution of industrial recycling, as processes are combined, streamlined, and updated with new technologies.

Recyclate Preparation

Next Generation Recycling will offer a live demonstration of its Nxt:Gran system, which incorporates several steps—shredding, feeding and extruding — into a single operation. Overall output has been increased by improving the cutting efficiency of the shredder and optimizing material feeding. Next Generation will also highlight its P:React machine, which uses liquid - state polycondensation to remove contaminants from PET, allowing production of 100% food-grade rPET.

Saperatec will be highlighting its recently announced hot - wash separation technology for composite multilayer packaging. The process adds no contaminants to recycled polymers, and all chemicals used in the process comply with EU food-contact regulations, helping to ensure the outputs are suitable to replace virgin raw materials in film and foil-based packaging.

Innovations will be exhibited in every step of the process chain, from grinding, washing, drying, compounding and repelletizing to injection molding.

Lindner will be presenting the upgraded Jupiter BW shredder for the first time. Its newly developed cutter system produces a homogenous particle size with

fewer fines and also optimizes particle size for near - infrared (NIR) sorting.

Lindner will also exhibit innovations in washing and drying. Its Rafter prewash system includes a larger rotor that lengthens dwell times. Ecodry is a new thermal dryer boasting energy savings of up to 30%, achieved by strategic use of heat exchangers and insulation.

Hosokawa Alpine will present its new Polyplex PPC 50/120 Combi Grinder. The rotor is arranged vertically, with an upper shredding zone and a granulator zone below. The joint drive reportedly makes size reduction more energy efficient. The firm will also present the Polymer-Line PL-XS 45/100, a compact granulator for economical size reduction of bulky plastics.

Herbold Meckesheim will have its HV series Plastcompactor, which is used for agglomeration of recovered materials, as well as drying, recrystallization and compounding. Pre - granulated material is screw - fed into the processing area, between a fixed disk and a rotating disk, where it is rapidly heated by friction. Both disks are equipped with replaceable kneading rails.

Herbold will also display the SML 60/100 Sb, a granulator for PET bottles. Material is fed by three vertical screws, a unique setup that reportedly offers consistent feed rates, reduced power consumption, no material flyback, quieter operation, reduced wear on the cutting chamber, and reduced fines and dust when compared with gravity feed.

Herbold's 216 T Series is an intensive washer that can also be used as a dryer. For washing flakes, it features a special high-speed rotating agitator, a stainless - steel screen basket, and double outboard bearings.

Sorema will be highlighting its recycling process for PET bottles, which transforms collected consumer waste into clean, dried PET flakes. The washing process water moves in the opposite direction of material flow, such that the final rinse is completed by the cleanest water, which is then reused in upstream cleaning phases. Capacities range from 1320 to 20,000 lb/hr (600 to 9000 kg/hr).

Recycling in Extrusion, Compounding, Molding

The open - air fairground at K Show will be dedicated to a Circular Economy Forum, allowing live demonstrations of product recycling. As an example of an entire washing plant, Lindner will present a shredding, washing and drying unit with integrated water treatment and will demonstrate recycling live several times each day. Rigid plastics will pass through the Micromat HP shredding machine, a new series featuring bolted knives and an enhanced drive, which can handle either film or rigid plastics. The demonstration will continue with the clean and homogeneous flakes being directly molded into new product, without need for extrusion.

Recycling will be a theme in injection molding as well. Arburg will demonstrate production of plastic plugs from recycle on its electric Allrounder 370 A injection molding system with Multilift robot. At Arburg's main booth, other injection machines will also demonstrate the capabilities of its recycle processing package. An Allrounder 470 A will mold PP handles from PCR; an Allrounder 270 S will produce tweezers from glass - reinforced PPS recycle; and an Allrounder 375 V will produce a bicycle tool from recycled nylon.

Erema will highlight its new, larger and more efficient Vacurema recycling extruder, which promises a broader processing window and gentler material treatment. It has a capacity of 13,200 lb/hr and uses 10% less energy than previous equipment. Erema's latest extrusion filter, the Laserfilter 406 features 50% more filtering area and increased throughput.

Erema will also present its data solutions for process monitoring and equipment maintenance. PredictOn is its system of software and instrumentation for early detection of critical component failure, and Bluport is a suite of apps for machine performance monitoring. (More details in last month's Keeping Up section.)

Coperion will be exhibiting an entire production line for PET recycling. The exhibit will encompass bulk solids handling,

feeding, extruding and pelletizing. At the center will be a system built around a ZSK 58 MC18 twin -screw extruder, configured for manufacturing high - quality PET using recycled materials, without the necessity for predrying and crystallization. The extruder will be fed by the SWB-300 belt feeders, an S100 single - screw pre-feeder, and a new ZSB 70 Megafeed side feeder, which can reliably feed large quantities of plastic recyclate with densities as low as 12.5 lb/ft^3. After melting, devolatilization, and homogenization in the extruder, the material stream is filtered and transferred to an underwater pelletizer. The pellets are then condensed in a solid state polycondensation reaction, then are ready to be reprocessed into bottles, fibers, or films. The output of this process has been approved by the FDA for direct food contact (letter of non-objection).

KraussMaffei will demonstrate compounding of three different materials in its direct - compounding injection molding (DCIM) process: PP fiber from face masks, shredded HDPE from packaging, and HDPE blow molding scraps from toy production. The combination of molding and compounding in a single heating process reduces material cost by up to 50%. DCIM uses a single - screw extruder on the injection machine, which is more economical than KM's IMC process using a twin-screw compounder on the injection press. At the K show the direct compounding process will be used to make collapsible crates for transporting fresh fish.

Aisa Automation of Switzerland will present the IPRA 250 recycling plant, which processes mixed, multi - component plastics into new, simple recycled products without any chemical separation, washing, or granulation.

Chemical Recycling

Several exhibitors will be presenting solutions for new directions in the area of chemical recycling, sometimes called advanced recycling, with the potential to process plastic waste into monomer feedstock. Coperion will highlight equipment capabilities that support chemical recycling of mixed waste, especially packaging waste, which include the K-Tron feeder for accurate loading of raw materials and the ZSK twin-screw extruder for preparing material for chemical recycling reactors.

Erema will be presenting its entry into chemical recycling, Chemerema. Its extrusion process is specifically tuned for downstream input to chemical recycling processes.

Resins & Additives for Sustainability in Vehicles, Electronics, Packaging & Medical

The theme of the “Circular Economy” will dominate K 2022 next month in Düsseldorf. Material suppliers have been stepping up development of resins and additives for improving sustainability in cars — especially electric vehicles (EVs) — as well as electronics, packaging and medical devices. A great majority of their efforts entail collaborations across the industry supply chain.

Visitors can expect to see a slew of new engineering and commodity thermoplastics as well as new additives that are sustainable yet are reportedly drop - in replacements for their fossil - based counterparts. New entries include resins with mechanically or chemically recycled content and materials and additives made from biobased feedstocks. (For more details on new materials at K 2022

High - Performance 'Greener' Nylons

Solvay will introduce a partially biobased addition to its Kalix high - performance polyamide (HPPA) line. Kalix 10000 is made with renewable feedstock from non-food sources, and is available with a wide range of alternative recycled contents for diverse customer needs. It also boasts a lower global - warming potential (GWP) than traditional nylons, as well as high heat resistance, stain resistance, and low moisture absorption, suiting it as a structural material for precision electronic applications.

Said to be the second - largest global producer of nylons 6 and 66 since its acquisition of Solvay's Technyl nylon 66 business, Domo is aiming to double its sales of recycled grades — now at 10% — by 2030, and is very active in mechanical recycling of nylon, such as auto airbags. Its industry partnerships in nylon PCR collection systems are

The company will also present advances in design of batteries for electric vehicles via the use of PC resins and blends, which also can be used in associated parts such as battery modules, housing parts and crash absorbers, as well as control units in the electric powertrain. The properties of PC - based materials are also beneficial for applications in charging stations, wallboxes and battery home-storage systems.

DuPont will feature six new grades of its Hytrel polyester TPE under the brand Hytrel EcoB, based on up to 72% biomass. Launched as drop - in replacements for standard Hytrel, these grades are said to match properties such as strength, chemical resistance, processability, and overmolding capabilities, are aimed at consumer electronics and automotive; they can also be foamed. (As previously reported, DuPont is selling the majority of its polymer businesses to Celanese by year's end.)

Avient will present the latest in its portfolio of Resound REC TPEs for improving the sustainability of exterior and underhood automotive components. Included are two grades of polyvinyl butyral (PVB) recycled from automotive glass.

Avient will also launch two new Edgetek PKE polyketone (PK) grades with non - halogen flame retardant, designed specifically for electric vehicle components, including connectors.

As reported last month, other resin suppliers with sustainable engineering resin offerings include Ineos Styrolution with its Luran S Eco B ASA containing up to 50% renewable (bio-attributed) content. The Eco B version of Luran S ASA is produced with renewable feedstock such as household-kitchen and wood waste.

Also new from Ineos Styrolution will be four grades of mechanically recycled Novadur Eco and Novadur Eco HH ABS resins for household appliances and automotive, respectively. Up to 100% PCR content is possible, and color options (e.g., red and blue) will be available in addition to black and white.

Lanxess High Performance Materials is presenting new Tepex composites based on recyclates or biobased raw materials and new halogen - free flame - retardant and hydrolysis - stabilized PBT compounds for high - voltage connectors.

Röhm GmbH will feature its growing portfolio of recyclable and durable Plexiglas acrylic molding compounds. With its latest special molding compound Plexiglas Optical HT, Röhm says the days of compromising between high optical quality and suitability for high long - term service temperatures are gone. This compound is said to cover both requirements, suiting it to contemporary product design, such as lenses for high-performance LEDs and long light guides.

Röhm will also highlight special molding compounds that have been developed to meet the changing design of vehicle front ends, such as long light guides, high - gloss panels and logos replacing chrome. For illuminated applications, Plexiglas Resist AG 100 compound is said to meet both optical and mechanical requirements. In high - gloss panels at the front of the vehicle, Plexiglas Hi-Gloss NTA-5 is a robust and resource-efficient alternative to components that need additional painting. It boasts high weather resistance, for long - lasting aesthetic properties.

Advances in Polyolefins

Borealis will present new packaging and infrastructure applications of its new Bornewables portfolio of circular polyolefin products, manufactured with renewable feedstocks, such as waste from pulp production or residues from food-processing oils. Among the first successful commercial examples of the use of Bornewables PP is the new Aino packaging ice-cream tubs and lids launched by Finland's ice cream manufacturer, Froneri. The new application is the result of Borealis' partnership with Froneri and German global plastics packaging manufacturer Paccor, which injection molded the tubs and lids from monomaterial Bornewables PP with PP in-mold labels.

Also from Borealis will be drop-in replacements for crosslinked PE and PP pipes made from Bornewables polyolefins. Among these is Bornewable PEX used by pipe specialist Upanor, Apple Valley, Minn., to create the PEX Pipe Blue, which is said to be the world's first pipe made from PEX with renewable feedstock. This also marks a major step forward to help customers in the building and construction industry achieve their

aimed in part at using technology to separate the resin from glass fiber.

Asahi Kasei will discuss accelerated trials for commercializing nylon 66 resin made using a biomass - derived intermediate for production of automotive and electronics components. This comes from its new strategic partnership with Genomatica regarding hexamethylenediamine (HMD) based on biomass-derived raw materials (bio-HMD). Asahi Kasei currently uses fossil – derived HMD to make its Leona nylon 66 compounds. The strategic alliance with Genomatica provides Asahi Kasei with preferential rights to access the early volume of bio-HMD for evaluation as a nylon 66 feedstock.

BASF will show several examples of performance materials for sustainability, ranging from safe and durable nylons for high-voltage components of e-mobility charging infrastructure to enabling a miniature electrical circuit breaker (MCB) that uses 100% chemically recycled nylon 6 based on pyrolysis oil from used tires.

BASF will also launch a portfolio of high - performance, low - carbon - footprint materials including nylons, PBT and TPUs.

Solvay will highlight its new grades of Amodel PPA and Ryton PPS with recycled content (including used fishing nets), and will also feature reinforced engineering resins made with recycled glass or carbon fiber.

DuPont will feature its work on automotive multilayer cooling pipes, critical for thermal management, particularly with electric vehicles. The external layers are based on long - chain nylons 612, 610 and 1010, while the internal or tie layer is made of TPO.

Avient will launch an expanded portfolio of Compelt REC long-fiber reinforced composites using recycled resins. The new formulations can use varying levels of post-industrial recycled (PIR) content, from 25% to 100% for nylon 66 and 25% to 75% for TPU. This expands the product line that launched earlier this year with nylon 6 resin derived from reclaimed fishing nets.

As reported last month, other nylon suppliers with new high-performance and sustainable resins include Ascend Performance Materials, which will launch a half-dozen glass-filled nylon compounds with 20% to 40% biocontent, and is also introducing Vydyne Thermapluss, a new technology platform of high - temperature, high - ductile nylon 66 for clips and fasteners. The latter is designed as an alternative to DSM's Stanyl nylon 46.

Ascend Performance Materials will also showcase new grades of HiDura long-chain nylons 610 and 612 with 40% to 60% biobased content for injection molded consumer goods and connectors, as well as copolymers for films that make packaging more durable.

Also from new Ascend will be Vydyne AVS nylon 66, said to be a novel solution to dampen noise, vibration and harshness (NVH) in electric vehicles. It is reportedly effective at damping high - frequency vibrations at the motor, which translates into an 80% reduction in cabin sound pressure.

DSM Engineering Materials will highlight its new Stanyl B-MB (Bio - based Mass Balanced), said to be the first 100% biobased high - temperature nylon — in this case, a new, more sustainable version of its flagship product, Stanyl nylon 46.

Other Sustainable Engineering Resins

The Lehvoss Group and its subsidiary WMK Plastics will present sustainable materials from the Luvotech eco product line based on raw materials from mechanical recycling. The company says its technology makes possible the production of materials from PC/ABS to PEEK.

Lehvoss will also showcase its new Luvocom 3F eco PET products of 90% recycled PET, for use in both the FFF (Fused Filament Fabrication) and FGF (Fused Granulate Fabrication) 3D printing processes. It boasts excellent processability and properties for producing functional prototypes and production parts in industries such as automotive and medical.

Covestro will highlight PC resins and blends with up to 75% mechanically recycled material.

sustainability targets in plumbing, heating, ventilation and air - conditioning (HVAC) installations.

Borealis has also partnered with Italy's NUPI (parent of Houston-based NUPI North America), the first pipe supplier in Italy to use Bornewables in high-performance random copolymer PP pipes for plumbing and heating systems. The company has selected Bornewables PP for the next generation of its Niron Beta PP-RCT piping solutions for domestic plumbing, heating and HVAC systems designed to perform under higher stress conditions and temperatures.

LyondellBasell's focus has been on mechanical recycling with its Circulen Recover PCR- and PIR-content polyolefin. The company will highlight examples of commercial products such as Samsonite's new line of suitcases made from Circulen resin derived from PP yogurt containers. Chemically recycled products and biobased (e.g., cooking oil) feedstock resins, Revive and Renew, respectively, will be the firm's focus in the second half of this decade, say LBI officials.

As previously reported, SABIC will highlight its new Bluehero program focused on boosting the performance of EV components. Bluehero materials examples include Stamax FR LGF-PP resins and SABIC FR PP compounds. SABIC has a new range of SABIC PP compounds and long-glass reinforced Stamax PP resins based on biorenewable and advanced recycled feedstock. Certified biorenewable based SABIC PP compounds are aimed at high - performance automotive applications, from bumpers and exterior trim to interior door panels, instrument panels and visible interior trim.

Certified bio-renewable based, long-glass reinforced PP Stamax resins are targeted at structural automotive applications such as front - end carriers, instrument-panel carriers, tailgates and door modules. The new SABIC PP compounds and Stamax resins reportedly can replace corresponding SABIC fossil - based grades with no need of lengthy technical validation, as they offer the exact same level of performance and quality.

ExxonMobil will demonstrate how it is "Advancing Sustainable Solutions Together" at the booths of industry leading machine manufacturers (OEMs) and distributors at K 2022. Demonstrations will cover packaging, automotive, consumer products, agriculture, hygiene and medical applications. The solutions will include advances in mechanical recycling and monomaterial structures and the company's Exxtend chemical recycling technology. Packaging and engineered products manufacturer Berry Global is the first customer for certified circular polymers from Exxtend technology. Berry is using circular PP impact copolymer to manufacture containers of high-performance food - grade packaging.

ExxonMobil's will also present the latest updates on its recently introduced Exceed S hexene - based LLDPE film resins targeted for use in food, industrial and agricultural applications. They boast unusual combinations of stiffness and toughness and reportedly provide opportunities to reduce the complexity of film formulations and structures while improving processing, converting, film performance and package durability.

Additives Enable Recycling

Clariant will launch a new generation of sustainable high-performance antioxidants. Included is AddWorks PKG 906 Circle, a proprietary stabilizer that reportedly enables significant increases in recycled content of polyolefin films. It allows introduction of reground scrap at a rate of up to 20% or more without any loss in quality or process efficiency, thus creating considerable benefits both in BOPP and cast and blown PE film production. It is said to offer outstanding protection to the polyolefin resin during processing, without loss of transparency or additional yellowing.

BASF will highlight IrgaCycle, its new range of additive blends that improves mechanical recycling of polyolefins and mixed polymers. These ready -to-use granulated, non - dusting formulations reportedly ensure safe and easy dosage.

Avient will present its new Cesa Nox A4R polyolefin antioxidant for recycling. This specialized formulation is said to stabilize polyolefins during processing, preventing discoloration, gels and

black spots during multiple conversion steps and recycling loops. Protecting PCR from degradation in this way can help achieve higher quality levels of recyclate and better end - use products and improve the quality of the overall recycling stream due to its long-term stabilizing effect.

SI Group will be launching a new additives brand for plastics recycling. The first products will be stabilizers for recycled polyolefins and PET that are designed to allow use of more recycled materials without compromising performance in the end application.

SI Group will also present a new masterbatch grade of Weston 705 liquid antioxidant and Ultranox LC stabilizers.

Denmark's Palsgaard will highlight its five - year - old Einar polymer additives, which are also manufactured in Mexico and are now available in North America. Einar additives are all plant-based and food-grade, and they serve as antistatic additives for PE and PP. Also offered are antifog additives for polyolefins and mold-release lubricants for injection and compression molding of PE, PP and PVC.

China's Unitechem will highlight the newest additions to its extensive range of UV stabilizers. The company, which claims to be the world's largest producer of UV stabilizers, will have new offices in North America and warehousing facilities here within a year's time. (They have been selling in the U.S. through a Morris Plains, N.J., office for 10 years.). The company's core business is HALS (hindered-amine light stabilizers), but they also have UV absorbers as well as some antioxidants and stabilizer blends.

In 2020, Unitichem launched LS-119 HALS for automotive applications. Coming next year is LS-4040 HALS, a low-molecular - weight product for thick - walled automotive components. They have also been developing a new process to make "safer" versions of benzotriazole UV absorbers.

Technip Energies and Agilyx Announce the Launch of The Trustyrenyx™ Brand, The Only All - In - One Solution for The Chemical Recycling of Polystyrene.

TruStyrenyx™ combines Agilyx's pyrolysis process and Technip Energies purification technology, yielding a recycled styrene monomer with exceptional high purity. Styrene monomer is used to make numerous plastics and other polymers. It is one of the three primary components of ABS (acrylonitrile - butadiene - styrene), can make the pure polymer polystyrene, and is an ingredient in various synthetic rubbers.

This launch follows successful results from pilot plant testing conducted on difficult to recycle waste polystyrene, including flame retardant laden waste polystyrene. Recycled styrene monomer from the pilot plant meets American Society for Testing and Materials (ASTM) standards[(1)] for styrene monomer and is greater than 99.8 wt% purity. Flame retardants contain halogens, which are known to be difficult impurities for current polymer production processes. The pilot plant has successfully shown that the resulting halogen concentration in the styrene monomer product is below available detection limits[(2)].

Technip Energies and Agilyx announced their partnership in June 2021, leveraging Agilyx conversion technology and Technip Energies purification process.

Bhaskar Patel, SVP of Sustainable Fuels, Chemicals and Circularity at Technip Energies, said: "We are pleased with the results of our pilot plant testing in our R&D facility in Weymouth, Massachusetts. This marks an important step in our development of circular solutions for styrenics technologies, and our relationship with Agilyx. Our joint innovative solution, TruStyrenyx™, for the chemical recycling of polystyrene offers potential clients a feasible way to make polymer products from recycled sources without compromising product integrity."

Chris Faulkner, Ph.D, Chief Technology Officer at Agilyx, said: "This technology collaboration is completely new to the marketplace, offering an all - in - one solution for the chemical recycling of Polystyrene. The high purity of the recycled styrene monomer from testing proves that TruStyrenyx™ offers a recycling solution on par with virgin materials."

(1) ASTM standards are used and accepted worldwide and cover many industries.

(2) By ASTM D7359 testing method.

About Technip Energies

Technip Energies is a leading Engineering & Technology company for the energy transition, with leadership positions in Liquefied Natural Gas (LNG), hydrogen and ethylene as well as growing market positions in blue and green hydrogen, sustainable chemistry and CO2 management. The company benefits from its robust project delivery model supported by extensive technology, products and services offering.

Operating in 34 countries, our 15,000 people are fully committed to bringing our client's innovative projects to life, breaking boundaries to accelerate the energy transition for a better tomorrow.

About Agilyx

Agilyx is a technology company that enables customers to recycle difficult - to - recycle post - use plastics to high value, virgin - equivalent products. With a focus on diversion and conversion of plastic waste, Agilyx is uniquely positioned with a molecular recycling technology offering and an integrated feedstock solution by way of Cyclyx, an innovative feedstock management consortium of partners that drives up global plastic recycling rates by chemically fingerprinting plastic waste and matching it to appropriate recycling processes. Agilyx was the first to establish a commercial scale closed loop plastic - to - plastic chemical recycling facility and holds over 17 patents. Agilyx conversion technology utilizes pyrolysis without a catalyst and can convert mixed waste plastic to naphtha and fuels or depolymerize specific plastics such as polystyrene and PMMA (acrylic) back into virgin - quality products.

Case Study: Bunting Magnetic Separators Pass The HML Recycling Test

Effective metal separation is one of many important processes in HML Recycling's specialist metal recycling operation. HML has installed Bunting Permanent Overband Magnets in their cable recycling process, and a Metal Separation Module on a new line for recycling plastics perfume bottle caps.

HML recycle a wide range of metals including an established cable recycling plant and a new line for handling shredded perfume bottle tops. On the cable recycling plant, HML use two Permanent Overband Magnets to remove ferrous metals including steel after primary shredding. One Overband Magnet is positioned across a vibratory feeder, where the vibration liberates entrapped material to enable to cleaner separation of magnetic metals. The second removes steel and other magnetic metals from a shredded copper cable mix to protect a granulator. Mounted above the granulator feed conveyor handling up , the Overband Magnet lifts and removes potentially damaging steel.

HML has recently installed a new line for the recycling of shredded plastic perfume bottle caps. The mix includes both ferrous and non - ferrous metals, which are removed using a Bunting Metal Separation Module. In operation, the shredded material is fed via a conveyor onto a Vibratory Feeder. The Feeder evenly spreads the material before feeding at a steady rate onto a high - strength Permanent Drum Magnet, which separates any magnetic material. A Drum Magnet has a fixed magnet element mounted inside a rotating non - magnetic shell. Any ferrous metal or magnetic particle is attracted and held to the surface of the rotating Drum Magnet shell before being transported and deposited underneath in a collection area.

The remaining non - magnetic mix drops onto the moving belt of a High - Intensity Eccentric (HIE) Eddy Current Separator. An Eddy Current Separator is a dual pulley conveyor system, where the non - metallic rotor cover houses an independently rotating high - speed magnetic rotor. Separation occurs when a non - ferrous metal particle is conveyed into the magnetic zone. The non - ferrous metal particle is exposed to rapidly changing magnetic polarity. This

induces 'eddy currents' into the particle generating an electrical current (Fleming's left-hand rule) that subsequently creates its own magnetic field. The two magnetic fields oppose each other, causing the repulsion of the non-ferrous metal particle and change in trajectory. The measured positioning of a splitter enables the separation of non-ferrous metals from non-metallic material due to the altered and unaltered material trajectories.

Prior to ordering the magnetic separators, Bunting conducted control tests at its Customer Experience Centre in Redditch, UK to confirm capacities and separation capabilities. In operation, the 750mm wide Drum Magnet and Eddy Current Separator will handle up to two tph of 0-15mm shredded plastic perfume bottle caps. Both the recovered aluminium and plastic will have purities exceeding 98 per cent.

"The HML Recycling installation is another exciting project for Bunting," said Tom Higginbottom, Bunting's Sales Engineer. "Conducting the tests at our Customer Experience Centre enabled us to understand the material and ensure that we could meet the separation expectations."

Recycling: What's Ahead in Advanced Sorting Technology

As the industry tries to ramp up recycling, there are several innovative sorting solutions in the offing — ranging from enhanced optical sorting technologies and chemical tracers to advanced solutions based digital watermarks and artificial intelligence.

Reports published almost daily refer to the abysmally low plastic recycling rates, with the national average in the U.S. and globally still hovering around the single - digit mark. While the corresponding data from the European Union is definitely higher, it's safe to say that a lot of work is still needed and that there is no "silver bullet" to tackle this issue. Several coordinated actions, already on the move, are required to accelerate scale - up of recycling rates.

Advances in recycling technologies—be they mechanical or chemical — are underway and their complementary implementation is crucial to widening the pool of high - value recyclates. Equally important will be steps taken during the complete lifecycle of the plastic product — starting from design for recycling (before the product hits the market), further reuse while in circulation, and finally, wide - spread collection and *enhanced sorting* at end - of - life.

The plastic waste issue is multi - dimensional not only because of the large volume that needs to be dealt with, but also due to the wide variety of plastic types (polyolefins, polyesters, styrenics, vinyls, and specialty polymers) and plastic product designs (rigid, flexible, multilayer). This diversity makes recycling them a challenging task—one that can be overcome with a "toolbox" of recycling solutions. To significantly improve the recycling rates and also the quality of recyclates, it is also important to ensure advanced sorting of mixed plastic waste into high - quality mono - waste fractions.

The good news is that the industry has taken up this challenge and there are several innovative solutions in the offing—ranging from enhanced optical sorting technologies to advanced solutions based on digital watermarks, and artificial intelligence (Table 1).

TABLE 1 Advanced Sorting Technologies and Leading Projects

Advanced Sorting Technologies	Leading Projects/ Companies
Optical (Near Infrared)	• TrinamiX • Tomra • Matoha
Chemical Tracers	The Prism Project (Nextek)
Digital Watermark	HolyGrail 2.0 (AIM—European Brands Association, Alliance to End Plastic Waste, >160 companies and organizations from the complete packaging value chain.)
AI/Robotic	• Recycleye • TrueCircle • AMP Robotics • Ishitva Robotics Systems • Greyparrot AI waste recognition system • Perfect Sorting Consortium • Unilever + Alibaba

Expanding The Scope Of Optical Sorting

Near-infrared (NIR) is a proven technology that uses a hyperspectral camera to identify and sort specific polymer types. However, there are certain limitations such as the inability to detect inner layers in the case of multilayer packaging, plastic with carbon black pigment, low levels of contamination, and very thin coatings.

Research institutes and industry players are working on solutions to improve this technology to enhance the quality of the sorted fractions. Earlier this year, Danish researchers from Aarhus University in collaboration with Vestforbrænding, Dansk Affaldsminimering Aps and PLASTIX shared an update regarding a new NIR camera technology that can distinguish between 12 types of polymers: PE, PP, PET, PS, PVC, PVDF, POM, PEEK, ABS, PMMA, PC, and nylon 12. This technology, tested at pilot scale, can allow separation of plastics based on purer chemical composition (polymer type) than is possible today, further improving the recycling rate.

Efficient separation of nylons 6 and 66, which have similar properties, has also been a challenge that was recently addressed by trinamiX, a wholly-owned German subsidiary of BASF. Its hand - held mobile NIR spectroscopy solution combines robust hardware with intelligent data analysis and a mobile app to distinguish between the two polymer types.

Another interesting portable unit that uses NIR has been developed by the U.K's Matoha. Its easy-to-use PlasTell device reportedly can identify all the common polymers such as PET, PVC, PE, PP, PS, ABS, PC, nylons, PMMA, PLA, and PU. Specialty plastics or polymers can be added upon request. However, thin films (<20 microns) and plastics containing

To enable detection of black plastics, Tomra, a leading manufacturer of sensor - based sorting systems, has developed add-on laser sensors. Its Autosort technology combines multiple technologies in one sorting machine — including NIR spectroscopy, laser, electromagnetic, and AI-based camera sensors.

Tomra is also a partner in the Nextloopp project, which aims to create circular food - grade recycled PP from post-consumer packaging. The technology behind Nextloopp is based on high - speed precision sorting of packaging using Nextek's PolyPrism fluorescent markers. In sorting trials conducted with Tomra, 99.9% purity was achieved at full speed using NIR/VIS sorting equipment.

Digital watermarks have been identified as perhaps the most promising technology to improve post - consumer recycling.

Digimarc offers a secure, universally available, and covert identification technology, which reportedly improves sortation accuracy, efficiency, and precision. It does not impact the overall recyclability of the packaging and performs in the harsh conditions of waste sortation and recycling facilities. The watermark can be identified regardless of the position or orientation of the packaging, even at high sorting speeds. This technology also enables sorting machines to detect dark-colored & multilayer packaging and sort nonfood from food packaging.

The digital watermark requires no special inks, printing process, materials, or manufacturing process and can be applied in print, using encoder software that applies tiles to graphics over the entire surface by using existing pixels, or in the substrate, by embedding micron-height topological variations via engraved molds or laser texturing.

Together with SGK, a global packaging and brand-experience company, Digimarc tested another option of applying the code in the varnish only. The initial results are promising, as it can offer additional benefits such as allowing brands to preserve their original design and enabling standardized application for all artworks, removing the need for customization of the Digimarc application method.

Thanks to the QR codes, it is has already proven possible to use this innovative technology for consumer engagement as it can provide information such as product composition, usage, and recycling guidelines.

Recycler Pet Baltija Agrees to Acquire Leading Czech Fibre Producer

PET Baltija: one of the largest PET recyclers in Northern Europe, said it has signed an agreement to acquire **Tesil Fibres** from parent **Silon** , which in future plans to focus more fully on the production of polyolefin-based performance compounds.

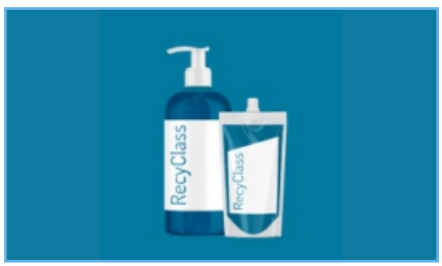
The acquisition is said to be one of the largest investments by a Latvian company in the

Czech Republic to date and is set to boost PET Baltija's revenues by more than 50% to over EUR 100 mn.

Tesil Fibres reportedly posted sales of EUR 27 mn last year with a staff of around 150. It was spun off along with Silon's staple fibre production facilities and has a capacity of 33,000 t/y. The company supplies various European industries, including automotive, hygiene, textile, and furniture.

PET Baltija claims to have the largest market share in the Baltic states and a share of 2% in the European market. It is a subsidiary of waste management group **Eco Baltia** (Riga, Latvia; www.ecobaltia.lv) and part of the investment portfolio of the **INVL Baltic Sea Growth Fund**, which announced an increase in PET reclaim capacity and further acquisitions on behalf of the Latvian company.

Aptar's Simplicycle Tpe-S Valve Technology Approved By Recyclass



The latest testing approves Aptar's SimpliCycle TPE-S valve as fully compatible with the European rigid polypropylene (PP) recycling stream. The recycling compatibility has been positively assessed via the RecyClass Evaluation Protocol for PP containers.

The technology is a thermoplastic elastomer valve made of Styrenic Block Copolymers (TPE-S or TPS), paired with a PP-based cap. This closure system is commonly used in food, beverage and other applications. Based on the study conducted, the valve itself represents less than 1% compared to the total packaging weight.

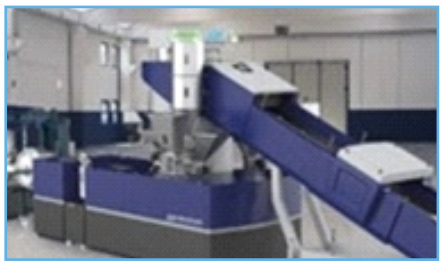
The testing was carried out independently by the Institut für Kunststofftechnologie und -recycling (IKTR). According to the laboratory results, SimpliCycle TPE - S valve conforms to the current European PP container natural and coloured recycling streams, provided it is used under specific conditions. The tests demonstrated that plastic generated by the recycling process can be used back in closed-loop applications, such as PP blow-moulded bottles and injection moulded products with up to 50% of this material.

Upon the review by RecyClass Technical Committees, TPE-S valves representing less than 1wt% were also approved as fully compatible within the HDPE rigid plastic stream. Consequently, Aptar's testing results will be integrated under the 'fully compatible' section of the existing RecyClass Design for Recycling Guidelines and the Online Tool. This is in addition to the approval that Aptar's SimpliCycle technology received for the PET stream from EPBP.

Closures play an important role in the functionality of plastic packaging, and with its innovative technology Aptar points to the significance that each component plays in the overall recyclability of packaging. Solutions like this bring the industry one step closer to the circular plastic future.

(Source: POLYMERS Communique - e-Bulletin – 13th September, 2022)

The Technological Evolution for Gamma Meccanica Lines: New Design, Energy Savings and Smart Solutions for Recycling of Plastic Materials



The new technological evolution began for Italian company Gamma Meccanica S.P.A. that designs and manufactures the lines for the regeneration of plastic materials since 1987. Gamma Meccanica's technologies for regeneration are known for their high level of automation and energy efficiency.

There cent Tandem and Tandem PLUS technologies have contributed to the growing success of the company on the market. GM Tandem lines allow to recycle heavily printed (over 100%), high humidity (up to 12% of humidity) and contaminated materials. The Tandem PLUS line thanks to the combination of a single screw extruder with a twin screw extruder and a special degassing chamber.