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THE ECONOMIC TIMES

# POLYMERS

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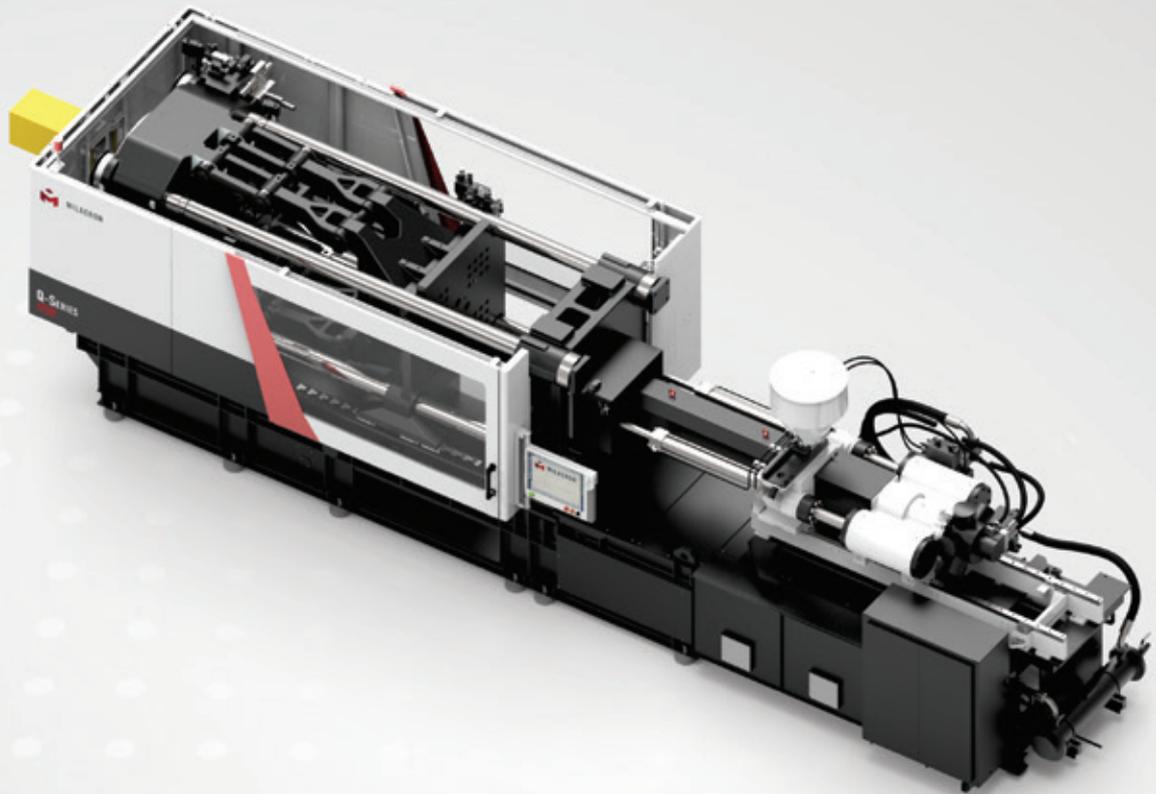


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# Walk the Talk

Ciao Readers! (Since it blew up in Italy first, I thought I should blow it up in Italian too!)

**A**fter a lot of contemplation, if I should choose the pandemic, recession, or the sluggish economy as the narrative of this magazine, I chose to start as the Editor of ET Polymers on an optimistic note. Hence, at the onset of my journey with Times, I'm highly elated to weave an edition for you that's packed with some powerful interviews and updates.

Amidst the chaos, the one positive and opportunist programme of the Central government that caught my eye was the Jal Jeevan Mission (JJM).

I dug a little deeper, just to find a billion-dollar treasure hidden beneath, and here I spill the beans. The Central government has released a whopping Rs 60 billion to 15 states for implementation of the JJM (rural) in FY22 for tap water connections in rural areas. And, this is just the first tranche of the four to be released this financial year. Meanwhile, post release of the operational guidelines for implementation of JJM (rural) 2024 on 25th Dec '19, despite the pandemic, by the end of FY21, about 40.8 million rural households have been provided with new tap water connections. The result? Tap water supply is now reaching about 73 million rural households, i.e. more than 38% of rural homes of the country. With budgetary allocation under JJM (rural) now increased to Rs 550 billion vs Rs 115 billion allocated in FY21, this is likely to offer a strong business potential for PVC pipe processors in particular.

**With the launch of JJM (urban) in FY22, it is expected that around 28.6 million households in 4,378 urban local bodies will get tap water connections**

That said, with the launch of JJM (urban) in FY22, it is expected that around 28.6 million households in 4,378 urban local bodies will get tap water connections. This will incrementally generate demand for PVC/HDPE piping systems while creating supply infrastructure in the earmarked urban local bodies.

Meanwhile, the current ET Polymers edition is something to look for. An interesting conversation with two generations of Prince Pipes will take you down the memory lanes of their three decades of an exciting and adventurous journey. Also, read how Fraunhofer Institute UMSICHT, SABIC and Procter & Gamble (P&G) have announced their collaboration in an innovative circular economy pilot project which aims to demonstrate the feasibility of closed-loop recycling of single-use facemasks.

We also give you a glimpse into Professor Silvia Vignolini, the University of Cambridge research on finding a sustainable and non-toxic alternative to the many colouring techniques used today. Packaging companies have had to however change their focus and innovate as the race against the pandemic enters its second year. This edition takes a brief look at what the sector has been doing. We also take a closer look at Hi-Tech International replacing single-use and multi-use plastic products with bio-compostable plastic.

I hope you enjoy reading this edition as much as we enjoyed putting it together. Do share with us your opinions, comments and thoughts at [rahul.kamat@wvm.co.in](mailto:rahul.kamat@wvm.co.in)

*R Kamat*  
Editor

THE ECONOMIC TIMES



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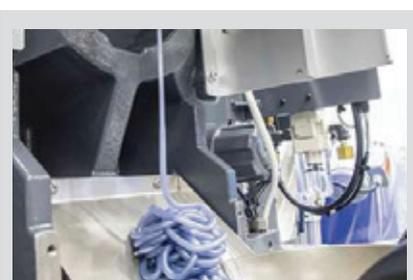
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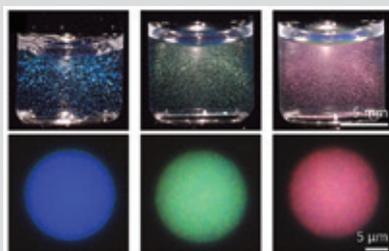


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# GROW with PROPEL

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## Constantia India Lauds The Rajoo 5-Layer Pod Blown Film Line

For Rajoo, every sale is a project; the one at Constantia India, however, is even more special as it reinforces the stamp of 'excellence in extrusion' for Rajoo. The company's 5-Layer POD blown film line is today running successfully in over 15 countries. The choice of Rajoo as a preferred brand to Constantia India was the outcome of a total evaluation in terms of technical, commercial and service support and a survey covering all the suppliers. "A buyer needs to understand whether high-end specifications are essential or desirable, and its impact on the end product quality; consistency is an important parameter that is always considered. Another crucial aspect that needs to be considered when it comes to deciding on a solution as this is the after-sales support, response to emer-



gencies, costs of spares and services," explains **Srikanta Khatua, Head of Operation 'Creative Sub-Cluster', Constantia Flexibles – India.**

The equipment performance is endorsed by the product produced itself; the Constantia installation drives home this point as the films produced from this machine are benchmarked with the best-in-class flexible packaging laminates, locally and globally. Constantia has com-

pared the sample films from the market with the product produced on the Rajoo 5-layer line and they find it superior.

For a state-of-the-art line as this, it is all about customer experience. When this production

"The agenda of 'excellence in extrusion' globally stems from the unique concept embarked on by Rajoo as offering 'Appropriate Tech-

nology' for business. For us at Rajoo, gone is the era to build specifications for competitive advantages, it's now time to identify just

the right technologies and their mix, to add value to the client business. Over specifications only add on to customer costs and not his business," enunciates **Khushboo Chandrakant Doshi, Executive Director, Rajoo Engineers Ltd.**

## Waters Arc Premier System Delivers Increased Precision and Certainty

Waters Corporation has introduced the Waters™ Arc™ Premier System, the first liquid chromatography system optimized for chromatographic separations on 2.5 – 3.5 micron columns to also feature Waters' novel MaxPeak™ High-Performance Surface (HPS) technology. The new system complements Waters' best-selling MaxPeak Premier Columns to virtually eliminate the surface interactions that occur between sample analytes and instrument and column hardware, saving laboratories time wasted on costly passivation and providing greater confidence in separations results

Analytical scientists working in method development and quality control laboratories can typically waste hours and days re-running or troubleshooting analytical methods that fail to reproduce an expected test result, such as missing low concentrations of a target analyte known to be in the sample or that fail to detect an impurity. The Waters Arc Premier System and Columns are designed to

help increase speed, consistency and confidence in analytical results for scientists working to develop, transfer and run chromatographic assays that are central to business and laboratory operations.

"With liquid chromatography results, there is no room for error. Laboratories cannot afford to overlook or under-report an impurity in a drug formulation for example, or miss product release timelines because of assay variations," said **Udit Batra, President and CEO, Waters Corporation.** "Laboratories both big and small have long suffered the frustrations of analyte/surface interactions, which degrade sensitivity, reproducibility, and of separations methods that can require several days for passivation. The combination of the Arc Premier System and Columns sets a new standard for pharmaceutical analysis, giving scientists the confidence they need while reducing the cost and time to market."

The Arc Premier System deliv-

ers reproducibility and repeatability for scientists developing methods for stability testing, impurity profiling and product release data in compliance with regulatory requirements. The combined solution provides reproducibility without sacrificing performance along with system ruggedness for delivering consistently accurate chromatographic results in test after test.

"Mitigation of deleterious analyte interactions with chromatographic columns and systems has always plagued separations scientists striving for perfect peak shapes and recoveries," says **Jonathan Shackman, Associate Scientific Director, Bristol Meyers Squibb.** "Material modifications that maintain all the best properties of stainless steel while reducing or even eliminating these secondary binding events will be transformative. Removal of internal passivation procedures and skipping mobile phase additives to address chelation is exciting and very promising!

# STRAPPING LINE



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## Recyclable Cheese Packaging for Dutch Market

Leading global packaging and paper group Mondi, along with cheese packaging company Hazeleger Kaas and brand owner Westland Kaas, worked together to package the well-known Dutch Maaslander brand in EnvelopeForm, a new fully recyclable polypropylene (PP) mono-material packaging solution. Most sliced cheese in the Holland is still packaged in mixed material film, which is difficult to recycle. This new packaging has a PP thermoforming top and bottom web, and a PP label instead of a paper label, so that the new solution can be recycled in its entirety. The solution has been certified as recyclable by the German institute cyclos-HTP.

Hazeleger has been committed to sustainability for more than two decades and has been certified by several institutions recognis-



ing its commitment to operating in a socially responsible way. This commitment to sustainability also meant looking at their packaging. “When we began the search for a new sustainable solution in 2018, our standards were already very high. For our cheese to stay fresh, the packaging had to have the same level of barrier protection as the previous film, and at a lighter weight.

Mondi worked very closely with us to trial and test the best packaging solutions. Ultimately, the lighter film and improved product to packaging ratio meant we could reduce the amount of plastic used by 23 per cent. This makes it possible for us to save 9.2 tonnes of plastic per year,” said Andre Roeterdink, Procurement Manager of Hazeleger Kaas.

“Using our customer-centric approach, EcoSolutions, we knew that we could help Hazeleger find the optimal sustainable solution for their cheese. The new mono-material film is recyclable, performs well on their machines and keeps the cheese slices fresh on shelves. This, along with our commitment to quality, made it possible to provide Hazeleger with a sustainable new solution,” said Peter Jagt, Regional Sales BeNeLux Consumer Flexibles, Mondi.

## Covestro Launches Total Solutions Approach



Around the world, paint manufacturers are facing a rapidly changing decorative industry with winner-takes-all dynamics. In particular, demand is accelerating for sustainable solutions that protect health and safety, drive functionality and efficiency, and provide new emotional and sensory experiences – such as 1K and low-VOC systems, highly adhesive coatings, and ultra-matte paints. At the same time, regulatory authorities are requiring greater value-chain transparency and higher performance standards. To maintain a competitive position in the market, paint manufacturers are under increasing pressure to deliver differentiating products that address these global macro-trends and local market requirements.

To support its customers in creating futureproof portfolios and to turbocharge performance in the decorative industry, Covestro has developed a unique, industry-beating, total solutions approach – known as its House of Resins. This approach makes use of proprietary market insights gained through artificial intelligence tools with big data, frontrunner bio-based resins, and a comprehensive understanding of all major advanced resin technologies. By working in close collaboration with paint manufacturers, Covestro will provide support to identify specific market demands more quickly and accurately and to develop solutions that meet the needs of all value chain parties.

Specifically, Covestro has so far monitored 7.8 billion paint search queries on Google, analysed feedback from more than 550,000 paint reviews, and conducted over 27,000 annual consumer interviews and over 10,000 annual interviews with painters, architects, and contractors. Based on these

insights, Covestro draws on one of the broadest advanced technology toolboxes in the market – including alkyds, acrylics, urethanes, hybrids, and plant-based resins – to develop solutions to address market needs. ‘Insights 2 Innovations’ workshops facilitate this process.

As well as addressing functional performance requirements, solutions from Covestro also support its customers’ sustainability journeys. Among the organization’s environmentally driven innovations is the Decovery® resin family: a frontrunner in biobased resin technology containing up to 52% plant-based content. Sustainability dialogues between RFM and its partners further complement these efforts.

Gerjan van Laar, Marketing Segment Manager Decorative at Covestro, commented, “Our unique data-driven approach enables paint manufacturers to step up and seize emerging commercial opportunities like never before. From insights to innovation, we provide our customers with a total support package based on our in-depth knowledge.”

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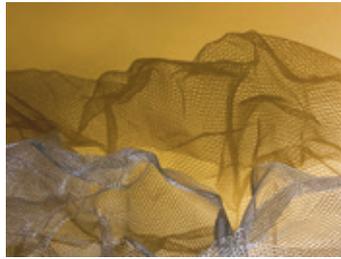
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## Accelerating Development of Long-Lasting Insecticidal Nets

According to the World Health Organization, every year there are more than 200 million new cases of malaria, with children under 5 the most vulnerable group affected by the disease. Avient is working together with IVCC, a not-for-profit Product Development Partnership (PDP) based in the UK, to step up the global fight to eradicate malaria and tackle insecticide resistance. Avient and IVCC are creating a new masterbatch production laboratory in Guangzhou, China to support the research and development of novel, active insecticide ingredients for long-lasting insecticidal treated nets (LLINs).

The pioneering new facility is expected to be fully operational this summer, and open to current and future innovation projects. It will provide a medium-scale platform for testing and developing masterbatch formulations with insecticides to speed up the process of bringing LLINs to the market. Developing these formulations is imperative to eliminating malaria, as insecti-



cide resistance is making the most widely used formulations, such as pyrethroids, increasingly ineffective. The new facility will also support scale-up for those formulations that prove promising.

With extensive global expertise in ground-breaking material solutions to support malaria control, Avient has the capabilities to optimise masterbatch formulations for LLINs to deliver ideal insecticide performance. This includes optimum bio-efficiency and controlled migration of the insecticide to the fibre surface -- just enough to kill any mosquito on contact.

**Nick Hamon, CEO of IVCC,**

comments: "Partnering with Avient is an important step in our product portfolio development work. Improving our capabilities to develop and deliver new tools to help address the growing threat of insecticide resistance is critical if we are to achieve our mission of delivering a toolbox of effective interventions to eradicate malaria."

Avient, a leading sustainable solutions provider for synthetic fibre applications, enables enhanced fibre performance and colouration for more agile and environmentally friendly textile industry.

"Avient's collaboration with IVCC will enable LLINs manufacturers to transform their visions into ground-breaking products that improve quality of life in a meaningful way," said **Michael Adam, Global Technology Director at Avient.** "Working towards a solution that saves lives and improves public health aligns with Avient's sustainability goals and commitment to our communities, both local and global."

## Oerlikon Signs Agreement To Acquire INglass

Oerlikon, a leading provider of surface engineering, polymer processing and additive manufacturing, announced today that it has signed an agreement to acquire Italy-headquartered INglass S.p.A. and its innovative hot runner systems technology operating under its market-leading HRSflow business.

"The acquisition of INglass accelerates our strategy to expand into markets with strong growth potential. It will broaden our OEM customer base in other industries and put our polymer processing business on an entirely new growth trajectory," said **Dr Roland Fischer, Oerlikon Group CEO.** "Additionally, we expect this acquisition to create further synergies between our polymer processing and surface solutions divisions."

"With INglass, we are acquiring a leader in polymer flow control solutions with proven success in many markets," added **Georg Stausberg, CEO of the Oerlikon Polymer Processing Solutions Division.** "Our combined know-how and expertise in polymer processing and melt distribution engineering, our global market presence and our well-established brands make a winning formula and will advance our goal to become a leading supplier for polymer processing in an attractive and growing component solutions market."

The completion of the transaction is subject to customary regulatory approvals and closing conditions and expected to take place in the second quarter of 2021.

## Bio-Based Ice Cream Cups

The multinational ice cream manufacturer Froneri, a joint venture between Nestlé and R&R Ice Cream has placed an order with MPG Manifattura Plastica S.p.A

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cups made from

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produced from bio-based

naphtha offers virgin-like

performances with a reduced

carbon footprint and is fully recyclable.

MPG is

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production of rigid plastic food packaging from

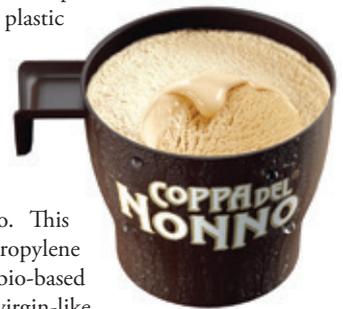
renewable feedstock.

This value chain partnership combines Total-

Energies' technologies and MPG's plastics conversion expertise to meet Froneri's sustainability

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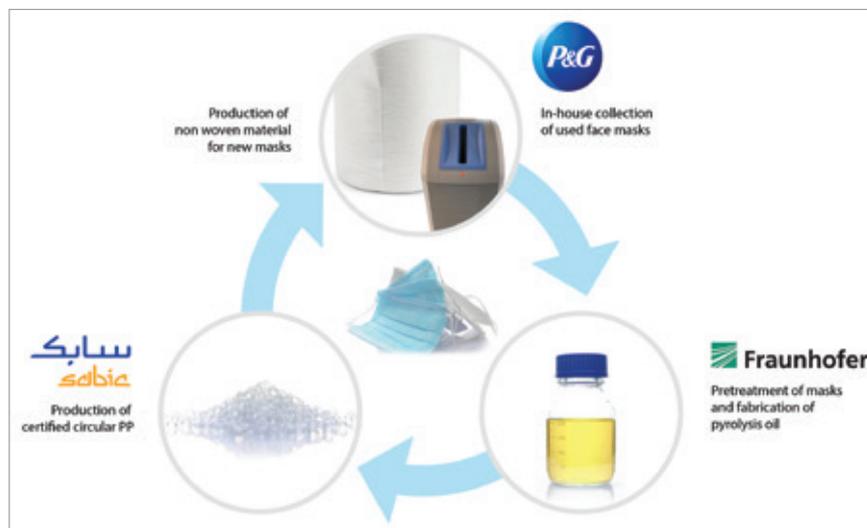
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# Face (mask) Off: Recycle & Reuse

Fraunhofer, SABIC, and Procter & Gamble join forces in a closed-loop recycling pilot project for single-use facemasks



**F**raunhofer Institute UMSI-CHT, SABIC and Procter & Gamble (P&G) have announced their collaboration for an innovative circular economy pilot project which aims to demonstrate the feasibility of closed-loop recycling of single-use facemasks.

Due to COVID-19, the use of billions of disposable facemasks is raising environmental concerns especially when they are thoughtlessly discarded in public spaces, including - parks, open-air venues and beaches. Apart from the challenge of dealing with such huge volumes of essential personal healthcare items sustainably, simply throwing the used masks away for disposal on landfill sites or in incineration plants represents a loss of valuable feedstock for new material.

“Recognising the challenge, we set out to explore how used facemasks could potentially be returned into the value chain of new facemask production,” says **Dr Peter Dziezok, Director R&D Open Innovation**

**at P&G.** “But creating a true circular solution from both a sustainable and an economically feasible perspective takes partners. Therefore, we teamed up with Fraunhofer CCPE and Fraunhofer UMSI-CHT’s expert scientists and SABIC’s Technology & Innovation specialists to investigate potential solutions.”

As part of the pilot, P&G collected used facemasks worn by employees or given to visitors at its manufacturing and research sites in Germany. Although those masks are always disposed of responsibly, there was no ideal route in place to recycle them efficiently. To help demonstrate a potential step-change in this scenario, special collection bins were set up, and the collected used masks were sent to Fraunhofer for further processing in a dedicated research pyrolysis plant.

“A single-use medical product such as a face mask has high hygiene requirements, both in terms of disposal and production. Mechanical recycling would have not done the

job”, explains **Dr Alexander Hofmann, Head of Department Recycling Management at Fraunhofer UMSI-CHT.** “In our solution, therefore, the masks were first automatically shredded and then thermochemically converted to pyrolysis oil. Pyrolysis breaks the plastic down into molecular fragments under pressure and heat, which will also destroy any residual pollutants or pathogens, such as the Coronavirus.” In this way, Hofmann adds, “it is possible to produce

feedstock for new plastics in virgin quality that can also meet the requirements for medical products.”

The pyrolysis oil was then sent to SABIC to be used as feedstock for the production of a new PP resin. The resins were produced using the widely recognised principle of mass balance to combine the alternative feedstock with fossil-based feedstock in the production process. Mass balance is considered a crucial bridge between today’s large scale linear economy and the more sustainable circular economy of the future, which today is operated on a smaller scale but is expected to grow quickly.

“The high-quality circular PP polymer obtained in this pilot demonstrates that closed-loop recycling is achievable through the active collaboration of players from across the value chain,” emphasises **Mark Vester, Global Circular Economy Leader at SABIC.** “The circular material is part of our TRUCIRCLE™ portfolio, aimed at preventing valuable used plastic from becoming waste

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and at mitigating the depletion of fossil resources.”

Finally, to close the loop, the PP polymer was supplied to P&G, where it was processed into non-woven fibres material. “This pilot project has helped us to assess if the close-loop approach could work for hygienic and medical-grade plastics,” says **Hansjörg Reick, P&G Senior Director Open Innovation.**

“Of course, further work is needed but the results so far have been very encouraging.”

The entire closed-loop pilot project from facemask collection to production was developed and implemented within only seven months. The transferability of advanced recycling to other feedstocks and chemical products is being further researched at Fraunhofer CCPE.

**About Sabic**

SABIC is a global diversified chemicals company, headquartered in



Riyadh, Saudi Arabia. SABIC supports its customers by identifying and developing opportunities in key end-use applications such as construction, medical devices, packaging, agri-nutrients, electrical and electronics, transportation and clean energy. Production in 2020 was 60.8 million metric tons.

**About Fraunhofer CCPE and Fraunhofer Umsicht**

The transformation from a linear to a circular plastics economy can

only succeed with a multi-stakeholder approach. The Fraunhofer Cluster of Excellence Circular Plastics Economy CCPE combines the competencies of six institutes of the Fraunhofer-Gesellschaft and cooperates closely with partners from industry. Together, they work on systemic, technical and social innovations and keep an eye on the entire life cycle of plastic products.

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UPDATE

**Beiersdorf selects SABIC certified renewable polypropylene for new NIVEA packaging**

SABIC recently announced that Beiersdorf will innovate the packaging of its world-leading ‘NIVEA Naturally Good’ range of face creams using SABIC’s certified renewable polymers. SABIC’s bio-based polypropylene (PP) resin, part of its TRUCIRCLE™ portfolio, will be used for producing the jars of Beiersdorf’s NIVEA Naturally Good day and night face creams. The new NIVEA packaging will be phased in at point-of-sale outlets worldwide from June 2021 onwards and make a major contribution to help Beiersdorf reduce its use of fossil-based virgin PP.

The new product is playing into Beiersdorf’s ambitious Sustainable Packaging Targets 2025 to reduce fossil-based, virgin plastic for its cosmetic packaging products by 50 percent. The new sustainable NIVEA jars pay into the Sustainability Agenda CARE BEYOND SKIN, by which the company is targeting a significant reduction of its car-

bon emissions and environmental footprint. The agenda has set three major packaging goals to be achieved by 2025 as compared to 2019: make all of the group’s packaging 100 per cent refillable, reusable or recyclable; increase the share of recycled materials in plastic packaging to 30 per cent; and reduce the use of fossil-based virgin plastics by 50 per cent.

“We are excited to implement this important change in the packaging of our NIVEA brand products and to be the first in the skincare mass market to use polypropylene made from second-generation bio-based feedstock on a global basis,” says **Michael Becker, Head of Global Packaging Development at Beiersdorf.** “Together with SABIC, we have taken a major step forward in transforming conventional fossil-based packaging in the cosmetics and skin care segment towards fully sustainable material alternatives.”

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# The Evolution of Packaging

**Packaging traditionally see-saws between flexibility and turnkey approach, more so in the pharma sector. Packaging companies have had to however change their focus and innovate as the race against the pandemic enters its second year. Here is a brief look at what the sector has been doing.**

By Kruti Bharadva

The pharmaceuticals industry is at the core of the manufacturing capabilities of any country and this importance has been brought to the forefront in an unprecedented manner. With the pandemic calling upon all industries to bring into action their very best innovation and resourcefulness skills, there is no doubt that the one sector which has been in the spotlight is the pharma and ancillary industries. This pressure to develop a vaccine and much needed other medicines also came with an impetus to the pharma packaging industry to keep pace, and in many cases, evolve at a greater speed –to get the medicines to the end-user in a safe, hygienic and efficient manner. There is no doubt that the past year has seen considerable use of technological concepts in pharma packaging solutions.

## Innovations at its Best

The Marchesini Group, an Italian based company, has introduced the ultra-technological blister line which includes the Integra 520 V and the fast bundler FA 04. Boasting of delivering 520 blisters and 500 cartons per minute, the line can pack blisters into cartons and bundle them at high speed. The Integra 520 V integrates two machines—a thermoformer and a cartoner and is the fastest robotised integrated blister line ever created by the firm.

Equipped with features of its previous model—the Integra 320, the new line also comes with new pushers, a drum-type carton opener



to deal with high speeds and a leaflet pick-and-place system. The blister line can be used for single-blisters cartons and the blisters are inserted into the cartons by an ingenious product insertion unit, the MA 500. The company states that the MA 500 is designed to handle all kinds of carton closure: tuck-in or glued flap and various other combinations. The new fast bundler FA 04 can handle a production flow of 500 cartons per minute, arranged in 50 bundles of ten cartons.

## Small Footprint

The ACG Group is another heavyweight from this sector. The company has recently introduced the NXT Series, a comprehensive portfolio of pharmaceutical production, inspection and packaging equipment. The next-gen series comprises machines ranging from tablet presses to blister and carton packing equipment to

serialisation units for track and trace applications. The firm has labelled them as Protab 300 NXT, Protab 700 NXT, BMax NXT, KartonX NXT and Verishield CS18 NXT.

With stunning elements such as the Ultra HMI, Stealth Design, Explore AR (Augmented Reality) and Reveali OT, the series offers many plus points to the industry. The Ultra HMI system requires minimal human-machine interaction and is capable of seamlessly controlling high-precision, contamination-free machines. A simplified operator experience, better data visualisation, and a decision dashboard are also provided to the user.

Whereas, the Stealth Design element ensures that the machine is versatile and occupies a smaller footprint while delivering maximised output. According to the firm, the Explore AR element boosts process efficiency with the assistance of Aug-

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mented Reality. Process downtime is reduced; maintenance issues are identified and resolved quickly and enable the manufacturing process to function at an optimised pace. Some of the other features of this element include real-time monitoring, remote diagnosis and proactive service support, proactive maintenance and more realistic operator training. Lastly, the Reveali OT element is the company's IIOT platform which is responsible for inter-machine connectivity and smart manufacturing processes via easy-to-read dashboards detailing difficult to measure KPIs.

**Perfect for Medium Batches**

Perfect for medium batch sizes, Romaco Noack's NBL 400 blister line boasts an output of 400 blisters and up to 300 cartons per minute. The versatile and flexible line comprises a blister machine with rotary sealing and a continuous motion cartoner. The blister line is user-friendly and does not require special skills to operate it. In terms of configurations, tablets and capsules with different specifications can be placed in the blister cavities either individually or using a brush-box feeder.

Another advantage with this machine is that the products can be fed manually, this proves ideal for sample packs or very small or clinical batches. The durable line can process any standard thermoformable laminate and be used for manufacturing aluminium-aluminium blisters, which opines the firm. The cavity geometries have been designed by Romaco's software solution—Blister Magic. It is also utilised to develop individual packaging layouts. The company states that this innovative tool provides a very quick and easy route to customise blister packaging.

**Multiuse Concept**

Pharma machinery manufacturers

**THE PRESSURE TO DEVELOP A VACCINE AND MUCH NEEDED OTHER MEDICINES ALSO CAME WITH AN IMPETUS TO THE PHARMA PACKAGING INDUSTRY TO KEEP PACE, AND IN MANY CASES, EVOLVE AT A GREATER SPEED TO GET THE MEDICINES TO THE END-USER IN A SAFE, HYGIENIC AND EFFICIENT MANNER**

are also adding new elements to their solutions. For instance, the German company Optima Packaging Group has introduced its turnkey project for pharmaceutical products which comprise comprehensive processes for filling and closing, isolator technology and pharmaceutical freeze-drying. The firm's Optima Multiuse system concept is exclusively designed for small to large batches of high-value, expensive drugs. With the assistance of robotics and cross-interface programming, the system offers maximum flexibility.

The company's freeze-drying systems can be incorporated in turnkey projects as well as single applications. The energy-efficient systems can be used for small to large batch sizes and its product portfolio covers the entire range from laboratory systems to large scale manufacturing plants.

The isolator technology by the firm's subsidiary Metall+Plastic is also incorporated in the turnkey plants which makes it convenient to carry out the Decopulse decontamination process. The innovative process is capable of vaporising H2O2 at room temperature. According to the firm, with the combined benefits of both the isolator technology and the Decopulse decontamination process, extremely fine atomisation and particularly uniform distribution of H2O2 is made possible. The greatly reduced use of H2O2 leads to huge reductions in cycle times.

**Blister Packs with Extra Moisture Protection**

The global packaging company Amcor collaborated with GSK and CAM-Partena, the machine manufacturer, to work towards the development of a unique blister pack for one of GSK's antibiotic. This medicine which is highly sensitive to moisture had to be used in Pakistan's tropical climate and hence, required extra protection. As a result of the partnership, the companies were able to find a solution based on the Formpack Dessiflex Ultra, a desiccated blister system with a special lidding foil. The new blister system absorbed the moisture before it entered the cavity and dried the atmosphere of the cavity post the packaging process. The Formpack Dessiflex Ultra new blister system was able to offer many benefits as compared to standard aluminium blisters or the previous packaging of the medicine which was in a glass bottle

**The Good Thing out of the Pandemic**

The packaging industry for pharmaceuticals has grown leaps and bounds over the challenging past year and continues to do so. The rising awareness of the need for a circular economy as well as prompted companies to challenge their base packaging raw materials and replace them with greener alternatives. Hopefully, this impetus remains unchecked and we can be witness to eco-friendly packaging of drugs as a norm in the coming years. 📌

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# Perfecting your Purging Procedures

**Determining the source of streaking or contamination in your molded parts is a critical step in perfecting your purging procedures, ultimately saving you time and money. We take a closer look at the nitty-gritty details of purging.**

By Kruti Bharadva

Part contamination in the form of streaking and/or black specks is a common problem in injection molding. Once you find contamination, the next task is to determine the source of the problem. In this article, we will address how to locate the problem area and then provide some purging procedures to deal with specific areas of concern. This will streamline the purging process and allow you to utilise your purging compound in the most cost-effective manner.

## Determining the Source

If the streak or contamination shows up randomly, it's likely to be in the barrel or feed system. Colour or degraded resin may be trapped in a negative-flow area. There may not be enough physical turbulence in the area to remove all the contamination and the next material only picks up trace amounts that show up intermittently.

At this point, don't discount resin issues. Examine your resin for specking and be sure that the drying system is working reliably. Dirty filters in a feed system can wreak havoc. Regrind—if used—is another possible culprit, caused by poorly cleaned grinders, fines, and dust. If the cause is not in the feedstock, then it may be in the barrel. Long residence times



can lead to degradation and cause black specks. Remember this rule of thumb: Use 25 per cent to 65 per cent of the barrel capacity when choosing the best-sized machine for your job.

Oil seeping into the barrel on older machines—from seal failure—is another possible culprit. To determine if the barrel is the issue, run shots of purge compound through the barrel. Be sure that the barrel is full to ensure that any material left behind in a dead spot is also being picked up. Examine the purge pile for specks and uneven colour distribution. If there are random specks or streaks in the pile, then your problem likely lies with the screw and barrel. If the contamination shows

up at the same spot every time, it's likely to be entrapped in the nozzle, hot runner, or barrel.

If you have determined that the contamination is not in the barrel, then run purge shots through the hot runner to determine whether the contamination is downstream in the manifold or gates. One or more gates may be more problematic than others due to an uneven flow pattern in the manifold, so examine each purge pile individually. Be sure to check with your purging compound supplier first to determine whether the purge compound is suited for hot runners. Mixing nozzles and colour-dispersion discs are extremely difficult to purge. They are notorious for cracking, which allows colour and carbon build-up. Due to the non-Newtonian flow of plastics, a colour streak will follow the flow pattern and deposit itself in the same place. Knowing this, the further from the gate the consistent colour streak shows up, the further back in the barrel the problem is occurring. If the colour change does not show up as a streak, but as a burst of colour, then the contamination may be coming from your feed throat. Colour-concentrate pellets may be caught up in the throat, hopper, or feeding system. Even one colour-concentrate pellet can cause a significant colour change.

## Solving the Problem

If the streaking or contamination is in the barrel, try one or more of the following:

- Raise the barrel temperature by approximately 50–100° F (28–56° C) above the normal operating

**TO DETERMINE IF THE BARREL IS THE ISSUE, RUN SHOTS OF PURGE COMPOUND THROUGH THE BARREL. BE SURE THAT THE BARREL IS FULL TO ENSURE THAT ANY MATERIAL LEFT BEHIND IN A DEAD SPOT IS ALSO BEING PICKED UP**

temperature. This will lower the viscosity of the resin, allowing it to be flushed out more effectively by the purging compound. Always stay within the recommended safe temperature range of the resin and purging compound to prevent degradation.

- Run several short bursts of agitation at higher screw speed. This loosens the colour of carbon. Subsequently slowing the screw speed allows the purge to expand and then push the loosened contamination out.
- Increase the screw rpm and/or backpressure to improve results by adding force and agitation to the purging process. Be sure to use enough material to fill the barrel, so the purging compound can scrub and push through contamination.
- If your contamination is at the check ring, run several short, high-velocity shots. This should help to dislodge and remove build-up around the check ring.
- Shut down the machine between a resin or colour change to allow for additional contamination to be removed from the barrel and screw. Leave a full barrel of purging compound in the machine, then turn the machine off and

let it cool down. This cooling process allows the purging compound to bond with any residual contamination on the surfaces during cooling. On startup, the purging compound will flush the contamination out of the machine. If performed regularly, this is also a good preventive-maintenance procedure to keep build-up from forming on the surfaces of the screw and barrel. If the problem is in the hopper or feeding system, try the following:

Implement a standard procedure to clean the hopper and magnets thoroughly with an air hose and/or



**IF THE STREAK OR CONTAMINATION SHOWS UP RANDOMLY, IT'S LIKELY TO BE IN THE BARREL OR FEED SYSTEM. COLOUR OR DEGRADED RESIN MAY BE TRAPPED IN A NEGATIVE-FLOW AREA.**

soft cloth, both before introducing the purge and before introducing the next resin. Check all auxiliary feeding equipment to ensure that no pellets are caught in corrugations or on hidden shelves.

Avoid clumping or "balling up" in the feed throat by keeping it cool. The temperature of the throat coolant should be maintained at 80-120 F

(27-49 C). It is best to control the feed throat temperature as close to 100 F (38 C) as possible. In humid weather, the temperature should be just warmer than the dewpoint to avoid condensation. Also, in some cases, keeping the screw turning at a low speed will help to prevent bridging. 

Source: White paper, *Plastics World Technology*

## UPDATE

### Archroma launches its new 'Colour Atlas'

In 2016, Archroma launched the Colour Atlas by Archroma®, a unique tool dedicated to providing fashion designers and stylists with off-the-shelf colour inspiration for cotton that can be implemented in production with just a few clicks. Building on this success, Archroma is now introducing a Colour Atlas library with 1'440 colours carefully selected in collaboration with fashion, sportswear and trend experts.

The new Colour Atlas by Archroma® Polyester Library brings together colours in line with current trends, from the most neutral tones to the most vivid hues to fluorescent colours.

In line with the most demanding performance specifications, the shades of Archroma's first Colour Atlas by Archroma® Polyester Library are characterized by their:

- Excellent resistance to washing, so that they can be easily used for the design and production of sportswear fabrics and articles
- Achievability and reproducibility in global production supply chains,
- Compliance with the main ecological standards, such as bluesign®, Oekotex® or ZDHC, as well as the specifications of major brands

# Inspired by Nature

A project researching the effects of structural colouration in nature and translating the same for pigmentation in industrial applications

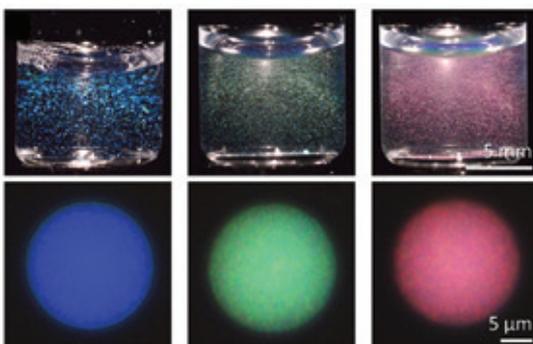
By Ulrike Kauscher Pinto

**H**ave you ever wondered how peacock feathers shine with so many brilliant colours all at the same time? In contrast to pigment-based colouration, many materials are coloured through a phenomenon called “structural colouration” where colours are formed because of the reflection of light by periodic microscopic structures on their surface. These structural-based alternatives can be more vibrant, durable, and eco-friendly.

“Structural colouration’ is responsible for many of the most vibrant colours in nature,” says Professor Silvia Vignolini from the University of Cambridge. “From the metallic wing of the Morpho butterfly to the vibrant feathers of the peacock. In these natural examples, intense colouration is produced not by the absorption of light, but instead from the reflection of light from precisely defined nanoscale architectures.”

Peacock feathers, for example, contain brown pigments, but due to tiny structures found on the feathers’ surface that reflect only specific wavelengths of light, they appear blue, turquoise, and green depending on the viewer’s angle.

Vignolini is part of a team of experts, including Dr Richard Parker, seeking to utilise structural colouration to overcome some longstanding challenges in the industry. Finding a sustainable and non-toxic alternative to the many colouring techniques used today — many dyes are toxic or produce toxic waste during synthesis — is a long-time goal.



“We report a simple and scalable route to produce new pigments, exploiting the principle of structural colour that could be used as a replacement for colourants in paints or passive displays,” she explained.

As such, extensive research efforts have been invested in developing what are called “photonic materials”, which produce colour due to their controlled interactions with light. However, there is still a hitch to their widespread application.

“While photonic materials capable of producing vibrant colours have been extensively studied,” said Vignolini, “they are typically focused on nanostructured systems with long-range order.”

## New edge Nano Structure

Long-range order refers to the “orderliness” of nanostructures on the material’s surface over specific intervals larger on the microscale. This is a problem because while these types of materials are easier to make, they are naturally iridescent, meaning they gradually change colour as the angle of view or illumination changes, like a soap bubble or oil in water. This makes their colouring difficult to control.

“To produce a non-iridescent photonic material, it is instead necessary to ensure there is an only short-range correlation, which exhibits surface arrangements within the nanoscale,” added Vignolini. “However, these materials are challenging to fabricate in a reproducible and scalable manner, arising from the need to precisely control the degree of disorder in the system.”

In a study published in *Advanced Materials*, the team succeeded in solving this challenge by introducing a new and elegant way of producing nanostructured microparticles with precise control over their dimensions for short-range order. Vignolini highlights that “the vibrant palette of colours was prepared from a single polymer brush, avoiding the need for complex synthesis. Their method is based on a single and scalable self-assembly of “bottle-brush” block copolymer, named after their molecular structure, which resembles that of a bottlebrush. “Block copolymers have been shown to self-assemble into a wide library of architectures and structures, however, the dimensions are typically too small to produce photonic structures,” said Vignolini. “By using rigid polymer brushes we can translate such architectures to a scale that can interact with visible light.”

To begin, these polymers are dissolved in micron-sized drops of toluene, after which water is controllably diffused into these droplets. “This is then stabilised by the polymer brushes, which act much like giant soap molecules,” said Vignolini.

This is because the bottle brush

polymers form micelles — spherical arrangements with the “water-loving” portion of the polymer facing inward, and the non-polar or “solvent loving” portion of the polymer facing outward, toward the toluene. As a result, they form a polymer coat that stabilises the water droplets within the solvent.

“As the drop of toluene then dries, the similarly sized water droplets (coated with a layer of the polymer brushes) are packed tightly together,” she said. “Upon complete drying, the water evaporates to leave behind a porous particle with thin walls made from the polymer brushes.”

This technique allowed the team to structure the polymers on the nanoscale. Crucial here is the formation of similar-sized pores with precise separation, retaining a certain degree of disorder due to the deformable droplets. “It is this combination of short-range order between the pores, and lack of long-range order across the particle that gives rise to the unique optical properties of these microparticles,” stated Vignolini.

**WE REPORT A SIMPLE AND SCALABLE ROUTE TO PRODUCE NEW PIGMENTS, EXPLOITING THE PRINCIPLE OF STRUCTURAL COLOUR THAT COULD BE USED AS A REPLACEMENT FOR COLOURANTS IN PAINTS OR PASSIVE DISPLAYS**

The researchers found they can even tune the structural colour from red through green to blue just by changing the amount of water being introduced into the toluene bubble. “By controlling the amount of water introduced to the toluene drop, we can control the size of the water droplets,” added Vignolini. And with it, the pore sizes of the resulting microparticles.

She continues that this procedure does not rely “on the droplet interface to directly template the assembly process, which offers the advantages of a high tolerance to structural defects, a rapid fabrication time, and colour-independence from the microparticle.” Furthermore, one type of polymer brush results in several vibrant colours, ultimately avoiding complex synthesis steps.

“The biggest barrier to translat-

ing this technology into industry,” Vignolini said, “is the synthesis of the polymer brushes, which currently relies upon expensive catalysts and precise chemical synthesis. As concerns over microplastics in the natural environment continue to grow, the degradation pathways of such photonic pigments need to be taken into consideration.”

As such, the future of this project will be spent focusing on the development of “a new generation of polymer brushes that employ biopolymers as building blocks and exploit scalable, green synthetic pathways,” she concluded. 

*Reference: Tianheng H. Zhao, Angular-Independent Photonic Pigments via the Controlled Micellization of Amphiphilic Bottlebrush Block Copolymers, Advanced Materials*

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# Taking on the 'New Normal'

In an interview with ET Polymers, **Rahul Tikoo**, Managing Director – India Sub-continent & Polyurethanes South Asia Business, Huntsman Corporation, talks about how the company is forging ahead and embracing the 'New Normal' in the pandemic aftermath.

By Kruti Bharadva

## How has Huntsman India been dealing with the new restrictions imposed by the government?

Much like this time last year, the safety and wellbeing of our employees, customers and suppliers remain our topmost priority. With a second surge observed in the number of Covid-19 cases, we continue to take all the necessary precautionary measures across our sites to help curb the spread of infection. While a major part of the Huntsman India Centre has been functioning remotely, our manufacturing facilities have been operating to an extent of providing support to essential industries. We have been working towards ensuring the safety of our employees while also enabling continued operations, through a series of measures across our corporate office and sites such as frequent RT-PCR tests for employees, daily site fumigation, and social distancing and hygiene protocols. Further, we also conduct recurring maintenance checks for the machinery at our sites to ensure the safety of those operating the machinery.

## How would you analyse the overall chemical industry in India?

One thing the pandemic has taught us is that being agile and flexible will always be critical. While the Covid-19 outbreak has proven to be a disruptor, it has also provided us with an opportunity to innovate and reinvent ourselves. For instance, we have leveraged technology to remain connected with our customers and developed customised products to cater to their evolving needs. As the crisis continues, it has become evident that identifying effective

ways of working, collaborating and challenging the status quo is the only way forward for the industry. To become a USD300 billion industry by 2025, we must continue building on innovation, invest in the right capabilities including talent, and leverage new opportunities as well as technologies to ensure sustained growth for the sector.

## Has the pandemic expedited the Indian chemical industry's digital transformation? What is Hunts-



ONE THING THE PANDEMIC HAS TAUGHT US IS THAT BEING AGILE AND FLEXIBLE WILL ALWAYS BE CRITICAL. WHILE THE COVID-19 OUTBREAK HAS PROVEN TO BE A DISRUPTOR, IT HAS ALSO PROVIDED US WITH AN OPPORTUNITY TO INNOVATE AND REINVENT OURSELVES

## man India doing in this context?

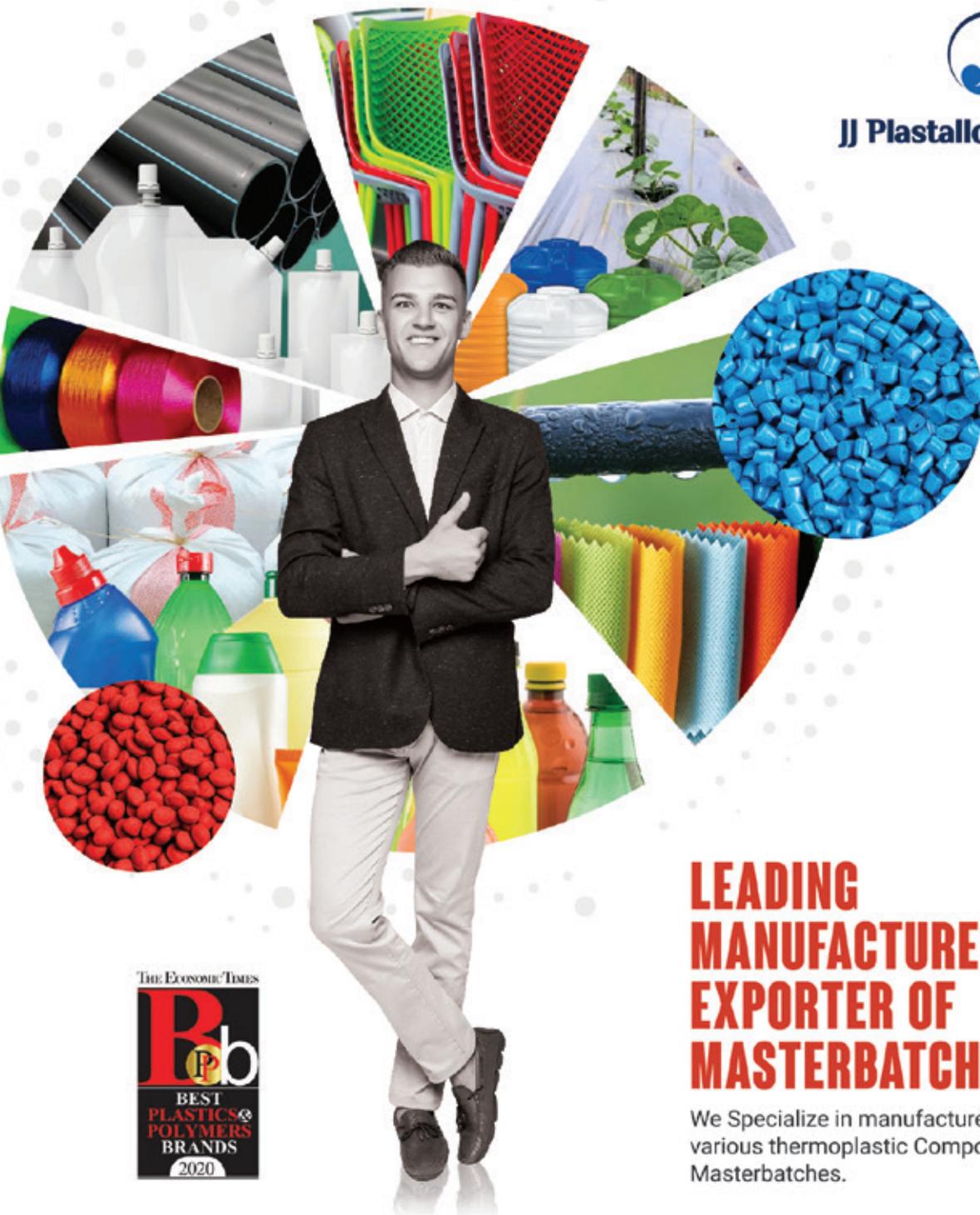
While technology has always been one of the key factors leading the transformation of the chemical sector, the application of advanced digital technologies has now gained more attention given the growing uncertainties caused by the ongoing crisis. The industry has made significant progress with maintaining a digital connection with stakeholders, however, digital transformation runs beyond excelling communication channels. For instance, digital technologies can aid in co-creating with customers, rapid prototyping and product development, bringing efficiencies in manufacturing, offering a data-driven approach to drive optimization of networks, providing real-time support to customers and enhancing the robustness of supply chains. At Huntsman, we are adapting to these transformative steps with a clear view of improving our customer experience.

## What are the priorities outlined by Huntsman India?

One of our key focus areas, as a brand, will be to continue driving sustainability through innovation. It is not only about developing new products but how sustainable these are for the value chain, including augmenting and making production practices more sustainable for us, and our customers. We will continue to support our customers through the development of these solutions to help them achieve better resource optimisation and cost-efficiency. For instance, Huntsman's AVITERA® SE range of innovative reactive dyes that helps manufacturers achieve energy and



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water savings of up to 50 per cent. Additionally, Huntsman's TEROL® range of polyester polyols transforms plastic waste into energy-saving insulation. It enables the use of waste PET (polyethylene terephthalate) bottles, through a proprietary process, utilising the equivalent of one billion 500 ml PET bottles per year.

**With regards to the key industries that Huntsman India caters to, what has changed in terms of the market strategy for you given the fact that the pandemic has had a varying effect on each of these sectors you cater to?**

We at Huntsman cater to many industries and are not reliant on one specific industry. Moreover, our exposure across value systems and the overall consumption pattern has helped us stay ahead of the curve. For instance, we have optimally used the available technology to stay virtually connected with our customers, thereby giving them the much-needed access and assurance during trying times like these.

**There has been a gradual increase in the use of Polyurethanes and advanced materials in automotive applications. Do you see this trend to continue in the view of stricter safety and emission norms being adopted in India?**

We see every challenge as an opportunity worth exploration to reinvent ourselves as a brand. I believe that polyurethanes will continue to play an important role in addressing notable global trends. The most efficient thermal insulant, the MDI based polyurethanes are widely used to deliver energy savings across domains. With a tectonic shift towards a sustainable automobile sector, there has been a major change in the way vehicles are being built and driven. Huntsman polyurethanes play an important role in providing lightweight materials, ensuring

**WITH A TECTONIC SHIFT TOWARDS A SUSTAINABLE AUTOMOBILE SECTOR, THERE HAVE BEEN MAJOR CHANGES IN THE WAY VEHICLES ARE BEING BUILT AND DRIVEN.**

better safety and a significant reduction in emissions. Huntsman understands the EV market well since we have been catering to the segment for a long time. This has enabled us to be in a good position to work with the industry and understand and address challenges that might crop up.

Similarly, for the Advanced Materials business, there lies a great opportunity to continually evolve and adapt as per customer requirements. Huntsman Advanced Materials offers multiple innovative lightweight solutions through its Araldite range of Industrial solutions, such as composite resin systems, encapsulants and adhesives dedicated to the automotive industry. Our specific range of Araldite® systems for the automotive industry meets customer needs for high performance, reduced production cycles, fire resistance and aesthetics. Araldite® composites solutions offer a broad portfolio of epoxy resin systems for manufacturing automotive body in white parts, binders for performing, leaf springs, pressure vessels, wheels and battery housings. We also have a wide range of reliable thermal management solutions that answer the most stringent requirements for e-mobility applications. Araldite® encapsulants protect sensitive devices, improve thermal management and meet new temperature resistance requirements, and flame-retardancy (UL94 V0/HB and EN 45545-2 qualification).

**How do you look at the prospects of the Huntsman Polyurethanes business in India in the new normal?**

The polyurethanes sector is quite a versatile one, highly driven by evolving applications and consumer preferences. Polyurethane, as a mate-

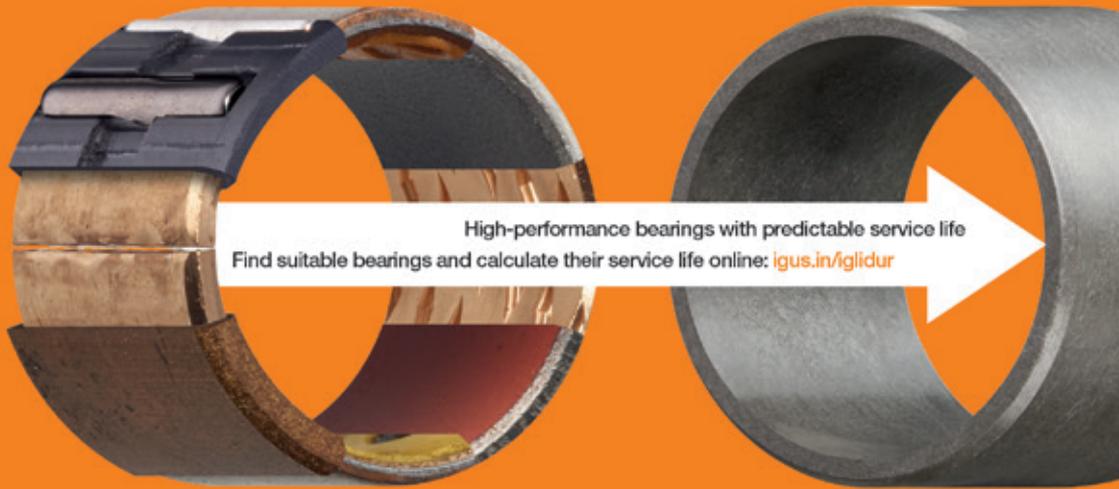
rial is lightweight, and offers a wide range of applications and properties such as good aggression, tensile strength, and good insulation properties. Huntsman is one of the global leaders in MDI-based polyurethanes and the business offers end-to-end solutions for industries such as packaging, footwear, construction, automotive, cold chain and bedding to name a few. We see infinite opportunities on how we can help transform efficiencies in e-mobility globally. This will only lead to an increase in demand for polyurethanes.

**Your outlook for the overall chemical industry in India for the next two years?**

The chemical sector is expected to grow at 1.2x-1.3x of the GDP multiplier in the coming year. It further expects favourable market conditions across the broader subsectors along with a healthy rebound among end-user industries. Moreover, the government has stated that the Indian chemical industry has an opportunity to attract investment of about Rs 10 lakh crore by 2025 as the country offers a location advantage. Further, recent developments including production linked schemes for key end-user segments, greater emphasis on infrastructure spending, reduction in import duty of key feedstock have also been key indicators of rapid growth for the sector in the coming years. India presents an attractive opportunity for exponential growth in the coming years supported by various social, geopolitical and economic factors. India's favourable demographic dividend, availability of talent, largest working-age population will likely be significant growth drivers for the chemical sector. 

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# UNSHAKABLE VALUES, UNSTOPPABLE GROWTH



An exclusive interaction with Parag Chheda, Joint Managing Director and Nihar Chheda, Vice President- Strategy, Prince Pipes & Fittings Ltd, ET Polymers takes a comprehensive peek into the inner workings of this family-run company which continued to deliver strong performance led by healthy growth in agriculture and plumbing segments, improved operating efficiency and cost optimisation measures. The company, over the period, has made multiple strategies to embark on its journey to the next level and sustain the business in the long run with the tie-up with Lubrizol and Tooling Holland. We expect the company to sustain its leadership by leveraging manufacturing expertise, distribution network and competitive agility.

L to R: Mr Jayant Shamji Chheda, Chairman; Mr Nihar Chheda, Vice President-Strategy;  
Mr Vipul J Chheda, Executive Director; Mr Parag J Chheda, Joint Managing Director

By Kruti Bharadva

**D**rip, drip, drip go the pipes as Akshay Kumar (think tall, good looking, Indian movie star) sits with his head in hands and his 'family' dances around him in typical Bollywood fashion – berating him for choosing pipes which leak, for their dream home. And then Akshay Kumar looks at you right in the eye and tells you, “Don’t commit the same mistake, choose Prince Pipes, the Zero Defect manufacturing process!”

If I hadn’t already been sold by now (to the ‘Jeevan mein aayi tsunami’ jingle (A tsunami came into my life) and Akshay Kumar of course), an interaction with two generations of the Chheda family – founders of Prince Pipes and Fittings Ltd – certainly did. The Et Polymers team, in tête-à-tête (virtually) with Parag Chheda, Joint Managing Director and Nihar Chheda, Vice President-Strategy, found out how the company continues to benefit from market consolidation, steady Capex plan,

and imminent opportunities in the pipe segment.

### **An Ethos of Ethics and Integrity**

In 1987, Mr Jayant Chheda, Chairman, Prince Pipes & Fittings Ltd, laid the foundation of what the company was to grow into – both literally and figuratively– by opening the first manufacturing unit for PVC products, and installing in all business activities the core aspects of ethics and integrity. These were the first building blocks and the company continues to stand on and build upon these through three generations.

“We have, since 1987, emerged as one of India’s fastest-growing, multi-polymer processing company providing integrated piping solutions, and we do this with ethics and integrity. All our strategic efforts towards growth and expansion incorporate these values and it has remained unchanged through



the years and generations,” stated Mr Chheda.

“It is very important that the basic principles and fundamentals, set generations before, remain unchanged. As the company evolves, and strategies evolve, our core principals, our values, our very foundations should remain steadfast and intact,” Nihar affirmed.

**IT IS VERY IMPORTANT THAT THE BASIC PRINCIPLES AND FUNDAMENTALS, SET GENERATIONS BEFORE, REMAIN UNCHANGED. AS THE COMPANY EVOLVES, AND STRATEGIES EVOLVE, OUR CORE PRINCIPALS, OUR VALUES, OUR VERY FOUNDATIONS SHOULD REMAIN STEADFAST AND INTACT**



### **Building Up the Brand**

A brand is nothing but an expression of consumer’s loyalty and trust. And Prince Pipes certainly has one of the biggest portions of the pipes and fittings pie – being the manufacturer of choice in plastic pipes in at least three-quarters of the country.

“We have been investing intensively and consistently into building our brand amongst the stakeholders of the industry, and trying to drive a higher range of brand consciousness, over the past few years,” informed Nihar.

A key factor in building up brand awareness is through strategic and technical tie-ups. Companies regularly seek partners with complementary capabilities to gain access to new markets and channels and build entire portfolios of practical and value-creating partnerships. Such a partnership is the one

between Prince Pipes and Lubrizol. Headquartered in the United States, Lubrizol is the inventor and global leader of CPVC compounds, servicing hot and cold water plumbing markets worldwide.

Through this strategic partnership, Prince Pipes consumes Lubrizol's raw CPVC material and is also a licensee of FlowGuard Plus - one of the safest, most reliable and cost-effective plumbing solutions that has been part of Indian residential and commercial buildings for more than two decades.

"Our association with Lubrizol expands our capabilities and strengthens our agility in the marketplace. Prince Pipes' robust distribution network combined with Lubrizol's brand equity is set to create a strong and sustainable partnership in the piping Industry. We understand India's evolving needs and are committed to leveraging new technologies to offer homeowners, consult-

ants and builders the advantage of a preferred global brand and best-in-class product," stated Mr Chheda.

Last year, the company also announced a technical collaboration with Tooling Holland BV, to strengthen technical competence and enhance operational efficiencies. Tooling Holland BV is a privately held company with over 30 years of experience in the development and production of injection moulds. The company specialises in the manufacture and exports of moulds for fittings (16-1000 mm), crate and container moulds, thin-wall packaging moulds and PET preform moulds.

This association enables Prince Pipes to draw upon Tooling Holland's technical expertise and deep knowledge, build skills at par with international standards, significantly enhance internal operational efficiencies and optimise production costs.

"Our collaboration with Tooling Holland BV is very exciting for

us as they bring tremendous expertise in plastic mould manufacturing. This alliance provides great impetus to our growth plans and our firm commitment to build and offer superior products, aligned to global standards and at competitive costs. They are also pioneering in critical technologies which will help us build our competitive edge," explained Mr Chheda.

### Connecting with the End-User – The Plumber

To drive and build a strong connect with plumbers, Prince Pipes organises special plumber workshops and meets, where plumbers are given detailed information on techniques, new products and any other methods which make their work easier.

"The central aim to any branding strategy is to of course drive home the name of your brand in the minds of your end-user and decision-maker – in our case, the plumber," emphasised Nihar.

He resumed, "Our goal is not to just sell our products to the plumber community, but to enhance their profile and therefore in the process, enhance our profile and brand loyalty. We also have structured training programs wherein we host the plumbers at our manufacturing units and show them the manufacturing processes, quality checks in place, etc."

One of the most successful initiatives though has been the 'PRINCE UDAAN LOYALTY PROGRAM' -India's first loyalty program in the pipes and fittings industry, with over 160,000 registered members. PRINCE UDAAN is a platform of equal opportunities that gives everyone including the company's wholesalers, retailers and plumbers a chance to earn more, earn fast and earn with pride. Launched in November 2016, the program received an overwhelming response that by 2018, PRINCE UDAAN had already gone digital as 'one app, one tap' solution covering both iOS and Android.

My favourite initiative though





had to be the celebration of a 'world plumbing day' and the launch of the 'plumbing song' – what a great way to earn the loyalty of your customers!

### The Numbers says it all

The company reported an impressive 25.7 per cent year-on-year volume growth driven by strong growth in its plumbing portfolio. Higher inventory gains (Rs 300 million-350 million), operating leverage and superior pricing power

led to a sharp beat in its Q4FY21 EBITDA margin at 19.3 per cent. This was achieved despite a marked increase in its brand spend, which was higher at 4.5 per cent of sales vs 2-2.5 per cent normal quarter. The company management has guided for a 13-14 per cent EBITDA margin with an upward bias on the back of likely operating leverage, superior product mix and logistics cost savings with Telangana facility likely to ramp

up production in the near to medium term.

- The company posted strong volume growth of 25.7 per cent on the back of improvement in sales from plumbing and SWR and higher focus on CPVC pipes in projects business post-Lubrizon tie-up.
- EBITDA margin at 19.3 per cent was led by inventory gains of Rs 300 mn-350 mn during the quarter although some of the gains were passed on to dealers as well. Margins also expanded due to superior pricing power, better mix and operating leverage.
- Brand expenses during the quarter saw a sharp jump to 4.5 per cent of sales from the usual 2-2.5 per cent due to its dealer incentive program and advertising expenses. The company will continue to focus on Udaan, its dealer incentive program which is likely to drive brand pull.
- The company has been building projects/B2B team for its new CPVC flow guard pipe segment.
- Plumbing and SWR mix for FY21 stood at 69 per cent vs 66 per cent in FY20 with higher sales of CPVC plumbing sales post Lubrizon tie-up
- CPVC prices were hiked in Dec'20 and Mar'21; prices are now likely to remain firm in the

Prince Pipes and Fittings, May 14, 2021

Source: ICICI Securities

Table 1: Q4FY21 result review

(Rs mn, year ending March 31)

Particulars	Q4FY21A	Q4FY21E	Q4FY20	YoY (%)	Q3FY21	QoQ (%)	FY21	FY20	YoY (%)
Net Sales	7,614	6,300	4,308	76.7	5,490	38.7	20,715	16,357	26.6
Total Op. Income	7,614	6,300	4,308	76.7	5,490	38.7	20,715	16,357	26.6
Expenditure	6,146	5,205	3,731	64.7	4,461	37.8	17,099	14,069	21.5
Raw Materials	4,833	4,100	2,882	67.7	3,446	40.2	13,442	10,779	24.7
Cost of traded goods	128	155	112	14.4	117.5	9.2	346.6	484.9	(28.5)
Staff Cost	275	300	242	13.7	275	0.0	997	892	11.7
Other Expenditure	910	650	496	83.6	622	46.2	2,313	1,912	21.0
Operating Profit	1,468	1,095	576	154.7	1,029	42.6	3,616	2,288	58.1
OPM (%)	19.3	17.4	13.4	590bps	18.8	50bps	17.5	14.0	350bps
Other Income	45	48	52	(13.1)	46.3	(2.9)	176.0	69.4	153.4
Interest	50	40	62	(39.5)	35	41.2	207	332	(37.7)
Depreciation	151	165	144	4.9	151	0.1	594	520	14.3
Exceptional income	0	0	0		0		0	0	
PBT	1,312	938	402	226.5	890	47.5	2,992	1,506	98.7
Tax	340	221	119	185.2	222	53.3	773	381	103.1
PAT	972	717	283	243.8	668	45.6	2,218	1,125	97.2
Minority Interest	0.0	0.0	0		0.0		0.0	0.0	
Reported PAT	972	717	283	243.8	668	45.6	2,218	1,125	97.2
NPM (%)	12.8	11.4	6.6	620bps	12.2	50bps	10.7	6.9	380bps

Source: Company data, I-Sec research



Work in progress at Prince Pipes Manufacturing Plant

near term despite the recent decline in PVC prices.

- PVC resin consumption industry has declined by 15 per cent in FY21 while the company has posted a growth in the PVC pipe segment thereby, increasing its market share.
- DWC pipe segment posted a high double-digit growth in FY21 driven by a low base contribution from the tank segment remains insignificant.
- The company is now a long-term debt-free company with short-term debt at Rs 850 mn vs overall debt of Rs 2.6 bn a year ago.
- The number of distributors increased by 50 in Q4FY21.
- While PPF is likely to spend Rs 400 mn-500 mn towards maintenance Capex, the Telangana plant may see incremental investment to the tune of Rs 900 mn-950 mn in FY22.

- The company has a dominant position in North and West markets while it is amongst the top two players in East.

**Closer to Market**

Prince Pipes follows a distribution led business model and to this end, it is vital to be strategically located near your core markets.

“In line with our vision to be closer to market and optimise the supply chain function, our manufacturing units – seven in total- are strategically located. We also have an excellent warehouse location, pan-India. Our 7th plant, in Telangana, has just commenced commercial production in the last quarter, and it was fuelled by the IPO proceeds in December 2019,” expressed Mr Chheda.

The other six manufacturing plants are in Silvassa (two), Haridwar, Chennai, Kolhapur and Jaipur

and have a cumulative installed capacity of approximately 270,00 metric tones and with a production capacity of 200,000 metric tones per annum. “The Telangana unit will now bump up cumulative installed capacities to approximately 300,000 metric tones per annum,” added Nihar.

In addition to the manufacturing units, Prince Pipes also has two contract manufacturing units for pipes and nine job work facilities for our water tanks

business. That said, the company also has around 11 CNF strategically located depots to best serve their customers. “We will continue to expand in our existing units or through our greenfield projects whenever feasible, depending on the demand and supply situation,” commented Mr Parag.

**Market Consolidation & Overview**

The global PVC pipe market size was valued at \$54,246 million in 2019 and was anticipated to grow at a CAGR of 6.7 per cent to reach \$85,565 million by 2022 (Source: Allied market research) – that was before the pandemic hit every country and industry, with India being no exception. But the effects on the Indian market can be traced back to demonetisation and the introduction of GST too – the main one being prices of raw material go-

**History and Milestones**

**1987**

Incorporated as a private limited company and first pipe manufacturing plant set up

**1995**

Set up large scale plastic injection moulding and extrusion unit at Athal, Dadra and Nagar Haveli

**2008**

First to move in Northern Markets with a new plant set up at Haridwar for manufacturing pipes and pipe fittings

**2012**

Acquisition of Trubore Piping System brand and two plants in Chennai and Kolhapur

ing through the roof, more so post-COVID. With many players not able to pass on this hike, a cash flow impact has been felt.

Nihar gave us his unique take on the current market status. "PVC, like any other raw material/commodity, has been on an unprecedented price surge in the last 12 months. Whilst we are currently witnessing a slight reversal, or softening in India, globally PVC remains firm. This is a testament to how our country can bounce back from the shutdown during the lockdown period and the subsequent effect on demand. It would be presumptuous to comment on pricing in such an uncertain environment, suffice to say we don't see any sharp reversals soon."

And how has Prince Pipes leveraged the current market state? "We have been quite fortunate, with the IPO coming in at a very opportune time. In the face of COVID, when most companies are being forced to go conservative on CAPEX, we have had the flexibility to go out and invest because we had the IPO coming in at the right time," shared Nihar.

When asked about the export strategy, Mr Chheda shared that, being a product sensitive to logistics cost, the focus has always been on moving closer to the market- thereby narrowing the exports option.

"The silver lining to that cloud, though, is that we never have to face input pressure, for example competition from China in finished goods- due to the very nature of our product, we don't face that kind of market pressure," added Nihar.

**WE UNDERSTAND INDIA'S EVOLVING NEEDS AND ARE COMMITTED TO LEVERAGING NEW TECHNOLOGIES FOR HOMEOWNERS, CONSULTANTS AND BUILDERS WITH THE ADVANTAGE OF A PREFERRED GLOBAL BRAND AND BEST-IN-CLASS PRODUCT**

### A Focus on Innovation

With a guiding motto of ' Ahead of the curve every time,' Prince Pipes leads its contemporaries in the innovation, research and development areas.

"We are an application-driven company and our strong, in-house R&D team is constantly striving to better our existing applications as well as create new ones. We factor in consumer insights while improving every function related to the product and application, be it procurement, manufacturing or delivery – to provide optimised solutions as the product," explained Mr Chheda.

A testament to the company's commitment to innovation is the list of patented products in their kitty, namely:

- Vent cowl
- Gully Trap
- DWC Coupler
- Nahani Trap with Jali

Recently, the company brought its mastery of PVC to a new segment: The Prince Storefit Water Tank, which is part of the company's introductory range of overhead water storage solutions. The products are manufactured using the roto moulding process and find extensive use for installation at home, offices, factories, commercial places and

hospitals that need large volumes of hygienic water storages. Designed with a 3-layer insulation-outer white layer for UV resistance, Insulated black middle layer, the tank maintains water temperature lower than ambient temperature and the Inner food-grade polymer layer prevents water contamination.

"Water is a basic necessity and therefore its hygienic storage of vital importance. We are quite optimistic about this product range though we are only manufacturing regionally as the supply chain is a challenge here," expounded Nihar.

### Today's Visionaries, Tomorrow's Pioneers

Peter Drucker, incomparable management guru, once said, "Wherever you see a successful business, someone once made a courageous decision". Leadership in the 21st century has been influenced by constant change, geopolitical volatility, technological disruptions, and economic and political uncertainty. Mastering and staying on top of these major forces of change will be the defining characteristics of next-generation leaders.

Nihar Chheda is more than just the Vice President for Strategy at Prince Pipes. With the mantle

**2018**

Appointed Akshay Kumar as Brand Ambassador and roll out print and ad film campaign across diverse medium

**2019**

New plant set up at Jaipur for pipe manufacturing

**2020**

Got listed on BSE & NSE with an IPO of Rs 5bn.

**2021**

Prince Pipes begins its Commercial Production at Telangana, sooner than its prescribed time schedule.

**IN THE FACE OF COVID, WHEN MOST COMPANIES ARE BEING FORCED TO GO CONSERVATIVE ON CAPEX, WE HAVE HAD THE FLEXIBILITY TO GO OUT AND INVEST BECAUSE WE HAD THE IPO COMING IN AT THE RIGHT TIME**

of being the 3rd generation family member to be involved in the business, resting upon his shoulders, he not only has to uphold the heritage and vision set before him but to take it to greater heights. Nihar was responsible for driving the company's IPO IN 2019 and has also been involved in high-level engagement with key external stakeholders across the industry, expanding the company's pan-India distribution network through global association – to cite an example, the partnership with Lubrizol.

He has also successfully introduced a culture of 'humanising growth' approach to the organisation, which has helped Prince Pipes immensely in driving sales across the company. Apart from his active role in different departments of Prince Pipes, he is also responsible for anchoring the company's raw materials procurement strategy that has illustrated encouraging results, an area where he works alongside his spirited and visionary grandfather, Mr Jayant Chheda.

It was no surprise then, with all these achievements that Nihar Chheda was awarded 'The Economic Times Polymers – Next Generation Leader for the Year' award, at the ET Polymers Awards, held in March in Mumbai.

### Going the Extra Mile

Sustainability and social responsibility are ingrained in the very ethos of Prince Pipes, as explained by Nihar, "We call this our triple bottom line – wherein it's not just about the financial bottom line but also social and environmental responsibilities contributing equally to our bottom line."

The company is also future-ready, today, as far as being sustainable and government implementation of renewables is concerned.

"We have begun incorporating solar power across all over facilities, in the last few quarters. This will not only help us curb our carbon footprint, but also bring down our greenhouse emissions by 23 per cent. The solar energy generated will be equal to approximately 1,200 metric tones of coal used in a year or equivalent to 40,000 saplings grown over a decade," Nihar stated.

On the social front, the company developed 'Sanifit,' a contactless sanitiser dispenser which is operated with a pedal- and each unit made and assembled with PVC pipes manufactured by Prince Pipes. These were supplied to ATS Units in Mumbai, the DM's office in Haridwar, police stations at Silvassa, Bewell Hospital in Annana-

gar and some other centres. This year, in aid of COVID relief, oxygen concentrators were airlifted for the surging second wave of Covid and the equipment was distributed to the states of Bihar, Rajasthan and Telangana.

A very interesting initiative was the 'Ghar Ghar Mein Ganga' Kumbh campaign in Haridwar – wherein the prototype of the company's Storefit water tank was used to store 'Ganga Jal' (holy water). This initiative went a long way in ensuring that senior citizen devotees at the Kumbh could get the Ganga Jal without visiting the ghats during the pandemic.

Other social initiatives include the building of sanitation facilities for a school in Dahanu, educating the children on cleanliness and hygiene through a drawing competition and also being part of 'Bharat ke Veer,' a fund-raising initiative by the Ministry of Home Affairs, Government of India on behalf of members of the Indian paramilitary forces.

Needless to say, CSR activities are vital to Prince Pipes and undertaken through meaningful initiatives which make a significant difference to both society and the environment.

Nihar concluded the interaction on a beautiful note: Over the years, as the identity of the company evolves, and along with it our strategies become more agile and dynamic, what keeps me hooked is the passion- a passion for the business, which has remained a beacon of continuity throughout the generations. 📍



Manufacturing unit in Jaipur

# The Rise of CO<sub>2</sub> Based Polymers

According to the Nova Technology's & Trends report, the production of carbon dioxide-based polymers is on the rise as the world tries to balance industrial need and sustainability. An in-depth look at what the report says, below.

By Kruti Bharadva

Around 400 million tons of polymers are produced globally each year. The amount has been growing by 3–4 per cent per year for decades and they have become an integral and important part of the modern world. Despite all their useful and versatile material properties, polymers face a major problem: 90 per cent of them are produced from fossil carbon and finally end up as CO<sub>2</sub> emission. This has no future!

The organic chemistry and plastics sectors cannot be decarbonised, simply because carbon is the main atom in their material structures. In this context, renewable alternatives to fossil feedstocks are needed, which have already been available for a long time, thanks to intensive research. Chemicals and polymers are already being produced today using renew-

**CO<sub>2</sub>-BASED POLYCARBONATES ARE ALREADY COMMERCIALY AVAILABLE FROM VARIOUS SUPPLIERS. ONE OF THE LARGEST VOLUMES AVAILABLE ARE AROMATIC POLYCARBONATES, BUT SEVERAL PLAYERS WORLDWIDE ARE ALSO OFFERING ALIPHATIC POLYCARBONATES**

able carbon, which is carbon from biomass and recycling – and CO<sub>2</sub>. However, as the use of biomass and the recycling of plastics alone will not suffice, CO<sub>2</sub> utilisation could be the solution to meet the demand for virgin polymers in the future.

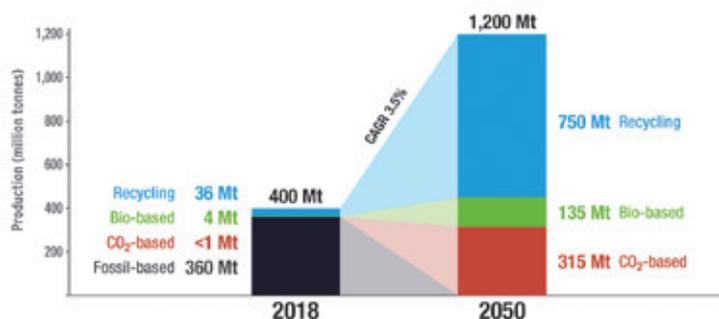
## Production Capacities for CO<sub>2</sub>-Based Polymers

As per the Nova report, the potential and the actual production capacity for CO<sub>2</sub>-based polymers is much larger than commonly assumed and

discussed. The production capacity, mainly for polycarbonates and polyols for polyurethanes production, already amounts to more than 850 kt/a today, with an average weighted CO<sub>2</sub>-based carbon content of currently only 5.4 per cent. Nine companies were considered, mainly located in Asia, Europe and North America and are shown in *table 1*.

However, many technical challenges still need to be overcome to enable the deployment of new CO<sub>2</sub>-conversion plants on a widespread

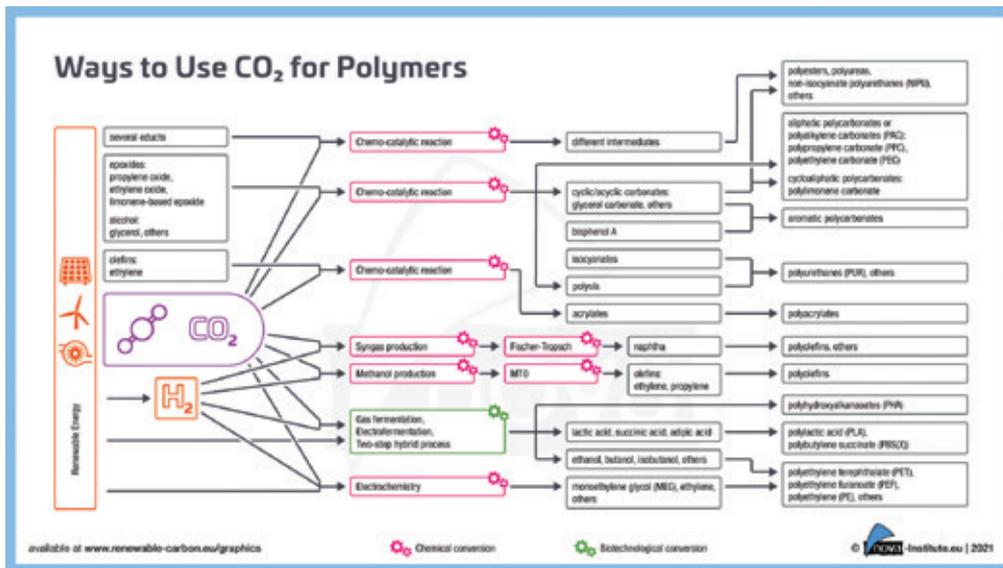
**World Plastic Production and Carbon Feedstock in 2018 and Scenario for 2050 (in Million Tonnes)**



The virgin plastic production of 364 Million t in 2018 will increase to 450 Million t in 2050, completely based on renewable carbon. The total demand for plastics of 1,200 Million t in 2050 will be mainly covered by recycling.

available at [www.renewable-carbon.eu/graphics](http://www.renewable-carbon.eu/graphics)

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basis, but the use of CO<sub>2</sub> as a chemical feedstock for polymers has been intensively diversified in the last years. By now, there are several successfully implemented technologies on the market or close to the commercialisation phase.

### Catalysis is the Key for CO<sub>2</sub>-conversion

The breakthrough innovations for CO<sub>2</sub>-utilisation have all been achieved using specifically designed catalysts. CO<sub>2</sub> is a very thermodynamically stable molecule, so it requires a significant amount of energy to be activated. Accordingly, a catalyst must be used to reduce the energy barrier. Whether synthetic or biocatalysts: most of the research on CO<sub>2</sub>-conversion to polymers focuses on the design of the appropriate catalysts. An introduction to catalysis in CO<sub>2</sub>-utilisation for polymers is included in the report.

CO<sub>2</sub>-based products have significantly lower greenhouse gas emissions than comparable fossil products if the energy used to convert the CO<sub>2</sub> comes from renewable resources. The chemical industry's carbon demand will continue to grow with an annual growth rate (CAGR) of 3–4 per cent. Calcula-

tions demonstrate that just 1–2 per cent of the Sahara area would be sufficient to meet the entire carbon demand of the chemical industry in 2050 using photovoltaics and CO<sub>2</sub> utilisation!

### Chemical CO<sub>2</sub>-Conversion Known for Decades

CO<sub>2</sub>-based polycarbonates are already commercially available from various suppliers. One of the largest volumes available are aromatic polycarbonates, but several players worldwide are also offering aliphatic polycarbonates such as polypropylene carbonate (PPC) or polyethylene carbonate (PEC) for a large range of applications. The amount of CO<sub>2</sub> incorporated can reach up to 50 per cent by weight for these types of aliphatic polymer! In addition, some companies are focussing on polycarbonate polyols as one component in polyurethanes, which can be

used in mattresses, car interior foam or textiles.

Different pathways are being studied for the chemical conversion of CO<sub>2</sub> to various polymers, such as polyureas, at the academic level. Two different approaches are being reviewed to introduce CO<sub>2</sub> onto polymer backbones: CO<sub>2</sub> is either used as a comonomer and participates directly in the polymerisation process or it is used for the synthesis of building blocks which can afterwards be involved in a polymerisation process. There is also a research interest in the production of CO<sub>2</sub>-based polyacrylates for use as superabsorbent polymers.

A lot of improvements have also been made in the last years on electrolyzers and electrocatalysts for the conversion of CO<sub>2</sub> to chemicals and chemical building blocks, which led to increasing interest from key players and the creation of several

CO<sub>2</sub> IS EITHER USED AS A COMONOMER AND PARTICIPATES DIRECTLY IN THE POLYMERISATION PROCESS OR IT IS USED FOR THE SYNTHESIS OF BUILDING BLOCKS WHICH CAN AFTERWARDS BE INVOLVED IN A POLYMERISATION PROCESS

Table 1: Most advanced implemented plants for the synthesis of CO<sub>2</sub>-based polycarbonates and polyols for polyurethanes

Companies	Countries	Capacity in tonnes per annum (t/a)	Final products	CO <sub>2</sub> share (%)	CO <sub>2</sub> -based carbon content (%)
Asahi Kasei and various under their licenses	various	750,000	Aromatic polycarbonates	17.3	4.7
Covestro	Germany	5,000	Polycarbonates polyols for polyurethanes	20	5.5
Empower Materials	United States	500	PPC, PEC, PCHC, PPCHC, PBC	ca. 40	ca. 11
Jiangsu Zhongke Jinlong-CAS Chemical	China	10,000	PPC polyols	40	11
Jilin Boda New Materials	China	50,000	PPC or PEC	ca. 40	ca. 11
Inner Mongolia Mengxi High-Tech Group	China	3,000	PPC, PEPC, PPCHC	ca. 40	ca. 11
Saudi Aramco (formerly Novomer)	United States	5,000	PPC, PEC	43	ca. 12
Taizhou BangFeng Plastic	China	30,000	PPC	ca. 40	ca. 11
Nanyang Zhongju Tianguan – Tianguan Group	China	5,000	PPC	ca. 40	ca. 11

start-ups in this area. The electrosynthesis of chemicals such as ethylene or monoethylene glycol has been of particular interest because of its potential to produce polyethylene or polyethylene terephthalate, two main conventional plastics used in high volumes. Chemicals such as methanol, formic acid and other chemical building blocks have also great potential to be produced via this technology.

### Biotechnological CO<sub>2</sub>-Conversion

Biotechnological CO<sub>2</sub>-conversion remains of great interest and shows high potential to produce many chemical building blocks and polymers. Thanks to the use of various micro-organisms or cyanobacteria and improvements in microbial engineering, biotechnological conversion of CO<sub>2</sub> to polymers has seen tremendous growth in recent years.

Several companies and startups are focusing only on PHAs synthesis from patented processes and micro-organisms, such as Newlight Technologies. Other key players have a larger portfolio and could offer chemicals such as butanol, ethanol, lactic acid and other building blocks. The most advanced technology in this field belongs to the company LanzaTech, which currently has commercial plants for CO<sub>2</sub>-based ethanol, used for fuel and ethylene synthesis. Finally, some companies and research consortia are working on the combination of electrosynthesis and biotechnology, either in a two steps approach or by working on electro fermentation.

### The Broadening of the CO<sub>2</sub>-Based Portfolio

This has already started! Companies working on the Fischer Tropsch conversion of syngas (a mixture of

hydrogen, carbon monoxide and carbon dioxide) to hydrocarbons are already operating pilot plants for the production of diesel, kerosene, wax and naphtha and one commercial plant is being constructed by the company Nordic Blue Crude. CO<sub>2</sub>-based Naphtha can be used in the already established cracker process to produce olefins which are needed for most plastics currently in use.

The potential market volume of CO<sub>2</sub> utilisation is in principle the entire petrochemical market. Almost all chemical products currently manufactured from fossil raw materials can be produced from carbon dioxide and with already nearly 1 million tonnes production capacity installed – carbon-based polymers are certainly going to be an integral part of the future. 

Sources: Nova Institute & reports

# The Best Brands in Plastics & Polymers

The Best Brands in Plastics & Polymers were felicitated recently in Mumbai. Here is a brief look at the companies recognised- and the reason why they are the best of the best.



Knowledge Partner



The 'Economic Times Best Brands in Plastics & Polymers 2021' were felicitated this year despite the challenges every organisation has been facing. This ET initiative is aimed at recognising brands that have innovated, excelled and ultimately been a 'best' brand in every way. Dr Jitendra Sharma, Managing Director & Founder CEO of Andhra Pradesh MedTech Zone, honoured the occa-

sion as Chief Guest.

"Whilst it has become common to use the words innovation and invention interchangeably, we must remember that everything made from plastic may be an innovation, but the plastic itself - is ultimately an invention. A great invention at that, as each of us, if you introspect, begin and end our day with plastic. Let us not discount the myriad possibilities plastic offers, most of all its life-saving capabilities- never more evident than in today's challenging times," commented Dr Sharma in his keynote address.

With Breakthrough Management Group India as knowledge partner and the ET Polymers magazine driving the initiative editorially, we give you here a list of the brands which were felicitated as well as a comprehensive list of the companies which made it to the top 100.

### Blend Colours Pvt Ltd

Blend Colours Pvt Ltd is an ISO 9001:2008 certified manufacturer, exporter and supplier of different types of masterbatches. Technology has always been a key differentiator for the company, which has notably



Dr Jitendra Sharma, MD & Founder CEO of Andhra Pradesh MedTech Zone

benefited its customers and has set a new standard in the industry. A well-equipped R&D, technically advanced production and testing facilities, qualified human capital ensure that customers get a product that they are confident in.

### Dhruv Polychem Pvt Ltd:

The company is one of the leading industrial chemicals and polymers additives suppliers, manufacturer as well as traders for the plastics and rubber industry, The company provides solutions for all the industrial chemi-



icals and polymers additives, fillers, pigments and elastomers. Its focus is on offering a wide range of innovative additives that meet the highest industrial requirements in terms of efficiency, sustainability and performance.

**Electronica Plastic Machines Ltd:** Also known as EPML in the industry, the company’s sophisticated technology has ensured high scalability and accurate products. EPML has a pan India presence at strategic locations to ensure swift and efficient customer correspondence for all its plastic injection moulding machines. It recently launched its advanced two-platen injection molding machine.

**Exxon Mobil:** Exxon Mobil is a pioneer in lubrication technology helping the Indian manufacturing companies to increase their productivity and profitability goals. With a legacy of over 120 years in India, Mobil has become a byword for lubricants. Mobil has a deep knowledge of its customers and their needs – it works directly with more than 6,000 OEMs to understand new industry trends and technologies. Mobil lubricants are formulated to meet the requirements for precision, protection and performance. In addition to providing cutting edge lubricants, Mobil provides a host of services to help save time and money, while boosting equipment reliability and productivity. In its endeavour to help India achieve its ‘Aatmanirbhar’ mission in manufacturing, Mobil has been working closely with industries to give them a competitive edge.

**GMS Plastics Machinery:** GMS Plastic Machinery Pvt Ltd is synonymous with quality and excellence in the recycling industry. In a period when “plastics” is touted as a pollutant and several organisations are targeting a “BAN” on plastics, GMS strives to encourage proper disposal of plastics and systematic recycling of the same.

**HASCO India Pvt Ltd:** Hasco enables its customers to build molds in the easiest way possible. With the invention of the modular standard component system, HASCO has defined international standards and revolutionised mold making. Designers and mold makers benefit from a complete range of ready-to-install, high-



**100 Best Brands in Plastics & Polymers Industry 2021**

Ace Designers Limited
Alok Masterbatches Pvt Ltd
Apar Ind Ltd
APPL Industries Limited
ASB International Pvt Ltd
Ashish Exports
Birla Carbon
Blend Colours Pvt Ltd
Borouge (India) Pvt Ltd
Brahmaputra Cracker and Polymer Limited
Brakes India Pvt Ltd
Branson Ultrasonics
Bry-Air (Asia) Pvt Ltd
BulBul Masterbatches Pvt Ltd
Chilton Refrigeration Pvt Ltd
Clariant Chemicals India
Covestro (India) Pvt Ltd
D & M Enterprises
Devu Tools Pvt Ltd
Dhruv Polychem Pvt Ltd
Dow Packaging Specialty Plastics
DSM India Pvt Ltd
E.I.DuPont India Private Limited
Econ Machinery Pvt Ltd
Electronica Plastic Machines Ltd
Ester Industries Ltd
Evonik India Pvt Ltd
Exxon Mobil
Fine Organics
Flamingo Additives & Colourants Pvt. Ltd
GAIL (India) Limited
Gem Orion Machinery Pvt Ltd
Genn Controls India Pvt Ltd
Global Pet Industries Pvt Ltd
GMS Plastic Machinery Pvt Ltd
Gurucharan Industries
H. K. Industries
Haitian Huayuan Machinery (India) Pvt Ltd
HASCO India Pvt Ltd
Hindustan Plastic & Machines Corporation
HPL Additives Ltd
HRSflow India Pvt Ltd
Husky Injection Molding Systems
igus (India) Private Limited
Illig India Pvt Ltd
Indian Oil Corporation Ltd
Indo air Compressors Pvt Ltd
J P Extrusiontech Limited
Jagmohan Pla-Mach Pvt Ltd
JJ Plastalloy Pvt Ltd

...continued

Kabra Extrusiontechnik Limited
Kandui Industries Pvt Ltd
KBM Extrusions Machines Pvt Ltd
Kevichem Colour Pvt Ltd
Konkan Speciality Polyproducts Pvt Ltd
Kuraray India Private Limited (EVAL)
Lanxess India Private Limited
Leister Technologies India Pvt Ltd
Lohia Corp Limited
Luk Plastcon Limited
Mahalaxmi Pet Machines
Mamata Machinery Pvt Ltd
Matsui Technologies India Limited
Meusburger India Pvt Ltd
Milacron India Pvt Ltd
Moldwell Products India Pvt Ltd
Motan-Colortronic Plastics Machinery (India) Private Limited
N. A. Roto Machines & Moulds India
Nexthermal Mfg India Pvt Ltd
Nishant Mouldings Pvt Ltd
ONGC Petro additions Limited
Panchal Plastic Machinery Ltd
Pimco Machines Pvt Ltd
R R Plast Extrusions Pvt Ltd
Rajhans Plastic Machinery Pvt Ltd
Rajoo Engineers Ltd.
Ravago Shah Polymers Pvt Ltd
Reliance Industries Ltd
Rollepal Engineering India Pvt Ltd
S&T Plastic Machines Pvt. Ltd.
SABIC India Pvt Ltd
Sankhla industries
SBM Extrusion India
SCJ Masterbatches Group
Shibaura Machine India Private Limited
Shree RadheKrishna Extrusions Pvt Ltd
Shyam Plastics Industries
Soltex Petroproducts Limited
Solvay India
Spectalite Sustainable Materials Private limited
Steer Engineering Private Limited
Team Thermoformings & Allieds
Theysohn Extrusionstechnik India Pvt Ltd
Vasantha Tool Crafts Pvt Ltd
Welset Plast Extrusions Pvt Ltd
Windsor Machines Limited
Wittmann Battenfeld India Pvt Ltd
Yudo Hot Runner India Private Limited
Yuken India Limited
Yupo Corporation

precision system components and intensive specialist advice that Hasco provides.

**igus India Pvt Ltd:** The motion plastics specialist, igus undertakes turnkey projects in moving cable management system in numerous industries including material handling, power plants, defence, automation, etc. It has also contributed to the prestigious projects of ISRO.

**J P Extrusiontech Pvt Ltd:** J P Extrusiontech Pvt Ltd manufactures plastic processing machinery and equipment and is situated in one of the largest industrial estates of Asia at Ankleshwar in Gujarat, having state of the art manufacturing facilities. They offer a wide range of machinery in every segment depending upon the need of the end product.

**JJ Plastalloy Pvt Ltd:** JJ Plastalloy specialises in the manufacture of various thermoplastic compounds and masterbatches. What sets it apart is its tremendous focus on research & development. Along with the domestic market, the company exports to 30 countries.

**Kandui Industries Pvt Ltd:** With a vision to consistently create and innovative world-class masterbatches, Kandui was established in 2006 with a modest production capacity of 2500 TPA. With a wide acceptance of its vast range of products, today, the company has a production capacity of 30,000 TPA. Further expansion is underway.

**Kevichem Colour Pvt Ltd:** It is said, "Great things in business are never done by one person. They are done by a team of people and in Kevichem, this is achieved by the team of three brothers. It is the only Indian company manufacturing PP Clarifier. Kevichem also manufacture dyes and additives for MB and fibre applications.

**Kuraray India Pvt Ltd:** Kuraray India is a local subsidiary established in September 2008. Globally, the company has been manufacturing and marketing ethylene vinyl-alcohol copolymers (EVOH) under the name EVAL since 1972 and remains the world leader in EVOH production and market development.



- Company names arranged in alphabetical order.
- This is a listing of Best Brands. It does not imply ranking in any manner whatsoever.
- Inclusion in the ranking does not imply the permission to use the Best Brands logo or title in any kind of communication.



**Luk Plastcon Ltd:** Luk Plastcon Ltd is a Nagpur based Bajaj Group Company, manufacturing masterbatches with the brand name BAJAJ POLYMIN ENHANCERS. The group has more than 35 years of experience in the plastics industry. Having an experience of 25+ years in manufacturing masterbatches, the company is a pioneer in developing world-class speciality filler and additive masterbatches solutions for all types of applications in blown film, cast films, blow molding, extrusion coating etc. – with highly consistent with unmatched quality products.

**Mahalaxmi PET Machines:** Established in the year 2008, Mahalaxmi Pet Machines has been in the business of manufacturing pet stretch blow moulding machines for the past 10 years. The range includes of machines includes fully automatic pet blow molding machines and semi-automatic pet blow molding machines.

**Mamata Machinery Pvt Ltd:** Today, with an installed base of nearly 4800 machines in more than 78 countries, Mamata is one of the leading manufacturers and exporters of plastic bag/pouch making machines globally. Mamata also offers packaging lines for the end-user flexible packaging market in form of

automatic form fill and seal pouching machines.

**Panchal Plastic Machinery Pvt Ltd:** Panchal Machinery has specialized exclusively in the development, designing and fabrication of recycling plants for the plastics recycling and processing industry for the last 39 years.

**Pimco Machines Pvt Ltd:** In the year 1975 PIMCO started manufacturing mini granulators. An incessant yearning for development has today made the company proficient in manufacturing the biggest size of granulators and the smallest size of granulators with precision.

The company's wide range of machines with a variety of model has made it capable of offering the best possible solutions to the plastics processing industry's growing demands.

**S&T Plastic Machines Pvt. Ltd.:** S&T Plastic Machines is renowned among customers with its comprehensive injection moulding solutions. They have a unique product in UPVC pipe fittings where the CPVC & UPVC can be molded on the same machine; They also have HDPE pipe fitting injection moulding machines. The company also offers custom-built machines to suit specific requirements of customers and serve clients in industries such as

automotive parts, home appliances, packaging, medical, electronics, pipe-fitting, logistics carriers, as well as various other fields.

**Soltex Petroproducts Ltd:** Soltex is driven by constant innovation and research to meet the demands of its customers to provide the best balance between quality and cost-effectiveness. Its masterbatch manufacturing facilities at Mumbai, Daman, Silvassa, Kolkata and Uttaranchal are equipped with the latest machinery and research centres to provide unmatched quality products and makes them one of India's leading masterbatch manufacturers.

**Welset Plast Extrusions Pvt Ltd:** Welset Plast Extrusions Pvt Ltd, a 52-year-old company, is a high-quality manufacturer and global supplier of colour, white, black and additive masterbatches, anti-fibrillation masterbatches- for the plastics industry.

**Yudo Hot Runner India Pvt Ltd:** Since its foundation in 1980, YUDO has strived to develop and produce a quality hot runner system. The company is also a leading solution provider for automated takeout robot and factory automation, injection auxiliary equipment, machine tool automation system, packaging and PET preform solutions. 

# Going Sustainable With Polymers

**Hi-Tech International is the first company in the country to manufacture a plant-based bio-polymer – Dr Bio – which can be used to replace single-use and multi-use plastic products with bio-compostable plastic. The Machinist take a closer look...**

By Kruti Bharadva

The hazards of plastic waste are well known across the globe. India alone produces 9.46 million tons of plastic waste every year, of which 40 per cent remains uncollected and 43 per cent of which is used for packaging, most of it single-use. The real green and sustainable solution for the industry is to take a leap from recyclable plastic and move towards bio-compostable plastics which dissolve in the soil, thus making a strong, positive impact on plastic waste management as well as plastic contribution in the landfills.

That said, Hi-Tech International has set up a manufacturing facility spread of 250,000 sqft in Ludhiana for the commercial manufacturing of a unique polymer – Dr Bio.

“Reports indicate that urban India generates 62 million tons of waste (MSW) annually, and this will reach 165 million tons in 2030. 43 million tons of municipal solid waste is collected annually, out of which 31 million is dumped in landfill sites and just 11.9 million is treated. The sizes of landfills in India are on a constant rise and this is turning out to be a major concern. Contrary to the composition of waste in western countries, most of India’s waste is organic which means that there is a tremendous opportunity to compost a lot of it,” stated **Mukul Sareen, Director of Business Development at HiTech Group.**

“Then there is sustainability, renewable feedstocks such as corn, sugarcane, and algae can be utilised as raw material instead of petroleum, thereby reducing global dependence

on crude oil and lessening the impact on climate. With our unique farm to polymer model, we are working closely with farmers to procure and secure our highly refined corn starch supplies and other essential biomass inputs,” Mukul Sareen added.

Dr Bio is made from cornstarch and is 100 per cent compostable and biodegradable. It is unlike paper, which has a recycling limitation- as every kg of paper uses 70 litres of water to recycle. Similarly, the process of recycling aluminium and recyclable plastic has high upfront capital costs and these processes themselves are unhygienic and unsafe. Even the recycled products are not of very high quality.

Dr Bio products are not just completely biodegradable, they can be used to manufacture packaging material as per the need of custom-

ers. The products offered by the company are used in different sectors and applications such as home textiles, appliances, plastic bottles, cards, apparel, fresh food packaging, folded cartons, cellphone cases, service ware, lactides, polymers, polymer additives, nonwovens, adhesives, coatings, cosmetics, laptops, other durable goods, printing toners, and surfactants.

The major advantage is that bio-based polymers replace fossil carbon in the production process with renewable carbon from biomass. This is indispensable for a sustainable, climate-friendly plastics industry.

The second advantage is offered by more than half of the produced bio-based polymers: they are biodegradable (depending on the environment) and can therefore be a solution for plastics that cannot be collected and enter the environment. This results in the elimination of microplastics from our environment

“Our biopolymers are produced from corn starch in the agriculture rich region of Punjab, India and available in 45 countries globally. Hi Tech Group’s commitment towards sustainability is oriented to reduce the greenhouse gasses impact, minimize the dependence on fossil oil derivatives, and promote the use of renewable energies and reduce plastic waste in the environment. Following our core values, we have optimised our production processes to reduce the generated waste with a “zero waste” policy and to minimize our CO2 footprint impact from our activities,” concluded Mukul Sareen 



## Linear Systems From Iigus As Space-Saving Solution

Living, working and cooking in confined spaces is currently part of everyday life for many people worldwide. Therefore, more and more practical furniture such as the multifunctional cube SQR is in demand. A square solution that combines kitchen, workplace and dining table. To create plenty of storage space, the inventor relied on the lubrication-free and long-lasting drylin linear guides from igus.

At the end of 2016, Daniel Pracht lived in a small flat with no kitchen. The then budding master carpenter developed a practical quadratic solution: the SQR. A multifunctional cube with an extendable induction area, with which one or more persons can not only cook, but also stay, work and live in a compact space. Perfectly suited, especially at times when a home office is more than ever, the order of the day. To



**| Thanks to their compact design, the drylin linear guides from igus provide more storage space. The linear bearing made of the high-performance polymer iglidur J200, ensures a quiet and lubrication-free operation.**

create a lot of storage space, the inventor was looking for a pull-out solution. Normal roller guides took up too much installation space and did not meet the requirements for a simple and elegant design. Daniel Pracht found what he was looking for in the drylin linear systems from igus: “The guides convinced me right from the start, both in terms of de-

sign and smooth operation.”

When choosing the drylin WSQ linear system, one decisive criterion was not only the functionality - the wear-resistant and long-lasting opening and closing of the drawers - but also the processing of the rails. “The combination of the aluminium of the rail and the oak of the cube complements one another, which was very important to me. Just like the square shape of the guide”, explains Pracht. Each of the five drawers contains two guides. Liners made of the high-performance iglidur J200 polymer ensure smooth operation. It is lubrication-free and maintenance-free, thanks to the use of solid lubricants. A great advantage in potential contact with food. Furthermore, dirt and dust cannot adhere to the bearings. The guides and bearings are easy to clean with household chemicals. An all-round hygienic solution.

## Waters Improves Ease and Reliability of Small Molecule Analysis

Waters Corporation has released the ACQUITY RDa™ Detector featuring SmartMS™, the company's newest time-of-flight (TOF) mass spectrometer (MS) for small molecule analysis for pharmaceutical, academic, food, and forensics applications. The accurate-mass ACQUITY™ RDa Detector can be quickly deployed and operated to enable faster and more informed decision-making across a broad set of applications.

The ACQUITY RDa Detector is a compact, accurate-mass, time-of-flight mass detector with SmartMS technology for analysing small molecules across pharmaceutical, food, natural products, and seized drug profiling applications.

“With the ACQUITY RDa Detector, we've taken the complexity of operating a mass spectrometer and put it behind the user interface so that the bench scientist doesn't have to worry about how it works, but about what to do with



the high-quality, reproducible results the detector produces,” said **Ian King, Senior Vice President - Global Products, Waters Corporation.**

### Faster Decision-Making

From setup to results, the ACQUITY RDa Detector is designed for ease of use with intuitive system health checks and dedicated results-oriented workflows. With SmartMS, users can identify analytes more accurately and confidently evaluate outcomes with end-to-end robust, reliable workflows for routine applications. Paired with a simple one-button start, the RDa Detector reduces the extent of training, limits downtime, and ensures consistent, reproducible results.

“In the pharma industry, the Waters RDa Detector meets regulatory and production challenges for which a satisfactory solution doesn't exist,” said **Marc Foulon, Director, Pharmaphysic.**

### Big Impact on Small Molecule Analysis

The ACQUITY RDa Detector is also optimised for small molecule applications where quality, compliance and data integrity are critical. These include impurity analysis, forced degradation studies, lipid screening, natural products profiling, food contaminant analysis, seized and controlled drug profiling and general accurate-mass measurements.

For improved usability and faster outcomes, the detector operates on waters connect™, an open software platform designed to enhance the value that the RDa brings to laboratories with new functionality, features and software updates. Providing a complete audit trail for acquisition, processing and reporting of data, waters\_connect enables seamless compliance and the highest standards of data integrity. With the option of system qualification, the platform is suitable for regulated and non-regulated laboratories alike.

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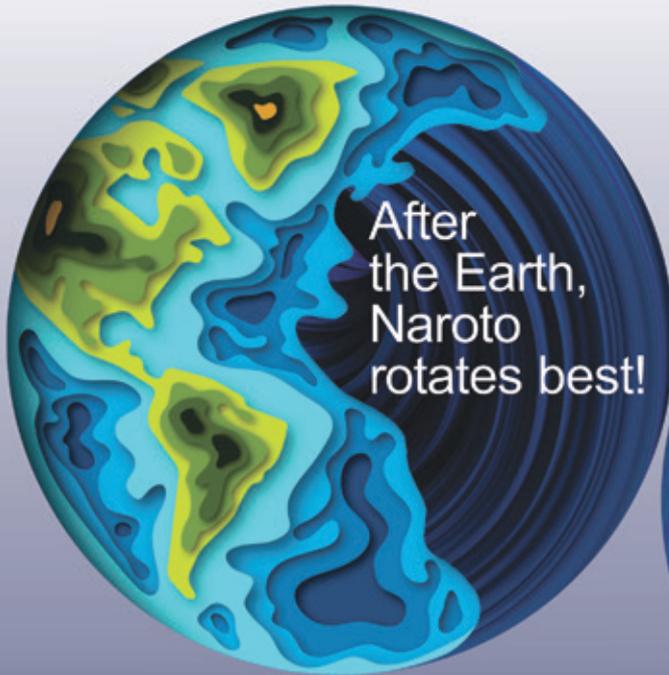
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