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THE ECONOMIC TIMES

# POLYMERS

Vol. 22, Issue 4 • October - November 2021 • Rs 75

## THE MOBILITY METAMORPHOSIS

Mobility as we know it, is evolving at super-sonic speed, with E-Mobility being the hottest commodity in the automotive sector. We explore how plastics are pushing forward this metamorphosis and spotlight the **ET Global Conference on Plastics in Automotive**

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# THE ECONOMIC TIMES POLYMERS

Volume 22 Issue 4 October - November 2021



## Is It Chips Down for Autos?

Ciao Readers!

**T**he revival trajectory of the automotive industry appears to be facing turbulence due to prolonged but recently exacerbated semi-conductor shortages. While the major regulatory challenges such as the transition to BS-VI, higher insurance costs, change in axle load norms and other challenges such as Covid-related disruption, liquidity crisis, general economic slowdown, etc, are under the rear-view mirror now, the ongoing semi-conductor shortage is keeping the industry in commotion. Against this backdrop, original equipment manufacturers (OEMs) are induced to consider rollbacks in the production and explore alternatives such as a shift to lower-end variants or focusing on high-margin models.

Owing to higher usage of semi-conductors, Passenger Vehicles (PVs) are witnessing greater impact than Commercial Vehicles (CVs), Two-wheelers (2Ws) and Tractors. Accordingly, PV demand shall continue to outpace the supply in the near term. Top PV players viz. Maruti Suzuki and Hyundai Motors, which aggregately holds more than 50% of domestic PV market share, reported Y-o-Y decline of 36% and 27% respectively in aggregate sales volumes on Aug 21 and Sep 21. This apart, Maruti Suzuki has announced to cut the production of PVs by 40% in the month of October-21 due to chips shortage. Aggregate PV production and sales declined by nearly 20% YoY on August 21 and September 21. Global automotive players like Ford Motor Company, Daimler AG, Toyota Motor Company, Tesla Inc., General Motors Company and Nissan Motor Co. Ltd. have also witnessed YoY decline in the range of 15% to 40% in overall vehicle sales volume during Sep-21, in the automotive market of United States amidst chips shortage.

Although there is significant expansion lined up in the global semiconductor industry, high capital intensity and long gestation periods associated with the setting up of facilities are expected to keep the ongoing chips shortage intact at least in the rest of FY22. While OEMs have considered recent price hikes to offset the impact of rising commodity prices, the prices of the increasing chips could induce them to take further price hikes to safeguard the margins. However, any significant price hikes may dampen the consumer sentiments considering vehicle ownership costs are already elevated due to unprecedentedly high fuel prices. Moreover, any changes in the product mix due to shift towards lower-end variants could also lead to lower profitability with typically low margins associated with such variants.

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

*R Kamat*  
Editor





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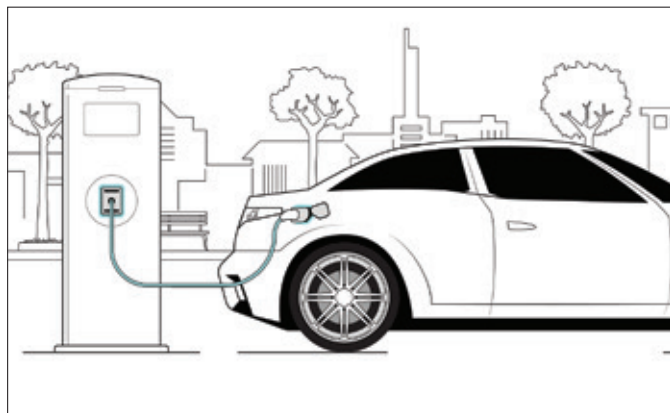


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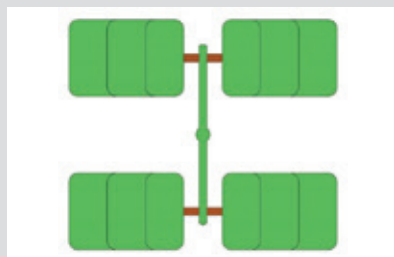


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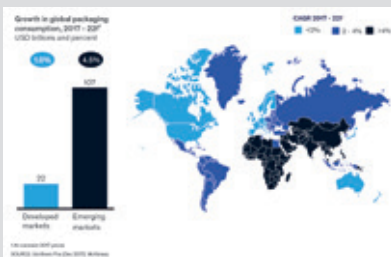
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# STRAPPING LINE



## PET

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## Clariant Catalysts & Lummus Technology Expand CATOFIN® Footprint

Clariant Catalysts and its process partner, Lummus Technology, continue to expand their presence in the PDH market with a major contract award in India. GAIL (India) Ltd has chosen Lummus Technology's CATOFIN process and Clariant's tailor-made catalysts for India's first PDH plant. Its upcoming 500 kiloton per annum propane dehydrogenation facility in Usar, Maharashtra, will be integrated with a downstream polypropylene (PP) unit. The US\$1.2 billion PDH-PP project is expected to start operations by 2024.

Since 2017, CATOFIN Technology has now been selected for a majority of new PDH awards global-



ly, representing 32 new PDH plants, or more than 22 million metric tons of propylene annually.

**Stefan Heuser, Senior Vice President and General Manager of Clariant Catalysts**, stated, "We are extremely proud of the ever-increasing global demand for CATOFIN – and we couldn't have achieved this without our long-time partner, Lummus Technology. Thanks to our

collaboration, we are able to offer GAIL (India) Ltd excellent performance and profitability by combining the best of PDH expertise with catalyst innovation."

CATOFIN technology is a highly reliable and productive method for light paraffin dehydrogenation. The process operates at thermodynamically advantaged reactor pressure and temperature to maximise conversion of propane to propylene, while reducing investment and operating costs. Selectivity and yield are further enhanced with Clariant's Heat Generating Material (HGM), its metal-oxide innovation which produces heat and drives the dehydrogenation reaction.

## Airnov Showcases New Brand

A leader in controlled atmosphere systems, Airnov is excited to showcase several products targeted at the nutraceutical market. Airnov's 1-gram laser-marked canister launched late last year. The new canister does away with labels, inks, adhesives, and varnishes by utilising high-power laser technology to mark canisters through a photochemical effect that results in a permanent, legible marking. In addition to increasing product safety by eliminating extraneous materials, the new marking system reduces waste and the carbon footprint of Airnov's canister line. At SupplySide West, Airnov will showcase the new 2- and 3 gram versions of the laser marked canister, scheduled for launch in Q3 of 2022.

Another tool in Airnov's arsenal to protect and enhance nutraceutical products is the Aroma-Can scented canister. This innovative canister uses natural flavours molded into a plastic canister for high-speed insertion. The flavours can cover unwanted odours in products such as fish oil or enhance the user experience by adding scents to vitamins and probiotics.

Airnov's EQius® equilibrium stabilisers keep natural and herbal products safe by acting as a desiccant when the humidity is high and a humectant when the humidity is low. This innovative solution maintains the relative humidity inside customer packaging for products that can become damaged if the internal packaging environment is too dry or mouldy if the humidity is too high. The pre-conditioned canisters and packets come in a range of sizes and humidity levels to meet your product's specific needs.

## Covestro Expands Portfolio Of Resins

Covestro, a world leader in coating resin solutions for the decorative industry, has announced the launch of an additional approach as part of its strategy to enable more sustainable, safer solutions for the decorative paints and coatings market. As part of this new approach, which leverages Covestro's leading position in bio-based resin innovation, the organisation will grow its Decovery® family of resins and added-value services to meet the demands of its customers and markets.

Across the global decorative coatings industry, there is now unprecedented demand – from regulatory bodies, professional painters and consumers alike – for sustainable products that protect health and safety while still driving functionality and efficiency. In fact, according to a recent Paint Monitor report, environmentally friendly paints are now the number-one desired innovation among painters in the EMEA region. And, with the decorative industry changing rapidly, it's increasingly important for paint manufacturers to differentiate themselves by meeting these demands.

Covestro's 'Decorative House of resins' strategy aims to address these requirements through three key pillars: proprietary market insights, its advanced resin technology toolbox, and its frontrunning position in bio-based innovation. The organisation's latest initiative – known as 'A natural home to create more sustainable paints' – focuses specifically on this last pillar and the plant-based family of Decovery® resins, which have bio-based content up to 52 per cent, verified to C14 standards.



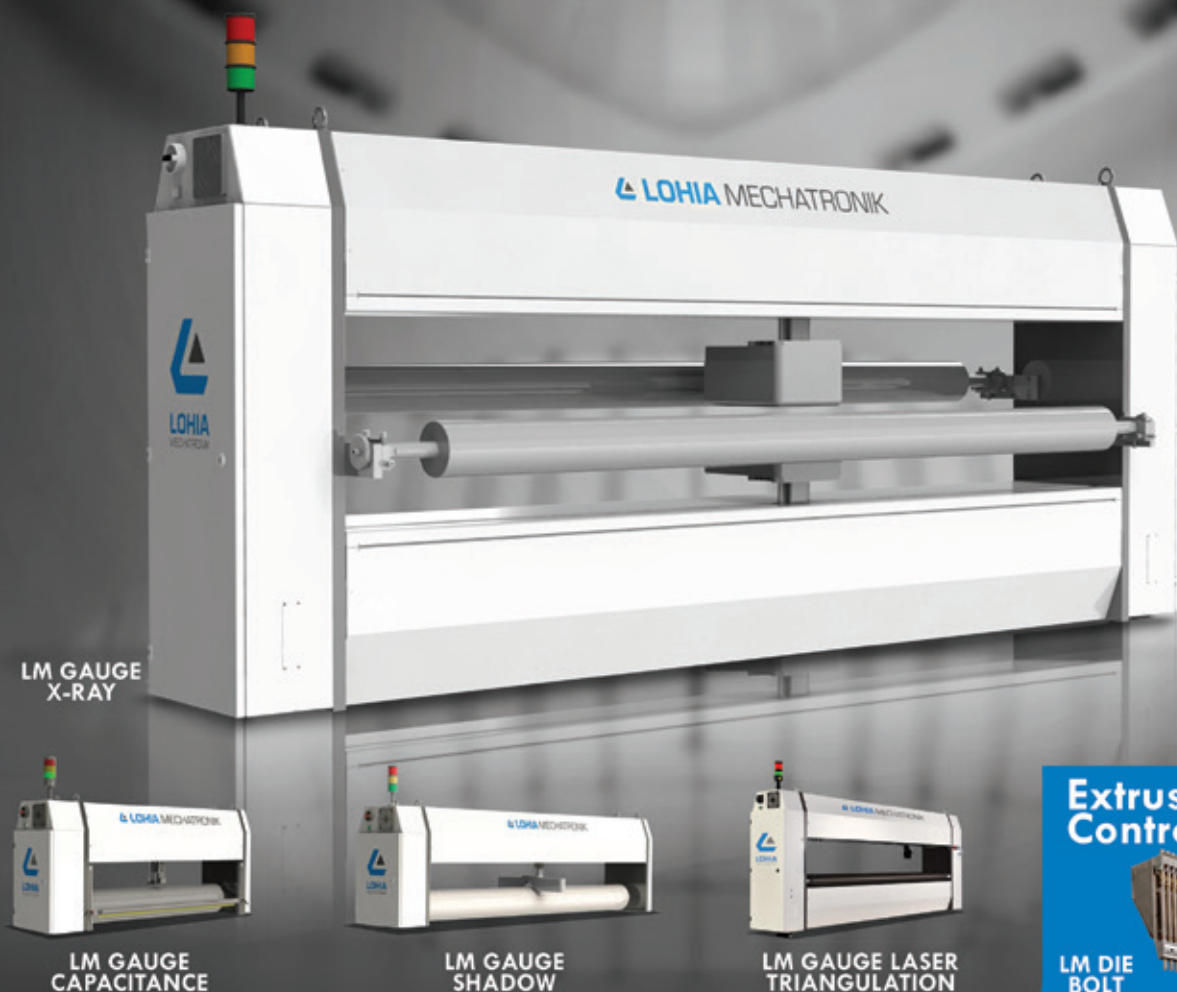


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## ITW Chemin Launches Best In Class Waterless Industrial Hand Cleaners

**I**TW Chemin has extended the finest quality waterless industrial hand cleaning solutions for the Indian market. The brand identified the biggest challenge that the workers in body paint shops, auto repair facilities, automotive manufacturing, and maintenance department of most of the industries face - the right hand cleaner

The Septone™ Eliminator - Paints & Resins Industrial hand cleaner is the most effective cleaning formula designed to remove paints, adhesives, and other resin-based products. It outperforms



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Industrial coatings, Marine paints, Body fillers, polyester and epoxy resins, Silicone sealants, Urethane & Acrylic sealants to name a few. Specially formulated with Nontoxic and Biodegradable surfactants, it is safe on skin. It does not have any petroleum distillate, which causes major skin-related problems with multiple uses. Unlike other alkaline solutions, it also provides natural hydration to the skin. With 99 per cent less water consumption and time saving application industries can benefit from maximum productivity levels.

## Waters and University of Delaware Announce Innovation Partnership

**W**aters Corporation and the University of Delaware have announced a five-year research partnership to develop new analytical solutions for bioprocessing and biomanufacturing. Key to this partnership is Immerse™ Delaware, an Innovation and Research Lab, ("Immerse Delaware") set to open in early 2022 located at the University of Delaware Science, Technology and Advanced Research (STAR) campus. At Immerse Delaware, Waters will partner with students and faculty to identify and address the most significant challenges facing the biopharmaceutical industry.

The success of biotherapeutics such as monoclonal antibodies (mAbs), cell and gene therapies and vaccines has transformed the life sciences industry. However, the optimisation of the manufacturing process of these complex medicines has been limited by the lack of robust analytical methods that clearly decouple the critical quality attributes of the product from the process parameters. Waters is partnering with University of Delaware because of its leadership in chemical and biological manufacturing research as well its active support and proximity to the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL), a collaborative effort amongst industry, academia, and regulators.

"We strongly believe that the most difficult challenges can only be solved through collaboration across academia and industry. Immerse Delaware follows from our highly successful launch of Immerse Cambridge, A Waters Innovation and Research Lab," said **Dr. Udit Batra, CEO and President of Waters Corporation**. "Through this collaboration, researchers from both Waters and University of Delaware will identify and develop solutions that can better characterise biological manufacturing processes and drive improvements in quality, yields, efficiency and process control.

"We are thrilled that an industry-leading innovator like Waters Corporation and the University of Delaware are forming this collaborative partnership to advance novel solutions to biopharmaceutical process development and manufacturing," said **Dr. Dennis Assanis, President, University of Delaware**. "This is a true testimony to UD's recognition as a national hub for innovation and talent development that feeds cutting edge progress across industries — including engineering, biopharmaceuticals, life sciences, and so much more.

The Immerse Delaware Lab will feature a purpose-built research test bed, with a focus on leveraging LC-MS and adjacent technologies to support bioprocess engineers' em-

pirical data in the areas of process and informatics. Initial projects at Immerse Delaware will seek to gain a deeper understanding of novel schemes to quantify and ultimately minimise process-related impurities from uncontrolled glycosylation, which negatively impacts drug efficacy. These will be paired with informatic solutions to predict the evolution of biotherapeutic products.

Through its strategy to invest in academic and external partnerships, Waters is fostering a global community of scientific collaborators and innovators. Immerse Delaware, and future Immerse laboratories, will enable Waters to tap into a new set of talent and drive diversity of thought in its mission to improve human health and well-being.

In addition to investing in Immerse Delaware, Waters has furthered its commitment to biopharmaceutical innovation by joining NIIMBL. Located at the University of Delaware STAR campus, NIIMBL is a public-private partnership pursuing its mission to accelerate biopharmaceutical innovation, support the development of standards that enable more efficient and rapid manufacturing capabilities, and educate and train a world-leading biopharmaceutical manufacturing workforce, to fundamentally advance US competitiveness in this industry.



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## Mondi And Vafo Group Unleash Recyclable Packaging

Mondi, a global leader in packaging and paper, is supplying a range of recyclable mono-material pet food packaging for Hau-Hau Champion, one of Finland's most recognised brands in the premium dog food segment. The new packaging fulfils the pet food producer's objective to launch a reclosable and recyclable packaging solution that does not compromise on performance and retains the strong brand recognition in stores. It also addresses sustainability concerns of end consumers that are playing more of a role in the purchasing of pet food and products.

Mondi's customer-centric approach, EcoSolutions, helped Hau-Hau Champion find a high-barrier solution that can be reclosed, keeps food fresh and confines any smells. The previously unrecyclable multi-layer packaging contained a metalised layer which was replaced by Mondi's recyclable mono-material packaging: a reel material for form-fill-and-seal (FFS) 1.5kg bags and



pre-made FlexiBag Recyclable for bags up to 15kg. FlexiBag Recyclable is a mono-material polyethylene (PE) pre-made bag developed specifically for recycling, which means it can be deposited directly into Finnish plastic recycling streams.

**Thomas Kahl, EcoSolutions Project Manager at Mondi** says: "Through our EcoSolutions approach, we help customers find environmentally responsible alternatives without compromising on performance, ease of use, or aesthetics. For Hau-Hau Champion, this involved

asking many questions to gain deeper insight into the needs of the brand and its end users, as well as collaborating closely throughout the process to test and evaluate all solutions. The new packaging also supports Mondi's MAP2030 sustainability goal to make 100% of its products reusable, recyclable or compostable by 2025."

**Suvi Sillvan, Brand Specialist at Hau-Hau Champion** adds: "With Hau-Hau's brand refresh, we were looking for packaging that fully aligns with our commitment to reduce the carbon footprint of our products and operations as well as upgrades the packaging to match the high quality of the product content. Given that this is a premium product, we are especially pleased with the high-quality finish, including the printing, which retains brand familiarity on the shelf and informs consumers that they can easily recycle our dog food packs. The new packaging material also fully supports the fact that all our dry dog foods are now completely CO2 neutral through carbon emission compensation."

## DOMO to bring DOMAMID®, ECONAMID® and THERMEC™ Branded Solutions Under The Market Winning TECHNYL® Umbrella, Worldwide

Following the acquisition by DOMO Chemicals of Performance Polyamides Business (Polytechnyl) in Europe - including the well-known TECHNYL® brand - all current DOMAMID®, ECONAMID® and THERMEC™ branded engineered materials solutions will be merged under one TECHNYL® umbrella worldwide.

The move, which goes live early next year, will improve the visibility of DOMO's best-in-class portfolio of PA6 and PA66 solutions, including a full set of new product qualifiers to simplify customer purchasing.

"This step is all about serving our customers and partners and capitalising on the strong heritage of TECHNYL®. With sole global supply, our widened portfolio of tailored

engineered materials solutions, and the 360° services that address our customer needs, we will better serve a variety of segments with undisputed expertise, opening new opportunities for innovation and collaboration," said **Philippe Guérineau, DOMO's Chief Commercial Officer Europe and Europe Export**.

The new brand architecture will be effective from 1 February 2022, when the TECHNYL® brand will be distributed exclusively by DOMO Chemicals at a global level. This date marks the end of the bilateral non-compete agreement with BASF, as imposed by the European Commission. The new brand architecture will reinforce DOMO's brand identity and harmonise and simplify product lines.

Based on almost 70 years' experience, the TECHNYL® brands serve a wide range of applications, in the automotive, E&E and consumer goods market segments, helping DOMO to keep growing with its global customers.

The brand merger is focused on helping customers by aligning product descriptions with DOMO's principles of delivering quality, service excellence and consistency. There will be no change in the composition, technology, or processing of DOMO's materials.

The new TECHNYL® nomenclature will replace the current one in all documentation, such as order confirmations, delivery notes, invoices, certificates of analysis and technical data sheets.





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## Smooth Touch TPE For Packaging And Design

There is a worldwide change in the way of thinking – the “less is more” mindset is driven particularly by more conscious and longer-term purchase decisions. This means that customers are targeting development and design departments and bind them to break new ground. Whether plastics are used as (a part of) packaging or individual design element or component – the requirements for them are increasing and solutions are in demand that save resources and provide additional added value such as outstanding touch quality. For this reason, KRAIBURG TPE is now offering thermoplastic elastomers (TPEs) particularly suited for applications that benefit from a surface with optimised gliding properties. The focus is clearly on packaging for high-quality cosmetic products but also on direct addi-



tions for consumer products from the electronics or household sectors. Launching products is made easier, as Smooth Touch TPEs also meet standard regulations for the food sector.

With the new series, KRAIBURG TPE takes a decisive step: it was developed based on formulations and experiences from the medical sector to meet the requirements for excellent frictional behaviour.

This is the reason why the new products are also an ideal materials solution for diverse market industries that require a surface with optimised gliding properties and want the end user to benefit from a unique touch quality.

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- Conformity with DIN EN 71-3

## Milliken & Company Acquires Encapsys, LLC

Milliken & Company, a global diversified manufacturer with more than a century and a half of materials science expertise, has formally acquired Encapsys, LLC (“Encapsys”), a world leader in microencapsulation, from the Cypress Performance Group LLC (“Cypress”). The transaction officially closed October 18, 2021.

“Moving the needle on sustainability requires big thinking and powerful collaborations. We’re thrilled to welcome Encapsys to Milliken,” said **Halsey Cook, president and CEO for Milliken & Company**. “Encapsys’s expertise coupled with our ability to scale will propel our efforts to deliver sustainable innovations for our customers.”

“Encapsys brings a unique combination of innovation, science and technology to the Milliken team,” adds **Cindy Boiter, Executive Vice President and president of Milliken’s Chemical Business**. “Enhancing our portfolio of specialty chemicals with global reach, this acquisition will accelerate sustainable solutions for the markets and customers we serve.”

As Encapsys integrates into Milliken, daily operations will continue without interruption, including relationships with existing suppliers and customers.

“Encapsys associates are excited to become a member of the Milliken team and welcome a world-class organization to Northeast Wisconsin,” stated **Mary Goggans, president of Encapsys**. “Our culture and values are a perfect fit, and we look forward to leveraging Milliken’s global capabilities to accelerate innovation and growth.”

## Perstorp Recruits Patrice Pinsard As EVP Strategic Markets & Innovation

Perstorp is excited to announce that **Patrice Pinsard has been appointed EVP Strategic Markets & Innovation** as of October 18, where he will drive value creation and growth focusing on Perstorp’s portfolio of specialty chemicals.

Patrice Pinsard is an experienced executive with a long track record in the chemicals industry, a PhD in Fine Chemicals from the Université de Rennes, and an MSc in Chemical Engineering from Ecole Nationale de Chimie de Rennes. He has held senior positions in companies such as Rhodia and Cognis and, most recently as Global EVP Coatings, Industrial Solutions & Amines at Solvay.

“I am very proud to be joining the team as I believe Perstorp has all the means to grow as a true specialty company that will create sustainable solutions for a great future”, Patrice Pinsard commented.

In the first quarter of 2021, Perstorp redefined its business strategy to become a leading sustainable solutions provider, focusing on the global Resins & Coatings, Engineered Fluids and Animal Nutrition markets. This strategic direction will see Perstorp focus its specialty chemicals growth initiatives primarily on selected customer segments where innovation and services are prioritised.





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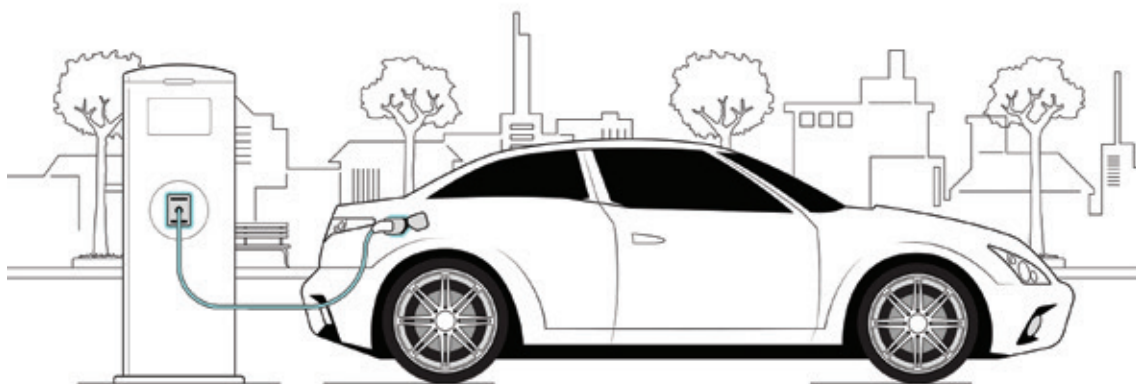
- Removes residues of oil, adhesives, greases and any other industrial fluids safely and easily



# Aiding The Switch To Safer E-Mobility

One of the challenges automotive companies face in building mass-market electric vehicles (EVs) is fire safety. Clariant International Ltd, a speciality chemical company, shares how it's innovative solution can make EVs safe in an efficient and affordable manner.

By Kruti Bharadva



It seems the electric revolution is finally here. According to the International Energy Agency, there were more than ten million electric cars on the world's roads already at the end of 2020 – up 43 per cent from 2019. By the end of this decade, the total number of electric cars, buses, vans, and trucks is projected to jump to 145 million or possibly even 230 million if enough countries tighten their emission targets. Carmakers are investing billions to secure their slice of the market. One of the challenges they face in building mass-market electric vehicles (EVs) is fire safety. But probably not in the way most people think.

Contrary to what action movies would have you believe, cars rarely burst into flames. If they ever do catch fire, passengers usually have more than enough time to walk away safely. That is why fire safety regulations for cars are a lot less strict than for planes, trains, or even most electronics used in homes. But now, with the advent of EVs, news reports

of burning EVs have caused new concerns.

## Are Electric Cars At Risk?

According to the US National Fire Protection Association (NFPA), electrical failures are already one of the leading causes for fires in conventional cars, accounting for one in four vehicle fires in the United States. With EVs carrying high energy in their lithium batteries, it seems only logical that they pose an even greater fire risk. Not so, says **Sebastian Hoerold, Head of Technical Service Thermoplastics & Market Manager Flame Retardants at Clariant**. The fire risk of electric vehicles is not higher but different from traditional cars with combustions engines."

## Not More But Different Risks

Electric power trains work at much higher voltages and currents. Most conventional cars carry a twelve-volt battery to run the starter, lights, and all onboard electronics. Even

so-called mild hybrids, in which a powerful electric motor supports the combustion engine, run on just 48 volts. In contrast, some all-electric vehicles have fast-charging cycles that can involve 800 volts or more.

Then there are the differences in everyday use: Parking a diesel essentially puts the car to sleep. But parking an EV usually involves charging it. "We see some of the highest voltages and currents precisely as the car is unattended," says Hoerold. "That can be overnight in your garage or during the day in a public parking area, say, underneath a busy shopping centre or an office building. It is this combination of high-energy batteries, high voltages and currents during charging while being unattended that needs to be considered in safety standards," he adds.

## High Voltages, Tight Spaces

"Up until recently, the automotive industry was not much of a market for our high-performing flame retardants. However, that is about to change dramatically," says **Elmar**



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**Schmitt, Segment Manager for Clariant's flame retardant business.** "In reinventing their product, carmakers will need new materials with safety built in to deal with a whole new set of challenges and requirements."

First, there are the high voltages. These can cause short-circuits and sparks that can ignite flammable materials. One of the ways to prevent such failures is by design: Simply placing conducting parts further apart is one strategy. Another is to encase components. But these approaches aren't always practical in car design. For one, cars are crammed with ever more electric hardware. Spaces are tight. Components need to fit close together. Adding material and assembly work to encase components drives up costs and adds weight.

"Carmakers have always been sensitive on these two fronts," says Schmitt. "Even small extra costs add up quickly, so does excess weight. Every gram you can shave off an EV adds to its battery range, which is currently one of the most important selling points."

#### ***Resistant And Lightweight***

High-voltage plugs, connectors, bus bars and other electrical components require high-performing polymers with high-performance flame retardants – such as Clariant's Exolit®. It has been in use for two decades in some of the most demanding industries, from smart consumer electronics to home appliances to industrial applications. Based on organic phosphorus compounds, Clariant's additives can stop plastics burning within seconds and thus stop flames from spreading. It also helps minimise the risk of creepage and sparks. "Exolit is non-halogenated, which makes it safer and more environmentally compatible than most solutions out there," says Schmitt. "But it is the improved material performance that makes it especially appealing to the EV industry."

**STANDARD CARS ARE EXPECTED TO LAST UP TO 200,000 MILES. WITH FEWER MOVING PARTS, EV'S MAY GET EVEN MORE MILEAGE.**

Adding Exolit to plastics does not affect or in some cases even improves their electrical properties – measured as the Comparative Tracking Index (CTI). "We enable manufacturers to reach Performance Level Category 0, which holds for 600 volts," Hoerold explains. "That way, conducting parts can be fit closer together, allowing further miniaturisation and weight cutting."

Plus, Exolit itself adds remarkably little weight to the parts.

#### **Harsh Conditions**

Then there is the matter of durability. Standard cars are expected to last up to 200,000 miles. With fewer moving parts, EV's may get even more mileage. However, that heavily depends on how well connectors, plugs, cables, brackets, and the likes hold up to the constant stress caused by vibration, extreme temperatures, UV light, corrosive liquids, dust and moisture. High voltages and humidity can further exacerbate this stress through a process called hydrolysis. "Over time, it can break down materials within the polymer and lead to corrosion in the pins and connectors," Hoerold explains. "Exolit is hydrolysis-stable and can be used in dedicated hydrolysis resistant formulations as well."

Probably the most important draw to carmakers is how little the addition of Clariant's flame retardants affects a polymer's other properties.

"The automotive industry has made an art of engineering cars to optimise costs, production speed, durability, and so on," Schmitt says. "They want their polymers to perform the way they're used to."

However, most flame retardants make plastics more brittle, less workable, and even less durable overall. Some make specific production


processes harder or even impossible. "With Exolit, we have carmakers covered," says Hoerold. "For example, they are very satisfied with the way it works with both laser welding and laser marking. Plus, it affects the physical properties of the plastics as little as possible."

#### **Aiding The Revolution**

In EV's, the colour orange is a safety feature. It indicates high voltage components and cables. Meeting and maintaining this specific standard colour throughout the entire lifetime of a car is crucial. Some flame retardants can make it impossible to colour parts accordingly. Exolit can be used for any colour. Other flame retardants can also cause heat-related discoloration over time. "Our solution affects the colour of the polymer less than any other product," Hoerold adds.

It is clear then, that high-performing flame retardants are crucial in EV's. "The industry standards and regulations on fire safety are not completely finalised yet," says Schmitt. "But we know that products such as Exolit will have a role to play that goes beyond fire safety."

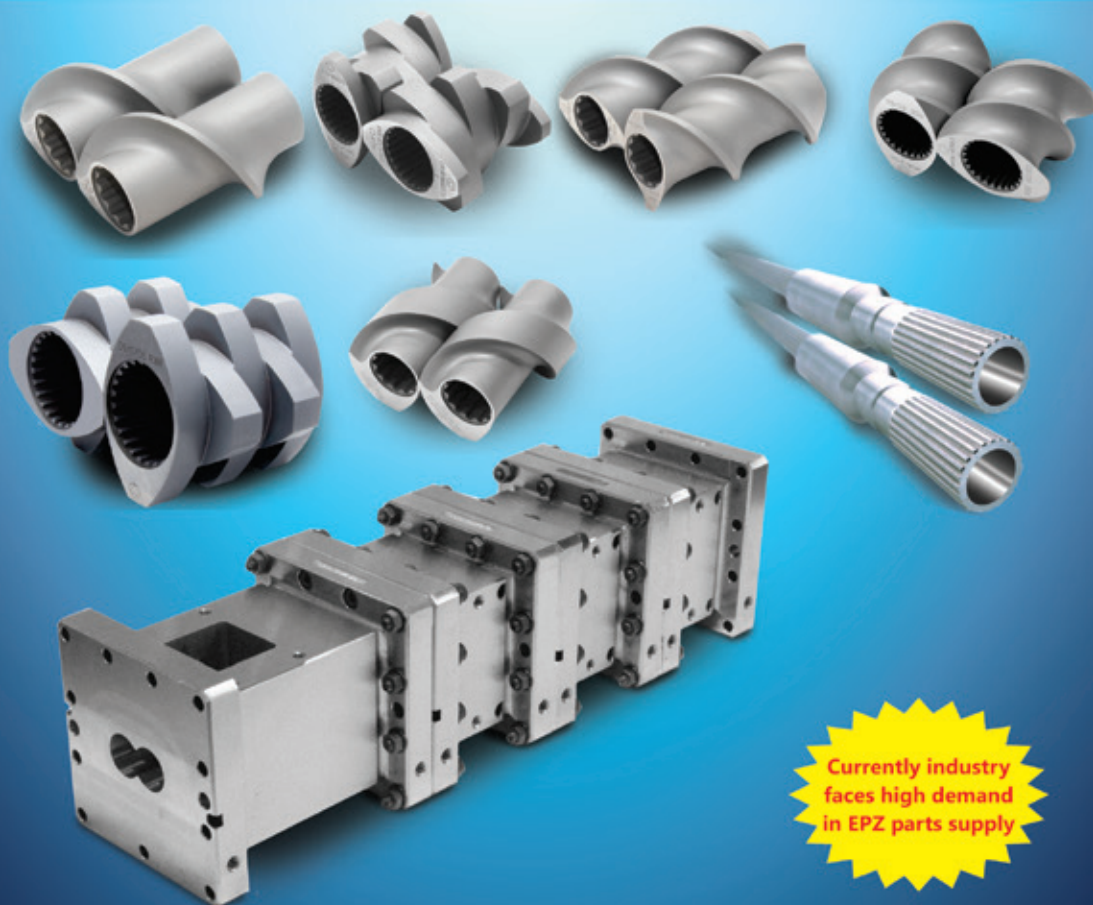
Combining high fire safety standards and high CTI with good mechanical properties and sustainable chemistry will help make electric vehicles more efficient and reliable. That in turn will instil greater confidence in EV's and thus help expedite the electric revolution around the world. It's one of many ways in which Clariant helps build a sustainable infrastructure and promote the kind of immediate climate action we need to reach sustainable development goals.

*Clariant is a focused, sustainable and innovative specialty chemical company based in Muttensz, near Basel, Switzerland.* 



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**By Kruti Bharadva**

**S**TEER Engineering Pvt Ltd is driven by intelligent technology, paving the way for a simpler, better, more evolved tomorrow. The company started its journey in 1993, founded by Dr Babu Padmanabhan, in Bengaluru. Since then, it has made enormous progress at a global level in twin screw extrusion technology for functionalising various materials without degeneration. The company has 4 platforms for its twin screw extrusion systems as well as uniquely designed extrusion processing zone parts (also called as EPZs). STEER also make its own sophisticated gear boxes. STEER has 39 granted patents and has applied for another 60 patents including FGD tech. We caught up with **Subodh Jindal, Global CEO, STEER Engineering Pvt Ltd** and here is what he had to share with us:

**Sustainability is vital in today's environment. In this context, please describe for us your patented technology being used in the development of biomass resin**

There is a tremendous push for sustainability today all over the world. At STEER, sustainability is at the core of our innovation- we evolve considering the future. This approach has enabled us to develop several eco-friendly technologies and processes that are aimed towards reducing the burden on our environment. Recently, we announced the deployment of our patented technology for the development of biomass resin. This initiative will bring forward several biomass-related so-

lutions as an environment-friendly alternative to oil-based plastics for applications in various industries, including the growing consumer market worldwide. The technology we developed will help accelerate development and commercialisation of compound materials of inedible rice with polyolefin resins, called "Rice Resin"<sup>™</sup>. Using these compound materials, products such as trash bags, shopping bags, cutlery (plastic utensils) and toys can be manufactured for end customers. In the long term, these products significantly reduce plastic waste through environment-

friendly polymer. At STEER, we have been pioneering technology that can help transform compounds for biomass-based solutions. We are proud of the fact that our technology is now being deployed by global brands. It is our mission to drive the world towards a simpler, better and more evolved tomorrow.

**How important is R&D to your company ethos and how is it shaping your business today and for the coming future?**

The core of the STEER culture is to continuously innovate, provide cutting edge technology and lead the next generation of innovation in its chosen field. Today, the company has more than 60 patents and many more patents applied for. We are preparing to provide solutions which can make a huge impact at the global level in the areas of how drugs will be manufactured and how they will be consumed in future with the principal of 'quality by design' over 'quality by testing'. Similarly, STEER is investing significant resources in sustainability through developing technologies for 100 per cent recyclable materials which can be used in wide applications including primary and secondary packaging, storage and beyond, including for food.

**Please tell us about your state-of-the-art Application Development Centres (ADCs) in India, Japan and US, as well as a dedicated Polymer Science & Diagnostic Centre (PSDC) in India.**

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very closely with customers in solving their problems or providing next level solutions. Hence our Application Development Centres (as we call them Customer Experience Centres) are core to the engagement with customers and other stakeholders in various industries. We also work with the reputed global research institutions and organisations to develop new technologies and solutions. Each of our four Customer Experience Centres are very well equipped and are manned by the trained professionals.

## PSDC:

At STEER's NABL accredited, Polymer Science and Diagnostic Center (PSDC), we offer expertise across a range of speciality areas that add value to customers' business, all under a single roof. Whether it is materials development, technology development, testing and characterisation, validation or certification, it is a one-stop destination. Our PSDC caters to the holistic needs of the polymer industry and addresses issues relating to analysis. Besides being a knowledge bank, we partner with various organisations around the world to help create quality compounds and better products. The PSDC possesses expertise across a range of speciality areas with services such as, processability tests, short-term mechanical tests, effects of temperature, magnetic properties, electrical properties, measurement of moisture content, environmental resistance, and measurement of mass, dimensions and density. In addition, the PSDC has the following equipment:

- Flammability Tester
- Environmental Stress Crack Resistance Tester
- FT-IR Spectroscopy
- Colour spectra photometer
- Magnetic Susceptibility meter
- Equipment to measure mass, dimensions and density
- Injection moulding machine for



specimen preparation

- Equipment for sample preparation

**A good compound is the result of a thorough understanding of what goes on inside the 'extruder processing zone' – please explain this statement of STEER and how It's working towards making these processes more efficient.**

A good compound is the result of a thorough understanding of what goes on inside the 'extruder processing zone (EPZ)'. The key to success lies with the exact design of the 'element and barrel' configuration. At STEER, we have mastered this art, which is why over 6000 extruder lines around the globe prefer STEER's replacement elements and components. Our replacement elements are purpose-built for performance and deliver outstanding process efficiency. Every element is made from special tool steel manufactured at our very own state-of-the-art foundry. This means that STEER replacement elements are designed to last and to work in perfect unison with the existing system. They include intake elements, melting elements, venting elements, mixing elements, vacuum elements and metering elements, all crucial for effective mixing of the compound.

The EPZ barrels and liners are technologically advanced masterpieces, designed to deliver outstanding value. Made with the right

metallurgy at our very own state-of-the-art foundry, they are crafted for high performance, longer life and perfectly match with your existing co-rotating twin-screw extruder machinery. Our barrels are available for a wide range of co-rotating twin-screw extruders. We manufacture barrels from 10mm dia to 300 mm dia (with a maximum length of 600mm). Whether customers require solid or lined, hard-faced or surface engineered, flanged or round, tie-bar or clam-shell, each and every barrel is purpose-built with great attention to detail, offering customers a host of advantages including customised metallurgy with required accuracy, cooling circuits for increased efficiency and customised vent inserts for better performance.

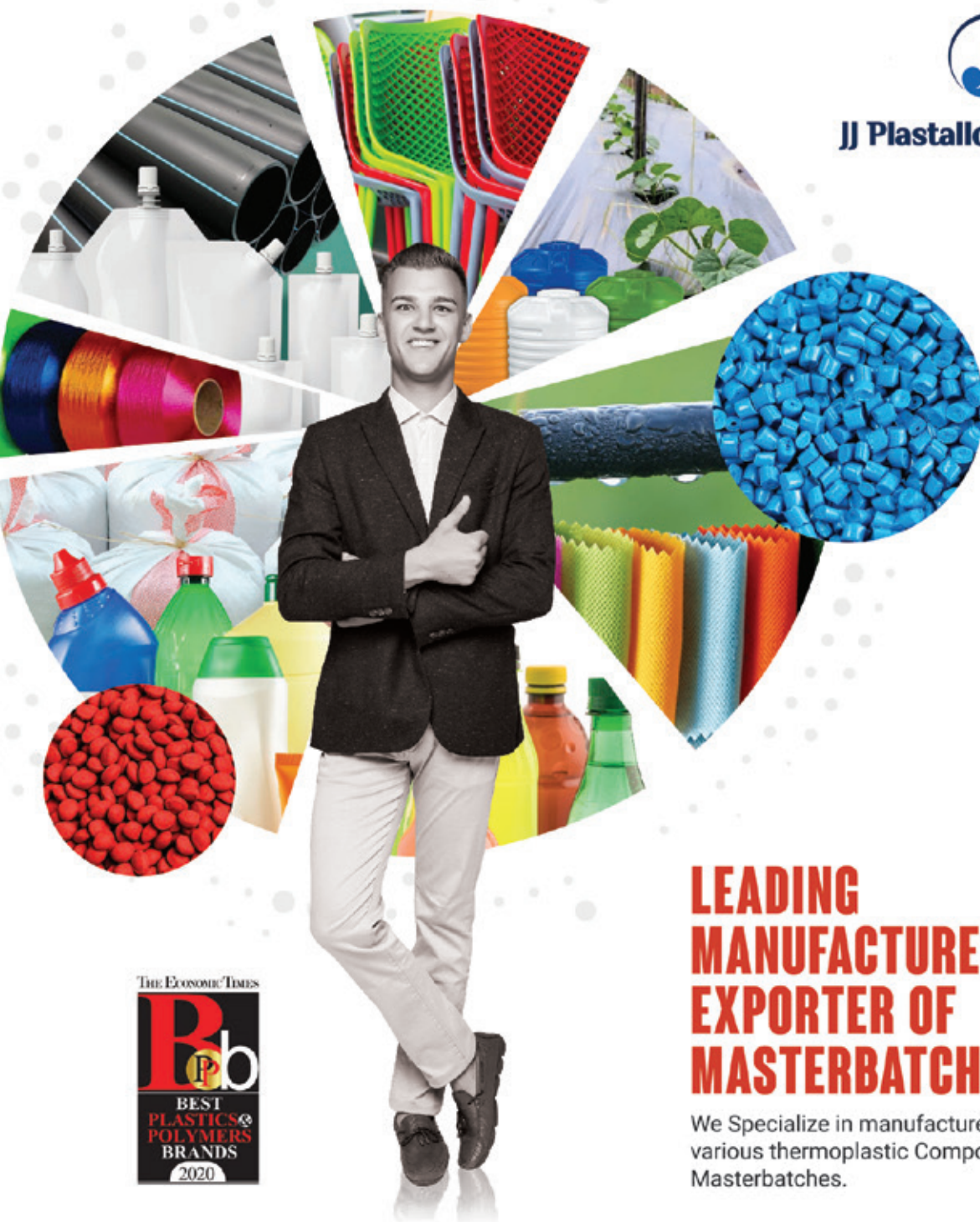
Another important component of the EPZ is the shaft. STEER shafts are also made with superior metallurgy from our very own foundry, with full-fledged in-house treatment. Besides they are diligently designed and made with high accuracy. And, we have the ability to machine any contour for up to 5.5m. Our in-house torque testing facility helps rate the capacity of these shafts. STEER manufactures exclusive shafts of required profile and geometry for all makes of twin-screw extruders. This combined unique approach makes our EPZ unique.

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**keeping the end use and user in mind. Please expound upon this.**

STEER platforms are a combination of high-performance technology, design thinking and advanced engineering. Every section is designed with a thorough understanding of mixing, materials and outcomes. Our advanced co-rotating twin-screw platform technology is a beautiful symphony of engineering, design and technology. Our core competency and expertise is around “Material Processing”. However, this is backed by technology, which can be divided into two components: (1) Intricate Computer Aided Design and Manufacturing with Advanced Design and Engineering Capability (in practice since 1993) and (2) Highly Advanced Tool Steel Manufacturing facility with patented steel formulations (since 2004).

The synergy of these two provides a high degree of core competence in extruder processing zone (EPZ) parts for the after-market comprising plastics, pharmaceuticals, food & beverages, nutraceuticals, bio refining etc.

STEER's revolutionary Omega 1.71 Do/Di materials platform with advanced EPZ (Extruder Processing Zone) technology, including patented ‘fractional-lobe’ special elements, gives material compounders and manufacturers the much-needed capability and control to work with difficult-to-manage, low bulk density and shear-sensitive materials. This ultimately helps in the creation of safer, stronger, lighter and more sustainable products.

Key to the company's success has been its ability to combine advanced technology with technical expertise and an in-depth knowledge of sciences in its field of focus. STEER designs and creates platform technologies with precision engineering for a wide range of engineering plastics, from the basic variant to those created for specific applications and

industries. STEER platforms, with patented Fractional-Lobe special elements and advanced EPZ technology, are specifically designed to give manufacturers the capability and control to develop superior engineered plastics, natural fibre compounds, bioplastics, conductive plastics, effect pigments, colour masterbatch, carbon black and more.

**Tell us about STEER's omega series platform in the context above.**


The OMEGA SERIES sets a new standard in the compounding industry. The revolutionary 1.71 Do/Di allows manufacturers to increase their production capacity by up to 25 per cent\* with its increased volume and torque ability. The patented ‘fraction-lobe’ special elements enhance process efficiency and quality of output, while delivering far greater returns on investment to customers. The Omega 1.71 Do/Di materials platform with advanced EPZ technology, including patented ‘fractional-lobe’ special elements, gives material compounders and manufacturers the much-needed capability and control to work with difficult-to-manage, low bulk density and shear-sensitive materials. This ultimately helps in the creation of safer, stronger, lighter, more sustainable products.

STEER has been a pioneer in Fractional Geometry Technology (FGT), a technology used in elements design and manufacturing. Though it is a fact that co-rotating twin-screw extruders evolved through the years, the ability to process certain shear and temperature sensitive materials is greatly enhanced in an extruder only with deeper flights. The increase in melt temperature due to the kneading elements at high speeds is solved by FGT with unequal tip angles. FGT can easily replace standard kneading elements. For example, in an eccentric tri-lobed kneading element, the

small tip angle leads to higher wear rate. Increasing the tip-angle gives a circular shape to the element and reduces the free volume available in the extruder. These elements continue to work as conjugate pairs while suiting the needs of twin-screw extrusion. The new element geometry provides greater flexibility in design of individual elements. FGT is being applied on standard elements used in STEER's extruder – the Omega series. The changes were made over the years, but we have been deploying the FGT-based elements since the last few months after successful tests and validation. The FGT elements are unique and cannot be replacement elements for other branded extruders and vice-versa.

The Omega series offers manufacturers 6 distinct advantages when compared to conventional platforms.

- Up to 25 per cent\* more production capacity due to increased volume and torque ability. The high free volume leads to higher throughput
- Improved process efficiency and quality\* due to patented special elements with ‘fractional-lobe’ geometry, that allow for higher conveying capacity, uniform shear, and extensional flow
- Reduced energy dissipation\* due to a narrower, sharper residence time distribution.
- Better control\* over kneading, stirring and shear to give manufacturers the capability to work with sensitive materials
- Improved conveying efficiency, greater ROI and minimised downtime due to self-wiping elements that prevent degradation.
- Controlled processing with higher required mean shear, reduction in total shear as well as controlled residence time.

The Omega series is available in different variants, built to address a wide range of production requirements. 



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# Playing The Field of Bioplastics

Toys manufacturing is increasingly taking the sustainable road, Here is a brief overview of bioplastics in toy making

By Kruti Bharadva

Plastics are seemingly the ideal raw material for toys. They're relatively inexpensive, easy to clean, durable and can be molded into just about anything a child's imagination is capable of cooking up. While wood, textiles and metals can no doubt still be found in your average toy box, these materials have largely been supplanted by the now-ubiquitous plastic toy. Teethers rattlers, stack toys, play food and other early childhood toys especially are all reliably made from plastics these days.

But the mass production made feasible by the qualities above has created its own set of problems. As will surprise no one familiar with mass consumption and its green backlash, the products we make—plastics in this case—are prone to unintended consequences. Environmental degradation, exposure to harmful chemicals and the problem of waste plague all industries. But given the ubiquity of plastic toys in stores, classrooms and nurseries, the toy manufacturing industry faces the twin prospects of having a uniquely massive carbon footprint and the severest consequences for a vulnerable user-base if it neglects to make a change to more sustainable plastics.

Luckily, toymakers are in fact exploring options for using more sustainable plastics over petroleum-based incumbents. The following are some of the most promising spins on an old material, both from a sustainability and performance perspective, that toymakers are exploring with some success:

- Bio-based plastics like PLA,



PHA and starch polymers made with renewable feedstocks instead of petroleum-based feedstock used in traditional plastics for toys that do not deplete our finite natural resources.


- Biocomposite plastics combine natural fibers or wood flour with recycled, biodegradable or biobased plastics to create durable weather-resistant toys.
- Biodegradable plastics like PLA, PHA or Flex compostable soft plastic elastomer can be used to make toys that can be returned to nature when their useful life has ended.

## Why Toymakers Are On The Lookout For More Sustainable Plastics

A sort of symbolism plays into the exploration of alternative, sustainable plastic materials for toys. When toymakers break from petroleum-based feedstock for the toys, and instead explore more environmentally-friendly raw materials, they signify an interest in what sort of planet their users will grow up to inherit. Sustainable plastics, made with bio-based, Biocomposite or biodegradable raw materials reflect a desire to preserve our planet's natural resources and ensure their toys leave a legacy of innova-

tion and care rather than waste and degradation. And, it turns out, what initially makes sense about toymakers exploring sustainable plastics makes even more sense when you think about what they're subbing out in exchange.

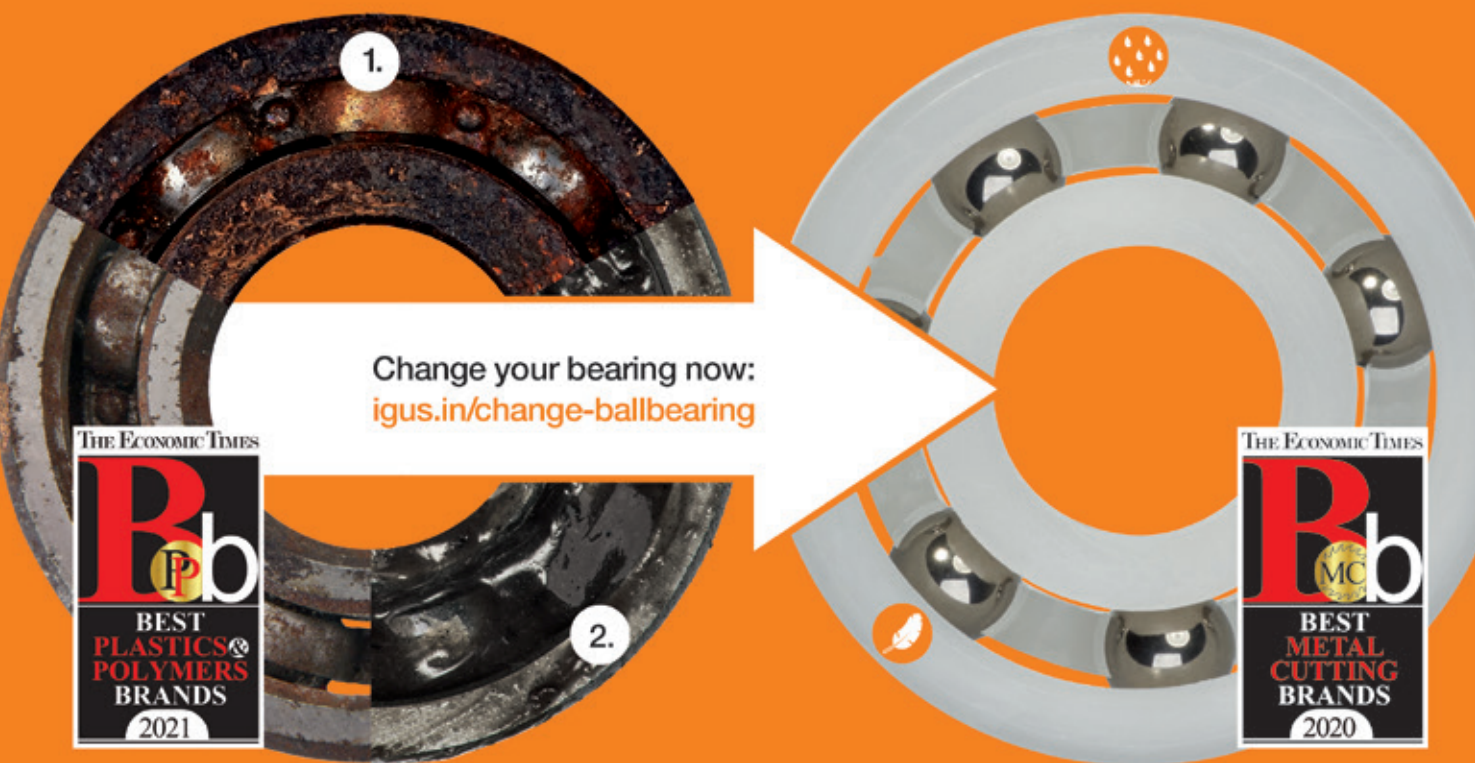
Many of the chemicals used to give plastic their flexibility—plasticizers as they are known—have been shown to be endocrine disruptors and linked to the development of tumours, birth defects and developmental disorders. Both the United States and the European Union have had a ban on the use of certain types of phthalates for years. Especially for young children, there is a fear that chewing on or heating the toys can exacerbate the harmful effects of exposure to chemicals like phthalates, bisphenol A (BPA) and heavy metals. Removing these chemicals, as well as others like PVC, should be a major thrust for toymakers looking to avoid exposing children to potentially harmful substances during the important period of early childhood development.

Once toymakers begin exploring options for less toxic materials, they often also find an unexpected marriage between sustainability and performance. Biocomposite materials which utilise natural fibers such as wood pulp, flax, starch and others can bring performance characteristics such as durability, natural feel and even buoyancy to the fore. Exploring sustainable plastics made with Biocomposite materials gives toymakers a degree of flexibility and chance for creativity that's lacking even with already versatile traditional plastic formulations. 



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# Taking Playtime Seriously

An overview of the toys manufacturing sector in India

By Kruti Bharadva

The history of the Indian toy industry stretches back to the birth of our nation itself. Manufactured all over the country, Indian toys reflect cultural diversity in the range of products manufactured. Local toys are manufactured from various raw materials such as plastic, wood, rubber, metals and textiles, with a big proportion of the businesses being SMEs. It is a labour-oriented industry based on master craftsmanship and creative designing.

The Indian toys industry is estimated to be \$1.5 bn making up 0.5 per cent of the global market share. The toy manufacturers in India are mostly located in NCR, Maharashtra, Karnataka, Tamil Nadu and clusters across central Indian states. The sector is fragmented with 90 per cent of the market being unorganised and 4,000 toy industry units from MSME sector.

The toys industry in India has the potential to grow to \$2-3 bn by 2024. With only 0.5 per cent of the global industry share, there is a large potential growth opportunity. Additionally, the domestic toy demand is forecast to grow at 10-15 per cent against the global average of 5 per cent.

Some trends contributing to growing demand:

1. There will be a 2.5x increase in income per capita from 2016 to 2027
2. There will be a 1.2x increase in the proportion of affluent and elite consumers in Tier 2 & Tier 3 cities by 2025



3. 80 per cent of the population will belong to Gen 'T' by 2027

## Value Chain Assessment for the Toys Manufacturing Sector

### Raw Material Availability

- World's second largest producer of polyester and related fibres with 8 per cent global share for plush toys
- Indian players have the technical know-how in precision tooling and are rapidly working towards growing capabilities to compensate for the shortage in ready-made molds and structures. Tooling is critical for sub-segments like electronic and remote control toys, video games, etc.

### Labour Costs

- Labour cost comprises almost 20 – 40 per cent of the total cost for toys and thus are an essential input for this industry
- Labour costs in India are cheapest amongst the other competing geographies
- Rate of growth of wages is significantly lower and rate of growth of productivity is relatively higher compared to other low cost countries like China, Vietnam

and Thailand

### Initiatives

To further boost the toy industry, the Government has undertaken the following initiatives:

**National Action Plan** - a comprehensive action plan to boost local manufacturing and incentivise toy and handicraft manufacturers in the country. The 'National Action Plan' will be implemented in collaboration with 14 Central Ministries.

**Toy Fair** - In line with the national initiative to promote the domestic toy industry, the government organised a National Toy Fair in 2021.

**Toycathon** - To promote toy manufacturing among domestic players, particularly rural entrepreneurs, a Common Service Centre (CSV) and a Special Purpose Vehicle (SPV) under the Ministry of Electronics and IT, joined forces with the All India Council for Technical Education (AICTE) to organise 'Toycathon 2021'.

**Toy Cluster Programme** - 90 per cent of the Indian toy industry is unorganised, with more than 4,000 micro, small and medium enterprises operating across the country. Most toy manufacturers are in Delhi NCR, Maharashtra, Karnataka, Tamil Nadu and small clusters across other Indian states. To streamline this sector, the government announced the 'Product Specific Industrial Cluster Development Programme' in 2020 to build toy clusters in dedicated SEZ's. 📍

Sources: IBEF  
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# Save Time & Money: Use a Mold-Design Checklist!

**Jim Fattori, Founder, Injection Mold Consulting LLC**, takes us through a comprehensive list of common molding issues that occur during an initial mold trial - many of which can be avoided or corrected with a proactive checklist

By Jim Fattori

Injection molders quote or estimate a job based on six primary factors: part weight, material cost, machine size, cycle time, labour requirements and packaging. The material and packaging costs are relatively easy to obtain from suppliers, which makes them fixed values—not estimates. Thanks to solid modelling software programs, part weight is also a fixed value, based on the models volume and the density of the material.

That leaves three variables, or estimates made by the person quoting the job: cycle time, machine size and labour requirements. These three estimates typically determine if you are going to make money or lose your shirt. More often than not, the mold design can control all three of these variables, because the estimator doesn't base his or her costs on having an issue with the mold. He, or she, base them on the mold performing as it should—in the correct machine, at the anticipated cycle time, and with the expected number of operators required.

Smart mold-makers use a mold-design checklist to help ensure they don't overlook anything. Most checklists that I have seen include details such as pry slots, insulator plates, steel types, safety straps, interlocks, etc. They all relate to the mold construction, but not the molding process.

The automotive and medical industries (as well as the military) insist on using all sorts of comprehensive checklists, with acronyms

such as APQP (Advanced Product Quality Planning), PPAP (Production Part Approval Process), FMEA (Failure Mode and Effects Analysis), DOE (Design of Experiments), IQ/OQ/PQ (Installation Qualification/Operational Qualification/Process Qualification) and Mil Spec (Military Specification). Most of these checklists address the function of the part, or the repeatability of the mold and machine to make the part.

Very few checklists are geared towards preventing mold-design problems that arise at the initial mold sampling. I'm talking about problems that cause the cycle time to be extended, the machine size to be larger, the labour requirements to be increased—or even prevent the mold from running in full auto mode. They don't include any “what if” questions. What can be done if this or that happens during the initial mold trial? I call this a “Proactive Mold Design Checklist.” Merriam-Webster aptly defines proactive as “acting in anticipation of future problems, needs, or changes”.

In this article I'll give 15 examples of common molding issues that occur during an initial mold trial. Many of them are avoidable or correctable with a proactive checklist. Each example will list a question or questions that relate to the problem, which you might want to add to your checklist.

## Common Molding Issues

1. A mold is built and it's time to sample it. The machine tonnage,

tie bar spacing and shot size were all taken into account during the mold design phase. The processor starts to dial in the machine settings. The first thing he encounters is the 4-in.-tall part will not eject off the core because the machine only has 31/2 in. of ejector stroke. Oops!

- *Do we have the intended molding machine's specification?*
  - *Is the machine's ejector stroke long enough?*
  - *If not, can outboard puller bars, or some other mechanical method be added?*
2. The mold has an eight-drop hot-runner system with 12 heat zones. The processor has no idea what zone controls which component. He turns the controller on. The zones that come up to heat slowly are for the manifold. The zones that come up to heat quickly are for the cavities.
- *Is a wiring schematic needed for the molder?*
  - *If so, do the zone numbers correspond with the cavity numbers?*
3. The mold has a stripper-plate ejection system. When the processor starts to determine the transfer position by making progressively larger short shots, the parts don't eject because the stripper plate is not pushing against any plastic yet.
- *Was the shot volume provided to the molder in cubic inches, or the shot weight in grams? The proces-*





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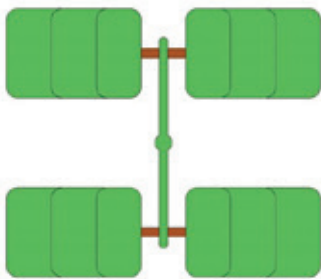
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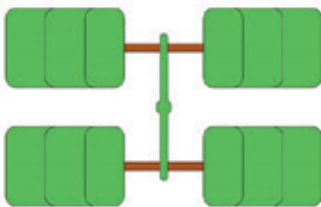
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processor can do the math based on the barrel diameter and the volume, or he can simply take an air-shot and weigh it.

4. The cavities are out of balance. Some of them fill out way before the others, but the processor can't identify which cavities are the short ones.
  - Is the cavity identification engraved near the gate, and not at the end of fill?
5. The four inside cavities fill first and the four outboard cavities are short.
  - Is each runner branch feeding the parts long enough to be effective when attempting to balance the cavities after the initial trial? Do not attempt to balance a mold by modifying the gate sizes. Gate widths and depths should be identical to all cavities. Otherwise, you will get packing and warping issues. You will also get an extended cycle time due to a variation in gate-freeze time. Balance the cavities by changing individual runner diameters. Long runner branches



Difficult-to-balance-cavities



Easy-to-balance-cavities

are easier to balance individual cavities (see Figs. 1 and 2).

6. A mold-filling analysis was performed prior to designing the mold and the results said the part requires 100 tons of clamp pressure. The mold is sampled in a larger, 150-ton machine, but the processor still can't pack out the sink without getting flash.
  - Should the parting line be relieved for more clamp force around the cavity?
  - Should the centre support pillar(s) be pre-loaded?
  - Are the clamp plates thick enough to counteract platen wear?
  - Can the sprue, runner and gate sizes be increased if necessary, to reduce the injection pressure?
  - Should a flash trap be added around the perimeter of the runner?
  - Can a second gate be added to the part if necessary?
7. The mold-filling analysis estimated the cycle time to be 30 sec. That is what the estimator used when quoting the job. The best cycle the processor could achieve to make a good part was 40 sec due to inadequate cooling in various areas.
  - Are all the molding areas adequately cooled? This includes everything from the sprue bushing, all the way to the end of fill.
  - Should any area of the part be cored out?
  - Should the core or any other mold component be made of beryllium copper, aluminium, or other thermally conductive material, especially for molds with short cycle times, thick wall sections, and places that are difficult to add a cooling channel?
  - Would conformal cooling be beneficial?
  - Would a post molding cooling fixture be beneficial?
8. The part is sub-gated into either

the ejection side or the injection side of the mold. Upon mold opening, or upon ejection, the sub-gate breaks off the runner and stays in the mold, which then blocks the cavity on the next shot.

- Is there sufficient land length on the ejector pin, or puller pin next to the gate, so that it can be shortened, to form a longer boss connected to the runner?
  - Can a stiffening rib or gusset be added in case there is an issue with the gate?
  - If the ejector pin, or puller pin next to the gate, ends up being too close or too far away, is there room to add another pin in a different location?
  - The location of the ejector pin or gate puller frequently doesn't allow the runner to flex, or it allows the runner to flex too much. That is often the reason why a sub-gate will break off.
9. The parts have a fairly thin wall section and the material is unfilled nylon 66. The injection velocity is pretty fast, so that the parts fill before the small gates freeze off. The parts have a lot of burn marks, but if the processor slows down the injection speed, the cavities won't fill.
    - Should a perimeter vent be added?
    - Should a runner vent near the gate be added?
    - Can any rib, boss or other "dead zone" be vented?
    - Should a vent pin or porous metal insert be added?
    - Can the land lengths of the vents be shortened if necessary?
    - Can a flow leader be added if the part is difficult to fill?
  10. When sufficient pack pressure is used to eliminate the sink marks, the part wants to stick in the cavity. When mold release is sprayed in the cavity, the sticking goes away for a few shots.
    - Is there sufficient draft on the outside of the part?



- Can undercuts or a rough texture be added to the core?
  - Should a vent or air poppet be added to the cavity?
11. When sufficient pack pressure is used to eliminate the sink marks, the ejector pins try to push through and leave circular stress marks on the part.
- Can more or larger ejector pins be added if there is a “pin-push” issue?
  - Has a draw polish been specified to help with release?
  - Is there sufficient draft on the inside of the part?
  - Should a lubricous plating or coating be added to the core?
12. The parts have deep, thin ribs. At first, the ejector pins push right through ribs. The parts eject, but the ribs break off and stay in the core. The processor’s hands are badly bruised from trying to remove the ribs with a propane torch and a straightened out band clamp. After several attempts and a lot of frustration, the small ejector pins under the ribs simply buckle and break. In addition to the checklist questions above:
- Should bosses be added to any ribs or deep impressions?
  - Should blade ejection be added to ribs for more ejection contact area?
  - Should a “floating” insert be added to release any ribs or deep impressions?
13. The mold has two opposing lifters, which form undercuts on the part. When the ejector plate advances forward, the part releases from one of the lifters, and sticks like glue to the other. Multiple ejector pulses still don’t eject the part. It just goes back and forth for a ride.
- Should a boss, rib or pointed ejector pin be added to keep the part centred during ejection?
14. The runner on a three-plate mold is a real problem. Sometimes it hangs up on the sucker pins. Sometimes it curls and won’t fall out of the mold. Sometimes it hangs up on the extended sprue bushing due to nozzle-tip drool.
- Does the runner clear the range bolts, springs, interlocks, or other obstructions?
  - Should the body of the sucker pins enter the runner about 0.010 in. to prevent “hang-ups”?
  - Should a thin stiffening rib be added to the runner to prevent it from curling?
  - Should an air- or spring-actuated poppet with a long throw be added to push the runner off the floating X-1 plate?
15. The job was quoted using one-half an operator. In other words, one operator being able to attend to two machines. Therefore, the mold must run fully automatic and the operator must have sufficient time to perform such operations as degate the runner, apply a part label, put the part in a polybag, neatly pack the parts in a box, and inspect the part quality. Trimming flash is never taken into account when quoting a job. All of this leads to a few more checklist questions.
- Can an operator degate the part cleanly and without too much difficulty?
  - Can the gate be recessed into the part?
  - Will a sub-gate, cashew gate or split pin gate help reduce the operator requirements?
  - Will the parts scuff or become damaged if they are ejected onto a chute or conveyor?
  - Will a robot or picker be used to remove the part?
- If so, can the mold open up enough for the robot to fit inside?
  - Is the machine’s maximum daylight sufficient for robotic extraction?

Here’s a tip that the mold-maker, the molder, and the estimator should keep in mind: Molding machines have different hourly rates based on their clamp tonnage. The larger the machine, the higher the rate. In contrast, a molding machine operator has a fixed overhead rate, regardless of the molding machine size. If the molding machine has an hourly rate less than the operator’s burden rate, the primary concern should be the labour requirements. Conversely, if the molding machine has an hourly rate more than the operator’s burden rate, the primary concern should be the overall cycle time.

There is an old saying in our industry: A mold-maker is only as good as his last mold. Molders understand that almost every mold is unique. They usually don’t get upset when an unforeseen problem arises. If the mold-maker says, “We considered the possibility of that happening during the design phase and we have an action plan in mind,” the molder is probably going to be impressed.

However, when a common mold problem occurs—one that is not unique and should have been foreseen and prevented—that is when the likelihood of a mold-maker getting another job starts to diminish. Therefore, the use of a thorough checklist can be financially invaluable. The checklist should be a “living” document, updated whenever an issue occurs. And they occur all the time. 📌

*Jim Fattori is a third-generation molder with more than 40 years of experience in engineering and project management for custom and captive molders. He is the founder of Injection Mold Consulting LLC in Pennsylvania, USA.*



# The Mobility Metamorphosis

Mobility as we know it, is evolving at super-sonic speed, with E-Mobility being the hottest commodity in the automotive sector. We explore how plastics are pushing forward this metamorphosis and spotlight the **ET Global Conference on Plastics in Automotive**- the industry's go to event for everything that is vital, trending and pioneering in automotive plastics

By ET Polymers Team

The world is changing. Or to be more accurate, factoring in the aftermath of the pandemic, the world has CHANGED. From the way we live, work, perceive ourselves and our surroundings- every aspect of our lives has transformed. Mobility has been no exception. In fact, various factors contributing to global mobility trends have dramatically shifted- There is more emphasis on sustainable mobility, intelligent mobility, safer mobility, and of course, efficient mobility.

One of the largest contributing elements to these shifting, transforming trends is – plastic. Plastic is the very enabler of making the way we travel more sustainable, safer and efficient. It is with these essential trends in mind that the **Economic Times Global Conference in Plastics** is being organised, in conjunction with the ET Polymers Magazine- to discuss, evaluate, comment and share the latest developments in the role plastics play in the automotive sector. The full-day conference will take place in Pune,

on the **25<sup>th</sup> of November 2021**. The ET Polymers team gives you here an in-depth analysis on just why plastics are so vital:

## The Market

According to the market analysis report by Grand View Research, the global automotive plastics market size was valued at USD 28.1 billion in 2020 and is expected to expand at a compound annual growth rate (CAGR) of 4.4 per cent from 2021 to 2028. Globally, recovery in the automotive sector, improved vehi-



cle design capabilities and increasing focus on vehicle weight reduction and emission control are the key factors boosting the growth of the market for automotive plastics. Plastics are widely used in automotive components and

parts owing to easy manufacturing, possible sourcing from renewable raw materials, and improved designs.

Polypropylene (PP), Polyvinyl Chloride (PVC), Acrylonitrile Butadiene Styrene (ABS), and Polyurethane (PU) are the most utilised materials for vehicle parts and component applications. Usually, an average car consists of 5.8 to 10 per cent of plastics, depending on fuel-efficiency standards and performance requirements, with consumption in vehicular equipment accounting for over 110-120 kg in an average car. This percentage is expected to increase owing to growing demand from consumers for high-performance, lightweight, and fuel-efficient vehicles, thereby augmenting demand for automotive plastics over the years to come. Weight reduction also offers a cost-effective way to reduce Greenhouse Gas (GHG) emissions and fuel consumption, conserving non-renewable crude oil reserves. For example, every 10 per cent weight reduction in a vehicle would improve fuel economy by 5 to 7 per cent.

Plastic monomers are polymerised using chemical reactions and catalysts to form polymers and co-polymers and are turned into Polycarbonate (PC), Polypropylene (PP), Polyethylene (PE), Polyvinyl Chloride (PVC), Polystyrene (PS), and other such polymerized materials. These materials possess far better properties than their respective monomers and are extremely stable for use in molding and fabrication.

The polypropylene segment led

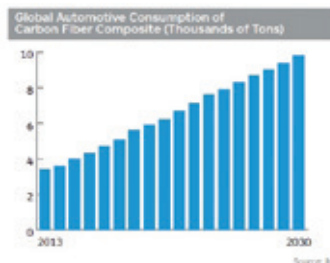
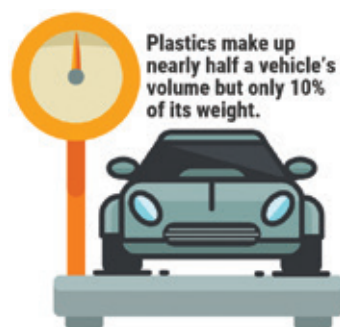


the market for automotive plastics and accounted for the largest revenue share of more than 32.0 per cent in 2020. This growth can be attributed to the rising product demand from end-use industries such as packaging, electrical and electronics, construction, consumer products, and automotive.

Polypropylene finds application in both rigid and flexible packaging owing to its physical and chemical properties. Apart from this, it offers excellent chemical and electrical resistance at very high temperatures. PP is quite lightweight as compared to other plastics making it suitable for application in the automotive sector for reducing the overall weight of vehicles, which, in turn, helps reduce fuel consumption and carbon dioxide emissions.

Polyvinyl chloride emerged as the second-largest product segment in 2020. Its major automotive applications include underbody coatings, sealants, and floor modules, wire harnesses, passenger compartment parts, and exterior parts.

The injection molding segment led the automotive plastics market



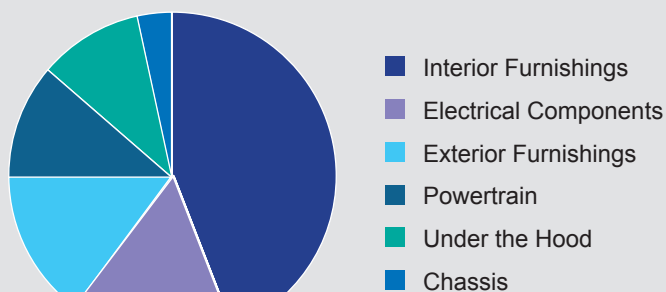
and accounted for the largest revenue share of more than 56.0 per cent in 2020. The high share is attributed to the application of the broad range of injection-molded plastics in the automotive industry to manufacture door handles, engine hoses and tubes, console and dashboard covers and brackets, radio covers and other electrical internal components, buttons and bezel panels, knobs for shifter levers, controls and covers for the sunroof, and convertible roof assemblies.

Apart from this, the blow molding process is also widely used in the automotive industry owing to its advantage of making more complex products in various designs and shapes that would otherwise be challenging with other technologies with the cost of the end product being significantly higher.

The interior furnishings segment led the market for automotive plastics and accounted for the largest revenue share of more than 44.0 per cent in 2020. Growing demand for automotive plastics in an area such as body and light panels, seat covers, steering wheels, seat bases, load floors, headliners, and rear package shelves and fascia systems is projected to boost the market for automotive plastics over the forecast period.

Moreover, the proliferation of digitalisation has fostered the demand for plastics integrated into car dashboards to support highly advanced electronics. Safety concerns and high electrical insulation properties of plastics have also propelled their demand in instrument panels

**Global automotive plastic market share, by application, 2020 (%)**



Source: [www.grandviewresearch.com](http://www.grandviewresearch.com)

containing advanced electronic systems. Plastics such as PVC exhibit excellent chemical & solvent resistance with good tensile strength and flexibility, which makes them highly suitable for instrument panels and other electrical components.

### Asia- The Automobile Growth Story

Asia Pacific dominated the market for automotive plastics and accounted for the largest revenue share of over 45.0 per cent in 2020. Shifting production bases from developed regions to emerging economies of Asia Pacific, particularly in China, India, Thailand, Vietnam, and Indonesia, is expected to boost the market growth. Expanding the manufacturing base and increasing investments in advanced technologies for vehicular production is expected to bring about a new era of automobiles, positively influencing the market for automotive plastics. Consumers in Europe and APAC are highly conscious regarding fuel-efficiency. This has also driven the demand for sustainable plastics.

The Asia-Pacific automotive parts and components market was valued at USD 52.42 billion in 2020, and it is expected to reach USD 72.14 billion by 2026, registering a CAGR of 5.6 per cent during the forecast period (2021 - 2026).

The outbreak of COVID-19 acted as a massive restraint on the automotive parts and components market in 2020, as supply chains were disrupted due to trade restrictions and consumption declined due to lockdowns imposed by governments globally. However, government incentives, growing regional demand, and easy availability of raw materials are expected to drive the market growth during the forecast period.

For instance, India's Automotive Mission Plan FAME-II emphasises providing government support to

the country's growing automotive and its components manufacturing industry. Over the past few years, the automotive parts and accessories manufacturing industry has gone through a comprehensive remodeling, which is leading to the advent of a highly competitive industry.

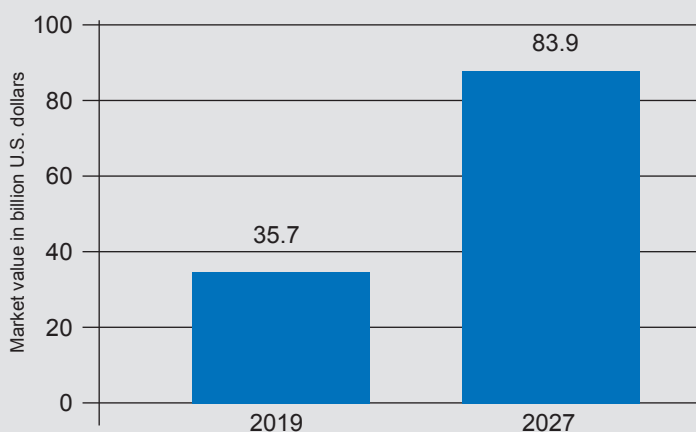
Europe was the second-largest market for automotive plastics and accounted for a revenue share of more than 31.0 per cent in 2020. Automobile manufacturers in Europe are using high-performance plastics as these materials are energy-efficient and help in a weight reduction of the vehicle. Strict emission standards in the region have forced automakers in European countries to shift from diesel engines to electrified motors.

### Impact of Electric Vehicles on Polymer Consumption

The emergence and rapid growth of electrically-powered road vehicles have become a key issue for consideration when assessing the automotive outlook and for resulting polymer demand. While the overall

**Market value of automotive plastics worldwide in 2019 and 2027**

(in billion U.S. dollars)





## Key Discussion At The Event

- Economic outlook and industry forecasts for plastics and advanced composites
- Exploring innovative plastics and advanced composite materials for automotive light-weighting
- New manufacturing processes and additive manufacturing techniques for automotive production
- Latest research and development in using advanced materials for improving design and aesthetics
- Upcoming regulations, safety standards, and recycling initiatives for new automotive vehicles
- Case studies on plastics and advanced composites for the next-generation of vehicles
- Productive studio interior design engineering (plastics) to leverage reduce vehicle development time
- Automotive plastic processing challenges & opportunities
- What are the economic expectations for the pandemic process and after?
- What kind of vision do the companies that lead the sector follow?
- Will the transformation of the automotive industry slow down?
- What are the expected digitalisation practices in company processes?
- Will megatrends such as electric vehicles, artificial intelligence, automation lose momentum?



| GCPA 2019

number of electric vehicles (EVs) remains at a low level on a global scale, vehicle fleet electrification has gained significant momentum in recent years, supported by regulatory incentives, changing consumer perception, and the development of large numbers of affordable electric models by the auto industry. Despite the growth trend for electric vehicles, automobiles that are powered by Internal Combustion Engines (ICE) will remain a significant proportion of the vehicle fleet, with polymer innovation driven by increasing fuel efficiency.

The EV vehicle design is not radically different from a traditional ICE vehicle, with the main difference being in the design and use of materials under the hood. However, electric vehicles will not have fuel system, pump, tanks, connecting cables, etc. As the market penetration of electric vehicles increases, polycarbonate (PC) consumption is expected to grow at a faster rate, as PC will be used in sensors and in LEDs in the car. The application of polymer components within engine transmission will become more common as manufacturers seek to squeeze costs and weight. But, the consumption of engineered polymers will be counterweighed by the industry's emphasis on light weighting, resulting in smaller and lighter components. The light weighting of the battery pack in electric vehicles is viewed as another important trend that will allow EVs to compete with cars using an internal combustion engine. The entire structure of the battery pack offers opportunities of light weighting with the use of engineering polymers and composites.

## Why A Global Conference?

**The Economic Times Global Conference on Plastics in Automotive, 2021**, will explore the breadth and depth of the role that plastics plays in vehicle development, with a look at how automotive suppliers will need to respond as the industry changes. Change continues to be a theme in the automotive industry. In this environment, plastics systems and parts suppliers must cope with a quickened development pace and the shifting needs of OEMs and consumers. The conference will explore trends, issues and opportunities, as well as the latest innovations, in automotive interiors, body panels, powertrain systems, under-the-hood applications and more.

This conference is unique in that it brings together a large network of automotive leaders from across different departments, yet maintains an intimate, tailored agenda that was designed by the industry for the industry.

Unlike other events, we get to know the industry personally, we drill down on individual challenges, hopes and dreams to ensure this meeting provides a platform to inspire, collaborate and network, so together we can challenge what's possible. 🌐

*See you in Pune on the 25th November 2021!*

## No Ordinary Disruption

According to McKinsey & Company, five major trends will “change the game” in the packaging industry and raise the bar for performance in the next five to ten years. Much higher levels of innovation and agility will be required to deal with the pressure and potential disruptions emanating from these trends – here is an overview of these disruptive trends

By Kruti Bharadva

Over the past decade, the global packaging industry has enjoyed steady growth, driven by shifts in choice of substrates, expansion of new markets and changing ownership dynamics. Headline changes include increased use of plastics to replace other substrates and accommodate consumers’ demand for convenience, the economic boom in China, India and other emerging regions, and greater industry consolidation and growing private equity ownership. Growth will continue in the decade ahead, but with more pressure and disruptive changes likely. Although growth in China is slowing, together with other markets

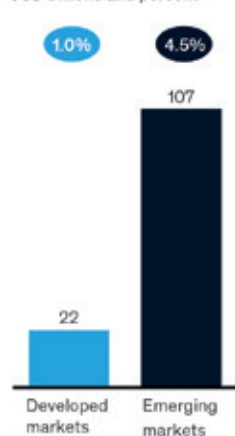
in Asia it will remain the industry’s top growth engine alongside North America. Meanwhile, the use of plastic has soared, but the burden on the environment is prompting increasing restrictions. And, while e-commerce has been a boon to many converters, its spread has created new demands and sharply compressed margins for converters’ customers, namely fast-moving consumer goods (FMCG) companies and retailers.

So, what is in store for converters up to 2030? To find answers, McKinsey’s Basic Materials Practice conducted extensive interviews with retailers, FMCG companies, and packaging industry executives in major end-user markets and across the

main substrates and carried out deep-dive primary research and analyses. The analysis identified five major trends that will transform the packaging industry over the next ten or more years. If companies can capitalise on them, these changing consumer behaviours, technology disruptors and sustainability trends will also present opportunities for high growth and improved profit margins in some packaging segments in mature markets. However, to succeed, packaging companies need to put strategy back on their agenda – simply doing what everyone else is doing (like in the previous period) is no longer going to cut it. Instead, packaging companies need to embark on a change jour-

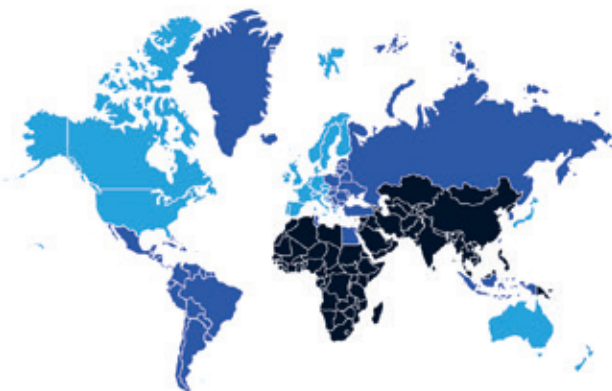
### Geographically, most of the global growth will be fueled by emerging markets

Growth in global packaging consumption, 2017 - 22f<sup>1</sup>  
USD billions and percent



CAGR 2017 - 22f

■ <2% ■ 2 - 4% ■ >4%



<sup>1</sup> At constant 2017 prices

SOURCE: Smithers Pira (Dec 2017); McKinsey



## 5 major trends will change the packaging industry's game over the next 10+ years



ney with controlled urgency: it will be essential for them to revise their approach from one based predominately on continuous improvement-type actions with reliance on market growth; rather, they should increase their strategic focus on innovation and agility in order to preserve value and capture growth. All the while, the forces at work are shaping up to form a new higher-pressure universe, what we might term a 'pressure-verse'.

### The Current Trends

All trends in packaging offer some opportunities; they also differ in that they are approaching at various strengths and speeds, with a special role for digital trends. The research interviews and analysis have identified five major trends that will "change the game" in the packaging industry and raise the performance bar over the next five to ten years.

- E-commerce everywhere- intense focus on increased packaging requirements, including for new products, along with last-mile delivery innovations
- Changing consumer preferences-

demand for much more personalisation, convenience, health, and affordability, driving SKU proliferation to new heights

- FMCG and retail margin compression- further margin compression for fast-moving consumer goods (FMCG) manufacturers and retailers, with pressure passed back up the line to converters, intensifying the threat of insolvency
- Sustainability requirements increasing at every step of the value chain, with rising activist scrutiny
- Digitisation/Internet of Things (IoT)- both to drive down costs and increasingly throughout the decade, gain a competitive edge with consumers; for example, by generating greater customer value and service through technology integration in packaging.

While none of the trends are new, most are now leaving infancy and coming at converters head on with increasing pressure and speed that could prove disruptive. Sudden turbulence could blindsides an individual company or segment of the

supply chain. As before, converters will need to meet rising e-commerce and sustainability requirements, particularly last mile customising and concerns about plastics. Also, as always, converters must satisfy consumer preferences – this will drive the proliferation of SKUs to meet demand for personalised, healthier, more convenient, and more affordable packaging. All the while, packaging companies will also be dealing with a severe margin squeeze passed back up the line by FMCG manufacturers and retailers. Finally, even with challenges, increasing adoption of digital solutions and IoT will provide all-important options for improving cost efficiency and (later) faster customisation. We discuss two of the most disruptive trends below:

### Growth Of The E-Commerce Channel

Can any packaging company win without fully integrating e-commerce as a key component of the business? Retail business is shifting from the traditional bricks-and-mortar channel to online and mo-

bile shopping and with the global e-commerce market set to double by the end of 2022, more and more traditional businesses, such as grocery, are embracing e-commerce.

### **Is the online glass half empty for packaging ...**

The move to online retail in general will continue to have a significant impact on packaging needs and the traditional converting value-chain constellation. E-commerce packaging must meet new and different needs, with increased requirements for strength and less investment necessary in “on-the-shelf” printing. Instead, there is a much greater need to optimise the overall packaging for last-mile shipments, improve the consumer’s unboxing experience, and facilitate easy, efficient returns. The pessimistic view is that e-commerce will radically diminish the traditional role of primary packaging designed to attract consumer interest in retail stores as part of the purchase decision. Has this role already peaked, and could it continue to decline until, at some point after 2030, it will become a quaint relic of the past? Customers are becoming increasingly digitally savvy, so the argument goes: they seamlessly roam between the best of both online and offline channels, and they have already made up their minds before ordering or buying an item. This may well imply a large-scale shift to utilitarian protective packaging only. Moreover, consumer tools are being developed for easy replenishment and reordering, and such tools will tend to reduce impulse purchases by consumers in stores.

### **or half full, with new avenues for growth?**

More optimistically, however, e-commerce also brings with it new and different opportunities for packaging. In the short term, this is especially true for the next generation of transportation packaging, for example:

**New volume:** At the most basic level, the strong growth trajectory in parcel delivery implies that the demand for individual packaging will increase, driven by the underlying growth in e-commerce activity (purchases and returns). This is already benefiting converters that make flexible packaging (pouches), corrugated boxes, and other protective packaging used in the last-mile delivery to consumers. In fact, e-commerce will, through its sheer growth rate, drive half the growth of the European fibre-based transportation packaging.

**New types of packaging:** Different types of packaging will emerge with new features and characteristics to fit the omnichannel environment; for example, easy-to-pack, customer-focused unboxing, simple returns, and robust handling in the supply chain – that is, individual packages able to withstand at least some of the rough handling of shipping outers and crates. E-commerce requirements for robustness are currently roughly three to four times higher than traditional standards for package units; for example, packaging is typically drop-tested from 5 angles for store deliveries but from 18 angles for e-commerce shipping by some e-retailers. Additionally, we also expect further disruption in packaging because e-commerce will require significant supplementary investment in product development and R&D to develop even more competitively efficient solutions to support this channel’s expansion.

**Next generation of e-commerce transportation packaging:** Basic requirements for e-commerce parcel packaging have so far been quite simple – prevent product damage and optimise productivity – but the bar is rising quickly. The pressure is especially noticeable given that e-commerce is highly competitive with very slim margins and demands packaging that can act as an enabler to improve profitability. Cost pressure has so far been especially promi-

nent in fostering the use of pouches. They are cheaper and faster to fill on production lines, take brand imaging well, and, in many cases, include design elements for easy returns.

**Convergence of primary and secondary packaging:** We expect to see a tipping point emerge when purchasing volume via e-channels reaches over 20 to 30 per cent. As volume increases, many more product manufacturers will be looking to e-channel-enabled packaging. In other words, the merging of primary and secondary packaging. We expect large e-commerce players to lead the way in removing the outer box by demanding primary packaging designed to allow direct shipment to consumers without a secondary protective outer layer. For example, the recent launch of a new laundry detergent presented a product specifically for online orders. The detergent was reformulated to be more concentrated and its packaging innovated to reduce its overall weight in transit. Handling has been improved with a plastic container fit snugly into a rectangular board shoe or raft. The hybrid mix of substrates adds another sustainability benefit by using less plastic and being even lighter than the original version.

**Design for high automation:** With the expansion of e-commerce, demand is increasing for packaging designs that also efficiently meet the needs of advanced/AI-enabled or fully automated warehousing and filling technologies. Finally, as e-retailers tackle the challenges of increased shipments of individual parcels and repackaging, we expect to see changes to the traditional packaging conversion value chain. For one thing, business models requiring quicker turnaround and flexible conversion will encourage increasing use of automation. For another, it is likely that conversion will need to be more localised – that is, will be increasingly done close to or even in-house at brand owners –

Exhibit 4

**Mega trends will affect packaging substrates in different ways**

## ILLUSTRATIVE EXAMPLES

	Trend aspect examples	Paper and board	Plastics <sup>1</sup>	Metal	Glass	Examples
Growth of e-commerce	Packaging optimized for omnichannel	+	+	-	-	Need for robust packaging benefits for flexible plastics
	Convergence of primary and secondary packaging	+	+	-	-	Overall less material used but upside for flexible plastics/board
	Strong increase in parcel shipments	+	+			Corrugated and flexible pouches gaining
	Small and close converting	-	-	-	-	Challenge for overall packaging asset footprint
Rapidly changing consumer and customer preferences	Mass personalization		+			Plastic highly customizable for differentiation
	Preference for local products/growth of small businesses	+	-		+	Natural/organic trend in favor of glass and fiber
	Health and wellness trend	+	-		+	
	Increase in convenience	-	+	-	-	Plastic highly customizable for differentiation
	Increased price awareness	-	+	+	-	Plastics/metal low-cost options
CPG and retail margin compression	Transportation and handling costs	+	+	-	-	Retail-ready packaging needs benefit for paper board
	General shift to cheaper materials	-	+	+	-	Increased use of low-cost packaging
Increasing pressure on sustainable packaging	Increased policy pressure for sustainability	-	-	+	+	
	Design for recycling/reusability		-	+	+	Metal and glass highly recycled materials
	Increased recycled content	+		+	+	Metal, glass, and board already large users
	Food contamination concerns (e.g., BPA, mineral oils)	-	-	-	+	
	Recycling systems in place	+	-	+	+	
	Compostability	+				Paper with no barrier coatings and PLA plastics
Digitization of packaging (IoT)	Digital printing	+		+		Large billboard surface in favor of board and metal
	AR- and AI-enabled packaging	+				
	RFID/NFC integration into material	+				Integration possible as early as the paper-making stage

<sup>1</sup> Includes both rigid and flexible plastic packaging (and multilayer plastic laminates)

SOURCE: McKinsey



where converters need to be nimble to offer rapid prototyping, fast turnaround, and new technologies such as digital print.

## Digitisation Of Packaging

Over the coming decade, intelligence and digitisation in packaging – meaning technology integration and use of new technologies – will increasingly be aimed at enhancing customer value and pursuing new business areas. In general, intelligence and digital in packaging offer a broad range of growth opportunities. Over the next 10 to 15 years, solutions that integrate digital technology into packaging substrates will likely also change the way consumers interact with packaging. Here, digital devices can add value for consumers by boosting packaging's power as a platform for information and brand messaging. Multiple technologies are available to facilitate such interaction (for example, QR codes, RFID, and NFC). Over the next decade, we expect to see their increasing adoption for use in packaging to interact with consumers. Such interaction helps differentiate brands and makes them more consumer-centric, thereby uncovering unmet needs by segment, assessing willingness to pay, gaining early signals on new packaging trends, and so on.

In the shorter term, we see more potential for packaging digitisation to create value directly for FMCGs and retailers, for example:

- Developing track-and-trace solutions at the packaging-unit level to enable complete supply chain traceability (for instance, for product recalls, food safety, quality tracking)
- Conducting continuous, integrated demand planning (for example, to optimise production runs and inventory using customer and third-party data)
- Digitising customer interactions to deliver a better customer journey, increase sales, and improve

service, particularly for small-scale customers


- Increasing customer collaboration (for instance, co-development/co-design with customers)
- Pursuing new areas of business with opportunities to serve a broader range of smaller customers directly and efficiently (for example, developing an e-platform where smaller customers can order their packaging directly from the converter and not go through the traditional distributor channel)

Converters' adoption of such digital solutions with business partners will be accelerated by the effect of increased margin compression on FMCG manufacturers and retailers, and by the development of the e-commerce channel with growing automation and use of AI, which will, in turn, require more intelligent packaging. Application of digitisation in packaging is, however, still in its infancy and will require further economies of scale to make costs competitive for unit-level implementation.

## The Evolving Journey

The breakthroughs achieved by packaging industry winners as they navigate the change journey over the coming decade will be many and various. Some that seem audacious or nearly impossible will result in great rewards and much acclaim, followed by widespread imitation. Others may be achieved with the help of intuition, conferring a strong competitive edge that is hard for rivals to unlock. Still others will be the result of close study of the substrate's physical properties and how they can be used to good advantage, including production and supply chain features that may be hiding in plain sight. In turn, all this packaging-specific knowledge will need to be harnessed to the machinery of a new business model that builds on five elements – innovation, agility,

asset and resource reallocations (including M&A), collaboration, and sustainability – to meet the demand for lower cost and greater value for the customer and consumer.

These five game-changing trends will create different tailwinds and headwinds depending on a company's substrate focus. Most favour continued plastics substitution but only if the makers of plastic packaging can create more sustainable circular or recyclable offers. For example, innovation that results in a cost-efficient, easily recyclable flexible pouch with appropriate barrier and aesthetic properties will likely win big. Similarly, improving recyclability of polyethylene-coated paper (such as coffee-to-go cups), which today has very low recyclability properties, will be another area requiring collaboration across the value chain. Efforts are already underway, as illustrated by a recent contest sponsored by major coffee-to-go retailers that received more than 400 entries and yielded a dozen finalists, who are obtaining funding to develop their solutions, ideally to commercial viability. Converters that harness knowledge of the trends, substrates, and processes along the value chain to a new business model will have the best chances of preserving value and capturing growth. As resources and attention are scarce, we suggest focusing on the five elements described above to develop a winning formula for lower cost and/or greater value for the customer and consumer. Devising a winning formula for the change journey will involve both deep insights into substrate features as well as answers to questions about how a company can revamp its approach and strategic focus to best exploit these features for a given end use and geography, and thus follow these trends to success. 

*Source: McKinsey & Company Report - No ordinary disruption Winning with new models in packaging 2030*

# A Cleaner, Safer Environment

**Taking hygiene measures to prevent hospital-acquired infections: A case study at the University Hospital Basel confirms the high effectiveness of an antimicrobial coating on adhesive films**

By Kruti Bharadva

In a clinical study that lasted several months, the effectiveness of antimicrobial treated surfaces against hospital pathogens was examined under real-life conditions at the University Hospital Basel in Switzerland. The research team, headed by **Prof. Dr. Andreas Widmer and Dr. R. Frei**, confirmed that the Sanitized® treated adhesive film developed jointly with Hexis S.A.S. has 98 per cent effectiveness against microbes. The results were first published in the peer-reviewed scientific journal "Antimicrobial Resistance & Infection Control". The study was supported by Innosuisse, the Swiss Innovation Agency.

Despite improvement in hygiene measures, it is estimated that hospital-acquired infections claim 37,000 human lives in the EU every year, whereas in the US, they claim over 98,000 lives. In addition, high economic losses are involved. Therefore, the development and research into the effectiveness of hygiene measures is critical, since the microbes that cause infections can survive on surfaces for hours or even months and be spread from there. One current field of research are antimicrobial coatings.

A case study at the University Hospital Basel headed by Prof. Dr. Andreas Widmer and Dr. R. Frei addressed the issue of whether and



how effectively the antimicrobial coated plastic adhesive film from Hexis S.A.S. acts against the cause of what are commonly known as hospital-acquired infections (HAI). In this study, the commercially available PURZON060B adhesive film by Hexis S.A.S. was tested, which is a flexible and transparent product with a silver-ion-based active ingredient supplied by SANITIZED.

## **Study setting: Frequently touched surfaces, with and without a Sanitized® treated coating**

A real-life situation was created by focusing the study on frequently touched surfaces in six patient

rooms, three in the surgical and three in the medical department. Specifically, overbed tables, bedside tables, arm rests of patient chairs, dining tables, toilet seats, and toilet flush handles were included. The Sanitized® treated film was applied onto half of the surface, while the other half remained in its original state and served as the control surface.

During the study's several-month duration, the patients' rooms were cleaned normally once a day, and the bathrooms were disinfected once a day. Swabs from the treated and untreated surfaces were taken twice a week from a 25 cm<sup>2</sup> area and examined for microorganisms. The number of microbes was determined by plating on culture media, and isolates were examined for clinically relevant pathogens such as *Staphylococcus aureus* (incl. MRSA).

**Long-term effect: A clear and significant reduction in pathogens**  
All in all, 403 swabs were analysed.



**A REAL-LIFE SITUATION WAS CREATED BY FOCUSING THE STUDY ON FREQUENTLY TOUCHED SURFACES IN SIX PATIENT ROOMS, THREE IN THE SURGICAL AND THREE IN THE MEDICAL DEPARTMENT**

The Sanitized® treated film led to a reduction in total viable count of 98.4 per cent across all six different surface types. The largest reduction was measured on the toilet seats and on the toilet flush handles (99 per cent). In addition, the scientists have confirmed a highly significant reduction of pathogens, particularly enterococci. Their multi-resistant strains can survive on dry surfaces for up to four years and they were responsible for a nationwide outbreak in Swiss hospitals in 2017, which could only be contained after two years.

The long-term effect of the treated Sanitized® PURZON060B adhesive film by Hexis S.A.S was confirmed by repeating the measurement after six months. "A long-lasting antimicrobial surface supports hygiene management in hospitals and care facilities," explains **Michael**


**IN ADDITION, THE SCIENTISTS HAVE CONFIRMED A HIGHLY SIGNIFICANT REDUCTION OF PATHOGENS, PARTICULARLY ENTEROCOCCI. THEIR MULTI-RESISTANT STRAINS CAN SURVIVE ON DRY SURFACES FOR UP TO FOUR YEARS**

**Lüthi, CEO SANITIZED AG.**

"The study results show that antimicrobial-treated surfaces can make a valuable contribution to preventing the spread of multidrug-resistant pathogens in hospitals. Even daily disinfection of surfaces cannot prevent recontamination within a few hours: antimicrobial-treated surfaces can close this gap," explains **Prof. Dr. Andreas Widmer.**

"For our antimicrobial adhesive film, we have cooperated with SANITIZED AG. Hospitals, senior residences and care facilities thus benefit

from decades of experience and the highest quality," explained **Clément Mateu, CEO of Hexis S.A.S**

*Sanitized® enhances textiles, polymer products as well as paints and coatings. The company develops its innovative technologies in Switzerland and markets them worldwide. Sanitized® ensures odour-free textiles, the responsible protection of paints and permanently treats polymers with a hygiene function and material protection.* 

Source: Study Publication "Antimicrobial Resistance & Infection Control"

## UPDATE

### India's 'Toy Story'- Growth is on the Cards!

The Indian toy industry is expanding on the back of a growing young population, rising disposable incomes, and a slew of innovations for the junior population base. The industry stands on the cusp of significant opportunities in every toy segment such as electronic toys, puzzles, construction and building toys, dolls, ride-ons, sports and outdoor play toys, infant/pre-school toys, and activity toys.

According to the latest available date, India's share in the global toy market is less than 1 per cent and is worth Rs. 5,000-6,000 crore (US\$ 678.30-813.96 million). A report by the IMARC, a market research company, stated that the Indian toy sector will cross the US\$ 3.3-billion mark by 2024 at a CAGR of 13.3 per cent between 2019 and 2024.

Mr. Narendra Modi has called upon start-up entrepreneurs to explore the toy sector. He has also urged industry players to support local toys and reduce reliance on foreign goods. Quoting Nobel Laureate Rabindranath Tagore, the PM said toys should be incomplete so that kids can complete them in their imagination. The PM highlighted that expensive foreign-made toys severed our children from others and have destroyed the



concept of collective gaming. He also asked educational institutions to organize hackathons for students to innovate in toy technology and design, including online games, to reflect Indian ethos and values.

Source IBEF



## The Waters BioAccord System with ACQUITY Premier

**W**aters Corporation has introduced the Waters™ BioAccord™ System with ACQUITY™ Premier, a combination of the Waters BioAccord System and the breakthrough ACQUITY Premier UPLC™ with MaxPeak™ High Performance Surface (HPS) technology. The integrated high-resolution LC-MS system simplifies multi-attribute monitoring of biotherapeutics by improving analyte recovery and assay-to-assay reproducibility so that regulated laboratories can get needed medicines to patients faster.

As promising as next generation biotherapeutics are, they can be difficult to characterise when they contain low-level analytes which strongly interact and bind to the internal metal surfaces of conventional LCs, making them almost impossible to detect,” said **Dr. Udit Batra, CEO and President, Waters Corporation**. “When it comes to analysing biologics, information is currency and by solving the problem of analyte-to-metal interactions, the BioAccord System with ACQUITY Premier gives scientists a faster means of getting information about everything in their samples from the very first injection.”

The compact, benchtop BioAccord System with ACQUITY Premier features MaxPeak HPS technology and the SmartMS™-enabled ACQUITY RDa™ mass detector allowing analysts of all abilities to monitor critical quality attributes of biotherapeutics and assess the processes that make them, all while decreasing risk, thanks to compliant-ready acquisition and data workflows that deliver consistent data quality from user-to-user and system-to-system.

MaxPeak HPS technology is a hybrid organic/inorganic surface technology that forms a barrier between the sample and the biocompatible metal surfaces of both the UPLC inlet and column. By mitigating, or eliminating altogether, non-specific adsorption, MaxPeak HPS offers many benefits, among them:

- up to a 300 per cent increase in detector sensitivity for more accurate glycan profiling, important for monitoring process and product quality of biologics
- greatly improved analyte recovery and assay sensitivity for the measurement of modified peptides and impurities that are undetectable by conventional means
- sharper peak shapes and greater

peak capacity for more accurate analyte identification and data interpretation

- greater reproducibility for separations prone to adsorptive losses meaning less re-work or troubleshooting, and more confidence in results
- eliminates need for system passivation that wastes valuable sample material or ties up instrument cycles
- eases the transfer of methods from site-to-site and from company-to-company

With automated set-up and guided workflows made possible with SmartMS technology, the BioAccord System with ACQUITY Premier is designed for easy deployment. Rapid system startup is enabled through the delivery of system and applications training with pre-defined biopharmaceutical methods for each key workflow. And, because regulatory compliance and data integrity is vital to many biopharmaceutical laboratories, the system is built on the waters\_connect™ informatics platform backed by an industry-leading compliant informatics architecture and the worldwide availability of professional qualification services.

## Greater Efficiency In Production

**T**he new drylin W linear bearing from igus is made entirely of iglidur polymer, so it can be manufactured quickly, simply and cost-effectively with injection moulding. The liner and linear housing are combined in a single component that simplifies handling, from storage to installation. The iglidur polymer bearing weighs up to 84 per cent less than classic linear bearings with their metallic housings. There is thus less mass to move, so force, motor output and energy consumption falls. The slim bearing, just ten grammes at installation Size 10, has several advantages for those new to linear technology who need a simple linear guide for applications, such as



adjusting tabletop devices, cameras, sensors or monitors. The bearing is made of iglidur JB, a tribologically optimised high-performance polymer, so it needs no lubrication or maintenance and is durable and resistant to dust and dirt.

The black material is remarkable for its very low coefficient of friction

in dry running and very low stick-slip tendency. The polymer bearing can handle loads of up to 25 newtons with ease, as tests performed in our 3,800 square metre in-house laboratory in Cologne show. It is also impact-resistant and robust while remaining elastic and damping so that it can absorb and dissipate vibrations.

The new bearing can be installed very easily on any drylin W single rail or double rails. If the user is looking for a cost-effective linear guide, igus's clear anodised drylin W WS-CA aluminium rails are a good choice. Combining the two materials – silver aluminium and black bearing material – gives the user a complete solution with a simple, elegant design.

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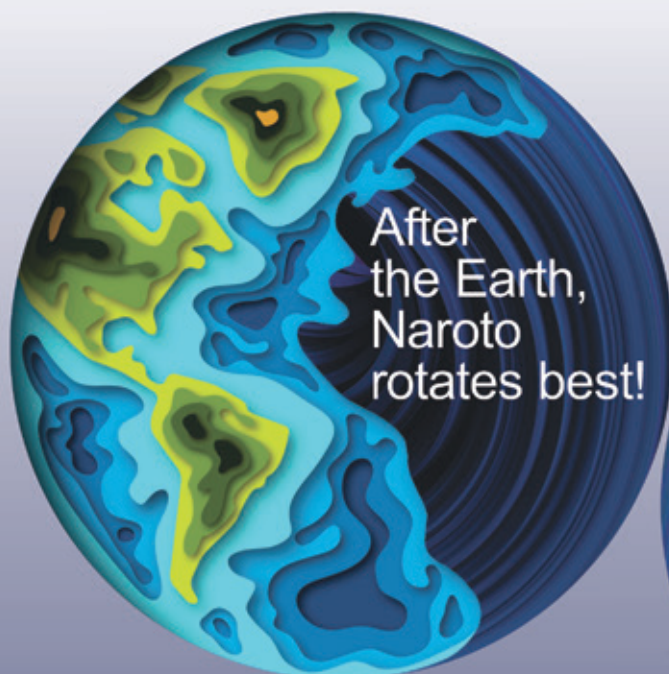




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