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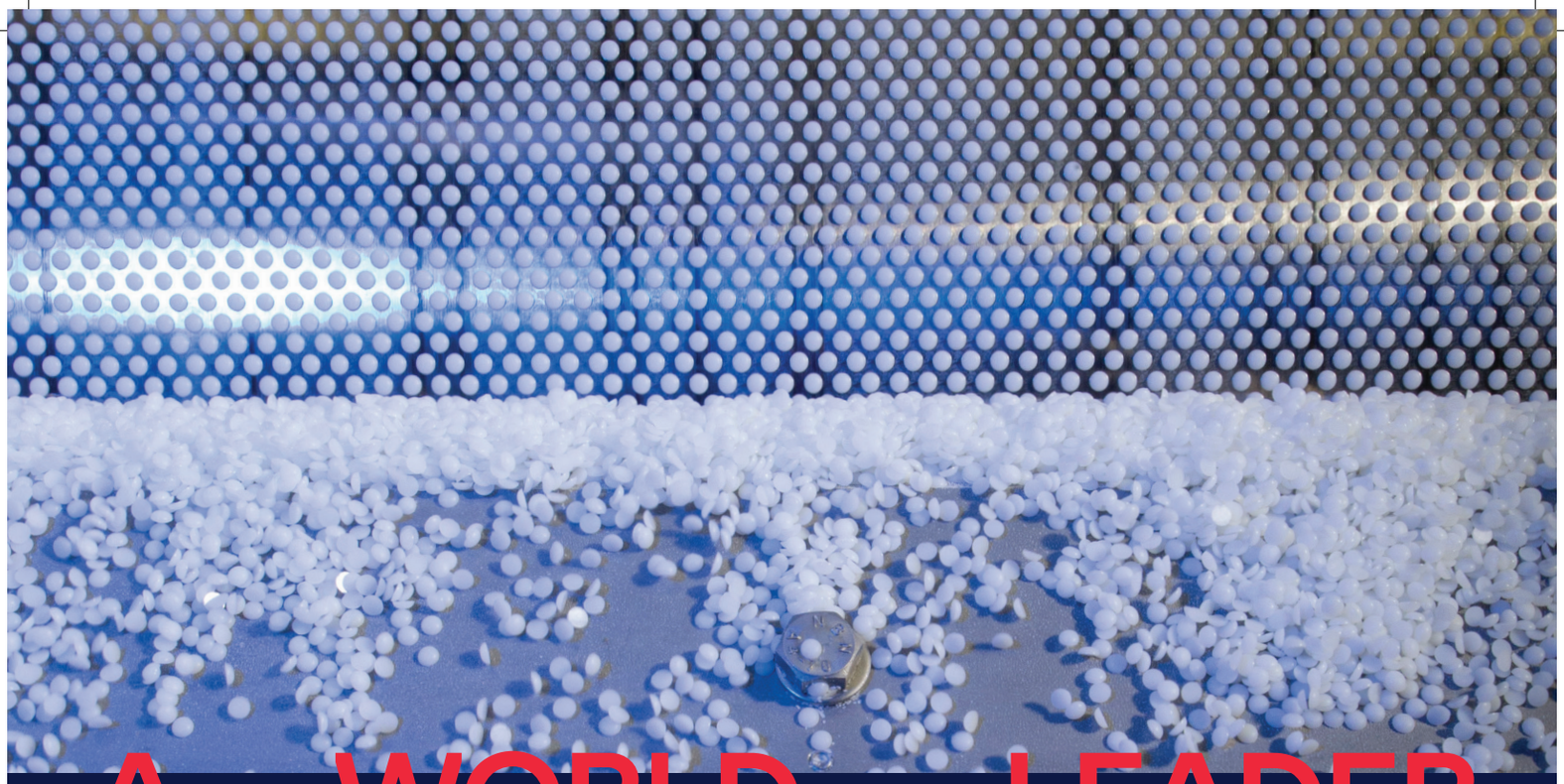

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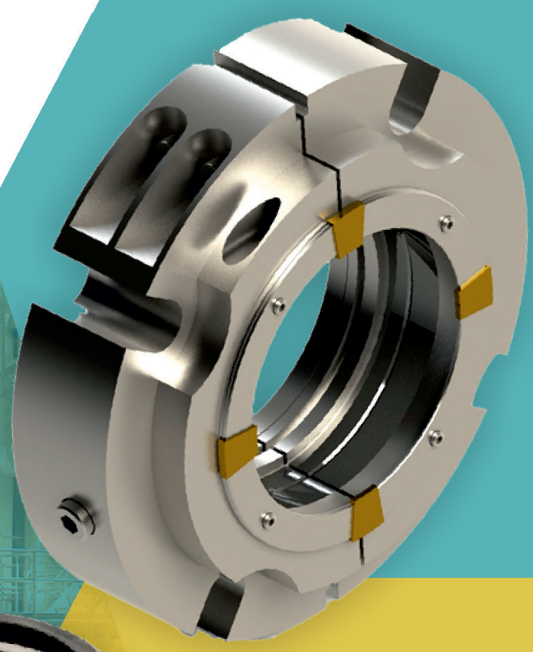

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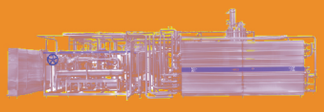

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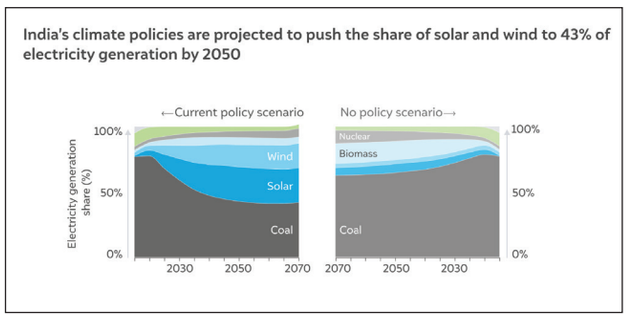
Hardeep Singh Puri highlights biofuels, green hydrogen as keys to energy transition

New Delhi, India: The 7th edition of the Global Sustainable Technology & Innovation Community Conference (G-STIC) was inaugurated in New Delhi. The conference is organised by TERI (INDIA), VITO (a leading research organisation in sustainability and innovation from Belgium) and other co-hosts.

Hardeep Singh Puri, Hon'ble Minister of Petroleum and Natural Gas, Government of India, and His Excellency Didier Vanderhasselt, Ambassador of Belgium to India, officially inaugurated the conference. In his address. Shri Puri emphasised the role of biofuels and green hydrogen in India's energy transition. "India's biofuel story started in 2006, with 1.5 per cent blending against the target of 5 per cent. Moving forward, we achieved a 10 per cent target in November 2022 and are on track to achieve 20 per cent blending by 2025. We are already discussing the post-20 per cent blending roadmap," he noted. Puri also highlighted the importance of technology scaling and the economics of energy transitions, particularly in the Indian context.

CEEW's latest study highlights transformative impact of India's climate policies

New Delhi, India: India's current climate policies are projected to reduce CO_2 emissions by almost 4 billion tonnes between 2020 and 2030, according to a new, independent study by the Council on Energy, Environment and Water (CEEW). This reduction is equivalent to nearly 1.6 times the European Union's CO_2 emissions in 2023. It is a significant achievement given India's commitment to reducing emissions by 1 billion



tonnes by 2030 at COP26 in Glasgow. The study, 'Impact of Select Climate Policies on India's Emissions Pathway', found that policies for India's power, residential, and transport sectors have already saved 440 million tonnes of carbon dioxide ($MtCO_2$) between 2015 and 2020. The highest reduction due to the policy interventions is observed in India's power sector, given that its share of the country's carbon emissions is significantly higher than other sectors. Over the coming decades, India must scale up decarbonisation efforts and continue championing climate policies to meet its net-zero goal by 2070. CEEW's first-of-its-kind modelling assessment shows how India's climate policies have collectively saved emissions and pushed India towards a higher share of renewables in its energy mix, increased adoption of electric vehicles, and improved energy efficiency in domestic air conditioning and lighting.

Thermax acquires 100% stake in Buildtech Products India

Pune, India: Thermax, a leading provider of energy and environment solutions and a trusted partner in energy transition has signed an agreement to acquire a 100 per cent stake (approximately ₹72 crore) in Buildtech Products India Private Limited, a company manufacturing admixtures, accelerators and capsules used in tunnels, infrastructure and railway projects. This partnership solidifies Thermax's presence in the construction chemicals sector. Thermax actively

Haldia Petrochemicals appoints Sanjiv Vasudeva as Executive VP & CMO

Haldia Petrochemicals Limited (HPL) has announced key addition to its leadership team with the appointment of **Sanjiv Vasudeva as Executive Vice President & Chief Marketing Officer (CMO).** Sanjiv Vasudeva will lead the Polymers and Chemical divisions in his new role, leveraging over 30 years of rich industry experience in thermoplastics and polymers. Based in Kolkata, he will work closely with departmental heads and team leaders to drive HPL's growth and market presence in this crucial sector.

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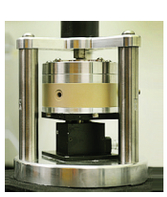

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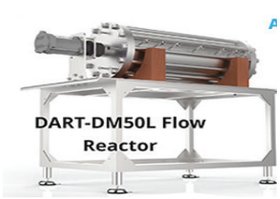

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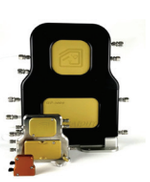

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contributes to the growth of the Indian construction chemicals sector with its expertise in the field of chemicals offering an extensive range of products for infrastructure, industrial, and commercial usage. The acquisition of Buildtech will be completed in due course.

Tamilnadu Petroproducts posts revenue ₹ 455.66 crore in Q2 of FY24-25

Chennai, India: Tamilnadu Petroproducts Limited (TPL), Chennai-based Petrochemical manufacturing company, has announced its second quarter unaudited financial results for FY2024-25. TPL posted a revenue of ₹455.66 crore as compared to ₹467.41 crore in the preceding quarter and ₹441.35 crore in the corresponding quarter of the previous year. EBIDTA decreased by 3 per cent vis-à-vis Q1FY25. The company has incurred ₹1.62 crore during the quarter towards material damage and plant restoration activities (Michaung cyclone – Dec'2023). This has been recognized as an exceptional item.

Ingersoll Rand acquires three companies

Davidson, NC: Ingersoll Rand Inc., a global provider of mission-critical flow creation and life science and industrial solutions, has acquired Air Power Systems Co., Blutek s.r.l. and UT Pumps & Systems Private Limited for a combined purchase price of approximately USD135 million. These acquisitions add more than USD50 million in revenue cumulatively acquired at a high-single digit multiple of 2024 estimated adjusted EBITDA.

APSCO, based in the United States, is a leading provider of hydraulic and pneumatic products and engineered solutions serving diverse specialty work truck vehicles. The acquisition will expand Ingersoll Rand's leading position in the dry and liquid bulk markets with energy efficient, innovative solutions. APSCO will join the Industrial Technologies and Services (IT&S) segment.

Blutek, based in Italy, specializes in the design and production of highly engineered solutions for compressed air and nitrogen generation in mission-critical environments. As a certified supplier to leading Engineering, Procurement, and Construction (EPC) companies, Blutek will increase Ingersoll Rand's ability to compete in high specification projects, adding technology capabilities, expertise, and aftermarket potential in high-growth end markets including biogas and carbon capture. The business will join the IT&S segment.

UT Pumps is a leading Indian manufacturer of screw pumps and triplex plunger pumps. This acquisition adds new pump technology to Ingersoll Rand's portfolio. Its high-pressure pumps are mainly focused on attractive end markets including water, wastewater, food and beverage, pharmaceuticals, general industrial, and chemicals. UT Pumps will join the Precision and Science Technologies (P&ST) segment.

Henkel continues growth momentum in third quarter

Mumbai, India: In the third quarter of 2024, Henkel increased Group sales to around 5.5 billion euros. This corresponds to strong organic growth of 3.3 percent, which was driven by good price development and an overall positive volume trend at the Group level. In nominal terms, sales increased by 1.0 per cent compared to the prior-year quarter. "In the third quarter, we achieved strong gross margins, which allowed us to continue the increased investments in our businesses and brands," said Carsten Knobel, CEO, Henkel. Henkel has developed a net-zero roadmap, which includes extended targets for reducing emissions across the entire value chain. "We all must take responsibility and help limit global warming to 1.5°C, as set out in the Paris Climate Agreement. Our roadmap, which

Siegwerk names Manjusha Singh as new CEO for India Region

Siegwerk, a global leader in printing inks and coatings for packaging and labelling, has appointed **Manjusha Singh as Chief Executive Officer (CEO)** for the India region. She is the first woman CEO in the Siegwerk Group, and one of the few woman leaders in the ink industry. In her new role, Manjusha will oversee the Siegwerk India operations, a key growth engine within the Siegwerk Group, consistently delivering double-digit growth in recent years. Manjusha holds a bachelor's degree in Mathematics (Honors) from Delhi University and a PGDBM in Marketing from the Institute of Management Technology, Ghaziabad.

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has been validated by the Science Based Targets initiative, outlines what we are doing to achieve net-zero greenhouse gas emissions by 2045," explained Carsten Knobel. The Adhesive Technologies business unit achieved strong organic sales growth in the third quarter, supported by all business areas. The good organic sales growth in the Consumer Brands business unit was driven primarily by the global business area Hair. Organic sales growth in the third quarter was driven by the Europe, IMEA, Asia-Pacific and Latin America regions. The Adhesive Technologies business unit achieved sales of 2,800 million euros in the third quarter of 2024.

Godrej Industries' Chemicals Business to acquire Savannah Surfactants Limited

Mumbai, India: Godrej Industries' Chemicals Business has announced the signing of a business transfer agreement with Savannah Surfactants Limited, with the intention to acquire their Food Ester and Emulsifier Business. As a leading player in Oleochemicals, Surfactants, Specialities and Biotech, this transaction will help the company expand its product offerings to food and beverages segment.

Located at Goa, Savannah Surfactants Limited has a manufacturing capacity of 5,200 MTPA of finished products.

Vishal Sharma, Executive Director and Chief Executive Officer, Godrej Industries (Chemicals), said, "The acquisition of this unit will help us to grow our speciality chemicals business. This acquisition is aligned with our commitment towards sustainable growth and innovation."

Hindalco ranks as World's Most Sustainable Aluminium Company for 5th Consecutive Year

Mumbai, India: Hindalco Industries Limited, the Aditya Birla Group metals flagship, has emerged as the World's Most Sustainable Aluminium Company for the fifth consecutive year in the 2024 edition of the S&P Global Corporate Sustainability Assessment (CSA) rankings. Hindalco achieved a total score of 87 points (as of 30 October 2024), thereby improving its tally by 9 points from the last year, and is 22 points ahead of its closest peer.

Hindalco achieved the 100th percentile in most aspects of the three dimensions of environmental, social, and governance (ESG), including climate strategy, environment and social reporting, and water-related risks, as well as in operational eco-efficiency parameters such as waste management and resource consumption, cybersecurity, community engagement, and employee development. The company is leading in climate action and emission reduction programs and has taken a number of initiatives in this direction, such as setting up a 100 MW round-the-clock carbon-free power project for its Odisha smelter, which also earned the prestigious 'Energy Transition Changemaker' award at COP28. It has also achieved a remarkable 19.54 per cent reduction in specific GHG emissions compared to its FY2011-12 baseline and is making further investments to support eco-friendly smelter expansions as a part of its vision to source 30 per cent of its energy from renewables by 2030.

Hindalco recycled 85 per cent of its operational waste in FY24, and three of its units received zero-waste to landfill certification. Its US-based subsidiary Novelis, the largest aluminium recycler, processed about 2.3 million metric tonnes of recycled aluminium in FY24. All these initiatives helped Hindalco secure the 100th percentile in

Ingersoll Rand India appoints Sunil Khanduja as Managing Director

Sunil Khanduja has been appointed as **Managing Director** for a period of five years from November 12, 2024 to November 11, 2029 of **Ingersoll Rand India.** Prior to being appointed as Managing Director, Sunil Khanduja was a Whole-time Director of the company designated as Director – Operations originally appointed on November 8, 2023. Sunil Khanduja is aged about 45 years, is an Engineer from BITS Pilani. He also holds MBA degree from Kelley Business School of USA and MBA degree from Manchester Business School of UK. Sunil joined Ingersoll Rand (India) Limited in June 2018 as Plant Leader at Naroda factory.

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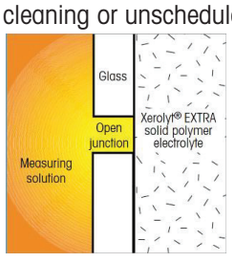

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the environmental segment with an overall score of 87 per cent. In the social category, the company retained its top position by scoring 89 per cent. As part of its social commitment, the company invested ₹154 crore in community programs in FY24, impacting more than 2.5 million lives. In terms of governance, the company scored an impressive 84 per cent.

Meanwhile, in another major development, the International Copper Association (ICA) has elected Hindalco Industries Limited as its newest member.

Vishnu Chemicals to acquire Chrome Mining Complex

Hyderabad, India: Vishnu Chemicals Limited, a leading global player in the manufacturing of speciality chemicals, has announced the signing of a definitive agreement to acquire a significant Chrome Mining Complex, comprising of Chrome Mine along with Processing, Mining and Infrastructure assets from Volclay Group of Companies in South Africa, through its wholly owned subsidiary Vishnu South Africa (Pty) Limited. The acquisition of Chrome Mining Complex will provide Vishnu with a reliable source of Chrome Ore, critical for its existing and future production needs. The Chrome Mining Complex includes a Chrome Mine spanning over ~1,800 hectares with an estimated resource of ~10 million tonnes. Additionally, the complex includes a Chrome Processing Plant and associated mining infrastructure.

The acquisition is expected to provide the following strategic and financial benefits including stable supply of critical raw material; Integrated business from sourcing to manufacturing; Cost-effective expansion compared to a greenfield initiative. The transaction comprises of a combination of share and asset deal. The subsidiary of Vishnu Chemicals Limited will own 74 per cent of the mining entity and 100 per cent of the Chrome processing plant, along with the associated mining and infrastructure assets.

In compliance with local regulations, foreign owned entities are permitted to hold up to 74 per cent in South African Mining Operations. The acquisition is expected to be completed within 12 months, subject to customary closing conditions, including regulatory approvals.

Birla Carbon achieves significant strides in sustainability initiatives

Mumbai, India & Marietta, USA: Birla Carbon, one of the leading manufacturers and suppliers of high-quality carbon-based solutions, has released its 12th annual sustainability report titled – 'Sustainability In Action.' The 2024 report highlights the company's commitment to achieving net zero carbon emissions by 2050 through substantial advancements in Continua™ Sustainable Carbonaceous Material (SCM) and prioritizing the focus on its net zero 4Rs strategy - Research, Reduce, Replace, and Repurpose to achieve lower carbon emissions.

The key highlights of the report include ISCC Plus certification for all 16 Birla Carbon plants; interim greenhouse gas reduction targets to reduce Scope 1, 2, and 3 emissions intensity by 22 per cent by 2030; Continua™ SCM - recognized with a Gold Award at the Aditya Birla Group's 7th Sustain-Ability Conference in 2024 and achievement of 40 per cent reduction in its total recordable incident rate (TRIR).

Sharing his thoughts on the release of the report, John Loudermilk, President & CEO, Birla Carbon, said, "In our 12th annual sustainability report, 'Sustainability In Action,' we reflect on our journey over the last year on our progress as a company, driven by innovation in sustainability." He further added, "This year, we have made significant strides in reducing greenhouse gas emissions, promoting circularity, and enhancing energy systems through strategic acquisitions like Nanocyl."

Sadhana Nitro Chem gets nod for acquisition of Calchem Industries (India)

Mumbai, India: Sadhana Nitro Chem Limited, a prominent manufacturer specializing in intermediate specialty chemicals, has announced the approval of it's resolution plan for a 100 per cent acquisition of Calchem Industries (India) Limited by the Hon'ble National Company Law Tribunal (NCLT), Mumbai Bench, Court III.

The acquisition, approved at a total consideration of ₹9.50 crores, will be completed by 27 January 2025. Calchem's facility, comprising of leasehold and freehold land covering approximately 14.5 acres (58,000 sq. meters) in MIDC Roha, Maharashtra, is located just 250 meters from SNCL's existing plant. Established in 1992, Calchem had been engaged in the production of various chemicals with a combined installed capacity of approximately 78,000 TPA before ceasing operations under the Corporate Insolvency Resolution Process. ■

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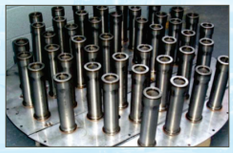
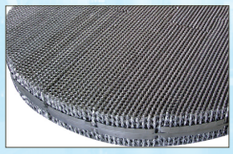
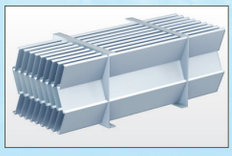

Axial Cyclones


Multi-Cyclones


Structured Packing


Vane Inlet Device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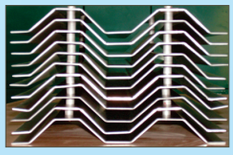
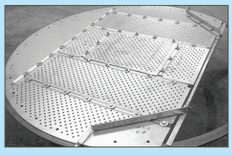

Chevron Type Mist Eliminator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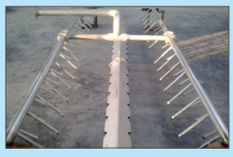
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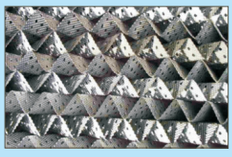
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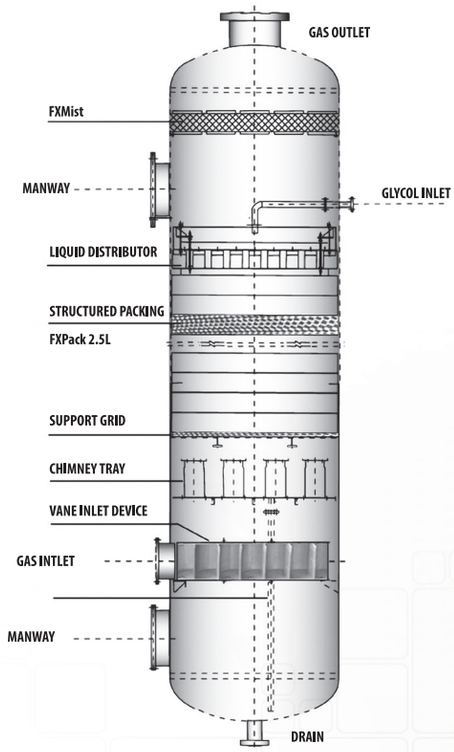

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Haldia, Lummus to enhance phenol plant capacity

Kolkata, India: Haldia Petrochemicals Limited (HPL), a major player in India's petrochemical industry, has signed a license amendment with Lummus Technology to expand its phenol production capacity for the upcoming Phenol and Acetone Plant in Haldia, West Bengal. The agreement marks a key step forward in enhancing HPL's phenol production capabilities from 300 KTPA (kilotons per annum) to 345 KTPA.

In line with its substantial greenfield investment of over ₹5,000 crore in Haldia, HPL is not only focusing on phenol but also on cumene and acetone production to meet rising domestic demand and foster downstream chemical sector growth. The facility also includes India's first on-purpose propylene plant using olefins conversion technology (OCT), which Lummus will supply as well. HPL aims to complete the project by Q1 2026.

Deepak Chem Tech to acquire Trinseo polycarbonate tech license

Wayne, Pa: Trinseo, a specialty materials solutions provider, has entered into agreements to supply a polycarbonate technology license as well as all proprietary polycarbonate production equipment in Stade, Germany to Deepak Chem Tech, a wholly owned subsidiary of Deepak Nitrite Limited for use in India.

"These are the initial steps of a strategic, collaborative partnership with Deepak, as we explore additional opportunities to leverage our technology portfolio and expand in higher-growth areas such as India," said Frank Bozich, President and Chief Executive Officer of Trinseo.

The total value of the combined agreements is USD52.5 million. The company expects to receive approximately USD9 million by the end of 2024 and an additional approximately USD21 million in the first half of 2025, subject to key milestones. With this disposition of the manufacturing assets in Stade, Germany, the company has decided to exit the site.

Coromandel to expand at Kakinada Unit Capacity

Secunderabad, Telangana: The Board of Directors of Coromandel International Limited has approved capital projects with an investment outlay of around ₹800 crore mainly pertaining to enhancement of granulation capacity by 7.5 lakh tons per annum for manufacture of complex and unique fertilisers at Kakinada, Andhra Pradesh.

The capacity enhancement will involve setting up of a new granulation train for Nitrogen Phosphorus Potassium (NPKs) at Coromandel's existing fertiliser manufacturing unit at Kakinada. The new granulation train will have an annual production capacity of 7.5 lakh tons, taking the total production capacity of the Kakinada site to 30 lakh tons.

The strategic location of the Kakinada facility on the east coast of India provides Coromandel with logistical advantages, ensuring efficient supplies to markets across India. The proposed granulation plant will be equipped with state-of-the-art technology, adhering to the highest environmental and safety standards, while ensuring energy-efficient operations.

UltraTech, UCLA to advance cement industry decarbonization

Mumbai, India: UltraTech Cement Limited, India's largest cement and ready-mix concrete (RMC) company, has announced the signing of a collaboration agreement with the Institute for Carbon Management (ICM) at the University of California, Los Angeles (UCLA) to pilot a ground-breaking new technology - The Zero Carbon Lime (ZeroCAL) developed by ICM that can significantly reduce carbon dioxide emissions from cement production. ICM, in partnership with UltraTech, will build a first-of-a-kind demonstration plant for the technology at one of UltraTech's integrated cement manufacturing units.

The ZeroCAL process, developed by ICM researchers, can eliminate nearly 98 per cent of carbon dioxide emissions associated with limestone decomposition in cement manufacturing. UltraTech will be the first company globally to implement the ZeroCAL process at scale through a demonstration plant that will produce several metric tons of zero-carbon lime per day.

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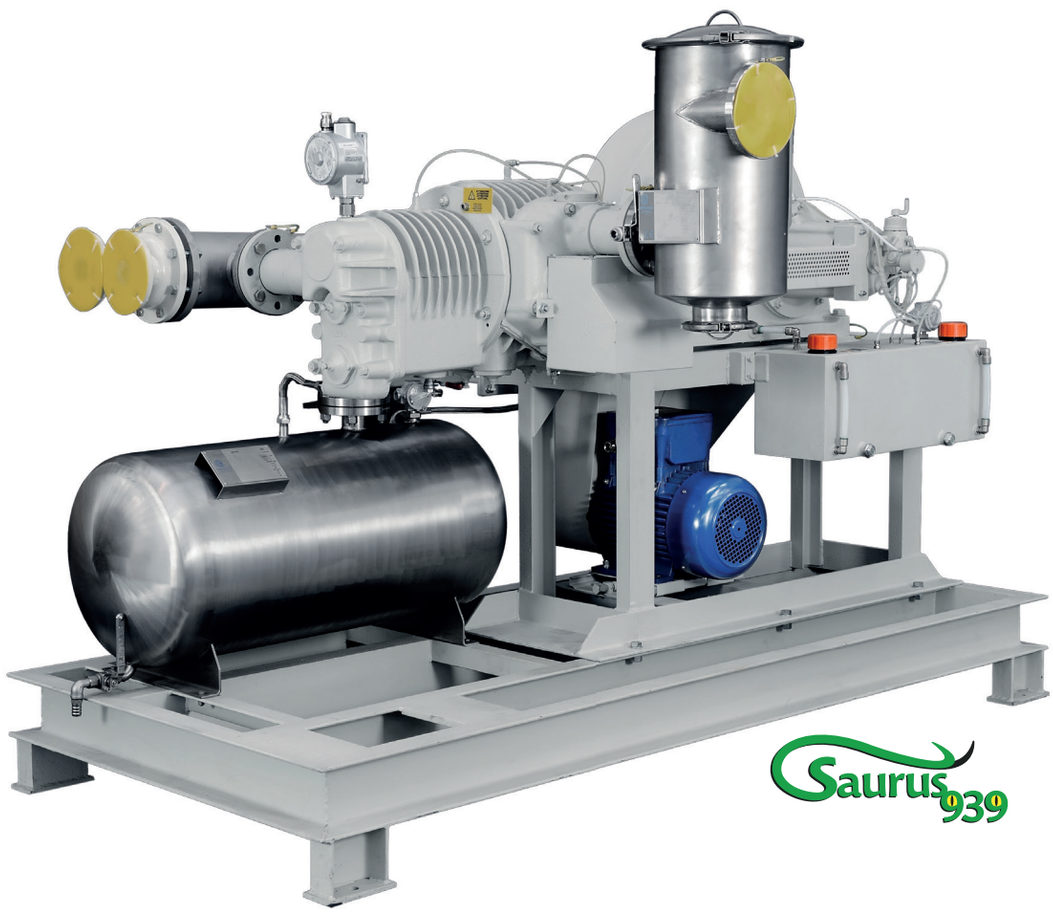

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revalyu Resources commissions 2nd PET recycling plant at Nashik

revalyu Resources' Nashik site.

Nashik, India: revalyu Resources, a leading chemical Polyethylene terephthalate (PET) recycling company with a global presence, has commissioned its second technology-leading PET recycling plant at its site in Nashik, India, to further bolster its production capacity and meet growing customer demands.

The recent commissioning of the second plant means the revalyu site now recycles over 20 million used PET bottles a day into 160 tonnes per day of high quality PET chips and PET polymer. This is being used by customers to meet their sustainability targets in applications from diverse sectors such as PET bottle, packaging materials, textiles, automobile accessories and a wide variety of other PET copolymer based products. The third plant is fully financed as part of the USD100 million investment, and under construction which will add a further 120 tonnes per day of capacity in Q3 2025. This will increase the site's recycling capacity to approximately 35 million post-consumer plastic bottles a day and total production capacity to 280 tonnes per day.

The site utilizes highly advanced patented glycolysis-based recycling technologies and automated processes, which make the manufacturing operations highly optimized, scalable, profitable and easily replicable. The recycled PET is produced using 75 per cent less water and 91 per cent less energy than conventional PET made from oil.

revalyu Resources will set up a 240 tonnes per day PET recycling facility in the US by 2027 and has plans to expand globally with partnerships to increase its production to over 1,000 tonnes per day by 2030.

LG Chem, ExxonMobil sign MoU for lithium offtake

Shin Hak-cheol, CEO, LG Chem (R), and Dan Holton, Senior Vice President of ExxonMobil Low Carbon Solutions (L), during signing of MoU for lithium offtake

Spring, TX, Seoul, SK: LG Chem and Exxon Mobil Corporation have signed a non-binding memorandum of understanding (MoU) for a multiyear offtake agreement for up to 100,000 metric tons of lithium carbonate. The lithium will be supplied from ExxonMobil's planned project in the US to LG Chem's cathode plant in Tennessee, which LG Chem expects to be the largest of its kind in the U.S.

LG Chem's Tennessee cathode plant broke ground in December 2023 and is expected to have an annual production capacity of 60,000 tons. The plant offers excellent geographic accessibility for both customer deliveries and raw material imports.

Final investment decision will be subject to various factors including the establishment of commercially competitive regulatory frameworks. The planned production of Mobil™ Lithium will utilize Direct Lithium Extraction (DLE) technology, aligning seamlessly with ExxonMobil's core competencies in subsurface exploration, drilling, and chemical processing. This approach offers US EV battery manufacturers a domestically extracted and processed lithium supply option which is expected to have substantially lower environmental impacts, including approximately two-thirds less carbon intensity than hard rock mining.

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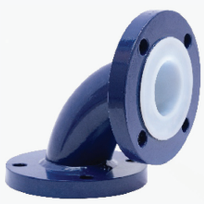

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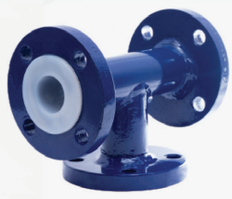

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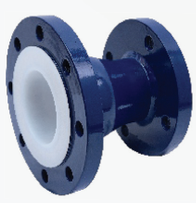

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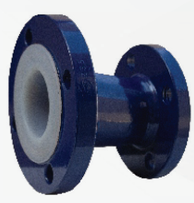

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L&T Energy CarbonLite Solutions bags LNTP for thermal power plants

Mumbai, India: L&T Energy CarbonLite Solutions has secured 'Limited Notice to Proceed' (LNTP) from NTPC Limited for setting up thermal power plants in Madhya Pradesh and Bihar. The orders pertain to main plant packages of 2x800 MW Stage-II thermal power plant at Gadarwara in Madhya Pradesh and 3x800 MW Stage-II thermal power plant at Nabinagar in Bihar.

The scope of work involves design, engineering, manufacturing, supply, erection and commissioning of boilers, turbines, electrostatic precipitators, auxiliaries, along with the related mechanical, electrical, instrumentation and civil works. Commenting on the development, Subramanian Sarma, Whole-time Director & President (Energy), L&T, said, "Winning LNTP for ultra super-critical projects highlights our expertise and reputation in delivering innovative solutions. We look forward to ensuring delivering the projects with exceptional outcomes that meet our high standards of execution within a strict timeline."

JSW Group, Korea's Posco Group to develop steel plant

Mumbai, India: JSW Group (JSW), one of India's fastest-growing conglomerates, has signed a Memorandum of Understanding (MoU) with Korea's POSCO Group (POSCO), outlining a framework for collaboration in steel , battery materials, and renewable energy sectors in India. The partnership will focus on setting up an integrated steel plant in India with an initial capacity of 5 million tonnes per annum (MTPA).

The two Groups will also explore collaborations in the areas of battery materials related to Electric Vehicles (EVs), and renewable energy for meeting the captive requirements of the proposed integrated steel plant.

Syrma SGS sets up largest electronics manufacturing plant in Pune

Pune, India: Syrma SGS Technology Limited, one of the leading electronics systems design and manufacturing companies in India, has announced the opening of one of its largest state of art integrated electronics manufacturing facility in Ranjangaon near Pune.

The new campus is spread across 26.5 acres of land and will have a manufacturing area of 1.20 million square feet at its peak. This new campus will strengthen the company's PCB (Printed Circuit Board) assembly capabilities and will primarily serve the growing domestic demand for PCBAs, especially in the automotive and industrial sectors. The first phase of the facility commissioned, measuring over 60,000 square feet, is expected to create approximately 1,000 direct employments.

J S Gujral, Managing Director, Syrma SGS, said, "With the 'Make in India' initiative gaining momentum, the launch of our Pune facility positions us perfectly to capitalize on the vast business opportunities ahead."

Tecnimont to develop biogas plant from waste

Mumbai, India: Tecnimont has announced that its Indian subsidiary Tecnimont Private Limited (TCMPL) has teamed up with Paradeep Municipality and National Institute of Technology, Karnataka – Surathkal (NITK) to develop a biogas plant from waste at Paradeep Municipality, District Jagatsinghpur, Odisha.

The biogas plant enhances the deployment of circular solutions to efficiently manage organic waste. In particular, this initiative will help Paradeep Municipality to generate biogas by converting food and vegetable waste through anaerobic digestion; the biogas obtained from the recycling of organic waste will be then used by community kitchens.

This project will create jobs for local people engaged in the waste collection activities and bring educational benefits, serving as a model for innovative solutions and actively engaging university students in practical learning experiences. A first pilot plant, was inaugurated in 2021 at NITK campus, promoting research and improving energy self-sufficiency within the campus. The generated energy is obtained by converting food and vegetable waste from the hostel blocks and canteens.

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BASF SE, AM Green to evaluate opportunities in low-carbon chemicals

From left: Gautam Reddy K, CEO, AM Green Ammonia; Mahesh Kolli, Group President, AM Green; Dr. Markus Kamieth, Chairman of the Board of Executive Directors of BASF SE and Alexander Gerding, Managing Director, BASF India and Head, BASF Group Companies India.

New Delhi, India: BASF and AM Green B.V. have entered a memorandum of understanding (MoU) to jointly evaluate and develop business opportunities for low-carbon chemicals produced exclusively with renewable energy, and the corresponding value chains in India.

Under the MoU, BASF and AM Green intend to conduct feasibility studies on low-carbon chemicals production in India including a joint evaluation of potential technologies. The cooperation also includes a non-binding letter of intent for the offtake of 100,000 tons annually of ammonia produced exclusively with renewable energy including energy from pumped storage projects from AM Green's plants in different locations in India. This ammonia will meet EU standards for renewable fuels of non-biological origin (RFNBO) as defined in the Renewable Energy Directive (RED III).

"We are convinced that India is the right place to explore low-carbon chemical production together with our partner AM Green," said Dr. Markus Kamieth, Chairman of the Board of Executive Directors of BASF SE. Mahesh Kolli, Group President, AM Green said, "We are delighted to partner with a global chemical leader like BASF to propel the green transformation in the industry." ■

Nouryon unveils new Innovation Center

Charlie Shaver (L), Chairman and CEO, Nouryon and Sobers Sethi, SVP Emerging Markets and China, during the inauguration at Nouryon's newly expanded office and new Innovation Center in Mumbai.

Mumbai, India: Nouryon, a global specialty chemicals leader, has announced the launch of its new Innovation Center and expanded office footprint in Mumbai, India, nearly doubling the previous office space, to accommodate its rapidly growing Global Service Center. The Innovation Center caters to key end markets including paints and coatings, agriculture, and home and personal care. Nouryon sales and global research and development teams will partner closely with customers to provide technical support. The expanded Mumbai office space now occupies 100,000 square feet and hosts approximately 325 employees with room to grow further.

The Innovation Center facility enables the development of water-based paints and solutions in asphalt and building and construction applications. It also focuses on powder formulations and seed coating formulations and is equipped with specialized machinery for applying coatings to seeds, enhancing their protection and performance in agriculture. In home and personal care, the Innovation Center will support advanced applications for surfactants, chelating agents, fabric softener actives, hair styling polymers, and starches. ■

Domestic Demand: The Catalyst for Specialty Chemicals

Anuj Sethi
Senior Director, CRISIL Ratings

The specialty chemicals sector's ability to maintain comfortable debt protection metrics amid ongoing capex highlights its stability and potential for growth. However, prolonged pricing pressures and the subdued export outlook may impact the sector's credit outlook, opines **Anuj Sethi, Senior Director, CRISIL Ratings.**

India has emerged as a leading global manufacturing hub for chemicals, ranking sixth in the world and fourth in Asia at an industry size of ~USD230 billion by revenue. The country's chemical industry has grown at a healthy pace over the past 5-6 years, boosted by strategic diversification into various end-user segments and successful implementation of downstream projects by manufacturers.

Within the industry, the proportion of specialty chemicals is bubbling over, expanding to ~20 per cent this fiscal from ~13 per cent in fiscal 2015 at 10 per cent Compound Annual Growth Rate (CAGR); this is vis-à-vis 6 per cent for the overall industry.

India has decisively strengthened its presence in crucial sub-segments of specialty chemicals, growing its capabilities and sharpening its competitiveness in international markets. These sub-segments include agrochemicals, dyes and pigments, and Fast-Moving Consumer Goods (FMCG), and contribute a large share of the specialty chemicals industry's revenue (see Chart-1).

Sector to see gradual recovery ahead

CRISIL Ratings expects modest 3-4 per cent on-year revenue growth in the specialty chemicals sector this fiscal, primarily driven by higher volumes, mainly in the domestic market. Demand in key export markets, such as the United States (US), Europe and Latin America, is expected to remain subdued.

Higher volume offtake, along with moderating pricing pressures, is expected to raise operating margin 60-100 basis points to ~14.0 per cent in the current fiscal.

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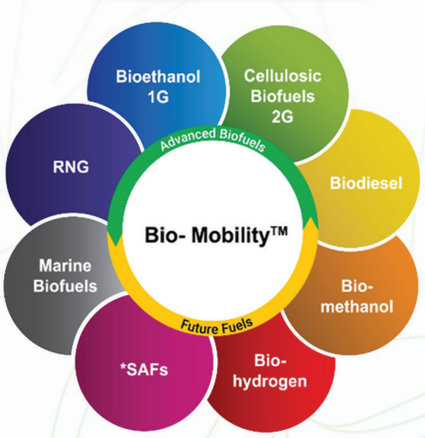

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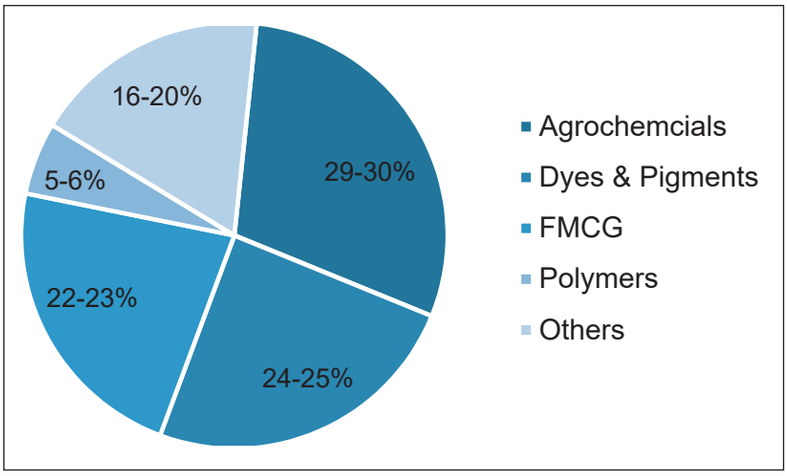


Source: Company Annual reports, CRISIL Ratings

Chart 1: Well-diversified end-user industries.

Furthermore, strict cost-control measures implemented by players will help mitigate a decline in profitability in case of pricing pressures.

The sector will continue to benefit from its strong financial position, supported by robust balance sheets, which will enable further investments. This fiscal, capital expenditure (capex) will primarily comprise downstream projects and de-bottlenecking efforts to enhance operational efficiencies.

However, the pace of demand recovery, significant pressure on the prices of key products and fluctuations in crude oil prices will be monitorables and may hinder the sector's recovery.

Domestic segment to drive revenue growth revival

Domestic demand, which commands ~65 per cent of total revenue is expected to fuel India's specialty chemicals sector growth this fiscal. However, pricing pressures and sluggish demand in overseas markets will likely continue to affect exports.

This expected revenue growth follows a nearly 9 per cent decline in the previous fiscal (see Chart 2) due to oversupply from China, which resulted in sharp price reductions, even as inventories in distribution channels were elevated and most players wrote-down inventory. Pricing pressure is expected to persist this fiscal as well, but at moderate levels. Consequently, inventory losses are expected to be significantly lower. As a result, the impact on export demand will likely persist and domestic markets will continue to drive growth this fiscal.

The domestic segment will lead the sector's recovery this fiscal, with 5-6 per cent projected revenue growth. This growth will be driven by rising demand for high-performance pigments and chemicals in the FMCG segment, such as flavors and fragrances. Also, above-normal monsoon is likely to support the revival of rural demand, driving an increased need for agrochemicals

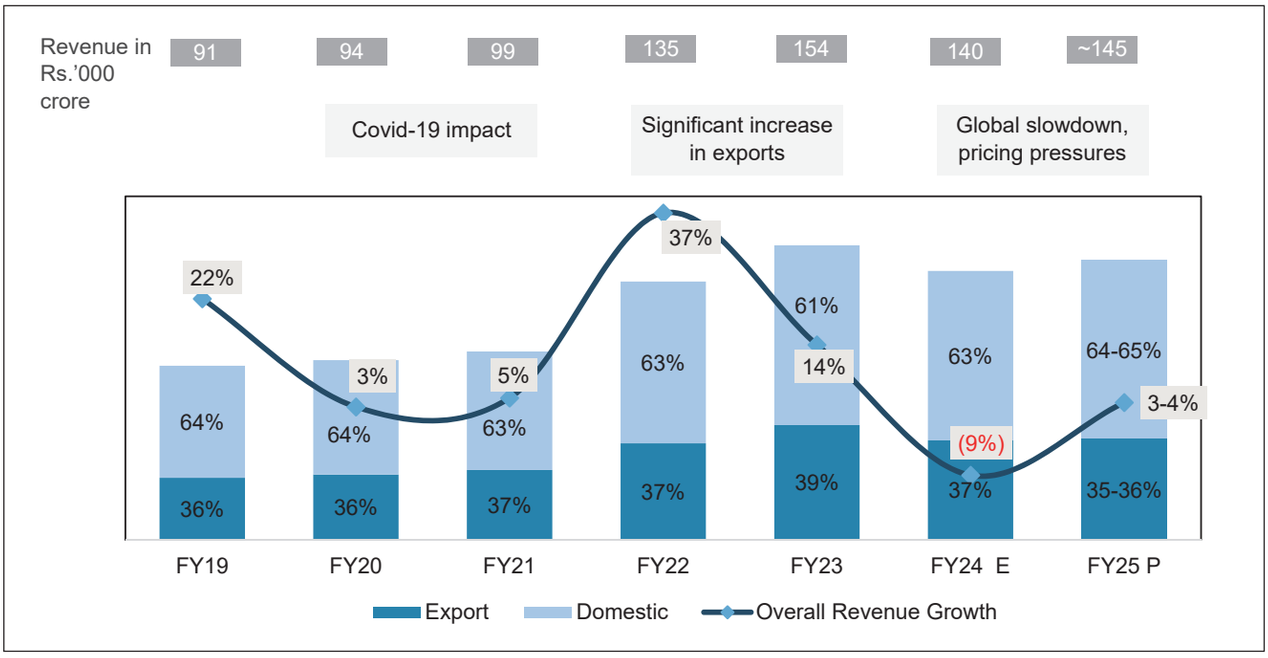


Chart 2: Steady domestic demand to support overall revenue growth.

Source: Company Annual reports, CRISIL Ratings

and ensuring consistent growth in consumption. Overall, these factors represent a favorable outlook for the domestic market and offer various opportunities for expansion.

Recovery in exports to be muted

Exports, which make up 35 per cent of the sector's revenue, are expected to grow at a modest 1-2 per cent this fiscal, amid stabilising prices, normalising inventory levels and gradually improving demand in key export markets.

Last fiscal, export revenue declined 14-14.5 per cent owing to a significant drop in price realisations, primarily caused by an oversupply of chemicals from China. This oversupply led to inflated global inventory levels as major players stockpiled excess supplies. Subsequent destocking, combined with a sluggish global economy and high interest rates, resulted in weakened demand across key overseas markets.

With pricing pressures from Chinese supplies continuing, export growth is expected to be subdued in the near term. Substantial export recovery will depend on significant improvement in global macroeconomic conditions and better demand in China, which, in turn, could help ease competitive pressure.

Operating profitability to recover gradually

With volumes rising, pricing pressures moderating and inventory losses reducing, the industry's operating margin is expected to improve 60-100 basis points to ~14.0 per cent this fiscal. Furthermore, the implementation of rigorous cost-control measures by most Indian players will help mitigate the impact of any potential pricing pressures that may arise in the future. This strategy will ensure profitability is sustained at the current level despite challenging market conditions.

In fiscal 2024, operating margin declined by nearly 400 basis points due to lower operating leverage and substantial inventory losses, particularly in the first half of the fiscal.

Healthy financial risk profile offers scope to invest

Notwithstanding the ongoing challenges in the business environment, the sector's financial risk profile remains strong. The resilience is a result of the cautious approach towards spending in fiscal 2024, enabling entities to absorb the impact of weak profitability. The sector prudently postponed capex plans, which allowed minimal reliance on external debt.

Gearing remaining below 0.50 time (see Chart 3) provides ample opportunities for future investment and growth. With the expected increase in demand in the coming months, the sector plans to undertake capex of ~₹14,000 crore, consistent with the previous fiscal. The same, however, was about 15 per cent lower than the capex incurred in fiscal 2023. The capex will primarily focus on expanding applications in emerging technologies, strengthening downstream product value chains and enhancing operational efficiency. By prioritising investment in these areas, the sector underscores its commitment to sustainable growth and resilience amid evolving market dynamics.

Despite the ongoing capex, key debt protection metrics will likely remain comfortable due to steady recovery in volume, along with stabilising raw material prices

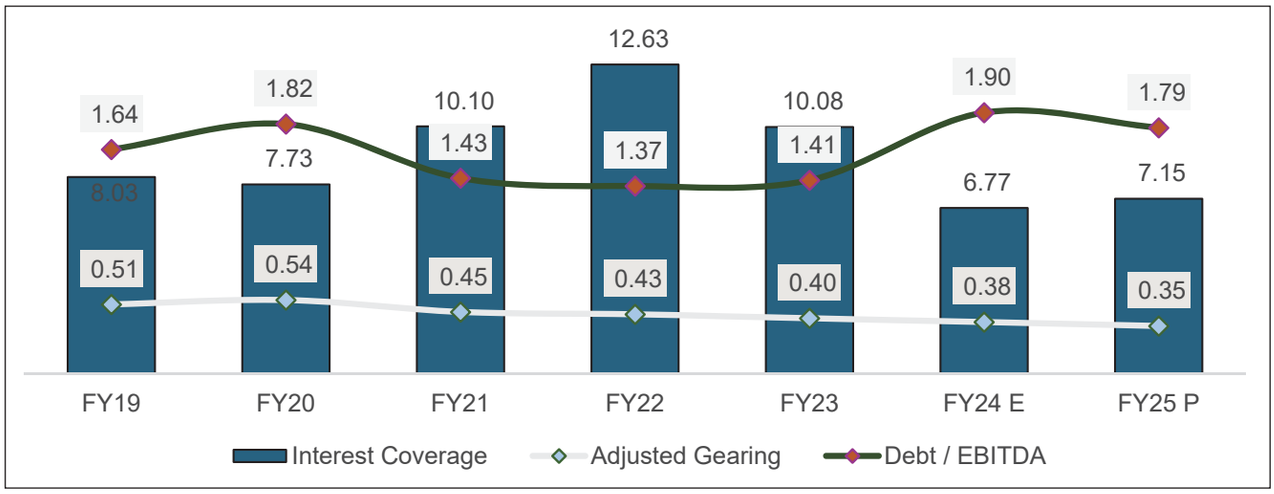


Chart 3: Balance sheets and key debt protection ratios to remain healthy.

Source: Company Annual reports, CRISIL Ratings

and realisations. As a result, we expect a gradual improvement in the sector's profitability. For companies rated by CRISIL Ratings, interest coverage and debt to Earnings before Interest, Tax, Depreciation and Amortization (EBITDA) ratios are expected to be strong at 7.0 times and below 2.0 times, respectively, this fiscal, consistent with fiscal 2024 levels.

In conclusion, the sector's ability to maintain comfortable debt protection metrics amid ongoing capex highlights its stability and potential for growth. However, prolonged pricing pressures and the subdued export outlook may impact the sector's credit outlook.

Key monitorables and long-term prospects

As demand recovers, it is essential to keep an eye on key factors that can significantly impact the performance of the Indian specialty chemicals sector.

Macroeconomic indicators, such as improvement in domestic and export demand, are essential for achieving the sector's growth potential. Additionally, monitoring price pressures from China – a major player in the global chemicals market – is crucial since these pressures could directly affect India's competitive position.

Moreover, fluctuations in raw material prices and currency exchange rates can directly influence operating margins. Therefore, tracking these factors is crucial to assess the sector's growth prospects, competitiveness and profitability.

Despite the current challenges, the long-term outlook for the sector is encouraging. Global entities are implementing diversification strategies to reduce dependency on a single market, spread their risk and tap into new opportunities.

This focus on diversification not only strengthens India's resilience but also enhances its position as a vital hub for international trade and business in the global chemical space. ■

Enhancing Competitiveness for Sustainable and Value Generative Business Solutions

In today's rapidly evolving industrial landscape, enhancing competitiveness through sustainable and value-generative business solutions has become a critical focus for companies worldwide. As industries strive to meet growing demands while minimizing their environmental impact, the emphasis is on adopting innovative approaches that integrate efficiency, sustainability, and operational excellence. Leading organizations like CSIR-National Chemical Laboratory (NCL), Aarti Industries, NOCIL, and Hindalco are paving the way by leveraging cutting-edge technologies, developing sustainable processes, and making significant investments in forward-thinking solutions. Their collective efforts are transforming their sectors and contributing to the decarbonization of supply chains, setting new benchmarks for a greener, more efficient future in the chemicals and manufacturing industries.

The global specialty chemicals market requires efficient, economical, and sustainable bulk manufacturing methods. Over the past two decades, **CSIR-National Chemical Laboratory (NCL)** has pioneered the synthesis of specialty chemicals through sustainable processes. They have developed microreactors, micro-heat exchangers, and microextraction units, which offer up to 100 times faster heat transfer and 10 times faster mass transfer, making them safer, more economical, and scalable compared to traditional semi-batch methods. NCL is collaborating with an Industry Consortium on Continuous Manufacturing to involve 25 mid-sized chemical industries, aiming to decarbonize the supply chain. Dr. Ashish Lele, Director, CSIR-NCL, believes this approach can create a global impact.

Aarti Industries is leading growth with the purpose of creating the right chemistry for a better tomorrow. The company is highly focused on new value chains such as chlorotoluene derivatives, renewable energy solutions, modern effluent treatment systems, and cutting-edge technologies, all aimed at reducing carbon footprints and enhancing operational efficiencies. Rajendra Gogri, Chairman & Managing Director, Aarti Industries Ltd, shares, "In FY23-24, we invested ₹1,358 crore in CAPEX. For FY24-25, we are planning a similar investment range of ₹1,300–1,500 crore, with approximately ₹1,000 crore earmarked for FY25-26."

NOCIL is aligning its organization to enhance competitiveness by focusing on sustainable and value-generative business solutions. This approach integrates the development and scaling of products and processes that meet customer demands, optimizing operations to reduce waste, energy use, and carbon emissions while leveraging digitalization and automation. The company is also building clean, lean, and reliable supply chains. V. S. Anand, Managing Director of NOCIL Ltd, emphasizes the company's commitment to not only positioning itself competitively in the market but also contributing to a more sustainable future for the chemicals sector. NOCIL is investing in state-of-the-art facilities to improve efficiency and reduce waste and emissions.

At the core of **Hindalco's** strategy is a dual commitment to sustainability and innovation—two essential pillars in today's industrial landscape. Sustainability guides decisions, while innovation propels the company forward. The Hindalco Innovation Centre for Alumina (HIC-A), supported by the Aditya Birla Centre for Science and Technology, is leading the development of next-generation products. Saurabh Khedekar, CEO, Hindalco Specialty Alumina Business, states that, looking to the future, the company is on track to commission India's first Precipitated Hydrate plant, which will set new safety standards in the wire and cable industry with halogen-free, flame-retardant solutions.

This cover story explores the strategies and innovations driving Indian specialty chemical companies to new heights, with experts from the industry ecosystem sharing valuable insights into their initiatives and future plans.

- Mittravinda Ranjan

COVER STORY

Indian Chemical Industry can Create a Global Impact by Adopting Continuous Manufacturing

DR ASHISH LELE
Director
CSIR - National Chemical Laboratory

The rapidly growing global market of specialty chemicals demands not only efficient and economical but also decarbonized and sustainable bulk manufacturing. Over the last two decades, the CSIR-National Chemical Laboratory has been a key player in synthesizing specialty chemicals and materials using sustainable approaches. This is achieved by developing conceptual breakthroughs using novel scalable flow synthesis and reactor designs and their successful demonstration and implementation at the pilot and commercial scale. Further, an innovative business solution is incorporated as a means to decarbonize the Indian chemical sector.

Sustainable Approaches Towards Bulk Manufacturing

The laboratory has developed continuous processes that are easily scalable, and more safe and economical than conventional semi-batch processes for synthesizing a variety of fine and specialty chemicals. Continuous processes have been optimized and intensified in the laboratory to reduce the reaction time from several hours to a few minutes and to improve the yield. A systematic analysis is carried out for each reaction in the flow environment through hydrodynamics and kinetics studies by a team of scientists and engineers in the Chemical Engineering & Process Development division at CSIR-NCL.

Continuous plants for APIs, drugs & materials

Adaptation of Miniaturized Devices for Enhanced Sustainability

When complemented with miniaturized devices, the sustainable flow method offers at least 100 times faster heat transfer, at least 10 times faster mass transfer, and rapid mixing of reagents for carrying out complex reactions relevant to the fine and specialty chemicals industry. NCL has 30 different microreactors/flow reactors, micro-heat exchangers, and microextraction units. These indigenously designed, patented, and fabricated continuous flow reactors offer scalable, economical processes with significantly lesser capital and operating costs. To date, over 200 industries are using these flow reactors at different scales of synthesis and production. These designs in metal microreactors are licensed to Amar Equip. Pvt. Ltd., while the glass-lined flow reactors for corrosive reactions are licensed to GMM-Pfaudler Ltd to manufacture and supply globally. This approach has been extended for reactions involving solids as reactants/products using reactive extrusion where the volume fraction of solids is more than 80 per cent. Continuous mechanochemistry is also developed and demonstrated extensively for solvent-free synthesis of various chemicals.

Notable Examples of Technology Transfer and Industry Implementation

Over the years, in addition to the flow reactors, the laboratory has successfully developed a few continuous processes. A few notable examples include:

- Production of silver nanowires (0.1 to 1 kg/day), mesoporous silica (1 kg/day), and nano-porous gel through,
- Continuous ozonolysis for synthesizing azelaic acid,
- Continuous nitration of polyaromatic compounds,
- Flow synthesis of several APIs and drug molecules viz. 7-ethyl tryptophol, Ivacaftor, Fingolimod, OTBN, edravon, paracetamol, metformin hydrochloride, etc., and
- A continuous process for hydroxyl-terminated polybutadiene for the strategic sector.

Micro-reactors designed, patented and licensed by NCL

Many of these processes are licensed to industries. In addition, many energy-efficient processes have been developed to synthesize azo dyes, reactive dyes, and dyestuff intermediates. The primary focus is to help MSMEs in the dyestuff sector through a DSIR-sponsored CRTDH project. The laboratory has recently started working on developing novel approaches for continuous flow synthesis and formulations of conducting inks, OLED materials, conducting polymers, energy storage materials, zeolites, nano-

Continuous plants for APIs, drugs & materials

catalysts etc. The impact of the work has been realized in various sectors of the chemical industry: APIs and medicinal drugs, perfumery chemicals, azo dyes and pigments, deuterated solvents, agrochemicals, functional materials, catalysts, catalyst supports, polymers, and high-energy materials. The team at NCL has developed competencies in flow synthesis involving the following types of reactions: chlorination, bromination, fluorination, photochemical reactions, catalytic hydrogenation, aromatic nitration, esterification, oxidations including ozonolysis, diazotization and related chemistry, Grignard reactions, lithiation, polymerization (radical, emulsion, anionic, etc.), pyrolysis, fusion reactions, amidation and many other solvent-free reactions.

Decarbonization of the Chemical Industry: An Innovative Business Solution

CSIR-NCL also innovates creative business models to foster industrial collaborations. In 2007, an Industry Consortium on Microreactor Technology was run for 5 years at NCL to infuse the concept of microreactors and flow chemistry into the Indian industries for the first time. With 16 industry partners, the initiative was well received. To scale the efforts further, recently, a Centre for Sustainable Continuous Manufacturing has been established at CSIR-NCL in collaboration with the Centre for Process Innovations (UK). The aim is to develop technologies and approaches to decarbonize the Indian pharma and specialty chemicals industry by combining NCL's strength in continuous flow synthesis and CPI's expertise in digitalization. A 'Living lab' is being set up as a unique testbed for enabling the transition to continuous manufacturing that enables significant emissions reduction. Based on the Public-Private-Partnership model, the Centre encourages participation from industries at different levels of engagement to enhance pre-competitive research and manufacturing practices. Companies like Aarti Industries, Glenmark Life Sciences, Sun Pharma, USV, Anthem Biosciences, Corning, and GMM Pfaudler are already on board. An upcoming Industry Consortium on Continuous Manufacturing aims to involve at least 25 mid-size chemical industries in this effort to facilitate decarbonization of the supply chain. All these industries will have access to the unique flow chemistry facilities at NCL. We believe that the Indian Chemical Industry can create a global impact by adopting continuous manufacturing, and NCL can catalyse this paradigm shift. ■

Creating the 'Right Chemistry for a Brighter Tomorrow'

RAJENDRA V GOGRI
Chairman & Managing Director
Aarti Industries

At Aarti Industries Limited (AIL), our growth strategy is guided by our purpose of creating the "Right Chemistry for a Brighter Tomorrow," while fostering competitiveness through innovation, sustainable approach, strategic investments, and market responsiveness.

AIL's focus on new value chains such as chlorotoluene derivatives and other import substitution opportunities ensures that we remain at the forefront of emerging market prospects. This includes exploring an asset-light growth model through tolling and outsourcing arrangements for the early commercialization of various new innovations. Currently, more than five projects are under active discussion, spanning various chemistries. These include backward integration for existing polymer base molecules, intermediates for personal care applications, polymerization projects for oil additives, and polymer recycling solutions—all aligned with AIL's commitment to sustainability and the circular economy. Our robust R&D capabilities and customer-centric innovations empower us to deliver high-margin, low-volume specialty chemicals tailored to diverse sectors like pharmaceuticals, agrochemicals, energy, and pigments. At the same time, adherence to the highest standards of safety, quality, and compliance remains a cornerstone of our operations.

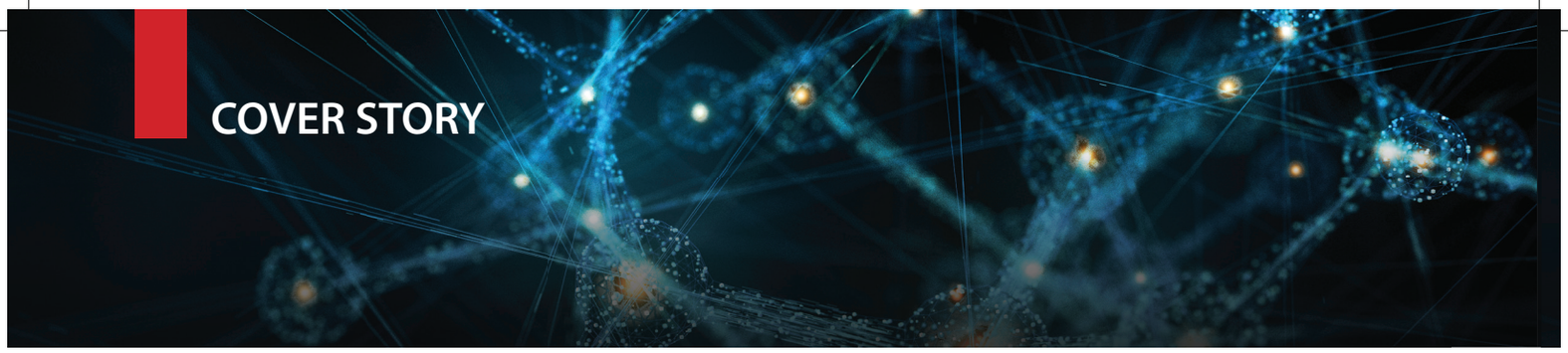
By investing in renewable energy solutions, modern effluent treatment systems, and cutting-edge technologies, AIL is not only reducing its environmental footprint but also enhancing operational efficiencies.

Key Priorities

AIL has identified five core strategies to drive sustainable growth and competitiveness:

- Timely Project Execution
- Existing Business Enhancement
- Strategic Partnerships
- Market Diversification and
- Customer Realignment

Timely Project Execution: Ensuring the successful and timely completion of CAPEX-intensive projects, particularly in Zone-IV, to unlock new products / diversification revenue streams. These efforts are driven by our strong in-house capabilities in R&D, engineering, procurement, and project execution, ensuring precision and efficiency at every stage.



Existing Business Enhancement: Our immediate priorities include capacity expansions for high-demand products such as Nitrotoluene and Ethylation, alongside debottlenecking existing operations to meet growing customer demands and sustain our competitive edge. We are also optimizing production efficiencies and implementing advanced digital solutions to strengthen operational excellence. Simultaneously, we are addressing pricing pressures from Chinese competition through targeted cost-saving measures, operational efficiency improvements, and strategic adjustments to our product mix, driving continued margin optimization.

Strategic Partnerships: Deepening relationships with existing partners and forging new collaborations remains pivotal. Notably, our 50-50 per cent joint venture with UPL exemplifies our commitment to leveraging synergies for developing value-added chemical intermediates for global markets.

Market Diversification: Expanding AIL's presence in export-driven applications like energy, while ensuring stable and sustainable growth in the domestic market.

Customer Realignment: Strengthening relationships with Tier-1 customers while cautiously expanding into Tier-2 and Tier-3 markets to diversify and stabilize revenue.

Investment Plans

With a primary focus on projects that drive growth through downstream integration and developing new chemistries, AIL has outlined significant capital investments to support its growth trajectory. In FY23-24, we invested ₹1,358 crore in CAPEX. For FY24-25, we are planning a similar investment range of ₹1,300–1,500 crore, with approximately ₹1,000 crore earmarked for FY25-26.

These investments are focused on:

Capacity Expansions: Recent commissioning of the NCB unit expansion and Phase 1 of the acid unit revamp are part of our ongoing efforts to scale operations. Projects under execution, such as Nitrotoluene and Ethylation expansions, are on track for completion by FY24-25, supporting global demand growth.

Capitalizing on Value Chain Adjacencies: Building on the success of its Benzene value chain, AIL's Zone-IV project represents a transformative step in its growth journey, expanding into the Toluene value chain. The commissioning of a pilot plant will accelerate product development, streamline project cycles, and strengthen customer alignment. The forthcoming Multipurpose Plant (MPP), slated to become operational by mid-next year, will offer unparalleled flexibility to adapt the product portfolio based on market conditions and margin dynamics, enabling swift transitions between molecules. Commercialization will be executed in phases over 18 months, gradually contributing to profitability as commissioning advances. Although full ramp-up may extend beyond three years, these efforts underscore AIL's dedication to innovation, resilience, and long-term sustainable growth.

JV with UPL: A combined investment of ₹300 crore targeting ₹400–₹500 crore in annual revenue by FY27, aimed at strengthening AIL's position in the agrochemical sector.

R&D and Technology Upgradation: AIL's Aarti Research & Technology Centre (ARTC) drives innovation with 250+ scientists, exploring advanced chemistries like photochemistry, fluorination, and Grignard reactions. The new 30,000 sq. ft. ARTC Phase-2, featuring state-of-the-art safety, scale-up, and intensification labs, is poised to enhance our capabilities, complemented by a pilot facility for faster process scale-ups.

Sustainability Initiatives: Our investments in renewable energy, including a 13.2 MW hybrid power plant, and advanced effluent treatment systems reflect our commitment to environmentally responsible growth.

In alignment with its growth strategy, AIL plans to explore strategic alliances in high-potential sectors, including sustainability, circular economy solutions, and chemical recycling technologies. Additionally, the company has made early bets on sunrise sectors, including electronic chemicals and specialty chemistries in battery materials, which are expected to provide new growth avenues over the next 3-5 years. These investments and initiatives aim to deliver a 20–25 per cent EBITDA CAGR over the next five years, ensuring long-term growth and financial resilience while positioning AIL to lead in future chemical markets. ■

Multifaceted Approach for Sustainable Value Generative Business Solutions

V. S. ANAND
Managing Director
NOCIL Limited

At NOCIL, aligning our organization towards enhancing competitiveness for sustainable and value-generative business solutions involves a multi-faceted approach that integrates:

- **Innovation and Research & Technology:** Develop and scale-up products and processes that meet customer demands while being environment friendly and using green chemistry as building blocks.
- **Operational Efficiency:** Optimize processes to reduce waste, energy use, lower carbon emissions and at the same time leverage digitalization and automation in our processes to reduce costs and further enhance efficiency.
- **Robust Supply Chain:** Build supply chains that are reliable and lean on carbon emissions.

Immediate Priorities

Our immediate priorities in achieving the same include:

- **Sustainable Product Innovation:** Investing in R&D to develop eco-friendly solutions that meet stringent market and regulatory demands.
- **Excellence in EHS:** Upholding global standards in Environment, Health, and Safety (EHS) while continually improving processes.
- **Integrate ESG:** Embed Environmental, Social and Governance (ESG) principles into our day-day operations.
- **Talent Development:** Foster a culture of innovation and sustainability within the workforce, equipping employees with the skills to adapt to emerging trends and challenges
- **Recognition of Leadership:** Our recent accolades, such as the LACP Platinum Award and multiple sustainability awards, reinforce our role as a leader in sustainable practices.

Investment Plans

To achieve these ambitious goals, NOCIL has outlined strategic investment plans focusing on expanding our manufacturing capabilities and enhancing R&D efforts. We are currently investing in state-of-the-art facilities that utilize cutting-edge technologies to improve production efficiency while reducing waste and emissions. Our recent establishment of a new manufacturing facility at Dahej exemplifies this commitment, as it incorporates advanced process technologies designed to optimize resource utilization. Furthermore, we are allocating resources towards developing eco-friendly packaging solutions and exploring alternative raw materials that align with our sustainability objectives. These investments not only position us competitively within the market but also contribute to a more sustainable future for the chemicals sector. ■

COVER STORY

Committed to Delivering Innovative Solutions for Value Creation & Competitiveness

SAURABH KHEDEKAR
Chief Executive Officer
Hindalco Specialty Alumina Business

In the ever-evolving world of chemicals, adaptability and precision often define leadership. Hindalco Specialty Alumina plays a pivotal role in this landscape, providing high-precision alumina chemicals for non-metallurgical applications. With over 1,000 customers across 45 countries, our diverse portfolio spans industries from refractories and ceramics to water treatment, polishing, flame retardants, and emerging sectors like batteries, semiconductors, solar glass, electronic substrates, etc. Supported by our fully integrated 'mines-to-market' operations, we ensure consistency in product quality while addressing the unique needs of our customers.

At the core of Hindalco's strategy lies a dual commitment to sustainability and innovation, two pillars that are increasingly essential in today's industrial environment. A prime example is our Belagavi facility, which has been powered entirely by renewable energy since June 2024, using wind and biomass sources. This initiative has led to a significant reduction in our carbon footprint, now at just 0.56 t CO_2 per ton—well below the global average of 1.29 t CO_2 per ton. We've also solved the long-standing industry challenge of red mud utilization, achieving over 100 per cent reuse across three refineries, conserving 6.5 million tons of natural resources. Additionally, freshwater consumption at Belagavi has decreased by 53 per cent since FY19, with treated effluent being repurposed for gardening.

While sustainability guides our decisions, innovation propels us forward. The Hindalco Innovation Centre for Alumina (HIC-A), supported by the Aditya Birla Centre for Science and Technology, is driving the development of next-generation products. Among our recent advancements is FUSALOX™ White Fused Alumina, a prime example of how we're addressing the growing need for high-performance materials. Our SMA, HCA, and IC series for ceramic armors, spark plug, electronic substrate applications demonstrate our ability to stay ahead of industry trends. At the Battery Japan Expo in February 2024, we launched Hindalco's High Purity Ultra Fine Boehmite for battery separator applications, reinforcing our commitment to providing innovative solutions for clean energy.

Looking to the future, we are on track to commission India's first Precipitated Hydrate plant, which will set new safety standards in the wire and cable industry with halogen-free flame-retardant solutions. Our

contributions to green energy solutions extend further through products for solar glass and wind energy, alongside thermal ceramics, catalytic converters, and wear-resistant ceramics, all of which enhance energy efficiency and support industries in their sustainability efforts.

With over 75 years of expertise at Muri and more than 50 years at Belagavi, we have continuously adapted to meet evolving market needs while maintaining a focus on operational excellence. Our ongoing investments in renewable energy, including a 9 MW solar power plant and an expanded biomass facility, position us to further reduce our carbon footprint to an ambitious 0.16 t CO_2 per ton by FY30 — paving the way for a greener future in the specialty alumina industry. Simultaneously, we are advancing investments in spherical alumina for semiconductors, hydratable alumina, and tabular alumina, further enhancing our portfolio to address the growing demand for high-performance materials in critical sectors.

Beyond our industrial efforts, we are equally committed to social sustainability. Through initiatives like Kosala, which preserves traditional Kosa silk craftsmanship and supports livelihoods in Chhattisgarh, and programs like Project Disha for education and Project *Suposhan* for nutrition, we are creating lasting value for the communities we serve.

As we look to the future, Hindalco Specialty Alumina remains steadfast in delivering innovative solutions that drive competitiveness, foster sustainability, and create value. With a proven legacy and a vision rooted in progress, we are committed to being the one-stop solution for all alumina needs, consistently demonstrating technical excellence and environmental responsibility. ■

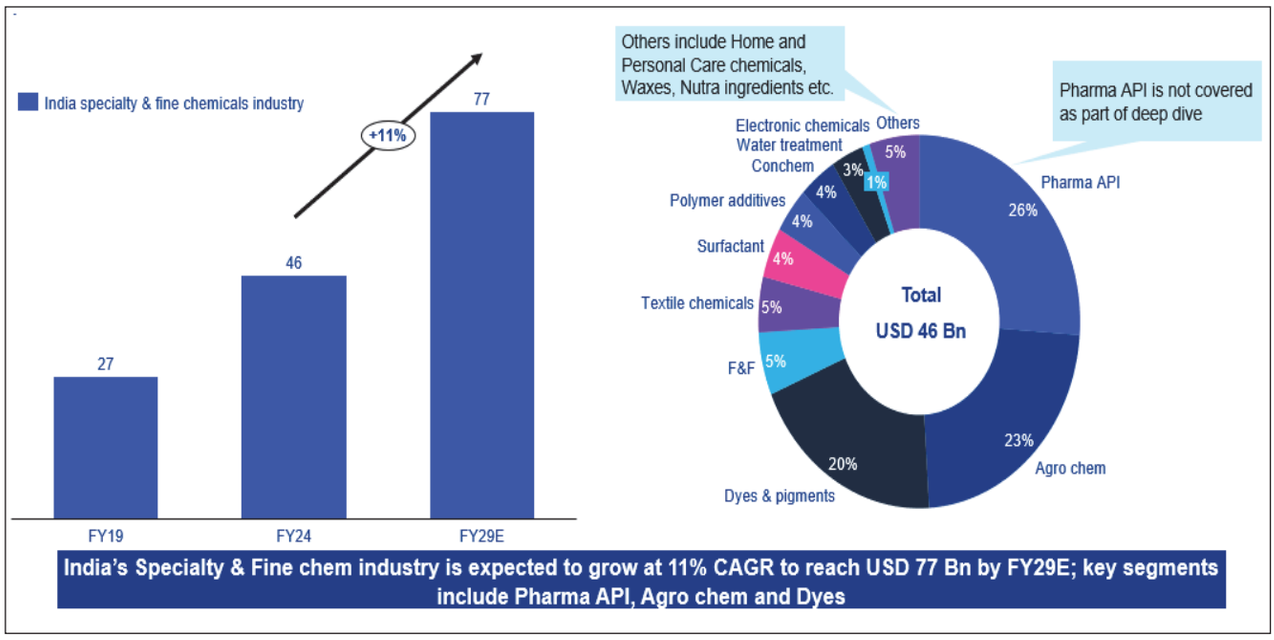
Indian Specialty Chemicals Industry: Innovation as Catalyst for Future Growth

Jeffry Jacob
Partner and Industry Group Leader (Chemicals)
KPMG in India

The growth of the Indian specialty chemicals industry over the last decade has indeed been remarkable. It has been globally valued for its unique products and high value-addition in diverse end-use sectors, such as pharmaceuticals, agrochemicals, and consumer goods, and represents a key pillar of India's manufacturing and export landscape. But what worked well in the past may not necessarily be the recipe for future success. **Jeffry Jacob, Partner and Industry Group Leader (Chemicals), KPMG in India,** throws light on the growth opportunities for the Indian Specialty Chemicals industry.

India today accounts for ~4 per cent[1] of the global specialty chemicals market, with a size of ~USD 46 billion[2] in FY24. Active Pharmaceutical Ingredients (API), Agrochem, Dyes and Pigments accounts for nearly 70 per cent of this market with a number of well-established domestic and international players operating in the country. Strong domestic tailwinds in the form of increasing per capita usage due to changing customer preferences and shift towards premiumization of end-products, together with increasing consumption is expected to continue to drive strong growth in key segments at over 9-12 per cent[3] CAGR going forward.

While China is the world leader in the chemicals space driven by its strong ecosystem, availability of raw materials, investment-friendly policies, and dedicated chemical zones, exports from India have been witnessing an increasing uptick in recent times. This was further accentuated by the 'China plus One strategy' being adopted by several MNCs post Covid. The shift was driven by several factors including trade tensions, changes in Chinese manufacturing policy, environmental regulations, and desire for supply chain resilience.



India specialty chemicals market size growth (FY19-29E) and breakup of market (FY24)

India today produces 20-25 per cent[4] of the global demand of dyes and pigments and has emerged as the preferred destination especially for specific segments like reactive dyes, phthalo pigments, synthetic food colors etc. We have also established a strong position globally in manufacturing of APIs, agchem, textile chemicals, construction chemicals and Flavors & Fragrances (F&F) ingredients. Improvement in several business levers, improving cost competitiveness vs. China, and increase in ease of doing business has further cemented India's position, leading to a number of MNCs actively considering India for their next phase of investments.

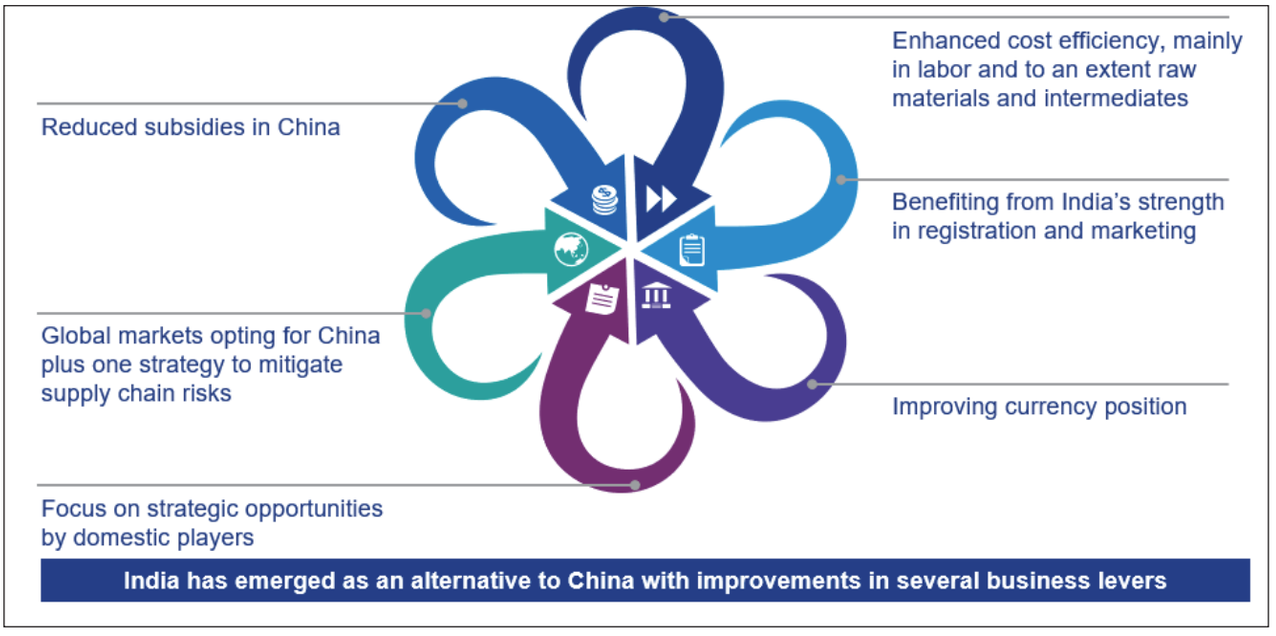
Driven by these trends, the specialty chemicals industry in India is expected to grow at 11 per cent CAGR to reach USD77 billion by FY29E[5]. However, to truly seize the future opportunities the industry must align itself with the key global mega trends and drivers of future growth. This means that the manufacturers must focus on fostering innovation and introducing new products by developing strong capabilities in newer chemistries. The Indian electronic chemicals market, for example, which is relatively small today at USD 0.4 billion, is expected to grow at over 32 per cent CAGR to reach USD1.4 Bn by FY29E[6]. Innovation will not only help increase efficiency and provide opportunities for greater margins and higher value capture, but will also ensure alignment with global trends of sustainability, performance improvement, and increasing compliance.

Key areas for innovation include:

Green Chemicals: There is a rising global demand for environmentally friendly chemicals. Green chemicals, which are designed to reduce waste and toxicity, present a large opportunity for India to differentiate itself. Some examples of these could include areas such as bio-degradable plastics, ecofriendly paints and bio-based alternatives to lubricants and detergents.

Semiconductor Chemicals: The semiconductor industry requires chemicals of the highest purity levels, e.g. electronic-grade solvents, photoresists, and wafer-cleaning solutions. These materials are essential to semiconductor fabrication, and innovation here can give India a competitive edge in supplying these highly technical products. With the Indian Government's clear direction and focus on developing large scale semiconductor manufacturing in India, this presents a large opportunity for manufacturers to make in India for the world.

Battery Chemicals for EVs: With the growing long term trend towards electric vehicles, India has an opportunity to focus on battery chemicals, particularly lithium-ion and solid-state battery materials. Developing safer,



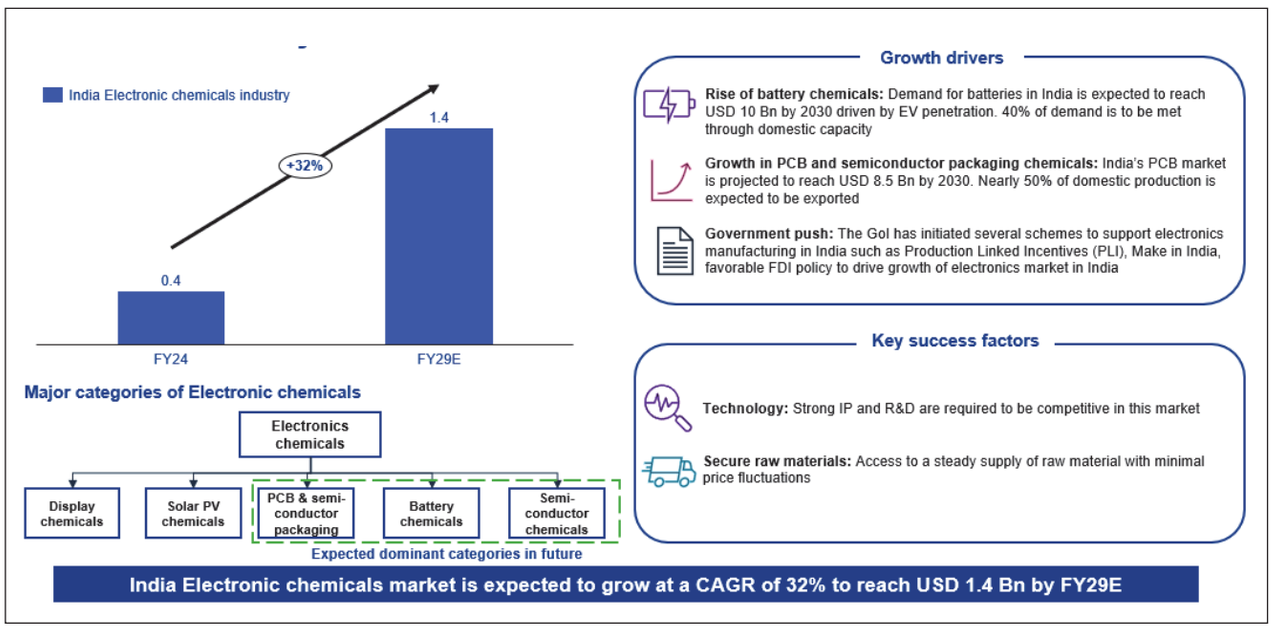
Advantage India.

higher-performance battery materials can position India as a major global supplier in this sector. A few leading Indian companies have already started working in this area and are actively evaluating global partnerships and tie-ups.

High-Performance Materials for Emerging Industries: Specialty chemicals companies have the opportunity to explore advanced materials tailored for sectors like aerospace, automotive, and construction, where demand for high-performance and sustainable materials are on the rise.

By investing in research and establishing collaborative partnerships with global players and research institutions, Indian companies can create unique products that cater to niche and high-demand markets. However, realizing the potential of the specialty chemicals sector requires several pro-active measures, both from the industry and the Government. Some of the key enablers include:

- **Increasing investments in R&D:** Traditionally, Indian companies have shown a strong ability to excel globally in areas such as differentiated process and technical customization, process optimization and cost competitiveness. However, going forward the focus should be on product innovation in new and emerging areas. Private companies should focus on setting up dedicated world class R&D facilities, with a focus on sustainable and cost-effective solutions. Public-private partnerships as well as academia-industry collaborations in R&D, particularly in sectors like green chemicals, semiconductor chemicals, and battery materials, can help significantly accelerate the pace of development.
- **Regulatory Support:** Streamlined regulations and faster approvals for environmentally sustainable chemicals will be essential. Policies that reward innovation, such as tax incentives for R&D or streamlined processes for 'green' products, can support growth.
- **Infrastructure and Chemical Parks:** Government initiatives to develop chemical parks with advanced infrastructure and shared resources can enable cost reductions and help leverage ecosystem benefits for smaller companies, encouraging more players to innovate and scale.
- **Skill Development and Talent Pool:** As the industry becomes more technology-intensive, building a talent pool equipped with advanced technical skills will be essential. Government led programs focusing on skill development in chemical



Electronic chemicals market in India (FY24-29E).

engineering, semiconductor manufacturing, and material science can contribute to enhancing the sector's innovation capacity.

- **Sustainability Incentives:** As global clients increasingly prioritize sustainable sourcing, government programs promoting sustainable practices, such as energy-efficient manufacturing or waste management, will support Indian companies' export competitiveness.

In order to truly seize future opportunities, the Indian specialty chemical manufacturers must focus on fostering innovation, especially in areas like green chemistry, semiconductor chemicals, and other high-performance materials essential for new-age industries. By prioritizing innovation, both in products and processes, Indian companies can develop a competitive edge and move up the value chain. India's specialty chemical industry stands at a critical juncture, where through concerted efforts by all key stakeholders and the right investments in innovation and technology, it can establish itself as a preferred global supplier for new-age industries, thereby ensuring a bright future for the sector. ■

Sources

[1] Initiating coverage report India specialty chemicals by Yes securities, Jan 2022.

[2] KPMG estimate based industry reports: Initiating coverage report on Chambal Fertilizers, Oct 2023 for Agchem industry value; Pharmaceutical industry in India, Dec 2023 report by RBSA Advisors for Pharma API industry value; Investor presentation of Oriental Aromatics, Feb 2023 for F&F industry value.

[3] Chemicals Industry Report by Indian Brand Equity Foundation.

[4] KPMG estimate based on industry reports: India Dyes and Pigments Market size and Outlook report by Grand View Research.

[5] KPMG estimate based on individual growth rates of each sub-sector within specialty chemicals.

[6] Estimated based on Niti Aayog ACC report.

Indian Specialty Chemicals Sector: Trends and Outlook

Prashant Vasisht
Senior Vice President &
Co-Group Head - Corporate Ratings
ICRA Limited

The Indian Specialty chemicals sector is likely to grow at a Compound Annual Growth Rate (CAGR) of 9 per cent through 2030. **Prashant Vasisht, Senior Vice President & Co-Group Head - Corporate Ratings, ICRA Limited,** throws more light on the trends and outlook for the Indian Specialty Chemical sector.

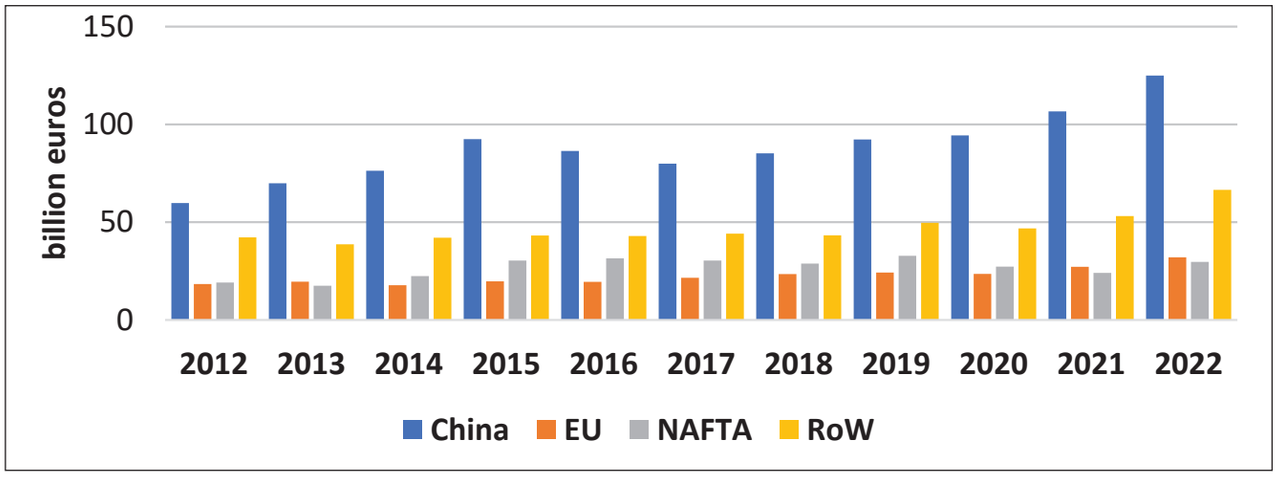
The global specialty chemicals market was estimated to be about USD650 billion in CY2023 and is expected to grow at a CAGR of ~4.5 per cent through 2030. The key drivers for the growth will be the rising income levels in developing economies, changing lifestyle patterns and demand for high performance products. The Indian specialty chemicals market was valued at ~USD36 billion in CY2023 and is expected to grow at a CAGR of 9.0 per cent till CY2030.

Indian players have undertaken significantly large capex in the past few years to expand their capabilities, both for increasing capacities and backward integration/ moving to adjacent chemistries. Additionally, the sector has seen some consolidation, wherein large companies have been acquiring smaller ones whose products are complementary to their existing product line or where synergies exist such as common customers or distribution networks.

China+1 strategy

The domestic industry has benefitted from the supply chain realignments, which started with the pollution crackdown by China in 2017 and thereafter the strict zero-Covid lockdowns - popularly known as China+1 strategy. The energy disruption in the European Union (EU), post the Russia-Ukraine conflict, also led to widespread disruption in chemical production as a lot of plants became unviable for production amid the elevated energy costs. This also prompted major chemical players to look at an EU+1 strategy. There have been incremental order flows for Indian players resulting from these two developments.

China has been adding large capacities over the last few years in the petrochemicals and specialty chemicals space as a means for stimulating economic growth. China is expected to add 18.7 million tonne



Trend in capital investment in chemical sector by region in billion euros

Source: CEFIC, Industry, ICRA Research

per annum capacity in CY2024 of chemical building blocks like ethylene, propylene, butadiene, benzene etc exacerbating an already oversupplied market. Post lifting of zero-Covid restrictions by China in December 2022 the global chemical markets have been flooded by Chinese exports, leading to decline in prices/ realisations.

Additionally, during the pandemic container freight rates had risen sharply amid supply chain disruptions, container shortages and strong demand. Additionally, central banks undertook rapid rate cuts leading to the borrowing costs falling. With low inventory holding costs and elevated freight rates, the channel inventory has risen sharply. However, in CY2022, the supply chains started stabilising, leading to a fall in the container freight rates and the availability-related uncertainties waned. Meanwhile, the central banks also started tightening interest rates to tame inflation. The rise in the inventory-holding costs as well as normalisation of supply chains, coupled with subdued economic outlook on demand, led to aggressive inventory destocking since the beginning of CY2023.

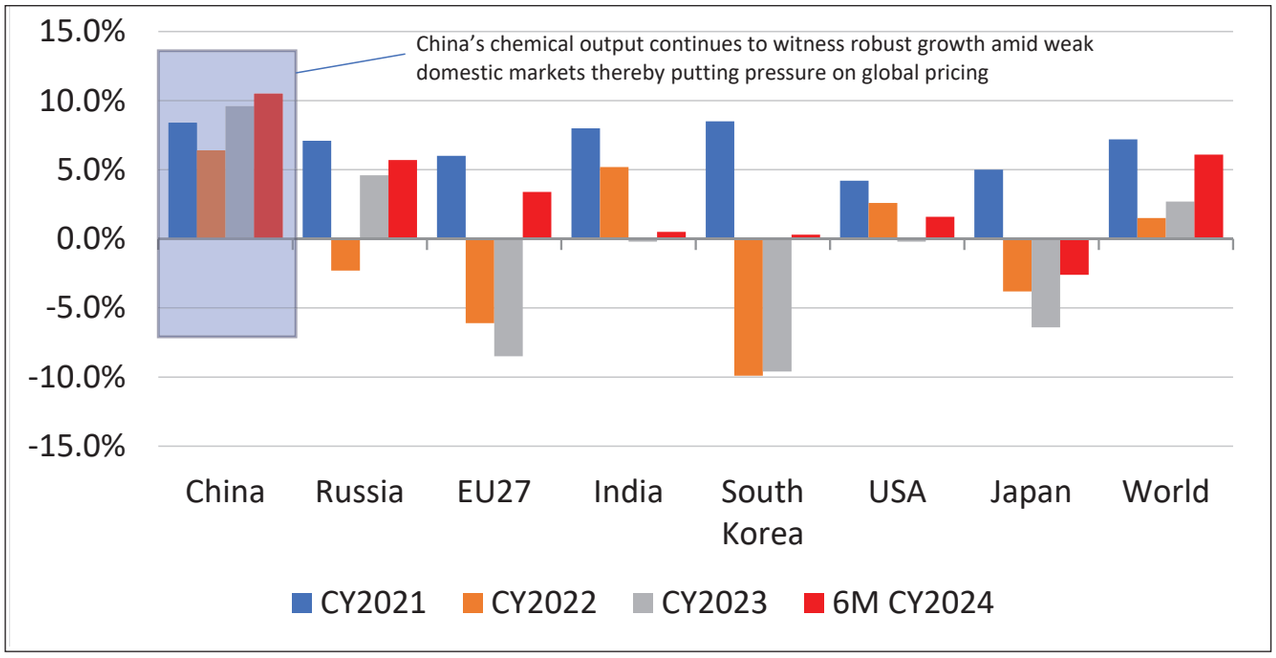
Macroeconomic headwinds and high inflation have led to weak demand in EU and several developed economies. The major EU-based chemical players have been investing heavily in China for setting up large scale chemical plants, which in the long term might lead to shifting of the chemical production out of EU.

Headwinds

Accordingly, the Indian specialty sector has been facing headwinds over the past two years owing to the combined effect of subdued demand, large capacities built and dumping by China and inventory destocking.

Within the specialty chemicals industry, the segments that have been impacted the most are agrochemicals, dyes and pigments and flavours and fragrances. The agrochemicals segment has been impacted by inventory destocking and dumping by China. The dyes and pigments and flavours and fragrances segments have been impacted by dumping by China and deferment of discretionary purchases of textiles and fragrances respectively, due to weak economic growth in several developed economies, thus affecting export volumes have suffered.

The Indian specialty chemicals industry lags that of China due to a host of reasons. One, China is a net exporter of most of the basic chemicals. On the other hand, India is a net importer of several basic chemicals such as ammonia, acetic acid, methanol etc, which serve as building blocks for specialty chemicals. Two, China is such a large producer of automobiles, solar panels, electronics etc that chemical companies have built plants for the benefit of being closer to customers, whereas India is a much smaller chemicals market. Third, China scores ahead in infrastructure with about 250 chemical parks whereas India has just two Petroleum, Chemicals and Petrochemicals Investment Region (PCPIR) in Dahej (Gujarat) and Visakhapatnam (Andhra Pradesh). Fourth Chinese companies add huge capacities because of encouragement by the state whereas Indian companies are more market oriented and add incremental capacities that markets can absorb.



Trend in chemical production by key countries

Source: CEFIC, ICRA Research

Additionally, Chinese companies usually have significant price advantage as many are state-owned and are not run with a profit-maximising motive besides which the Government provides subsidies and incentives to many. The Government of India (GoI) has yet to come out with a productivity-linked incentive scheme for specialty chemicals. Also, China has huge reserves of coal and has developed a large industry of coal-derived chemicals, unlike any other country.

Challenges

The Indian specialty chemical players face several challenges that impede their growth. Indian players are dependent on import for feedstock with China remaining one of the major sources of raw material/ intermediates. Apart from this, Indian players have been acting primarily as contract manufacturers for global majors or dependent on molecules going off-patent for introducing new products. There is limited focus on research and development to develop novel products like global majors. While Research and Development (R&D) spending has increased over the past few years, it still lags significantly behind global majors. Indian companies also have no presence in new emerging chemicals such as semi-conductor chemicals and electronic chemicals and would require R&D to develop such chemicals. The increasing costs of compliance with various regulations and Environmental Social & Governance (ESG) norms remains a major source of cost for Indian industry.

The Indian chemical players have been investing heavily in augmenting capacities. The first leg of the capex growth was driven by the pollution crackdown in China. The second leg of capex growth was driven by the Covid lockdowns in China and EU+1 strategy. The capex has largely been incurred by specialty chemical players in enhancing capacities. However, recently the capex levels have moderated as companies wait for headwinds to abate.

Way Ahead

ICRA (formerly Investment Information and Credit Rating Agency of India Limited) expects the Indian specialty chemical players to post higher operating margins in FY2025 vis-à-vis the lows of FY2024 and thereafter witness improvement in FY2026 although still remaining lower than the previous levels. Revenue growth will be supported by the capex undertaken in the past as well as incremental order inflows. However, given the healthy cash generation, the sector's credit profile is expected to remain healthy with credit metrics remaining comfortable.

ICRA expects the capex cycle to continue as companies invest in improving their capabilities focusing on increasing production of technicals, investment in battery chemicals, fluoro-polymers etc. The capex being incurred will support the growth of the sector going forward and also enable the companies to compete with other global alternatives like China, Vietnam etc. ■

Specialty Chemicals as Enablers for Growth of the Indian Economy

Professor Prakash D. Vaidya
Department of Chemical Engineering
Institute of Chemical Technology

India's high-value specialty chemicals industry exhibited substantial revenue growth during the past five years. It is projected to maintain its growth trajectory even beyond 2030, opines **Professor Prakash D. Vaidya, Department of Chemical Engineering, Institute of Chemical Technology,** as he shares valuable insights about this industry.

Specialty chemicals, which are designed for specific purposes, are applied in several industries such as textiles, personal care, electronics, automotive and agriculture. India's high-value specialty chemicals industry exhibited substantial revenue growth during the past five years, mainly due to rising exports and nationwide demand and helpful government schemes. For example, the tendency of diversification in the global supply chain (China plus one strategy) resulted in growing export demand from India, which is endowed with technical expertise, big workforce, abundant feedstock and affordable manufacturing costs. Similarly, the growing demand for specialty chemicals in the end-use segments (such as pharmaceuticals, water treatment, household products and cosmetics) resulted in higher domestic consumption. Besides, 'Make-in-India' (for a strong manufacturing ecosystem), 'Atmanirbhar Bharat' (Self-Reliant India), 'Production-Linked Incentive' (PLI) scheme and the reduction of import dependency are some examples of the governmental schemes that promoted growth. The specialty chemicals sector is projected to maintain its growth trajectory even beyond 2030.

What's new in this segment?

Several interesting trends are seen in this sector today. Buyers prefer specialized products that suit their requirements. The demand for customized high-performance chemicals (e.g., pharmaceutical ingredients and agrochemicals) is rising. To meet the high export and domestic demand, big manufacturing companies are increasingly investing in new expansion plans. Indian companies are collaborating with global players for building useful partnerships.

Much focus is now given on research and development for technological advancements. There is greater emphasis on sustainability and green chemistry. Thus, chemicals producible from renewable biomass are becoming increasingly popular. Products, whose environmental footprint is low, are in demand. Alternative manufacturing routes that avoid harmful chemicals (reactants, products or intermediates) are often sought.

Efforts are made to reuse chemicals (for a circular economy), efficiently use raw materials and energy, avoid the usage of solvents during synthesis, adhere to safety standards and utilize waste. Catalysis, which is

a major tool in green technology, is used for improving product selectivity. Continuous flow manufacturing, which is a novel advancement in process chemistry, is being considered. Automation and digitalisation are increasingly applied. There is lot of interest in new-age technologies such as artificial intelligence, machine learning and internet of things.

What are the challenges?

Looking ahead, there are several key challenges:

- This is an era of sustainability. However, the development and implementation of sustainable manufacturing technologies is complex and expensive.
- Many specialty chemicals are not available on a large scale and establishing scalability is difficult.
- Several key raw materials are still imported and the dependency on just a few suppliers is concerning. To avoid risks during difficult times, the supply chain should be diversified.
- Environmental regulations are becoming increasingly stringent, and all companies must comply, thus resulting in higher compliance costs.
- A highly skilled workforce can substantially contribute to research and development, process optimization, product design and quality control; thus, companies should continually strive to improve the technical expertise of their personnel. Academia-Industry collaboration will be useful in this endeavour.
- Besides, generous funding for research and development is essential if companies wish to achieve improved technologies and stay ahead of competitors.
- Some more gaps that need to be filled include fragmented supply chain, neglect in quality assurance and inadequate packaging and warehousing.

What are the opportunities?

Several opportunities for the innovative applications of specialty chemicals exist in the fields of green chemistry (e.g., waste reduction, energy conservation and reduction in carbon footprint), nanotechnology (nano-coatings, carbon nanotubes etc.), material science (novel, improved and efficient materials) and biomass utilisation (e.g., bio-based feedstock). Specialty chemicals can reduce emissions (e.g., carbon dioxide), improve the quality of water, treat wastewaters, avoid waste (such as plastic waste) and improve energy efficiency.

Especially, the many green chemistry benefits offered by catalysis provide several opportunities to reduce material and energy usage, avoid agents for separation, improve product selectivity and enable the usage of less toxic materials. In future, novel catalysts can be developed for improving existing production processes (e.g., by increasing yield, selectivity and energy savings) and developing newer processes (with alternative raw materials). Heterogeneous catalysts provide a wide scope for improvement, e.g., replacing expensive and scarce catalysts with cheaper alternatives, reducing the number of steps in processing, developing processes which abate the formation of undesired gases and wastewater, and removing impurities from feeds and intermediates. Catalysts can improve several processes such as oxidation, alkylation, polymerization etc. Recent trends in catalyst development include scientific catalyst design, robotic instruments (for synthesis, testing and characterization), application of microreactors and other in-situ characterization methods, and scaleup of laboratory data to demonstration plants. [1]

How the Government can help?

Additionally, the below-mentioned initiatives from the government will further boost growth in this industry segment:

- Production-linked incentives to stimulate the manufacturing of selected high-value specialty chemicals, for instance, through price disability (which depends on the complexity of the manufacturing process, availability of the raw material, production capacity etc.).
- Policy interference for import substitution to promote self-reliance.
- Reassurance of incessant supply of chemicals, intermediates and raw materials.
- Raising the capacity and competitiveness of the domestic segment.
- Strengthening the regulations for compliance, exports and approvals.
- Enhancing the scope for anti-dumping measures and ensuring enforcement.
- Support for promoting innovative research and development (e.g., as tax benefits or grants or subsidies for improving the production skills).
- Allocation of funds for training programs to improving skills and know-how of the workforce.
- Superior transport networks to ensure faster movement and timely delivery of goods and reduce costs and delays. ■

Reference: *[1] J. Hagen, Industrial Catalysis: A Practical Approach, Wiley, Weinheim, 2015.*

"We are committed to advancing sustainable manufacturing processes"

MAULIK PATEL
Chairman & Managing Director
Epigral Limited

Epigral Limited (erstwhile Meghmani Finechem Limited), a leading integrated chemical manufacturer, is on a growth path announcing major expansion plans. While being committed to advancing sustainable manufacturing processes, the company's expansion plans are in harmony with the Government of India's national priorities, such as the *Atmanirbhar Bharat* and 'Make in India' initiatives. In an exclusive interview with ***Chemical Engineering World***, **Maulik Patel, Chairman & Managing Director, Epigral Limited,** shares more details about the company's expansion plans and also throws light on Q2FY25 results.

Epigral has posted a robust growth in Profit After Tax (PAT) at ₹ 81 crore for Q2FY25. What would you attribute this jump in growth to?

Epigral is a growth oriented company and hence we have done continuous capex to have volume growth. We have witnessed volume growth of 17 per cent in H1FY25 vs H1FY24. This volume growth is majorly coming from Derivatives and Specialty business and has led to PAT of ₹81 crore in Q2FY25, i.e. 111 per cent growth compared to Q2FY24. Revenue contribution from Derivatives and Specialty business has reached to 59 per cent vs 46 per cent in Q2FY24. The capex that we have done in previous years will drive growth in FY2025 and FY2026. Further, we have announced to double our Chlorinated Polyvinyl Chloride (CPVC) Resin and Epichlorohydrin (ECH) capacity - these projects are expected to drive growth from FY2027 onwards.

As India embarks on net zero emissions target, enhancing competitiveness for sustainable and value generative business solutions has become the need of the hour. How is Epigral aligning itself in this direction?

At Epigral, we firmly believe that business transformation is not a one-time event but a continuous journey that evolves with the changing landscape of our industry. This ongoing transformation aims not only to accurately reflect our enhanced capabilities and ambitious goals but also to foster a sense of confidence and trust among all our stakeholders, including customers, partners, and the communities we serve. As a responsible organization and a dedicated partner in India's pursuit of sustainable growth, it is our mission to identify and implement sustainable practices across all facets of our operations.

We are particularly committed to advancing sustainable manufacturing processes. A notable example of this commitment is our collaboration with RENEW Power to establish a hybrid wind power plant. This initiative underscores our dedication to leveraging renewable energy sources and reducing our carbon footprint. Additionally, we are excited to invest in Pure.rBrine™ technology, which focuses on the recycling and reuse of by-products generated during our manufacturing processes. By repurposing these by-products as raw materials for other products, we are not only minimizing waste discharge but also significantly reducing greenhouse gas (GHG) emissions throughout our supply chain.

Moreover, this innovative approach to sustainability is expected to yield additional benefits for the company. By integrating by-products into our manufacturing processes, we anticipate a cost rationalization that will enhance our operational efficiency. Strengthening our integrated complex in this way not only supports our environmental goals but also positions us to respond more adeptly to market demands while promoting a circular economy. Through these efforts, we aim to create long-term value for our stakeholders while contributing positively to the environment and society as a whole.

How would you describe the role of innovation for the foundation of the next phase of growth of Epigral in specialty chemicals?

In the current competitive business environment, innovation and research and development (R&D) are crucial for companies looking to achieve growth and success. In the coming years, companies that are focused on growth will increasingly prioritize investments in Research & Development (R&D) while also cultivating talent to inspire new ideas that have a positive impact on society.

Epigral is placing a strong emphasis on innovation within derivative products designed for emerging sectors such as renewable energy and automotive components. We have established a dedicated R&D center that is currently focused on developing new specialty chemicals along the Chlorotoluene value chain. This center is also committed to enhancing the processes of existing plants to achieve greater operational efficiency.

By FY2027, you are foreseeing a 70 per cent revenue contribution from the derivatives and specialty business, what according to you will be the contributing factors for this growth?

Yes, as on FY2019, revenue contribution from Derivatives and Specialty business was 0 per cent. In line with the strategy to diversify into different

downstreams of Chlorine and Hydrogen, Epigral has entered into various products like Hydrogen Peroxide, Chloromethanes, CPVC Resin and Epichlorohydrin. Because of this expansion, revenue contribution from Derivatives and Specialty business has reached to 56 per cent in 1HFY25.

Also very recently, the board has approved to enhance the capacity of CPVC Resin and ECH. We are expanding 75,000 TPA of CPVC resin capacity, which will lead to total capacity of 1,50,000 TPA (World's largest plant) and expanding 50,000 TPA in ECH, which will lead to total capacity of 1,00,000 TPA (India's largest plant).

CPVC Resin is consumed to make the CPVC pipes and fittings which are used in hot water application. Epichlorohydrin is majorly used as a raw material to manufacture Epoxy Resin, which in turn goes in to making windmill blades, automobile industry and construction industry. ECH is also used in pharmaceutical, water treatment chemical and paper chemicals.

These expansion plans in Derivative and Specialty business will drive the revenue contribution to 70 per cent by FY27 or FY28. Also these expansions in to Derivatives will strengthen our integrated complex, ultimately creating value of our stakeholders.

Could you throw more light on the immediate expansion plans of the company and the investments earmarked for the same?

Epigral's board of directors has officially greenlit an ambitious expansion project focused on the production capacities of CPVC (Chlorinated Polyvinyl Chloride) resin and Epichlorohydrin (ECH). This strategic initiative aims to significantly increase CPVC resin capacity to an impressive 150,000 Tonnes Per Annum (TPA) by incorporating an additional 75,000 TPA capacity. Concurrently, the production capacity for Epichlorohydrin will also see a substantial boost, expanding to 100,000 TPA through the addition of 50,000 TPA capacity. This expansion will take place at the company's state-of-the-art facility located in Dahej, Gujarat.

With these enhancements, Epigral is set to establish itself as a global leader in CPVC resin production,

"At Epigral, we firmly believe that business transformation is not a one-time event but a continuous journey that evolves with the changing landscape of our industry."

making its facility the largest of its kind in the world. In addition, the expanded capacity for Epichlorohydrin will position it as the largest ECH production facility in India.

The decision to ramp up production in both CPVC and ECH aligns with the surging demand for these essential products in the Indian market. As consumer needs grow, this expansion will not only enhance Epigral's operational capabilities but will also bolster its commitment to supporting the broader industrial landscape in India.

Furthermore, this initiative is in harmony with the Government of India's national priorities, such as the Atmanirbhar Bharat (Self-Reliant India) and 'Make in India' initiatives. These programs are designed to promote domestic manufacturing and economic independence, reflecting Epigral's dedication to fostering self-reliance within the nation while contributing to its industrial growth. ■

“Renofluthrin's development stands as a powerful testament to the innovative capabilities within Indian industry”

Shogun Organics, a part of Safex Chemicals Group, marked a historic achievement by developing Renofluthrin after a decade of intensive research and development, representing a noticeable advancement in the country's capabilities in molecular research. The research and development of Renofluthrin - India's first indigenously developed and patented mosquito repellent molecule - was carried out in partnership with Godrej Consumer Products Limited (GCPL). Shogun Organics holds the patent for Renofluthrin and has partnered exclusively with GCPL for its use in India. In an exclusive chat with ***Chemical Engineering World,*** **Neeraj Jindal, Group Director, Safex Chemicals and Director, Shogun Organics**, shares the successful research growth journey.

Neeraj Jindal
Group Director, Safex Chemicals and
Director, Shogun Organics

Can you share the thought behind the development of this unique molecule?

We noticed that the existing mosquito control products were very old and were not working well anymore, as mosquitoes had become resistant to them. Since mosquitoes are a major problem in tropical countries like ours, causing dangerous diseases like Malaria and Chikungunya, we decided to take action rather than waiting for Western countries to solve our problem. We wanted to create our own solution and be self-reliant.

How did the development process begin?

Our journey started with a systematic approach to understanding the synthetic pyrethroid family of chemicals. The team began by defining clear research objectives, followed by an extensive review of existing literature and studies in this chemical category. This thorough analysis helped identify crucial gaps in current solutions, leading to a refined research focus. The process then evolved into exploring new possibilities within the synthetic pyrethroid range, specifically targeting molecules that would offer superior effectiveness, versatile application formats, and maintain high safety standards while remaining competitive with the existing products.

Could you throw light on the extensive Research & Development (R&D) that went into formation of this molecule?

The development of Renofluthrin involved extensive research, carried out by our dedicated R&D team with strong experience in chemistry, entomology, and toxicology. The process unfolded over several phases, beginning with the identification and shortlisting of chemical molecules. Following this, the shortlisted molecules underwent screening for their compatibility with various formulation types (end-user formats) and their effectiveness against mosquitoes.

Once suitable formulations were identified, a detailed evaluation of their safety and toxicological profiles was conducted to ensure that they were safe for human use while remaining effective against mosquitoes. In parallel, partnerships with industry leaders were established to ensure a wide market outreach, while initiating the regulatory process with the Central Insecticide Board.

To ensure consistent quality and competitive pricing, efforts were made to scale up production capabilities for both the product and its formulations. Additionally, the team explored further applications for the molecule, applying the same process to other new molecules to expand the product's potential uses. Our R&D team, which has a history of collaborating with various esteemed government and private research institutes, leveraged its expertise to drive this project forward.

What would you describe as the unique part of the R&D process?

The most unique part of the research and development process was the team's ability to stay positive and keep going, even when things got tough. It was a long journey with new challenges almost every day, and there were times when it felt like we had reached a dead end. But instead of giving up, we kept pushing forward until we finally succeeded. This determination made all the difference.

What were the challenges that you faced during the research and development of this molecule?

The research and development of this molecule came with several challenges. Firstly, it was the first time that an Indian company was introducing a new research molecule for registration in India. The regulatory system was not accustomed to this, which made it difficult to convince regulators of the product's effectiveness, safety, and research standards, even though they were on par with Western counterparts. Additionally, being a smaller company, the resources required for this type of research—such as funding, infrastructure, and manpower—were substantial, while the chances of success, like in any research, remained uncertain. Moreover, the process would have been smoother with supportive government initiatives for such research programs, which could have provided valuable assistance along the way.

How would you describe the 10-year journey for development of this product?

The 10-year journey for the development of this product was nothing short of a roller coaster ride, filled with its own highs and lows. There were moments of great excitement when the product demonstrated excellent effectiveness against mosquitoes and received a positive response from our marketing partners. But there were also tough times when we wondered if all the time, money, and effort we put in would be worth it, especially as we waited for regulatory approval. But, all's well that ends well and we are grateful we took this journey to give India its first indigenously developed molecule which we are proudly looking forward to presenting to the world.

Renofluthrin's successful development stands as a powerful testament to the innovative capabilities within Indian industry. This achievement demonstrates indigenous research excellence. We are proud that we could develop this in India, and we are confident that we can create many more useful products using this molecule in the future. ■

Combating Corrosion: Harnessing the Power of Fluoropolymer

Corrosion, the silent enemy, wreaks havoc across industries, costing billions annually. From bridges crumbling to pipelines leaking, its impact is undeniable. Fortunately, the battle against corrosion isn't without its heroes – fluoropolymers stand tall as a powerful weapon in this fight. **Durgesh Verma, Assistant General Manager, Marketing; Raxit Mansinh Rodiya, Chief Manager, Application Development & Marketing and Anurag Gulati, General Manager, Marketing,** throw more light on the vital role of fluoropolymer to combat corrosion.

Corrosion is the deterioration of a material due to its interaction with its environment. It can be caused by various factors like:

Oxidation: When metals react with oxygen, forming oxides (rust).

Reduction: When electrons are transferred from the metal to the surrounding environment, causing it to dissolve.

Galvanic corrosion: When two dissimilar metals come in contact, creating an electrical current that accelerates corrosion.

Stress corrosion cracking: When a combination of stress and corrosion leads to cracks in the material.

Fluoropolymers: A Shield Against Corrosion

Fluoropolymers, such as polytetrafluoroethylene (PTFE) and perfluoroalkoxy alkanes (PFA), due to its strength, carbon and fluorine bond possess unique properties that make them ideal for corrosion protection. Their exceptional chemical resistance, non-stick surface, and high-temperature stability make them ideal corrosion barriers. Here's why:

Examples on types of metal corrosion

Chemical inertness: The strong carbon-fluorine bond creates an exceptionally resistant surface, repelling most chemicals and solvents.

Low surface energy: Their smooth, non-stick surface prevents dirt, water, and other corrosive agents from adhering, further reducing the risk of attack.

Exceptional thermal stability: They can withstand high temperatures without degrading, making them suitable for demanding environments.

Dielectric properties: They are excellent electrical insulators, preventing galvanic corrosion caused by stray currents.

Low friction: Ideal for bearings and other wear-resistant applications.

Flame retardancy: Enhance fire safety in critical environments.

Non-stick properties: Facilitate easy cleaning and product release.

Outstanding weatherability and UV resistance: Resist degradation from outdoor exposure to sunlight and harsh weather conditions, making them suitable for outdoor applications within chemical plants.

In the chemical industry like chloralkali plants / caustic chlorine applications, where corrosive substances are omnipresent, key concern areas for corrosion include:

Piping and Storage Tanks: Corrosion in these components can lead to leaks, spills, and environmental contamination, posing safety hazards.

Reaction Vessels and Process Equipment: Corrosion compromises product quality, disrupts production processes, and necessitates costly repairs.

Heat Exchangers and Cooling Systems: Corrosion impairs heat transfer efficiency, increases energy consumption, and accelerates equipment deterioration.

Instrumentation and Control Systems: Corrosion compromises process control and safety, leading to malfunctioning equipment.

Comparison with other polymeric materials

PVC/CPVC: While commonly used, PVC and CPVC can degrade and corrode over time when exposed to chlorine and caustic soda. They also have lower temperature limitations compared to fluoropolymers.

PP/PPH: Polypropylene (PP) and High-Density Polypropylene (PPH) offer good chemical resistance but may not be suitable for high temperatures or highly concentrated chemicals.

MSRL: Metallically Stabilized Rubber Lining (MSRL) can be effective but requires special installation and maintenance procedures. Additionally, MSRL can be susceptible to mechanical wear and tear over time.

Overall, fluoropolymers (PTFE/PFA) offer a compelling combination of properties that make them ideal for various applications in chlor-alkali plants and caustic chlorine production:

Improved equipment longevity: Superior chemical resistance extends the lifespan of pipes, valves, and other equipment, reducing replacement costs and downtime.

Enhanced safety: Fluoropolymer's inherent properties contribute to a safer operating environment by minimizing leaks and potential chemical exposure.

Reduced maintenance: Easy cleaning and low friction properties lead to reduced maintenance requirements and operational costs.

Increased efficiency: High-temperature tolerance and low friction contribute to improved process efficiency and energy savings.

While the initial cost of fluoropolymers may be higher than some traditional materials, their superior performance, durability, and safety benefits often translate to significant cost savings over the long term.

Cost Savings and High ROI for Fluoropolymers vs Metals in Corrosion Resistance

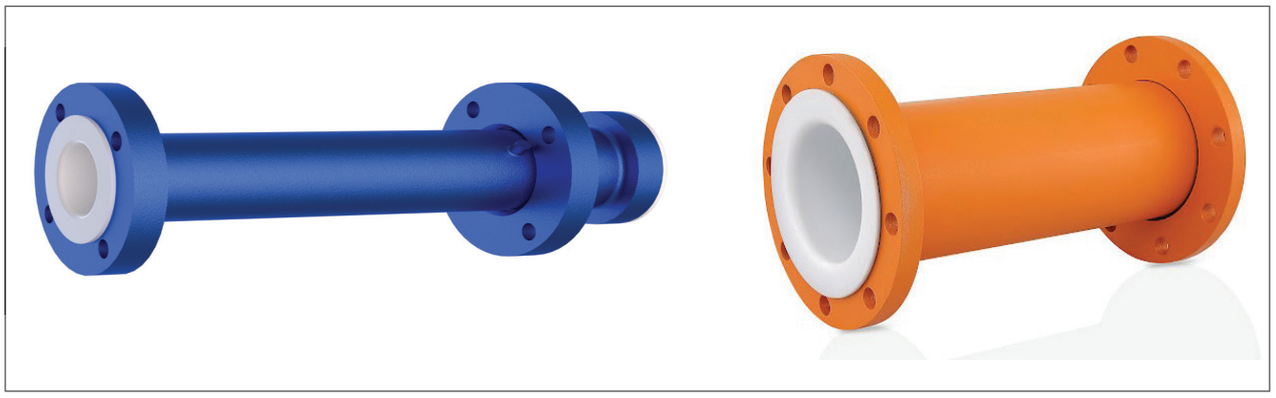
While metals like Nickel, Inconel, Hastelloy, and Titanium offer excellent corrosion resistance, fluoropolymers can be a compelling alternative due to their cost-effectiveness and high Return on Investment (ROI) in specific applications. Here's a breakdown of the key points:

Cost Savings:

- **Lower material cost:** Compared to the high cost of metals, fluoropolymers typically have a lower initial material cost, reducing upfront investment significantly.
- **Reduced fabrication costs:** Fluoropolymers are generally easier to fabricate than reactive metals. This translates to lower fabrication costs, including welding, machining, and forming.
- **Extended equipment life:** The superior chemical resistance of fluoropolymers leads to longer equipment life, reducing the need for frequent replacements and associated costs (e.g., downtime, labor, and materials).
- **Minimal maintenance:** Low friction and non-stick properties of fluoropolymers minimize build-up and simplify cleaning, leading to reduced maintenance costs.

High ROI:

- **Cost savings over time:** While the initial cost of fluoropolymers might be slightly higher than some reactive metals, the combined benefits of lower material cost, fabrication costs, extended equipment life, and minimal maintenance often result in a higher ROI over the life cycle of the equipment.
- **Reduced downtime:** Increased equipment life and minimized maintenance translate to reduced downtime, leading to increased productivity and overall cost savings.



PTFE spool pipe (PTFE as wetted part with anticorrosive external paint to protect the outer surface of the pipe due to environmental corrosion).

Application Areas

Diaphragms in diaphragm cell chlor-alkali plants: These diaphragms separate the anode and cathode compartments, preventing the mixing of chlorine and sodium hydroxide while allowing the passage of sodium ions.

Gaskets and seals: Gaskets and seals are used in various flange connections, pumps, valves, and other equipment to prevent leaks and ensure containment of aggressive chemicals

Pump components: Impellers, diaphragms, and other components of pumps handling corrosive chemicals can be made, PFA lining to ensure long service life and prevent contamination.

Linings for pipes and vessels: Fluoropolymer linings are applied to the inner surfaces of pipes, tanks, and other vessels to protect them from corrosion and chemical attack. PTFE and PFA are commonly used materials for linings due to their exceptional chemical resistance and broad temperature range.

Benefits for Society

Environmental Protection: Fluoropolymers play a vital role in preventing environmental damage caused by leaks and spills of hazardous chemicals. Their robust barrier properties ensure containment, minimizing soil and water contamination.

Public Health Improvement: By reducing the risk of chemical accidents and exposure, fluoropolymers contribute to improved public health and safety. This is particularly significant in communities located near chemical plants.

Conclusion

Fluoropolymers are not just materials; they are guardians, protecting the chemical industry from corrosion's perils and safeguarding society from its detrimental consequences. Their impact extends far beyond the realm of chemical production, contributing to environmental protection, public health, and technological advancements. As research and development continue, fluoropolymers promise even more robust solutions, further strengthening our defenses against the relentless threat of corrosion. ■

Authors

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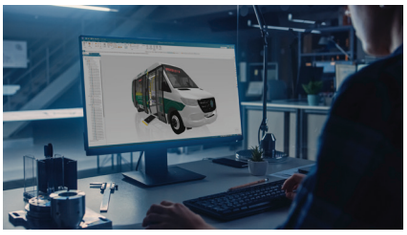
Malema launches new Industrial Flow Meter

Malema, part of PSG, a global pump, metering and dispensing-solution expert and an operating company within Dover Corporation, has launched the new Malema CIFM-88 Series DuraMassFlow PFA Coriolis Industrial Flow Meter.

The latest CIFM-88 Series addresses a critical need in the chemical and process industries by providing enhanced accuracy, reliability and durability when handling aggressive chemistries. The CIFM-88 Series features a patented design that leverages the Coriolis principle. By reducing maintenance costs and minimizing downtime, the CIFM-88 Series significantly improves operational efficiency and safety for operators measuring corrosive substances such as acids and alkalis.

The CIFM-88 Series is designed with sensors that simultaneously measure mass flow, density and temperature with exceptional accuracy of ±1 per cent, even with gas volumetric void fractions up to 30 per cent. Its robust stainless-steel enclosure ensures reliable long-term performance in harsh industrial environments. At the same time, the PFA-wetted materials provide durability against corrosive chemicals, eliminating the need for Coriolis flow meters constructed of costly exotic metals. The built-in LCD panel offers real-time data on flow rate, totalized flow, temperature and density. ■

Siemens introduces Solid Edge 2025 and Solid Edge X



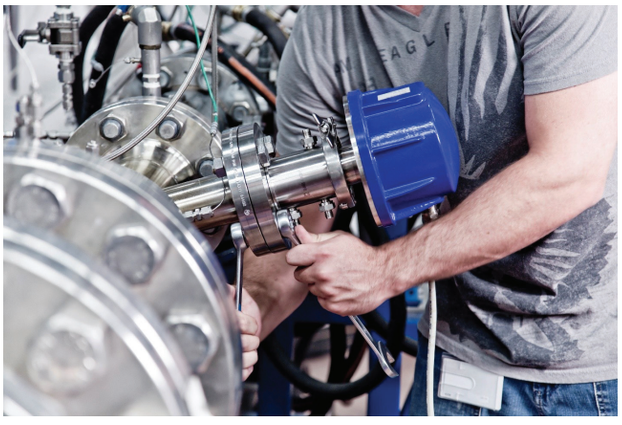
Siemens Digital Industries Software has announced the 2025 release of Solid Edge® software. The latest release also introduces Solid Edge® X software, delivering Solid Edge in a cloud-enabled secure Software as a Service (SaaS) environment, enhanced with new AI-enabled tools to help users work smarter. Solid Edge 2025 includes a range of enhancements to increase modeling speed, improved etch and bend features for sheet metal design, and simplified Model Based Definition (MBD) creation. Solid Edge X delivers the power of Solid Edge software in a secure SaaS environment, offering the easy-to-use features of Solid Edge in a flexible, accessible experience. Solid Edge X helps reduce IT complexity and costs, with automatic updates and secure access from any device. ■

Teledyne GFD brings in GDCloud

Teledyne Gas & Flame Detection (GFD) has launched its new and proprietary Teledyne GDCloud™ available with the company's GS700, GS500 and Shipsurveyor portable gas leak detectors, as well as its PS200 portable four-gas monitor for personal safety and confined space applications. The integration of cloud connectivity significantly enhances the gas leak detection process by visualising all instrument data and turning it into actionable business insights. Teledyne GDCloud™ is a comprehensive cloud solution that elevates gas detection measurement by recording hazardous events, ensuring regulatory adherence, and streamlining safety programmes. ■

Choosing Your Next Gas Analyzer in 10 Steps

Selecting a gas analyzer is a complex yet crucial decision that can significantly impact your operations. Whether you are replacing an existing analyzer or choosing one for a new installation, there are numerous factors to consider. This process involves various stakeholders, advances in technology, and the balance of costs and operational efficiency. This article presents a comprehensive 10-step approach to help you make an informed decision.



Step 1: Perform a 360° Assessment of All Requirements

Gas analyzers play a vital role in safety, quality, and regulatory compliance. Given their long lifespan, gathering requirements from key stakeholders is essential. Involve:

- Maintenance teams
- Electrical and Instrumentation (E&I) technicians
- Process engineers
- Quality Assurance (QA)
- Environment, Health and Safety (EHS) officers
- Plant management

Document all requirements to establish a common understanding of selection criteria. Develop a rating system to capture the importance of each criterion, and include a root cause analysis of any issues with the current analyzer.

Step 2: Research Available Technologies and Assess Their Pros and Cons

With multiple gas analyzer technologies available, it is crucial to assess their pros and cons. Create a technology overview summarizing specifications, requirements, and a pros/cons list for each technology. Consider traditional methods like paramagnetic and zirconium oxide, as well as innovative technologies such as Tunable Diode Lasers (TDLs) and Quantum Cascade Lasers (QCLs). Stay informed about emerging technologies that might address your needs more effectively.

Step 3: Engage Potential Vendors to Assess Total Lifetime Costs

Once you have an understanding of the technologies, engage vendors neutrally. Frame your needs broadly, e.g., "we need a new oxygen analyzer for LEL monitoring," to ensure a focus on solutions rather than specific technologies. Gather information on maintenance intervals, ancillary equipment costs, calibration time, and serviceability. Be sure to collect budgetary pricing, as the selection based solely on upfront costs can lead to significant hidden lifetime expenses.

Step 4: Assess Each Measuring Point for Specific Technological Requirements

No two applications are identical. Conduct a thorough evaluation of each measuring point, considering factors like process gas composition, external influences (e.g., piping bends, direct sunlight), and the validity of the data provided in the Process Data Sheet (PDS).

This comprehensive understanding will guide you in narrowing your options later.

Step 5: In Situ vs. Extractive Measurement

Decide whether to use in situ or extractive measurement. In situ measurement minimizes complications related to sampling systems, ensuring greater accuracy and fewer maintenance issues. Given that 70–80 per cent of analyzer maintenance issues stem from sampling and conditioning systems, prioritizing in situ methods where applicable is advisable.

Step 6: Get Quotes from Vendors and Summarize in a Spreadsheet

Now, it is time to collect quotes from your shortlisted vendors. Share your process data and measurement point specifics, allowing vendors to suggest optimal solutions. Ensure that all costs — acquisition, installation, commissioning, and ongoing maintenance — are itemized for easy comparison. Consider any additional equipment needed for extractive measurements.

Step 7: Narrow Down Your Options and Build Your Technology Case

Limit your options to three analyzers for effective internal discussion. Use the weighted requirements list from Step 1 to align with vendor responses. Prepare to address stakeholder concerns, particularly if you propose new technologies. Building a compelling case, including a Return on Investment (ROI) calculation, will aid in securing buy-in from stakeholders.

Step 8: List Questions for Suppliers and Resolve Concerns

Prepare a list of questions to clarify any uncertainties with your selected suppliers. Address their ability to meet your long-term needs and encourage them to refine their arguments for each solution. This comprehensive research will equip you for the stakeholder review meeting.

Step 9: Summarize Total Project Costs

Before making your final recommendation, ensure you understand all potential costs associated with installation and commissioning. This includes potential modifications to piping, electrical connections, calibration gases, and ancillary equipment. Being fully transparent about costs will facilitate a sound decision.

Step 10: Hold Stakeholder Review Meeting

Communicate your recommendations to stakeholders through an in-person or online meeting. Active dialogue will enable you to address biases and concerns effectively. After presenting your case, engage with your suppliers to provide feedback based on the outcomes of the meeting. This will contribute to a comprehensive vendor assessment, ensuring that your final decision is well-informed and collaborative.

By following these ten steps, you can navigate the complexities of selecting a new or replacement gas analyzer with confidence. This structured approach ensures that all stakeholder needs are met, operational efficiency is enhanced, and compliance with environmental regulations is maintained, ultimately leading to better decision-making in your organization.

About METTLER TOLEDO

METTLER TOLEDO is a leading global manufacturer of precision instruments. The company is the world's largest manufacturer and marketer of weighing instruments for use in laboratory, industrial and food retailing applications. The company also holds top-three market positions for several related analytical instruments and is a leading provider of automated chemistry systems used in drug and chemical compound discovery and development. In addition, the company is the world's largest manufacturer and marketer of metal detection systems used in production and packaging. Additional information about METTLER TOLEDO is available at www.mt.com. ■

For more information
Visit: https://www.mt.com/us/en/home/products/Process-Analytics/gas-analyzer.html
Email us at – sales.sales@mt.com
Call us toll-free at – 1800 22 8884 & 1800 1028 460

National

Chemtech World Expo 2026

Date: 3-6 February 2026
Venue: Bombay Exhibition Centre, Goregaon (E), Mumbai, India

Details: World meet of the chemicals, petrochemicals, biopharma and process industry in India

Organiser: Jasubhai Media Pvt Ltd
Contact: 022 - 4037 3636
Email: sales@jasubhai.com
Website: www.chemtech-online.com

Oil Gas & Power World Expo 2025

Date: 5-7 March 2025
Venue: Bombay Exhibition Centre, Goregaon (E), Mumbai, India

Details: The 13th edition of 'International Integrated Energy Show' will bring together the stakeholders of energy ecosystem from the up-mid and downstream of hydrocarbon industry, alternate and new energies, power generation, transmission and distribution and allied sectors.

Organiser: Jasubhai Media Pvt Ltd
Contact: 022 - 4037 3636
Email: sales@jasubhai.com
Website: www.chemtech-online.com

Water & Waste Expo 2025

Date: 20-22 February 2025
Venue: Pragati Maidan, New Delhi, India

Details: Leading fair for water, sewage, waste and recycling

Organiser: CII
Contact: 011 - 4577 1000
Email: info@cii.in
Website: www.cii.in

WAPTAG Water Expo 2025

Date: 26 Feb – 1 Mar 2025
Venue: Mahatma Mandir, Gandhinagar, Gujarat, India

Details: The expo aims to foster discussions, collaborations, and advancements in water management, conservation, and technology.

Organiser: WAPTAG
Contact: 99741 52935 / 99741 52936
Email: waptaggujarat@gmail.com
Website: www.waptag.org

Automation Expo South 2025

Date: 20-22 March 2025
Venue: Chennai Trade Centre, Hall 2 & 3, Chennai, India

Details: 2nd Edition of South Asia's Automation Expo

Organiser: IED Communications Ltd
Contact: 022 - 2207 9567
Email: sales@industrialautomationindia.in
Website: www.industrialautomationindia.in

International

World Future Energy Summit

Date: 14-16 January 2025
Venue: Abu Dhabi National Exhibition Center, Abu Dhabi, UAE

Details: Leading business event for renewable energy and sustainability

Organiser: Masdar
Contact: +971 2 653 3333
Website: www.abudhabisustainabilityweek.com

JEC World 2025

Date: 4-6 March 2025
Venue: Paris-Nord Villepinte

Details: JEC World is the global trade show for composite materials and their applications.

Organiser: JEC
Email: hotline@jeccomposites.com
Website: www.indiachem.ficci.in

EWWM 2025

Date: 17-18 June 2025
Venue: Telford International Centre, Telford, UK

Details: The European Wastewater Management (EWWM) conference provides an essential annual update on the latest innovations, best practice, cutting-edge technology and research in the wastewater sector.

Organiser: AquaEnviro
Contact: 07771618209
Email: sarah.brown@aquaenviro.co.uk
Website: www.ewwmconference.com

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ChemTECH WORLD EXPO 2026

SPECIALTY ChemiCAL WORLD EXPO 2026

Bio Pharma World Expo 2026

32nd International Exhibition and Conferences

3-6 February 2026

Venue: Bombay Exhibition Center, Goregaon (East), Mumbai, India

Concurrent Events

EPC 2026 | Specialty ChemiCAL | Refining & Petro Chemicals 2026 | Bio Pharma | Industry Automation & Control 2026 | PVF | WaterEX WORLD EXPO 2026 | Surface Engineering Coating & Corrosion WORLD EXPO 2026 | Chlor-Alkali World Expo & Conferences 2026

Scope for ChemTECH World Expo 2026

- Plant Machinery & Industrial Consumables
- Engineering Consultants
- OEMs for Chemicals & Pharmaceutical Processing Equipment
- Metals & Metallurgy
- Bioprocessing Equipment
- Construction Services Providers
- Plant Maintenance Services Providers
- Logistics & Supply Chain Solutions Providers
- Instrumentation & Process Control
- Industry Automation (Process & Factory)
- Systems Integration & ERP Solutions Providers
- Water & Waste Water Treatment Consultants
- Environment Solutions Providers
- Waste Management Consultants
- Financial Institutions
- Fire & Safety Solutions Providers
- Material Handling Solutions
- Certification Bodies
- Welding Solutions
- Quality Health & Environment Solutions
- Analytical & Laboratory
- Packaging Materials, Machinery & Systems
- Business Consultants

Scope for Specialty Chemicals World Expo 2026

- Agrochemicals Intermediates
- Adhesives & Sealants
- Agrochemicals & Crop Protection
- Bulk Drugs & Intermediates
- Enzymes
- Colorants, Dyes & Pigments
- Cosmetics & Personal Care Ingredients
- Hygiene & Cleaning Chemicals
- Laboratory Chemicals
- Surfactants
- Water Treatment Chemicals
- Catalysts
- Electronic Chemicals
- Flavours & Fragrances
- Contract Manufacturers

Scope for Biopharma World Expo 2026

- Materials Processing
- Pharma Machinery
- Pharma Ingredients
- Plant Engineering, Process Plants & Equipment
- Laboratory & Analytical Solutions
- Process Measurement & Inspection
- Sterilization & Clean Room Solutions
- Biopharma R&D And Manufacturing
- IT Solutions
- Water & Waste Treatment Solutions

FACT & FIGURES 2024

- 750 EXHIBITORS FROM 15+ COUNTRIES
- 25871 VISITORS FROM 53 COUNTRIES
- SCALE@CHEMTECH World Expo 2024: 60+ GLOBAL CLIMATE TECH STARTUPS FROM 20 COUNTRIES; 40 TECHNICAL PRESENTATIONS
- 8 TECHNICAL CONFERENCES
- 1500+ BUSINESS DELEGATES
- 250+ GLOBAL SPEAKERS
- BRICS WORKING GROUP BRAIN STORMING SESSION
- 2500+ ENGINEERING PHARMA & SCIENCE STUDENTS AT STUDENT OUTREACH PROGRAM FROM 28 STATES & UNION TERRITORIES

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