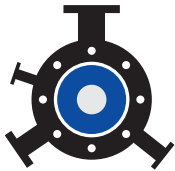


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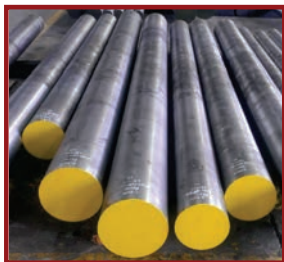


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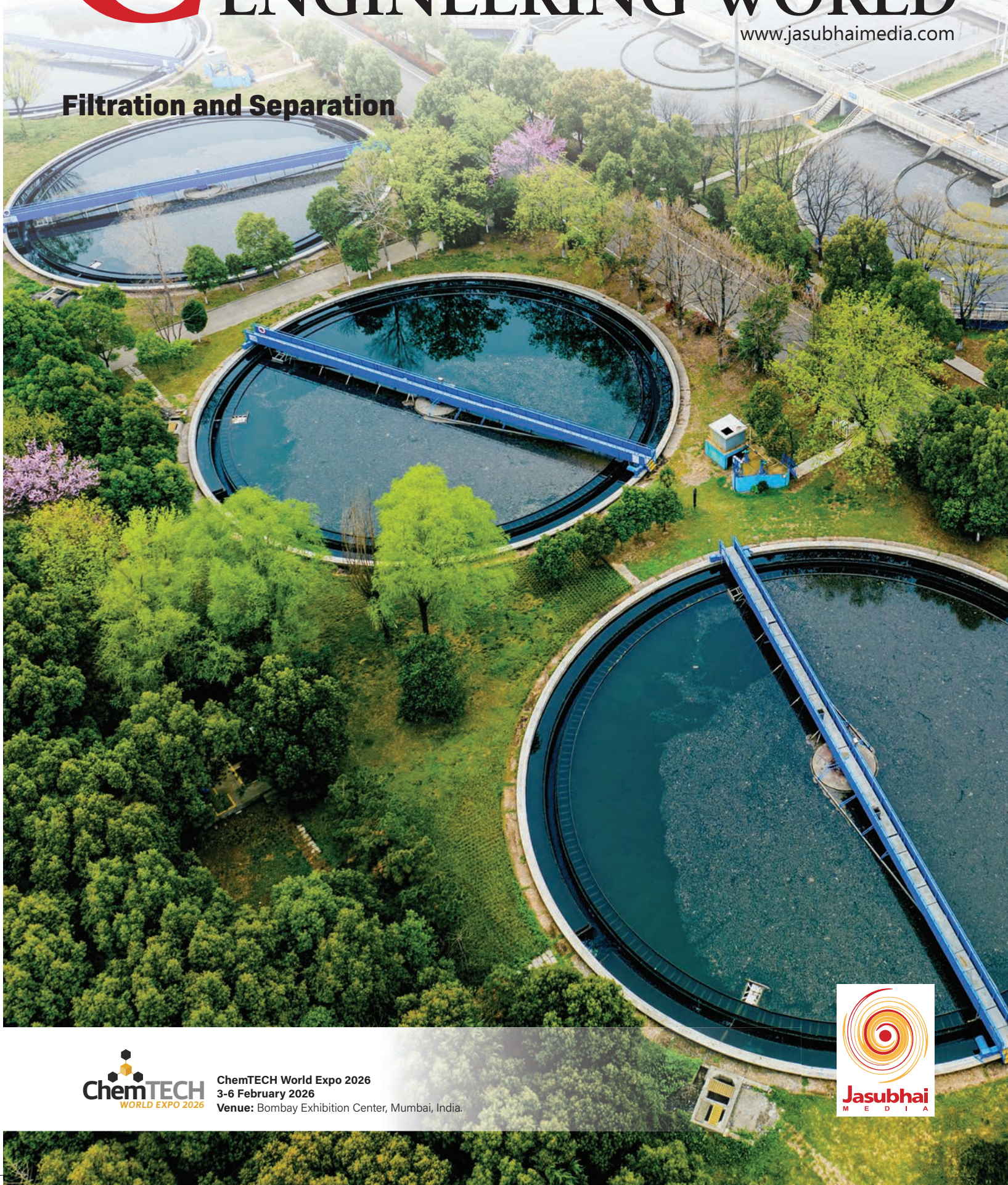
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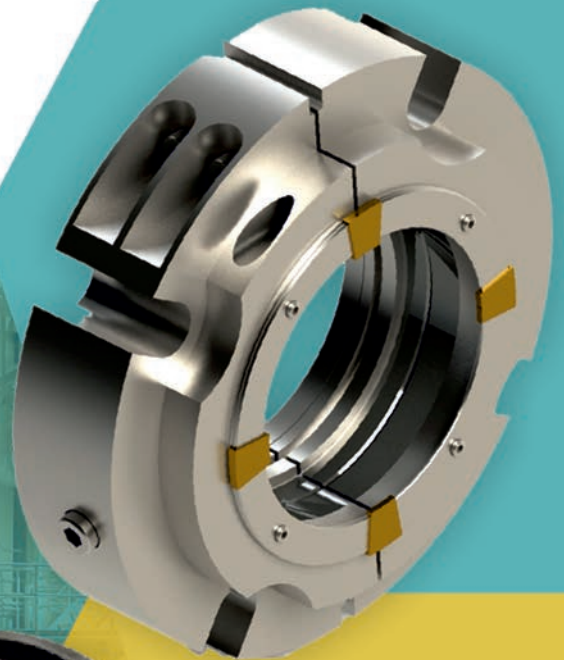


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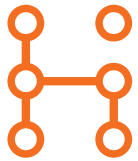
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ACE posts highest ever sales and profits, total income up by 14.6% YoY

Mumbai, India: Action Construction Equipment Limited has recorded its highest ever sales and profits with total income up by 14.6 per cent YoY with expanded margins. EBITDA increased by 26.2 per cent YoY to ₹606 crores, margins expanded by 162 Bps to 17.68 per cent. PAT increased by 24.7 per cent YoY to ₹409 crores, margins expanded by 97 Bps to 11.94 per cent. Margin expansion was driven by operating leverage, a better product mix and efficient cost control measures. Cranes, Material Handling and Construction equipment volumes grew by 14.75 per cent YoY, revenue grew by 15.70 per cent YoY.

“We have strengthened our role as a market leader in Indian Crane industry and with our consistent efforts; on a standalone basis, we have scaled our Cranes, Material Handling and Construction Equipment business to over ₹3,090 crores in the fiscal gone by and this segment has registered a growth of 15.55 per cent. The growth was both in value and volume terms. Our numbers for cranes, material handling and construction equipment have increased by 14.75 per cent from 11,643 in FY24 to 13,360 in FY25. In this segment, we have been able to grow our profits by 35.36 per cent to ₹564 crores with a margin expansion of 18.26 per cent v/s 15.58 per cent for the last year. The Agri division registered revenue of around ₹230 crores with the margins at 3.73 per cent.

Further, in the quarter gone by, the company was awarded company's single largest order till date to

deliver 1,121 rough terrain fork lift trucks (Telehandlers) with attachments and accompanied accessories at a total value of ₹420 crores to the Indian armed forces.

Fertilizer policy favours foreign players, say grassroots associations

New Delhi, India: The Fertilizer Control Order (FCO) was established under the Essential Commodities Act, 1955 (Act No. 10 of 1955), as a regulatory framework aimed at ensuring the quality of fertilizers and monitoring their movement, particularly for the effective distribution of subsidies. It played a crucial role during a period when India had limited domestic fertilizer production capacity and was heavily reliant on imports. Over the years, the FCO significantly contributed to regulating the fertilizer sector and facilitating fertilizer movement control to meet national agricultural demands.

Over the years, the concurrent nature of the Fertilizer Control Order—governed by both central and state authorities—has led to numerous amendments. However, it has struggled to keep pace with evolving domestic needs and global developments. Gradually, the framework has come to be seen as a relic of the legacy “Inspector Raj”, “License Raj”, often proving counterproductive to the sector's growth and efficiency.

Although these restrictive policies apply to all non-subsidized fertilizers, soluble fertilizers stand out as a prime example. Unlike sectors such as electronics, pharma and defence, where the central government's “Import Substitution” and “Make in India” initiatives have gained significant traction, the fertilizer sector—

FAI Board elects Sailesh C Mehta as new Chairman



The Fertiliser Association of India (FAI) has appointed Sailesh C Mehta as the new Chairman. Sailesh Chimanlal Mehta is the Chairman and Managing Director of Deepak Fertilisers and Petrochemicals Corporation Limited (DFPCL), one of India's leading manufacturers of fertilisers and industrial chemicals. With over three decades of association with the company, Mehta has been instrumental in transforming DFPCL into a diversified, multi-product conglomerate with operations across fertilisers, mining chemicals, and industrial chemicals. The company operates in Maharashtra, Gujarat, Andhra Pradesh, and Haryana. Mr. Mehta began his journey at DFPCL as Managing Director in 2002, later becoming Vice Chairman in 2005, and Chairman in October 2012. Under his visionary leadership, the company has achieved significant milestones in business growth, operational excellence, and strategic diversification. He restructured DFPCL's Crop Nutrition Business into a wholly owned subsidiary - Mahadhan AgriTech Limited (MAL).



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particularly soluble fertilizers—has seen little progress. Soluble fertilizers are critical to the growth of horticulture, and achieving self-reliance in this segment is essential. However, grassroots innovation in manufacturing these vital compounds continues to struggle due to a lack of market access, constrained by the outdated and rigid provisions of the Fertilizer Control Order (FCO). The high cost of setting up offices, warehouses, and securing licenses in each state—combined with the need for market partners to duplicate these efforts—erodes any competitive edge Indian manufacturers might have. In contrast, Chinese manufacturers face virtually no such regulatory obligations when supplying to the Indian market. This disparity creates an uneven playing field, fundamentally undermining the spirit and objectives of the “Make in India” initiative.

Jayantibhai Kumbhani, President, CAIP (Chamber For Agri Input Protection, Ahmedabad), highlights the disproportionate regulatory burden under the Fertilizer Control Order (FCO), noting that no other industry, including pharmaceuticals, faces such an intense level of inspector oversight. In some cases, a single district can have many inspectors monitoring one fertilizer unit, creating undue pressure on Indian entrepreneurs. He emphasizes the urgent need for FCO reforms to foster self-reliance in the non-subsidized fertilizer sector, which holds the potential to reduce overall subsidy burdens and advance the goals of Atmanirbhar Bharat. This view is echoed by Vijay Thakur, President, grassroots agri-entrepreneur association OAMA, Maharashtra who shares similar concerns and advocates for urgent policy intervention.

“A practical path forward includes implementing “One Nation, One License,” ensuring parity with foreign manufacturers by allowing marketers to add sourcing in one state and market across all operational states for Indian sources, capping inspector numbers to two per unit, and ultimately enacting a new law for non-subsidized fertilizers outside the Essential Commodities Act to realise the vision of Atmanirbhar Bharat,” adds Vinod Goyal, National Secretary, SFIA.

Ajax Engineering revenue grows by 19% to cross ₹2,000 cr

Bengaluru, India: Ajax Engineering has recorded ₹2,074 crores revenue from operations, up 19% YoY for FY25. The EBITDA stood at ₹318 crores, up 15.5 per cent YoY. The Profit After Tax (PAT) is ₹260 crores, up 15.5 per cent YoY. For Q4FY25, the revenue stands at ₹756 crores, up 15 per cent YoY; EBITDA is ₹111 crores, up 1.5 per cent YoY and PAT - ₹91 crores, up 3 per cent YoY.

Mr. Shubhabrata Saha, Managing Director & CEO, Ajax Engineering Limited, said, “FY25 has been a year of resilience and strategic progress. Despite external challenges, including the regulatory shift from CEV-4 to CEV-5 emission norms and slower infrastructure execution, we delivered robust growth, crossed the ₹2,000 crore revenue milestone, and maintained profitability. Our leadership in the Self-Loading Concrete Mixer (SLCM) segment remains strong, with a 75 per cent market share, while our non-SLCM and Spares businesses continue to gain momentum.”

Ohmium International appoints new CEO



Ohmium International, a leading manufacturer of advanced PEM hydrogen electrolyzers, has appointed Dr. Markus Tacke as its new CEO, effective July 1, 2025. With over 22 years of experience at Siemens and a proven track record in the renewable energy sector, Dr. Tacke will drive Ohmium’s global expansion and commercialization of its next-generation green hydrogen solutions.

Dr. Tacke has a history of growing companies in energy, infrastructure, manufacturing, and technology. His focus on customer centricity, operational efficiency, and strategic acquisitions has consistently driven growth and value. As CEO of Oerlikon Surface Solutions AG, he achieved 8 per cent annual growth and turned the company from break-even to 9 per cent profitability through regional integration and new business exploration. At Siemens Gamesa Renewable Energy, he streamlined product lines, launched advanced platforms, and initiated a €2.5 billion cost savings program, stabilizing the wind business and launching a high-impact growth strategy.

"We are also excited about the upcoming launch of our Adinarayanahosahalli plant in H2 FY26, which will add further capacity and product flexibility," he added.

Mr. Tuhin Basu, Chief Financial Officer, Ajax Engineering Limited, added, "We have delivered a healthy performance in Q4 and FY25 with revenue growth across several key business areas – our SLCM and non-SLCM segments grew at 18 per cent YoY; the Spare Parts and Service revenue rose 33 per cent YoY and revenue from exports increased 29 per cent YoY. Our EBITDA has grown by 15 per cent YoY."

Henkel leads Mangrove clean up drive on World Environment Day in Navi Mumbai



Volunteers collected and segregated an estimated 5,000 kgs of waste during the cleanup drive along the mangrove belt near TS Chanakya in Navi Mumbai on World Environment Day

Navi Mumbai, India: In commemoration of World Environment Day, on June 5, 2025, Henkel India partnered with the Navi Mumbai Municipal Corporation (NMMC), and organized a cleanup drive along the mangrove belt near TS Chanakya in Navi Mumbai. Aligned with this year's theme, "Our land. Our future. We are #GenerationRestoration," the initiative mobilized

nearly 100 volunteers, including Henkel employees, NMMC staff, and students from various colleges, to combat plastic pollution in one of the city's most critical and biodiverse coastal ecosystems.

"The cleanup drive reflects Henkel's long-standing commitment to sustainability, protecting and regenerating the natural environment, and community-led action. We deeply appreciate the unwavering support of the Navi Mumbai Municipal Corporation and the enthusiastic participation of all volunteers, whose collective efforts made this initiative truly impactful and inspiring. Consistent, local action like this is essential to driving meaningful, long-term change," said Mr. S. Sunil Kumar, Country President, Henkel - India.

The mangroves of Navi Mumbai serve as the city's natural lungs and shields. They filter pollutants, absorb carbon dioxide, and protect inland areas from storm surges and flooding. They also serve as biodiversity hotspots for migratory birds such as flamingos and kingfishers, which have become indicators of the region's ecological health. Plastic and non-biodegradable waste has been steadily suffocating this ecosystem. Volunteers collected and segregated an estimated 5,000 kgs of waste, helping protect a natural barrier against coastal erosion and climate impacts.

Venator hits key waste reduction target six years ahead of schedule

Wynyard, UK: Venator, a global leader in specialty chemicals and ingredients, has hit a key sustainability target six years earlier than planned, reducing its

Al-Daajani appointed Executive Vice President - Petrochemicals at Tasnee



As part of Tasnee's continued efforts to develop national talent and strengthen executive leadership across its strategic sectors, and in alignment with its goal of promoting leadership from within, the company has promoted Eng. Yasser Al-Daajani to Executive Vice President - Petrochemicals, effective June 1, 2025.

Eng. Al-Daajani brings extensive experience in the petrochemicals sector, having held several leadership positions at Tasnee where he significantly contributed to operational efficiency and strategic project execution. His leadership has played a pivotal role in boosting the company's competitiveness and market presence. In addition to his role as the EVP Petrochemicals, he also serves as a board and committee member in several industry bodies both locally and regionally.

generation of non-hazardous waste by nearly 100,000 tonnes – a goal it was aiming to reach by 2030. The achievement was announced in Venator's 2024 Sustainability Report, which was published on World Environment Day.

The 2024 Venator Sustainability Report outlines wider achievements across the company over the past year. Underscoring Venator's commitment to environmental stewardship, accountability, and long-term value creation, the report provides transparent metrics aligned with global frameworks, such as the GRI – highlighting reductions in greenhouse gas emissions and water consumption as well as enhanced circular economy initiatives.

Operational changes and co-product utilization were pivotal to Venator hitting its non-hazardous waste target early, with efforts made across the business to recover, reuse, and recycle by-products wherever possible. For example, the business achieved 100 per cent beneficial use of non-hazardous waste and co-products at its Huelva, Spain and Uerdingen, Germany sites. In 2024, the business also sold or reused 98 per cent of copperas by-product produced through its PIP plant at Teluk Kalong, Malaysia.

Other achievements, enabled by operational efficiencies and site transition activities, included a lower overall waste intensity metric from 0.54 to 0.47 tonnes of waste by tonne of product, a 12.1 per cent reduction in scope 1 and 2 greenhouse gas emissions, a continued reduction in nitrogen oxide (NOx) and sulfur oxide (SOx) emissions, a 21 per cent reduction in total absolute water consumption and a 23.5 per cent decrease in water withdrawal.

In 2024, Venator also set out a staged approach to decarbonizing its sites, beginning with its Greatham, UK facility. The business has recently completed a study on the infrastructure required to utilize hydrogen gas as a replacement for natural gas on-site. If it were to be implemented, this investment would make Greatham one of, if not the, lowest carbon footprint manufacturing plants in the titanium dioxide industry.

Bryan Snell, President and Chief Executive Officer of Venator, said, "Throughout 2024, we laid a solid foundation for driving performance across our sustainability strategy – enhancing our data capture and reporting processes as we move towards a more stable and resilient future. In this transitional year, we also

achieved several significant milestones that underscore our commitment to continuous improvement and innovation. Our latest Sustainability Report shows the progress we are making against our 2030 targets and the work we are undertaking to create lasting value for our organization and our stakeholders. Thank you to everyone that is on this journey with us."

Nouryon honored with Responsible Care® awards from the American Chemistry Council

Amsterdam, Netherlands: Nouryon, a global specialty chemicals leader, has been recognized by the American Chemistry Council (ACC) with multiple prestigious Responsible Care® awards. These accolades highlight the company's commitment to safety, leadership, and excellence in the chemical industry. In addition to several site awards, Nouryon employee Paul Phillips was honored with the ACC Member Company Responsible Care Employee of the Year Award.

Paul Phillips, Regional Process Safety Management (PSM) Manager for the Americas at Nouryon, was recognized by the ACC for his efforts in contributing to improved Process Safety performance and enhanced technical safety competencies across the region. His dedication to developing efficient methodologies and fostering collaborative industry efforts has been instrumental in advancing safety standards. This esteemed accolade is given to only one member company employee annually and celebrates Paul's contributions to the ACC Process Safety Committee and outstanding leadership in the Responsible Care® program.

In addition to Paul's individual recognition, several Nouryon facilities in the US have been awarded ACC Facility Safety Awards for their exceptional safety performance in 2024.

LANXESS starts fiscal year 2025 with significant earnings increase

Mumbai, India: Specialty chemicals company LANXESS has started the 2025 fiscal year with a significant increase in earnings: EBITDA pre exceptionals rose by 31.7 per cent from EUR 101 million to EUR 133 million – despite the weak global economic environment. The

Group improved its earnings in all segments, mainly due to better capacity utilization and cost savings as part of the 'FORWARD!' action plan.

Sales in the first quarter remained stable at EUR 1.601 billion, on a par with the prior-year figure of EUR 1.607 billion. LANXESS increased sales volumes in most businesses, although lower sales prices had a negative impact on revenues.

"We have made a solid start to the new fiscal year – despite all the adversities in the economic and geopolitical environment. Our more efficient positioning and improved cost situation are now paying off," said Matthias Zachert, Chairman of the Board of Management of LANXESS AG. "The situation around us has continued to escalate since the beginning of the year. The U.S. government's new trade policy has shaken the markets and exacerbated the already high level of uncertainty. Combined with the ongoing weakness of the economy, this makes the situation even more challenging for companies."

Net income for the first quarter of 2025 was minus EUR 57 million, compared with minus EUR 98 million in the same period last year. LANXESS confirmed its guidance for the 2025 fiscal year and is expecting EBITDA pre exceptionals of between EUR 600 and 650 million.

For the second quarter of the fiscal year 2025, LANXESS anticipates an increase in earnings compared with the first quarter of 2025. However, compared with the same quarter of the previous year, the Group expects earnings to decline, primarily because the earnings contribution from Urethane Systems will no longer be included. ■

Letters to Editor



"This Journal is a 'Model for Unification of Responsible Technocrats Internationally', acronym being 'MURTI'. Its 'COVER PAGE' has always been contemporary and is a true reflection of changing times, topical relevance to the global issues. 'PRODUCTS' section stands out as per me, as it deals with AS-ON-DATE Systems/Tools/Devices/Components which are just launched in the global arena by precision engineering manufacturing companies. 'IMPACT FEATURES' stands out for the right methods to be adopted for handling fragile/porous components during their surface treatment to achieve desired level of finish.

'FEATURES' Section opens the flood-gates for 1:1 corroboration with my co-professionals in the field of materials selection to suit specific applications, e.g. corrosion resistance and the like. 'GUEST COLUMN' too is to be taken for serious reading considering that it invariably throws light on our NETZERO CARBON Mission of 2023 by our Centre, of which I am a stakeholder."

Nandkumar Kakade

Research Scholar
MIT-ADT UNIVERSITY, Pune

"I appreciate the insights and effort that go into curating such informative content. Looking forward to staying updated with your publications!"

Divya Jhavar

Account Executive - PR and Digital Outreach
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Shivtek Spechemi Industries to set up new chemical manufacturing unit in Hazira



Manufacturing unit of Shivtek Spechemi Industries Ltd at Dahej

Gurugram, Haryana: Leading specialty chemicals manufacturer, Shivtek Spechemi Industries Ltd, a flagship company of the Shiva Group of Industries, has finalized a new manufacturing facility near Hazira, spread across 1M+ square feet. The new facility, to be operational from 2027, will add to the production capacity of 2,50,000 MTPA by 2027-28 and offers cost-effective logistics and seamless connectivity to both domestic and international markets. The new Hazira plant will pioneer the production of oil additives, Proteogenic to Aprotic solvents, and specialty petrochemicals.

The location offers easy access to major ports including Hazira, Dahej, Kandla, and Mundra, ensuring seamless connectivity for both imports and exports. Its proximity to the dedicated freight corridor further enhances the efficient and cost-effective movement of raw materials and finished goods. Additionally, being just 70 kilometers from the Dahej plant significantly reduces logistics costs, making it a strategic advantage for streamlined supply chain operations.

The expansion is further supported by a 5000 KL storage facility and a dedicated warehousing space of 1,50,000 square feet for export orders and products from the Dahej plant.

Dr. Amitt Nenwani, Managing Director, Shivtek Spechemi Industries Ltd, said, "Investment in Hazira aligns with the company's long-term vision of sustainable innovation in the specialty chemicals sector. The upcoming plant represents a significant strategic expansion for Shivtek, driven by clear logistical, industrial, and market-oriented considerations. By expanding our manufacturing capacities, we are not only investing in our future,

but also reinforce our commitment to environmental responsibility, technological advancement, and market leadership."

Balrampur Chini Mills launches 'Balrampur Bioyug', India's first PLA biopolymer brand

Mumbai, India: The Hon'ble Chief Minister of Maharashtra Shri Devendra Fadnavis formally launched India's first Poly Lactic acid (PLA) brand 'Balrampur Bioyug', to be produced by Balrampur Chini Mills Limited (BCML). Strategically located adjacent to BCML's existing sugar factory in Kumbhi, Uttar Pradesh, the upcoming PLA plant will involve a gross investment of ₹2,850 crores. This plant is going to be India's first industrial scale biopolymer plant C and will be powered by 100 per cent renewable energy for its entire production process. It will also be the first plant location where sugarcane is transformed into PLA in a single, integrated site.

"With an investment of ₹2,850 crores over a period of around 2.5 years, this project is aimed to fuel India's journey towards achieving net zero emissions by 2070. PLA is a bio-based, compostable material that emits c8 per cent less CO₂ over its lifecycle compared to fossil-based plastics, offering an environmentally friendly alternative for a sustainable planet. With Balrampur Bioyug, we're not just launching a brand, we're pioneering a revolution in sustainable materials," said Vivek Saraogi, Chairman & Managing Director, Balrampur Chini Mills Limited.

Ms. Avantika Saraogi, Executive Director, Balrampur Chini Mills Limited said, "By embarking upon this business diversification with a fully integrated facility we will be able to redefine standards in India's sustainable economic landscape and look forward to an eco-conscious future."

Huayou Group awards tailings filtration equipment order to Metso

Espoo, Finland: Metso has been awarded a repeat order to deliver sustainable tailings filtration technology for the Huayou Group's laterite nickel mine project in Indonesia. Metso's delivery consists of the engineering, manufacturing and supply of 16 Larox® FFP3512 filters, as well as advisory services and spare parts for installation and commissioning. The fully automatic, fast-opening

filter press (FFP) is part of the Metso Plus offering. The filter combines the benefits of membrane technology and sidebar design with high mechanical and process performance, providing safe and sustainable high-volume dewatering of tailings with low operating and life cycle costs.

Metso has signed several cooperation agreements with Huayou Group to provide comprehensive minerals processing solutions for its projects in Indonesia, including SAG mills, ball mills, as well as Larox® filters and thickening equipment of various specifications.

In another major development, Metso celebrated the success of its Services Certification program, a structured training initiative designed to refine the skills and expertise of Metso Field Services and Technical Support experts, among others. Through this program, launched in 2021, Metso can officially validate and standardize the work of Metso service experts globally, ensuring consistent and high-quality support.

The program consists of a range of carefully planned modules targeting specific technologies and designed for employees who perform service activities at customer sites. The program involves a comprehensive curriculum of training courses, hands-on training, and rigorous assessments to validate the knowledge and competency of employees.

"All Certification program courses have technology specific safety elements embedded in them and all certified employees are required to complete Metso's safety courses. We focus on fostering a culture of quality and reliability," said Nichole Pritchard, Director, Training Operations at Metso.

BASF introduces reactive polyethylene glycol Pluriol® A 2400 I in Europe

Ludwigshafen, Germany: With Pluriol® A 2400 I, BASF Industrial Formulators adds a new product to its reactive polyethylene glycol portfolio for polycarboxylate ethers (PCE) in the construction industry in Europe. Pluriol® A 2400 I is an isoprenol-PEG (iPEG) that is used to create third-generation superplasticizers that offer better performance in terms of flow characteristics and durability. In the construction industry IPEGs find diverse applications. In addition to being used as raw material for superplasticizers or flow agents in concrete admixtures, they can also be used as a raw material to produce dispersants for inorganic pigments.

"As the only European supplier, we provide our customers with reliable delivery and raw material independence through a backward-integrated manufacturing process for Pluriol® A 2400 I, while simultaneously contributing to the reduction of CO₂ emissions through local sourcing," says Jordi Tormo, Vice President Business Management Industrial Formulators.

ICRISAT, IFFCO & BBSSL sign tripartite agreement for Advancing Seed Innovation



ICRISAT, IFFCO & BBSSL have entered into a tripartite service agreement to establish the Beej Anusandhan Kendra, a state-of-the-art research center in Gujarat, India.

Gujarat, Ahmedabad: The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the Indian Farmers Fertiliser Cooperative Limited (IFFCO), and Bhartiya Beej Sahkari Samiti Limited (BBSSL) have entered into a tripartite service agreement to establish the Beej Anusandhan Kendra, a state-of-the-art research center in Gujarat, India, focused on advancing seed innovation and sustainable agriculture.

Under this agreement, ICRISAT has been appointed as the Knowledge Partner responsible for developing the Detailed Project Report (DPR) for the center. This collaboration harnesses ICRISAT's global research expertise, IFFCO's cooperative leadership, and BBSSL's commitment to seed quality and sustainability, creating a strong foundation for impactful agricultural advancement.

The Beej Anusandhan Kendra (BAK), proposed to be built by IFFCO and operated by BBSSL, aims to foster sustainable agricultural growth through the integration of world-class seed research and development infrastructure. BBSSL and IFFCO bring deep grassroots reach and cooperative strength, while ICRISAT contributes its international scientific expertise to create a center poised to benefit millions of farmers.

PROJECT UPDATES

AGI Glaspac to partner with Glass Futures to advance global sustainability in glass manufacturing



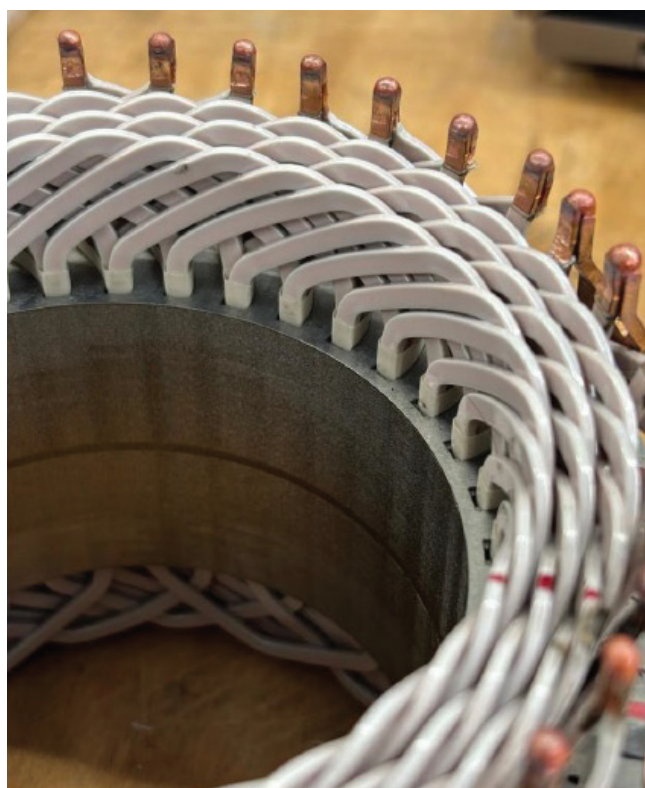
Hyderabad, India: AGI Glaspac, glass packaging company, has announced its partnership with Glass Futures, a global research and technology organization, dedicated to developing sustainable, low-carbon solutions for the glass industry. This landmark collaboration marks a new chapter for Indian glass manufacturing, signalling a shared commitment to industrial decarbonisation. By aligning with global momentum toward net-zero emissions, AGI Glaspac will actively contribute to and benefit from pioneering research in low-carbon glass production, including collaborative trials involving biofuels, hydrogen energy, carbon capture technologies, and circular raw material systems.

'Glass Futures' 30tpd experimental R&D furnace in St Helens, UK, will serve as a scalable testbed for innovation. AGI Glaspac's involvement will help tailor collaborative international innovation for application in India, building a bridge between global sustainability research and local industrial implementation. The collaboration also reflects the broader strengthening of trade and innovation ties between India and the UK. With the recently signed free trade agreement between the two nations expected to boost sectors such as Scotch whisky - a sector where glass packaging is essential- the timing further elevates the strategic value of this alliance.

Commenting on this partnership, Mr. Rajesh Khosla, CEO, AGI Glaspac, said, "Glass is fully recyclable and with the support of global research organizations like Glass Futures, we have an unparalleled opportunity to discuss and implement green policies that each of us can adopt for a better environment. This collaboration

isn't just about reducing our footprint; it is about pioneering a sustainable future for glass manufacturing in India and globally."

Mavel Powertrain selects Syensqo's advanced materials for new high voltage e-motor



Mavel electric motor stator with Syensqo's Ajedium™ PEEK slot liners and KetaSpire® PEEK magnet wire insulation.

Brussels: Syensqo's innovative Ajedium™ PEEK (polyetheretherketone) slot liners and slot wedges and KetaSpire® PEEK magnet wire insulation have been selected by Mavel Powertrain for integration into their latest high-voltage electric motor for a renowned premium sports car manufacturer.

The combination of Ajedium™ PEEK slot liners and monolayer KetaSpire® PEEK magnet wire enhances electric motor efficiency, supporting operations at over 800 volts. These materials' reduced thickness allows for more copper in the motor design, improving electrical output and thermal management.

Beyond these innovations, Syensqo also supports advancements in e-motor technology with Amodel® PPA and Ryton® PPS for busbars and connectors, as well as Xencor™ PPA LFT for slot wedges. "Material excellence is at the core of our commitment to delivering cutting-

edge electric powertrains to our automotive customers,” said Luca Favre, Head of Motor Development at Mavel Powertrain.

BASF starts up new world-scale plant for hexamethylenediamine in France



Chalampé, France: BASF has started its new world-scale hexamethylenediamine (HMD) plant in Chalampé, France, construction of which began in 2022. The plant increases BASF’s annual HMD production capacity to 260,000 metric tons.

The plant is an essential component of BASF’s strategic path forward in its polyamide (PA) 6.6 business in Europe. In addition to starting up the new HMD plant, the company is in the final stage of expanding its PA 6.6 production in Freiburg, Germany.

The economic and industrial platform in the Alsace region of France and the direct integration into the main raw material adiponitrile (ADN) provide an ideal setup for the production and supply of HMD. In addition to chemical production assets, BASF operates a state-of-the-art research and development laboratory as well as corresponding infrastructure dedicated to PA 6.6 research at the Chalampé site.

HMD is a precursor used in the production of high-quality PA 6.6 polymers and coatings raw materials. Among other applications, these products are used in the automotive industry as well as in the production of high-quality fibers.

“The successful completion of this investment project is a significant step towards our goal of being the leading supplier for HMD and the preferred partner for PA 6.6

in Europe,” said Dr. Ramkumar Dhruva, President of BASF’s Monomers division. “Through the new HMD production plant in Chalampé and the expanded PA 6.6 polymerization in Freiburg, we are ideally positioned to supply our customers reliably with high-quality products,” he added.

Anupam Rasayan signs LOI with E-Lyte Innovations & Fuchs Lubricants Germany for supply of electrolyte salt

Surat, Ahmedabad: Anupam Rasayan India Ltd., a leading provider of custom synthesis and specialty chemicals, has signed a Letter of Intent (LOI) with E-Lyte Innovations GmbH (E-Lyte), a European developer and supplier of electrolyte solutions for energy storage and FUCHS LUBRICANTS GERMANY GmbH, a subsidiary of FUCHS SE working on innovative lubricant solutions. This LOI is considered the entry point for Anupam Rasayan’s collaboration with leading European companies within the battery value chain to take the next step in entering the fast-growing lithium-ion battery chemicals market. This agreement lays the foundation of negotiating a supply contract with an initial term of five years. Commercial deliveries could begin as early as FY 2026-2027. The LOI envisions supply of a volume of up to 1,500 TPA of Lithium Hexafluorophosphate (LiPF₆), based on market conditions.

Speaking about the LOI, Anand Desai, Managing Director of Anupam Rasayan, said, “Our process optimization capabilities have played a pivotal role in ensuring the product’s validation, offering significant advantages over its global commercial scenario. Additionally, our backward integration in fluorine chemistry through our subsidiary, Tanfac Industries Ltd, provides raw material supply chain security — a critical factor that contributed to signing this LOI. Anupam will be one of the first manufacturers of this molecule in India commercially, strengthening our foothold in the rapidly expanding battery ecosystem. Entering the battery chemicals market positions Anupam as a preferred partner for global innovators in advanced energy solutions. This is one of the many products Anupam is working on in the battery space that has been successfully agreed for supply to a customer, with several others in the pipeline.”

Meanwhile, in another major development, Anupam Rasayan India Ltd., has signed a long-term Master Purchase Agreement (MPA) with Japan-based

PROJECT UPDATES

multinational conglomerate, a global leader in fluorochemicals and advanced technology solutions. The agreement establishes comprehensive terms governing the customer's purchase of specialty chemicals from Anupam Rasayan, marking a significant milestone in Anupam's strategic expansion into the Japanese market.

Anupam is working with this Japanese Multinational conglomerate to supply multiple niche molecules used in across diverse applications, including semiconductor, data centre, electronics and more. Major molecules are set for commercialization this year, with production ramping up next year and onwards. This collaboration not only highlights Anupam's proficiency in fluorination and custom synthesis but also demonstrates customer's trust in Anupam's quality and capability.

INOX India launches India's first ultra-high-purity ammonia ISO tank container

Vadodara, Ahmedabad: INOX India Limited has launched India's first ultra-high-purity (UHP) ammonia T-50 ISO tank container. This ground-breaking innovation is a significant contribution by INOX India towards strengthening the semiconductor and solar panels ecosystem globally. The ultramodern tank container, designed, engineered and manufactured by INOX India, features an impressive capacity and is engineered to withstand high pressures levels. Built to meet the highest international standards including ASME Sec VIII, Div-1 with U-designated construction, the ISO tank incorporates innovative technology specifically designed for ultra-high-purity ammonia applications.

The state-of-the-art ISO tank is engineered for unparalleled product integrity. Its core feature is a high-precision internal finish with a surface roughness below 0.3 RA, a standard extended to all piping elements with orbital-welded joints to guarantee the highest level of purity for ammonia. Additionally, for providing a fail-safe protection, the ISO tank comes with a spring-actuated emergency shut-off mechanism, facilitating valve closing remotely.

The ISO tank has successfully undergone all required tests and received a full suite of certifications, including UN Portable Tank T-50, ADR, RID, ISO 1496-3, CSC, US-DOT, and IMDG. These certifications make the tank export-ready and capable for adding strength to the global UHP gas supply chain as well, besides ensuring

versatile transportation via rail, road, and ocean, offering customers maximum logistical flexibility.

thyssenkrupp nucera to expand TGV SRAACL's caustic soda plant in AP



TGV SRAAC Chairman TG Venkatesh and thyssenkrupp nucera India Interim CEO & CFO Kiran Joseph exchange signed copies of the contract in the presence of their respective teams.

Kurnool, Andhra Pradesh: TGV SRAAC Limited (formerly Sree Rayalaseema Alkalies and Allied Chemicals Ltd.) has appointed thyssenkrupp nucera to expand their caustic soda facilities in Kurnool, Andhra Pradesh. thyssenkrupp nucera will expand the caustic soda plant from the existing 1,000 tpd to 1,500 tpd. The scope of the contract covers engineering and proprietary supplies using the group's e-BiTAC technology with Generation 7 elements.

The project involves the installation of 3 additional electrolyzers in addition to the 10 electrolyzers that the plant currently deploys. The scope of the project also includes setting up a new chlorine and a waste air dichlorination system, and enhanced provision for the primary and secondary brine purification.

Speaking at the contract signing ceremony held at Kurnool, TG Venkatesh, TGV Group Chairman, expressed his happiness that the project had been signed. "This is a watershed project for us, especially since it involves expanding our plant significantly. We are convinced of the merits of thyssenkrupp nucera technology, and eagerly look forward to them delivering a state-of-the-art plant."

TGV SRAAC Limited is the flagship company of the TGV Group. It is the leading producer of chlor-alkali products and also manufactures castor derivatives and fatty acids. It also operates a commercial power project of 28MW. ■

Separation Technologies: A Comprehensive Summary to Modern Industrial Applications

Separation technologies are no longer silent utility operations; they are strategic levers for competitiveness, compliance, and climate action. The winners will be solutions that pair low-energy architectures with digital foresight, deliver clear techno-commercial payback, and slot seamlessly into circular-economy supply chains.

Separation science now sits at the crossroads of industrial decarbonisation, water security, and circular-economy ambitions. Distillation still dominates bulk chemical production, but its high thermal duty is pushing operators toward lower-energy options such as membranes, adsorption, and hybrid systems. Over the next decade, analysts expect global demand for advanced separation equipment to grow at 3-6 per cent annually — led by water reuse, gas purification, and high-purity bioprocessing — while digital twins and AI-powered diagnostics cut unplanned downtime by up to 60 % in early pilots.

The sections that follow unpack the techno-economic drivers, process-specific trade-offs, and emerging R&D frontiers that will shape investment decisions through 2035.

Industrial & Market Context

Energy-intensive thermal separations consume roughly half of all operating energy in a typical petrochemical complex, with distillation alone accounting for 40 per cent of that figure. In parallel, the membrane-separation-materials market reached \approx USD 21 billion in 2024 and is forecast to post a 5.6 per cent CAGR to 2030 on the back of stricter water-quality rules and pharmaceutical-grade purity demands. India mirrors this trajectory: its industrial-filters segment is projected to climb from USD 1.29 billion in 2024 to about USD 2.03 billion by 2031, a 6.9 per cent CAGR, as manufacturing, food, and specialty-chemicals output expand. These macro trends frame both the opportunity and the urgency for plant owners evaluating new separation trains.

Performance Benchmarks in Plain Language

Energy & Carbon: Typical heat-integrated distillation columns draw 5-6 kWh per m³ of feed, translating to \sim 2.8 kg CO₂e per unit processed when fired by natural gas boilers. The fossil fuel fired boilers would have even more carbon footprint as compared to the aforementioned type of boiler. Polymeric or ceramic membrane systems, by contrast, often run below 1.5 kWh m³ and emit $<$ 0.7 kg CO₂e, provided fouling is kept in check. Adsorption beds fall in between — 2-3 kWh m³ — because they avoid reboilers but still incur regeneration heat.

Cost: At today's fuel and electricity prices, operating expenditures (OPEX) for mature distillation average USD 0.15 per unit of product; membranes range USD 0.08–0.12 depending on replacement frequency; adsorption hovers near USD 0.12; and batch crystallisation typically sits around USD 0.14 owing to cooling duty. Capital intensity (CAPEX) tells a different story: membrane skids run 20-40 per cent cheaper than tray columns at small scale, yet distillation regains the advantage beyond \sim 50 kt yr⁻¹ because of well-established fabrication supply chains and easy heat integration.

Techno-Commercial Feasibility Matrix

When matching technology to process needs, engineers weigh five factors:

1. **Separation Driving Force:** Large volatility gaps favour distillation, whereas close-boiling isomers or azeotropes push designers to membranes, pervaporation, or extractive hybrids.

FEATURES

- Throughput Range:** For flows below ~ 200 t day⁻¹, modular membranes or PSA/PSA-membrane hybrids minimise CAPEX; above that threshold, tall columns amortise hardware efficiently.
- Product Purity & Yield:** Biopharma and semiconductor fabs often require sub-ppm impurity levels — conditions where multistage chromatography or high-flux ultrafiltration shine.
- Fouling & Maintenance:** AI-enabled analytics now forecast membrane fouling events days in advance, cutting cleaning cycles and saving 10-15 per cent OPEX in early adopters.
- Regulatory Exposure:** Tightening global Per- and Poly-Fluoro Alkyl Substance (PFAS) rules demand near-zero discharge levels, prompting water utilities to adopt high-selectivity nanofiltration with advanced oxidation polishing.

Because each driver carries a cost penalty if mismatched, techno-economic models increasingly combine process simulation with discounted-cash-flow analysis to deliver a single-number cost of ownership — often quoted in USD per ton of contaminant removed or USD per kg of high-value isolate produced.

Sector-Specific Perspectives

Pharmaceuticals: A 2024 Certain-pharma-based Lab retrofit replaced resin columns with a ceramic-membrane skid, boosting monoclonal-antibody yield to 98.7 per cent and slicing energy by 40 per cent versus chromatography; inline CIP extended uptime by 30 per cent. Payback arrived in under two years thanks to higher batch throughput and solvent savings.

Nutrition & Botanicals: A Gujarat nutraceutical pilot recovered > 99 per cent pure curcumin via supercritical CO₂ at 300 bar and 50°C, delivering 45 per cent

The industrial-filters segment in India is projected to climb from USD 1.29 billion in 2024 to about USD 2.03 billion by 2031, a 6.9 per cent CAGR, as manufacturing, food, and specialty-chemicals output expand

lower life-cycle carbon than hexane extraction and eliminating solvent-recovery units. Although CAPEX is high, premium product pricing offsets the investment, making the process commercially attractive at > 150 t yr⁻¹ scale.

Gas Processing & Decarbonisation: Alloy-based pressure-swing adsorption (PSA) beds now reclaim 70-75 per cent of hydrogen from dilute refinery off-gas streams, cutting fresh H₂ purchase costs dramatically. For CO₂ capture, PSA and membrane-solvent hybrids hover between USD 60-110 t⁻¹ captured, narrower than early amine-scrubbing estimates but still above many carbon-market prices.

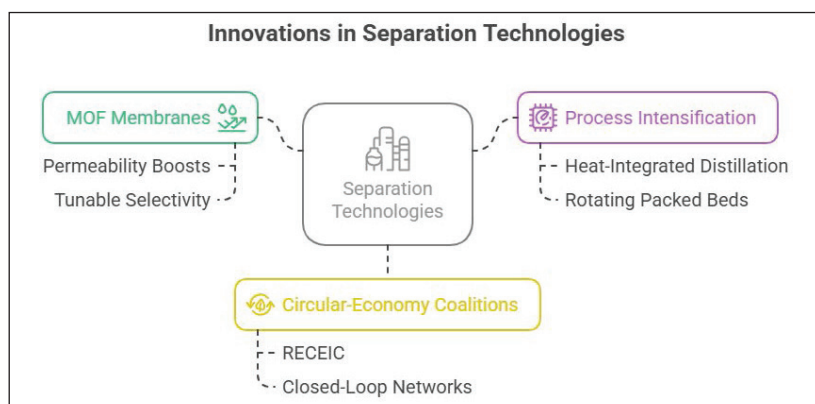
Water & Zero-Liquid-Discharge (ZLD): India's Koyambedu tertiary-treatment and reverse-osmosis (TTRO) plant recycles 45 ML day⁻¹ of municipal effluent for industrial use, demonstrating mature membrane-RO feasibility at city scale. Forward-osmosis pilots paired with RO now achieve 30 per cent energy savings in polyester wastewater recycling campaigns.

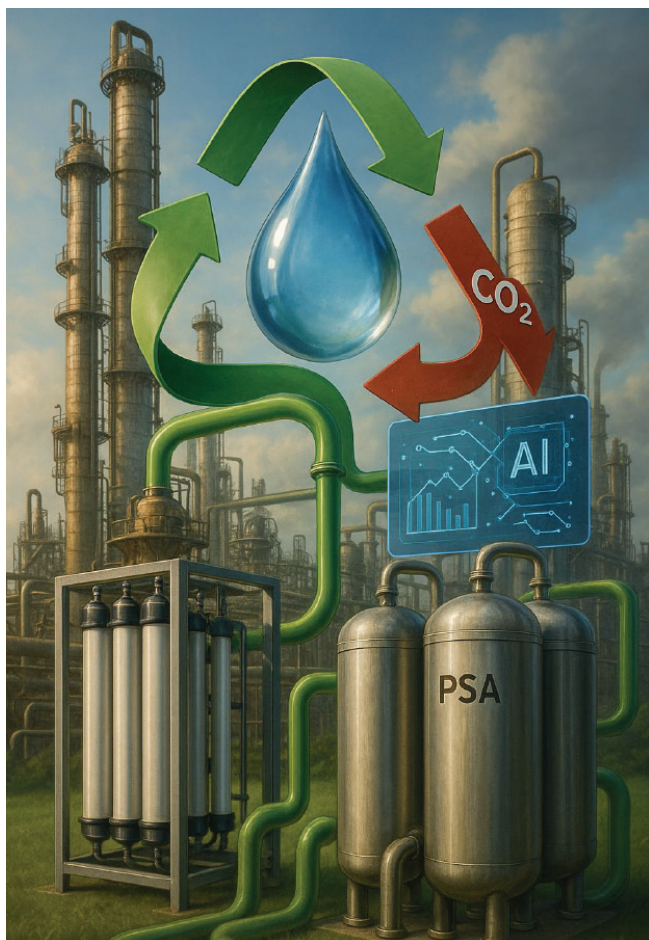
Emerging R&D Frontiers

Metal-Organic-Framework (MOF) Membranes: MOF-polymer composites exhibit order-of-magnitude permeability boosts and tunable selectivity for CO₂/CH₄ and N₂/O₂ separations, with several scale-up programs under way.

Process Intensification (PI): Compact heat-integrated distillation columns and rotating packed beds cut footprint by 30-60 per cent while maintaining mass-transfer efficiency.

Circular-Economy Coalitions: India's Resource Efficiency & Circular Economy Industry Coalition (RECEIC), launched





under the G20 banner, is championing closed-loop water and solvent networks that hinge on high-selectivity separations.

Digitalisation & Operations 4.0

Digital twins couple first-principles mass-transfer models with real-time sensor data, enabling predictive maintenance that slashes unplanned shutdowns by up to 60 % and reduces energy use by optimising reflux or trans-membrane pressure continuously. Such AI-assisted control loops — still nascent — are expected to become standard, particularly for fouling-prone ultrafiltration and vacuum-swing adsorption units.

Future Outlook & Investment Signals

Market analysts anticipate that by 2030 hybrid flowsheets — membrane + distillation or adsorption + membrane — will dominate grassroots plants because they strike the optimal balance between capital intensity, energy demand, and regulatory risk. Carbon capture will likely remain a niche application for high-value CO₂ streams unless capture costs fall below USD 50 t⁻¹, a target that emerging biotech sequestration

concepts such as carbon casting claim to approach. Simultaneously, hydrogen recovery via advanced PSA is projected to grow alongside green-H₂ expansion, given its ability to monetise waste streams.

Separation technologies are no longer silent utility operations; they are strategic levers for competitiveness, compliance, and climate action. The winners will be solutions that pair low-energy architectures with digital foresight, deliver clear techno-commercial payback, and slot seamlessly into circular-economy supply chains. In practice, that means modular membranes for water and biotech, intensification for bulk chemicals, adsorption hybrids for gas purification, and AI-optimised control across the board. Plant designers who integrate these insights early can secure lower operating costs, faster regulatory approvals, and a smaller carbon footprint — advantages that compound year after year in an increasingly resource-constrained world. ■

Author



Shrey B Patel
Founder-Director
Angiras Rasayan LLP IN

The State of Counterfeiting in High-Risk Sectors in India: Pharmaceuticals, Chemicals, and Agrochemicals



Manoj Kochar

President

Authentication Solution Providers' Association (ASPA)

Counterfeiting in India has evolved into a sophisticated threat impacting high-risk sectors. India's high-risk sectors face an urgent need to adopt an integrated strategy. Fragmented actions and reactive measures are no longer sufficient in a landscape where counterfeiters are well-funded, tech-savvy, and exploit every available loophole. A forward-looking approach must focus on long-term investment in technology, public education, and harmonized regulation.

Once limited to knock-off accessories and budget goods, counterfeiting in India has evolved into a sophisticated threat impacting high-value and high-risk sectors. From life-saving pharmaceuticals to critical agrochemicals and industrial chemicals, counterfeit products now pose serious risks to public health, food security, and economic integrity. As counterfeiters grow smarter and exploit regulatory loopholes, fake products are penetrating both urban centers and rural supply chains. Addressing this growing crisis demands a unified response, one that blends innovation, policy reform, public awareness, and technology-driven authentication solutions.

Pharmaceuticals: Strengthening Supply Chain Security

India's pharmaceutical industry, globally recognized for affordable medicines, faces mounting challenges from counterfeit infiltration, especially in tier II and III cities where limited organized retail, low authentication awareness, and dependence on unregulated online sources increase risk. The ASPA CRISIL Report 2022 notes that 32 percent of consumers in Hyderabad, 29 percent in Indore, and 25 percent in Chennai have encountered counterfeit drugs.

Counterfeiters use advanced printing and design tools

to replicate packaging and QR codes with high accuracy. Fake drugs often enter the system through informal routes, bypassing regulatory checks and directly risking public health. The rise of e-commerce and grey-market channels has further worsened the spread. Regulators struggle to monitor unregulated online sales, particularly those taking place through informal digital marketplaces and social media platforms. The challenge has grown more complex as the landscape of distribution has become increasingly fragmented.

These challenges underscore the urgent need for enhanced authentication and supply chain monitoring mechanisms to safeguard public health.

Agrochemicals: Threats to Yields and Food Security

Agriculture is the backbone of the Indian economy and agrochemicals play a critical role in ensuring food security and sustaining rural livelihoods. However, counterfeiting, particularly in pesticides, has emerged as a serious concern. The ASPA CRISIL Report 2022 highlights that insecticides account for 56 per cent of pesticide use, herbicides 23 per cent, fungicides 20 per cent, and other categories around 1 per cent. It estimates that counterfeit agrochemical products make up 30 to 40 per cent of the market. Pesticides remain the most counterfeited category, primarily due to their scale of usage. The use of fake agrochemicals can lead to a reduction in crop yields by three to four percent, directly impacting farmer incomes.

Many of these counterfeit products contain banned or incorrect formulations that not only fail to protect crops but also lead to pest resistance, soil degradation, and

Agriculture is the backbone of the Indian economy and agrochemicals play a critical role in ensuring food security and sustaining rural livelihoods. However, counterfeiting, particularly in pesticides, has emerged as a serious concern. The use of fake agrochemicals can lead to a reduction in crop yields by three to four percent, directly impacting farmer incomes.

long-term environmental damage. The ASPA CRISIL Report further points out the key states most affected by this problem, including Uttar Pradesh, Jharkhand, Madhya Pradesh, Andhra Pradesh, Telangana, Haryana, Maharashtra, West Bengal, Karnataka, Tamil Nadu, and Bihar. Limited availability of authentic products, economic pressures, and low awareness drive farmers to purchase cheaper alternatives, many of which are counterfeit.

Addressing these risks requires improved product verification methods and awareness initiatives to ensure farmers access authentic, effective agrochemicals.

Chemicals: Industrial Risks

The Indian chemical industry is essential to sectors like pharmaceuticals, food processing, manufacturing, and textiles. Its vast and often fragmented supply chain makes it vulnerable to the infiltration of counterfeit raw materials, solvents, and specialty chemicals. The risks associated with counterfeit chemicals are often less visible but can have deeply damaging consequences.

One counterfeit intermediate can compromise an entire pharmaceutical batch or food-grade product. In industrial settings, such materials can corrode equipment, disrupt manufacturing processes, or even cause safety hazards. Weak regulatory enforcement, particularly at the transit and storage levels, has worsened the problem. The challenge is amplified because many chemical products are visually indistinguishable and lack overt security features, allowing counterfeiters to exploit these blind spots effectively.

The chemical supply chain often involves multiple tiers across domestic and international borders. This complexity introduces vulnerabilities at several stages, including bulk imports, warehousing, and regional redistribution. These entry points are particularly difficult to monitor, giving counterfeit materials an opening to reach legitimate networks.

To tackle this, closer collaboration between manufacturers, regulatory authorities, and enforcement agencies is vital. Standardized traceability mechanisms and real-time data sharing across networks can play a significant role in minimizing these risks. Border control, especially at customs and logistics touchpoints, must also be strengthened to prevent illicit materials from entering domestic circulation. These factors highlight the critical need for strengthened traceability and

cross-sector cooperation to mitigate counterfeit risks in chemical supply chains.

The Role of Advanced Technology and Standardization

The adoption of advanced authentication technologies across high-risk sectors is transforming India's response to counterfeiting. A layered security approach combining physical features with digital tools is proving to be the most effective. Technologies such as tamper-evident packaging, holographic security labels, QR codes, NFC tags, and microtext printing offer visible signs of authenticity that consumers and distributors can use to verify products.

These visible elements are being increasingly combined with advanced digital authentication systems. Serialization allows manufacturers to assign unique identification codes to individual product units, enabling full traceability throughout the supply chain. When integrated with blockchain, this traceability becomes immutable and transparent, giving regulators and companies the ability to monitor product movement from production to the point of sale. Blockchain's distributed ledger systems, especially when supported by artificial intelligence, can detect anomalies, flag counterfeit activity, and support efficient recall mechanisms.

AI-enabled systems enhance this further by identifying suspicious distribution patterns or inconsistencies in real-time, providing actionable insights and increasing the speed and accuracy of investigations. QR codes printed on product labels offer an accessible tool for consumers, especially in rural areas, to instantly verify product authenticity using a smartphone. As public awareness improves and technology becomes more user-friendly, these tools are becoming central to anti-counterfeiting strategies.

International standards such as ISO 22383 help unify these efforts by offering a structured framework for deploying and auditing product authentication solutions. Aligning with such standards ensures that solutions are scalable, effective, and compatible with global best practices.

Collaborative Efforts against Counterfeiting

A central pillar in the fight against counterfeiting is meaningful cross-sector collaboration. This challenge is too vast and complex to be managed by individual

manufacturers or regulatory bodies alone. Addressing it effectively requires a shared commitment and coordinated action across the entire ecosystem. Industry leaders, government agencies, enforcement authorities, technology providers, and consumers all have a role to play in creating a resilient and transparent supply chain.

The scale and sophistication of modern counterfeiting networks demand unified strategies that cut across sectors and geographies. Without collective vigilance, even the most advanced security technologies can fall short. That is why building long-term partnerships, encouraging knowledge-sharing, and aligning policy frameworks have become essential steps in safeguarding product authenticity and public safety.

ASPA collaborates extensively with key stakeholders across different industries, to combat counterfeiting and promote secure supply chains. Through technical workshops, policy dialogues, and educational campaigns, ASPA supports pharmaceutical companies in adopting advanced authentication technologies and aligning with evolving regulatory frameworks. A flagship initiative led by ASPA, the Traceability and Authentication Forum (TAF) 2025, which convened industry leaders, government officials, and technology providers to address threats, policy developments, and technology-driven countermeasures. The forum continues to serve as a key platform for aligning global best practices, scalable authentication frameworks, and strategies to safeguard patients and supply chain integrity.

Towards an Integrated Strategy

India's high-risk sectors face an urgent need to adopt an integrated strategy. Fragmented actions and reactive measures are no longer sufficient in a landscape where counterfeiters are well-funded, tech-savvy, and exploit every available loophole. A forward-looking approach must focus on long-term investment in technology, public education, and harmonized regulation.

What is encouraging is the growing alignment among stakeholders. As authentication tools mature and awareness grows, businesses are increasingly recognizing that trust and transparency are not just regulatory necessities but strategic advantages. Those who lead in building secure systems will not only mitigate counterfeiting but also earn consumer loyalty, enhance their market reputation, and gain a competitive edge. ■

“India is not just ready to make its own future — it is already doing it”



PATHIK GOPANI
Managing Director
Gopani Filters

Ahmedabad-based Gopani Filters has come a long way since its inception in 1993. Starting operations by building basic filters in a modest unit, today the company is proud to serve customers in over 30 countries across industries such as pharma, water, chemicals and food, amongst others. **Pathik Gopani, Managing Director of Gopani Filters**, in an exclusive interview with *Chemical Engineering World*, speaks about the company’s successful growth journey; the growth potential and future of the Indian filtration industry.

How would you describe the growth of the filtration segment of the chemical industry in the past 5 years? What are the latest innovations seen in the filtration segment?

Over the last five years, the filtration industry — particularly in sectors like chemicals, APIs, and water treatment — has moved from the background to the boardroom. Once seen as a maintenance function, filtration is now central to process integrity, environmental responsibility, and even national competitiveness. What has driven this shift? A few things: increased regulatory vigilance, rising input costs, the need for zero discharge, and perhaps most importantly — India’s awakening as a responsible manufacturing powerhouse. Filtration is the invisible enabler behind clean APIs, purified effluent,

solvent recovery, and energy savings across industries.

Innovations today are aligned with India’s larger goals — smart backwashable filters that conserve water, sintered metal filters that last for years without needing replacement, and low pressure-drop cartridges that save megawatts of pumping energy in utilities. What’s unfortunate, however, is that while India builds world-class facilities in pharma, food, and chemicals — many of them still default to imported filters out of habit, not necessity. As someone who has walked these factory floors, I say this with conviction: we are no longer behind. If you are building for India’s future, why not also filter through India’s innovation?

Gopani Filters specializes in the filtration segment.

Here's a question I pose to industry leaders: If your plant can go net zero faster using Made in India filtration systems — why wouldn't you? When the tools for our national mission are already being built in our own backyard, choosing them isn't just practical. It's patriotic.

What are the challenges in terms of penetration in different market segments?

The filtration industry is a paradox — it is critical, yet invisible. That invisibility is our first challenge. Most plant heads or procurement teams only think of filters when things go wrong. We have had to reverse that mindset — to make filtration a strategic discussion, not a troubleshooting one.

The second challenge is inertia. Even when Indian filters outperform or match global brands, the habit of relying on imports persists. "Just buy what we always bought"— that mindset is silently costing us crores in operating losses and waste of water.

At Gopani, we are changing that by standing on three principles:

1. Design with purpose - Filters engineered for your exact application, not just off-the-shelf matches.

2. Support with science - Trials, data, and validation that speak your language.

3. Partner with responsibility - We don't just sell filters; we stay accountable to your performance metrics.

When you choose an Indian filtration partner, you are not just saving money — you are making a statement: that India can design, build, and innovate for its own future.

With the Honourable Prime Minister of India, Shri Narendra Modi, setting up ambitious net zero plans by 2030, what trends do you foresee in the filtration industry and how is Gopani Filters gearing up towards it?

The Prime Minister's net zero vision is not just an environmental mission — it is a call to transform how India manufactures, consumes, and conserves. Filtration lies at the very core of that transformation.

Think about this: a high-efficiency filter can reduce the energy load on a pump by 15–20 per cent. A reusable sintered metal filter can prevent hundreds of kilograms of non-biodegradable waste from reaching landfills. A properly engineered system can help a pharmaceutical plant recycle more than 70 per cent of its wastewater.

At Gopani, we have chosen to align our Research and Development (R&D) directly with these outcomes. We are developing filters that last years, not months. Systems that save water in every backwash. Solutions that recover solvents, trap carbon, and preserve the purity of both product and planet.

And yet, here's a question I pose to industry leaders: If your plant can go net zero faster using Made in India filtration systems — why wouldn't you? When the tools for our national mission are already being built in our own backyard, choosing them isn't just practical. It's patriotic.

What according to you are the challenges seen in this industry and how has Gopani tried to overcome the same?

The filtration industry, despite its criticality, faces four challenges:

1. Commoditization - Everyone believes a filter is just a filter. Until one fails and brings down a batch.

2. Lack of awareness - Engineers and consultants are overwhelmed; filtration is rarely understood in full technical depth.

3. Import bias - Many still assume that if it's foreign, it must be better.

4. Fragmentation - From pharmaceuticals to F&B to power plants, the requirements are too diverse for a one-size-fits-all approach.

Gopani's approach has been to embrace these challenges head-on. We have invested in educating our customers, not just supplying them. We have created a team of application experts, not just sales engineers. And we have built our systems to be faster, more responsive, and more customized than large global players.

We have also started conversations that matter — with consultants, design houses, and OEMs — inviting them to co-create solutions. When we say “partner,” we mean it. If India’s industries are growing, we believe filtration should not be a bottleneck — it should be a competitive edge.

How would you describe the growth journey of Gopani Filters from the time of inception in 1993 till date? To what factors would you attribute this success to?

Gopani’s story mirrors India’s own industrial evolution. We started in 1993, building basic filters in a modest unit. Today, we operate from a world-class facility, with in-house R&D, precision manufacturing, and global exports. We have supplied to critical industries — pharmaceuticals, APIs, refineries, food processing, even power plants. But more than the scale, it is the trust we have earned that defines us.

Our success rests on a few foundational beliefs:

- That Indian companies deserve Indian partners who understand their pressures and promise.
- That filter failures are not just technical issues — they are business risks.
- That India can lead, not just follow, in precision engineering.

This success belongs not to Gopani alone — it belongs to the engineers who tried our filters before we were known. To the consultants who recommended us in specs. To the procurement heads who chose performance over price. You have shaped us.

And if there is one message I would like to leave behind, it is this: India is not just ready to make its own future — it is already doing it. In water, in energy, in pharma, in every drop that passes through a filter — we have a role to play.

We invite India’s industries to walk with us, partner with us, and build that future together. ■

CHEMICAL ENGINEERING WORLD

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UPCOMING ISSUE - JULY 2025

DIGITALIZATION & AUTOMATION

Automation and digitalization is a transformative shift for the industry in terms of operations, economic advantage, quicker turnaround time and improved efficiency. This shift is seeing a major rise across all chemical process segments. In the July 2025 issue, we focus on these important trends in the digitalization and automation sector. The issue will also feature regular stories of **News, Project Updates, Innovation and Product write-ups**.

Send Editorial submissions before 20th July 2025 to editorial@jasubhai.com

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An Overview of Natural Gas & CNG Filtration



Natural gas is rapidly becoming one of the most important sources of energy in the modern world. It is known for being a clean-burning, efficient, and cost-effective fuel used widely across sectors such as power generation, heating, and transportation. However, despite its benefits, natural gas is rarely available in its pure form. During extraction, transportation, compression, and storage, it often becomes contaminated with dust, rust particles, oil residues, and moisture. These impurities can significantly affect the performance and safety of downstream equipment such as gas turbines, compressors, and engines.

To address these challenges, effective filtration is essential. Filtration not only helps in ensuring the optimal performance of gas systems but also extends the lifespan of critical equipment and reduces maintenance costs.

Delta Filters, a filtration solutions provider established in 1994, has positioned itself as a key player in filtration segment. With a focus on high-efficiency filtration systems, Delta Filters offers a comprehensive range of products designed for both Natural Gas and Compressed Natural Gas (CNG) applications. These include advanced dry gas filters, coalescing filters, duplex filtration systems, and gas conditioning skids that meet stringent quality and safety standards.

The Importance of Natural Gas Filtration

Natural gas, in its journey from the wellhead to end users, undergoes multiple processes including exploration, extraction, compression, and transmission.

Each of these steps introduces potential contaminants that can compromise gas purity and system integrity. The presence of particulates like dust and rust can cause erosion in pipelines and valves. Moisture and hydrocarbons can corrode components and interfere with combustion efficiency. Such contamination



poses serious risks to metering instruments, engines, turbines, and control systems.

To prevent these issues, high-quality filtration is crucial. Delta Filters designs and manufactures a wide variety of filtration systems that operate at pressures up to 300 bar. Each filter is built according to ASME Pressure Vessel Code, ensuring mechanical integrity under high-pressure conditions. Welding is performed by certified professionals under procedures approved by SGS and conforming to ASME Section IX. Non-destructive testing (NDT) ensures structural soundness, while rigorous inspection guarantees each unit meets or exceeds client expectations.

Delta's product portfolio for natural gas includes dry gas filters for removing solid particulates, and coalescing filters for eliminating fine liquid aerosols and oil mist. These filters are widely deployed in applications such as city gas distribution networks, metering and regulation stations (MRS, DRS), and servo instrumentation systems. By using pleated filter elements and advanced materials, Delta Filters achieves high flow rates with minimal pressure drops, leading to enhanced efficiency and longer service intervals.

Compressed Natural Gas (CNG) Filtration

Compressed Natural Gas (CNG) is emerging as a vital component of the global clean energy movement. It is especially popular in transportation due to its low emissions and lower cost compared to gasoline and diesel. However, like natural gas, CNG is also susceptible to contamination.

During compression and storage, solid particles, compressor oil, and water vapour often find their way into the gas stream. These contaminants can be highly damaging to vehicle engines and other sensitive components if not effectively filtered.

Delta Filters has been addressing the needs of



the CNG industry for over 30 years. Our high-pressure CNG filters are engineered to withstand operating pressures up to 275 bar (4000 PSIG). These filters use borosilicate glass fibre elements that provide both coalescing and particulate filtration. The result is superior removal of particles as small as 0.01 microns and oil mist to levels as low as 0.01 ppm. Our filters are suitable for deployment in CNG compressor suction and discharge ports, dispensers, LCV filling posts, and decompression skids.

Each CNG filtration unit is designed to ensure optimal purity at the point of use. For example, at the dispenser end, high-efficiency coalescing filters guarantee that fuel delivered to vehicles is free from contaminants. Delta Filters works closely with OEMs around the world, including those in India, USA, UAE, Europe, and Southeast Asia, to provide custom-designed solutions for specific operational needs. With a commitment to safety, reliability, and environmental responsibility, Delta CNG Filters play a vital role in supporting sustainable transportation systems worldwide.

Duplex Filtration Systems for Uninterrupted Operation



Certain industrial operations, such as power generation, petrochemical refining, and steel manufacturing, cannot afford even a momentary halt in fuel supply. In these mission-critical applications, continuous gas filtration is essential. Delta Filters addresses this requirement through Duplex Natural Gas Filters, which ensure 100 per cent

operational availability.

A Duplex Natural Gas Filter system comprises two identical filters mounted in parallel, along with a set of interconnecting valves and monitoring instrumentation. The standard configuration includes two inlet valves, two outlet valves, and safety, drain, and vent valves. A front control panel displays essential data such as inlet/outlet pressure, temperature, and differential pressure across the filters. This setup allows for seamless changeover from one filter to another, enabling maintenance or filter element replacement without halting operations.

These systems are particularly well-suited for gas engines and turbines used in base-load operations. The duplex arrangement allows for simultaneous use of both filters during high-demand periods, effectively doubling the filtration capacity. This feature makes the system highly scalable for future expansion. With installations in countries across Asia, the Middle East, and South America, Delta Duplex Filters are a trusted solution for industries that require uninterrupted fuel supply and high-purity gas.

Fuel Gas Coalescers: Precision Liquid Removal

In many gas processing applications, removing entrained liquids such as water and hydrocarbons is as critical as removing solids. Coalescing Filters are designed specifically for this purpose. These filters work on the principle of coalescence — capturing fine liquid droplets and merging them into larger droplets that can be drained away easily. This function is vital for protecting compressors, metering stations, gas-fired heaters, and purification membranes from damage and inefficiency.



Delta Coalescing Filters employ pleated borosilicate glass fibre media, which not only increase the surface area for filtration but also reduce pressure loss across the system. These filters are capable of removing liquid aerosols with 99.9 per cent efficiency. They are commonly installed upstream of compressors to prevent oil and water from entering sensitive components, and downstream to recover lube oil and maintain gas purity.

All Delta Coalescing Filter vessels are fabricated according to ASME Sec VIII Div 1 standards, with 100 per cent radiographic testing of weld joints. Products are shipped under inspection from globally recognized agencies such as SGS, BV, DNV, ICS, and TUV. These robust design and quality assurance measures ensure that each coalescing filter delivers long service life and reliable operation under demanding conditions.

IMPACT FEATURE

Gas Conditioning Skids: Integrated Filtration Solutions



For installations requiring a plug-and-play filtration system, Delta Filters offers gas conditioning skids. These are pre-assembled units that integrate multiple filtration components on a single skid-mounted frame. Designed to pre-treat fuel gas before combustion in engines or turbines, these skids simplify

site installation and ensure consistent gas quality.

A typical Delta gas conditioning skid includes a knock-out drum fitted with either a stainless steel demister pad or vane mist eliminator for initial bulk liquid removal. The gas then passes through a set of parallel coalescing filters to remove fine particulates and aerosols. Fire-safe ball valves, differential pressure gauges, and drain valves are also included to enhance safety and ease of maintenance.

These skids are ideal for applications in power plants, refineries, and offshore platforms where space is limited and operational uptime is critical. With compact footprints, modular designs, and high throughput capacity, Delta's gas conditioning skids deliver dependable performance and exceptional filtration efficiency. They are custom-designed based on the client's flow, pressure, and contaminant profile, ensuring that each system meets the unique demands of its installation environment.

Commitment to Quality and Customer Satisfaction

Delta Filters is ISO 9001:2015 certified and dedicated to maintaining the highest standards in product design, manufacturing, and service. Every filter unit undergoes thorough quality checks, including third-party inspections by agencies like SGS, TUV, BV, and DNV. Our manufacturing facilities are equipped with state-of-the-art machinery, and our team is composed of experienced professionals committed to excellence.



We use advanced filter media (Borosilicate glass fiber), which provides greater dirt holding capacity, lower pressure drop, and longer maintenance intervals compared to conventional filters. This results in cost savings and reduced downtime for our clients. With over three decades of expertise and a global footprint, Delta Filters is a trusted partner for natural gas and CNG filtration solutions. ■

For more information or to discuss your filtration requirements, please reach out to:

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Phone: +91-9930073977

Website: www.deltafilte.rs.com



AJIT KINI

Managing Director

Delta Filters & Separators Pvt Ltd

mmp Filtration: Leaders in Pleated Filter Bag & Cartridge Manufacturing since 1993



For over 30 years, mmp Filtration has been a trusted name in industrial and commercial filtration solutions, specializing in the manufacture of pleated filter bags and pleated filter cartridges. With a strong foundation built on innovation, reliability, and technical excellence, we have grown to serve a broad spectrum of industries, offering advanced filtration products that improve system efficiency, reduce downtime, and deliver long-term value.

Our Legacy in Filtration Technology

Established in 1993, mmp Filtration began with a mission to create high-performance filtration products tailored to the critical needs of complex industries such as pharmaceuticals, chemical processing, power generation, and food & beverage. Over the decades, we have consistently upgraded our capabilities, expanded our product line, and earned a reputation for delivering precision-engineered filter bags and cartridges that meet international standards.

From a modest beginning to a globally recognized brand, our journey is marked by continuous innovation, strict quality assurance, and a customer-first approach that defines everything we do.

Core Specialization: Pleated Filter Bags & Cartridges

At the heart of our offering lies our pleated filter range — engineered to deliver superior performance in challenging environments. Our pleated filter bags and cartridges are designed to offer:

- **High Surface Area:** Increased pleat count for extended filtration media surface area, enabling higher flow rates and better dirt-holding capacity.
- **Low Pressure Drop:** Optimized for energy-efficient operations by minimizing resistance to flow.
- **Long Service Life:** Reduced need for frequent

replacements, leading to lower maintenance costs.

- **Versatile Applications:** Compatible with various housings and filtration systems across industries.

Whether it is for pre-filtration, final filtration, or specialty requirements, MMP's pleated filters offer unparalleled versatility and performance.

Key Features of mmp Pleated Filters

Our pleated filter bags and pleated filter cartridges come with a host of technical benefits:

- **High Dirt Holding Capacity:** Capable of capturing a large volume of particulate matter without clogging quickly, our filters are ideal for processes requiring continuous flow and minimal intervention.
- **Wide Micron Range:** From coarse filtration (50–100 micron) to sub-micron filtration (0.2–1 micron), we manufacture filters to meet the precision needs of different industries.
- **Thermal & Chemical Resistance:** Designed to withstand harsh industrial conditions, our filter media can tolerate a wide temperature range and is compatible with aggressive chemicals.
- **Custom Configurations:** Available in a variety of materials (PP, PES, PTFE, glass fiber), lengths, diameters, and end-cap designs (DOE, SOE, 222/fin, 226/flat, etc.), to suit your exact specifications.
- **Ultrasonic Welding & Leak-Proof Construction:** Our filters are constructed using ultrasonic welding for added durability and seamless, leak-proof performance.

State-of-the-Art Manufacturing Facility

Our manufacturing facility is designed to support high-volume production without compromising on quality. Some highlights include:

IMPACT FEATURE



- Cleanroom Production Areas for contamination-free manufacturing
- Advanced Pleating Machinery to create uniform pleats for high filtration surface area
- Ultrasonic Welding Stations for consistent bonding and structural integrity
- Quality Testing Equipment for burst pressure, micron efficiency, and flow rate
- Skilled Workforce trained in filter design, production, and inspection protocols

Industries We Serve

Our pleated filter cartridges and filter bags are widely used in both liquid and air filtration applications. MMP Filtration serves:

- Pharmaceutical Manufacturing
- Food & Beverage Processing
- Chemical & Petrochemical Industries
- Thermal Power Plants
- Nuclear Power Plants
- Shot Blasting Operations
- Cement & Minerals



- Paints, Inks & Pigments
- Oil & Gas Sector
- Electronics & Semiconductor Plants
- Sewage Filtration & Disposal (SFD)
- Textiles & Dye Manufacturing

Each industry comes with its own unique set of filtration challenges — and we provide custom filter solutions for every requirement.

Our Commitment to Innovation

mmp Filtration continues to push the boundaries of what is possible in industrial filtration. Our dedicated in-house R&D team works on:

- New media development for better filtration efficiency
- Enhanced pleating techniques for higher surface area
- Sustainable materials that align with environmental goals
- Compatibility testing with various housings and systems
- Prototyping custom filters for clients with unique operating conditions

Environment & Sustainability

We are deeply committed to environmental responsibility and sustainability. Our filtration solutions are designed to:

- Extend filter life, reducing disposal frequency
- Enhance energy efficiency of filtration systems
- Minimize process downtime, thereby conserving resources
- Use recyclable or reusable materials, wherever possible

By helping industries transition to low-waste, high-efficiency filtration, mmp is playing its part in a cleaner and greener tomorrow.

Custom Solutions for OEMs & EPC Contractors

We partner with Original Equipment Manufacturers (OEMs) and Engineering, Procurement, and Construction (EPC) contractors for:

- Bulk supply of custom filter elements
- Private labeling and branded filters
- Co-development of filtration systems
- Filtration feasibility and design assistance
- Export-ready packaging and documentation

Whether it is a high-volume application or a highly specialized requirement, mmp offers end-to-end support.

Why Choose mmp?

- **Over Three Decades of Experience:** Trusted by industry leaders since 1993.
- **Customized Filtration Solutions:** Tailored products designed to meet specific flow rates, operating pressures, and contamination loads.
- **ISO-Certified Quality Standards:** Consistent, traceable manufacturing processes with stringent quality checks.
- **In-House Design & Technical Expertise:** Support from product selection to after-sales service.
- **Global Export Capabilities:** Efficient logistics and compliance support for international clients.
- **Environmentally Responsible Manufacturing:** Filters built for longevity, energy savings, and reduced environmental impact.

Applications of Our Filters

- Pre-Filtration in RO systems
- Vent & sterile filtration in pharma
- Ink filtration in printing units
- Coolant filtration in metalworking



- Paint booths & powder coating plants
- Compressed air & gas filtration
- Process water & effluent treatment

Materials We Work With

- Polypropylene (PP)
- Polyester (PES)
- Glass Fiber
- Nylon
- PTFE
- Stainless Steel Core
(Optional for High Temp/High Pressure)

All media and construction materials are selected based on chemical compatibility, thermal resistance, and regulatory compliance.

Certifications & Standards

- ISO 9001:2015 Certified
- FDA-Compliant Materials (on request)
- CE & GMP Standards (as applicable)
- Custom third-party testing & validation available

Looking for a Reliable Filtration Partner?

From pleated dust filter bags to liquid filter cartridges, mmp Filtration offers the most dependable and cost-effective filtration solutions on the market. Our clients stay with us for our engineering precision, technical support, and customer-centric service model. ■

For more details, please visit:
www.mmpfilter.com



NILESH TODI
Executive Director
mmp Filtration Pvt. Ltd

“The industry is shifting towards low-energy, high-selectivity systems”



PROF. LALIT VASHISTA

Founder & Director
Diva Envitec Pvt Ltd

Mumbai-based Diva Envitec Pvt Ltd is focused on revolutionising separation technologies and wastewater treatment for the process industry by providing sustainable, innovative solutions that contribute to a cleaner and greener future. In an exclusive interview with *Chemical Engineering World*, Prof. Lalit Vashista, Founder & Director, Diva Envitec Pvt Ltd, shares his growth journey, his inspirations and the future of the separation technologies in the chemical process industry.

Diva Envitec has pioneered several filtration and separation technologies over the years. Could you share the journey of the company’s evolution and the key milestones that have defined its success?

Diva Envitec began as a boutique process engineering firm in 1995 dedicated to tackling the most persistent challenges in Industrial process engineering and wastewater treatment. Over the years, we have transitioned into a full-fledged technology developer, building advanced separation platforms based on membrane processes, catalytic oxidation, and biologically enhanced filtration systems. Key milestones include:

- **2014:** Commercialisation of Contufilt-M - Precious Metal catalyst recovery and Contufilt-MH, a modular hot gas filtration system for high-temperature, corrosive gas environments.
- **2017–2020:** Development and deployment of BIOPORE — our proprietary biological consortium for high-ammonia and sulfide-laden wastewater.
- **2023 onwards:** Introduction of Nanoporex cavitation-aided separation and Disrob absorbents for oil-water and lithium recovery from produced water.
- **2024 -** Thermox - Wet Air Oxidation process for spent caustic generated from refineries and petrochemicals

- **2025:** ZLD systems Evaporators with MVR in collaboration with EFSAN
- **2025:** Most recent is the launch of Diva Septek Pvt Ltd for specialised Technology-based R&D company.

Each stage has been defined by deep academia-industry collaboration, pilot trials, and a focus on retrofittable, modular, and energy-efficient solutions.

What emerging trends do you foresee in the filtration and separation technology industry, and how is Diva Envitec preparing to adapt to these changes?

The industry is shifting towards low-energy, high-selectivity systems, with increasing emphasis on zero-liquid discharge (ZLD), resource recovery, and digitally monitored operations. We foresee:

- Integration of AI-assisted diagnostics for membrane and media life prediction.
- Nanostructured materials with enhanced fouling resistance.
- A push towards modular, containerised plants for decentralised treatment.

Diva Envitec is actively investing in sensor-integrated platforms, pilot-scale SCWO (supercritical water oxidation) modules, and AI-linked membrane performance dashboards, with strategic academic and start-up collaborations.

What specific growth targets has the company set for its filtration and separation segment as a whole, including any numerical goals?

Our short-term target (FY2025–26) is to achieve ₹75 crore revenue from separation and filtration systems alone, with a CAGR of 22 per cent over the next 3 years. This includes:

- Doubling exports (targeting Southeast Asia and the Middle East).
- Capturing 10 per cent of India's refinery and textile caustic reuse retrofit market.
- Installing 30+ modular SCWO and nanobubble systems annually across refineries and municipalities.
- ZLD plant with establishing a MVR manufacturing in India in collaboration with EFSAN Germany, the process has been initiated.

Looking ahead, what areas of research and development is Diva Envitec focusing on to drive the next generation of filtration technologies?

Our R&D is sharply focused on:

- Subcritical water wet oxidation for COD and phenolic wastewater.
- Hemicellulose separation from viscose rayon industry.
- Lithium Direct Extraction using selectively functionalised absorbents - LIQSorb range of products.
- High-flux membrane-enzyme hybrids for pharma effluent treatment.
- Ultrasound-aided nanobubble cavitation for non-chemical lake rejuvenation.

What are the most pressing challenges facing the filtration and separation industry today? What is the plan of action to address them?

Challenges include:

- Membrane fouling and life-cycle cost pressures.
- Handling refractory COD and saline-organic combinations.
- Scalability of pilot successes to real-time plant settings.

Our action plan:

- Embed smart pre-treatment units to delay fouling.
- Special charged membrane introduction to overcome biofouling.
- Deploy modular wet oxidation units for pre-destruction of complex COD.
- Introduce performance-linked service models to de-risk industrial adoption.

How does Diva Envitec foster a culture of innovation within the organisation, and what strategies are employed to stay ahead in the competitive filtration technology market?

Innovation is embedded via:

- In-house 'Innovation Days' with open lab access to cross-disciplinary teams.
- Joint IP development with universities like MG

INTERVIEW

University Kerala and MIT, Pune, IIT Guwahati and CSIR - NML with whom we have technical collaboration, IISc Bangalore.

- A proprietary 'Failure Audit' system, where unsuccessful pilots are logged and studied for derivative use.

We stay ahead through nimble prototyping, field engagement, and a flat structure where plant operators can directly initiate R&D feedback loops.

How do the technologies developed contribute to environmental conservation? What are the company's long-term sustainability objectives?

Our technologies directly reduce freshwater usage, promote resource recovery (e.g., caustic, lithium, oil), and minimise greenhouse gas emissions by reducing sludge generation.

Key objectives:

- Enable 100 MLD of wastewater reuse annually by 2028.
- Develop sludge-free oxidation units for high-COD waste streams.
- Expand low-carbon retrofits for legacy chemical facilities.

Diva's ESG policy mandates energy benchmarking for all installations and lifecycle emissions reporting from 2025 onwards.

Precious Metal Catalyst filtration in corrosive environments is a complex challenge. How does Diva Envitec's Contufilt-M system address this issue, and what industries benefit most from this technology?

Contufilt-M is engineered with polymeric or speciality alloys surface filter system housed in stainless steel or nickel-alloy shells.

It ensures:

- Filtration at up to 250°C and acidic/alkaline liquid streams.
- In situ cake washing and recycling to prevent exposure to air, which can poison these expensive catalysts.

Major users:

- API, chemical, pharmaceuticals, refineries and speciality chemical facilities who do hydrogenation reactions.

How does Diva Envitec ensure that its technologies comply with international standards and regulations, particularly in the pharmaceutical and chemicals sector?

Compliance is ensured through:

- Validation protocols under cGMP, where applicable.
- Use of FDA-certified polymeric membranes and USP Class VI elastomers.
- Adherence to ATEX, CE, and ISO 10678:2010 (membrane integrity) for European markets.
- Full DQ-IQ-OQ-PQ documentation suites for turnkey pharma deployments.

We depend on 3rd-party audits annually and retain an in-house QA-QC team trained in EU MDR and GAMP 5 standards.

Who or what has been your greatest inspiration in your journey to establish and grow Diva Envitec through time?

Our inspiration has always come from the field operators and plant engineers who face real problems daily with limited resources. Their resilience and creativity under constraints shaped how we designed practical, non-theoretical solutions. Problems have to be addressed at grassroot levels.

Technologically, I drew early inspiration from Prof. M. M. Sharma on innovation in chemical engineering, Prof. G. D. Yadav for thinking out of the box and Prof. R. A. Mashelkar who showed a way on how policy, innovation, and scalability must go hand-in-hand. ■



Climate Change as a Challenge for Sustainable Agriculture

Amit Gupta

CEO & Co-Founder
Agrifields

Climate change has emerged as the greatest existential crisis of our time. Climate adaptation is therefore no longer a future consideration but an immediate necessity. With emerging solutions, particularly sustainable farming, we can turn adversity into opportunity. Investments in sustainable farming, climate-resilient seeds, smart irrigation and rural infrastructure can help us accelerate to protect the world's most vulnerable communities and secure the foundation of global food systems.

Climate change has emerged as the greatest existential crisis of our time and its impact on agriculture is immediate and profound. From unpredictable rainfall and frequent droughts to rising temperatures and pest outbreaks, farmers worldwide are confronting a battlefield. In India alone, districts across Punjab, Haryana and Uttar Pradesh are forecast to suffer significant declines in staple crop yields by mid-century which are wheat by over 6 per cent, rice by about 3 per cent to 15 per cent and chickpea cropping by nearly 10 per cent to 30 per cent in semi-arid zones, as per recent survey. As temperatures increase and agri-ecosystems degrade, farming becomes an uphill struggle. Yet with emerging solutions, particularly sustainable farming, we can turn adversity into opportunity.

Dual Role of Agriculture

Agriculture is deeply entangled in the climate crisis: it is both harmed by it and contributes significantly to it. Globally, the agricultural food sector accounts for about 37 per cent of all greenhouse gas emissions. Practices like tilling, synthetic fertilizer use and methane emissions from livestock and land-use change are amongst the main culprits. Equally, climate impacts higher heat, water stress and unstable weather cause a real and measurable drop in agricultural productivity which is a 21 per cent reduction in global agricultural total factor productivity since the 1960s, with even larger losses in hotter regions.

Climate-Smart Agriculture

At the heart of the response lies Climate-Smart Agriculture (CSA), a framework that aims to boost productivity, enhance resilience and reduce emissions simultaneously. CSA integrates tailored techniques like precision irrigation conservation tillage, agroforestry, drought-resistant seeds and integrated pest management that are context-specific and scalable.

Key sustainable agriculture practices are designed to address climate challenges

while enhancing productivity and ecosystem health. Conservation cultivation and cover cropping play a crucial role in maintaining soil integrity by minimizing disturbance, preserving natural cover, reducing erosion and sequestering carbon in the soil thus turning farmland into a carbon sink. Agroforestry and crop diversification involve integrating trees with crops and rotating different plant species, which strengthens soil health, improves biodiversity and builds ecological resilience against climate shocks. These methods also generate additional income through fruit, timber or medicinal products. Precision water management is another cornerstone, encompassing techniques like drip irrigation, laser land leveling and rainwater harvesting to optimize water usage critical as water becomes increasingly scarce. Integrated pest and nutrient management merges traditional and modern techniques such as manual control, biological agents and data-driven tools to reduce reliance on synthetic chemicals, thereby cutting pollution and improving food safety. Finally, regenerative agriculture emphasizes soil restoration through no-till practices and mixed cropping, achieving global soil carbon gains of up to one pentagram (PgC) annually. Remarkably, such diversified systems have outperformed monocultures by 2,800 per cent in terms of profitability, ecological services and biodiversity, highlighting their vast potential in transforming agriculture into a climate solution.



Impacts Already Showing

The consequences of climate change on agriculture are no longer distant projections they are unfolding now, with measurable losses and mounting pressure on global food systems. In India, a joint 2025 report by the Federation of All India Farmer Associations (FAIFA) and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has sounded the alarm, projecting severe crop yield declines by mid-century. Wheat yields are expected to drop by 25 per cent and rice by 15 per cent, primarily due to rising temperatures and erratic rainfall patterns. Rain-fed crops, which make up a significant portion of India's food basket, face even graver losses by 30 per cent highlighting the vulnerability of millions of smallholder farmers. Meanwhile, a study by Indian Institute of Science Education and Research (IISER) reveals that central India, particularly Madhya Pradesh, is increasingly experiencing hot-dry extremes coupled with low humidity and failed monsoons. This trend is accelerating the frequency of droughts and heat waves, pushing rural communities toward economic and existential peril.

Globally, 2024 was a stark reminder of what is at stake. France, a major grain producer, reported a staggering 30 per cent reduction in winter crop yields due to unseasonable rains and frost events. Across Brazil, Niger and the United States, extreme weather which is ranging from floods to prolonged droughts has disrupted planting and harvest cycles, leading to significant agricultural setbacks. In Nigeria, one of Africa's most populous nations, the crisis is acute. About 80 per cent of farmers are grappling with water shortages and widespread crop failure has driven food insecurity to alarming levels. The country's food imports surged by 136 per cent between 2023 and 2024, underlining the urgent need for localized resilience-building.

These global data points paint a sobering picture of how deeply climate change is impacting agriculture today not just as an environmental issue, but as a threat to food security, livelihoods and economic stability. The message is clear. The climate adaptation is no longer a future consideration instead it is an immediate necessity. Investments in sustainable farming, climate-resilient seeds, smart irrigation and rural infrastructure must accelerate to protect the

world's most vulnerable communities and secure the foundation of global food systems.

Real-World Solutions for India and Beyond

India's National Innovations in Climate Resilient Agriculture (NICRA) program has reached nearly 6,93,000 farmers with drought-tolerant crops, solar pumps and capacity building. The program reports yield increases, reduced risk and net cost savings mirroring findings from Ethiopia, where conservation agriculture lifted food scores by 7-994 per cent compared to non-adopters. Africa is seeing similar effects. The precision irrigation and digital advisory are reducing UT burden for smallholders, lowering debt and enhancing resilience.

Barriers & Solutions

While CSA has demonstrated clear benefits in enhancing resilience, productivity and sustainability, scaling these practices to reach the millions of farmers who need those remains a significant challenge. Several key barriers hinder widespread adoption. Foremost among these are limited access to affordable finance, inadequate availability of appropriate technology, insufficient training and extension services and a lack of enabling policy frameworks and incentives that encourage farmers to transition to sustainable methods.

In India, the challenge is particularly acute because small and marginal farmers, who constitute over 80 per cent of the country's agricultural community often lack the resources, knowledge and capital to invest in climate-smart innovations. These farmers typically face difficulties in accessing credit, modern inputs and timely information, which restricts their ability to adopt practices like precision irrigation, organic

Climate-Smart Agriculture (CSA) integrates tailored techniques like precision irrigation conservation tillage, agroforestry, drought-resistant seeds and integrated pest management that are context-specific and scalable.

fertilization or agroforestry. At the global level, climate finance allocation has also been skewed. Despite agriculture being highly vulnerable to climate impacts and a major contributor to greenhouse gas emissions, investments in food systems remain chronically underfunded compared to sectors such as energy and transportation.

To break through these barriers, coordinated action is essential. Governments must step up by providing targeted subsidies and incentives that reduce the upfront costs for water-efficient irrigation systems, organic inputs, renewable energy technologies and micro-irrigation infrastructure. Additionally, public and private sector investments need to accelerate innovation, scaling digital tools such as satellite monitoring, mobile advisory services and data-driven pest management systems that can empower farmers with real-time guidance. Strengthening rural extension networks and building farmer capacity through hands-on training and knowledge sharing are equally critical. By aligning financial support, policy frameworks and technological innovation, it is possible to create an enabling environment where CSA can thrive, ensuring food security while protecting the planet.

The Role of Technology

In today's rapidly evolving agricultural landscape, technology plays a pivotal role in transforming traditional farming into a precise, efficient and climate-resilient practice. The era of new agriculture marks a digital revolution where cutting-edge tools empower farmers with real-time, data-driven insights that enhance decision-making and optimize resource use. Advanced technologies such as artificial intelligence (AI) enable highly accurate weather forecasting, allowing farmers to anticipate climatic events and plan their planting, irrigation and harvesting schedules accordingly, thereby minimizing risks from droughts, floods or unseasonal rains.

Satellite imaging and remote sensing technologies provide detailed information on crop health, soil moisture levels and pest infestations over vast areas, enabling targeted interventions that reduce input wastage and environmental impact. Soil sensors deployed in the field continuously monitor nutrient levels, pH and moisture, facilitating precision agriculture practices where fertilizers and water

are applied in just the right amounts, promoting sustainability and cost savings.

In addition to these digital tools, breakthroughs in biotechnology, such as gene editing are creating crop varieties that are more tolerant to heat, drought and pests that can become key traits for adapting to the challenges posed by climate change. Meanwhile, blockchain technology is enhancing transparency and traceability throughout the agricultural supply chain. By providing consumers with verified information on the origin, production methods and environmental footprint of their food, blockchain aligns farming practices with growing market demands for sustainably and ethically produced products. Together, these technological advancements form a robust ecosystem that not only increases productivity and resilience but also fosters trust and accountability in the food system, paving the way for a sustainable agricultural future.

Time to Act Together

Sustainable farming offers a roadmap to restore balance in the form of conserving water, rebuilding soils, growing nutritious crops and connecting farming systems to modern markets.

When implemented at scale, these sustainable agricultural practices can significantly reduce emissions from agriculture, which currently contribute about 13 per cent of global greenhouse gases. Alongside mitigating climate impact, they have the potential to boost crop yields and increase farmer incomes by promoting more efficient and resilient farming methods. Moreover, these practices help protect biodiversity and conserve vital water systems, ensuring the health of ecosystems that support agriculture. Collectively, they enhance climate resilience across regions, enabling communities to better withstand the increasing challenges posed by climate change and secure a more sustainable future for food production.

But the future depends on collective action: governments, agribusinesses, financiers, researchers and NGOs must prioritize sustainable agriculture. We need proactive policies, targeted subsidies, digital access and climate-smart incentives to empower smallholders. ■

The role of tailings filtration plant design in optimizing cost and performance

As the amounts of tailings produced in mining processes continue to increase, so does the demand for tailings filtration capacity and throughput. With an optimal plant design, mining companies can achieve maximum filtration capacity whilst making cost-effective decisions for their operations.

Recent developments in tailings filtration have substantially increased unit capacities, making filtration plants up to 100 kt/d feasible for future plants requiring dry stacking of their tailings. In fact, more and more minerals processing companies across the globe are shifting to dry stack tailings.

Developing Filtration Plants - Key Challenges

Implementing a filtration process can be challenging, from flowsheet selection to ramp-up and eventual performance and capacity. Alongside the financial aspects, one must evaluate executional and operational factors while selecting the most feasible solution.

Some aspects to consider might be:

- How to deliver an accurate CAPEX and OPEX filtration trade-off?
- How to operate safely and efficiently, while maximizing uptime?
- How to manage on-time and on-budget project execution given multiple stakeholders?
- Most importantly, how to obtain an integral service package as capabilities are widely scattered in the industry?

Seeing the Bigger Picture

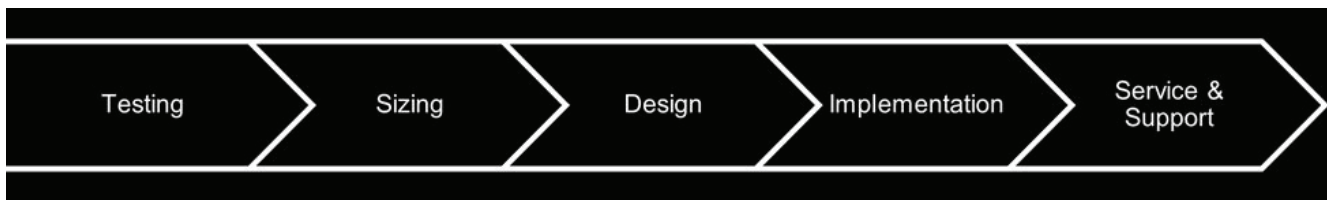
Metso, a leading minerals and metals processing technology

supplier with long experience also in filtration plant configurations, says that customers often conduct cost evaluations and quote comparisons focusing on the equipment level. Strong focus on equipment only is due to many reasons, but often the reason is simply a conventionally split project execution model, where technology suppliers and EPC/M service providers are all evaluated as individual portions, instead of considering a holistic, performance driven package.

Equipment-based approach can later lead to unexpected costs, as factors such as the required auxiliaries, steel structures, piping, and so on, may not be well estimated. Evaluating the entire plant configuration is crucial for accurate cost assessment. Hence, it would be beneficial to shift to a holistic approach considering total investment and ownership costs instead of equipment only focus.



Metso filtration plant



From testing to production

Sizing & Early Testing Give a Strong Starting Point

Ensuring the processing plants' maximum performance and competitive advantage starts in the early phases of a project. Sizing technology correctly is the key to success, whether it is an equipment supply or a system level scope.

As the feed characteristics are always case specific, accurate sizing with all the required auxiliaries requires testing. Testing at the very beginning of the project is the most affordable way to reduce the overall investment cost and the associated risks.

Comprehensive testing is available through, for example, Metso. With decades of testing experience and a global database of over 14,000 test cases, the company's Dewatering Technology Center serves as a comprehensive resource for all testing needs, ranging from bench-scale to laboratory and pilot testing.

Plant Design - Balancing Complexity and Clarity

Moving forward from testing and sizing during case development, it is possible to develop a business case and generate initial estimates using factorization methods based on literature-derived factors. While this approach allows for a quick estimation of the total investment, it can easily lead to incorrect evaluations and investment decisions.

The primary issue is that general process plant cost estimation models are often a poor fit for filtration technology. Filtration does not adhere to the typical costing principles, making the process more complicated, especially when pre-designed concepts or products are not available.

The accuracy of estimates is further compromised when assessing multiple filtration technologies, each with significantly different cost structures at the plant level.

Moreover, various sizes of filtration plants utilizing similar technology do not follow a linear cost path. Typically, more advanced filtration technologies result in a larger proportion of the total cost attributed to equipment. However, the overall price could remain the same or even more cost competitive. This nuance is often overlooked when using factorized estimations without considering the details. The key question worth pondering at this stage is that, if there's two or more suitable technology options, how are we supposed to make the correct decision beyond technical and performance aspects - by focusing on the equipment prices or should we instead look at the total plant costs?

The design of a filtration plant can make or break a project. This applies to both large-scale and smaller capacity filtration plants. Therefore, it is important to take a holistic approach to every project to provide the best possible solution and service support in terms of technology and filtration plant design.

Creating an optimized plant design with specific filtration technology requires specialized experts, who



Larox® FFP 3716 Filtration Plant Unit.

Metso Larox® FFP and tailings filtration

The Larox® FFP filter family stands out for its ability to handle high-volume processing across various applications. Utilizing advanced technology and a design focused on reliability and easy maintenance, the Larox® FFP filters offer multiple key benefits. Not only do they optimize dewatering processes, but also contribute to significant long-term savings, thus making them an invaluable asset for any mining operation.

Being part of Metso Plus offering with a focus on resource optimization, the Larox® FFP 3716 filter is a trusted solution for the industry's growing volume of tailings and water scarcity challenges. Dewatering and dry stacking tailings help minimize environmental impact and risks associated with tailings storage facilities. One of the significant advantages that the Larox® FFP3512 and Larox® FFP 3716 models can offer is the hole-less filter cloths feature. What does this mean for your operations?

- No filling shoes are required to be mounted on the cloths, leading to reduced downtime and lower maintenance costs
- The filter can handle ~14,000 t/day of coarse or sandy tailings and ~10,000 t/day of fine or clay tailings
- Increased availability resulting in more tons per hour
- Lower air consumption during air drying is due to eliminating bypassing on the filling shoe
- Simple to install, maintain, operate and remove
- Guaranteed consistently low cake moisture.

have extensive experience in the technology. However, those are few and far between even on a global scale. Alternatively, designing a plant without a professional who specializes in the field comes at an elevated risk and higher costs.

Comprehensive Filtration Plant Units

As in every process step in various industries, filtration is not different; a well-functioning, safe and operator

friendly process is not achieved only by having good filters. The auxiliary systems, including EIA, which are serving the filter, may impair a good technology's performance. That's one of the reasons why Metso developed the Filtration Plant Units offering to maximize operational reliability in diverse types of dewatering applications where superior process performance combined with energy and water efficiency are required.

The Larox® PF and Larox® FFP Filtration Plant Units have been specifically designed for the dewatering of concentrates, tailings, and industrial applications. These modular and advanced plant units bring operational reliability, scalability, and safety to the forefront by combining in-depth expertise and a comprehensive scope, assuring solid performance and proven results. The Filtration Plant Units come as complete customizable solutions to meet customer needs. By using pre-designed plant products, this also enables accurate cost estimations for sites.

A Filtration Plant Unit with optimized design for a total capacity of > 50,000 t/day could look like the following illustration by Metso, whose filtration plants have been designed with a variety of adaptable flowsheet options.

Larox® FFP 3716 Filtration Plant Unit.

As a conclusion, every filtration system requires a well-designed plant and supporting functions to operate efficiently. To achieve the maximum designed throughput cost-effectively and safely, these elements must be perfectly designed and engineered to reliably serve the core filtration technology. ■

Author



Toni Kuisma
Product Manager - Filtration Plant Units
Metso

Efficient Separation of Substances: Use of Bellows Pulsators in Extraction Processes

The modular design and electronic synchronisation of several pulsators allows stroke volumes between 0.2 and 28 litres.

In the chemical and pharmaceutical industries, it is often necessary to separate mixtures of substances. However, when these substances have similar boiling points or energy consumption must be minimised, conventional extraction methods quickly reach their limits. In such cases, using column extraction processes in which the mixture is subjected to controlled pulsation can be technically and economically advantageous.

LEWA pulsators for the chemical and pharmaceutical industries.

The LEWA bellows pulsator guarantees a particularly uniform pulse that is gentle on both the medium and the system itself. Thanks to the precise adjustment of amplitude and frequency, the system can be optimally adapted to different substance mixtures and separation tasks. Based on the robust, well-established and low-maintenance LEWA modular system, this bellows pulsator allows a high degree of variability in stroke volumes.



LEWA pulsators for the chemical and pharmaceutical industries

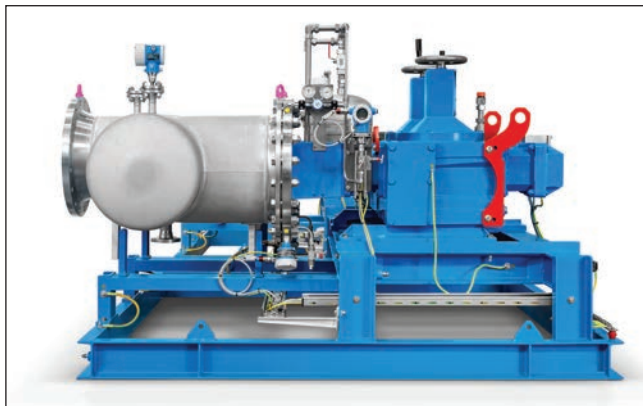
Industrial extraction plants increasingly work with complex liquid mixtures that must be processed in large quantities under constant conditions. In continuous flow extraction columns, insufficient mixing can lead to inefficient separation of the substances, resulting in large quantities of liquids remaining unused, product losses and high operating costs.

Inadequate mixing can be solved using pulsed extraction, in which the pulsing motion achieves a high separation efficiency with low energy consumption. In this process, bellows pulsators are used at the base of the column to achieve the necessary intensive mixing of the phases. LEWA bellows pulsators are suitable for use in both perforated bottom extractors and packed column extractors.

Feeding Extraction Columns up to 18 metres High

LEWA bellows pulsators feature push button controls that can be used to feed extraction columns up to 18 metres high. This allows stroke volumes of 0.2 and 28 litres at stroke frequencies between 20 and 160 cycles per minute. LEWA achieves high stroke volumes in

the most modern systems by electronically synchronising the individual pushbuttons. For optimum efficiency, the modular system drives the bellows mechanically. "The bellows are operated with our adjustable eccentricity mechanism, which means that the stroke length can be infinitely variable and highly precise, even during operation. In combination or separately, the stroke frequency can also be varied using a frequency converter," explains Karl-Heinz



The wetted components are made of hygienic stainless steel and PTFE.

Vogler, Head of Sales Process Industry & Downstream at LEWA.

Thanks to its robust design, the LEWA bellows pulsator is also suitable for continuous operation. The components in contact with the fluid are made of hygienic stainless steel and polytetrafluoroethylene (PTFE). In addition, a pressure compensation system with gas cushioning prolongs the service life of the bellows and minimises the drive energy required to generate the pulsation. "This significantly reduces operating costs, especially with large pulsation volumes and column heights," adds Vogler.

Comprehensive Leakage Monitoring for Operation in EX Zones

An integrated leak detection system in the bellows ensures safety during operation at all times. The system



The wetted components are made of hygienic stainless steel and PTFE.

sensor detects liquid leaks at an early stage and triggers an alarm or stops operation automatically. The nitrogen pressure at the rear of the bellows is also measured continuously and can be adjusted to the respective process. This stabilises the movement of the bellows, which reduces wear and tear and promotes a uniform and harmonious pulsation. This nitrogen atmosphere also ensures safe operation in EX zones, areas with potentially explosive atmospheres. Furthermore, flammable mixtures inside the pulsator are prevented from escaping in the event of a fault.

The high flexibility of the system is not only evident in the stroke and volumes, but also in the high adaptability of the installation: the connection geometry of the bellows pushbutton is specifically adapted to the respective extraction column. "During the planning of the pushbuttons, we also take into account the material requirements and the particular design features, so that the pushbuttons are designed to be exactly adapted to the subsequent use environment. This includes, for example, the mounting of multiple pushbuttons on rails, which enables the bellows to be replaced quickly and easily," sums up Vogler. ■

For more information, please visit:
www.atlascopcogroup.com
www.lewa.com

Author

Karl-Heinz Vogler
 Head of Sales Process Industry & Downstream
 LEWA GmbH



WORLD ENVIRONMENT DAY

JUNE 5

Building a Sustainable & Greener Tomorrow!

World Environment Day, celebrated annually on 5 June, has been raising awareness and driving changes for the environment. The day is marked by annual themes, major initiatives and accomplishments. In an exclusive interview with *Chemical Engineering World*, industry leaders from across the chemical segment, share their views on the significance of going green, the various initiatives and steps that they have taken to build a sustainable and greener future

“All Henkel sites in India follow a structured sustainability framework”



“In recent years, sustainability has become a defining priority for manufacturers in India, driven by climate urgency, evolving regulations, and growing public expectations. Henkel India has taken this challenge as an opportunity to lead by example, aligning local actions with its global environmental goals. Our goal is to

offer increasingly better solutions, products and services that also have a positive impact on the environment and society. All Henkel sites in India follow a structured sustainability

framework focused on energy efficiency, water conservation, and waste reduction, supported by advanced, sensor-based monitoring systems for real-time optimization. Through impactful initiatives, such as partnering with a renewable energy developer, we have enhanced solar power utilization at our Kurkumbh and Thane sites.

These efforts align with Henkel’s global net-zero ambition, which aims for a 90 per cent overall emissions reduction by 2045, validated by the Science Based Targets initiative (SBTi). On the occasion of World Environment Day 2025, Henkel organized a mangrove clean-up drive in Navi Mumbai to combat plastic pollution, reaffirming its dedication to biodiversity conservation and local environmental well-being.”

Mr. S Sunil Kumar
Country President – India
Henkel

“It is easy to live closer to nature — it just starts with caring”



“We all love the mountains, the sea, the snow, and the lakes. We love being outdoors, under the sun, the moon, and the stars. But the truth is — we are destroying what we love. Plastics and carbon emissions are choking the planet, and if we continue at this rate, earth may not remain sustainable for future generations.

It is time we wake up. Rivers are drying, temperatures are rising, and nature is sending us signals we can't ignore.

Sustainability doesn't require big sacrifices — it begins with small, conscious choices:

- Turn off lights and appliances when not in use.
- Use solar rooftops or energy-efficient appliances.
- Avoid frequent online food orders packed in plastic.
- Carry your own water bottle or shopping bag.
- Compost kitchen waste.
- Choose walking or cycling for short distances.
- Support local produce over heavily packaged imports.

It is easy to live closer to nature — it just starts with caring.

Mr. Ashwin Raikar
 Managing Director, Nauvata Energy Transition (NET)
 Enterprise Pvt. Ltd, Bengaluru

“Sustainable agriculture is no longer a choice but it is imperative”



“The future of farming lies not in exploiting the land, but in healing it. Sustainable agriculture is no longer a choice but it is imperative. By nurturing soil health, conserving water, embracing crop diversity and empowering smallholder farmers, we can grow more with less and build resilience against climate shocks.

At Agrifields DMCC, we believe every farm can be a climate solution. The technologies and practices are already in our hands but what we need now is collective will and long-term commitment. Let this be the decade where agriculture becomes the frontline of climate action restoring ecosystems, supporting livelihoods and ensuring food security for generations to come. Sustainability is not a destination but it should be a daily practice rooted in respect for nature and responsibility toward the planet.”

Mr. Amit Gupta
 Co-Founder & CEO
 Agrifields, Dubai

“Our vision is to build not just machines, but a future-ready, greener tomorrow”



“In today's rapidly evolving landscape, sustainability is no longer a peripheral concern — it is a strategic imperative. At ACE, we have embedded green design and low-carbon growth principles into the very fabric of our operations. Through continuous investment in R&D and technology-driven solutions, we have

developed electric cranes, CEV-V compliant machinery, and high-efficiency electric forklifts that enhance productivity while significantly lowering emissions. We also prioritize renewable energy adoption and energy efficiency across our manufacturing units. Sustainability is a shared journey, and

we believe that empowering leadership, employees, partners, and customers with data-driven tools and awareness is vital for long-term impact. Our vision is to build not just machines, but a future-ready, greener tomorrow, where development and environmental stewardship move forward hand in hand.”

Mr. Vyom Agarwal
 President
 Action Construction Equipment Ltd

"I will start with planting 20 trees this year"



“प्रकृतिः रक्षिता रक्षति.

Adapted from a verse in the Mahabharata, this means that if we protect the nature, nature will protect us. Sadly, we have not kept our part of the promise. And as a result, the

spends on dealing with natural disasters related to climate change have increased 6-8 times in the last three decades. If proof is in the pudding, 2024 is the hottest year recorded in the history of humankind.

We need to remind ourselves to do our bit. In India, our per capita CO2 emissions from the use of fossil fuels is 2.25 tonnes per year. A tropical tree sequesters approximately 22kg of CO2 per year. So to make ourselves carbon neutral each one of us should plant approximately 102 trees and keep them healthy!

Here is my Environment Day resolution, therefore - I will start with planting 20 trees this year and reach the target of 100 trees in 5 years or sooner.

Will you make your resolution match or exceed mine? Please do!"

Mr. Baroruchi Mishra

Group CEO, Nauvata Energy Transition (NET) Enterprise Pvt. Ltd., Bengaluru

"At every stage, we evaluate and review the footprint of our actions"



"At Rodic, we take pride in being environmentally conscious in our designs and operations. We understand the nexus between the resources (water, energy, materials), nature and society at large. At every stage, we evaluate and review the footprint of our actions to create a net positive impact. We truly understand

the importance of our planet and the people for our existence and value ESG in all our operations.

We consider ourselves fortunate to be in the infrastructure domain as we are contributing to the country's robust GDP in a sustainable and inclusive way by aligning with Sustainable Development Goals (SDGs), Viksit Bharat 2047, and net zero commitment of Government of India. Sustainability thinking is impregnated in all our designs, operations and allied activities.

The theme for World Environment Day 2025 – 'Beat Plastic Pollution' could not have been more apt. Though plastic was considered once as a 'wonder material' due to its durability, stability, affordability and versatility, its perception has changed due to severe environmental pollution being caused by its use. We all know about its carbon footprint, non-biodegradable nature and microplastic pollution, which is threatening the fragile ecosystem.

We at Rodic take pride in following 'zero non-compliance' policy in all the projects we design, supervise and operate. At our corporate office, regional and site offices, we have voluntarily banned single use plastic and resorted to more sustainable materials.

We pledge to raise awareness about the pervasive impact of plastic waste on the environment, encourage solutions to reduce its use and promote sustainable practices."

Mr. S. T. Ravishankar

**Vice President, Environment and Sustainability
Rodic Consultants**

LEWA launches compact triplex diaphragm pump



LEWA has launched the new triplex G3E, a compact triplex diaphragm pump, which has been specially developed for applications with limited space and high requirements for low pulsation. It provides around 30 percent space savings compared to modular pump models.

The LEWA triplex G3E is the smallest of its kind to date. With a hydraulic output of 10 kW, it offers a low-pulsation alternative to single-head pumps in the medium output range. Compared to a three-headed pump with a modular design, the G3E also requires a footprint that is around 30 percent smaller. As with all models in the LEWA triplex series, the three plungers of what is now the smallest triple process diaphragm pump are located in a common crankcase. The monoblock design not only makes the unit more compact than comparable modular solutions; it also has fewer individual components like gaskets and couplings, which makes the machine extremely robust. Thanks to this design, the LEWA triplex G3E can also be operated with stroke frequencies that are not possible with modular pumps.

Due to its robustness, the LEWA triplex G3E can run significantly faster than modular three-headed pumps. It has a permissible stroke frequency of up to 350 spm, which is very high for this size range. It achieves a maximum flow rate of around 20 m³/h at 16 bar. However, pressures of up to 400 bar are also possible at lower flow rates. In addition, the new triplex process diaphragm pump achieves extraordinarily high efficiencies of between 80 and 90 percent over a very broad operating range. It is perfect for fuel gas supply systems on ships and all other applications with limited space requirements. ■

Toyochem develops UV-curable hot-melt adhesive



Toyochem Co., the polymers division of the artience Group, has developed the new TOYOMELT™ P-201 Series of ultraviolet (UV) curable hot melt adhesives. The new hot melt product achieves heat resistance of 100°C and higher, making them suitable to meet the industrial demands of bonding steel components in such high performance applications as automotive and electronics devices. In addition, the P-201 Series applies an instant-cure technology for immediate tack and bonding ability, thus eliminating the need for the aging process. This leads to faster processing speeds and improved

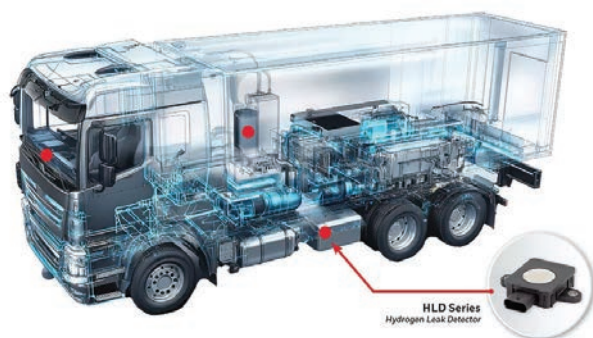
productivity for adhesives processors.

The new TOYOMELT P-201 Series of UV hot melt adhesives from Toyochem were designed to address the environmental challenges related to solvent-based adhesives and the durability issues of hot melt types. Solvent adhesives typically require drying and aging, which results in costly time losses before the material can be shipped or transferred for secondary processing. The energy costs and environmental impact associated with the drying process have also been identified as challenges by the industry.

Moreover, while conventional hot melt adhesives are known to provide environmental advantages due to their lack of organic solvents or the need for drying ovens, one of their shortcomings is performance at elevated temperatures. These products are by nature susceptible to heat, which can lead to softening or loss of bonding strength, thus making them undesirable for use in high temperature environments.

To overcome these environmental and heat-related issues, Toyochem engineers in Japan applied UV-curing technology to chemically crosslink the hot melt adhesive by UV irradiation. In early evaluation testing, the TOYOMELT P-201 adhesives demonstrate superior bond ability with difficult-to-adhere substrates of plastics like polyethylene (PE) and polypropylene (PP), metals such as aluminum and stainless steel (SUS), and glass. Furthermore, P-201 adhesives maintain a rubber-like flexibility even after it is cured or hardened, thus making it possible to bend and deform the adhesive without breaking. ■

Honeywell brings greater safety with new leak detection sensor



Honeywell has launched a new Hydrogen Leak Detector (HLD) solution engineered specifically to identify microscopic hydrogen leaks in real time to help ensure the safety of hydrogen-powered systems. By using cutting-edge Thermal Conductivity Detection technology, Honeywell's new HLD sensor can reliably identify tiny hydrogen leaks as small as 50 parts per million.

As with other forms of energy, management of the safety risks of hydrogen-powered solutions

is crucial. Hydrogen is colorless, odorless, highly flammable and rapidly diffused, making a leak difficult to detect and allowing the gas to easily escape a storage tank or pipe through seals and joints, creating risk of fires and explosions. With the introduction of Honeywell's new sensing technology, operators can now intervene early and stop a leak before it becomes a substantial safety risk.

Unlike other hydrogen detection technologies that require frequent calibration, Honeywell's HLD sensor is designed to operate without regular manual intervention. When the HLD sensor is installed adjacent to a hydrogen storage tank, gas piping, fuel cell or vehicle cabin, it does not need to be adjusted or manually calibrated for 10 years. With less required maintenance, operators are able to avoid equipment downtime and minimize labor costs in critical sectors like construction, power generation, ground shipping and air transport. ■

Corning introduces new chemical flow processing system for R&D applications

Corning Incorporated has introduced the Corning® Low-Flow Reactor System 2 as the latest product line available in its Advanced-Flow™ Reactor (AFR) portfolio. The Low-Flow Reactor System 2 – featuring a Low-Flow Reactor 2, a Lab Dosing Unit, and a chiller, enables a plug-and-play system that offers flexibility and scalability to help customers develop and process chemicals in a more efficient manner.

The Low-Flow Reactor System 2 supports customers in private, public, and academic laboratories settings with research and development work using inherently safer continuous flow technology.

Corning's AFR team leveraged the company's continuous innovation approach to design the Low-Flow Reactor System 2, which features units that provide seamless scale-up capabilities with the existing AFR portfolio. The Low-Flow Reactor System 2 includes the:

Low-Flow Reactor 2 - This solution leverages Corning's glass fluidic modules – featuring the company's 'heart-cell' design – which enables outstanding mixing and heat exchange to intensify the chemical reaction. Additionally, the Low-Flow Reactor System 2 offers improved temperature and pressure boundary conditions and a heat exchange system to manage multiple temperature zones. This unit is also fully enclosed, which allows inert gas to flow inside for lower temperature reactions (reduction of fogging) and a reduced risk of corrosion.

Lab Dosing Unit - This latest dosing solution enables a consistent and pulseless flow of reactants or starting materials, which is essential for flow chemistry. This unit features real-time graphing with an easy-to-use touch screen interface to provide an enhanced user experience and delivers high-chemical durability enabled by metal-free processing to support a broad range of reactions.

Chiller - A chiller is included with the Low-Flow Reactor System 2. ■

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GOVERNMENT OF INDIA



32nd International Exhibition and Conferences 3-6 February 2026

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

Concurrent Events



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



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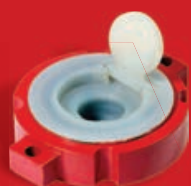
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