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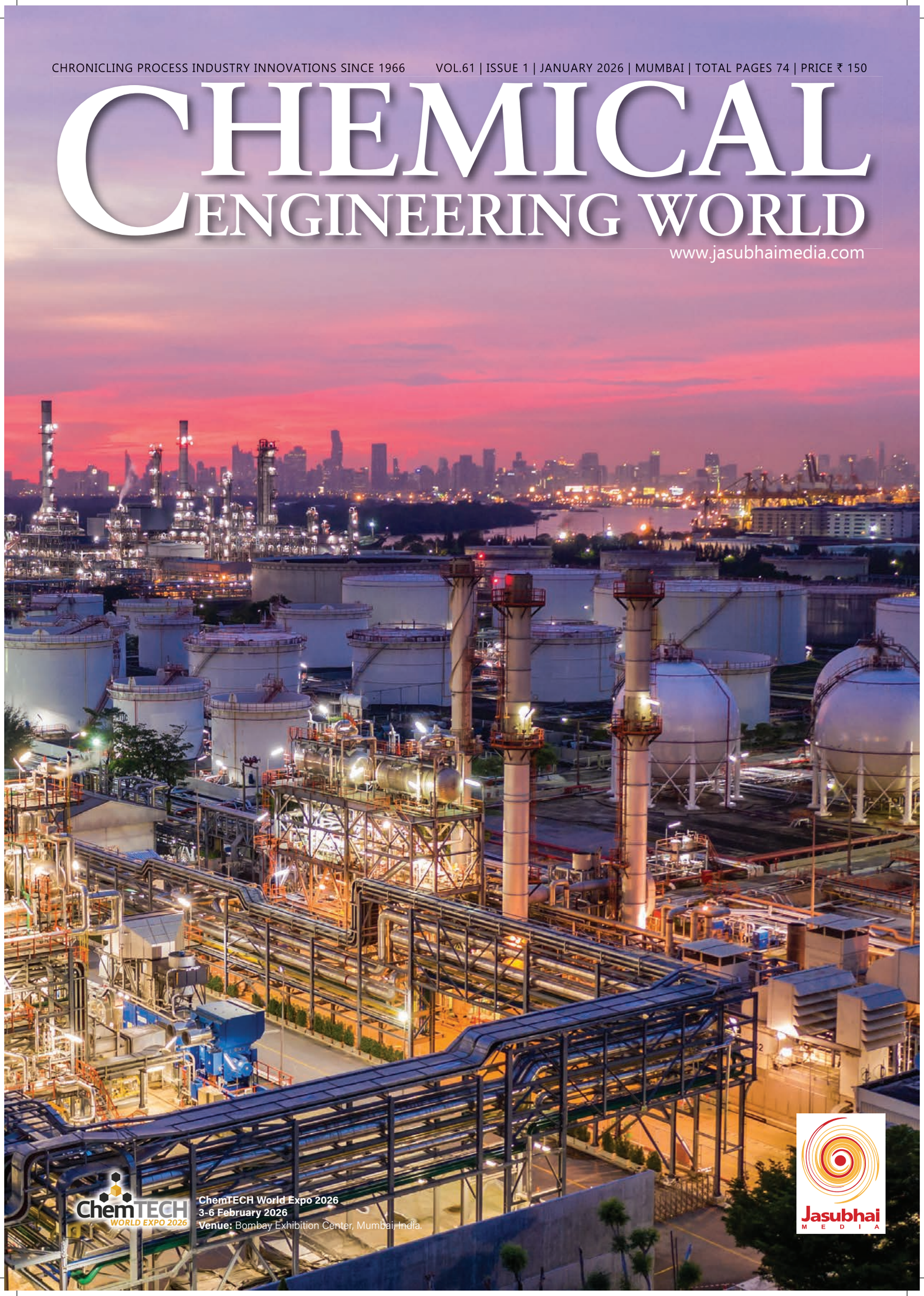

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CHAIRMAN
Maulik Jasubhai Shah

PUBLISHER & CEO
Hemant Krishna Shetty

EDITOR
Hemant Krishna Shetty

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Registered Office: 26, Maker Chambers VI, 2nd Floor, Nariman Point, Mumbai 400 021, INDIA.
Tel.: 022-4037 3737 Fax: 022-2287 0502
E-mail: sales@jasubhai.com

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AD INDEX

SPECIAL INTERVIEW

Mr. Andrew Loo
Managing Director
Akashichem Group

Mr. Krunal Chatre
Director
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NEWS FEATURE

PROJECT UPDATES 12

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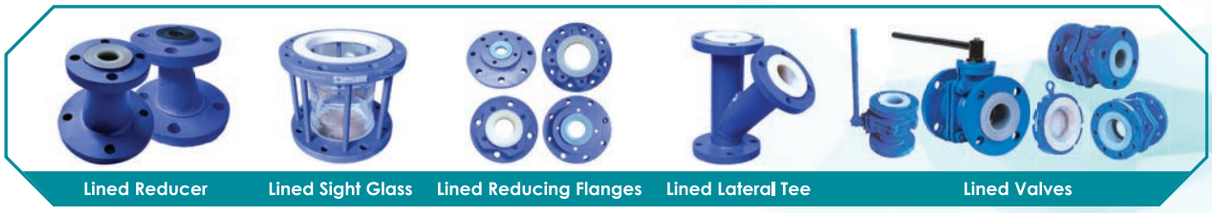

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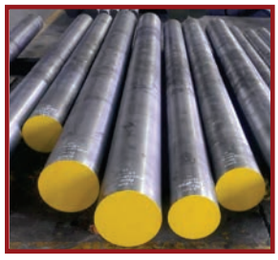

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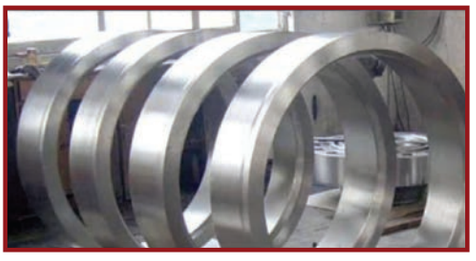

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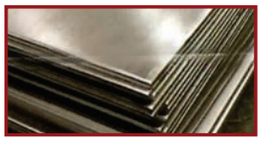
FLANGES

NUT BOLT



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GAIL inks MoU with Government of Chhattisgarh for gas-based fertilizer project

Raipur, India : GAIL (India) Limited and the Government of Chhattisgarh have joined forces for development of a greenfield gas-based fertilizer project in the State of Chhattisgarh.

A non-binding Memorandum of Understanding (MoU) was signed in the presence of Hon'ble Chief Minister of Chhattisgarh, Shri Vishnu Deo Sai. The MoU was signed by Shri Rajat Kumar, Secretary (Commerce & Industries), Government of Chhattisgarh and Shri Rajeev Kumar Singhal, Director (Business Development), GAIL (India) Limited.

As per the MoU, GAIL will undertake detailed techno-economic studies for setting up a urea manufacturing plant of 12.7 Lacs Metric Ton (LMT), proposed to be strategically located along GAIL's Mumbai–Nagpur–Jharsuguda Natural Gas Pipeline (MNJPL) corridor.

Based on the techno-economic evaluation, investment decisions will be taken for setting up the fertilizer project by GAIL. The Government of Chhattisgarh will provide facilitation across all stages of the project, including support for feasibility studies, identification and allocation of suitable land parcels, coordination with State and Central authorities, facilitation for statutory approvals & enabling infrastructure necessary for project implementation.

Tata Chemicals' arm acquires Singapore-based Novabay for over Rs 250 crore

Mumbai, India : Tata Chemicals Limited (TCL) announced that Tata Chemicals International Pte. Limited (TCIPL) a 100% subsidiary of TCL, has signed a Share Purchase Agreement (SPA) to acquire 100% equity shares of Novabay, manufacturer of premium grade sodium bicarbonate. Commenting on the acquisition, Managing Director & CEO, TCL, said, "Novabay's focus on premium-grade sodium bicarbonate aligns seamlessly with TCL's strategy to expand its presence in high-value, non-cyclical product segments. This acquisition strengthens TCL's capabilities in the specialty bicarb market & enhances our ability to serve premium customer requirements."

Novabay is among the largest premium sodium bicarbonate producers in the Asia-Pacific region (excluding China), supplying high-value grades for pharmaceutical, personal care, and food applications. The company holds key cGMP, API, and related certifications, supported by a fully automated facility.

With a current capacity of approximately 60,000 tons and potential to expand to 100,000 tons, Novabay is well-positioned for growth. The premium-grade sodium bicarbonate market benefits from steady demand in healthcare, personal care, and food sectors. Rising haemodialysis needs, improved access to medical care, and growing consumption in emerging markets drive this demand. We believe this strategic acquisition will accelerate TCL's long-term growth and value creation.

Aarti Industries secures long-term methanol, toluene feedstock

Mumbai, India: Aarti Industries Limited (AIL), a leading Indian speciality chemicals company, has secured multiple long-term supply contracts for key chemical commodities, including Methanol and Toluene, with globally leading manufacturers and suppliers across the GCC Countries (Gulf Cooperation Council) and South-East Asia.

Methanol and Toluene form a vital backbone of AIL's downstream product portfolio, supporting applications in pharmaceuticals, agrochemicals, consumer, and advanced industrial segments (FMCG) and advanced intermediates. These contracts significantly strengthen AIL's feedstock security, providing greater cost visibility, supply predictability, and operational continuity amid evolving global trade and supply-chain dynamics.

Collectively, the contracts are intended to cover a substantial portion of AIL's annual requirement of Methanol and Toluene, reinforcing margin stability and operational resilience across its manufacturing network.

Commenting on the development, CEO and Executive Director of Aarti Industries Ltd., Suyog Kotecha, said, "Securing reliable access to critical feedstocks is central to our growth strategy and customer commitments. These long-term supply agreements enhance the robustness of our supply chain, provide greater operating certainty, and strengthen our ability to serve customers consistently across global markets.

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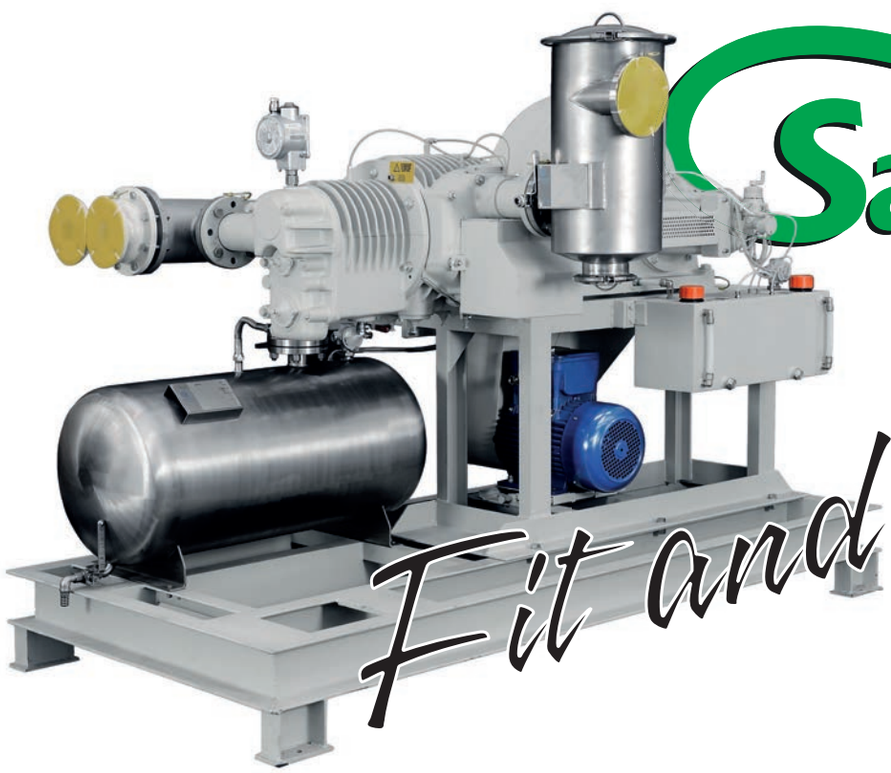

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We remain focused on building enduring relationships with credible global suppliers aligned with our long-term vision."

The collaboration aligns closely with AIL's strategic focus on partnering with high-credibility global suppliers, diversifying sourcing, improving cost and supply visibility and strengthening supply-chain resilience across key value chains.

As AIL continues to expand its global footprint, these long-term sourcing initiatives underscore its commitment to operational continuity, disciplined execution and sustainable long-term value creation within the global chemical ecosystem.

Arkema announces a proposed divestment in plastic additives

Arkema announces the proposed divestment to the Indian group Praana of some of its businesses in impact modifiers and processing aids, additives used in the manufacture of PVC profiles, pipes and packaging as well as engineering plastics. With this project, the Group continues to refocus its portfolio on its strategic activities.

This proposed divestment concerns Arkema's impact modifiers and processing aids businesses, and covers the global scope for Methyl Methacrylate Butadiene Styrene (MBS) copolymers as well as the European and Asian scope for acrylic copolymers (AIMPA).

These activities, part of the Coating Solutions segment, generated €44 million sales in 2024. This project entails the divestment of the Vlissingen production facility in the Netherlands which employs 50 people. On the other hand, Arkema will keep within its scope the Mobile plant (United States) as well as all the entirety of its American AIMPA businesses.

These plastic additives enable notably to enhance impact resistance and optimize the productivity of extrusion and molding processes for PVC and for a number of composites used in the construction and packaging sectors.

The Indian group Praana is a leading producer of specialty chemicals and composite materials comprising Sterling Specialty Chemicals, Galata Chemicals, Artek Surfin Chemicals, and 3B Fibreglass, which offer advanced solutions for the construction, textile, automotive, cleaning and personal care products industries as well as various industrial markets.

This proposed divestment is expected to be finalized in the first quarter of 2026 and is subject to a preliminary information and consultation process involving the employee representative bodies in the Netherlands. Arkema thus continues to actively manage its portfolio and to refocus on strategic and higher value-added activities in Specialty Materials.

KBR awarded green ammonia project by IGNIS in Spain

Houston, Texas : KBR has been awarded a technology and engineering contract by IGNIS for a new green ammonia facility in A Coruña, Spain.

Under the terms of the contract, KBR will provide proprietary engineering design and pre-FEED engineering services to IGNIS for a 200,000 tons per annum green ammonia plant. The facility will use renewable energy to produce green hydrogen, which will be converted to green ammonia. Green ammonia, a key element for producing renewable fertilizers, can be used as a highly efficient storage and transport medium for renewable energy and as a clean fuel.

“We are proud to support IGNIS in harnessing Spain’s exceptional renewable energy resources to produce green ammonia for domestic and European markets,” said Jay Ibrahim, President, KBR Sustainable Technology Solutions. “KBR’s green ammonia solutions, along with complementary technologies such as H2ACT® ammonia cracking, make us a global leader in delivering reliable and energy-efficient ammonia technology at a lower capital cost.”

KBR has been at the forefront of innovation in the ammonia market for decades. Since 1943, KBR has licensed, engineered, or constructed more than 260 grassroot ammonia plants worldwide.

Thirumalai Chemicals West Virginia facility moves to pre-commissioning and startup

Thirumalai Chemicals Specialties LLC, has started precommissioning and start-up activities of its new manufacturing facility in West Virginia, USA and progress to start-up operations. The company expects to start up a part of the Maleic Anhydride (MAN) unit by the end of the calendar year, with start-up and stabilization of the rest of the units progressively during H1 of the calendar year 2026.

This facility has two major plants: A Maleic Anhydride (MAN) plant with a capacity of over 40,000 tons/yr (90 million lbs/yr plus) and a Food Ingredients plant of over 30,000 tons/yr (66 million lbs/yr) of Malic acid & Fumaric acid.

Maleic Anhydride (MAN) is used in high strength-low weight composites (for housing, automotive & transport, recreational, infrastructure, energy), in water treatment materials, coatings, additives & lubes, high performance polymers and a spectrum of specialty & functional products.

The Food Ingredients plant will make and deliver essential ingredients (Malic acid & Fumaric acid) which are used in a large variety of snack foods, candies, beverages, preserves, food processing and other key applications. These products are normally made in the human and animal body and are essential for converting food into energy. This facility will initially cater to customers in North America, the LATAM and EU markets.

Only 25% of these essential food ingredients are presently produced in the United States; the rest is imported. The sole feedstock for this facility is n-Butane. TCL LLC's location in the heart of the Marcellus-Utica shale region is a significant advantage. These two plants are based on TCL India's proprietary and patented technologies, with the benefits of low investment and a very high level of energy and cost efficiency, automation and safety. All products and intermediates are readily and fully biodegradable.

The current environment in the United States, strongly encouraging domestic manufacturing is of great support to this investment. The parent company TCL India (Thirumalai Chemicals Limited, India) has about 40 years of experience in manufacturing, and marketing of these products to customers in Europe, Asia and earlier in North America.

The plants are highly automated. They were fully modularly built from equipment made by specialist companies in Europe, United States and India, and then integrated into India into modular units for final installation on site. This ensures significant investment reduction, and improvement in safety & cleanliness. The investment for the project underwent revisions due to major global events (Ukraine war, Covid, Middle East conflict) and increased US construction costs, to about $255 million, met by equity and debt.

BASF launches high-performance dispersant production line in Nanjing, China

Nanjing, China: BASF has officially commissioned its high-performance dispersant production line at the Jiangbei New Material Technology Park, Nanjing, China. This investment enables local production of the most advanced dispersants using Controlled Free Radical Polymerization (CFRP) technology. The overall global capacity increase improves supply reliability and flexibility, along with production from the company's site in Heerenveen, the Netherlands.

Dr. Stephan Kothrade, member of the Board of Executive Directors of BASF SE and Chief Technology Officer, attended the commissioning of the new line. "This new plant will establish a stable local supply to support fast-growing market demand in the industrial coatings and automotive sectors. With our advanced CFRP technology for dispersants and state-of-the-art production processes, the plant will enable the green transformation of our customers in Asia with lower PCF products," he said.

"Strong partnerships define our business. By expanding CFRP production in Nanjing, together with supply from the Heerenveen site in the Netherlands, we can respond faster and provide the flexibility that our customers need to thrive in a dynamic market," said Gops Pillay, President, Global Operating Division, BASF.

Sylvain Huguenard, Vice President of Global Additives Business Management, added, "Introducing CFRP

technology at the Nanjing plant reinforces our competitive edge. By delivering advanced dispersant solutions, we empower customers to lead in performance."

Since 2007, BASF's Nanjing plant has been a key specialty chemical production base for China and Asia Pacific. This latest expansion will further boost BASF's market competitiveness and innovation.

High-performance dispersants are essential in coatings, inks and composites, improving pigment dispersion, color performance and system stability. CFRP technology meets the demands of high-end markets for broader color gamut and superior product performance. Coinciding with BASF's 140th anniversary in China, the commissioning of the new plant underscores BASF's commitment to innovation and sustainable industry development.

Clariant announces the divestment of its business in Venezuela

Muttenz, Switzerland: : Clariant, a sustainability-focused specialty chemical company signed and closed the divestment of its legal entity, Clariant Venezuela S.A. in Venezuela for over Rs 16 crore (CHF 1.4 million) to CMV Química, C.A., Venezuela as part of the ongoing footprint optimization.

In 2024, Clariant's operations in Venezuela generated sales of around CHF 3 million and employed around 60 people. Following the divestment of the Group's operations in Venezuela and in accordance with IFRS, a CHF ~ 236 million cumulative translation adjustments (CTA) currently recorded as a separate component in the equity of the balance sheet ("cumulative translation reserves"), will be recycled through the income statement within the financial result.

This reclassification of the cumulative translation reserves is a noncash item. It will reduce reported net profit and reported earnings per share (EPS) for 2025. The reclassification and recycling will have no impact on Clariant's cash flow statement, the Board of Director's shareholder distribution framework and Clariant's profitability guidance of EBITDA before exceptional items of 17 to 18 % for 2025.

L&T's hydrocarbon onshore arm secures major BPCL order

Mumbai, India: L&T's Hydrocarbon Onshore business vertical (L&T Onshore) has won a major order from Bharat Petroleum Corporation Ltd (BPCL).

The scope of work encompasses engineering, procurement, construction and commissioning of a Linear Low-Density Polyethylene / High-Density Polyethylene (LLDPE / HDPE) Swing Unit comprising two trains of 575 KTPA each, at Bina in Madhya Pradesh.

To be executed by L&T Onshore on a Lump Sum Turnkey basis, it will be India's largest LLDPE / HDPE Swing Unit, setting a new benchmark in polyethylene production capacity.

The project forms an integral part of BPCL's Bina Petrochemicals & Refinery Expansion Project which aims to set up a petrochemical complex and enhance refinery capacity from 7.8 MMTPA to ~11 MMTPA. It aligns with the Government of India's 'Aatmanirbhar Bharat' vision by strengthening domestic manufacturing and achieving self-sufficiency in polymer production.

Commenting on the order win, Mr. Subramanian Sarma, Deputy Managing Director & President - L&T, said: "This is a major order that will not only strengthen our balance sheet but also provide impetus to our demonstrated credentials in the downstream hydrocarbon EPC space."

Mr. E S Sathyanarayanan, Senior Vice President & IC Head of L&T Energy Hydrocarbon - Onshore & Member of the Ecom – L&T: "In the ever-evolving landscape of the hydrocarbon and petrochemical sector, this win for L&T Onshore is a testament to the trust that customers repose in our execution and delivering capabilities. We are fully committed to delivering the project with high standards of HSE and quality."

L&T Onshore is one of India's largest EPC businesses, delivering comprehensive Lump Sum Turnkey solutions across the upstream, midstream and downstream hydrocarbon sectors. With a strong execution track record across geographies, it has delivered refinery expansions, petrochemical complexes, gas processing plants, fertiliser plants, LNG terminals and cross-country pipelines.

World's first dynamic green ammonia plant starts operations in Denmark

The partnership between Danish companies Skovgaard Energy, Topsoe and Vestas has reached an important milestone: The world's first-of-its-kind green ammonia plant has started operations. The plant, owned by Skovgaard Energy and located in Ramme Denmark, demonstrates how renewable power can be coupled directly to an ammonia plant while taking the fluctuations in power production into account without having a hydrogen storage.

Annual production capacity is 5,000 tons of green ammonia, with a CO_2 reduction of 9,600 tons. The partnership has received DKK 81 million (app. EUR 11 million) in funding from the Danish Energy Technology Development and Demonstration Program (EUDP).

Topsoe, a global leader in carbon emission reduction technologies, and its partners Skovgaard Energy, a Danish developer of green energy assets, and Vestas, the global leader in wind energy solutions, have reached a major milestone in their partnership: The world's first dynamic green ammonia plant is now in operation and producing green ammonia.

First of a kind, the plant demonstrates a dynamic approach, which entails that the plant will adapt to the inherent fluctuations in power output from the renewable power sources in integration with the plant's electrolysis and ammonia synthesis loop. This will ensure optimal production and improve cost-effectiveness of green ammonia. The dynamic approach is important as it optimizes operations and ensures less need for costly storage solutions of green hydrogen or renewable power.

Kim Hedegaard, CEO Power-to-X at Topsoe, said: "This is a significant achievement. By working across the value chain, we're accelerating green ammonia as a pathway to diversify our energy supply and decarbonize energy-intensive industries and long-distance transportation like shipping and agriculture."

Niels Erik Madsen, CEO at Skovgaard Energy, said: "We are extremely proud of this groundbreaking project in Northwest Jutland driving innovation, growth and job creation locally. It demonstrates the energy systems of tomorrow – scalable worldwide to accelerate the green transition."

Topsoe delivers the ammonia technology, and Vestas delivers renewable wind power adding to the power provided from Skovgaard Energy's solar panels and wind turbines. Ammonia – either in the form of low-carbon ammonia or as an e-fuel – is expected to play a critical role in the world's fuel mix. It can be transported using existing infrastructure; and it has multiple end-uses, not only as a fuel or hydrogen carrier but also to help decarbonize industrial processes like agriculture, shipping and steel production.

The plant is a demonstration project, which has received funding from the Danish Energy Technology Development and Demonstration Program (EUDP). Located at Ramme near Lemvig, Northwest Jutland, Denmark, the plant will produce 5,000 tons of green ammonia annually from renewable power. This production will prevent approximately 9,600 tons of CO_2 from being emitted into the atmosphere every year. To function, the power input will be from 50 MW new solar panels and 12 MW existing V80-2.0 MW Vestas wind turbines. ■

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"We aim to become a one-stop solutions provider"

Mr. Andrew Loo
Managing Director
Akashichem Group

Akashichem Group of Companies, established in 2000, is part of the Cavalier Capital Group of Companies. It is a leading chemical distributor specializing in high-quality chemicals and gases. In an exclusive interview with *Chemical Engineering World*, **Mr. Andrew Loo, Managing Director, Akashichem Group**, throws light on the company's growth journey, future plans and continued partnership with Chemtech, one of biggest integrated exhibition and conference for chemical process industry.

Can you give us a brief backgrounder about the origin of Akashichem?

Akashichem Group of Companies, established in 2000, is a globally integrated organisation specialising in the sourcing, distribution, and supply chain management of chemical and specialty materials. With over two decades of industry experience, we operate through 14 strategically located offices worldwide, enabling us to serve multinational customers with consistency, speed, and technical depth.

Our business model is built on a robust global manufacturing and supplier network, supported by long-term partnerships with qualified producers that comply with international quality, safety, and regulatory standards. Through this network, Akashichem enables customers to access high-quality materials, innovative solutions, and new market opportunities across multiple regions.

Leveraging an extensive international network of manufacturing partners and long-standing, trusted relationships with key suppliers, Akashichem connects customers to new markets and opportunities with confidence and reliability. Our global partnerships allow us to source competitively, scale efficiently, and maintain consistent quality standards across regions. We differentiate ourselves through comprehensive sales and technical support, offering total solutions rather than standalone products.

Our teams possess deep industry expertise and strong capabilities in end-to-end supply chain management, ensuring seamless coordination from production planning to final delivery. Akashichem maintains full control and visibility across the entire supply chain, managing the direct flow of goods from our partner factories to our customers' doorsteps. By integrating production oversight, quality assurance, logistics, and compliance under one coordinated framework, we eliminate complexity and risk for our clients.

As a result, our customers are able to focus on their core business activities, while we manage all operational aspects, including production scheduling, quality

control, warehousing, packaging, international shipping, customs clearance, documentation, invoicing, and payment collection. This integrated approach delivers efficiency, transparency, and reliability — hallmarks of Akashichem's commitment to excellence in a globalised marketplace.

How would you describe the growth journey of Akashichem?

Akashichem's growth journey has been defined not by uninterrupted momentum, but by resilience, discipline, and unwavering commitment to its founding principles. Like any business operating in a dynamic and cyclical industry such as chemicals, the Group has experienced periods of both challenge and opportunity. What has consistently distinguished Akashichem, however, is its ability to remain firmly anchored to its core vision and mission, using them as a compass through changing market conditions.

From its inception, Akashichem has been built on a clear vision: to be a family of companies that fosters trusting and lasting relationships — with customers, suppliers, partners, and employees alike. This relationship-centric philosophy has shaped the Group's long-term approach to growth, favouring sustainable value creation over short-term gains. Trust, credibility, and continuity have become foundational assets, enabling Akashichem to navigate volatility while preserving strong partnerships across its global network.

Complementing this vision is a deeply embedded mission: to be responsible stewards of the businesses entrusted to us and to conduct ourselves with integrity while consistently performing beyond expectations. This stewardship mind-set has driven disciplined decision-making, prudent risk management, and a strong sense of accountability across all levels of the organisation.

Growth has therefore been pursued with care—balancing ambition with responsibility, expansion with operational control, and innovation with compliance. Central to Akashichem's progress has been its people.

The Group's success is powered by teams of experienced professionals who are highly committed, resilient, and prepared to go beyond conventional boundaries to achieve collective goals. Their technical expertise, market knowledge, and execution capability have allowed Akashichem to remain focused even during periods of uncertainty, ensuring continuity of supply, quality assurance, and customer confidence. As Akashichem expanded geographically, it did so with a clear emphasis on local market relevance supported by global standards.

In every country where the Group has established operations, it has built a strong and credible footprint by combining local presence, trusted partnerships, and centralised governance. This approach has enabled Akashichem to scale effectively while maintaining consistency in quality, ethics, and service excellence.

Over time, these strengths — principle-led leadership, strong governance, deep relationships, and committed teams — have enabled Akashichem to evolve into one of the market leaders in the chemical industry. Rather than relying solely on size or reach, the Group's leadership position has been earned through reliability, long-term partnership building, and the ability to deliver integrated solutions across complex global supply chains. Today, Akashichem's growth story stands as a testament to the power of clarity of purpose, integrity in execution, and people-driven excellence. As the Group continues to expand, it remains steadfast in its commitment to sustainable growth—strengthening its presence in existing markets, entering new regions with discipline, and continuing to build a trusted, globally connected family of chemical enterprises.

What are the challenges that the company has faced in its journey, especially with respect to the Indian market?

Akashichem's global expansion has involved navigating complex and diverse regulatory, governance, and operating environments, a challenge that is particularly pronounced in the chemical and specialty materials industry. Establishing operations across different countries requires a deep understanding of local laws, compliance standards, and business practices, as well as the ability to manage diverse workforce dynamics. In India, these challenges are amplified by the market's scale and regulatory depth, including multi-layered approval processes and varying state-level requirements.

Adapting to local business norms and building effective local teams while maintaining global governance standards has required disciplined execution and long-term commitment. These challenges, however, have been mitigated by the supportive and increasingly pro-business stance of the Indian government. Policies promoting foreign direct investment, ease of doing business, and industrial growth have created a more transparent and structured environment for foreign enterprises.

Improved infrastructure and digitalisation of regulatory processes have further facilitated market entry and operational setup. Supported by these initiatives, and guided by Akashichem's strong governance, integrity-

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driven culture, and experienced teams, the Group has been able to establish a solid foundation in India. With India's strong economic fundamentals and long-term growth potential, Akashichem is well positioned to expand its footprint and pursue a Pan-India presence, turning initial challenges into sustainable growth opportunities.

What are the company's targets and implementation plans to achieve net zero targets?

Akashichem pursues a structured, phased, and pragmatic pathway toward Net Zero, strategically aligned with its asset-light, supply-chain-focused business model in the chemical and specialty materials sector. This approach emphasises measurable progress, operational efficiency, and responsible value-chain engagement, ensuring that emissions reduction is integrated seamlessly with business performance, governance, and long-term sustainability objectives.

Implementation Strategy and Current Initiatives

1. Renewable Energy Adoption: We have begun reducing its carbon footprint by utilising solar energy to power our factories and warehouses, demonstrating early commitment to clean energy solutions. This not only reduces Scope 1 and 2 emissions but also showcases our Group's ability to implement practical, scalable renewable energy initiatives.

2. Refrigerant Recycling and Quality Assurance: Through our own AHRI-certified laboratory, we ensure that all recycled refrigerant gases meet the highest quality standards. This initiative reduces greenhouse gas emissions from refrigerants while reinforcing our Group's commitment to environmental stewardship and technical excellence.

3. Green Hydrogen Production: Looking toward the future, we will be developing a green hydrogen facility, which will be showcased at its upcoming Chemtech exhibition booth. Supported by a highly qualified R&D team and local government collaboration, this initiative positions our Group at the forefront of sustainable energy solutions in the chemical industry. Once operational, the facility will contribute significantly to reducing carbon intensity and advancing clean energy adoption. This approach integrates operational efficiency, strong governance, and responsible value-chain engagement, allowing us to reduce environmental impact without compromising business performance. By embedding sustainability into its operations and supplier relationships, the company ensures that its Net Zero commitments support long-term growth, resilience, and stakeholder value.

How has the approach towards going green changed the business scenario today worldwide? What are your thoughts?

The global shift toward sustainability and decarbonisation has created both challenges and opportunities for companies in the chemical and specialty materials sector. For Akashichem, adopting a structured green and Net Zero strategy has strengthened its competitive positioning by aligning operations with global ESG expectations, regulatory requirements, and customer demand for environmentally responsible partners. This proactive approach reduces operational risks, enhances compliance, and builds credibility with investors, customers, and suppliers.

Beyond risk management, Akashichem's sustainability initiatives create strategic value. By optimising our supply chain, logistics, and energy use, we are able to improve efficiency and cost-effectiveness. Engagement with environmentally responsible suppliers and low-carbon logistics partners also ensures resilience and reliability in our global operations.

Furthermore, positioning as a responsible and forward-looking company opens new market opportunities, attracts ESG-conscious investors, and reinforces long-term growth and profitability. In essence, going green has transformed sustainability from a compliance obligation into a core driver of operational excellence, value creation, and global market leadership for Akashichem.

> "Chemtech enables us to engage directly with customers, suppliers, and industry peers, fostering meaningful relationships and facilitating the exchange of knowledge and expertise. This combination of exposure, learning, and networking has strengthened Akashichem's presence and credibility in the industry. We are proud to be part of this exhibition and look forward to continuing to leverage Chemtech as a key platform for growth and collaboration."
>
> **Mr. Andrew Loo**
> **Managing Director**
> **Akashichem Group**

What are the future plans of Akashichem?

Akashichem's future growth strategy is anchored in product diversification, industry specialisation, and global market expansion, building on the Group's established strengths in supply chain management, technical expertise, and operational discipline. We intend to broaden our portfolio of chemical and specialty materials to meet the evolving needs of a wide range of industries, including pharmaceuticals, semiconductors, chemical processing, oil and gas, and agriculture.

By offering a more comprehensive and tailored product range, we aim to become a one-stop solutions provider, delivering both technical and operational value to our customers. In parallel, Akashichem plans to intensify its promotion of "Make in India" products across its international offices, leveraging India's growing industrial capabilities, competitive manufacturing base, and supportive government initiatives. By positioning Indian-made products within its global network, we seek to create new revenue streams, strengthen supplier relationships, and offer cost-competitive, high-quality solutions to customers worldwide. Underlying these initiatives is a commitment to operational excellence and sustainability, ensuring that expansion and diversification are managed responsibly, with robust governance, supply chain control, and quality assurance. By aligning product innovation, global market access, and supply chain expertise, Akashichem is poised to accelerate its international presence, deepen industry penetration, and enhance long-term value creation for customers, partners, and stakeholders alike.

Akashichem is a valued partner with Chemtech and has been participating in Chemtech over the past years. What factor would you attribute to this strong partnership to?

Akashichem greatly values its ongoing participation in Chemtech, a premier exhibition in the chemical and specialty materials industry. Chemtech provides an excellent platform for us to showcase our products, demonstrate our technologies, and connect with a diverse range of industries.

It also allows us to stay updated on emerging trends and innovations, helping us continuously improve our solutions and offerings. Beyond technology and market insights, Chemtech enables us to engage directly with customers, suppliers, and industry peers, fostering meaningful relationships and facilitating the exchange of knowledge and expertise. This combination of exposure, learning, and networking has strengthened Akashichem's presence and credibility in the industry.

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ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

"GFRP's biggest contribution has been eliminating corrosion"

MR. KRUNAL CHATRE
Director, MONTERRA

MR. VISHAL VACHHANI
Director, MONTERRA

MONTERRA REINFORCEMENTS PVT LTD & MONTERRA INTERNATIONAL LLP. specializes in high-performance reinforcement solutions as well as GFRP products specially designed for various industrial and recreational applications, particularly GFRP (Glass Fiber Reinforced Polymer) products, designed for durability and corrosion resistance in construction. The company crafts GFRP Rebars, Cable Trays, Handrails, Platforms, Customize structures, Poles, Towers, etc. In a free-wheeling interview with ***Chemical Engineering World*****, Mr. Vishal Vachhani, Director and Mr. Krunal Chatre, Director, MONTERRA**, share about the advantages of GFRP products, the company's growth journey, the industry trends in composite materials of the construction industry and growth of GFRP over the past five years.

What are the key factors currently driving the demand for composite materials in the construction industry in India? In what ways do these materials align with the broader goals of sustainability and eco-efficient infrastructure?

Today, we are seeing a very strong shift in the Indian construction sector towards advanced composite materials, and several factors are driving this momentum.

First, India's infrastructure push is unprecedented. Programmes under the National Infrastructure Pipeline, *Gati Shakti* and major urban development projects are demanding materials that combine durability, speed

of execution and long service life. Composites fit that requirement extremely well. Their corrosion resistance makes them especially valuable in coastal, industrial and water-related structures, where traditional steel faces recurring maintenance issues.

Second, as construction becomes more modular and prefabrication-oriented, the lightweight nature of composites is a major advantage. They reduce handling effort, lower foundation loads and help contractors speed up installation timelines — which directly impacts project cost and efficiency.

We are also seeing increasing awareness around whole-life economics. Developers and government bodies are beginning to evaluate assets over 30–50 years, not just the initial material cost. In that framework, composites clearly outperform, because they eliminate repeated repairs, recoating and downtime.

From a sustainability perspective, composites align very well with India's goals for eco-efficient and low-maintenance infrastructure. Their long lifespan means lower material consumption over time. Their lightweight nature reduces transportation energy, and prefabrication leads to cleaner construction sites and less waste. The industry is also moving toward greener resin systems and bio-based fibre options, which will further reduce the environmental footprint of composite products.

Overall, composites support India's transition toward smarter, more durable and climate-resilient infrastructure. At Monterra, our focus is to bring high-performance reinforcement and pultruded solutions that not only meet technical demands but also contribute meaningfully to sustainability, long-term value and national infrastructure objectives.

How do you envision the future of composite construction materials, particularly GFRP, within the Indian market? What trends or opportunities are shaping this outlook?

As Director at Monterra, I see a clear and accelerating role for GFRP and composite materials in India's built environment — not as niche products, but as mainstream solutions for specific, high-value use cases.

First, the market fundamentals are strong: industry reports show rapid growth for India's composites and FRP rebar markets, with high single-to-double digit CAGRs forecast over the next 5-10 years.

Second, the immediate opportunities are very concrete. Heavy-duty infrastructure — highways, bridges, coastal and marine structures, water and sewage assets, and industrial flooring — is where GFRP's corrosion resistance, light weight and low life-cycle maintenance deliver the clearest value proposition. Public highway and port programmes in particular are already driving specification trials.

Third, adoption trends shaping the short-to-mid-term are:

- **Prefabrication & systems thinking:** pultruded profiles, meshes and modular panels that cut site time and labour;
- **Whole-life procurement:** clients are shifting focus from first-cost to 30–50-year life-cycle economics, which favours low-maintenance composites;
- **Localisation & scale:** improving domestic production and supply chains are bringing down costs and improving availability.

Longer term, I expect three strategic shifts: more stringent standards and LCAs to compare embodied carbon and lifecycle costs; growth in lower-impact resins and recycled/bio-fibre research; and integrated product-plus-services offerings (design, supply, installation, warranty) from suppliers who can guarantee performance.

For Monterra, that translates into doubling down on engineered GFRP systems for infrastructure, investing in greener resin options and publishing transparent life-cycle data to shorten procurement cycles. The technology is ready — the market is now aligning to specify it at scale.

From Monterra's perspective, what are the most pressing challenges currently facing the construction sector, especially in the adoption of advanced materials like GFRP?

From Monterra's perspective, the biggest challenge in adopting advanced materials like GFRP is still awareness and mindset. Most of the construction industry is deeply accustomed to steel, so even when GFRP offers clear advantages — corrosion resistance, light weight and long service life — many decisions are still made on first-cost rather than whole-life value.

The second challenge is standardisation and approvals. While India is progressing with codes for FRP materials, they are not yet uniformly adopted across engineering consultants and government bodies, which slows specification.

Third, there is a skills and training gap. Contractors often need guidance on handling, fixing and designing with GFRP, even though it is easier to work with than

steel. This is why we invest heavily in technical support and on-site training.

Fourth, procurement frameworks still lean toward L1 pricing, which does not capture the long-term cost savings GFRP provides.

Finally, clients expect reliable domestic supply and quality assurance. As manufacturers like Monterra scale up, confidence in composites is growing. Once awareness, standards and procurement practices align, GFRP adoption in India will accelerate significantly.

Monterra aspires to lead globally in composite reinforcements, fueling the next wave of sustainable infrastructure. What strategic initiatives or innovations are you pursuing to realize this vision?

At Monterra, our vision is to be a global leader in composite reinforcements and to drive the next wave of sustainable infrastructure. To achieve this, we are focused on four key strategic initiatives.

First, we are scaling advanced manufacturing — investing in high-precision pultrusion, automated rebar lines and rigorous quality systems that align with global standards. This ensures consistency, reliability and export readiness.

Second, we are strengthening our R&D and material innovation. We are working on next-generation GFRP reinforcements, improved resin systems, hybrid composites and greener material options to deliver higher durability and more sustainable products.

Third, we are moving from just supplying materials to delivering complete solutions — offering design assistance, on-site training and lifecycle documentation so engineers and contractors can confidently specify and install GFRP.

Finally, we are actively engaging with government bodies, consultants and infrastructure developers to integrate composites into standards, pilot projects and long-term procurement frameworks.

These initiatives together position Monterra to set global benchmarks in performance, sustainability and reliability for composite reinforcements.

In what ways has GFRP contributed to the advancement of modern construction practices over the past five years? Could you share any notable case studies or impact areas?

Over the past five years, GFRP has made a significant impact on modern construction by solving some of the industry's most persistent challenges. Its biggest contribution has been eliminating corrosion, which has transformed the way we build in coastal, industrial and water-related environments. Structures that traditionally needed repeated maintenance are now achieving much longer service life with minimal intervention.

Secondly, GFRP's light weight and easy handling have enabled faster, safer construction. This has been especially valuable in metro projects, where GFRP anchors and soft-eye reinforcements have reduced TBM downtime and improved overall project efficiency.

Third, GFRP has supported the rise of prefabrication and modular systems, allowing cleaner, quicker installations with lower labour dependency — a major advantage for fast-track infrastructure.

In terms of notable impact areas:

- Metro and tunnelling projects have used GFRP to streamline TBM operations.
- Bridge and coastal pilots have demonstrated its long-term durability and lower maintenance.
- Urban drainage and utility upgrades have benefited from GRP/GFRP systems that offer quicker installation and long service life.

Overall, GFRP has shifted from being a niche alternative to a proven, performance-driven material that strengthens India's move toward durable, sustainable and fast-delivery infrastructure.

What are the latest technological innovations or material science breakthroughs that are transforming GFRP and its applications in infrastructure projects?

Over the past few years, GFRP has advanced rapidly due to innovations in both material science and manufacturing. New high-performance resin systems — including bio-based, low-carbon and improved fire-resistant formulations — are enhancing durability and sustainability. At the same time, hybrid fibre architectures, nano-additives and better fibre sizing are improving bond strength, toughness and performance in demanding infrastructure environments. On the manufacturing side, automated pultrusion, robotic filament winding and digital quality control are delivering far greater consistency and scale, which is critical for large projects. Additionally, progress in thermoplastic composites and emerging recycling technologies is making GFRP more circular and future-ready. Combined with modern design tools and evolving standards, these breakthroughs are transforming GFRP from a niche alternative into a reliable, high-performance material for next-generation infrastructure. ■

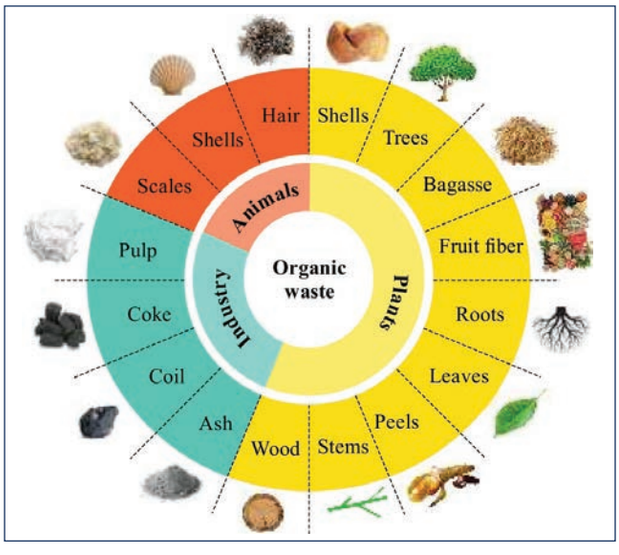
Microbial Technologies in Waste Management, Energy Generation and Climate Change

Owing to the changes in human lifestyle and resource deterioration impelled by rapid population growth and unsustainable industrialization, waste management has emerged as an extensive contrivance for human welfare and environmental prosperity as unmanaged waste impacts both rich and poor hurting their economy and environment. Waste management is a universal issue that is not only linked to individuals and households in a broader way but also affects human well-being and environmental prosperity.

Mala Mohini, Chief Operating Officer, EnviroWay Bioscience Pvt. Ltd., throws more light on the microbial technologies used in waste management, energy generation and climate change.

Organic waste, being the largest component of MSW in developing countries, can be developed into a valuable resource by utilizing microorganisms as microbes are important decomposers of organic waste. By decomposing organic waste and using it for their growth, microbes play an important role in maintaining ecosystem's carbon and nitrogen cycles. An ecosystem's microbial shift may disturb its carbon/nitrogen cycle as a result of any climate change or humanitarian factors, but heat produced by various instruments and greenhouse gases contribute significantly to global warming which in turn may be related to microbial shift of ecosystems.

The current waste management practices face challenges owing to a huge generation of greenhouse gases GHGs that has contributed to changes in consumption patterns and growth in resource squandering mainly caused by the rapid industrialization, urbanization and population growth. To reduce greenhouse gas emissions and global warming, innovative clean energy production methods must be employed to develop fuels with minimal greenhouse effect. Biofuels, such as bioethanol, provide clean energy with less carbon dioxide emissions. For the production of bioethanol it is always recommended to use microbes that are capable of decomposing complex organic matter (cellulose, lignin, hemicellulose).



Microorganisms having impressive metabolic ability are widely distributed on the biosphere, growing in wide range of environmental conditions. Their nutritional versatility can be exploited for the biodegradation of organic waste. Microorganisms are considered as the principle agents which can clean and alter the complex lipophilic organic molecules which are considered recalcitrant to simple water-soluble products. Microorganisms that carry out biodegradation of organic waste include Acinethobacter, Actinobacteria, Alcaligenes, Anthrobacter, Bacillus, Flavobacterium, Mycobacterium, Pencillium, Pseudomonas, Xanthfacter, Nocardia, Serratio etc. The advantage of utilizing microbes for organic matter degradation is that these techniques are practicable and economical it would have been unfeasible to employ physical / chemical methods.

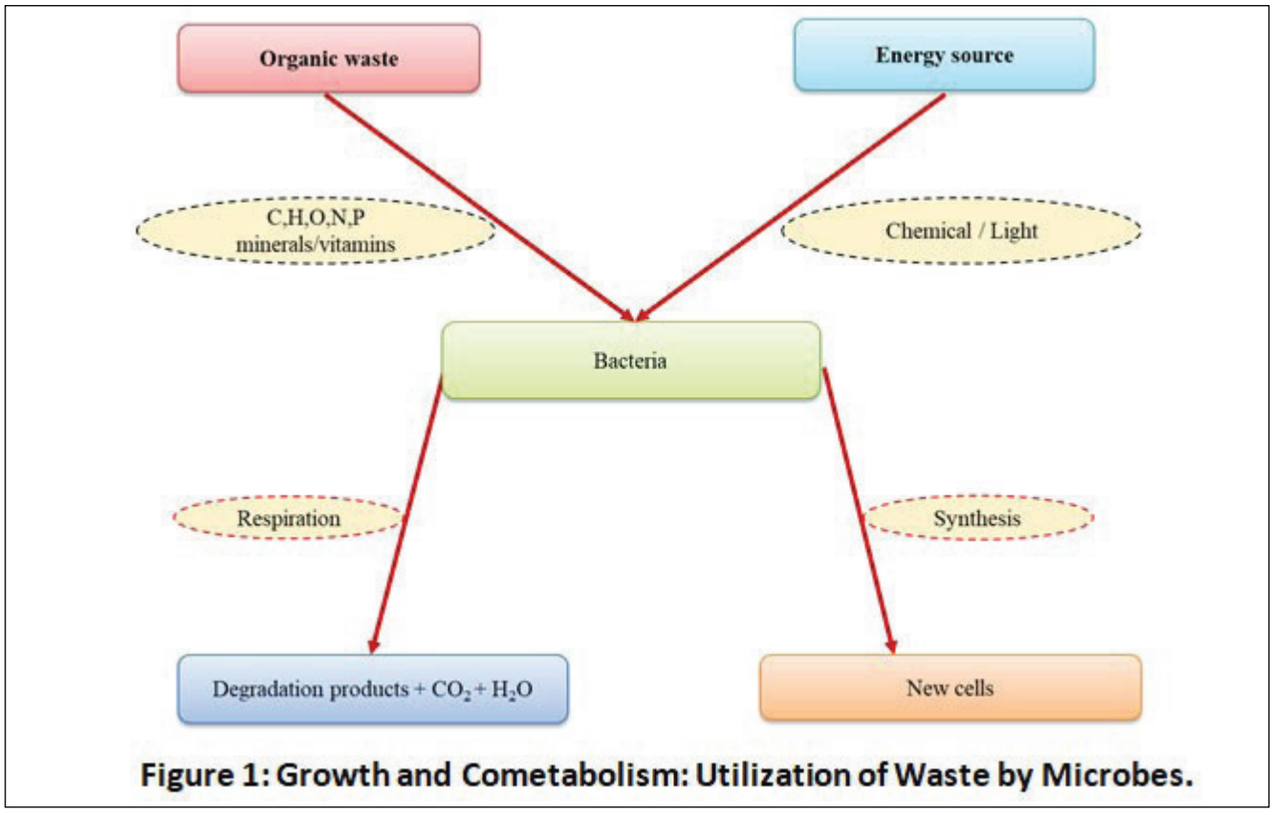


Figure 1: Growth and Cometabolism: Utilization of Waste by Microbes.

Principles of Microbial Degradation

Microorganisms utilize carbon, hydrogen, oxygen and nitrogen and the organic contaminants for their growth. Two categories of transformations exist:

- The first step in microbial degradation is growth linked as microbes utilize organic compound such as carbon and energy to support growth and the development process.
- The second step involves the microbes utilizing respirational carbon in order to maintain their cell viability. Co-metabolism is another phenomenon that involves the simultaneous degradation of two compounds also falls in second category. Co-metabolism is an essential exertion that has been utilized for organic waste degradation for more than twenty years. to metabolically degrade the hazardous solvents by bacteria.

Microbes reduce organic waste by breaking down complex organic matter through biodegradation into simpler substances, a process crucial for recycling nutrients. This is utilized in waste management techniques like composting and anaerobic digestion, which not only reduce waste volume but also produce valuable by-products such as nutrient-rich compost and biogas, which can be used as a renewable energy source.

Mechanisms of Microbial Action

- **Biodegradation:** Microorganisms, including bacteria and fungi, use enzymes to break down complex organic compounds like food scraps and yard trimmings into simpler forms.
- **Mineralization and nitrification:** In processes like composting, microbes first break down organic carbon (mineralization) and then convert ammonia into nitrates, preventing the build-up of toxic ammonia.
- **Valorisation:** Microbes can convert waste into valuable products like compost, which improves soil quality, or biogas, which can be used for energy generation.

Waste Management Applications

- **Composting:** Addition of microbial agents (like bacteria & fungi) accelerates the composting process, reducing the volume of organic waste and producing a nutrient-rich soil amendment.
- **Anaerobic Digestion:** In the absence of oxygen, microbes break down organic waste to produce biogas, a mixture of methane and carbon dioxide. This biogas can be used to generate electricity or heat, offering a renewable energy source.
- **Wastewater Treatment:** Microorganisms are the basis for activated sludge and fixed-film systems,

which degrade organic pollutants and transform waste in wastewater treatment plants.

- **Bioremediation:** Microbes can be used to degrade specific pollutants in industrial waste streams, such as breaking down complex chemicals or absorbing heavy metals.

Factors Affecting Microbial Degradation

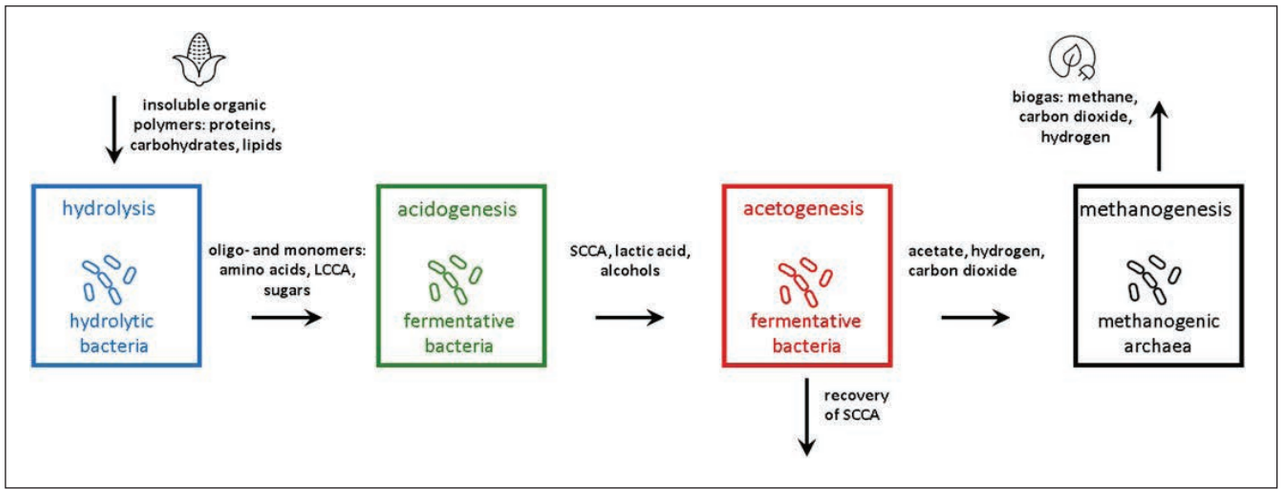
Microorganisms efficacy hinges on several dynamics including the chemical nature and concentration of wastes, their accessibility to microorganisms and the physicochemical characteristics of the environment.

- **Biological Factors:** Microbial transmutation is executed by numerous biotic factors that impact the rate of organic waste degradation via organism enzyme inhibition activities and proliferation rate. Competition among the organisms for limited carbon sources prompts enzymatic inhibition causing antagonistic or predatory interactions. Similarly, the degradation capability of organisms is facilitated by environmental contaminant concentration and catalyst activity that ultimately impact the rate of organic waste degradation. Factors like enzyme specificity, affinity and contaminant availability affect the rate of metabolism. To prevent the exponential and uncontrolled growth of microbes, proper and apt concentration of oxygen and nutrients should be supplemented by adequate conditions of temperature, pH and moisture content.
- **Environmental Factors:** The adsorption and absorption of organic compound is highly influenced by the soil type and its oxygen and moisture content. These processes are not only vital to diminish the accessibility of the contaminant to varied type of microorganisms but also impact the metabolism rate of contaminant that is proportionally declined. The oxidizing property of the soil gives the measure of electron density as Eh value >50mV indicates oxygen facilitated conditions while Eh value<50mV indicates reducing and anaerobic conditions. The desired degradation of the waste depends on the degradation reactions to which the compounds of interest will be subjected involving metabolism pathway and the mode of process classified as aerobic and anaerobic

Aerobic Degradation of Organic Waste

Under aerobic conditions, composting process is done by the exothermic reaction, producing energy in the form of heat that ultimately raises the temperature prompting degradation of organic waste (thermic phase) producing CO_2 and H_2O. Such a microbially driven process generates stabilized organic matter with high humic acid content. Composting, as an option for organic waste transformation, lessens the phytotoxicity and expands the hygienic prominence of non-stabilized OM that is beneficial to soils and plants. The process of composting involves four phases.

- **Mesophilic Phase (25-40^{0}C):** In Mesophilic phase of organic waste degradation, sugars and proteins that are energy-rich compounds are transformed by bacteria and fungi. These decomposers compete with each other for readily accessible substratum. As specific growth rates of bacteria surpass in magnitude as compared to fungi, these act as catalysts paving the ways for the mechanical transformation of organic waste.
- **Thermophilic Phase (35–65^{0}C):** The rate of degradation by thermophilic bacteria is boosted and accelerated up to a high temperature of about 62^{0}C. A temperature between 50 to 65^{0}C is highly optimized temperature for the genus Bacillus. At about 65^{0}C and greater, the thermophilic process is overtaken by *Bacillus. stearothermophilus.* The most suitable temperature where all the pathogens and harmful bacteria in waste stream are eliminated and thermophilic enzyme is activated to shorten the fermentation time is 70-80^{0}C. During the thermophilic mode of organic



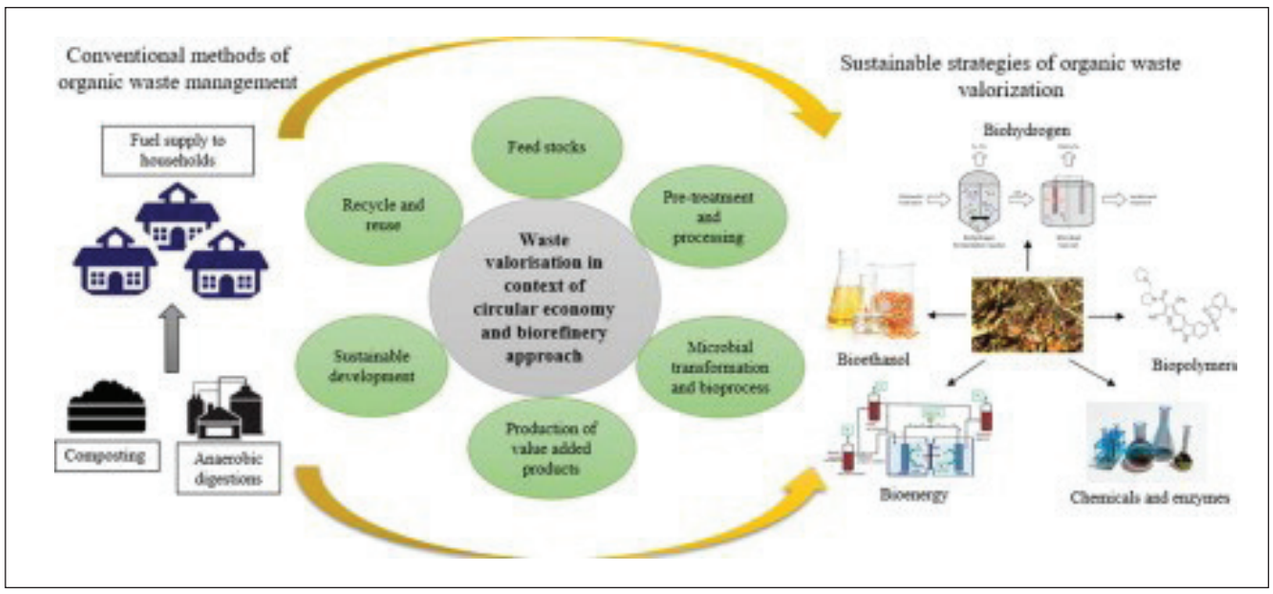
waste degradation, complex organic waste is digested, resulting in high-quality fertilizer, free of odour and pathogens.

- **Cooling Phase (Second Mesophilic Phase):** When substrates available for the thermophilic bacteria are reduced or halted owing to their activity, temperature decrease occurs. Such process is enhanced by number of microorganisms *(Cellulomonas, Clostridium and Nocardia, Aspergillus, Fusarium and Paecilomyces)* that cause starch and cellulose degradation.
- **Maturation and Curing Phase:** Owing to competitive advantage, the fungi to bacteria ratio upsurges due to diminishing water potential and lesser substrate accessibility. Compounds (lignin–humus complexes) that are not further degradable become highly dominant. In curing phase of organic waste degradation, physio-chemical parameters are not altered but microbial community changes do still occur. Organisms (*Mycobacteria and Verrucomicrobia*) tangled in macromolecule degradation begin to preponderate.

Anaerobic Degradation

Anaerobic process for organic waste degradation is a reduction process involving a series of biochemical reactions occurring under anoxic conditions. Such a process involves four different steps, Hydrolysis, Acidogenesis, Acetogenesis and Methanogenesis. The rate limiting step in anaerobic digestion is hydrolysis which causes failure under enacted kinetic process, resulting in washing out of microorganisms. Various factors such as physiology, nutritional needs, growth kinetics and sensitivity to the environment, influence the anaerobic degradation of organic waste. A delicate balance between acid forming and methane forming microorganisms can sometimes be an obstacle, prompting reactor instability and low methane production. The separation of microorganisms is based on differences in growth kinetics accomplished through membrane separation, kinetics and pH control.

- **Hydrolysis:** Hydrolysis is an enzyme facilitated alteration where greater molecular mass (lipids, polysaccharides, proteins, and nucleic acids) are transformed into simpler molecules. This process of organic waste is mediated by anaerobes (*Bacteriodes, Clostridia*) and facultative bacteria (*Streptococci*). The microorganisms secrete different extracellular enzymes that break down the complex compounds in order to take them up into the cell for use as a cradle of energy and nutrition. Different enzymes produced by microorganisms prompt the degradation of varied types of organic waste materials.
- **Acidogenesis**: During the Acidogenesis phase, monomeric compounds are taken up by the cells for the process of fermentation under the influence of electron donors accompanied by the bacteria *(Clostridium, Streptococcus and Lactobacillus)* generating Lactate, Butyrate, Propionate and Ethanol, plus CO_2 and molecular hydrogen. The process of fermentation can be accompanied through Stickland coupled deamination and deamination of a single amino acid in the occurrence of a H2- scavenging partner.
- **Acetogenesis:** Acetogenesis is accomplished by the oxidation of fermentation products to produce acetate, formate, hydrogen and carbon dioxide. The acetogenic process involving Acetogenic bacteria can be thermodynamically unstable requiring a syntrophic association between acetogen and hydrogen. The process of Acetogenesis forms the substrate for the Methanogenesis process, however, due to the



competition among/between few anaerobes and methanogens, sharing the substrate can diminish the proficiency of methane production. These include bacteria like *Desulfotomaculum, Desulfobulbus, Deferribacter, hydrogenogenic Carboxydocella* and Thermosinus that outcompete methanogens owing to an inhibition of numerous microbiotas and lowering partial pressure.

- **Methanogenesis:** Anaerobic degradation of organic waste in the Methanogenesis process involves the generation of methane accomplished by Achaea belonging to the phylum *Euryarchaeota*. In anaerobic reactors, methane-forming organisms commonly found include *Methanobacterials, Methanococcales, Methanomicrobials and Methanosarcinales.* These organisms most frequently utilize hydrogen as an electron donor, however formate or secondary alcohols can also be an option.

Microbes as Requisite Additives for Organic Waste Management

Techniques like bioremediation and biotransformation are used in microbial degradation to bind the innate proficiency of microbial metabolism to break down, transmute or accrue environmental pollutants. In recent years the utilization of microorganisms for organic matter degradation has grown tremendously over the years. This expeditious increase in such research has been facilitated by the omics approach (genomics, metagenomic, proteomic, bioinformatic) that has provided high throughput analysis of environmentally relevant microorganisms. This has enormously helped the scientific community to get new insights about the biodegradative pathways of microbes: and their ability to adapt in fluctuating environmental settings.

Microbial technologies are addressing the future needs for not only organic waste management but also clean energy/bioethanol production. However, the role of these technologies on space missions and extra-terrestrial settings needs to be explored to improve long term space missions. Organic waste should be seen as a treasured entity and not as a cradle of environmental effluence that can simply be put into landfills or incinerators, but can be transmuted into marketable harvests generating sufficient employment and profits.

Microbes are proven to augment the degradation process that provide an alternative solution to waste management, as chemical and thermal methods are not favoured in terms of cost, energy consumption and environmental prosperity. The most reliable strategy for degradation of organic waste is biodegradation by eco-friendly microbes. This has been widely accepted as an environmentally sound and economically feasible resource for treatment of solid waste and effluents. Hence microbes are a prerequisite for clean environment. ■

Author

Mala Mohini
Chief Operating Officer
EnviroWay Bioscience Pvt. Ltd.

Advanced Distillation Technologies for Sustainable Separation: Current Status, Challenges and Way Forward

Most of the industries still follows conventional ways of distillation despite various advanced distillation technologies being available which are more sustainable. This articles highlights few of the advanced distillation technologies which got good potential for energy efficient separation as compared to conventional distillation technique. It includes extractive distillation, reactive distillation, heat-pump assisted distillation and divided wall column. The article, also touches briefly the fundamental aspects to look at these advanced distillation technologies which includes vapor-liquid-equilibrium analysis, equilibrium limited reactions and improvement in thermodynamic efficiency. Current status of these advanced technologies and challenges involved in adopting them is discussed in detail along with way forward to implement them in industries at commercial scale. **Dr. Nilesh A Mali, Senior Principal Scientist & Associate Professor, CSIR-National Chemical Laboratory**, emphasizes that implementation of these advanced distillation technologies will certainly lead to more sustainable and competitive production with better product purities and recoveries, notes.

Distillation is the most preferred technology used for separation of chemicals in process industries from last several decades despite of being energy intensive. Typically majority of energy cost, around 40-60 per cent, in chemical plants comes from distillation operations. Unfortunately, in Indian Chemical industries, it is still used in the conventional way for all kind of separations without developing fundamental understanding of component systems to be separated. Hence, most of the distillation systems are quite energy intensive and with poor product recoveries. Usually, industry come across various close-boiling and azeotropic mixtures for which advanced distillation systems can offer energy efficient separation with good recoveries and purities. The advanced distillation technologies and their key features and advantages are mentioned in the Table 1.

Although, many advanced distillation technologies are now developed, very less acceptance is seen in Indian chemical industries. There are many challenges in developing and adopting the advanced distillation techniques which needs to be addressed jointly by industry and research institutes.

Vapor-Liquid-Equilibrium (VLE) Analysis

Knowing VLE behaviour of the component system to be separated is very critical to design an energy efficient distillation configuration. VLE is usually presented in graphical form as T-x,y, P-x,y or y-x plots a shown in Figure 1 a-c. It helps in understanding any thermodynamic non-ideal behaviour, such as azeotrope or pinch between bubble point and dew point curve. For isopropyl ether (IPE)-isopropyl alcohol (IPA) system non-ideal behaviour leads to a minimum boiling azeotrope. For acetone-chloroform system, a maximum boiling azeotrope is formed and its VLE plots are as shown in Figure 2 a-c. Unfortunately, VLE data is not available for many of the speciality chemicals in the literature and databanks. It is recommended to generate this data experimentally. The VLE data is also

Sr. No.	Distillation Technology	Key features	Advantages
1	Extractive Distillation	▪ Uses solvent to improve relative volatility of key components in the mixture ▪ Needs solvent recovery column	▪ Leads to complete separation of close-boiling or azeotropic component mixture ▪ Can be used in batch and continuous mode
2	Pressure-Swing Distillation	▪ Make use of variation in azeotropic composition with pressure ▪ Make use of two distillation column operating at different pressures	▪ Can separate azeotropic mixture without solvent ▪ Better product purities ▪ Can be used in continuous mode
3	Reactive Distillation	▪ Reaction and separation is done in single equipment ▪ It can be done with homogenous or heterogeneous catalyst	▪ Better conversions and yields can be obtained for equilibrium-limited reactions ▪Significantly less foot-print and operating cost ▪ Continuous operation
4	Heat-pump assisted Distillation	▪ Make use of heat pump technique for heat integration using Mechanical Vapor Recompression ▪ Heat integration can be done within the column and between two columns	▪ Can offer energy saving up to 50 per cent ▪ Can replace one heat exchanger, either reboiler or condenser
5	Divided wall column	▪ Column is divided in two sections using a partition ▪ Equivalent to thermally coupled distillation such as side stripper, side rectifier, Petlyuk column ▪ Reduces thermodynamic non-idealities due to mixing of feed stream	▪ Can offer energy saving up to 40 per cent ▪ Ternary separation can be done in single column leading to reduced footprint ▪ Can be used to further intensify reactive distillation and extractive distillation in single column

Table 1: Advanced Distillation Techniques and its Advantages

used to regress thermodynamic activity coefficient models to estimate the interaction parameters which can be further used for simulation analysis. For designing of any distillation configuration, availability of accurate experimental VLE data is crucial. It also helps in preliminary feasibility analysis of advanced distillation configurations for components system to be separated.

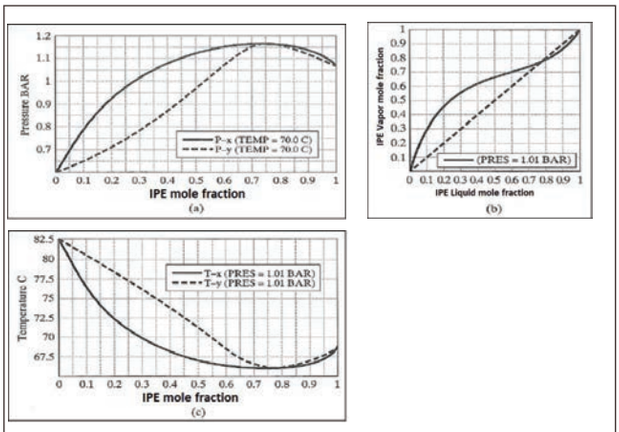


Figure 1: VLE plots for isopropyl ether (IPE)-isopropyl alcohol (IPA) mixture. (a) P-x,y diagram at 70^{0}C (b) y-x diagram at 101 kPa (c) T-x,y diagram at 101 kPa

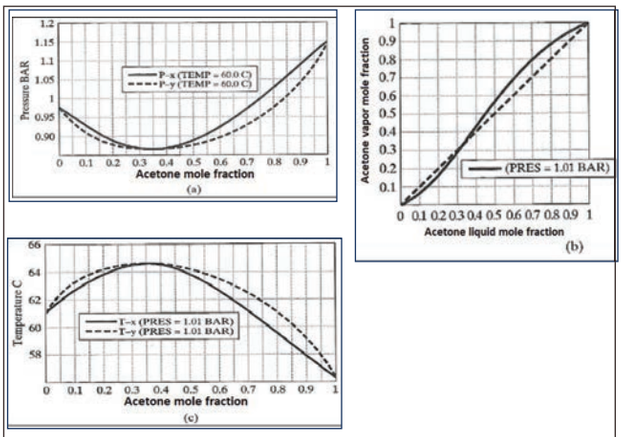


Figure 2: VLE plots for acetone-chloroform mixture. (a) P-x,y diagram at 60^{0}C (b) y-x diagram at 101 kPa (c) T-x,y diagram at 101 kPa

Extractive Distillation

In extractive distillation, a complete separation between azeotropic and close boiling components is achieved using appropriate solvent which improve relative volatility of the system. The solvent is usually high boiling as compared to components to be separated, hence it come in the bottom of the column along with one of the component to be separated. Solvent is recovered in a separate distillation column and is recycled as shown in Figure 3. Solvent being high boiling, the solvent recycle stream usually comes out at significantly high temperature and enthalpy of this stream can be recovered by heat exchange with the binary feed stream. In some cases, heat integration is also possible through heat pump which is describe in section 6.

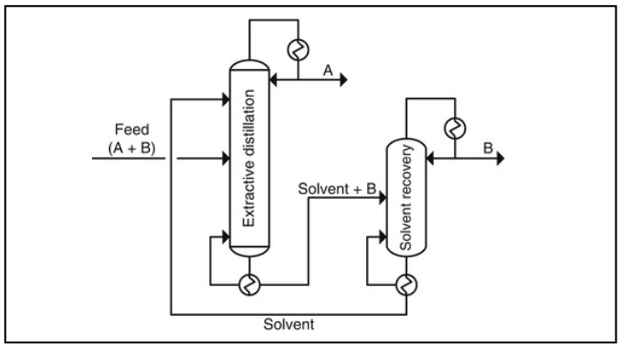


Figure 3: Extractive Distillation configuration

Pressure Swing Distillation

In some cases, azeotropic composition changes with pressure. Such pressure sensitive azeotropic systems can be separated without adding any third component using two column in series as shown in Figure 4a-b. Figure 4a is VLE plots at two different pressure and how azeotropic composition shifts with it. This enable recovery of both component in pure form in Low Pressure Column (LPC) and High Pressure Column (HPC). This configuration can be further improved using heat integration between the two columns either using heat pump technique or using high pressure overhead vapors from HPC as heat source for the reboiler of the LPC.

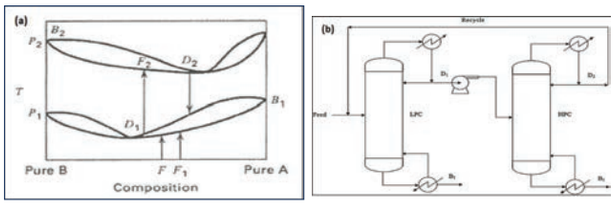


Figure 4: (a) Change in azeotropic composition with pressure (b) Pressure Distillation configuration

Reactive Distillation

Reactive distillation is the most intensified way of producing chemicals provided, VLE, reaction conditions and reaction kinetics are compatible. Particularly, it is very much useful for equilibrium limited reactions (such as esterification) to get better throughput with less capital and operating cost. In this reaction and separation using distillation is done in a single column as shown in Figure 5. In some case, where complete conversion of reactant is not achievable, additional column may be required to recover and recycle the reactant. In reactive distillation, reactive packing are used in middle section in which catalyst can be inserted. Operating conditions of the column needs to be set in such a way that temperature in the reactive

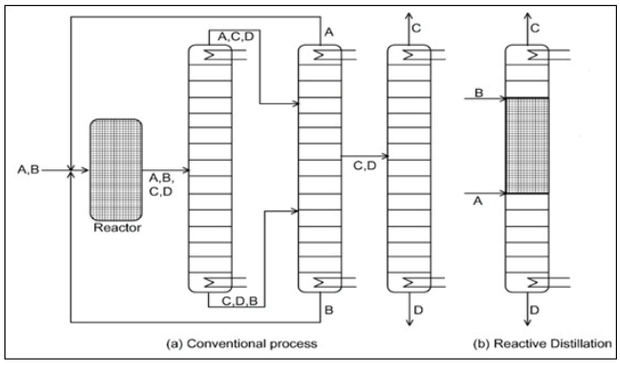


Figure 5: (a) Conventional process; (b) Reactive Distillation configuration

section does not exceed the maximum permissible limit of the catalyst. For this, VLE behaviour of all components should be well understood and column conditions can be fine-tuned to make VLE and reaction conditions compatible.

Heat-Pump-Assisted Distillation

Heat integration within the column using heat pump has a great potential to improve energy efficiency by reducing operating cost up to 20-45 per cent. It may involve significant capital investment for compressors and heat exchangers, however, the energy saving potential of this technology may make its ROI very interesting for revamping existing distillation system. The different single configurations for Heat-Pump-assisted distillations is as shown in Figure 6a-d. Similar, heat integration using heat pump is possible

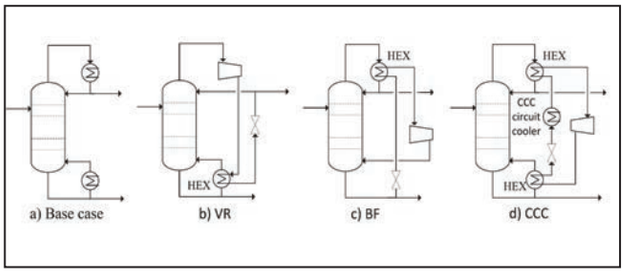


Figure 6: (a) Base Case (b) with vapour recompression (c) with bottom liquid flashing (d) with closed cycle compression

between two columns in which overhead vapors from one column can be compressed and fed to reboiler of the other column.

Divided Wall Column

Divided wall column is one of the intensified distillation technology which is suitable for ternary or more component system. It makes use of a partition in the column shell which reduces thermodynamic

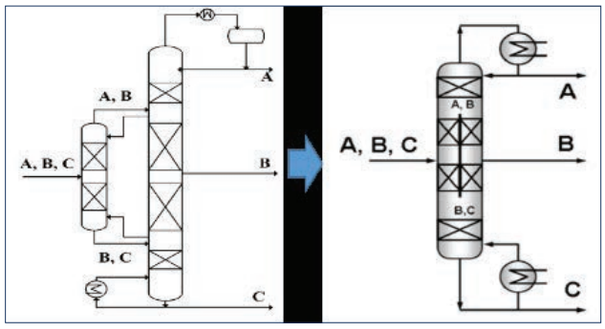


Figure 7: Divided wall configurations
(a) Petlyuk Configuration (wall at center)

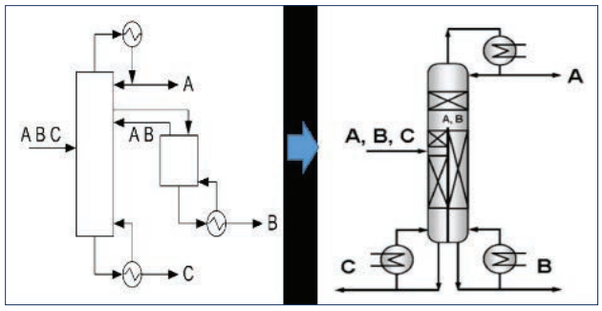


Figure 7: Divided wall configurations
(b) Side stripper configuration (Wall at bottom with two reboilers)

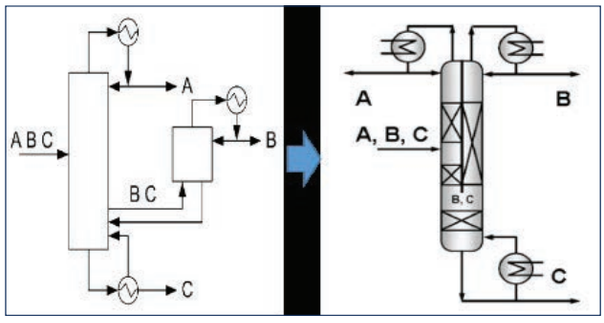


Figure 7: Divided wall configurations
(c) Side rectifier (wall at top with two condensers)

inefficiencies of mixing within the column and reduces operating cost significantly to around 20-40 per cent as compared to conventional distillation column in series configurations. Few of the configurations of divided wall and its thermodynamically equivalent configurations are shown in Figure 7a-c. The feed composition and relative volatilities of the components determines which configuration of DWC will be the most optimum. Usually, DWC provides significant energy saving when middle boiling component is in significant quantity.

Challenges in Implementation

Despite of great energy saving potential in the mentioned advanced distillation configurations along with better product purities and recoveries, very few industries have adopted few of these in commercial practice in India. Few successful implementation of DWC and extractive distillation are reported by petrochemical industries and refineries. However, specialty chemical industries are yet to adopt these technologies mainly because such as advanced distillation technologies are not available off-the-shelf for specialty chemicals.

The main challenge begins from availability reliable experimental VLE data and interaction parameters of thermodynamic model for simulation analysis. For example, in case of azeotropic system, to design extractive distillation to identify appropriate solvent, ternary VLE data is necessary. In case of reactive distillation, VLE data is must to estimate temperature profile of the column which will help to decide location of the reactive section. Screening of various advanced distillation configurations and conceptualisation of the most optimum configuration have to be done in a systematic way understanding the underlying fundamental principles such as residue-curve-maps.

Most of the configurations are well studied and results are reported based on simulation analysis. Hence, another challenge in adopting these technologies is a need for a pilot scale experimentation to establish proof-of-concept and generate design data for further scale-up. This need significant investment and time and most of the Indian industries are reluctant for it.

Summary and Way Forward

To address the mentioned challenges, few research organization has developed a good understanding on underlying fundamental principles and necessary experimental facilities to explore advanced distillation configurations for specialty chemicals. For example, CSIR-NCL is working with few industries to generate experimental VLE data and supporting them to develop simulation models for further development towards pilot plant studies. CSIR-NCL has also established pilot facility to explore extractive distillation, reactive distillation and divided wall distillation technologies. IIT Bombay has also contributed significantly in conceptualizing reactive distillation configurations for various equilibrium limited processes and few other advanced batch distillation configurations. Many other academic institutes got good capability to simulate, optimize and design process control philosophy for such advanced distillation technologies.

In nut-shell, industry should come forward and collaborate with research and academic institutes to develop advanced distillation technologies for system of their interest, instead of waiting for off-the-shelf turnkey solution to reduce their energy consumption and improve product recovery and quality. ■

Authors

Dr. Nilesh A. Mali
Senior Principal Scientist &
Associate Professor (AcSIR)
Chemical Engineering &
Process Development Division
CSIR-National Chemical Laboratory
Pune

FIDIC Contracts in Chemical Projects: Strong Framework, Weak Governance—or the Other Way Around?

FIDIC *(Fédération Internationale des Ingénieurs-Conseils)* contracts are globally recognised standard forms of contract used extensively across engineering, procurement, and construction (EPC/EPC(Management) projects. In the chemical and process industries — refineries, petrochemical complexes, fertiliser plants, and speciality chemical facilities — FIDIC contracts are often the framework of choice due to their ability to manage complexity, interfaces, and commercial risk. Despite their widespread adoption, chemical projects continue to experience cost overruns, delays, and disputes. The common narrative suggests that FIDIC does not work for chemical projects. However, industry evidence indicates the opposite - emphasises **Rashid Hussain, Executive Director, 3C Corporate Consulting & Training** – that FIDIC contracts are fundamentally sound — the failures arise from misapplication, weak governance, and lack of contractual discipline, not from the contract forms themselves.

FIDIC contracts are designed as operational management frameworks, not legal instruments to be consulted only after disputes arise. Their effectiveness lies in disciplined, day-to-day application.

Key features include:

- Clear allocation of roles and responsibilities
- Structured mechanisms for variations, EOTs, and cost control

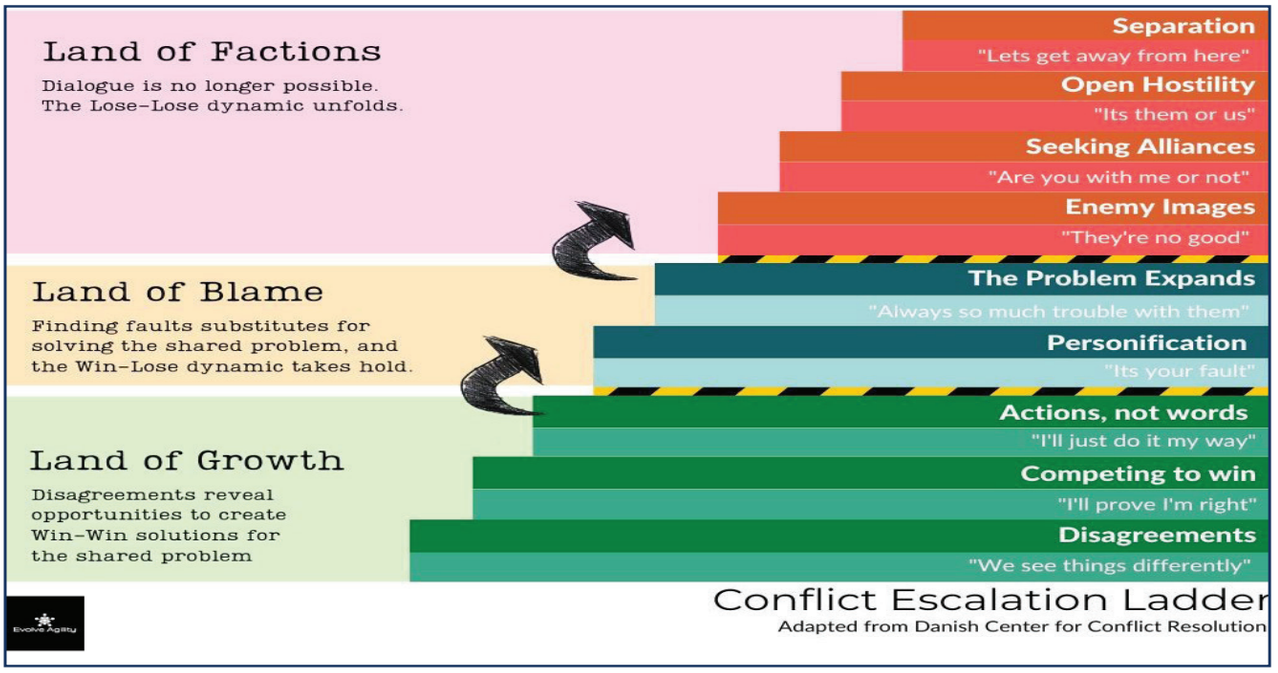
- Independent contract administration through the Engineer
- Early-warning systems via notices and claims
- Tiered dispute avoidance and resolution procedures

When applied as intended, these mechanisms promote predictability, transparency, and commercial balance throughout the project lifecycle.

Key Advantages of Using FIDIC in Chemical Projects

Global Recognition: FIDIC contracts are accepted by governments, international lenders, licensors, and EPC contractors worldwide. Their neutrality and familiarity reduce negotiation friction in multinational chemical projects involving diverse legal systems and cultures.

Clarity and Standardisation: Chemical projects involve evolving designs, long-lead equipment, licensor constraints, and stringent HSE regimes. FIDIC's standardised procedures for variations, payment certification, and time management reduce ambiguity in high-pressure project environments.



Chemical Project Dispute Escalation Ladder: Notice → Engineer → DAAB/DAB → Arbitration

Balanced Risk Allocation: FIDIC allocates risks to the party best equipped to manage them. Problems arise when contracts are amended to deny risk — for example, by transferring licensor risks to contractors without authority or compressing notice timelines beyond practical feasibility. Such unpriced risks inevitably reappear later as delays, disputes, or safety compromises.

Effective Dispute Resolution: FIDIC promotes dispute avoidance first through:

- Engineer's impartial determinations
- Timely notices and contemporary records
- Structured claim evaluation

Only unresolved issues escalate to DAAB/DAB or arbitration, significantly reducing adversarial outcomes when the process is respected.

Adaptability: FIDIC Red, Yellow, and Silver Books — along with the 2017 editions — can be adapted to EPC, EPCM, and hybrid delivery models common in the process industries, while retaining governance discipline.

Practical Application: Chemical Project Reality
In large chemical projects, change is unavoidable. Design evolution following HAZOPs, regulatory interventions, licensor clarifications, and supply-chain disruptions is the norm — not exceptions. Successful projects use FIDIC mechanisms proactively:

- Notices as early warnings, not legal traps
- Engineer-led determinations to protect cash flow
- Timely valuation of variations before impacts cascade into commissioning and performance testing

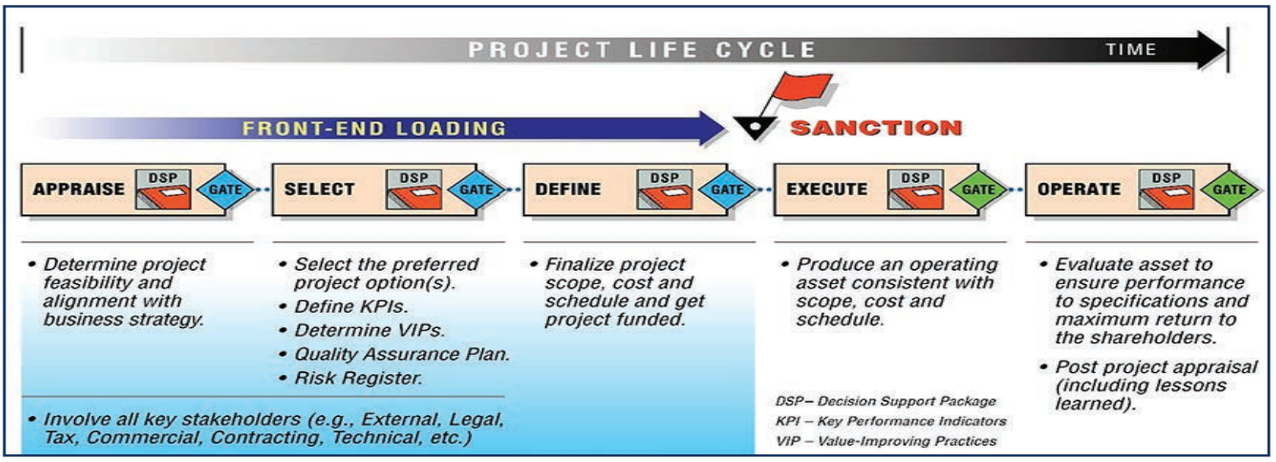
Projects that suppress notices, issue informal instructions, or delay certification rapidly lose commercial control, forcing disputes outside the project environment and into legal forums.

Challenges and Considerations

FIDIC's effectiveness is often undermined by governance failures rather than contractual limitations:

- Delayed decisions on scope and design
- Informal instructions bypassing contract procedures
- Politicised or delayed claims assessment
- Erosion of the Engineer's independence

These failures convert FIDIC from a management framework into a retrospective legal battlefield.



Risk Allocation vs Risk Denial: Split graphic showing managed risk vs delayed disputes

Future Trends in FIDIC Application

Chemical and process projects are increasingly focusing on:

- Stronger use of FIDIC 2017 dispute-avoidance tools
- Integration with digital contract administration systems
- Early risk visibility and proactive cash-flow management
- Reinforcing Engineer independence and accountability

The industry trend is clear: better governance, not new contracts.

Conclusion

FIDIC contracts are designed to govern time, cost, risk, and decision-making across the entire project lifecycle. In chemical and process-industry projects, failures rarely stem from the contract form itself. Instead, they result from governance breakdowns — delayed decisions, suppressed warnings, denial of risk, and dilution of the engineer's role.

When treated as operational management frameworks rather than legal weapons, FIDIC contracts enhance predictability, support fair commercial adjustment, and significantly reduce disputes. The chemical industry does not need new contracts — it needs disciplined application, stronger governance, and improved contract literacy. ■

Key Points

What do FIDIC contracts govern?

Time, cost, risk, and structured decision-making.

What causes chemical project failures?

Governance failures and misapplication — not FIDIC itself.

What is the Engineer's role?

Neutral administrator, certifier, and first-line dispute avoider.

Root cause of project difficulty?

Indecisive leadership and erosion of contractual discipline.

Author

Rashid Hussain
Executive Director (10+ years FIDIC Certified)
3C Corporate Consulting & Training

IPCO at ChemTECH 2026: Sustainable Process Solutions for Solidification, Film Casting and Pressing

At ChemTECH 2026, IPCO will showcase high productivity systems for chemical processing - from market leading pastillation to thin film casting and advanced composite production - backed by our global service network and local expertise in India.

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IPCO's sales and service organization operates in 25 countries across Asia, Europe and the Americas. This network of regional offices, including its Indian base in Pune, provides local, on-the-ground expertise backed up by a global service capability.

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The latest addition to the range is the Rotoform XG, a high capacity pastillation system for fertilizer finishing.

IPCO Rotoform 4G

Designed for applications such as sulphur bentonite and urea mixes as well as NPK and other fertilizers, this new model can convert melts containing solid particles into consistent, high quality pastilles from 2-4 mm diameter.

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IPCO is the world's leading manufacturer of double belt presses and scattering systems for the production of advanced composites. Applications exist across

IPCO Film casting system | Venturi drying

industrial sectors such as building, transportation / automotive and recycling.

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IPCO Thermopress double belt press system | 815lpr

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Author

Jitendra Thakkar
Managing Director
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Horizon Polymer – Innovating for a Sustainable Future

HORIZON POLYMER

Committed to Quality.
Committed to Performance.

Founded with a vision to redefine polymer solutions for the process industry, **Horizon Polymer** has steadily grown into a trusted partner for critical applications in chemical, petrochemical, pharmaceutical, and power sectors. With deep expertise in PTFE lining, corrosion prevention, and advanced valve and piping systems including columns and tanks, we have built a reputation for delivering products that combine engineering precision with long-term reliability.

Over the years, Horizon Polymer has:

- Successfully executed large-scale projects across India and overseas, ensuring mechanical integrity and compliance with global standards.
- Expanded operations by setting up manufacturing facilities in Hyderabad, strengthening capacity and regional reach.
- Established dedicated facilities for valve production and for lining of tanks & vessels, enabling specialized solutions for diverse industrial applications.
- Earned recognition for quality assurance and inspection protocols, reinforcing confidence among procurement teams and end-users alike.
- Built enduring partnerships with leading EPCs, OEMs, and process plants, becoming a preferred supplier for critical polymer-lined equipment.

Capabilities

Our core strengths include:

- **Comprehensive product portfolio:** PTFE/PFA-lined pipes, fittings, valves, provide lining for tanks, vessels and columns and customized polymer solutions.
- **Advanced manufacturing facilities** with stringent quality management systems (ISO 9001 certified).
- **Commitment to workplace safety** through adoption of ISO 45001, ensuring robust occupational health and safety practices across all operations.
- **Technical expertise** in material selection, corrosion protection, and compliance with ASTM/ISO standards.
- **Integrated support:** from design consultation and procurement guidance to inspection and performance validation.
- **Product qualification testing:**

1. Piping products successfully qualified through type tests **as per ASTM F 1545**, ensuring mechanical integrity, lining performance, and long-term reliability.
2. Ball valves validated through **Fugitive Emission Type Tests as per ISO 15848,** demonstrating compliance with international environmental standards and guaranteeing superior sealing performance under demanding service conditions.
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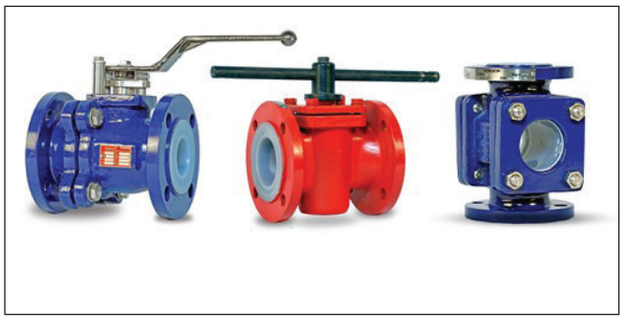


Strategic Acquisition

In due course, Horizon Polymer will become part of the Kitz Group, Japan, through Kitz India Pvt. Ltd. This acquisition marks a significant milestone in our journey, strengthening our global footprint and aligning us with one of the world's leading valve and fluid control solution providers. The integration will bring:

- Access to global technology platforms and advanced R&D capabilities.
- Enhanced manufacturing excellence through shared expertise and best practices.
- Expanded opportunities to serve customers with a broader product portfolio and international service standards.

Global Expansion – Saudi Arabia

To further strengthen our international presence, Horizon Polymer is establishing a joint venture in the Kingdom of Saudi Arabia under the banner Horizon Polymer Arabia Industrial Co. This initiative reflects our commitment to supporting the Middle East's growing process industries with:

- Localized manufacturing and service capabilities to meet regional demand.
- Strong partnerships with local stakeholders to ensure timely delivery and technical support.
- A platform to introduce advanced polymer technologies tailored to the unique requirements of the Gulf region.

The Way Forward

At Horizon Polymer, we believe the future lies in sustainable engineering. Our roadmap focuses on:

- Expanding into next-generation polymer technologies that enhance durability and reduce environmental impact.
- Strengthening collaborations with global technology partners to bring innovative solutions to the Indian and international markets.
- Investing in digital tools and workflow optimization to deliver faster, smarter, and more reliable customer experiences.
- Driving growth through continuous R&D and a commitment to excellence in every project we undertake. ■

Author

Gerard E. Pinto
President
Horizon Polymer Engineering Pvt. Ltd

ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

Concord Enviro Systems: Engineering Reliability across Water, Process, and Heat Transfer

Founded in 1992 and headquartered in Mumbai, **Concord Enviro Systems Ltd** is one of India's most established and respected engineering companies in the field of industrial water and wastewater treatment. With more than three decades of experience, the company has evolved from a domestic specialist into a global provider of advanced water and process technologies, supporting industries as they respond to growing environmental, operational, and regulatory demands

At the heart of Concord Enviro's work lies a clear and ambitious purpose: to enable the complete recovery, reuse, and responsible management of water and process resources, even under the most demanding industrial conditions. This mission reflects a broader commitment to sustainability that goes beyond compliance, helping industries reduce freshwater dependency, improve resilience, and lower lifecycle costs while maintaining operational reliability.

Concord Enviro's strength lies in its end-to-end, technology-agnostic engineering capability. The company designs, engineers, manufactures, installs, commissions, and supports complete water and wastewater systems, spanning zero-liquid discharge (ZLD), membrane processes, physico-chemical and biological treatment, and thermal and non-thermal evaporation technologies. This integrated approach ensures solutions that are robust, energy-efficient, and tailored to the specific realities of each plant and process.

Trusted across sectors including chemicals, specialty chemicals, pharmaceuticals, petrochemicals, metals, food and beverage, distilleries, and environmental applications, Concord Enviro's systems operate in some of the world's most challenging process environments. With installations across five continents and more than 70 million litres of wastewater recycled daily, the company has established strong credibility in both domestic and export markets.

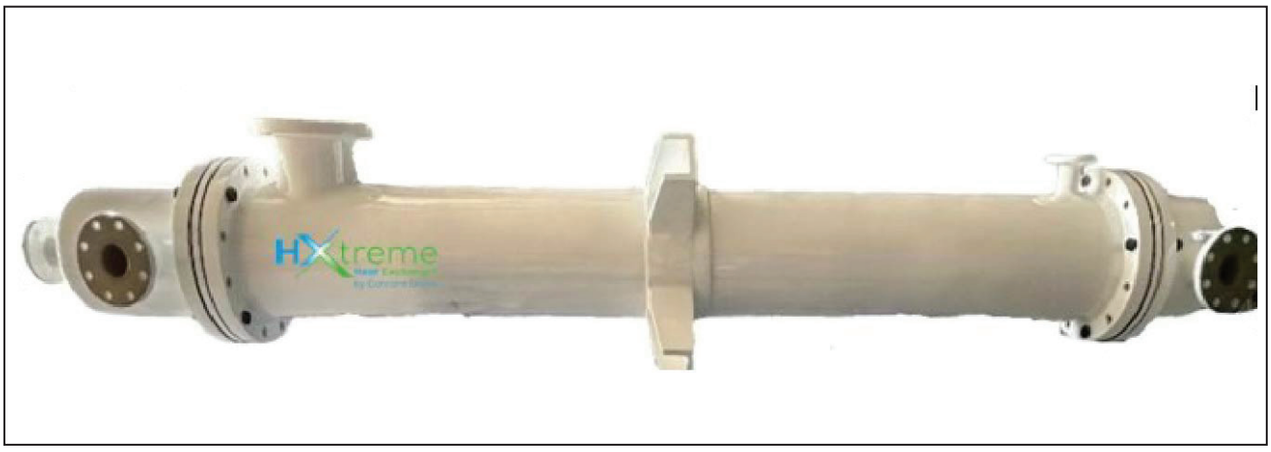
Extending Engineering Expertise into Process Heat Transfer

The same engineering discipline that underpins Concord Enviro's water solutions naturally extends into process heat transfer, where reliability is often critical but frequently underestimated. In aggressive industrial environments, heat exchangers are subjected to corrosive chemistries, thermal cycling, fouling, pressure fluctuations, and mechanical stress: conditions that quickly expose the limitations of conventional designs.

Failures at this level carry significant consequences: unplanned downtime, contamination risk, safety concerns, and loss of production capacity. In such applications, traditional metallic and impervious graphite heat exchangers often struggle to deliver sustained performance over time.

Recognising this gap, Concord Enviro has applied its deep understanding of materials behaviour, process conditions, and lifecycle performance to re-engineer heat exchange solutions specifically for corrosive and high-duty service.

This extensive material portfolio allows us to deliver optimized solutions for highly corrosive, hazardous, and ultra-pure process environments.



H-Xtreme™ Heat Exchangers: Engineered for Corrosive Duties

The H-Xtreme™ range of shell-and-tube heat exchangers represents Concord Enviro's response to the challenges of heat transfer in aggressive process environments. Central to this solution is the use of imported High-Performance Polymer reinforced with graphite (HPC) tubes, developed in collaboration with WHE Systems.

This advanced material platform combines:

- The corrosion resistance of graphite
- The mechanical resilience and shock resistance of high-performance polymers
- Thermal efficiency comparable to metallic materials
- A smooth, low-fouling surface that supports long-term performance

The result is a compact, lightweight, and highly durable heat exchanger, purpose-engineered to perform reliably under real operating stresses rather than idealised laboratory conditions.

Designed for Lifecycle Performance

H-Xtreme™ heat exchangers are engineered with a clear focus on uptime, maintainability, and total cost of ownership. Key advantages include:

- High reliability in cyclic and corrosive service
- Resistance to thermal and mechanical shock
- Lower fouling and easier cleaning
- On-site repairability using standard tools
- Reduced spares dependency and downtime
- Faster delivery timelines, typically within 6–8 weeks

These attributes make H-Xtreme™ particularly well-suited for process industries where equipment failure directly impacts safety, productivity, and profitability.

A Continuation of Concord Enviro's Engineering Commitment

H-Xtreme™ is not an isolated product offering — it is a direct extension of Concord Enviro's broader engineering philosophy: to design systems that endure, perform consistently, and support industrial resilience over the long term.

By combining advanced material science with practical engineering insight and decades of field experience, Concord Enviro continues to help industries operate more sustainably, more reliably, and with greater confidence in the face of increasingly complex process challenges.

As we gear up for Chemtech World Expo 2026, we invite you to experience our innovation and reliability in advanced material Heat Exchangers. ■

Author

Wolfgang Heinzl
CEO – Heat Exchanger Division
Concord Enviro Systems Ltd

ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

Engineered Industrial Valve Solutions for Process Reliability: TS Flow Controls at ChemTECH World Expo

In the contemporary process industry landscape, the demand for reliable, standards-compliant, and application-engineered flow control solutions continues to intensify. Industrial valves play a critical role in maintaining process integrity, ensuring operational safety, and achieving long-term plant reliability. Addressing these requirements through engineering-driven manufacturing is **TS Flow Controls Pvt. Ltd.**, an established Indian manufacturer of industrial valves with over three decades of industry experience.

Headquartered in Hubballi, Karnataka, India, TS Flow Controls (formerly T.S. Pumps & Valves Pvt. Ltd.) has evolved into a specialized valve manufacturing organization catering to chemical, petrochemical, oil & gas, power, fertilizers, water, and allied process industries. The company's participation at the ChemTECH World Expo underscores its continued engagement with the process industry and its commitment to delivering technically robust flow control solutions.

Engineering-Oriented Manufacturing Approach

TS Flow Controls follows an engineering-centric manufacturing philosophy, wherein valve design and production are governed by service conditions, process parameters, applicable codes, and project-specific requirements. Each valve is engineered considering pressure class, temperature range, flow characteristics, corrosion allowance, and operational criticality.

The company's in-house engineering, quality assurance, and production teams work in close coordination to ensure compliance with customer specifications and international standards. This approach enables TS Flow Controls to deliver customized valve solutions for demanding applications, rather than standardized commodity products.

Product Portfolio for Isolation and Control Applications

At ChemTECH World Expo, TS Flow Controls is showcasing a comprehensive range of industrial isolation and control valves, including:

- Gate, Globe, and Check Valves
- Ball and Butterfly Valves
- Piston, Knife Gate, and Diaphragm Valves

In addition, the company has developed strong capabilities in PFA-lined valves, including Ball, Plug, Butterfly, and Check Valves, engineered specifically for highly corrosive chemical services where resistance to aggressive media is essential.

Valve Automation and Actuation Solutions

Recognizing the increasing emphasis on automation and process control, TS Flow Controls offers valves in both manual and automated configurations. Valve automation packages are supplied with electric, pneumatic, or hydraulic actuators, selected and engineered based on operating conditions, torque requirements, fail-safe philosophy, and plant control system integration.

These automated solutions are designed to support modern process plants requiring higher levels of operational consistency, safety, and remote control capability.

Control Globe Valves for Critical Flow Regulation

A key technical highlight at the TS Flow Controls exhibit is its range of Control Globe Valves, designed for

accurate flow modulation in critical process services. These valves are engineered to handle varying flow regimes, pressure drops, and temperature fluctuations while maintaining control stability and repeatability.

The availability of both isolation and control valves enables TS Flow Controls to offer integrated flow control solutions for complex process applications.

Quality Assurance, Compliance, and Certifications

Quality assurance forms a core element of TS Flow Controls' manufacturing operations. The company implements robust QA/QC systems aligned with international quality standards, ensuring material traceability, dimensional accuracy, and functional integrity.

TS Flow Controls is approved by leading authorities, including EIL, IBR, and CE Marking (PED). In addition, selected valve designs are Fire Safe certified and Fugitive Emission Tested (FET), addressing critical safety and environmental compliance requirements for hazardous services.

Where project specifications demand, third-party inspection (TPI) is facilitated to ensure independent verification of quality and compliance.

Materials and Application Versatility

To meet the diverse requirements of process industries, TS Flow Controls manufactures valves in a wide range of metallic and non-metallic materials, including carbon steels, alloy steels, stainless steels, and special alloys. This material flexibility allows valves to be deployed across applications involving high pressure, high temperature, corrosive media, and critical service conditions. Engineering selection of materials is carried out with due consideration to corrosion resistance, mechanical strength, and lifecycle performance.

Emphasis on Lifecycle Performance

Rather than competing solely on initial procurement cost, TS Flow Controls emphasizes lifecycle performance and reliability. Valve designs are optimized to reduce maintenance requirements, minimize leakage risks, and enhance operational longevity, thereby lowering total cost of ownership for plant operators.

This value-driven approach has enabled the company to establish long-term relationships with EPC contractors and end users executing complex process projects.

Execution Capability and Delivery Performance

Project execution discipline is a critical differentiator in valve supply for large and mid-scale projects. TS Flow Controls has established structured planning, manufacturing, inspection, and documentation processes to ensure timely deliveries aligned with project schedules.

Close coordination between engineering, production, quality, and logistics teams allows the company to manage customized and inspection-intensive orders efficiently.

Continuous Improvement and Future Outlook

Continuous improvement is embedded within TS Flow Controls' organizational culture. The company consistently invests in improving design methodologies, manufacturing practices, testing procedures, and quality systems, incorporating feedback from customers, inspectors, and industry stakeholders.

As TS Flow Controls participates in the ChemTECH World Expo, it invites process industry professionals, consultants, and EPC partners to engage in technical discussions and explore engineered valve solutions designed for modern process challenges.

With a strong foundation in engineering, compliance, and execution capability, TS Flow Controls Pvt. Ltd. continues to strengthen its position as a dependable manufacturer of industrial valves for critical process applications. ■

Author

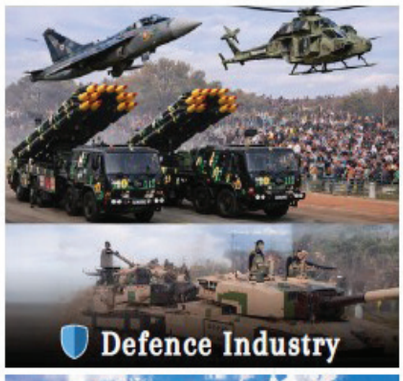
Abhishek Parmar
Director
TS Flow Controls Pvt. Ltd.

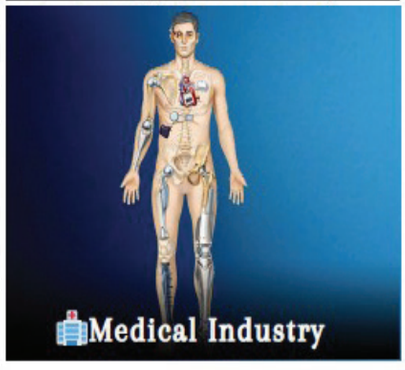
ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

Aries Alloys: A Trusted Partner in Titanium & Hard To Find Alloys for Most Critical Application

Aries Alloys, located at Charni Road, Mumbai, is a leading stockist and supplier of Titanium and specialty alloys in India.

We cater to high-performance applications across Aerospace, Medical, Marine, Oil & Gas, Chemical Processing, Defence, Automotive, Power, Architecture, Electronics, and Consumer industries.





Our product portfolio includes most critical grades like Titanium, Nickel alloys, Hard to find Alloys and special stainless steel in form of Sheets, Plates, Coils, Wires, Rods, Bars, Pipes and Tubes. We maintain strict control over traceability, documentation, and quality assurance.

Aries Alloys is committed to delivering reliable pre- and post-dispatch service with accurate and transparent communication.

At Chemtech, we present our strength in precision-driven metal solutions for demanding environments. ■

Website: *www.ariesalloys.com*
Email: *sales@ariesalloys.com*
Contact: *9004471998 / 8591544308*

Author

Kalpesh Doshi
Managing Director
Aries Alloys

AICMA: Empowering India's Cosmetic Industry

The All India Cosmetic Manufacturers Association (AICMA) is a premier organization representing the interests of the cosmetic industry, especially the MSME/SME, in India. With a mission to promote and support the growth of the industry, AICMA has been a driving force behind the development of the sector. Established to foster cooperation and collaboration among cosmetic manufacturers, AICMA provides a platform for industry stakeholders to share knowledge, best practices, and innovations. The association works closely with regulatory bodies, government agencies, and other industry associations to advocate for the interests of its members.

Going Digital

AICMA has taken a significant step towards digital transformation, with all registrations now done online. This move aims to streamline processes, increase efficiency, and make it easier for members to engage with the association.

Objectives

- Promote the growth and development of the cosmetic industry, especially MSME/SME, in India.
- Provide a forum for industry stakeholders to share knowledge and best practices.
- Advocate for favorable policies and regulations.
- Support innovation and Research and Development in the industry.

International Representation

AICMA has participated in international events promoting sustainability and anti-ageing initiatives, with international representation to stay updated on global trends and best practices. The association works closely with global partners to bring the latest innovations and technologies to India.

Supporting Industry Events

AICMA is a proud supporter of every cosmetic exhibition held in India, providing a platform for industry stakeholders to connect, share, and grow. The association believes that these events play a crucial role in promoting the industry and fostering business opportunities.

Membership

AICMA's membership includes cosmetic manufacturers, consultants, distributors, business development services, laboratory owners, retailers, and salon owners. The association offers various membership categories to cater to the diverse needs of industry stakeholders.

Activities

- Organizes seminars, workshops, and conferences on industry-relevant topics.
- Provides training and capacity-building programs for industry professionals.
- Collaborates with regulatory bodies to develop and implement industry standards.
- Advocates for policy changes and regulatory reforms.

Benefits of Membership

- Access to industry insights and market trends
- Opportunities for networking and collaboration
- Voice in policy-making and regulatory processes
- Support for innovation and R&D ■

Contact

For more information about AICMA and its activities, please visit www.aicma.in

All India Cosmetic Manufacturers' Association

Email: aicma.mumbai@gmail.com ; aicma@aicma.in

Phone: 9920990995

For membership, please visit www.aicma.in and register through the App.

Author

Mrs. Kajal Anand
President
AICMA &
Managing Director
Debon Herbals Pvt Ltd.

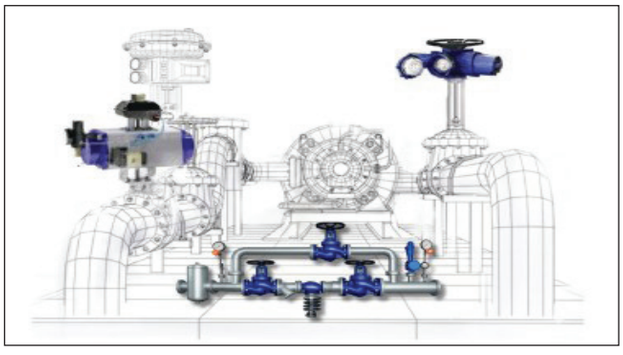
ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

Safety - Reliability - Performance Industrial Valves : Freture Techno's Engineering Excellence

FRETURE
EMISSION FREE PROCESS

As International process industries continue to grow, the demand for industrial valves that can withstand aggressive chemicals, high pressures, and continuous operation is rising rapidly. Modern plants operate under far more demanding conditions than in the past, making equipment reliability a critical factor for safety, productivity, and profitability. Even a small valve failure can lead to costly downtime, safety hazards, and quality issues. Addressing this challenge is **Freture Techno Pvt. Ltd.**, an engineering-focused company led by Managing Directors Ms. Mamta Chavan and Mr. Kailas Waghmare.

Today's Petrochemical, Pharmaceutical and Chemical plants handle increasingly corrosive fluids and wider temperature ranges. Conventional valve designs are often pushed beyond their limits, resulting in frequent maintenance and premature failures. Freture Techno has built its expertise around fluoropolymer-lined industrial valves and accessories, offering solutions specifically designed for harsh and chemically aggressive environments. These engineered products deliver stable performance, extended service life, and dependable sealing even under severe operating conditions.



One of the biggest challenges in process industries is corrosion. Corrosive media can weaken valve bodies, damage sealing surfaces, and cause leaks that threaten both safety and product quality. Freture Techno addresses this risk by using advanced lining technologies that form a strong protective barrier between the process fluid and the metal components. This ensures excellent chemical resistance, smooth internal flow paths, and long-term dimensional stability.

In industries handling hazardous or high-purity fluids, leak-free performance is essential. Freture Techno's lined valves are designed to maintain tight sealing across a wide range of pressures and temperatures, reducing the risk of contamination, emissions, and unplanned shutdowns. This reliability is especially important in continuous processes, where any interruption can have serious operational and financial consequences. Manufacturing quality is a key pillar of Freture Techno's success. The company employs uniform lining processes that ensure consistent thickness and strong adhesion across all wetted surfaces, eliminating weak points that could lead to failure. Strict dimensional control ensures accurate fit and reliable installation. Every valve is inspected and tested for pressure integrity and performance before delivery, giving customers confidence in long-term operation.

Rather than competing only on price, Freture Techno focuses on lifecycle value. Durable, high-performance lined valves reduce maintenance requirements, extend service intervals, and lower total operating costs. This helps plants maintain stable production while avoiding expensive emergency repairs and downtime.

Serving industries such as chemicals, pharmaceuticals, petrochemicals, and food processing, Freture Techno provides application-specific flow control solutions tailored to real operating conditions. With a growing international presence across the USA, Russia, Netherland, Saudi, Oman, Kuwait, Africa and other global markets, the company continues to strengthen its position as a trusted supplier of reliable industrial valves. Through engineering excellence and a commitment to quality, Freture Techno supports safe, efficient, and sustainable industrial operations worldwide.

We manufacture Bellow Seal Valves, Ball Valves, Butterfly Valves Lined Valves, Lined Fittings, Lined Equipment Pressure Reducing Station - Desuperheating. ■

Authors

Kailas Waghmare
Director
Freture Techno Pvt. Ltd.

Mamta Chavan
Director
Freture Techno Pvt. Ltd.

Engineering the Present; Skilling the Future

In today's rapidly evolving Chemicals, BioPharma, Refining, Petrochemicals, and Process Industries, success is no longer defined by technology or capital investment alone—it is driven by the seamless integration of engineering excellence and industry-ready talent, working together to deliver projects that are safe, compliant, cost-effective, and future-ready. This is where **Accent Techno Solutions Pvt. Ltd.** and **Suvidya Institute of Technology** (SIT) come together to offer the industry a powerful and complete ecosystem—one that combines world-class engineering consultancy with real-world, project-driven industrial training.

Established in 1996, Accent Techno Solutions Pvt. Ltd. is an IS/ISO 9001:2015 certified organization and a trusted provider of basic and detail engineering and consultancy services to the global process industry, serving chemicals, specialty chemicals, petrochemicals, refineries, pharmaceuticals, BioPharma, oil & gas onshore facilities, storage terminals, utilities, and modular skid-based plants. With nearly three decades of experience, Accent has built its reputation on delivering engineering solutions that are technically robust, constructible, compliant with international codes and standards, and aligned with real execution requirements, guided by its core philosophy of "Building Trust with Satisfaction." By leveraging advanced digital tools such as AVEVA E3D, AutoCAD Plant 3D, Cadmatic, SmartPlant P&ID, PDMS, Caesar II, PV Elite, and SolidWorks, Accent delivers clash-free designs, accurate material take-offs, faster model reviews, and reduced site rework, ensuring predictable project outcomes even on large, complex, and schedule-critical facilities including tank farms, refinery and petrochemical units, LNG onshore projects, LPG bullets, brownfield revamps supported by laser scanning, and stress-critical piping systems.

Complementing this engineering capability is Suvidya Institute of Technology (SIT), founded in 2002 and also an IS/ISO 9001:2015 certified organization, established with a clear mission to bridge the gap between academic learning and actual EPC and industrial practices. Over the years, SIT has trained more than 23,000 engineers and working professionals, conducted 650+ training batches, delivered 250+ corporate training programs, and executed multiple pan-India and international training assignments, making it one of India's most respected names in process industry skill development. SIT is recognized as the only ECITB-authorized Plant Layout Design Training Centre in India and is associated with the National Skill Development Corporation (NSDC), reinforcing its credibility and alignment with global and national skill standards. Together, Accent Techno Solutions Pvt. Ltd. and Suvidya Institute of Technology deliver reliability, competence, and long-term value—engineering the present and skilling the future of the process industry. ■

Accent Techno Solutions Pvt. Ltd. | Suvidya Institute of Technology Pvt. Ltd.
www.accent.net.in | www.suvidya.ac.in |
Mumbai, India

Authors

Varsha Vasant Mestry
Managing Director
Suvidya Institute of Technologies Pvt. Ltd.

Santosh Dinkar Mestry
Director
Accent Techno Solutions Pvt. Ltd.

Jyoti: Engineering Excellence in Filtration, Solidification & Drying

Jyoti Process Equipments Pvt. Ltd. is the brainchild of Mr. Sabesan Natarajan Nadar, whose vision, passion, and relentless dedication have been instrumental in establishing the company as a trusted organization in the field of filtration, solidification, and drying equipment.

With over four decades of experience in fabrication and process equipment manufacturing, Mr. Nadar founded the company in 1986 with the ambition to innovate and create a strong identity in the industry. Today, he leads a growing group of companies operating through four manufacturing units, employing over Team of 50 people and achieving a consistent annual turnover of approximately ₹12 Crores + over the last three years.

Company Profile

Jyoti Process Equipments Pvt. Ltd. is an ISO 9001:2015 certified company and a leading manufacturer of specialized process equipment, including:

- Pressure Leaf Filters
- Drum Flakers
- Candle Filters
- Drum Dryers
- Polishing Bag Filters

The company holds CE marking for its filters and has successfully supplied CE-certified Drum Flakers to international markets.

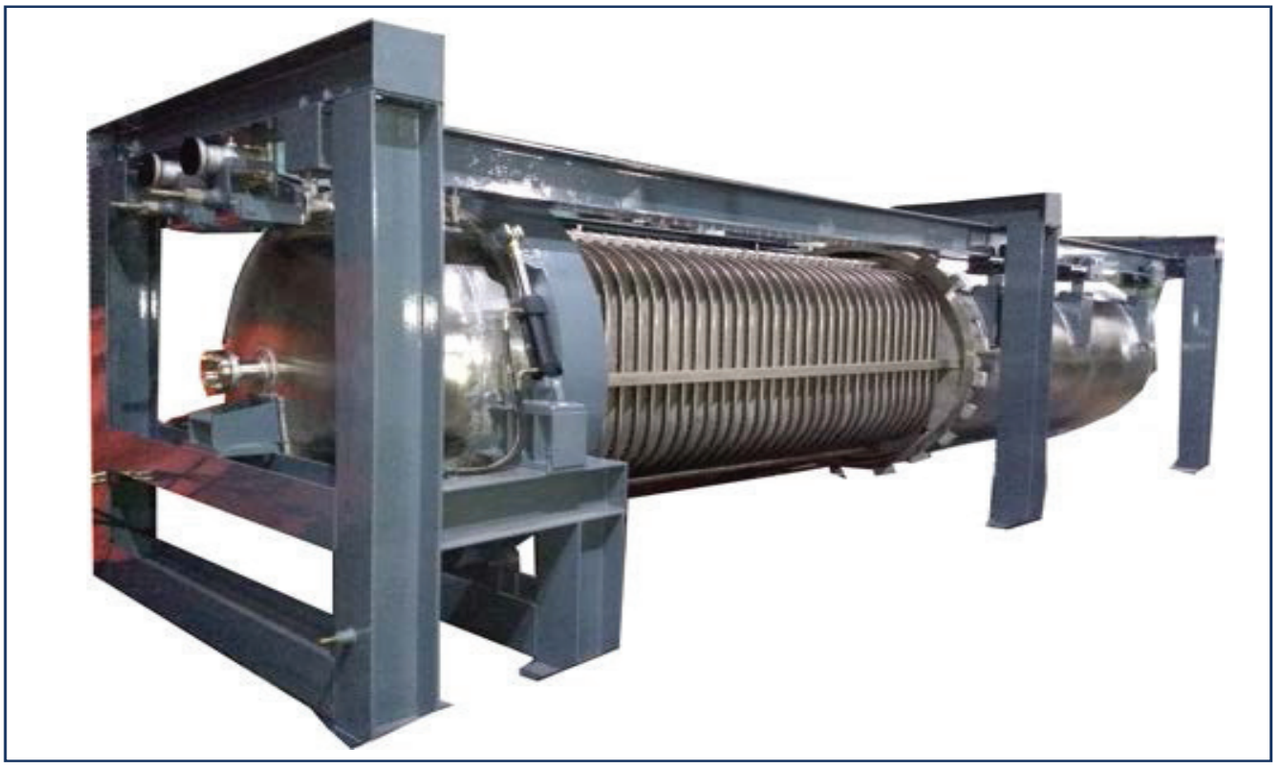
Global Presence

We cater to a wide range of industries and have supplied equipment to customers across India and internationally, including: USA, Canada, Russia, Turkey, Netherlands, UAE, Malaysia, Poland, South Africa, Chile, Ukraine, Nigeria, Philippines, Egypt, Czech Republic, Lebanon, Bolivia, Sri Lanka, Democratic Republic of Congo, Malawi, and many more. Currently, we directly export to over 20 countries, in addition to further international reach through PMC and project partners.

Journey and Growth

The company began as a machining workshop in MIDC, Rabale, Navi Mumbai. A major breakthrough came in 1988, when we successfully manufactured and installed precast moulds for the prestigious Konkan Railway Project.

In 1989, we identified strong demand for process equipment in the edible oil industry, where supplier



availability was limited. We utilized this opportunity to supply customized process equipment to edible oil manufacturers and later expanded into other chemical industries.

From the early 1990s, we focused on manufacturing import substitute equipment, and by 2008, we formally entered the export market, steadily expanding our global footprint.

Industries Served

We have successfully manufactured and supplied process equipment for:

- Sugar
- Sweeteners
- Starch
- Animal Feed
- Oligomers
- Molten Sulphur
- Copper Electrolyte
- Vegetable & Edible Oil
- Plasticizers
- Agrochemicals
- Pharmaceuticals
- Camphor
- Naphthalene
- Various Chemical Industries.

Research & Development Approach

Before commencing full-scale manufacturing for any new project, we conduct extensive research and evaluation of critical parameters affecting product quality and process performance. This includes prototyping and pilot studies, based on which the final equipment design is developed. Our ability to continuously adapt to evolving industry requirements and customer expectations remains one of our strongest competitive advantages. ■

Author

Mr. Sabesan Natarajan Nadar
Founder & Managing Director
Jyoti Process Equipment
Email: sales@jyoti-india.com
Tel: +91 9930999502 / +91 9930999111

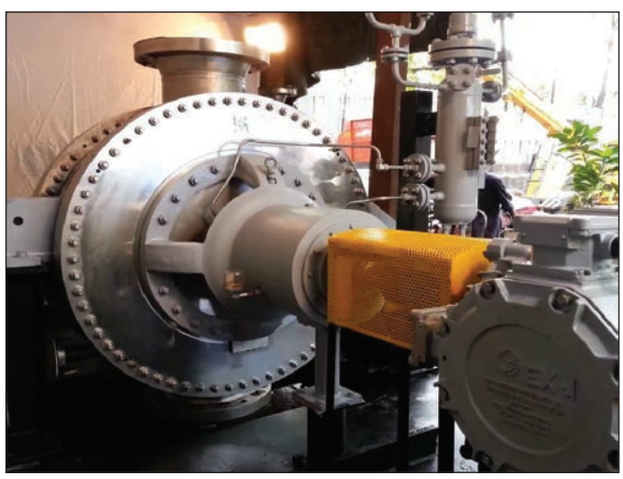
HiGee Technology: The Compact Solution Driving Air Quality Improvement and Global Decarbonization

Trilok Corporation, established in 1989 by Mr. Ramesh Chandra Mehta, has evolved from a trusted maintenance and fabrication partner for major Indian Oil, Gas, and petrochemical companies to a leader in sustainable process technology. We are meeting today's environmental challenges head-on through breakthrough Process Intensification (PI), specifically with our patented High Gravity (HiGee) Rotary Packed Bed (RPB) technology. We are delivering solutions that are smaller, faster to deploy, and exponentially cleaner — an embodiment of "An Industrial Evolution" for a greener tomorrow.

In an era defined by critical environmental benchmarks, industrial success is measured not just by productivity, but by sustainability and compliance. The core challenges facing the process industry today — reducing carbon emissions, controlling harmful flue gas pollutants (SOx and NOx), and maintaining high standards for the Air Quality Index (AQI) — demand radically efficient solutions.

The HiGee Revolution: Engineering Mass Transfer in Miniature

The HiGee system represents a paradigm shift in gas-liquid and liquid-liquid mass transfer. Instead of relying on conventional gravity and column height to facilitate contact between phases, the HiGee RPB utilizes intense centrifugal force to generate an environment equivalent to hundreds of G-forces (up to 1,000 g's) within a rotating packed bed. This controlled, high-gravity environment dramatically enhances mass transfer coefficients and rates. The result is a compact, skid-mounted unit that delivers the same, or superior, separation and absorption efficiency as a conventional tower, but with a footprint that is up to 30 times smaller in height and significantly reduced in overall volume. This miniaturization is the core value proposition of Trilok's HiGee technology, making clean technology accessible even in space-constrained industrial environments.



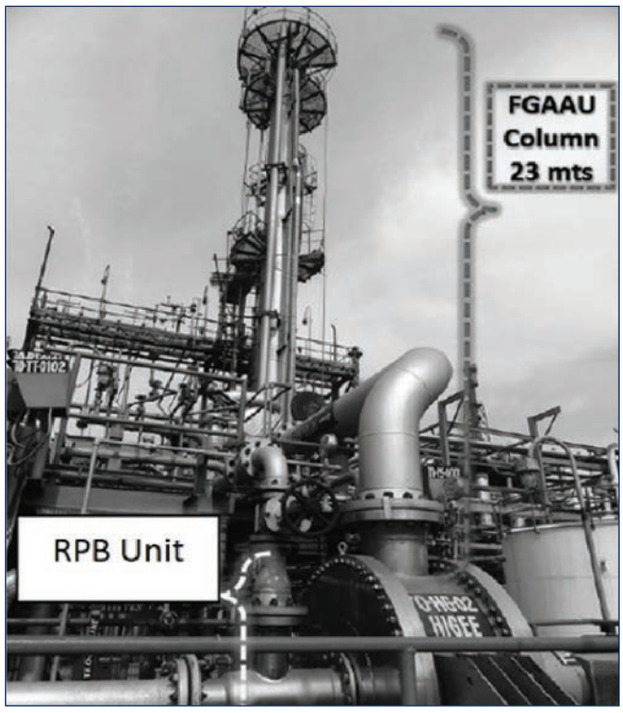
Critical Applications: Driving Sustainability and Air Quality Improvement

Trilok Corporation has successfully deployed HiGee technology across several critical industrial applications, demonstrating its versatility and direct impact on environmental health and process integrity:

Flue Gas Treatment: SOx, NOx and AQI Improvement

Emissions of Sulfur Oxides (SOx) and Nitrogen Oxides (NOx) are primary contributors to poor Air Quality Index (AQI) readings in industrial areas, particularly for thermal power and large chemical plants. Our HiGee systems are engineered for the simultaneous and highly efficient capture and removal of these pollutants from flue gas streams.

- **Impact**: By drastically reducing harmful SOx and NOx emissions, the HiGee system directly contributes to significant AQI improvement for surrounding communities and ensures immediate compliance with stringent government emission norms.
- **Advantage:** The compact, modular design is a practical, low-footprint alternative to traditional, large-scale scrubbers, making it perfect for rapid deployment and retrofitting of existing facilities.



Carbon Capture: Accelerating the Path to Net-Zero

The global push for decarbonization makes efficient CO2 capture a mandatory industry focus. Our HiGee Carbon Capture system is an ideal, low-footprint alternative to energy-intensive, tall-column absorbers.

- **Performance**: Trilok has successfully tested CO2 capture rates of 90 per cent in Research & Development partnerships, including a successful demonstration with the Energy and Environmental Research Center (EERC) of the US government in North Dakota.
- **Advantage:** The HiGee unit is delivered as a pre-fabricated, skid-mounted module, drastically cutting down installation time and enabling rapid integration of carbon capture capabilities into existing infrastructure.

3. H2S Absorber: Fuel Gas Cleanup and Safety

Removing lethal and corrosive Hydrogen Sulfide (H2S) from fuel gas is vital for both process safety and environmental compliance within the refinery and petrochemical sectors.

- **Performance**: Our HiGee H2S Absorber achieves an impressive elimination of 99.9 per cent of Hydrogen Sulfide from the fuel gas stream.
- **Efficiency:** The HiGee design features superior mass transfer efficiency compared to traditional designs, ensuring fuel purity and asset longevity.

4. Water Deaeration (Including Sea Water): Corrosion Prevention

The removal of dissolved oxygen from water, including sea water, is critical for corrosion prevention in power plants and petrochemical cooling systems.

- **Performance**: The HiGee Deaerator achieves superior dissolved oxygen removal, consistently reaching output levels of less than 20 ppb (parts per billion), exceeding industry standards for corrosion control. This HiGee Deaerator achieves a measured 99.5 per cent removal of Dissolved Oxygen from water, protecting boiler feed systems and critical assets.
- **Advantage:** Being compact and highly efficient, the HiGee system provides clear operational advantages over conventional de-aerators in terms of cost, efficiency, and maintenance.

Commitment to Excellence and Research

Trilok's innovation is firmly rooted in strong R&D partners. We maintain continuous collaboration with premier institutions like IIT Kanpur and IIT Bombay. Our proprietary technology is secured by two key patents, including the design for a "Novel Torsional-Couette-Flow HiGee" unit. Furthermore, our team is strengthened by the advisory role of Dr. D. P. Rao, Professor (retd. HOD) of Chemical Engineering at IIT Kanpur and a co-inventor of the Split Rotary Packed Bed, ensuring our process innovations are scientifically robust.

By combining engineering integrity with patented process technology, Trilok Corporation is shaping a more sustainable future for the chemical and process industry. Trilok Corporation is not just showcasing equipment; we are presenting the future of chemical plant design — smaller, smarter, and significantly more committed to a cleaner environment. We invite delegates, decision-makers, and technical experts to witness this culmination of dedication to innovation and efficiency. ■

Author

Ramesh C. Mehta
Founder & CEO
Trilok Corporation

PGE Industries: Advancing Clean and Reliable Sealing Solutions for Process Industries

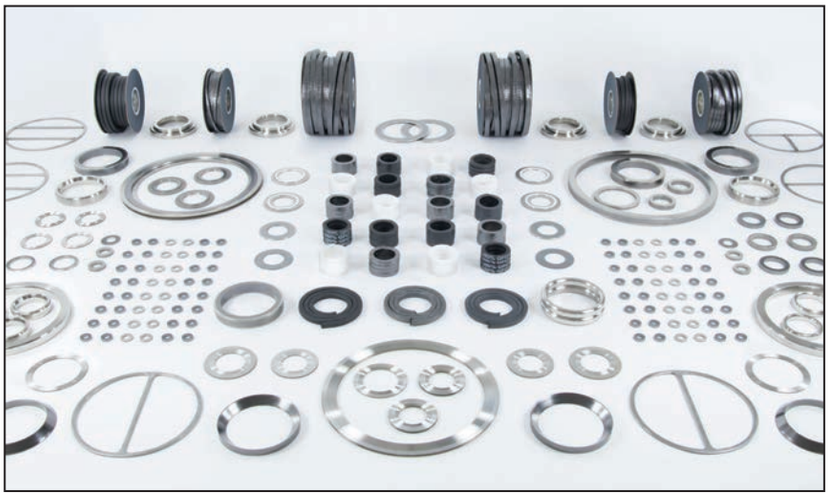
PGE Industries Pvt. Ltd.
SEALING SOLUTIONS SIMPLIFIED

In process industries where safety, reliability, and regulatory compliance are non-negotiable, sealing systems play a critical role in ensuring operational integrity. **PGE Industries Pvt. Ltd.** has emerged as a trusted Indian manufacturer of high-performance gaskets and engineered sealing solutions designed for demanding industrial applications.

A registered MSME, PGE Industries operates from its registered office in Mumbai, supported by a modern, well equipped manufacturing facility at Bhiwandi, Navi Mumbai. Over the years, the company has steadily built a reputation for technical competence, product reliability, and adherence to global quality standards.

Focus on Clean Manufacturing and Sustainability

Environmental responsibility and occupational safety form an integral part of PGE's operating philosophy. The company follows a 100 per cent Non-Asbestos manufacturing policy, aligning with global best practices aimed at protecting both human health and the environment. Significantly, PGE Industries is the only manufacturer in India producing 100 per cent Clean Gaskets certified as per ISO 14644 Class 8, catering to applications where contamination control is critical. This achievement underlines the company's commitment to clean manufacturing and controlled production environments.



Robust Quality and Management Systems

PGE Industries maintains stringent quality controls across its entire production cycle, from raw material selection to final inspection and dispatch. The company's management systems are certified to:

- ISO 9001:2015 (Quality Management)
- ISO 14001:2015 (Environmental Management)
- ISO 45001:2018 (Occupational Health & Safety)

In addition, PGE is an approved manufacturer with Engineers India Ltd. (EIL), further strengthening its credentials within the Indian EPC and process industry ecosystem.

Global Technology Collaboration

To enhance its technical depth and product portfolio, PGE Industries has entered into a strategic technical collaboration with DONIT Tesnit d.o.o., Europe, a globally reputed manufacturer of sealing materials and an approved supplier to the Linde Group.

DONIT Tesnit products are internationally recognized and enlisted with leading organizations such as Aramco, PDO Oman, Takreer Refinery, MiRO Refinery, and TOTAL Refineries. Through this collaboration, PGE manufactures specialized gaskets and sealing products in India, combining European technology with local manufacturing capabilities.

Engineering-Led Approach

PGE's growth trajectory is closely linked to its engineering-driven approach. The company works closely with OEMs, EPC contractors, and end users to develop sealing solutions for high-temperature, high-pressure, and critical service conditions.

Its products find extensive application across a wide spectrum of industries, including:

- Oil & Gas and Refineries
- Chemical and Petrochemical Processing
- Power Generation
- Process Plants
- Marine and Shipbuilding
- Pumps and Valves
- Steel and Metal Processing
- Food Processing
- Pharmaceuticals
- Pulp and Paper

Comprehensive Product Portfolio

PGE Industries offers a broad and technically advanced range of sealing solutions, including:

- Spiral Wound Gaskets
- KammProfile Gaskets
- Non-Asbestos Gaskets (Aramid and Carbon Fibre based)
- PTFE Gaskets – Virgin, Expanded, and Modified
- Graphite and Mica Gaskets for high-temperature applications
- Gland Packings (FE certified)
- Pressure Seal and Molded Graphite Components for valve internals
- Elastomer Rubber and PTFE engineered components
- Insulation and fire-safe welding products such as ceramic cloth, ropes, and blankets

The company also undertakes customized sealing product development to address application-specific challenges in critical operating environments.

Certifications and Regulatory Compliance

PGE's products are supported by a comprehensive set of national and international approvals, ensuring suitability for a wide range of regulated services. These include:

- EIL Approval
- FDA Approval
- BAM Certification for Oxygen Service
- WRAS for potable water applications
- BS 7531 Grade X
- ABS / DNV-GL for marine services
- TA-Luft Certification for fugitive emissions
- EC 1935/2004 for food contact
- EN 12308 for LNG and cryogenic services
- API 607 / API 10497 for fire-safe performance
- API 620 and API 622

Defence and Strategic Sector Presence

PGE Industries has established a strong presence in India's defence and strategic sectors. The company is enlisted with major Defence PSUs including Mazagon Dock Shipbuilders Ltd. (MDL), Hindustan Shipyard Ltd. (HSL), Garden Reach Shipbuilders & Engineers (GRSE), Goa Shipyard Ltd. (GSL), and Hindustan Aeronautics Ltd. (HAL). It is also a DGQA-approved vendor for gasket and sealing components and holds NCAGE Code: 3769Y. PGE has successfully indigenized several critical sealing and insulation components, supporting national self-reliance initiatives.

Looking Ahead

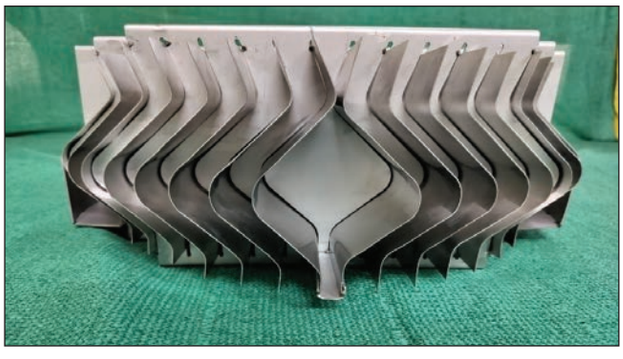
With a strong foundation in quality, technology, and sustainability, PGE Industries Pvt. Ltd. continues to strengthen its position as a reliable sealing solutions partner for the chemical and process industries. By combining global technical expertise with Indian manufacturing excellence, the company remains focused on delivering safe, compliant, and cost-effective sealing solutions for increasingly demanding industrial applications. ■

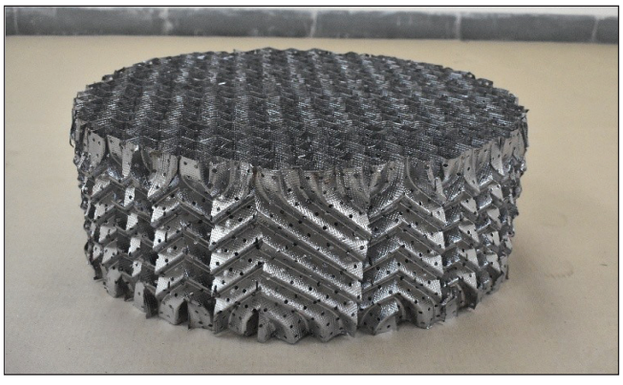
Evergreen Technologies: A Reliable Name in Engineered Process Equipment & Specialized Industrial Solutions

Evergreen Technologies Pvt. Ltd. is a part of the Evergreen Group, a business house with a proud legacy dating back to its establishment in 1948. With more than seven decades of industrial experience, the Evergreen Group has established itself as a reliable and trusted name in the field of engineered process equipment and specialized industrial solutions.

Evergreen Technologies was originally established as a manufacturer of woven wire mesh products and has since evolved into a leading designer, developer, and manufacturer of advanced mass transfer, separation, and mist elimination equipment.

Over the years, Evergreen Technologies has continuously expanded its product portfolio by combining strong engineering capabilities with in-house research and development. Today, the company offers a comprehensive range of high-performance products under well-recognized brands, including:





- **EVERMESH** – Mesh type Mist Eliminators / Demisters
- **EVERON** – Chevron / Vane type Mist Eliminators
- **EVERFIBRE Bed Mist Eliminators** – Candle Filter type systems
- **EVERPACK Structured Column Packings** – Sheet Metal, Wire Gauze and Knitted Mesh types
- **EVERRINGS** Random Column Packings
- **EVERFRAC Column Trays** – Conventional and High-Capacity Trays
- **EVERSEP Column & Separator Internals** – Liquid Distributors, Support Grids, Collectors, Chimney Trays and Vapor Inlet Devices
- **EVERSEP Coalescers** – Mesh, Cartridge and Plate Pack types

These products are widely used in refineries, petrochemical complexes, fertilizers, chemicals, power plants, gas processing units, and other process industries where efficiency, reliability, and performance are critical.

Evergreen Technologies Pvt. Ltd. is an ISO 9001:2015 certified company and operates from a modern manufacturing facility spread over more than 40,000 square feet. The facility is equipped with advanced fabrication, testing, and quality control infrastructure, enabling the company to meet stringent international standards and customer specifications. The company follows robust quality systems at every stage, from design and raw material procurement to manufacturing, inspection, and dispatch.

The company has built an extensive and impressive reference list, with its products being successfully supplied and operating at major installations across India and abroad. Evergreen Technologies has a strong presence in the energy and petroleum sector, serving leading oil and gas companies, refineries, EPC contractors, and power utilities. Its proven track record and consistent performance have made it a preferred supplier for critical applications involving separation, mass transfer, and fluid handling.

In addition to the above product range, Evergreen Technologies also supplies key equipment used in ultrapure water generation systems, which are vital for power plants, semiconductor manufacturing, pharmaceuticals, and advanced industrial processes. These include:

- Electrodeionisation (EDI) Modules
- Liquid Degassing Membranes

These components play an essential role in producing ultrapure water by removing dissolved salts and gases, ensuring extremely high water purity and reliability of downstream processes.

Innovation is a core strength of Evergreen Technologies. Along with its in-house R&D activities, the company has actively participated in collaborative research programs with some of India's most respected engineering and research institutions.

These collaborations have resulted in the development of cutting-edge, indigenous technologies and advanced product solutions tailored to the needs of Indian industry while meeting international performance standards. Such efforts have strengthened Evergreen's position as a technology-driven organization capable of competing in both domestic and global markets.

With its strong foundation, advanced manufacturing capabilities, commitment to quality, and focus on innovation, Evergreen Technologies Pvt. Ltd. continues to be a trusted partner for process industries seeking reliable, efficient, and future-ready engineering solutions. ■

Polymers in Industrial Tanks – Performance, Safety and Longevity

Quality assurance is the primary principle of **Polyrib's** manufacturing philosophy - each sheet undergoes rigorous checks for thickness precision, surface finish, material homogeneity and mechanical properties. These controls ensure that materials delivered to fabricators, support reliable, long term tank performance meeting the industry expectations.

Rapid growth in chemical processing, galvanizing and water treatment industries drives demand for corrosion resistant tanks. Polymer based tanks are being widely used due to their longevity and performance advantages over the conventionally used metal tanks which have poor corrosion resistance.

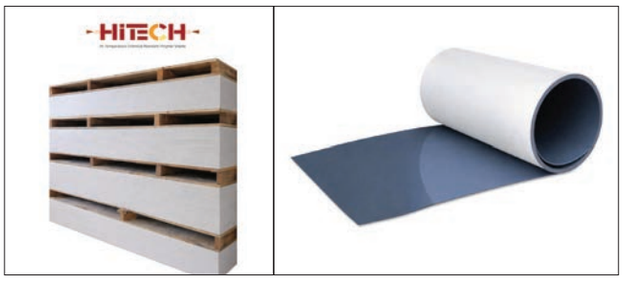
Why Polymer Tanks?

Polymers such as HDPE, PP and UHMWPE are displacing traditional materials across tank applications due to distinct advantages that align with industrial requirements.

- Excellent chemical resistance to a wide range of acids, alkalis and harsh media.
- Extended life 15-25yrs in aggressive environments.
- Up to 70 per cent less maintenance as compared to metal tanks.
- Thermal and Mechanical stability, fabrication flexibility – weldable and no lining requirements.

Hitech strengths

- Unmatched thickness range – 0.5mm to 250mm



- Material portfolio – PP excellent strength and chemical resistance temp tolerance – 35°C to 85°C, HDPE-High durability and impact resistance, temperature tolerance -50°C to 85°C and UHMWPE - superior abrasion resistance, self-lubricating material.
- Tailored colours for tanks PP - bone grey and white, HDPE - black
- Strict quality control – precise thickness, weldability and reliability.
- PPGL- glass lined polypropylene rolls engineered to enhance corrosion resistance. (1.5-10mm)
- Welding rods – HDPE and PP welding rods for tank fabrication.

Material	Key Advantages	Typical Applications	Service Life	Sustainability	Notes
PP (Polypropylene)	High chemical and thermal resistivity	Chemical Storage Tanks, Electroplating Barrels, Fume Hoods & pickling tanks	15–20 years	Recyclable	Easy to fabricate
HDPE (High Density Polyethylene)	High impact resistance	Spiral tanks, Chemical Storage Tanks,	20+ years	Recyclable	Low maintenance
UHMWPE (Ultra High Molecular Weight PE)	Excellent abrasion resistance	High-wear process areas	20+ years	Recyclable	Superior wear properties
PPGL (Polypropylene glass lined) Rolls	Corrosion-resistant lining, easy adhesion with	Internal lining of tanks and secondary containment	10–15 years	Partially recyclable	Used as a protective lining, not structural
Metal Tanks (Carbon/Mild Steel)	High mechanical strength but prone to corrosion	Petroleum, chemical and water industries	5–7 years (unlined)	Limited recyclability	Requires coatings & regular maintenance

Recyclability and Sustainability

- As industries are transitioning towards sustainable operations material recyclability has become an essential criteria for material selection
- Thermoplastic polymers used in tank fabrication specially PP and HDPE are inherently recyclable
- PP and HDPE are 100% recyclable. Reducing carbon footprint by 40% as compared to disposal. ■

For further queries, please contact: info@polyrib.com; Tel: 9936794816

ChemTECH WORLD EXPO 2026
3-6 February 2026 | Mumbai, India

Metso India: Frontrunner in Sustainable Technologies

Metso

Metso India Pvt.Ltd. is a leading subsidiary of Metso Corporation (Finland), established in 1992 in New Delhi, specializing in mining, aggregates, and mineral processing equipment and services.

Metso is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. We improve our customers' energy and water efficiency, increase their productivity, and reduce environmental risks with our product and service expertise.

Business Activities in India

- **Crushing & Screening:** Jaw crushers, cone crushers, impact crushers, vibrating screens.
- **Grinding Solutions:** Ball mills, SAG mills, and related spares.
- **Flotation & Separation:** Equipment for mineral beneficiation.
- **Filtration & Tailings Management:** Advanced filtration systems, thickeners, and tailings solutions.
- **Material Handling:** Conveyors, slurry pumps, feeders.
- **Automation & Digital Solutions:** Process optimization, analyzers, and plant automation.
- **Lifecycle Services:** Maintenance, spare parts, wear solutions, and field engineering support.

For Our Customers' Benefit

We deliver unique benefits to our customers with offering that combines equipment and services in aggregates and minerals processing. We offer digital and automated solutions and technologies that, in addition to being energy, carbon and water efficient, improve circularity and safety. We also have industry-leading service expertise and our extensive global service network is always close to the customer, improving availability of spare and wear parts.

In addition, our strong innovation and R&D activities, and an uncompromising approach to safety also benefit our customers. At the core of our offering are the Metso Plus products that are more energy or water efficient than the benchmark technology or help our customers achieve their recyclability and other sustainability goals. This portfolio includes over 100 products, and we aim to have a Metso Plus product for every part of the customer's value chain. We understand our customer's world and the daily challenges they face. Together, we can partner for positive change. ■

ABS Valves: Engineering Trust in Advanced Polymer Flow Solutions

ABS Valves
Manufacturer of Plastic Valves & PFA / PTFE Lined Valves

ABS Valves is a leading manufacturer of high-performance plastic and fluoropolymer flow control solutions, serving industries that operate under the most demanding chemical, thermal, and environmental conditions.

Guided by our core ideology: "We create honest products based on trust." ABS Valves delivers precision-engineered valves, piping systems, and custom-built polymer components, manufactured exclusively from 100 per cent virgin raw materials sourced from the world's most reputed polymer producers. Our unwavering commitment to quality, integrity, and engineering excellence has positioned ABS Valves alongside global leaders in advanced polymer manufacturing.

Material Expertise

ABS Valves specializes in a comprehensive range of engineering thermoplastics and fluoropolymers, including:

- PP / PP-H
- PVDF
- PFA
- PTFE
- ETFE
- ECTFE
- Anti-Static Grade Polymers

This extensive material portfolio allows us to deliver optimized solutions for highly corrosive, hazardous, and ultra-pure process environments.

Product Portfolio

High-Performance Valves

- Plastic and fluoropolymer-lined valves
- Manual, on-off, and control valve configurations
- Designed to withstand aggressive chemicals, high temperatures, and hazardous media
- Ideal for continuous, critical-duty industrial operations

Solid Thermoplastic Valves & Piping Systems

- Precision-molded thermoplastic valves and piping components
- Engineered to replace conventional metal systems
- Superior corrosion resistance, longer service life, and reduced maintenance
- Developed in collaboration with leading global polymer manufacturers

Customized & Tailor-Made Solutions

- Application-specific valve and piping designs
- Rapid customization for unique process requirements
- Prototyping and small-batch to large-scale production capabilities

Core Strengths & Competitive Advantages

- **Innovative Product Development:** Continuous R&D focused on performance, safety, and sustainability.
- **Customization & Agility:** Fast response to customer-specific designs without compromising quality.
- **Advanced Polymer Processing Expertise:** Deep know-how in polymer molding, lining, machining, and fabrication.
- **100% Virgin Raw Materials:** No reprocessed or mixed polymers — ensuring consistency, reliability, and long-term performance.
- **Global Quality Standards:** Manufacturing practices aligned with international industrial expectations.

Industries We Serve

ABS Valves solutions are trusted across a wide range of industries, including:

- Chemical & Petrochemical
- Pharmaceuticals & Life Sciences
- Specialty Chemicals
- Water & Wastewater Treatment
- Semiconductor & Electronics
- Power & Energy
- Mining & Metal Processing
- Industrial Process Engineering

Quality Philosophy

Quality at ABS Valves is not an inspection step — it is a design principle.

From raw material selection to final product testing, every process is driven by precision, traceability, and accountability. Our philosophy of honesty and trust ensures that every product leaving our facility performs exactly as promised, even in the harshest operating environments.

Our Commitment

At ABS Valves, we are committed to:

- Delivering safe, durable, and high-performance flow control solutions.
- Building long-term partnerships based on transparency and trust.
- Supporting global industries with reliable alternatives to metal systems.
- Continuously evolving through innovation and engineering excellence.

ABS Valves - A Global Partner in Polymer Flow Technology

With deep technical expertise, world-class materials, and an uncompromising approach to quality, ABS Valves stands ready to support global industries with advanced polymer solutions that perform, endure, and inspire confidence. ■

Asten Controls LLP: Optimizing Flow, Delivering Quality

At **Asten Controls LLP**, quality is not an option or an afterthought; it is the foundation on which every product and process is built. Recognizing this reality early on, Asten Controls has adopted innovative valve manufacturing techniques in addition to lean manufacturing, process automation & Kaizen to consistently deliver reliable, high-quality products without compromising on price competitiveness.

One of Asten Controls' key strengths lies in its extensive and diversified valve manufacturing portfolio. The company manufactures a wide range of industrial valves, actuators, and automation accessories. Each product line is offered in multiple sizes, pressure classes, materials, and configurations, enabling customers to select solutions precisely tailored to their process needs.

Product Portfolio

- Pneumatic Actuator Opt. Ball Valves & Butterfly Valves
- Angle Type Control Valves
- Solenoid Diaphragm Valves
- High Performance Offset Disc Butterfly Valves
- Mixing/Diverting Control Valves
- Disc Check Valve / Non-Return Valves (NRV)
- Roto Seal Couplings
- Dust Collector Solenoid Valves (Pulse Valve)
- Pneumatic Cylinders
- Auto Drain Valves
- Pneumatic/Manual Knife Gate Valves
- Pressure Reducing Valves
- Manual Gate / Globe / Check Valves
- Non–Metallic PP / CPVC / UPVC Valves

Asten has established a strong reputation for addressing some of the most demanding and critical applications across industries. Whether it involves highly corrosive media, ultra-critical pharmaceutical processes, superheated steam and thermal applications, or high-precision flow control requirements, Asten brings proven engineering expertise to solve customers' toughest challenges. The company's solutions are widely deployed across chemical, pharmaceutical, oil & gas, power, water treatment, and other core process sectors.

Over the years, Asten has also developed a dedicated export division, reflecting its growing global footprint. This division caters specifically to international requirements, with a strong presence across the Middle East, European and African markets. By understanding regional standards and industrial compliance requirements, Asten ensures dependable performance and timely deliveries for global customers. ■

Contact us at:

Phone: +91-9898290743 | +91-44-43607177

Email: info@astencontrols.com

Website: www.astencontrols.com

ChemTECH WORLD EXPO 2026
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Arvico Rubber Industries: Delivering High-Performance Sealing and Flow-Control Solutions

ARVICO® RUBBER
ARVICO RUBBER INDUSTRIES

Arvico Rubber Industries is a leading manufacturer and exporter of precision-engineered rubber components, delivering high-performance sealing and flow-control solutions to customers across India and international markets. With strong foundations in rubber engineering and process excellence, Arvico has earned a reputation for quality, reliability, and application-driven design.

We specialize in developing components that perform consistently under demanding operating conditions such as pressure, temperature variation, chemical exposure, and continuous cyclic movement. By combining deep material knowledge with disciplined manufacturing systems, Arvico supports OEMs, distributors, and industrial end users with products they can trust.

Arvico's core expertise lies in the design and manufacture of elastomers and polymer-based components used in sealing, isolation, and fluid-handling applications. Our product portfolio includes:

- Rubber Diaphragms for valves, pumps, regulators, actuators, and control systems
- O-rings, gaskets, sleeves, and custom sealing elements
- Molded rubber components for industrial and process equipment
- Rubber stators and application-specific industrial parts
- PTFE components for chemical and high-purity environments

Our products are widely used in Pumps & Valves, Chemical & Gas, Pharmaceutical & Biotechnology, Food, Beverage & Dairy Processing, Petroleum & Oil Refining, Power Generation, Pulp & Paper, Textile & Printing, and Sugar & Distillery industries.

Material performance is essential for product reliability. Arvico collaborates with a wide range of elastomers and polymers, including Natural, NBR, EPDM, Neoprene, Silicone, Viton®/FKM, and PTFE. Our engineering team assists customers in selecting the most appropriate compound based on application-specific parameters such as temperature, pressure, chemical compatibility, hygiene requirements, and regulatory compliance. We support both standard products and custom-engineered solutions, offering design assistance, material optimization, prototyping, and tooling development.

Arvico's manufacturing operations are supported by

in-house modern molding equipment, controlled curing processes, and structured quality systems. Each stage from raw material inspection to final dispatch is governed by defined procedures to ensure consistency and traceability.

We operate in alignment with international quality and export standards and comply with ISO-based quality systems, CE requirements, FDA/ADA-compliant materials, and REACH & RoHS norms, where applicable. Rigorous in-process and final inspections ensure dimensional accuracy, material integrity, and reliable field performance.

With a strong export focus, Arvico understands the expectations of global customers for quality consistency, documentation, packaging standards, and dependable lead times. Our systems are designed to support long-term international partnerships built on transparency and trust.

At Arvico Rubber Industries, we are committed to delivering precision, performance, and partnership, helping our customers enhance efficiency, safety, and reliability through well-engineered rubber and polymer solutions. ■

Indiana Gratings : Strengthening Industrial Infrastructure

In the chemical process industry, where safety, durability, and operational continuity are paramount, the role of reliable access and structural solutions cannot be overstated. **Indiana Gratings Private Limited** has been a trusted manufacturer and solution provider since over five decades, delivering high-quality grating and access systems that support safe and efficient plant operations across diverse industrial sectors.

With a strong foundation in engineering, manufacturing excellence, and customer-centric values, Indiana Gratings has steadily built its reputation as a dependable partner for chemical, pharma, petrochemical, oil & gas, power, and infrastructure projects in India and overseas.

Gratings

Electro-forged steel gratings are the foundation of Indiana Gratings and our strongest competence. We manufacture:

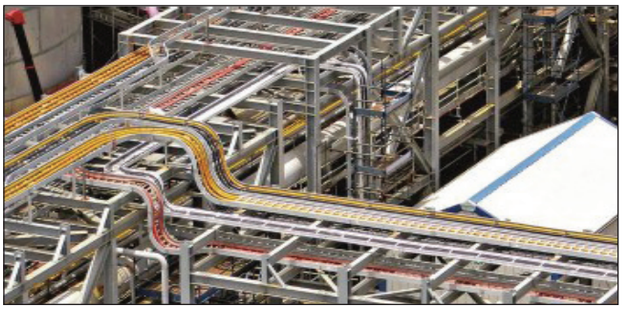
- Standard & Custom Fabricated Gratings
- Circular Gratings
- Heavy-Duty Gully Gratings
- Stair Treads
- GRP / FRP Hand-moulded & Pultruded Gratings.

With an installed capacity of 250 MT per day across seven production lines and ready stock of standard panels, we ensure rapid dispatch and uninterrupted project schedules.

Cable Trays

We fabricate perforated, ladder, and wire-mesh cable trays in Mild Steel, Stainless Steel, Aluminium, and FRP/GRP, up to 6 meters in length, with a capacity of 15 km per day. Manufactured as per NEMA / IEC standards and backed by ULC approval, our cable management systems are ideal for high-density Chemical and Pharmaceutical plants.

Handrails



We manufacture both Modular and Fabricated Handrails in Mild Steel and Stainless Steel, with a capacity of 600 posts per day, ensuring uniformity, safety, and long-term durability across plant walkways and platforms.

Fabricated Structural Steel

We undertake fabrication of hot rolled and built-up sections using fully CNC Peddinghaus lines. Capacity: 3,000 MT per month – Welding as per AWS D1.1. Our scope includes Columns, Beams, Girders, Gantries, and Industrial Frames for process plants and utility structures. ■

Double Motion Grease Kettles from Punja Petrokem Engineering

Punja Petrokem Engineering has been manufacturing equipment for Chemical, Petrochemical and other Process and Allied Industries since 1978. The company has a long standing agreement with M/s. Desmet, a Belgium-based company, for the supply of major equipment related to oil extraction and biodiesel plants for their global projects as well as projects in India for over 25 years.

The double motion grease kettles from Punja Petrokem Engineering Pvt Ltd, are designed, manufactured and supplied for use in wide range of process industries in India and abroad. The Kettles are in standard manufacturing range of the company and suitable for vertical installation.

The Kettles are supplied with Flat Top Cover as shown, or with a Flanged Dome Cover as per client requirements. The Kettle has twin motion agitation system with external convection cooling jacket for Cooking, Finishing and Cooling the grease. The stirrer is attached with spring loaded Scrapper with Teflon Tip covering entire surface in operation. The Kettles are designed and manufactured in accordance with the International Codes and Standards and are supplied with Inspection Certificate from Third Party like LLOYD'S Register Asia along with Performance Guarantee.

The operating process uses a twin motion counter rotating agitator to process the grease and impart desired properties. Cooling of entire mass is achieved through direct base oil addition and cooling water circulation through the Jacket. The grease coming out of the Kettle is then milled and homogenized to obtain desired consistency and texture.

Punja Petrokem Engineering Pvt. Ltd is a proud recipient of the Export Excellence Award - reflecting its commitment to quality, reliability and global competitiveness. ■

ChemTECH WORLD EXPO 2026
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Saurus939 by Italvacuum: A Vacuum Pump Defined by Reliability & Unique Performances

Saurus939 brings together **Italvacuum**'s long-standing experience in vacuum technology in a robust, simply engineered piston pump designed for demanding chemical and pharmaceutical processes. It combines proven mechanical strength with modern engineering solutions, delivering stable performance where solvent compatibility, operational continuity and product purity are non-negotiable.

Saurus939 has long been central to Italvacuum's portfolio. Italvacuum is among the leading manufacturers of vacuum pumps and is also a worldwide reference in the design and manufacture of vacuum dryers, enabling integrated solutions that connect vacuum generation with drying equipment.

A key differentiator is Italvacuum's LubriZero® system, which virtually eliminates oil consumption—supporting consistent operation, reducing maintenance needs and improving environmental performance.

Designed to work with both common and aggressive solvents, Saurus939 guarantees:

- Absolute safety for both operators and the process
- Easy 24/7 operation
- High and stable performance in harsh environments
- Nominal flow rate up to 3,800 m^3/h
- Ultimate vacuum down to 0.03 mbar
- Low operating costs, thanks to:

– low energy consumption motors

– LubriZero® system with negligible oil consumption

– Easy and economical maintenance

Powerful, efficient and safe, Saurus939 helps protect final product quality by providing an uncontaminated vacuum, supporting consistent purity across the process.

Use in the Fine Chemicals Industry

Fine chemicals — used as raw materials in the pharmaceutical, biopharmaceutical and agrochemical sectors — differ from basic chemical products due to stringent purity requirements.

Their production involves multiple synthesis and purification steps that often rely on vacuum technology, including reaction, drying, distillation and crystallization.

Reaction Processes

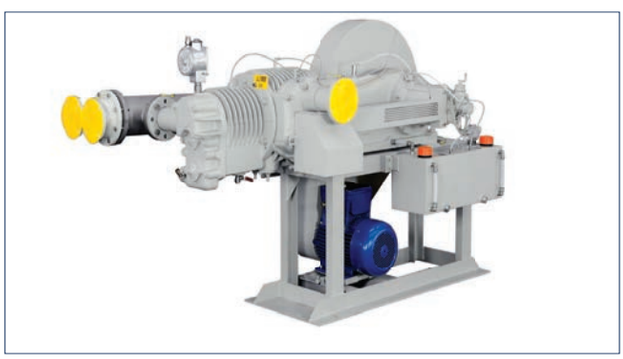
Vacuum is widely used in chemical synthesis to lower operating temperatures and avoid thermal stress, remove oxygen, and extract secondary products and volatile components.

Reactions are often conducted around 10-20 mbar(a). Vacuum reactors typically range from 1 m^3 to 10 m^3. For these duties, a vacuum pump with a nominal capacity between 80 and 380 m^3/h is often sufficient.

Here, the double-stage Saurus939 is an ideal solution, thanks to its resistance to corrosive solvents and its reliability in demanding industrial environments.

Examples of applications include the synthesis of:

- Agrochemical compounds, where the Saurus939 ATEX Zone 0 version is used
- Performance additives for the lubrication market, where piston pump technology is often preferred due to aggressive solvents and the presence of significant powder carryover



Drying Processes

Vacuum drying typically takes place immediately after centrifugation or filtration. It removes residual moisture from wet solids by applying heat under reduced pressure, allowing heat-sensitive substances to be dried at temperatures lower than those required at atmospheric conditions.

In the fine chemical industry, vacuum drying is generally a batch operation and can be performed using different technologies depending on the product. In this context, Italvacuum supplies both vacuum pumps and complete vacuum drying systems (vacuum dryers), offering an integrated approach from vacuum generation to drying equipment.

Applications for the Italvacuum vacuum pump in drying include:

- Pharmaceutical raw materials, where the Saurus939 double-stage piston pump with Roots booster is used
- Biopharmaceutical raw materials, where the basic double-stage Saurus939 configuration is used

Distillation Processes

Vacuum distillation reduces the pressure above a liquid mixture below its vapor pressure, enabling evaporation at lower temperatures. It is typically used when the components have low volatility (normal boiling point > 150°C), the product risks thermal degradation near atmospheric boiling conditions, or temperature-sensitive materials must be purified (e.g., flavorings).

Operating pressure can vary widely—from near absolute vacuum up to 60 mbar(a)—depending on the separation required. Vacuum distillation columns generally range from 5 m^3 to 20 m^3.

For these applications, Saurus939 is often combined with a Roots booster to increase pumping speed and reduce achievable pressure.

A typical application is the distillation of plant-based fragrances and flavorings for the cosmetics and food industries.

Crystallization Processes

Crystallization precipitates a solid compound from a solution and is typically selected when very low operating pressures are required or when the material is produced in relatively small batches with high added value.

Crystallization cycles generally last 2 to 8 hours. Operating pressure can range from near absolute vacuum up to 30 mbar(a). Vacuum crystallizers typically range from 1 m^3 to 4 m^3.

For these duties, Saurus939 is often used in combination with a Roots booster. Thanks to an uncontaminated vacuum and continuous recovery of extracted solvents, the vacuum system helps preserve finished product purity.

Use in the Pharmaceutical Industry

Vacuum pumps are among the most widely used pieces of equipment in pharmaceutical manufacturing, across scales from pilot to full production—from intermediate manufacturers to producers of Active Pharmaceutical Ingredients (APIs).

A key vacuum-enabled step is drying, which typically follows centrifugation or filtration. Drying under vacuum supports the processing of heat sensitive or hygroscopic substances at reduced temperatures, improving product quality and process control. In the pharmaceutical industry, drying is generally a batch operation, and the selected technology depends on the product characteristics.

Crystalline products from synthesis are often processed in dynamic dryers (e.g., rotary and horizontal paddle dryers), where particle size specifications and very low residual moisture are frequently critical. Amorphous products—or plant and animal-based products—are typically processed in static dryers, where particle size is less decisive (products are often ground downstream) and moisture specifications may be less stringent.

Italvacuum at Chemtech World Expo 2026 — Stand L 9

With a strong presence in the Indian market for over 25 years, Italvacuum has installed over 1,000 Saurus939 vacuum pumps across India. The company's commitment is further strengthened by its strategic partnership with Vacuum Drying Technology India, established more than 20 years ago to ensure comprehensive local service support.

Italvacuum will participate in Chemtech World Expo 2026, one of India's leading events for the chemicals, pharmaceutical, and petrochemical sectors. Visitors can meet Italvacuum at Stand L 9, where the company will exhibit alongside its partners from Vacuum Drying Technology India.

Event details: February 3 - 6, 2026

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

For more information: www.italvacuum.com

Dynamic Drying

In dynamic systems, drying effectiveness depends not only on the dryer but also on the vacuum unit. This is common in API production using rotary dryers and horizontal paddle dryers, where the vacuum pump must handle aggressive organic solvents (e.g., acetone, toluene) and potential interaction with solid powder particles (especially if not fully captured by filtration).

Saurus939 is designed to address both challenges. When very low final moisture is required, dynamic dryers are often paired with pumps combined with Roots boosters. In many processes, the booster is activated in the final drying stage to remove the last traces of solvent retained in pharmaceutical powders. Under these conditions, the condenser (typically installed upstream of the Saurus939 vacuum unit) may be bypassed and the positive-displacement booster activated. With a booster, significantly deeper vacuum levels and higher pumping speeds can be achieved compared to the vacuum pump alone.

Compared to other technologies used in API drying, Saurus939 can offer advantages under severe conditions. Rotary vane and liquid-ring pumps may show limitations with aggressive solvents and short life cycles, while dry pumps can be sensitive to even small amounts of dust in processes involving solid carryover.

Static Drying

Static dryers are universal systems capable of drying a wide range of products and rarely require Roots boosters. In addition, a filter between the dryer and the vacuum unit is only occasionally necessary. A typical example is the drying of plant extracts, a key process in today's rapidly expanding herbal sector. Natural products are subjected to solvent extraction, and the resulting batch is dried to preserve heat-sensitive properties. In this process, both the vacuum pump and the condenser unit are activated and typically remain in operation for the entire cycle. The double-stage Saurus939 may be used with or without a Roots booster depending on the required final moisture and cycle time. ■

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Taj Building, 3rd Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.
Tel: +91-22-4037 3636, **Email:** sales@jasubhai.com
Ahmedabad - 09833104834 | Bangalore - 09892644177 | Chennai - 09176963737
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