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CHEMICAL ENGINEERING WORLD
RNI REGISTRATION NO. 11403/1966

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Single Copy Price: ₹ 150/-,
Annual Subscription: ₹ 1620/-, Foreign: USD 180

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PLACE OF PUBLICATION
JASUBHAI MEDIA PVT. LTD.

210, Taj Building, 3rd Floor, Dr. D. N. Road, Fort,
Mumbai 400 001, Tel: +91-22-4037 3636

Printed and published by Mr Hemant K. Shetty
Address: 406-D, The Karachi Citizens Co-Op Hosg Soc Ltd.,
Juhu Varsova Link Road, Andheri West, Mumbai - 400053.

Printed at The Great Art Printers
25, Unique House, S A Brelvi Road, Fort, Mumbai 400 001.

Editor: Ms. Mittravinda Ranjan, 3rd Floor, Taj Building, 210,
Dr. D N Road, Fort, Mumbai 400 001.

Published from Jasubhai Media Pvt .Ltd. 3rd Floor, Taj Building,
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CONTENTS

INNOVATIONS

GUEST COLUMN

INTERVIEW

FEATURES

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Paradip Port Leads Major Indian Ports in Cargo Throughput for FY 2023-24

Odisha, India: Paradip Port Authority (PPA) has set a new national record by handling 145.38 million metric tonnes (MMT) of cargo in FY 2023-24, becoming India's top cargo-handling major port. This milestone marks a significant 7.4% increase, adding 10.02 MMT over the previous year. Paradip Port surpassed Deendayal Port for the first time in its 56-year history.

Key to its success, the port reported a record 59.19 MMT in coastal shipping traffic, a 1.30% growth from last year, with thermal coal shipments contributing 43.97 MMT. Paradip Port also led in berth productivity, achieving a new high of 33,014 MT, a 6.33% increase.

Financially, PPA showcased robust growth, with operating revenue reaching ₹. 2,300 crores, up 14.30%, and an operating surplus of ₹. 1,510 crores, growing 16.44%. Net surplus before tax rose to ₹. 1,570 crores, a 21.26% increase.

The port's capacity is set to expand further with the upcoming Western Dock project, enhancing its capability to handle fully-laden cape vessels by 2026. Paradip Port also plans significant infrastructure improvements, including 100% mechanization by 2030 and the development of green energy facilities.

Anupam Rasayan Secures USD 90M Deal with Japanese Firm for Chemical Supply

Surat, India: Anupam Rasayan India Ltd. (NSE, BSE: ANURAS), a front-runner in custom synthesis and specialty chemical production, has announced a significant milestone in securing a Letter of Intent (LOI) valued at approximately USD 90 million (₹.743 crores). The agreement spans over the next seven years with a prominent Japanese fluoro-chemicals company to supply two advanced intermediates. These intermediates will be produced using sophisticated fluorination chemistry at Anupam Rasayan's existing facilities and those slated for future commercialization.

Anand Desai, Managing Director of Anupam Rasayan, expressed his enthusiasm about the deal: "We are thrilled to be the pioneer Indian company manufacturing these crucial molecules domestically, catering to significant sectors such as pharmaceuticals and engineering fluids. This LOI not only broadens our customer base but also reinforces our standing in the Japanese market as a reliable supplier of specialized molecules."

The partnership highlights Anupam Rasayan's strategic efforts to expand its global footprint and diversify its product offerings in the specialty chemicals market. The company, with its robust business development strategies, continues to enhance its relationships with international clients, further solidifying its position as a global chemical manufacturer. Anupam Rasayan operates six manufacturing sites in Gujarat, India, focusing on multi-step synthesis and complex chemical reactions for a diverse client base.

ONGC to Drill Exploratory Wells in Bihar, Eyes Potential in Ganga Basin

Bihar, India: Oil and Natural Gas Corp (ONGC), India's premier oil and gas explorer, has announced plans to drill exploratory wells in the Ganga basin, starting with Samastipur, Bihar. This initiative marks the first

Deepankar Aron appointed as Joint Secretary (Chemical)

Deepankar Aron, an IRS officer of the C&IT cadre from the 1996 batch, has been appointed as the Joint Secretary in the Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India. His tenure in this role is set for five years. Aron brings extensive administrative experience to his new position, having previously served as Commissioner of CGST in various regions including Uttarakhand, Lucknow, and most recently as Commissioner Appeals (GST) in Dehradun. This new appointment leverages his substantial experience in tax administration and policy implementation within the government

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significant exploration attempt in the region in nearly 50 years, aimed at mapping potential oil and gas resources that could redefine India's energy landscape.

Director of Exploration at ONGC, Sushma Rawat, shared that the company has gathered 3D seismic data across 300 sq. km in its Samastipur block. The first of the two planned wells will be drilled this year with an estimated cost of ₹. 30-35 crore. The insights from this first well will guide subsequent explorations in the area, including a second well.

Exploratory efforts in Bihar could unlock the entire Ganga basin—spanning from Bihar to Uttar Pradesh and Punjab—for future oil and gas exploration. A commercial discovery would not only add Bihar to India's oil map but also boost local industries around the production sites.

Additionally, ONGC faces challenges in land acquisition for another planned well in Ballia, Uttar Pradesh, due to fragmented land ownership. The company is adapting strategies, including relocating the drilling site, to overcome these hurdles with support from local authorities.

India's Natural Gas Consumption Set for Historic Highs amid Rising Domestic Production

Mumbai, India: India is poised to achieve record levels of natural gas consumption by FY24, bolstered by steady domestic production and moderated import prices, according to CareEdge Ratings. The country's natural gas consumption is forecasted to surge as it aims to increase the gas share in its primary energy mix to 15% by 2030, up from the current 6%.

Despite the volatility caused by the COVID-19 pandemic and the Russia-Ukraine conflict, which initially led to a spike in imported LNG prices and a subsequent drop in consumption, prices have stabilized over the past year. As of FY23, LNG prices have normalized to approximately USD10-$12 per mmbtu, supporting a resurgence in gas demand. The consumption trajectory resumed in FY22 and is expected to continue its upward trend, reaching unprecedented levels in FY24.

Domestic gas production, which saw a decline until FY21 due to aging fields, has shown signs of recovery following new offshore discoveries. Approximately 30 MMSCMD of new domestic gas production has been added over the past three years, with another 15 MMSCMD expected by FY25. This increase in supply is contributing to a reduction in India's dependency on imported LNG, projected to decrease to about 45% of total consumption by FY26, down from 53% in FY21.

The anticipated growth in domestic production, coupled with stable import costs and robust demand from key sectors like fertilizers and power, underlines a positive outlook for India's natural gas sector in the medium term.

Reliance Industries Acquires Stake in Adani's Madhya Pradesh Power Project

Madhya Pradesh, India: In a landmark move uniting two of India's richest magnates, Reliance Industries Limited (RIL), led by Mukesh Ambani, has acquired a 26% stake in Mahan Energen Ltd, a wholly-owned subsidiary of Adani Power Ltd, controlled by Gautam Adani. This transaction involves Reliance purchasing 5 crore equity shares at a face value of ₹. 10 each, totaling an investment of ₹. 50 crore.

Arvind Kumar appointed as Director (Refineries) of Indian Oil

Arvind Kumar, previously the Managing Director & CEO of Chennai Petroleum Corporation Limited (CPCL), has been appointed the new Director (Refineries) at Indian Oil Corporation Limited (IOCL). The Public Enterprises Selection Board (PESB) recommended Kumar after a detailed selection process involving 12 candidates. With over three decades of diverse experience in the oil and gas sector, Kumar brings expertise in Engineering, Project Management, and Operations. As Director (Refineries), he will join IOCL's board of directors, enhancing the company's strategic and operational capabilities in the refining sector.

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Under this agreement, RIL will utilize 500 MW of electricity generated by the Adani power plant for its captive use, as per the announcements made by both companies in separate stock exchange filings. This deal marks a significant step in the cooperation between the two business leaders, who have historically maintained a distance in their expansive business ventures.

Mahan Energen Ltd has signed a 20-year long-term power purchase agreement with RIL, in accordance with the captive user policy outlined in the Electricity Rules, 2005. This strategic partnership not only signifies a historic collaboration between the two conglomerates but also highlights their commitment to leveraging synergies in the energy sector.

This move comes at a time when both industrialists are increasingly focusing on clean energy, with significant investments planned to advance India's renewable energy capabilities, aligning with global sustainability goals.

Aker Carbon Capture and SLB Launch Joint Venture for Decarbonization

Akershus, Norway: Aker Carbon Capture ASA (ACC), a key part of Aker Horizons' portfolio, has teamed up with SLB to merge their carbon capture operations, enhancing global industrial decarbonization efforts. This strategic move aims to harness ACC's strong commercial product offerings with SLB's innovative technology and industrialization expertise.

Under the agreement, SLB will acquire an 80% stake in the new joint venture, while ACC retains 20%. The joint venture is valued at NOK 4.12 billion in cash paid by SLB for the majority stake, with ACC holding onto an additional NOK 0.40 billion. ACC shareholders will see a valuation of NOK 9.19 per share, with potential additional performance-based payments up to NOK 1.36 billion.

The collaboration marks a significant expansion of the existing partnership between Aker and SLB, already established in subsea operations with Aker Solutions and digital ventures with Cognite. The joint venture will focus on delivering scalable carbon capture solutions, supporting the global shift towards Net Zero CO2 emissions by 2050.

Subject to regulatory approvals, the transaction is slated to close by the end of the second quarter of 2024. Aker Horizons will continue supporting ACC in its collaboration with SLB, aiming for enhanced growth and innovation in the carbon capture sector.

SABIC and Pashupati Group Forge Partnership to Boost Plastic Recycling in India

Uttarakhand, India: SABIC, a global chemical industry leader, has entered into a Memorandum of Understanding (MoU) with India's Pashupati Group, a prominent recycler of plastic waste, to enhance recycling efforts in India. This collaboration is set to explore and develop local recycling solutions, including the conversion of used plastics into pyrolysis oil, which will serve as feedstock for SABIC's certified circular polymers under its TRUCIRCLE™ portfolio.

The partnership intends to address the growing demand for recycled products in Asia, contributing to the region's shift towards a circular economy. Pashupati Group, known for its expertise in recycling polyolefin

KC Muraleedharan Appointed Head of NTPC Bongaigaon

NTPC, a Maharatna power company, has named **KC Muraleedharan** as the new business unit head of its Bongaigaon plant in Assam. A mechanical engineering graduate from Bhopal University, Muraleedharan replaces Karunakar Das following his retirement. Joining NTPC in 1989 as an executive trainee, Muraleedharan has shown outstanding leadership and commitment. Previously serving as the chief general manager (O&M) at the same plant, he was instrumental in enhancing operational efficiencies. In his new role, he will oversee all activities at the plant, which has a generating capacity of 750 MW.

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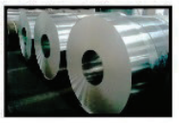

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L-R: Bankey Goenka, Managing Director, Pashupati Group and Janardhanan Ramanujalu, Vice President South Asia- SABIC

pellets and packaging bags, will work alongside SABIC to optimize the processing of used plastics. This includes enhancing the value of both virgin and recycled polyolefin in compounded and non-compounded products.

Sanjay Mishra from SABIC emphasized the strategic importance of this initiative in transforming India's plastics economy towards sustainability. Meanwhile, Bankey Goenka of Pashupati Group highlighted the synergy between the two organizations, combining their strengths in technology and market reach to support global circular economy goals.

This partnership follows SABIC's efforts in leveraging recycled ocean-bound plastics for new products, showcasing a continued commitment to innovative recycling solutions and sustainable materials management.

SPIC Shifts to 100% Natural Gas for Urea Production, Boosts Sustainability

Chennai, India: Southern Petrochemical Industries Corporation Ltd. (SPIC), a leader in India's fertilizer industry, has achieved a significant milestone by transitioning entirely to natural gas as the sole raw material for its urea production. This strategic shift is expected to cut raw material costs and enhance profitability.

SPIC's conversion was facilitated by the completion of the Indian Oil Corporation's (IOC) Ennore cross-country pipeline and the supply of domestic gas through the IOCL cross-country pipeline from Oil and Natural Gas Corporation Limited (ONGC). Previously, the company utilized a blend of fuels, with 60% of its domestic natural gas supplied through the IOCL Ramnad Tuticorin Pipeline.

Chairman Ashwin Muthiah expressed his satisfaction with the transition, noting, "This shift not only aligns with our sustainability commitments but also with government policies urging the use of cleaner fuel sources."

The change to natural gas will reduce the need for storage and minimize logistics and freight costs, thereby lowering the production costs of fertilizers. Additionally, this move supports India's goal to increase its gas share in the energy basket from the current 6.3% to 15%, marking a crucial step towards India's energy self-reliance and environmental sustainability initiatives.

Samir Chandra Saxena Appointed Director (Market Operation) of Grid-India

Samir Chandra Saxena has been appointed as the next Director (Market Operation) for Grid Controller of India Limited (Grid-India), effective June 1st. The Public Enterprises Selection Board (PESB) selected Saxena from a competitive field of 11 candidates. He currently holds the position of Executive Director (National Load Despatch Centre) at Grid-India. Saxena's new role involves overseeing commercial and electricity market operations, integrating renewable energy, managing power exchange operations, and handling regulatory affairs. His extensive experience within Grid-India highlights the organization's commitment to nurturing and advancing internal talent.

Kilburn Engineering Ltd Acquires M E Energy for ₹. 98.70 Crore to Boost Thermal Engineering Solutions


Ranjit Lala, Managing Director of KEL

Kolkata, India: Kilburn Engineering Ltd (KEL) announced its strategic acquisition of M E Energy Private Ltd for ₹. 98.70 crore. This move aims to enhance KEL's capabilities in the thermal engineering sector, particularly in waste heat recovery systems.

M E Energy, recognized for its expertise in waste heat recovery (WHR) solutions, reported a revenue of ₹. 44.70 crore for the fiscal year 2022-23. The acquisition, which includes a cash payout of ₹. 75.46 crore, is expected to significantly augment KEL's product offerings in the thermal engineering space.

Amritanshu Khaitan, Director of KEL, emphasized the acquisition's strategic importance, stating, "This acquisition marks a significant stride in our strategic growth trajectory. M E Energy's expertise strengthens our commitment to innovation and service expansion. We are confident that this collaboration will not only enhance our competitive edge but also deliver sustainable value to our shareholder."

Ranjit Lala, Managing Director of KEL, highlighted the potential for synergy between the two companies. He noted that M E Energy's specialization in thermal engineering and heat recovery systems complements KEL's existing drying systems, potentially opening new sales opportunities and enhancing service offerings to the combined client base.

For the nine months ended December 2023, KEL generated revenue of ₹. 207 crore and a net profit of ₹. 27 crore, indicating strong financial performance ahead of the acquisition.

Yasho Industries Starts Production at New Dahej Plant

Gujrat, India: Yasho Industries Limited, a prominent manufacturer of specialty and fine chemicals in India, has initiated commercial production at its new Pakhajan Plant located in Dahej, Gujarat. The plant, which spans 42 acres, represents a significant step in the company's expansion, with a production capacity of 20,000 metric tons per annum (MTPA). The facility was established with an investment of approximately ₹.470 crore, surpassing the initial budget by ₹.70 crore. The cost increase was attributed to enhanced automation, a 15% increase in capacity, and inflationary pressures.

Parag Jhaveri, the Managing Director and CEO of Yasho Industries, expressed enthusiasm about the new facility's role in boosting the company's market position and operational capabilities. He highlighted the plant's importance in Yasho's strategic growth and its contribution towards transforming the company into a leading global player in the chemical manufacturing sector. The Dahej plant is poised to play a crucial role in meeting the increasing demands for specialty chemicals, leveraging its advanced technology and increased production capacity to deliver superior products globally.

Pidilite Announces Appointment of Sudhanshu Vats as the new Managing Director

Pidilite Industries, known for its leading brands like Fevicol and Dr. Fixit, has appointed **Sudhanshu** Vats as the new Managing Director designate, set to take over from Bharat Puri in April 2025. Sudhanshu Vats currently serves as Deputy Managing Director and has a rich leadership background with companies like EPL Ltd and Viacom 18 Media. Alongside, Kavinder Singh has been named Executive Director and Joint Managing Director designate. These strategic leadership transitions, approved by Pidilite's board, aim to steer the company into its next growth phase under their experienced guidance.

Lubrizol Corporation Launches New Global Capability Center in Pune

Pune, India: The Lubrizol Corporation, a renowned leader in specialty chemicals, has inaugurated its new Global Capability Center (GCC) in Pune, India. This strategic move is aimed at accelerating regional growth and enhancing product innovation. Situated in the Embassy Tech Zone, Hinjewadi, the 42,000-square-foot facility is WELL- and LEED Gold certified, reflecting Lubrizol's commitment to providing a sustainable, healthy, and ergonomic working environment.

The new GCC is designed to foster closer collaboration with customers and optimize the utilization of local talent across various functions such as Engineering, Supply Chain, Technology, Finance, Procurement, Legal, and HR. Over the next year, the center plans to hire more than 200 regional employees.

This initiative is part of Lubrizol's 2023 investment strategy where the company pledged over USD 150 million to enhance its operational capabilities in India. These funds are also directed towards doubling the capacity of its CPVC resin plant in Vilayat, Gujarat, and opening a new grease lab in Navi Mumbai.

Senior Vice President, JT Jones highlighted, "India is undeniably one of our fastest growing markets and a critical hub for the talent we require." The GCC is poised to become a cornerstone in Lubrizol's efforts to drive global and regional customer success through innovative solutions.

Best Agrolife Acquires Sudarshan Farm Chemicals for ₹. 139 Crore

Greater Noida, India: Best Agrolife Ltd (BAL), a key manufacturer of agrochemicals in India, has announced the strategic acquisition of Sudarshan Farm Chemicals India Pvt Ltd. (SFCL) for an enterprise value of ₹.139 crore. The acquisition is settled through a cash consideration, resulting in a net cash outflow of ₹.9.5 crore for BAL, taking into account the net working capital and other liabilities.

SFCL, a subsidiary rooted in the longstanding Sudarshan Chemical Industry, brings over 40 years of industry experience and a strong track record of innovation and farmer trust. This acquisition includes SFCL's comprehensive IP portfolio, which contains 10 patent applications focused on pioneering chemical processes for agrochemicals.

Through this acquisition, BAL not only inherits SFCL's esteemed brands like Sutathion, Suphos, Suchlor, and Sumidon but also gains access to SFCL's extensive network of over 2500 deale. This network is expected to be instrumental in enhancing BAL's distribution capabilities across the central and southern regions of India.

Anil Khatri Named Business Head - Specialties at Deepak Nitrite

Deepak Nitrite Limited has appointed **Anil Khatri** as the **Business Head - Specialties (Effect Chemicals),** effective from April 1, 2024. Khatri, a B.Tech. Graduate in Chemical Engineering with a specialization in Petrochemical from UDCT, Maharashtra, brings over a decade of experience in techno-commercial roles. His expertise spans technology licensing, technical sales, business development, and corporate planning. Khatri's professional journey includes significant roles at GTC Process Technology and Baker Oil Treating, among others. He has also made substantial contributions at Deepak Phenolics Limited, a subsidiary of Deepak Nitrite, focusing on strategic planning and new product development.

Additionally, SFCL's robust R&D infrastructure and backward-integrated technical manufacturing operations will significantly boost BAL's ability to develop and manufacture cost-effective solutions for off-patent molecules, strengthening its competitive edge in the global agrochemical market. This move is part of BAL's broader strategy to expand its research capabilities and production capacity to meet growing market demand and ensure sustainable growth.

Arkema Acquires 78% Stake in Proionic to Boost Battery Technology Capabilities

Austria, Central Europe: Arkema, a prominent player in the specialty chemicals industry, has announced its acquisition of a 78% majority stake in Proionic, a leader in ionic liquid technologies vital for advancing lithium-ion batteries. This strategic move, finalized on April 19, 2024, positions Arkema to enhance its materials portfolio across various battery technologies, affirming its role as a pivotal materials supplier.

Proionic, founded in 2004 by Dr. Roland Kalb in Graz, Austria, is renowned for its pioneering role and market leadership in ionic liquids—a crucial component for next-generation batteries. The company reported sales of approximately € 2.5 million in 2023 and stands out with its proprietary technologies for the synthesis and recycling of ionic liquids.

This acquisition promises substantial technological and commercial synergies between Arkema and Proionic, poised to accelerate Proionic's growth and innovation. Arkema's Chief Technology Officer, Armand Ajdari, expressed enthusiasm about integrating Proionic's expertise, highlighting the partnership's potential to drive the development of safer, more efficient, and sustainable battery solutions. This collaboration marks a significant step in Arkema's strategy to diversify its technology offerings and strengthen its market position.

Nuberg EPC Wins Contract for India's Largest Chlor-Alkali Plant

Gujrat, India: Nuberg EPC, a prominent Indian EPC and turnkey project management firm, has secured a major contract to construct India's largest Chlor-Alkali plant. This significant project, commissioned by Mundra Petrochemical Ltd, a subsidiary of Adani Enterprises, is set to revolutionize the industry with a production capacity of 2,200 TPD of Caustic Soda using a 100% NaOH process.

Located strategically in Mundra, Gujarat, the project underscores Nuberg EPC's capability in delivering large-scale industrial projects. The company is committed to completing this project within a stringent 15-month timeline, emphasizing meticulous engineering, procurement, and construction management services across various technical disciplines.

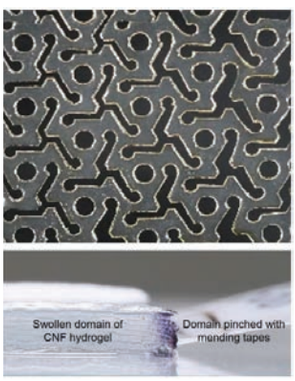
The contract was finalized in a high-profile meeting in Mumbai, attended by top executives from both Adani Enterprises and Nuberg EPC, including Jeet Adani, Jayant Parimal, and A K Tyagi. Tyagi, the CMD of Nuberg EPC, expressed gratitude for the trust placed in his company and reiterated their commitment to excellence and timely delivery.

This project not only marks a milestone in India's industrial capabilities but also paves the way for future sustainable industrial projects, highlighting Nuberg EPC's significant role in the nation's progress.

Lubrizol Strengthens Leadership in IMEA with New Appointment of Nitin Mengi

Lubrizol Corporation has appointed **Nitin Mengi** as **Vice President** of Lubrizol Additives for India, the Middle East, and Africa (IMEA), and as Chairman & Managing Director of Lubrizol India Private Limited. This strategic move underlines Lubrizol's commitment to growth in these regions. Mengi, with over 20 years of experience in the oil and gas industry and a strong educational background, will focus on driving growth in the transportation and industrial sectors. His collaboration with Bhavana Bindra, Managing Director of Lubrizol IMEA, aims to enhance regional strategies and support sustainable solutions.

Innovative Kirigami Hydrogels Developed for Advanced Material Applications



Tokyo, Japan: Researchers from Tokyo University of Agriculture and Technology (TUAT) have introduced a groundbreaking approach in hydrogel technology by creating kirigami hydrogels. These hydrogels are developed from laser-patterned cellulose films that swell into complex, three-dimensional structures when exposed to water. This novel research is published in the journal Science and Technology of Advanced Materials.

The team, led by Daisuke Nakagawa and Itsuo Hanasaki, utilized thin films composed of nanofibers derived from cellulose. Through precise laser cutting, these films are engineered to expand into unique kirigami patterns when hydrated. This technique allows the material to exhibit auxetic properties—increasing in width when stretched—due to the enhanced thickness during swelling.

This innovative method offers significant potential in various fields, including robotics, where these hydrogels can be used to develop soft, adaptable components. Additionally, they hold promise in the medical sector for applications such as tissue engineering, wound care, and drug delivery systems, where flexibility and environmental responsiveness are crucial.

The adaptability and the ability to maintain structural characteristics under different conditions make kirigami hydrogels a promising avenue for the development of intelligent, multifunctional materials.

ICIG Acquires Majority Stake in Vasant Chemicals to Expand Global Reach

Frankfurt, Germany: International Chemical Investors Group (ICIG) announced its acquisition of a majority stake in Vasant Chemicals, a leader in the production of specialty chemicals and pharmaceutical intermediates based in Hyderabad, India. This acquisition integrates Vasant Chemicals into WeylChem Group, ICIG's fine chemicals platform, marking a significant strategic expansion in the global specialty chemicals market.

Vasant Chemicals, with over 40 years of industry experience, operates advanced manufacturing facilities in Hyderabad and Visakhapatnam. The company is renowned for its robust export activities and long-term customer contracts, which underscore its commitment to stable and enduring partnerships.

Dr. Andreas Maier, CEO of WeylChem, expressed confidence in the acquisition, noting that it aligns with WeylChem's strategic goals to enhance long-term value and broaden its manufacturing and distribution footprint in Asia. G.K.B. Chowdary, representing Vasant Chemicals' former majority owners, highlighted the deal's potential to unlock new growth opportunities and operational efficiencies through the synergistic integration of the two companies.

The transaction was advised by Ambit Pvt. Ltd. for Vasant Chemicals, with PricewaterhouseCoopers and Deloitte conducting financial due diligence for ICIG and Vasant Chemicals, respectively. Legal advisories were provided by Dentons Link Legal and S&R Associates.

Ajay Sardana Takes Helm as Chairman of ICC Petrochemical Committee

The Indian Chamber of Commerce (ICC) has appointed **Ajay Sardana** as Chairman of the National Expert Committee on Petrochemical Initiatives. Sardana, with over three decades of industry experience, currently serves as President & Head of Strategy and Business Development in Reliance Industries' Polyester Business. He will lead efforts to promote sustainability, innovation, and collaboration in the petrochemical sector, aiming to enhance India's position in the global market. His appointment is set against the backdrop of a projected growth in India's petrochemical sector, which is expected to reach $100 billion by 2027.

Accelera Supplies Electrolyzer for Chevron's Solar-Powered Hydrogen Project in California

California, USA: Accelera by Cummins, the zero-emissions business segment of Cummins, has been selected to supply a 5-megawatt (MW) electrolyzer system to Chevron New Energies for a pioneering solar-to-hydrogen project in Lost Hills, California. This initiative is part of a strategic partnership between Cummins and Chevron aimed at boosting the adoption of hydrogen and other lower-carbon fuels in North America.

The project at Chevron's Lost Hills Oil Field will utilize two Accelera proton exchange membrane (PEM) electrolyzers. These units will produce hydrogen on-site using solar energy and non-potable water from the field's existing operations. The system is expected to generate over 2 tons of hydrogen daily, achieving fuel-cell-grade purity sufficient to power 80 freight trucks for up to 600 miles each.

Andreas Lippert, Vice President and General Manager of Electrolyzers at Accelera, expressed enthusiasm about the collaboration, highlighting its potential to advance the hydrogen ecosystem and reduce emissions significantly. This project not only underscores the commitment of both Cummins and Chevron to sustainable energy but also marks a significant step in using innovative technologies to support cleaner energy transitions.

OCI Global Partners with Compo Expert to Supply Low Carbon Ammonia

Münster, Germany: OCI Global, a leading producer of nitrogen, methanol, and hydrogen products, has entered a significant agreement to supply Compo Expert with low carbon ammonia, aimed at reducing the carbon footprint of their NPK fertilizers. The initial transaction, already underway, sees Compo Expert substituting 25% of the ammonia used at their Krefeld, Germany facility with OCI's environmentally friendlier option. This strategic shift aligns with both companies' sustainability goals and is set to increase over the next two years.

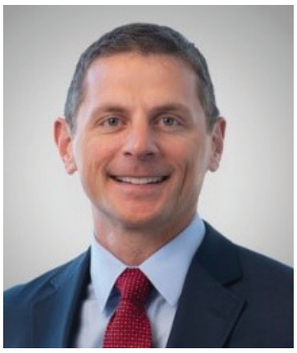
Produced in Texas, USA, and shipped from OCI's specialized ammonia terminal in Rotterdam, the supplied ammonia boasts a 60% lower carbon footprint compared to the industry standard. This supply chain enhancement supports European decarbonization efforts in industrial and energy sectors. OCI is also expanding its production capabilities with the construction of the Texas Blue Clean Ammonia facility, which will add 1.1 million tonnes per year of low carbon ammonia to their output.

Dr. Ingo Müller, CEO of Compo Expert, highlighted the critical role of ammonia in their production and its impact on their environmental footprint. By integrating OCI's lower carbon ammonia, Compo Expert takes a significant step towards more sustainable agriculture, supporting long-term environmental goals. This collaboration not only demonstrates a shared commitment to sustainability but also paves the way for more eco-friendly agricultural practices globally.

GACL appoints GS Paliwal as ED (Commercial)

Gujarat Alkalies and Chemicals Limited (GACL) has named **GS Paliwal** as the new **Executive Director (Commercial),** effective from April 4, 2024. Bringing over 29 years of experience in the chemical industry's marketing sector, Paliwal rejoins GACL after a stint at Deepak Phenolics Limited, where he served as President-Sales & Marketing from May 2022 to March 2024. He is well-versed in the industry, having previously been part of GACL for nine years. Paliwal holds an M.Sc in Chemistry from Mohanlal Sukhadia University and has completed advanced management programs at IIM Kolkata and the National University of Singapore.

Dow to Build New Carbonate Solvents Facility, Boosting EV Battery Production


Brendy Lange, Vice President of Dow Industrial Solutions

Texas, USA: Dow has unveiled plans to significantly expand its ethylene derivatives capacity by constructing a new carbonate solvents facility on the US Gulf Coast. This development is pivotal for the production of key components used in lithium-ion batteries, which are essential for electric vehicles (EVs) and energy storage solutions. The project comes as part of a collaborative effort with the US Department of Energy's Office of Clean Energy Demonstrations (OCED), with Dow entering negotiations for the necessary awards to proceed.

This strategic initiative will not only bolster the supply chain for domestic battery and EV manufacturing but also aims to capture and utilize over 90% of the carbon dioxide emissions from its ethylene oxide production process. The resulting low-carbon carbonate solvents are critical for enhancing the performance and longevity of lithium-ion batteries, thereby supporting the electrification of vehicles and strengthening the US power grid.

Dow's commitment is aligned with the broader governmental goals of reducing greenhouse gas emissions within the mobility and transportation sectors. According to Brendy Lange, Vice President of Dow Industrial Solutions, this project represents a significant step towards localizing the supply of essential, low-carbon products necessary for the clean energy transition. The facility is also a key addition to Dow's 'MobilityScience' portfolio, which addresses industry challenges such as decarbonization and improving EV performance.

Samyang Invest in Solid Ionics for Battery Development

Seoul, Korea: Samyang Corporation has increased its stake in Solid Ionics by investing an additional 3 billion won, bringing its total investment in the company to 5.9 billion won. This strategic move was formalized with a contract signed at the Samyang Group headquarters in Seoul. Initially, in 2020, Samyang had invested 2.9 billion won in Solid Ionics, a firm specializing in the development and manufacturing of solid electrolytes, crucial for solid-state batteries.

With this latest investment, Samyang not only consolidates its position in the solid-state battery industry but also expands its business portfolio to include essential materials like solid electrolytes and lithium sulfide (Li2S). This enhancement is expected to accelerate the commercialization of products currently under development by Solid Ionics.

Solid Ionics, renowned for holding a key patent in lithium sulfide production, is setting up a production facility in Ulsan, projected to be operational by 2027. This plant will have the capacity to produce 1,200 tons of sulfide-based solid electrolytes annually, targeting the final commercialization tests with battery developer.

Ho-sung Kang, CEO of Solid Ionics, emphasized the critical role of solid electrolytes in the industry and outlined the company's plans to broaden its battery materials portfolio, indicating a robust future growth trajectory. ■

Nayara Energy Appoints Alessandro Des Dorides as new CEO

NAYARA ENERGY

Nayara Energy has announced **Alessandro Des Dorides** as its new **CEO,** succeeding Dr. Alois Virag from April 1, 2024. Alessandro, with over 24 years in the energy sector, brings extensive experience and a robust understanding of global energy markets. He holds an economics degree from Sapienza University of Rome and an MBA from SDA Bocconi. Outgoing CEO Dr. Alois Virag is credited with leading Nayara Energy through significant challenges, including the pandemic. Under Alessandro's leadership, Nayara Energy aims to enhance its contributions to India's energy sector and expand its operations in sustainable energy and petrochemicals.

Haldia Petrochemicals Announces Major USD10 Billion Investment in Tamil Nadu

Haldia, Tamil Nadu: Haldia Petrochemicals Ltd (HPL), a key player in the production of polymers and chemicals, has announced a significant investment plan of USD 10 billion for an oil-to-chemicals (O2C) project in Tamil Nadu. This strategic initiative is designed to leverage the increasing demand for polymers across India by converting crude oil directly into valuable chemicals.

The ambitious project aims to generate an impressive production capacity of 3.5 million tonnes of ethylene and propylene annually. These chemicals are essential in manufacturing a wide range of products including shopping bags, automotive components, and water pipes. The development underscores HPL's commitment to expanding its footprint and enhancing its product offerings in the polyethylene sector, where it currently provides various grades of HDPE and LLDPE. These materials are extensively used in the production of packaging films, liners, pipes, tarpaulins, and tanks, catering to both domestic and international markets.

Located 125 km from Kolkata in Haldia, HPL's existing naphtha-based petrochemical complex stands as a testament to its capabilities in the industry. This new investment is set to further position HPL as a leader in the petrochemical sector, fostering growth and innovation.

IOCL and Panasonic Energy to Launch JV for Lithium-Ion Battery Production

L-R Shrikant Madhav Vaidya, Chairman, IndianOil and Kazuo Tadanobu, President & CEO, Panasonic Energy Co. Ltd.

Mumbai, India: Indian Oil Corporation (IOCL) is set to bolster its clean energy portfolio by entering into a joint venture with Panasonic Energy. This strategic alliance aims to manufacture lithium-ion cells in India, addressing the surge in local demand driven by the transition to electric vehicles (EVs) and the growth in renewable energy storage solutions.

The partnership, finalized with a binding term sheet in early 2024, will focus on producing cylindrical lithium-ion batteries. These batteries are crucial for a range of applications including consumer electronics, two- and three-wheelers, and battery storage systems (BESS). The initiative is not only a response to the rising demand for battery-powered two- and three-wheel vehicles but also caters to the growing need for effective energy storage solutions that can support solar projects in providing round-the-clock power.

IOCL's collaboration with Panasonic marks a significant step towards achieving its net-zero emissions target by 2046. This venture is also aligned with India's broader environmental goal to become a net-zero emitter of greenhouse gases by 2070. By fostering local production of lithium-ion batteries, IOCL and Panasonic are setting the stage for enhanced sustainability and innovation in India's energy sector.

Tata Projects Expands into Chemical Sector with DFPCL Nitric Acid Plant Expansion

Gujrat, India: Tata Projects Limited (TPL) has taken a significant step into the chemical industry by acquiring the Nitric Acid Expansion Project at Deepak Fertilisers and Petrochemicals Corporation Ltd. (DFPCL) in Dahej, Gujarat. This strategic move involves providing comprehensive engineering, procurement, and construction management (EPCM) services, along with Front End Engineering Design (FEED) for the plant's off-sites and utilities.

The expansion includes the development of a 900 TPD Weak Nitric Acid Plant and two 225 TPD Concentrated Nitric Acid Plants, complete with enhanced storage and loading/unloading facilities. The project will utilize technology from world-renowned licensors Casale and KBR, focusing on optimizing capital and operational expenditures, improving energy efficiency, and minimizing environmental impacts.

Rajiv Menon, President and COO of Tata Projects, highlighted the project's importance in Tata's evolution and commitment to diversified and technology-driven EPC solutions. The project, which started on February 19, 2024, aims for mechanical completion by

September 30, 2025, and may transition from a FEED Plus EPCM contract to a Lump Sum Turnkey contract. This expansion aligns with the growing needs of India's pharmaceutical, steel, solar, and agricultural industries, enhancing DFPCL's capacity and efficiency while supporting sustainable manufacturing practices.

Adani Total Gas commences production at Barsana Biogas project

Uttar Pradesh, India: Adani TotalEnergies Biomass Limited (ATBL), a subsidiary of Adani Total Gas Limited, has initiated the first phase of its ambitious Barsana Biogas Project in Mathura, Uttar Pradesh. Situated within Shre Mataji Gaushala, this project marks a significant development in renewable energy resources in India.

The first phase of the project is set to stabilize at processing approximately 225 tons per day (TPD) of agricultural waste and cattle dung, with an output of 10 TPD of Compressed Bio Gas (CBG) and substantial organic fertilizer production. Upon completion of all three phases, the facility is expected to handle 600 TPD of feedstock, yielding over 42 TPD of CBG and 217 TPD of organic fertilizer, making it the largest agri waste-based bio-CNG plant in India.

The total investment for the Barsana Biogas project exceeds ₹. 200 crore, highlighting its scale and the commitment of Adani Total Gas to sustainable energy practices. The project utilizes advanced anaerobic digestion technology to convert organic materials into renewable biogas, significantly cutting greenhouse gas emissions and reducing dependency on fossil fuels.

Suresh P Manglani, ED & CEO of ATGL, emphasized the project's alignment with Adani Group and TotalEnergies' sustainability goals, contributing to a low-carbon economy and supporting circular economy principles in agriculture.

India Boosts Li-ion Battery Recycling with New Facility in Uttarakhand

Hyderabad, India: The Technology Development Board (TDB), under the Department of Science & Technology, is set to bolster India's recycling capabilities by financially supporting the construction of a new Li-ion battery and e-waste recycling facility in Uttarakhand. The plant, a collaboration with M/s Remine India Private Limited, involves a total project cost of ₹.15 crores, with TDB contributing ₹.7.5 crores.

Signed in the end of March, 2024, the agreement will see the development of the facility in the Eldeco, SIIDCUL Industrial Area, Sitarganj (District Udham Singh Nagar). The initiative will utilize indigenous technology from the Centre for Materials for Electronics Technology (CMET), Hyderabad, aimed at processing Li-ion batteries and electronic waste efficiently.

This project is a response to the increasing problems of e-waste management in India, which ranks third worldwide in e-waste generation. Efficient recycling practices are deemed crucial to recover valuable metals from spent batteries and reduce environmental impacts. Currently, a staggering 95% of Li-ion batteries end in landfills, with only 5% being recycled.

Shri Rajesh Kumar Pathak, Secretary of TDB, emphasized the project's role in bridging the gap between informal and formal recycling sectors, thus enhancing India's pursuit of a circular economy and reducing the environmental burden of e-waste.

Payal Plastichem Launches First Plasticizer Plant in Southern India

Coimbatore, India: Payal Plastichem Pvt. Ltd., a subsidiary of Payal Group, has announced the commencement of the first phase of its new plasticizer manufacturing facility in Coimbatore. This plant, the first of its kind in Southern India, boasts an initial production capacity of 30,000 metric tons per annum (MT/PA).

With the addition of this facility, Payal Group's total production capacity for plasticizers has increased to 280,000 MT/PA. The Coimbatore plant is strategically focused on producing phthalate-free and REACH-compliant products, addressing the growing market demand for environmentally friendly and safer chemical additives. These specialty plasticizers are essential components in manufacturing processes for products such as wires and cables, footwear, and coir mats, catering to a diverse range of industrial applications.

Payal Plastichem is committed to innovation and sustainability, actively investing in research and development efforts to pioneer new and advanced products. This initiative not only enhances their

product offerings but also positions the company to meet the evolving needs of the industry effectively. The establishment of this plant marks a significant step in Payal Group's expansion strategy and their commitment to adhering to global environmental standards.

Balrampur Chini Mills to Launch India's First Industrial Bioplastic Plant

Kolkata, India: Balrampur Chini Mills Limited (BCML), a top integrated sugar milling firm based in Kolkata, has announced an ambitious ₹.2000 crore project to establish India's first industrial bioplastic manufacturing facility. The project, focusing on Polylactic Acid (PLA) production, is set to begin within the next 30 months and is aligned with India's sustainability objectives to achieve net-zero emissions by 2070.

The proposed PLA plant will have an impressive annual capacity of 75,000 tonnes and will be located next to an existing sugar mill in Uttar Pradesh, where BCML operates ten mills. This strategic placement will utilize local infrastructure and sugar production byproducts efficiently, supporting the sustainable production of bioplastics.

The initiative marks a significant step towards environmental sustainability by reducing reliance on traditional plastics and promoting a circular economic model. The plant will also help meet the growing demand for eco-friendly alternatives to single-use plastics in India.

Additionally, BCML has enhanced its commitment to bioplastics by acquiring a minority stake in Konkan Speciality Polyproducts Private Limited, a key player in specialty polymers and biopolymers. This move, coupled with the hiring of industry veteran Stefan Barot as President (Chemicals), underscores BCML's dedication to innovation and sustainable growth in the bioplastics sector.

PepsiCo India Announces ₹.1, 266 Crore Investment for New Flavor Facility

Ujjain, India: PepsiCo India revealed plans to invest ₹.1,266 crore in establishing a new flavor manufacturing facility in Ujjain, Madhya Pradesh, aimed at boosting its beverage production capacity. Covering 22 acres, the facility is anticipated to start construction in 2024 and become operational by the first quarter of 2026.

This strategic expansion is set to generate significant employment opportunities and contribute positively

to the local economy. Jagrut Kotecha, CEO of PepsiCo India & South Asia, emphasized the project's potential to enhance the socio-economic landscape of the region with support from the Madhya Pradesh government.

The Ujjain plant will be PepsiCo's second flavor manufacturing site in India, complementing the existing facility in Channo, Punjab. George Kovoor, Senior Vice President of Beverages at PepsiCo India, highlighted the new unit's role in scaling up production to meet increasing consumer demand and the company's commitment to high-quality products and sustainable practices.

In alignment with its global sustainability goals, PepsiCo India plans for the Ujjain facility to operate entirely on renewable energy sources, which will significantly reduce its carbon footprint by 1.9 metric tonnes per day, furthering its commitment to environmental stewardship.

DCM Shriram Announces ₹.1, 000 Crore Investment in New Epoxy Resin Plant

Gujrat, India: DCM Shriram, a prominent diversified agribusiness company, has declared its plans to invest ₹.1, 000 crore in a new greenfield epoxy resin manufacturing facility. This move is part of the company's strategy to expand into the Advanced Materials sector. The announcement was made in a recent regulatory filing, indicating the board's in-principle approval for this significant venture.

The upcoming facility is slated to complement the operations of DCM Shriram's nearly completed Epichlorohydrin (ECH) plant located in Jhagadia, Gujarat, expected to start operations in the first quarter of the 2024-25 fiscal year. ECH, a key raw material for epoxy, makes up over 80% of its global production.

Chairman and Senior Managing Director Ajay Shriram and Vice Chairman and Managing Director Vikram

Shriram emphasized the strategic advantage of integrating ECH and caustic production with the new epoxy resin project. They highlighted the diverse applications of their Advanced Materials portfolio, which includes liquid epoxy resins, hardeners, and other products, in industries such as wind energy, electric vehicles, aeronautics, and electronics.

Reflecting their positive outlook for the chemicals sector, the board has also declared an interim dividend of 200 per cent, equating to ₹.4 per equity share. This development marks DCM Shriram's commitment to expanding its footprint in specialty chemicals and materials, targeting both domestic and global markets.

CIL and BHEL Form Joint Venture for Ammonium Nitrate Plant in Odisha

Odisha, India: Coal India Ltd (CIL) and Bharat Heavy Electricals Ltd (BHEL) have signed a joint venture agreement to set up an ammonium nitrate manufacturing facility, leveraging surface coal gasification (SCG) technology. This initiative is set to take place in the Lakhanpur area of Odisha, under the aegis of Coal India's subsidiary, Mahanadi Coalfields Ltd.

The proposed plant is expected to start with an initial daily production capacity of 2,000 tons of ammonium nitrate, which translates to an annual output of approximately 660,000 tons. To support this production, the facility will require about 1.3 million tonnes of coal annually, which will be supplied by Coal India. BHEL will contribute its expertise with the indigenously developed pressurized fluidized bed gasification technology, marking a significant step in technology utilization and energy efficiency.

Ammonium nitrate is primarily used in the manufacture of bulk explosives, a critical component for Coal India's extensive open-cast mining operations. This plant not only aims to boost the domestic supply of ammonium nitrate, reducing the need for imports, but also represents a strategic move towards backward integration, ensuring a more stable and controlled supply chain for essential raw materials.

The venture aligns with government initiatives to enhance self-sufficiency in critical industrial inputs and is poised to significantly benefit India's mining and explosives manufacturing sector while also supporting local economies and technological advancement.

Chemplast Sanmar Set for Paste PVC Expansion

Tamil Nadu, India: Chemplast Sanmar Ltd., a key player in the specialty chemicals sector, is gearing up to commission its Paste PVC expansion project by the fourth quarter of FY2024. This announcement comes despite the company facing a challenging third quarter (Q3 FY24) with a consolidated net loss of ₹.89.38 crore, a significant downturn from a profit of ₹.27.14 crore in the corresponding quarter of the previous year. Over the nine months ending December 2023, the company reported a net loss of ₹.127.30 crore, in stark contrast to a net profit of ₹.106.27 crore a year earlier.

The Chennai-based firm, part of the SHL Chemicals group, attributed the losses to several market pressures including a drop in PVC prices due to increased international dumping, particularly from China, and a general slowdown in the chemicals sector like Caustic Soda and Chloromethanes. The company's total income for the quarter also saw a decrease, dropping to ₹.900.75 crore from ₹.1, 205.10 crore in the same period last year.

Despite these setbacks, Managing Director Ramkumar Shankar remains optimistic about the industry's outlook. He anticipates a recovery in PVC prices and margins in the coming quarters and expects improvements in the chemicals sector as excess supply diminishes. The commissioning of the 41 KTPA Paste PVC project is poised to reinforce Chemplast Sanmar's leadership in the Paste PVC market in India.

IOCL ups Stake in Chennai Refinery Project amid Cost Escalation

Tamil Nadu, India: Indian Oil Corporation (IOC) has announced an increase in its stake to 75% in the joint venture developing a new 9 million tonnes refinery in Chennai, as project costs surged by 12.5%. The cost revision has been reported from the initially estimated ₹.29, 361 crore to ₹.33, 023 crore, reflecting an increase of ₹.3, 662 crore. This decision was made public through a stock exchange filing following a board meeting on Thursday.

Originally, IOC and its subsidiary Chennai Petroleum Corporation Ltd (CPCL) were each to hold a 25% stake in the venture, with the remaining 50% to be financed by various financial investors. However, in a strategic shift, IOC has now revised the capital structure, raising its contribution to 75%, while CPCL will maintain a 25% stake.

The project, known as the Cauvery Basin Refinery and Petrochemicals Ltd (CBRPL), was launched to meet the growing demand for petroleum products in Southern India. It was incorporated on January 6, 2023, with plans to replace CPCL's existing 1 million tonnes per year Nagapattinam refinery with the new, larger facility. Notably, the National Iranian Oil Co (NIOC), despite holding a 15.4% stake in CPCL, is not involved in this expansion due to potential U.S. sanctions.

Petregaz India Launches New LPG Terminal

Krishnapatnam, India: Petregaz India, a subsidiary of the global LPG firm Petredec Group, has recently inaugurated a state-of-the-art LPG import and storage terminal at Krishnapatnam, Andhra Pradesh. Constructed with an investment of ₹.600 crore, this facility is strategically located within the Adani Krishnapatnam Private Port, enhancing its accessibility and operational efficiency.

The terminal boasts an impressive annual handling capacity of over 1.5 million tonnes of LPG. It features two advanced refrigerated storage tanks and a modern jetty that can accommodate all types of LPG vessels. Additionally, the facility is equipped with 16 truck loading bays, which will significantly boost its distribution capabilities.

This new terminal is expected to play a pivotal role in improving the supply chain efficiency for LPG marketers and bottlers, providing cost-effective logistics solutions. It is ideally positioned to serve a wide range of clients, including private marketers, and residential, commercial, industrial, and automotive sectors across multiple states such as Tamil Nadu, Telangana, Karnataka, and Andhra Pradesh.

The facility's enhanced road connectivity is also set to benefit government-run oil companies by facilitating better LPG distribution in the hinterland areas, thereby strengthening the overall LPG infrastructure in India. Petredec Group, known for its extensive network of LPG carriers and terminals, further solidifies its presence in the region with this significant expansion.

Cryolor Expands Operations with Phase II Launch

Tamil Nadu, India: Cryolor, a leading manufacturer of cryogenic equipment, has officially commenced the operations of its Phase II expansion at its plant in Tamil Nadu. The inauguration of the new production unit was led by Thierry Mathou, the Ambassador of France to India, highlighting the significant French investment in the region. The event took place at the company's existing facility located in Madurantakam, Chengalpattu district, originally established in 2010.

The Phase II expansion is set to significantly boost the plant's production capabilities, particularly in manufacturing cryogenic liquefied gas tanks, crucial for various industries including healthcare, especially noted during the COVID-19 pandemic when the demand for oxygen tanks surged. The plant's enhanced production will now support the making of 400 tanks annually, catering to both domestic and international markets.

Accompanied by Lise Talbot Barre, the Consul General of France in Puducherry and Chennai, Ambassador Mathou also unveiled a commemorative plaque at the site. This expansion, which represents a ₹.70 crore investment following a Memorandum of Understanding signed with the Tamil Nadu government in July 2021, is expected to create over 90 new jobs at the facility.

Furthermore, Cryolor has contributed to the community by installing an oxygen delivery system at the Government Hospital in Ariyalur, as part of its Corporate Social Responsibility initiatives. This commitment not only boosts local employment but also supports critical healthcare infrastructure in Tamil Nadu.

Jindal Advanced Materials Partners with MAE S.p.A. to Establish India's First Carbon Fibre Plant

Gurugram, India: Jindal Advanced Materials (JAM), in partnership with Italian firm MAE S.p.A., is investing ₹. 2,700 crore to set up India's first carbon fibre manufacturing facility. Announced earlier this month at JEC Paris, the world's largest industry event for composite materials, the plant will have an initial capacity of 3,500 metric tonnes per year.

This strategic collaboration aims to position JAM as a major player in the global carbon fibre market, catering

to increasing demand across various industries. The facility, projected to expand to 10,000 metric tonnes by 2027, will produce a wide range of carbon fibre products including prepregs, fabrics, and multiaxial composites.

MAE S.p.A. will contribute top-tier engineering and equipment to ensure the project's successful execution. Expected to be operational within 30 months, the facility will enhance India's capabilities in producing advanced materials, aligning with the 'Make in India' initiative.

"This partnership will redefine the carbon fibre industry and reinforce India's stance as a leader in the advanced materials sector," stated CP Agrawal, Director of JAM. Marco Rovellini, CEO of MAE, expressed enthusiasm about setting new benchmarks in carbon fibre production and fulfilling the growing needs of the Indian and global markets.

Toyo Ink India Announces Major Expansion in Solvent-Based Adhesives Production

Gujrat, India: Toyo Ink India Pvt. Ltd., a key player within the Japan-based Artience Group, has unveiled plans to significantly expand its production of solvent-based adhesives by constructing a new facility at its Gujarat manufacturing site. This expansion, set to operationalize in April 2026, aims to increase the plant's output by 3.5 times its current capacity.

The move is a response to escalating local demand across various sectors, including automotive interiors, home appliances, and labeling. The decision to enhance production capability follows the establishment of Toyo Ink India's first production operation in Gujarat in December 2021, a strategic setup that enabled the company to meet growing customer demands more efficiently.

As India, currently ranked fifth in global GDP, is projected to rise to the second position within two decades, the demand for industrial adhesives is expected to surge. This forecast is driven by increased automobile sales linked to urbanization, a shift towards nuclear family structures, and the booming consumer electronics market.

Mr. Naotoshi Nakamura, Chairman of Toyo Ink India, stated the company's ambitious goal to achieve a 30% market share by 2026, positioning it as the leading solvent-based adhesive manufacturer in India. Furthermore, Toyo Ink India plans to broaden its adhesive applications to the healthcare sector and establish India as a pivotal export hub for markets in the Middle East and Africa.■

Case Study : Cutting-edge Air compressors Revolutionize Emulsion Polymer Production

The case study highlights how the customer was able to address various operational requirements, including the need for clean, moisture-free, oil-less (1ppm) air free of other contaminant using ELGi's eco-friendly EG Series Screw Compressors.

One of Egypt's leading producers of emulsion polymers was seeking a robust and reliable compressed air solution for constant air supply with variable pressure compression. The company adopted ELGi's eco-friendly, energy-efficient EG Series Screw air compressors to increase reliability and ease of use at its manufacturing operations.

The client has been producing emulsion polymers since 1993. Spread across an area of 11,000 sq. m., its maximum production capacity stands at 25,000 tonnes yearly. Over the last two decades, the organisation has become a recognised brand across Asia and Africa. The company produces chemicals for adhesives, paints, textiles, carpets, and paper.

Carpet coating: The concern uses polyvinyl acetate emulsion for polyvinyl alcohol stability in woodwork and board lamination. This solution is appropriate for the manufacturing of wood adhesive and acts as a multipurpose adhesive.

Paint industry: The highly effective low-viscosity dispersing agents formulate high-gloss / low pigment volume concentration coatings within the emulsion. Thanks to its strong adhesive properties, Vinyl Acetate Homopolymer (PVAC) emulsion is used to produce wood glues and school glues.

Chemicals for papers: Alkyl Ketene Dimmer emulsion, antifoaming agents with surfactant properties, optical brightening agents (fluorescent whitening agent for cotton, paints, coating), and retention aid (high mass, water-soluble polymers to form environmentally responsible paper) are used at various stages of papermaking and paper coating.

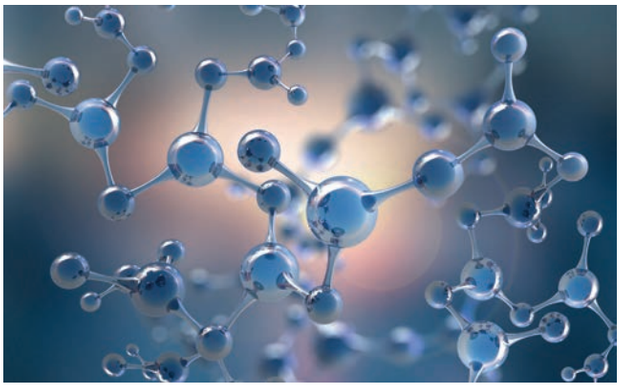
Textile auxiliaries: In its textile auxiliaries division, the customer offers comprehensive and innovative solutions for textile processing, covering each of the treatment phases: pre-treatment, dyeing, printing, coating, finishing, etc.

Printing: For continuous printing of textile fabrics, processing operations are carried out for localized dyeing. It delivers soft textures with dry, clean compatibility by deploying acrylic derivatives of copolymer emulsions like POLIVA-TPB, which is effective on polyester and cotton. Printing auxiliaries include textile chemical thickeners, wetting agents, inkjet printing, carriers, binding agent, hygroscopic agent, binders for pigment printing, cross-linking agents, oxidizing and reducing agents, emulsifier, fixing agents, dispersing agents, defoamers, and miscellaneous auxiliaries, etc.

Pre-treatment: At the heart of textile auxiliaries lie auxiliary for cotton, polyester, and their derivatives. A proper pre-treatment involves de-sizing, scouring, bleaching, eliminating natural impurities, and making the fabric hydrophilic and ready for wet processing.

Finishing: After pre-treatment, textile and mechanical properties are optimized on fabrics with new, special properties to attain aesthetic or functional use.

Garment chemicals: It produces safe, sustainable,



and great quality products to a vast range of dyes. Concentrated non-ionic solvent-based wetting and scouring agents are specially developed for use as an anti-redeposition agent in stone-washing processes using acid, neutral, and alkaline cellulases.

At the onset, by leveraging the right polyvinyl alcohol (PVOH) grade, a water-soluble crystalline polymer - thickeners and emulsion stabilizers are built. Polyvinyl alcohol is an emulsifying and dispersing agent for paper coating, board coating, water-soluble film, textile sizing agent, paper and wood adhesive, release liners, and carpet coating, among others.

Soluble PVOH in the shape of floccus, flake, or granule is heated to 810 C and held for optimum solubility. By adding vinyl acetate as a monomer, azobisisobutyronitrile for the initiation of polymerisation, and alchoholysation as the base catalyst, a unit is produced by starting and maintaining the temperature at 810 C and then cooled at 450 C. Due to its high melting point, it not only resists heat better, compared with the base emulsion, but also improves solubility and heat transfer capability and reduces polymerization induction time and foaming.

Customer Challenge

The emulsion polymer manufacturing process is very complicated. Hence, the most crucial parameter for production when profitability is at risk, competition is global, and the economy is slowly changing is the challenge to achieve consistent, reliable, and environment-friendly production.

With traditional energy-guzzling installations, mounting pressure loss, increased startling load, and rigidity in temperature compromising air quality, the need was for advanced air compressors with high-end design and advanced features. The company was seeking a partner to help deploy compressed air systems that can withstand the harshest environmental conditions while saving energy and costs and reducing Co2 emissions as well.

Solution

Starting in 2018, the company leveraged ELGi's total compressed air solutions to achieve best-in-class energy efficiency. ELGi's eco-friendly, energy-efficient EG Series Screw Compressors delivered constant air supply with variable pressure compression. Through its in-house, proprietary η-V profile rotors designed to run at optimum speeds, it reduced pressure losses and increased efficiency. ELGi's 1000 litre high-pressure air receiver, designed to ASME standards and built-in ELGi's dedicated facility, acted as an enabler between the compressor and the variable pressure caused by demand waves helping reduce the loading and unloading cycle pressure on the compressor.

Airtime refrigeration, air dryers, and filters prevented real-life problems like unwanted abrasive sludge, corrosion of piping, and erosion of pneumatic tools.

ELGi's Airtime refrigerated air dryer has ensured the longer life of the compressed air system by efficiently removing the condensate and contaminants. As per international protocol, ELGi uses ozone-friendly R 134A gas as the refrigerant, which has zero ozone-depletion potential.

Production Manager at the patron's facility said, "When traditional energy sources like electric power acted as a potential hazard, ELGi's air compressors provided us with a clean, safe and efficient utility. The electric ELGi Screw Compressor powered all the pumps and pneumatic valves for flammable raw materials. With minimal downtime, high volume, and energy consumption, the compressors not only met the dynamic demand (rise and fall over patterns) but also performed wonderfully in terms of capacity, discharge pressure, ambient conditions, and energy compliance."

The consumer specifically selected the ELGi EG Series compressor on account of its following features and benefits:

- **Reduced startling load:** The new generation intake valve system, with an integrated blowdown unit, solenoid controls, and actuators, is designed for low losses.

- **Oil-less air (1ppm):** Efficient air-oil separation with unique Oil Separation by Impact and Centrifugal action (OSBIC) process enabled the separation of air and oil with minimum pressure drop in three stages.
- **Moisture-free air:** Depending on the humidity level of inlet air, water remains in compressed air at varying levels and causes corrosion of piping, end tools, machinery, and valves. The EG Series air compressor, with its custom-designed centrifugal-type moisture separator and automatic drain, removed over 99% of the bulk water from the compressed air.
- **Cool air:** Efficient air cooling from an integrated fan motor maintains a low temperature, resulting in the increased lifespan of the motor.
- **Robustness and reliability:** Designed to perform in extreme temperatures, the compressors have performed well in cold, hot, humid, and arid conditions.

The partnership with ELGi has enabled the customer to address various operational requirements, including the need for clean, moisture-free, oil-less (1ppm) air that is also free of other contaminants. The emulsion polymer maker has also been able to reduce the life cycle costs for its air compressors, besides realizing significant energy savings and uptime warranty. ■

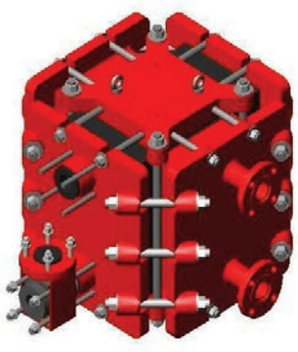
Courtesy: - ELGi Equipments Limited

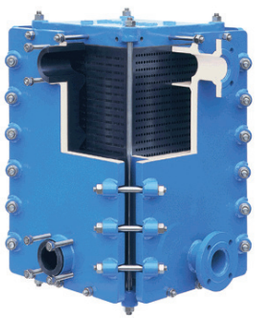
Highlighting GMP Standards with Graphite Cubic Heat Exchangers

In the chemical manufacturing and allied equipment manufacturing industries, ensuring the quality, safety, and efficacy of products is of utmost importance. Good Manufacturing Practices (GMP) play a crucial role in achieving these factors. GMP comprises a set of guidelines and regulations that are necessary for upholding the quality of products and mitigating risks throughout the processes. In this article, **Vikas. K, Plant Manager, Anti-Corrosion Equipment Division, Mersen India Pvt. Ltd.,** talks about the world of static equipment and delves deeper into the significance of GMP by acknowledging graphite cubic heat exchangers in particular.

Static equipment refers to equipment that lacks any moving parts and is used in various industries, including chemical and allied equipment manufacturing. This equipment are vital in the production process and are responsible for ensuring the quality, safety, and efficacy of the final products. To achieve these objectives, Good Manufacturing Practices (GMP) are essential. GMP is a set of guidelines and regulations that establish the best practices for manufacturing processes, ensuring high-quality products that meet regulatory requirements and customer expectations.

Understanding Good Manufacturing Practices (GMP): GMP is a quality management system that guarantees the safety, quality, and efficacy of products. It comprises a set of guidelines and regulations that companies follow to ensure that their manufacturing processes comply with industry standards. The primary objective of GMP is to minimize the risks associated with the production process and ensure that the final products are of high quality.





Key Elements of GMP: GMP guidelines cover various aspects of the manufacturing process, including personnel, premises, equipment, materials, production, quality control, and documentation. These guidelines aim to ensure that the entire production process is well-controlled and documented, and any deviations from the standard procedures are identified and addressed promptly.

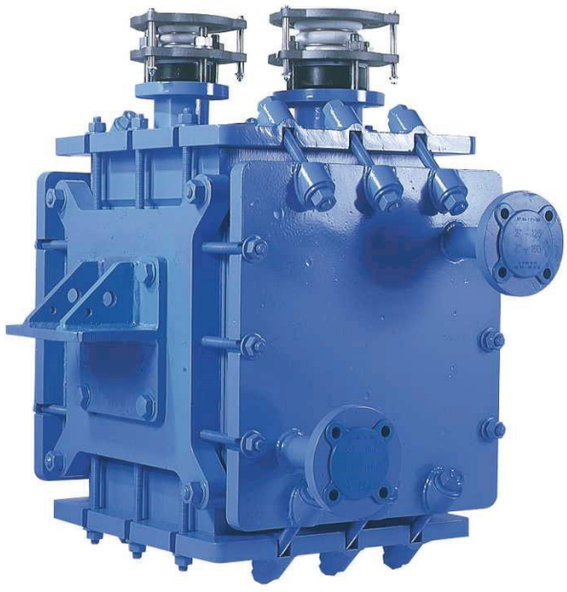
GMP in Static Equipment Manufacturing: Static equipment plays a crucial role in the chemical and allied equipment manufacturing industries. These equipment are used in various processes, such as mixing, heating, cooling, and storing, and any malfunction or failure can have severe consequences. GMP guidelines for static equipment focus on ensuring that these equipment are well-maintained, calibrated, and operated as per the standard procedures. This helps to minimize the risks associated with static equipment and ensures the production of high-quality products.

Benefits of Implementing GMP in Static Equipment Manufacturing: Implementing GMP guidelines in static equipment manufacturing has several benefits. It helps to reduce the likelihood of equipment failure, minimize downtime, and increase productivity. GMP also ensures that the equipment is well-maintained, which helps to extend their lifespan. Moreover, GMP guidelines also help in identifying potential risks and addressing them

before they escalate, thus ensuring the safety of the workers and the quality of the final products.

Static equipment: Graphite Cubic Heat Exchangers

Heater / Cooler

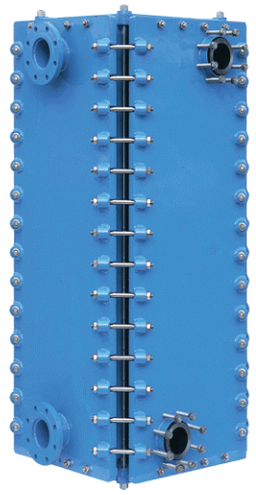


Graphite Cubic Heat Exchangers

- Multi-pass arrangement on process and service side
- No issue with temperature cross due to true counter current flow
- Range of drilling patterns to suit process streams
- Typical Industries; API, Chlor-Alkali, AgroChem, Vitamins, Specialty Chemicals, Plastics

Condensers

- Typical arrangement Main and Vent Units
- Wide Range of Chemicals; Acids, Solvents, Thermal Fluids
- Typical Industries; API, Chlor-Alkali, AgroChem, Vitamins, Specialty Chemicals, Plastics
- Vapour / Liquid Disengagement in Unit



Graphite Shell and Tube Heat Exchanger

FAQ's

What is the role of GMP in ensuring product quality?
GMP guidelines help in maintaining strict quality control measures, ensuring that the final products meet the required standards.

How does GMP help in mitigating risks in chemical manufacturing?
GMP guidelines focus on identifying potential risks and implementing strategies to mitigate them, thus ensuring the safety of the workers and the environment.

Is GMP certification mandatory for static equipment manufacturing?
While GMP certification is not mandatory, it is highly recommended for companies in the chemical and allied equipment manufacturing industries to ensure compliance with industry standards.

Can GMP be applied to other industries besides chemical manufacturing?
Yes, GMP guidelines can be applied to other industries that involve manufacturing processes to ensure the quality and safety of products.

How can companies ensure compliance with GMP guidelines?
Companies can ensure compliance with GMP guidelines by regularly reviewing and updating their processes, conducting internal audits, and seeking GMP certification.

Design Advantages

- GMP
- Fully Draining
- No Process to Service
- Interchanger Design
- Gaskets
- Temperature Cross
- Easy Maintenance
- Range of Impregnations
- No hidden gaskets
- No hidden gaskets
- Multipass
- Compact
- Corrosion Resistant
- Double Drilling
- Pharmaceutical Grade
- 10 Barg Design Pressure
- Vapour / Liquid Disengagement

GMP FEATURES

- Fully drainable process headers with no liquid hold up
- No process to Service Gaskets
- Solid drilled one piece core block
- Vertical once through process holes
- Easily dismantled on process side for cleaning and validation. ■

Author

Vikas K
Plant Manager, Anti-Corrosion Equipment Division,
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"Sustainability in business is now non-negotiable"

Stephen Reynolds, Industry Principal, Chemicals, AVEVA, explores the transformative impact of digital technologies on sustainability efforts within the sector. Reynolds highlights how data-led technologies are revolutionizing operations, enhancing efficiency, and fostering greener approaches, ultimately driving the industry towards a more sustainable and circular economy.

Sustainability in business is now non-negotiable – particularly for the chemicals industry. The sector has already being identified as the largest industrial energy consumer and the third largest industry subsector in terms of direct CO2 emissions, according to data from the International Energy Agency. While mitigating these outcomes through ESG targets remain important, the sector's primary focus lies in building sustainable and greener models to enhance efficiency and growth. Digital transformation is fueling the chemicals industry's evolution. The latest digital tools are already enabling companies in the energy, chemicals and power industries to proactively address the bigger picture by minimizing their carbon footprints, promoting recyclable raw materials and products, and electrifying and automating operational processes.

By harnessing technologies such as big data, artificial intelligence (AI), simulation, automation, cloud and the industrial internet of things (IIoT), chemicals companies are realizing both sustainability and value gains.

Three-step Digital framework Boosts Sustainability

Across brownfield plants and greenfield developments, these goals can be achieved with the help of a model-driven framework built around data-led technologies such as cloud-based data management platforms or digital twins. Technologies such as big data, artificial intelligence (AI), simulation, automation, cloud and the industrial internet of things (IIoT) can support chemicals companies in realizing both sustainability and value gains. Three pillars are essential to unlocking sustainability goals for chemical companies:

- **Improve efficiency to create agility.**

Reliable and efficient plants can produce products more quickly with fewer resources at a lower cost. The operation gains in terms of flexibility and can better adapt to dynamic market conditions. For example, production can be quickly adjusted in response to demand shifts or to harmonize with changes in feedstock availability.

Digital tools can be harnessed to improve efficiency on a number of fronts. By using a digital twin to determine the ideal state, process modelling and simulation can identify areas for improvement and determine the most efficient ways to reduce waste and increase throughput. Further, with AI-powered simulations, asset optimization helps ensure that equipment operates at peak efficiency and reliability. In addition, human efficiency can also be improved, such as by enhancing workforce competency through experiential training programs to develop employee skills and enhance health and safety.

- **Adopt greener approaches to production.**

Embedding clean-tech elements across the value chain supports greener outcomes for chemical operations. Such measures include tweaking existing processes and developing innovative production methods.

Incorporating feedstocks that have a lower footprint, such as bio-based materials, can dramatically reduce emissions. With the help of a process digital twin, companies can evaluate the impact of feedstocks changes, and ascertain when to shift to cleaner materials, such as those sourced from recovery chains.

Similarly, digital technologies can help engineers to identify and design novel and sustainable processes. The use of AI simulation, predictive analytics, and supply chain and information management solutions enables fast and low-risk engineering cycles, optimizing every phase of capital projects and giving companies control over their value chains.

- **Shift gears to advance the circular economy.**

In a rapidly changing business landscape, embracing the circular economy is a game-changer for the chemicals industry. Digital technologies light the way to the sustainable and regenerative approaches that are essential to circularity, showing how resources can be used more efficiently, waste minimized, and materials are recycled and repurposed.

Process simulation supports the switch to circularity by helping operators understand how different energy sources can impact their operations. For example, replacing gas-powered steam generators with electrical boilers slashes energy consumption. Similarly, with the help of solar panels, wind turbines and a repository of real-time weather data, companies can create 360-degree simulations of green hydrogen production, modelling electrical fluctuation and predicting hydrogen output.

True circularity requires the use of recycled feedstocks. Here, a process digital twin serves as a valuable tool to monitor, optimize, and visualize operations in real-time for the efficient uptake of recycled materials.

A third application comes from real-time KPI monitoring and reporting. Digital twins provide a holistic view of operational data, enabling companies to quantify and optimize critical metrics. With programs such as AVEVA Process Simulation, organizations can track environmental KPIs in real time and make realistic visualizations for sustainable operational excellence.

Real-world Chemical Industry Successes Unlock Data Dividends

Industrial enterprises are increasingly deploying data-led technologies – including the digital twin – for their numerous benefits. Across the industrial sector, early investors are already reaping the benefits of this new technology.

Here in Asia, SCG Chemicals, for example, achieved a transformative impact with the adoption of a unified digital reliability platform. Teams at the petrochemical leader benefitted from integrated, real-time visibility into various facets of operations, leading to improved operational efficiency and reduced unplanned downtime across the value chain. Thanks to this enhanced visibility and analytics models, SCG Chemicals was able to demonstrate exceptional results, including 100% plant reliability and an impressive nine-time return on investment (ROI) within just six months.

Elsewhere, Eastman Chemical, a producer of advanced materials, chemicals and fibers, was able to drive circularity and improve the sustainability of its operations with a digital transformation platform, SEIGA (Seamless EPCom Integrated Global Access). With engineering documents replaced by a data-centric system, teams benefit from seamless data-sharing and improved collaboration among engineering, construction, operations, and maintenance functions. Engineering errors and rework has been reduced, while project efficiency has improved. The company can now undertake new capital projects more sustainably.

Meanwhile, Covestro, a leading manufacturer of high-quality polymer materials and their components, used a cloud-based data management system to improve vertical integration within the organization and facilitate horizontal, or B2B, integration with authorized industry partners. Internal stakeholders benefited from one version of the truth and a shared understanding of how to address problems, while shared data supported innovation and service improvements for external suppliers. The system enables teams to standardize energy and production data and identify resource savings opportunities. As a result, Covestro was able to reduce energy consumption by 30% and cut CO2 emissions by 39% per ton of product. It is now on track

for a 50% reduction in consumptions and emissions by 2030.

Industries Invest in Digital Solutions to Combat Disruption

With disruption increasingly being seen as the new normal, industrial leaders are looking to ramp up investments in industrial digital solutions. Some 87% of executives polled in a recent survey by Wakefield Research and AVEVA said they plan to plan to increase spend more industrial digital solutions in the coming year. They will do so in order to tackle combined business challenges, including economic uncertainty, unstable geopolitical environments, labor shortages, and disrupted supply chains. The October 2022 survey polled 650 executives at global companies with a minimum annual revenue of US$50 million in the chemicals, manufacturing, and power industries around the world.

In the chemicals industry, 62% of business leaders have increased or accelerated their investment in industrial digital solutions, surpassing other industries. The investment reflects the sector's response to environmental regulations and sustainability pressures, with 33% identifying them as the most significant challenge in the next 12 months (compared to 23% across all sectors).

As McKinsey points out, end-to-end digitization can positively impact the chemicals value chain, nearly doubling the average EBITDA earnings from 8.5% to 16%. With data-led technologies, chemicals companies can drive sustainability and deliver significant value gains. By leveraging real-time insights, advanced analytics, and process optimization, companies can minimize waste, increase efficiency, and drive innovation at every level. ■

Author

Stephen Reynolds
Industry Principal for Chemicals,
AVEVA

High Efficiency Mist Cooling System - A Superior Alternative to Conventional Cooling Tower

Water cooling is essential for process industries and power plants, but conventional cooling towers face efficiency challenges, especially in humid conditions. Introducing mist creation technology as an alternative offers consistent cold water temperatures year-round. With a compact design and minimal maintenance requirements, this system surpasses traditional cooling towers in performance and cost-effectiveness. ***Makarand A. Chitale, Director (Technical), Mist Ressonance Engineering Pvt Ltd.,*** *explores its superiority in this article.*

In Process / Chemical Plants, product vapour generated in the process is condensed in a Heat exchanger and is recovered back.

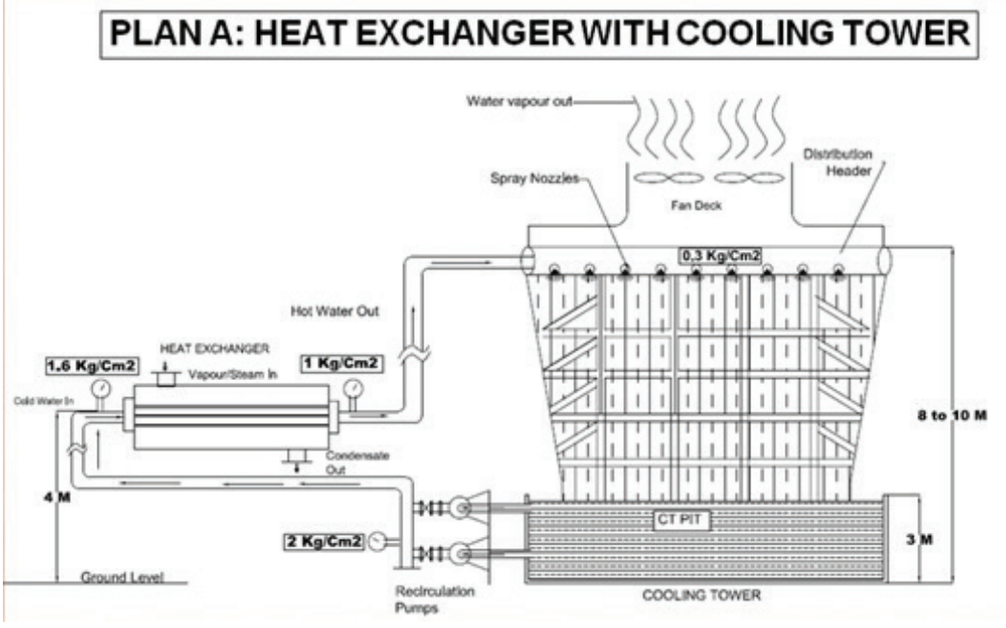
The condensation of steam / Vapour requires a cooling medium. In early days this was achieved by using water from a river, a basin or seawater. The cold water is pumped through a heat exchanger and the warm water is discharged back to the water source. This is called Once Through cooling system.

A once through system is an open loop system. The necessity to reduce the huge amount of water gave birth to the idea of closed loop system. Thus the Wet Cooling system came into effect.

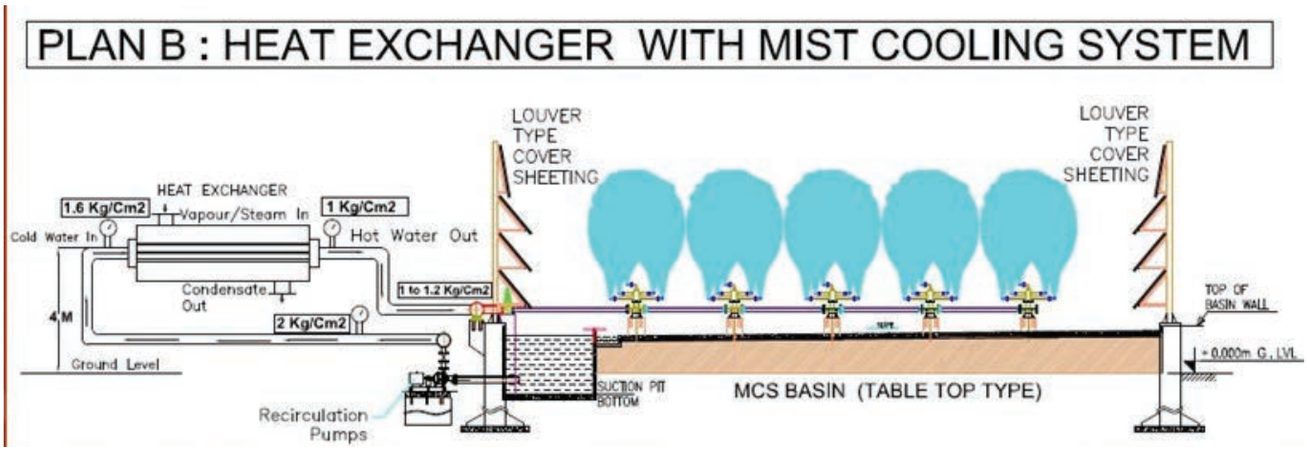
In a wet cooling system, water is circulated to condense the steam in the same type of heat exchanger that is used in the once through cooling. The warm water, instead of being returned to the water source, is cooled in a cooling tower using air as the cooling medium. Only the water carried away due to evaporation, drift and blow-down needs to be replenished by make-up water. Thus requirement of water quantity is vastly reduced.

Wet Cooling Systems

- Wet Cooling Tower System



Circulation Water Cycle in Cooling Tower Plan A:



Circulation Water Cycle in MCS Plan B :

We will first consider the Wet Cooling Tower System. The wet cooling tower system is based on the principle of evaporation. The heated water coming out of the surface condenser is cooled as it flows through a cooling tower, where air is forced through the tower by either mechanical or natural draft. Now a days, mostly, all wet cooling towers are mechanical draft cooling towers, where the air flow is accomplished by fans.

The Principle cooling device used in an Induced / forced draft cooling tower are Fans which run at the top of Cooling Tower (CT). Air enters through side louvers and escapes from the top. Water enters at the top and trickles down while getting cooled by air draft.

A correctly designed induced draft CT can give an approach of 4 to 6°C to wet bulb temperature with a temperature drop of 10°C. Even a very highly efficient CT can not give an approach less than 4°C to WBT. Moreover, if ambient temperature or humidity levels rise, efficiency of CT reduces.

Let's consider the same with an Example:

For a Chemical Plant, an induced draft cooling tower is designed to maintain Cold water temperature of 32°C at a WBT of 28°C with an approach of 4°C. Cooling Tower performs as desired during winter, early summer months. But during peak summer / Monsoon, efficiency of cooling tower reduces as humidity rises & its approach to WBT reaches beyond 6°C from design 4°C. Thus due to this rise in Cold Water temperature, these industries always experience loss in production by at least 5 to 7%. These losses do not occur in winter months. This means that the plant will operate at a reduced efficiency for almost 5 to 6 months as per Graphs A & B.

Also due to use of Fans, CT consumes a lot of power. It is observed that the efficiency of CT reduces over a period of time due to ware and tear of moving parts, Fills, Fins etc. which invites heavy maintenance.

Hence there is an urgent demand from the industry for a water-cooling system, which will operate with high efficiency even in adverse climatic conditions and maintain cold water temperature in closed vicinity to WBT.

Mist Cooling System

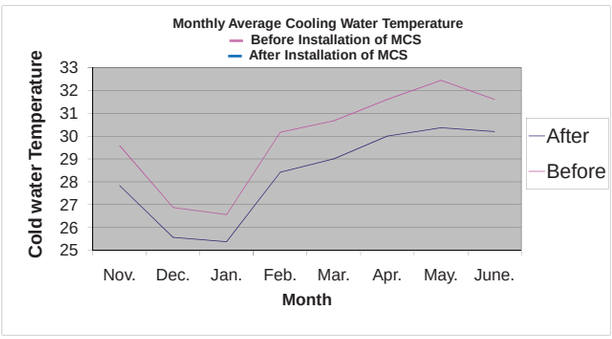
MREPL has come out with a solution by designing Mist Cooling System which is a high efficiency system, which ensures an approach of 1°C to prevailing wet bulb temperature with a temperature drop of 12 to 15°C even in adverse climatic conditions.

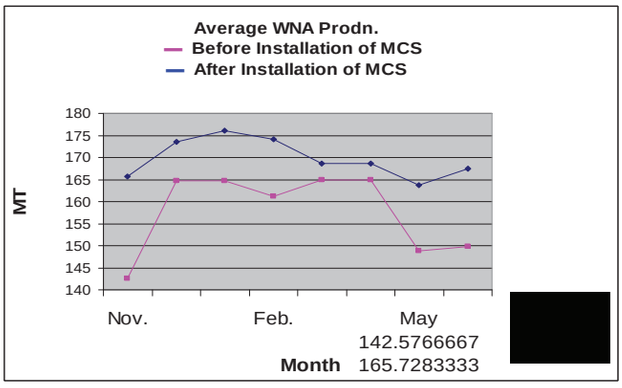
In tropical conditions, worst wet bulb temperature even at coastal applications is maximum 30.5°C. Hence MCS will always maintain Cold Water of around 31°C+1°C throughout the year. No other cooling system can operate with such efficiency and it makes cooling tower/spray pond systems obsolete.

COMPARISON TABLE BETWEEN
INDUCED DRAFT COOLING TOWER / FAN LESS COOLING TOWER &
LOUVER TYPE MIST COOLING SYSTEM

Sr. No.	Feature	Induced Draft Cooling Tower (IDCT)	Fan less / Jet Cooling Tower	Louver Type Mist Cooling System
1	Approach to WBT	**4 to 5 degrees.**	**6 to 8 degrees.**	**1 to 2 Degrees.**
2	Temperature Drop	**8 to 10 Degrees**	**6 to 8 Degrees**	**Regular: 12 Degrees. Advanced Model guarantees up to 40 Degree C in a single stroke**
3	**POWER CONSUMED** (Comparison for a 1000 m3/hr circulation flow assuming IDCT's Total Power as 100%) (Please refer PLAN-A & PLAN-B)	100 HP : 100% (70 HP : 100% on Pumping & 30 HP : Fan)	100 HP : 100% (100 HP : 140% on Pumping & 00 HP : Fan)	70 HP : 70% (70 HP : 100 % on Pumping & 00 HP : Fan)
4	**Nozzles**	Ordinary type which choke frequently	Ordinary Jet type which choke frequently	Special whirling type, choke-less design incorporating non-moving parts with 25 mm bore opening.
5	**Water droplet size**	5 mm	2 to 3 mm	Atomized to 5 to 50 Microns
6	**Travel time**	Less due to Downward fall only.	Less due to Downward fall only.	Two time travel due to upward & downward travel leads to Double air retention time
7	**Fills/ fins**	Various types used - prone to scaling, need Periodical changing	Various types used - prone to scaling, need Periodical changing	ABSOLUTELY NO FILLS / NO FINS REQUIRED.
8	**Drift Loss**	Same	Same	Same
9	**Make Up Water**	same	same	Same due to similar hold up.
10	**Flexibility**	Limited	Limited	Individual Line Isolation offers max. flexibility to use capacity as per requirement.
11	**Standby**	Required	Not Required.	Not Required.
12	**Erection/delivery**	Substantially high	Low	Fairly less
13	**Maintenance**	Very high due to replacement of fills/ fins/ fan blades etc. Also due to deposition of dust on fills, efficiency reduces with time.	Very high due to replacement of fills/ fins etc. Also due to deposition of dust on fills, efficiency reduces with time.	Negligible maintenance due to choke less operation and non-moving parts.
14	**Aesthetics**	Bulky, Generally most neglected part in a Plant	Untidy	Appears Fresh and Dynamic resembling active water like fountain
15	**Civil Construction**	Heavy due to static and dynamic load	Less	Simple due to table top construction with static load
16	**Total Footprint**	Less	Higher than CT	* More by 2 to 4 times to IDCT

* Note: As capacity (Flow, M3/Hr) through MCS increases, ratio of area required between MCS and CT reduces.





Graph A & B:

Results from a chemical unit in Andhra Pradesh.

Salient Features Of Mist Cooling System

Cold Water Temperature

Mist Cooling System ensures an approach of 1°C to WBT with a temperature drop of 12°C to 15°C.

▪ **Energy Savings (Refer Diagrams Plan A & B) :**

Due to increase in DT, water quantity required at the process side is much less. MCS requires water pressure equivalent to the height of cooling tower as shown in the following diagrams. Hence, considerable amount of energy is saved on circulation water pumping. Also, MCS does not require any fans for cooling. Thus, a huge amount of energy is saved on circulation and cooling.

▪ **Process Benefits :** Mist Cooling System will supply cold water at a temperature very close to WBT (Approach of 1°C) as against an approach of 4 to 5°C in cooling tower. This will reduce the product vapour losses in shell & tube heat exchangers. This will ensure that your plant operates at an enhanced yield in summer and monsoon, also giving stable throughout throughout the year.

▪ **Maintenance:** MCS has no moving parts. It does not use any Fills and Fins for cooling. Also material used in the MCS is special grade saran polymer, a highly non-corrosive material having a life of more than 10-15 years.

▪ **Chokeless Design of Nozzles:** MCS operates with a chokeless design. Size of smallest opening in MCS is more than one inch (25 MM) in diameter. Hence chances of particles choking the system are remote. This make MCS absolutely maintenance free.

▪ **Various Designs of MCS to Suit Site Conditions:** Open Type MCS: Here, MCS ensures an approach of 1°C to WBT with a ΔT of 12 to 15°C. Water loss due to drift is 0.1 to 0.25% depending on wind load.

▪ **Louver Type MCS:** Here MCS basin is closed from all sides, up to a height of 6 mtrs. by louver type cover sheeting. MCS ensures an approach of 2°C to WBT with a ΔT of 12 to 15°C. Drift loss can be limited up to 0.002% and also space requirement reduces considerably.

▪ **Table Top Design to Prevent Algae Formation:**

Latest table top design does not allow formation of water level inside the basin and all water passes to suction pit which is covered from top thus minimizing chances of algae formation.

▪ **MCS Design for Working in Dusty Environment:** Unique suction pit design does not allow dust to pass to the inlet of circulation pumps. Dust is drained from drain valve, while only clear water passes to circulation water pumps.

▪ **System Flexibility (Capacity Turn down Ratio):** MCS is offered with individual line isolation valve. MCS is the only system, which gives such a high flexibility in operation.

▪ **Hydro- Balance Valve: Hydro-Balance Valve (HBV)** is provided to take care of sub-cooling, which may happen in winter & also is helpful to release excess pressure which may develop on system at times.

▪ **Chemical Treatment:** Chemical dosing requirements are similar to that of cooling tower as same hold up of water is maintained in suction pit of table top MCS.

▪ **Make-Up Water Requirement:** Due to latest "Louver Type" design, drift loss through MCS can be limited to less than 0.002%. Hence, Overall make-up water quantity required is approximately same as compared to cooling towers.

▪ **Pay Back Period:** The Pay Back period of the MCS in most of the cases, will be obtained in less than ONE year only.

Mcs Matches The Design As Per Need:

MCS can be put to use in Open Type or Louver Type MCS designs to suit the need. Open Type design ensures an approach of 1°C to WBT while louver type MCS design ensures an approach of 2.5°C to WBT. Space requirement of Louver Type Design is only 65 to 70% of open Type Design. Also, there is an option of Advance MCS best suitable for plants where there is space limitations.

Terrace Top MCS Design:

Considering the need for high efficiency system required by the various industries, MCS surely meets the demand at an extremely affordable price. ■

Author

Makarand A. Chitale
Director
Mist Ressonance Engg Pvt Ltd

GUEST COLUMN

Devolving a Level Playing Field in Project Management

JIMMY SPENCER
Managing Director,
Chemtex Global Engineers Pvt. Ltd.

India is witnessing a surge in government spending to drive industrial and economic progress in the country, and PSU companies are following suit with hefty budgetary plans and project pipelines. During the EPC and Refining & Petrochemicals conferences held at ChemTECH World Expo 2024, subject matter experts provided their views on some of the topical issues. Based on his observations, **Jimmy Spencer, Managing Director, Chemtex Global Engineers Pvt. Ltd.,** expresses that the concept of awarding EPC contracts based on L1 needs a drastic change. He pens down his thoughts for a better understanding of where we stand and what is required to improve mechanisms to ensure better deliverables of EPC Projects in India.

In my experience being part of this industry for the last 30 years feels that, though we have progressed phenomenally in the way the work is performed on EPC Projects, there is still sufficient room for improvement in terms of devolving a level playing field between the Client Company (buyer) & the EPC Contractor (seller). It may be stated that there are still deficiencies and creases to be ironed out in terms of contractual terms and conditions, pricing of the contracts, and other project execution related matters. There is a greater need to involve a procedure for joint coordination for efficient project execution, improved productivity & skillset, technological upgradation and better use of risk mitigation tools. The current process of the client company appointing a project management consultant and leaving things under their jurisdiction to coordinate all the different components of the project is ideally fine but may not be the most efficient way of monitoring

the project as PMC consultants in most instances try to strike a delicate balance between the needs of the EPC Contractor and the Ultimate Client which may not always get the optimum result.

The entire exercise starting from the tendering process, technical evaluation of bidders, due diligence & determining of contractual conditions and commercial considerations needs to be fine-tuned. The tender document is such a voluminous document that very few contractors have the infrastructure and legal competencies to study and absorb the entire document before turning in their bid. The client through the services of its internal team works out the parameters of technical and commercial qualification criteria given the situation where the EPC Contractor excepting a very few financially strong & experienced EPC contractors is always in a subordinate position due to being perennially placed in a buyers' market and tends to accept terms and conditions however stringent to win the contract.

Implications of L1 Policy on Project Execution

In most cases Government owned PSU companies which are the main buyers follow a L1 policy in awarding such contracts. The argument presented by such buyer companies is that if any EPC contractor fulfills the requirement of technical bid evaluation, then financial considerations for awarding the contract are of secondary importance. This, in most cases turns out to be a wrong notion. The buyer companies have their own internal budget estimates prepared to execute the project but are still happy awarding the contract to an L1 EPC contractor who has quoted at a significant discount to a realistic price of executing the project. The buyer is happy that he has identified an EPC contractor who is willing to execute the project at a 20 discount to the budgeted price. The above policy is replete with flaws as was the earlier experimented policy of carrying out reverse auction process to award projects that was fraught with risk of cartelization between competing bidders in the reverse auction process as well as the philosophy that the most desperate contractor wins the job. Thankfully, that has been done away with thereafter.

The seller (EPC contractor) signs on the dotted line knowing fully well that he has accepted technical & commercial terms which are very stiff to complete the project in a timely manner and efficiently. What follows is compromises in the level of resources as the contractor is forced to cut corners to make ends meet and is always in damage control and loss mitigation mode rather than being in a frame of mind where the contractor only needs to focus on delivering a quality project in a timely manner. To mitigate the situation he is forced to compromise on the use of low quality resources to engineer the project, buy equipment by cutting corners and compromising the end product from the cheapest vendor with price and payment terms having precedence over quality & timely delivery. Typically, the contractor tends to break up various important equipment packages using multiple vendors that leads to using inferior quality of labor on the construction site, compromising on level of technology & upgradation and safety at the site. And last but not the least risk mitigation as there is no money left to cover for risk.

All the above factors form a heady cocktail for failure which lead to backlog in project progress due to series of delays across engineering - BEDP Package, placing orders on the vendor, reengineering multiple times, arrival of the procured equipment material at the site, start of construction activity and ultimately in the mechanical completion and commercial commencement of the project. The EPC contractor faces anxiety but has a defense tool of carrying out the project at 80% of the budgeted price. Delays in procurement also leads to delay in milestone payment to the EPC Contractor , more flexibility or delay in providing land for construction to the EPC contractor. Last of all there is always the fallback Liquidated Damages clause on the contract, which is a convenient buffer tool to cover for all these deficiencies.

The client company's current method of selecting a project management consultant may not be the most effective approach for overseeing the project. In many cases, PMC consultants aim to navigate between the requirements of the EPC contractor and the ultimate client, which may not always lead to optimal outcomes.

What does the seller do?

The EPC contractor tries to find ways and means on how to raise change contract requests, price escalation due to rework or additional work change in specifications from the buyer side, requests for waiver of liquidated damages, ask for extension of time to deliver the project in case of delay due to infrastructural issues in monsoon etc. All these can be best avoided of the EPC contractors are awarded the contract based on a realistic budgeted price and also incentivized if the EPC Contractor outperforms on different parameters / milestones on the contract. The mindset needs to change from being comfortable levying the liquidated damages clause to incentivizing the contractor for better and timely performance. At the end of the day if the project completion is advanced, the client tends to gain much more than what would be spent on incentivization.

So where do we go from here?

The Government is doing its best by increasing the spend manifold on infrastructure, encouraging technology upgradation, digitization and creating environment awareness. The Government owned Public Service Undertakings (PSUs) are following with hefty budgetary plans and project pipelines. But the question is what more needs to be done?

Basically, the Government needs to invite global competition to execute projects. The global companies can bring in better efficiency tools, greater utilization of resources, upgraded technologies, skillset of engineers ,quality of construction and better level playing field for timely execution of projects, All this can only be made possible if the situation permits more foreign participation of overseas EPC companies by encouraging bilateral investment participation, easing out the laborious process of tendering , cutting down on cumbersome contract clauses ,encouraging PPP participation and last of all creating a level playing field between the buyers and the sellers.

The concept of awarding EPC Contracts based on L1 seems archaic and needs a drastic change. Any EPC contract need not be awarded to the lowest bidder. It may be also be awarded to the higher bidder in the budgeted price (based on competency & merit with past experience of executing similar projects successfully), which will not only ensure delivery of quality project but also in a timely manner. Merit and previous experience & accomplishments of executing similar projects should carry more importance.

In alternate, the time is now ripe for having a totally different concept for awarding projects. Let us follow an open book policy where the buyer and the seller work together, make joint budgets on executing the project, reach consensus on the price of each component which goes into the project and then determine a cost-plus formula, decide incentivization for various parameters, lay down clear parameters for addition or reduction in contract price and specify factors which would attract a price escalation. All these would result in better execution of the projects without worrying about increase in commodity prices due to the Ukraine war or freight charges & delayed deliveries due to the West Asian crises in the Suez Canal. The ratio of delivering a project on time compared to projects in perennial delay calls for a drastic improvement in our way of thinking.

Given that India has given a call for 'Viksit Bharat' & 'Amrit Kaal' in focusing on becoming a developed country in the foreseeable future, the first target set of getting to the 5 trillion-dollar economy mark followed by being the third largest economy in the world. All these are within the realms of possibilities provided a process of openness & acceptability and ability to accept & adapt change for the better is within our mindset as the theory of continuous improvement in all what we do will go a long way in determining our goals. ■

Membranes for a Sustainable Future: Gogri Hub Targets Innovation and Make in India

Aarti Industries has set up the Gogri Hub for Membrane Research, a collaborative venture with IIT Bombay, a strategic decision to focus on research & development in membrane technologies. This dedicated center aims to bridge the academia-industry gap, tailoring solutions to Indian contexts, and fostering an ecosystem conducive to innovation and Indian manufacturing. On the sidelines of launch, **Mirik Gogri, Head Corporate Strategy, Aarti Industries Ltd** delves into the rationale behind this choice and the specific areas of membrane technology research that the Gogri Hub will focus on to drive societal impact and sustainable development

MIRIK GOGRI
Head - Corporate Strategy
Aarti Industries Ltd.

Please share the thought behind choosing the area of membranes for setting up the translational research centre in collaboration with IIT Bombay.

The global membrane market is projected to reach approximately USD 10 billion by 2027, with India's membrane separation technology market expected to grow at a rate of 12-13 % to USD 1300 million by the same year. India's demographic and industrial landscape further accentuates the need for membrane-focused research. With significant challenges in healthcare, energy, and water management, a dedicated center bridges academia and industry, tailoring solutions to Indian needs and conditions. Additionally, nurturing a robust ecosystem around membrane technology creates opportunities for Indian manufacturing, crucial in meeting the demand for efficient filtration, renewable energy, and affordable healthcare products.

Establishing a translational research center focused on membranes, in collaboration with IIT Bombay, aligns with various strategic imperatives. Membranes are pivotal across industries like healthcare, energy, and water treatment, addressing critical challenges such as energy & water access and medical advancements. Furthermore, for Spectrum Impact, backed by the promoter family of the Aarti Industries with a focus on climate tech investment, membrane technology

perfectly aligns with sustainability goals, contributing to environmental solutions and company growth.

The Gogri Hub aims to foster research in water and wastewater treatment, biomedical applications, alternate energy, and gas separation. We intend to bridge the gap between the industry and academia to develop practical innovations through collaboration and surpass existing market alternatives, reduce energy consumption and mitigate the environmental impact for diverse applications. We strongly believe that the translational research centre will be pivotal to overcome hurdles in the membrane manufacturing ecosystem which is one part. In my view, further collaborations between industry academia and government can foster innovation and address skill shortage through specialized training programs. Additionally, regulatory alignment and investments in infrastructure can drive the positive societal impact and economic growth and put India on the path to emerge as a global leader in membrane technology.

Please elaborate on the specific areas of membrane technology research that the Gogri Hub will focus on?

The research center aims to conduct interdisciplinary research, with a primary focus on addressing critical challenges in water treatment, biomedical advancements, and energy sector innovations. Within the field of membrane technologies, our goal is to expand boundaries. Our first priority lies in advancing membrane materials, involving the research and development of novel materials with improved performance

characteristics like selectivity, durability, and resistance to fouling. This includes exploring new polymer blends, nanocomposite membranes, and functionalized surfaces tailored for specific applications. The second area of emphasis is innovating membrane fabrication techniques to enhance efficiency, scalability, and cost-effectiveness. This entails developing advanced manufacturing processes such as electrospinning,

phase inversion, and molecular layer deposition to create membranes with precise pore structures and uniform properties. Our third focus is on designing and engineering innovative membrane modules and systems for diverse applications across aforementioned areas. This involves optimizing module configurations, flow patterns, and materials to improve performance, reliability, and operational ease. Efforts to enhance

THEMES FOR RESEARCH ENDEAVOURS AT THE GOGRI HUB

- Advanced membrane materials and fabrication techniques for desalination ,wastewater remediation & oil recovery
- Novel membrane technologies to enhance water purification processes
- Development of interfacial evaporators for desalination and photochemical reactors for wastewater remediation.
- Exploration of forward osmosis membranes and membrane distillation for efficient water treatment

Biomedical Applications

- Development of kidney dialyzer hollow fiber membranes & biodegradable pelvic floor membranes for applications in dialysis and pelvic floor reconstruction
- Potential of bio-artificial organs, including pancreas, kidney, and liver, to address the growing demand for organ transplantation and medical treatments

Energy Sector

- Development of electro-conductive UF and NF membranes for energy-efficient water treatment
- Exploration of cation exchange and anion exchange membranes for energy storage and conversion applications

efficiency, reduce energy consumption, and ensure product purity will necessitate the exploration of novel chemical separation techniques such as membrane distillation, pervaporation, and membrane bioreactors. Lastly, we aim to develop advanced analytical techniques and characterization methods to assess membrane properties, performance, and long-term durability. By employing sophisticated analytical tools and instruments, we seek to understand membrane structure-property relationships and optimize membrane design effectively.

How do you plan to identify research projects with high commercial potential and societal impact?

At Aarti Group, we have consistently embraced a multidisciplinary approach, leveraging various strategies. Our intention is to strategically and collaboratively drive research initiatives that support

projects capable of commercializing technologies, thereby making a significant impact on both industry and society. To kick start this process, we aim to thoroughly understand areas of high demand, unmet needs, and identify technology gaps by actively engaging with stakeholders. Our next step involves actively scouting for innovative membrane technologies with promising commercialization potential through research collaborations across industries, academia, and start-ups.

We will meticulously assess the intellectual property landscape, exploring opportunities for technology transfer and commercialization. This involves conducting patent searches, evaluating patentability, and analyzing freedom-to-operate. Furthermore, we'll seek out licensing and partnership opportunities with technology owners to facilitate the transfer and commercialization of valuable technologies. An integral aspect of our approach is providing support and resources to researchers and entrepreneurs to translate their findings into commercial products and startups. This support includes mentoring, funding opportunities, access to incubation facilities, and connections with industry partners and investors, all aimed at accelerating technology commercialization. Finally, we'll evaluate the societal and environmental impact of our research projects and technologies to ensure alignment with sustainability goals and societal needs. This will involve engaging with stakeholders, including communities, policymakers, and non-governmental organizations, to gather feedback and ensure that our research efforts address relevant societal challenges.

Despite its immense potential to bridge the gap between scientific discovery and real-world applications, translational research faces several significant challenges such as funding, investing in unproven technologies, knowledge gap to name a few. How do you plan to address such challenges to unlock the potential of research?

The intent of setting up this research centre is to surmount translational research challenges and unleash the full potential of research to drive positive societal change and economic growth which of course will require a multifaceted approach and a comprehensive strategy. The hub will provide strategic funding and investment, utilizing various mechanisms like seed grants and venture capital, along with forging strategic partnerships with industry, government, and philanthropy to provide financial backing to promising translational research projects. We will carry out rigorous due diligence, feasibility studies, and technology assessments to mitigate uncertainties associated with investing in nascent technologies, ensuring informed decision-making. The Hub will offer resources and facilities for validating technology and conducting proof-of-concept studies, essential for demonstrating the viability and efficacy of translational research endeavors. To equip researchers & entrepreneurs with the requisite skills & knowledge to transform scientific discoveries into practical applications will be our top priority and research centre will conduct mentorship programs,

R&D TOPICS FOR INTERDISCIPLINARY RESEARCH LED BY IIT BOMBAY

- **Gas Separations:** Biogas enrichment to biomethane through CO2 removal and green hydrogen production.
- **Hybrid Membrane Systems:** Thin film composite membranes for efficient desalination.
- **Hollow Fiber Membranes:** Applications in water treatment, kidney dialysis, and bioartificial organs.
- **Ion Conducting Membranes:** Hydrophilic particle-filled polymeric membranes for sustainable hydrogen production.
- **Carbon-based Membranes:** Versatile solutions for desalination, dye degradation, and solar concentration.
- **New Generation Membrane Fabrication:** Electro-conductive, selective, and antifouling membranes for various filtration processes.
- **Reverse Osmosis Membranes:** Applications in space systems and municipal wastewater treatment.
- **Low-cost Materials for Environmental Applications:** Waste-to-value-added products like Flash Graphene and Laser-Induced Graphene for environmental remediation.
- **Surface-modified Nanoporous Membrane:** Efficient oil-water separation in industrial wastewater treatment.
- **Graphene Micro-porous, Reusable Carbon Membranes:** Water purification and desalination technologies for sustainable water management

workshops and seminars. Facilitating collaborations between academia, industry, and government to leverage diverse resources and expertise will be key to accelerating technology development and maximizing impact. Our mission is to create a vibrant ecosystem conducive to innovation and collaboration in addressing real-world challenges.

The Hub will provide comprehensive support for entrepreneurship and innovation, including incubation programs, startup accelerators, and access to mentorship and investment networks, to facilitate the commercialization of research outcomes. Advocating for the importance of translational research through raising awareness, showcasing success stories, and advocating for policies that foster innovation and entrepreneurship will also be central to the Hub's mission. Our mission is to create a vibrant ecosystem conducive to innovation and collaboration in addressing real-world challenges.

What kind of support will the Hub offer to companies interested in developing or adopting membrane technologies and building a skilled workforce in the field of membrane science and technology?

We are committed to aiding companies interested in membrane technologies and nurturing a skilled workforce in the field through a range of initiatives. The Gogri Hub for Membrane Research is a state-of-the-art facility dedicated to advancing membrane science and technology through translational research, innovation, and collaboration. This includes advanced research laboratories, pilot scale testing facilities , prototyping & manufacturing centre, collaborative workspace , data analytics & computational resources , training & education centre and offering technology transfer & commercialization support.

For corporations, the hub will offer extensive technology assessment and advisory services to facilitate the adoption or development of tailored membrane solutions, including feasibility studies and implementation guidance. It will enable access to cutting-edge membrane science and technology research through collaborations with academic researchers and participation in research projects, ensuring companies remain informed about innovation as well as opportunities for technology transfer and licensing. Moreover, the research center will provide support for incubation and commercialization, assisting companies in translating membrane technology innovations into market-ready products, including assistance with business planning and access to funding options. Additionally, it will promote networking and collaboration among companies, researchers, industry partners, and investors to stimulate innovation and partnership development through industry forums and joint research initiatives.

To cultivate a skilled workforce, we aim to align educational programs with industry needs and offer relevant training and skills in membrane science and technology. We have adopted a multifaceted approach, which includes providing comprehensive education and training programs through workshops, seminars, and certificate courses covering various aspects of membrane fabrication, characterization, and application. For students and early-career professionals, the research center will provide practical experience in membrane technology research and development, as well as postdoctoral research scholarships and fellowships to drive advancements in advanced technologies.

How will the Hub measure its success in translating research into real-world applications and what are the long-term goals for promoting sustainable development and societal well-being?

The Gogri Hub employs a comprehensive approach to evaluate its success in translating research into practical applications and societal impact. It utilizes a combination of quantitative and qualitative metrics to reflect its influence on innovation, economic growth, societal welfare, and sustainability. One significant aspect of this evaluation involves tracking the adoption and commercialization of membrane technologies resulting from Hub activities. This includes monitoring metrics such as the number of research projects undertaken, patents generated, technology licenses issued, and startups established based on Hub innovations. Success is determined by the widespread uptake and successful commercialization of these membrane technologies across various sectors, including healthcare, energy, water treatment, and environmental sustainability.

Additionally, the Hub assesses its level of engagement and collaboration with industry partners. Metrics such as the number of collaborative projects initiated and technology transfer agreements signed are monitored to gauge the effectiveness of these partnerships in translating research outcomes into viable applications

and products. Furthermore, the Hub prioritizes education and workforce development in membrane science and technology. It monitors the number of students, researchers, and professionals trained through its initiatives to build capacity, enhance skills, and foster talent capable of driving research, innovation, and industry growth in the field.

Environmental sustainability is also a key focus area, with the Hub evaluating the contributions of membrane technologies to reducing energy consumption, water usage, and environmental impact. Success in this realm is measured by tangible environmental benefits and reductions in carbon footprint resulting from the widespread adoption of membrane-based solutions.

Overall, the Gogri Hub's overarching goal is to advance membrane science and technology for sustainable development and societal well-being. Through continual measurement of progress against these goals and assessment of impact on innovation, economic development, and societal welfare, the Hub aims to demonstrate the transformative potential of translational research in fostering positive change for a sustainable and prosperous future. ■

Vision of an Emission-free Petrochemical Industry Gets a Step Closer

The launch of the world's first electrically heated steam cracking facility for sustainable chemical production at BASF's Ludwigshafen site marks a significant milestone. By harnessing electricity from renewable sources, this innovative technology aims to slash CO2 emissions while revolutionizing olefin production.

E-Furnace Demonstration Plant at BASF's Ludwigshafen site

BASF, SABIC, and Linde have inaugurated the world's first demonstration plant for large-scale electrically heated steam cracking furnaces. Following three years of development, engineering, and construction work, the regular operation of the demonstration plant is now ready to start at BASF's Verbund site in Ludwigshafen, Germany. In 2021, the three companies signed a joint agreement to develop and demonstrate solutions for electrically heated steam cracking furnaces.

Typically, the reaction is conducted in furnaces at temperatures of about 850 degrees Celsius. Up to now, these temperatures have been reached by using conventional fuels. The demonstration plant aims to show that continuous olefin production is possible using electricity as a heat source. The demonstration plant, which produces olefins, such as ethylene, propylene, and possibly also higher olefins from saturated hydrocarbon feedstock, is fully integrated into the existing steam crackers in Ludwigshafen. The upcoming operation serves the goal of gathering data and experiences about material behavior and processes under commercial operating conditions for the final development of this innovative technology to industrial

Steam crackers play a central role in the production of basic chemicals and require a significant amount of energy to break down hydrocarbons into olefins and aromatics. By using electricity from renewable sources, the new technology has the potential to reduce CO2 emissions of one of the most energy-intensive production processes in the chemical industry by at least 90% compared to technologies commonly used today.

market maturity. In two separate demonstration furnaces, two different heating concepts will be tested. While in one furnace, direct heating applies an electric current directly to the cracking coils, in the second furnace, indirect heating uses radiative heat of heating elements placed around the coils. The two electrically heated furnaces together process around 4 tons of hydrocarbon feedstock per hour and consume 6 megawatts of renewable energy.

To support the development of the novel furnace technology, the project was granted €14.8 million by the German Federal Ministry for Economic Affairs and Climate Action under its "Decarbonization in Industry" funding program. The program is supporting energy-intensive industries in Germany in their efforts to achieve carbon neutrality.

"With the development of electrically operated steam cracking furnaces, we are getting our hands on a key technology that will help to significantly reduce greenhouse gas emissions in the chemical industry. It fills me with pride and joy that we have achieved this success together with our partners SABIC and Linde. The demonstration plant here in Ludwigshafen will provide us with valuable experience on the final step towards the industrial application of this technology", said Dr. Martin Brudermüller, Chairman of the Board of Executive Directors of BASF SE.

Abdulrahman Al-Fageeh, CEO of SABIC stated: "The e-furnace's technology holds huge potential for the sustainability of the global petrochemical industry. It can demonstrate the role that renewable electricity can play in higher efficiency and low-emission chemical processing. Through close collaboration, teamwork, intellectual property development, and advancing the best technical solutions holistically, the teams at SABIC, BASF and Linde have brought this project to this key stage. We are proud to be here together today to celebrate the power of collective action on our journey toward a circular carbon economy."

"It is our common goal to demonstrate that it is possible to electrify the petrochemical industry and to operate a steam cracker with sustainably generated electricity. This outstanding joint project is a significant proof of how together we can develop ground- breaking technologies that will advance us on the journey towards net-zero CO2 emissions and climate-neutral industry," said Jürgen Nowicki, CEO of Linde Engineering. "The STARBRIDGE™ technology brings the vision of an emission-free petrochemical industry a step closer."

Based on the combined knowledge and intellectual property of the three parties collaborating to develop the new technologies, the demonstration unit in Ludwigshafen will be operated by BASF. Linde was responsible for the engineering, procurement, and construction of the plant. Linde will in the future commercialize the developed technologies under the new trademark STARBRIDGE™, enabling the petrochemical industry to decarbonize by replacing conventional fired technologies. ■

Transforming Dysfunctional Plants into Compliant Assets

MANSI JAIN
CEO, Digital EcoInnovision

From transforming wastewater treatment to optimizing resource usage, DigitalPaani is changing water operations. **Mansi Jain, CEO, Digital EcoInnovision** addresses management challenges, safeguarding compliance and sustainability. With a goal to create water-positive buildings, the aim is to improve urban living standards.

The society can tackle the water crisis with widespread wastewater treatment and recycling to potentially meet 60–70% of urban water needs, in fact even treatment plants are coming up everywhere, but unfortunately nearly 75% of these plants are dysfunctional. Patrons are spending money operating and maintaining their plant every month, nonetheless success seems far from reality.

DigitalPaani observed these issues for 25+ years and interviewed hundreds of plant owners and experts from institutions like the WASH Institute. It was found that a major problem of onsite facilities like lack the tools and expertise for effective management was the root cause. Run by low-skilled operators, problems often go unnoticed and unresolved, leading to high costs and compliance risks of fines and shutdowns. Consequently, dysfunctional plants waste energy, produce unusable water, and contribute to ongoing freshwater extraction.

Re-Engineering the Water Operations

DigitalPaani is set out to redesign the future of water operations. It has envisioned a solution that would drive operational excellence in these facilities by empowering these low-skilled operators with the expertise needed to manage water operations efficiently. This has resulted in an IoT enabled integrated operations platform for water. It scales the expertise needed to handle facilities in 3 steps.

- Identify the needs of the industry by determining how each facility should operate given its unique physical configuration and needs. This is done by design assessment of each facility on software as well as capturing operations information from each unit operation in a facility. This data spans a wide range, from using computer vision to look at biological process health, to looking at electrical data, energy data, pressure, vibration, flow, and so on.

- Secondly, it communicates the necessity to the relevant stakeholders by offering complete visibility through WhatsApp and live dashboards.
- Finally, it addresses the need by executing the required actions directly through automated workflows, whether it's training onsite teams, guiding their daily workflow, and validating their work or managing the physical operation of equipment through our in-platform automation manager.

Execution to Maximize Productivity

The centralized control unit monitors plants 24/7 and coordinates directly with the operations team to ensure work is being done correctly and on time. When things start going wrong, it uses data streams from onsite sensors and electrical panels to diagnose the root cause of the issue and drive issue closure. It even recommends operational and physical improvements.

In fact DigitalPaani's mechanism is highly differentiated and can be seen as SCADA+++. It not only meets SCADA requirements but also provides:

- Easy expert insights, for instance not just current raw data but historical trends, analytics and actionable insights
- Enhanced automation control, for instance dynamic automation with different modes that changes based on the plant's current condition and
- Comprehensive operations management such as streamlined inventory management with targeted alerts for restocking. Moreover, many customers may have a range of sensors but struggle to derive value from them to ensure optimal plant performance.

DigitalPaani does not only close this gap, but the deliverable to customers is 'operational excellence', and not just monitoring or insights. For example, let's say the pH levels in the core reactor have dropped dramatically due to a complex biological reaction. Typically operators onsite have no way to understand what is going on in the reactor and how to resolve it, and those outside the site have no visibility on the issues coming up until a few weeks pass and the issue starts impacting treated water quality.

Here DigitalPaani detects, diagnoses, and sends out the appropriate instructions such as feeding more biological matter to the reactor to resolve the issue instantly. It even modifies the automation of the equipment such as the pumps to ensure the right balance of sewage in the reactor.

From Dysfunction to Compliance

This new style of operations has shown great results consistently, transforming dysfunctional plants into

Case Study -Industrial F&B Plant

+ System Health	**+ Quality improvement**
Over 50% reduction in the number of days the MGF and ACF choked	Average treated water
Ease of operations for in house team; no need to visit plant	BOD below 25 (expected was 30)
Stabilizing of post DAF pH above 6 post DigitalPaani	Average treated water COD below 75(expected was <250)
	No spikes in outlet water quality in 1+ month
+ Savings	
Nearly 48% reduction in caustic and lime chemical use due to better chemical control in pre- treatment compared to other known sister's concerned plants	
Energy consumption per KL of treated water of only 4-5 KW/KL rather than 8+ in other plants due to reduction in unnecessary use of equipments like post DAF pump	

compliant assets while improving water quality and reducing operational costs for customers by up to 41%. For instance, one industrial facility (550KLD plant with a complete ZLD system) experienced frequent process issues due to operational mismanagement. The operational team identified and resolved several concerns, including poor process stability, compromised biological health, and excessive PAC and urea dosing. Moving a long way today DigitalPaani has partnered with India's leading companies like Britannia, Leela, and Reliance, and have been recognized as top water innovators by Niti Aayog, FICCI, and ImagineH20.

This product innovation also enables DigitalPaani to unlock business model innovation. Instead of becoming an add-on cost for facilities like competitors, the company is able to de-risk adoption and offer guaranteed savings through two models that are unique in the market.

- First, plant owners can manage plants using their own under-utilized staff, such as plumbers, with the system and the team's remote management, rather than outsourcing operations due to lack of expertise. This allows them to save up to 66% of operating costs.
- Secondly, the entire operations contract of a facility is taken, allowing service provider partners to provide physical services like operators onsite to manage clusters of plants as a fleet with a small common workforce, rather than individual deployments. This also implies that the overall package of DigitalPaani enabled operations costs water facilities roughly equal to their current operations while delivering significant regulatory, sustainability, safety, and long-term cost savings.

In conclusion, DigitalPaani's innovative approach to water operations is revolutionizing the industry, addressing dysfunctionality and management issues while driving compliance and sustainability. Its eventual vision is to create water positive buildings that in turn will significantly improve quality of life in our cities. ■

Widespread wastewater treatment and recycling have the potential to address 60–70% of urban water needs, potentially mitigating the water crisis. Invariably by converting dysfunctional plants into compliant assets and enhancing water quality, operational costs for industries can be reduced by up to 41%.wastewater treatment and recycling have the potential to address 60–70% of urban water needs, potentially mitigating the water crisis. Invariably by converting dysfunctional plants into compliant assets and enhancing water quality, operational costs for industries can be reduced by up to 41%.

Solving the 5 billion tonne Plastic Problem with Bioinspired X-32

Born out of de-extinction company Colossal Biosciences , based on a core discovery out of the Wyss Institute for Biologically Inspired Engineering at Harvard, Breaking will develop X-32 to address the global plastics crisis. The researchers in the team are working to solve one of the biggest problems on the planet by using the natural world as inspiration and layering on cutting edge technology to transform how we break down plastics.

Sukanya Puntambaker, Co-Founder & CEO, Breaking Inc.

The world's plastic problem is growing increasingly severe. According to statistics, 5,000 million tons of plastic are currently in landfills, oceans, and ecosystems. These have been found in Antarctic sea ice and in marine animals in deep ocean trenches. Even bottled water contains almost a quarter of a million nanoplastic fragments. Additionally, 390 million tons more of plastic are produced each year, up 22,400% since 1950.

The technologies co-developed by the Wyss Institute offer limitless applications to address the planet's pervasive plastic contamination challenges. Sukanya Puntambaker, Co-Founder & CEO of Breaking Inc., shares, "I've spent my career in synthetic biology and protein engineering with the hope of developing something this transformational. In the future, our solution will be able to work across terrestrial and marine environments to break down today's greatest threat to our existence: the plastic that is choking our world."

This novel discovery distinguishes itself from competitors in the plastic remediation space by developing a bioinspired technology that can degrade many types of plastics threatening the environment. This can be accomplished without pre-treatment, and the breakdown products could be used to produce other valuable materials and commodities. With future synthetic genetic edits, the team is focused on making X-32 faster, more efficient, and more effective with minimal environmental impact.

The Chemistry of Naturally Derived X-32

Puntambaker shares, "The team discovered X-32 while conducting research at the Wyss Institute at Harvard, using a method called bioprospecting which aids in screening and identifying. The most interesting aspect of X-32 compared to other solutions is that it does not require pre-treatment of any sort before degrading plastics and can work across a variety of plastic types. Most microbial solutions only work on one type of plastic." Initially, the team was very excited about the novelty of nature's creation that could dramatically address the issue of man-made plastics, but they realized the need to create a way for the microbe to work faster on more plastics outside the lab sustainably in order to be effective.

X-32 is a breakthrough microbial discovery that destroys multiple types of plastic by breaking down hydrocarbon chains across different chemical structures quickly. X-32 works with polyolefins (the toughest plastic bonds), which include products like packaging materials, polyesters such as PET bottles, and polyamides such as nylon. In its current state, X-32 has been shown to degrade up to 90% of polyesters and polyolefins in less than 22 months, a significant improvement over other solutions which target only a single plastic type.

During the lab tests the team observed that the microbe starts to work immediately on degrading the plastics. If left untreated, paint brush bristles can take 450-1000 years to decompose, fishing wire can take 600 years, and dental floss would take 80 years to decompose naturally. However X 32 started working on the plastics immediately breaking down these samples in less than five days. X-32 utilizes plastics as a primary carbon source and requires no pre-treatment, sorting, cleaning, or decontamination, emitting carbon dioxide, water, and biomass during the degradation process.

Additionally, as X-32 degrades plastics, it generates biomass containing different biomolecules that may hold immense value in various industries. These molecules unveil potential for utilization in the production of biofuels, biodegradable plastics, and high-value chemicals. The team will continue to investigate the use cases as they explore X-32's enzyme secretion and biomass by-product more deeply.

"We have entered an era in which our environments and bodies are at risk from micro and nanoplastics that we once trusted. We have also entered an age of exponential technologies in which we can see and seek the nuances and continua of polymers. Harmful-to-helpful is not merely natural vs. synthetic; it depends on the size, shape, and location of the polymer particles. For example, polyethylene has the same set of bonds as beeswax, just longer. We are 'Breaking' these down and reusing the parts in beneficial reconfigurations," says Dr. George Church, Co-founder & Professor of Genetics at Harvard Medical School and Professor of Health Sciences and Technology at Harvard and the Massachusetts Institute of Technology (MIT).

Puntambaker explains, "Today's primary recycling processes are inefficient and either degrade the plastic to a point where it becomes unusable or further contribute to other environmental harms. Crushing and grinding destroys the fibres in plastics, making them unsuitable for re-use. As a result, only 9% of plastic makes it to a recycling plant. The most efficient disposal method, incineration, exacerbates the carbon crisis and releases noxious chemicals. However, Breaking's X-32 has no known negative environmental ramifications.

Applications & Market Potential

Breaking targets first-field trials for the food waste & composting industry in the USA, which costs the country around USD 16 billion per year as the waste food cannot be composted due to the presence of plastics along with the waste. Removing plastic contamination will enable the government to save money, mitigate emissions, and improve the quality of life. With 40 million tons of food waste in the U.S., Breaking sees the opportunity to reduce roughly 48 million tons of CO2 in the U.S. as both profitable and mission-oriented.

The group has raised USD 10.5 million in funding and will soon begin deeper studies to understand the

behaviour of the microbe in surrounding ecosystems, its impact on other microorganisms, and uses for the biomass it outputs in the process of consuming plastic. The team has identified numerous applications, including utilization in wastewater, food waste, and marine applications where X-32 and its further enhanced versions will be added to current microbe-based degradation programs. And, within the next few years, the team hopes to utilize their technology to ensure that newly created plastics have a faster degradation period and smaller overall impact on the environment.

Breaking believes this will be more cost-effective and more environmentally friendly in the long term and will have a lot more to share within the next year. Breaking is currently focused on building a team to examine X-32 to see how it can respond to synthetic edits. Puntambaker shares, "Our hypothesis is that we can make it faster and more efficient and thus have many more commercial applications." Speaking about implementing X-32 on a large scale, she adds, Breaking's go-to applications will be made adaptable so that there are minimal or no modifications to existing infrastructures in waste systems, such as installing a spray machine or the like, to ensure easy deployment. She elaborates that the team is looking at applications beyond plastic waste management and has identified numerous applications that include utilization in wastewater, food waste, and marine applications where X-32 and enhanced versions can be added to current microbe-based degradation programs.

The team will now utilize their expertise in synthetic biology to engineer X-32 into a faster, more efficient, and uniquely effective solution with the goal of breaking down more plastic, faster. They will first focus on identifying the enzyme used by X-32, which they believe breaks down the carbon bonds within plastics. By isolating the enzyme, then editing that enzyme, and applying machine learning and artificial intelligence to evolve more efficient enzymes, the team will build an improved solution for wide commercial distribution. Breaking is seeking partnerships across diverse industries such as wastewater, composting, landfills, agricultural, and CPG plastic waste and across geographies including India for collaborations. ■

Innovation, Quality, and Service: Leading the Pipe Hangers and Supports Industry

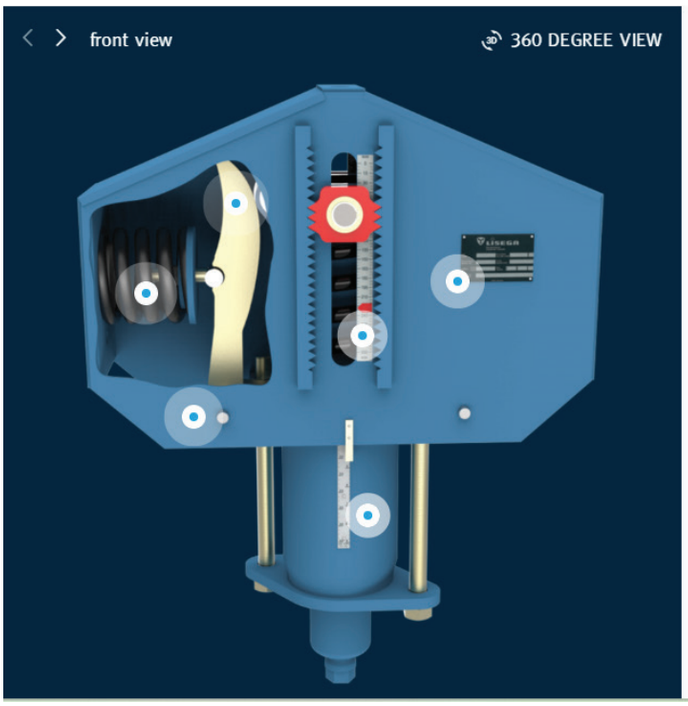
In a competitive landscape shaped by global dynamics, LISEGA emerges amongst one of the many beacon of innovations and reliability in the pipe hangers and supports industry. With a strategic focus on quality, innovation, and customer satisfaction, **Amitabh Anand, Managing Director, LISEGA India Pvt. Ltd.,** navigates challenges with resilience, positioning itself as a leader poised for growth.

AMITABH ANAND
Managing Director
LISEGA India Private Limited

What marketing challenges do you anticipate in India and globally, considering the competitive landscape, and how do you plan to position your offerings?

In the highly competitive arena of pipe hangers and support systems, we confront multifaceted marketing challenges both within India and across global markets. The competitive landscape is crowded with numerous players vying for attention, rendering product differentiation a formidable task. Moreover, the industry's susceptibility to global economic conditions, including fluctuations and geopolitical tensions, directly impacts demand dynamics, particularly in sectors like power and petrochemicals, subsequently influencing the need for our products on a global scale. Additionally, supply chain disruptions, whether stemming from global crises such as the COVID-19 pandemic or geopolitical conflicts, pose significant hurdles by impeding production and disrupting delivery timelines. Trade disputes further compound these challenges, necessitating agile supply chain management strategies to navigate through turbulent times. In response to these challenges, our strategic positioning plan is anchored in several key pillars. Foremost, we prioritize a relentless focus on quality and compliance, underscored by our adherence to stringent industry standards and regulations. Moreover, innovation serves as a linchpin in our differentiation strategy, as we invest heavily in research and development endeavors to introduce pioneering features and solutions that align with evolving industry needs. Our proprietary software tools, including LICAD and LISA, stand as distinctive assets that empower us to stay ahead of the curve, while our embrace of digital transformation ensures that we remain at the vanguard of industry advancements.

Furthermore, our global expansion strategy is underpinned by our expansive footprint with seven



- Symmetrical design ensures direct flow of forces through axis of symmetry.
- Favourable power-weight ratios for reduced installation loads.
- Arranged by load groups and travel ranges to simplify selection (modular system).
- Consistent functional behaviour due to high-quality corrosion protection and maintenance-free, chemically nickel-plated finishes.
- Readily adaptable to the installation situation due to suitable designs and standardised accessories.
- Double load-tube guiding of constant supports for transmission of side loads.
- Secure connection of load chains due to load- and connection-compatible modular components.

manufacturing units and sales offices strategically positioned across the globe. Notably, our manufacturing prowess in India not only bolsters our competitiveness but also diversifies our manufacturing portfolio, thereby enhancing our resilience to market fluctuations. Additionally, our strategic partnerships with key stakeholders such as plant operators and EPCs enable us to provide holistic solutions and serve as a trusted one-stop destination for all pipe hanger and supports requirements. Collaborations with representatives and industry associations further amplify our visibility and credibility, while active participation in trade shows and events serves to solidify our market presence and foster valuable connections within the industry.

In essence, by steadfastly prioritizing quality, driving innovation, expanding our global footprint, and nurturing strategic partnerships, we position ourselves as leaders in the pipe hangers and supports industry, equipped to surmount the myriad challenges and seize opportunities for growth in both domestic and international markets.

What is the Unique Selling Proposition (USP) of your product, and what is the current and projected demand for it in the market?

LISEGA pipe hangers and supports products stand as exemplars of excellence, driven by our unwavering commitment to innovation, quality, and customer satisfaction. Crafted with precision engineering, they offer unmatched performance, durability, and ease of installation, surpassing traditional alternatives in every aspect.

Example: - LISEGA unique design (cam & roller design) of constant hanger functions on principal of the parallelogram of force to deliver highest constancy and offer the user a large number of special benefits.

At the heart of our offerings lies a dedication to innovative design. Leveraging cutting-edge technology and engineering expertise, we develop solutions that not only meet but exceed the needs of our customers. Features such as adjustable components, vibration dampening mechanisms, and corrosion-resistant materials are seamlessly integrated, ensuring optimal functionality and efficiency in diverse applications.

Quality is the cornerstone of our manufacturing process. From meticulous material selection to stringent quality control measures, we leave no stone unturned in ensuring that our products adhere to the highest industry standards and regulatory requirements.

Reliability and consistency in performance, guaranteed from the moment of installation to years of seamless operation.

Customization lies at the core of our customer-centric approach. We understand that every project is unique, which is why we offer a wide range of customization options. Whether it's adjusting dimensions, materials, or coatings, we work hand-in-hand with our customers to deliver tailor-made solutions that perfectly align with their specific needs and requirements.

Exceptional customer service is our hallmark. From the initial consultation to after-sales support and technical assistance, our dedicated team is committed to ensuring a seamless experience for our customers at every stage of their journey. Their satisfaction is our priority, and we go above and beyond to exceed their expectations, time and time again.

Give a brief stating your future investments and growth plans for the coming years?

Looking ahead, the future of the pipe hangers and support industry appears promising. Factors such as increasing construction activity, infrastructure development, and industrial expansion, especially in renewable sector like green hydrogen and solar continue to drive demand both in India and globally. Rapid urbanization and population growth further fuel the need for modernization and expansion of critical infrastructure like petrochemical complexes, creating ample opportunities for our innovative products and considering the potential future growth, we have expanded our factory premised cum production capacity to double in year 2023.

In conclusion, our relentless pursuit of innovation, unwavering commitment to quality, and unparalleled customer service position us as leaders in the industry. As we continue to innovate, maintain high standards, and prioritize customer satisfaction, we are confident in our ability to capitalize on emerging opportunities and sustain our leadership position in the dynamic pipe hangers and supports market, both in India and around the globe. ■

Thermo Fisher Scientific Launches LInspector Edge for Enhanced Battery Manufacturing

Thermo Scientific LInspector Edge In-line Mass Profilometer

Thermo Fisher Scientific has unveiled a groundbreaking technology, the Thermo Scientific LInspector Edge In-line Mass Profilometer, aimed at revolutionizing battery safety and performance. This innovative tool offers comprehensive mass loading measurements across the full width of battery electrodes, a critical advancement in the production of high-performance batteries, particularly for electric vehicles.

The LInspector Edge is designed to provide real-time, full-coverage analysis of electrode coatings, measuring complete edge-to-edge profiles within milliseconds. This capability is crucial for battery manufacturers who require precise and consistent electrode coating thickness to ensure product reliability and performance. The technology boasts unprecedented resolution and precision, setting a new standard in the field of battery electrode analysis.

Miguel Faustino, President of Chemical Analysis at Thermo Fisher Scientific, emphasized the significance of the LInspector Edge, stating that superior battery technology is essential for the global shift towards clean energy. This new in-line mass profilometry technique enhances quality assurance processes, enabling manufacturers to produce better, safer batteries more efficiently.

The LInspector Edge not only aids in improving battery performance but also contributes to more profitable operations through better process control and reduced risks to quality. By providing battery manufacturers with critical data and insights, Thermo Fisher Scientific continues to support the advancement of the battery manufacturing industry, ensuring that it can meet the growing demands of the electric vehicle market and other high-stakes applications.

Shakti Pumps granted 13th Patent for Innovation on Soft Starter

Shakti Pumps (India) Limited, India's leading manufacturer of solar pumps and motors has received a patent for inventing "Methods & Apparatus for Soft Starting and stopping a Motor" The Patent Office, Government of India, has awarded Shakti Pumps this patent, fully adhering to the provisions set forth in the Patents Act of 1970. This patent is set to maintain its validity for duration of 20 years, commencing from the date of filing. This is the 13th Patent that the company has secured. This patented technology offers numerous benefits for both motors and grid electrical systems. Firstly, it reduces mechanical stress on the motor and connected equipment by gradually ramping up motor speed, extending motor lifespan, and lowering maintenance costs. Secondly, it ensures a smooth and controlled start-up, preventing sudden torque and mechanical shock, which is particularly advantageous for delicate equipment and applications vulnerable to damage from abrupt starts. Additionally, soft starters limit inrush current during motor start-up, preventing voltage dips in the grid, thus avoiding penalties for exceeding power consumption limits and reducing the need for oversized electrical infrastructure. Moreover, they provide precise control over acceleration and de-acceleration, enhancing system efficiency and reliability while minimizing equipment wear and tear, resulting in fewer breakdowns and extended equipment lifespan. Furthermore, the technology is compatible with generator-fed AC motors, reducing inrush current during start-up, improving generator lifespan, fuel economy, and reducing generator size requirements by 50 % compared to other starting methods. Dinesh Patidar, Chairman of Shakti Pumps, credited the company's R&D team for achieving this milestone. He highlighted, "This patented technology marks a significant stride in our commitment to innovation and excellence in the electrical industry. Soft starters, a pivotal aspect of our patented technology, are set to transform global electrical systems by providing controlled motor starting and stopping while minimizing stress on equipment and the grid. This advancement not only enhances motor durability but also contributes to a more resilient and reliable electrical infrastructure." Shakti Pumps (India) Limited Dinesh Patidar

ABB's AquaMaster: Revolutionizing India's Water Management for Two Decades

AquaMaster flowmeter series

ABB's innovative AquaMaster flowmeter series has been a cornerstone in enhancing the efficiency of India's water distribution networks for the past 20 years. First installed in Bengaluru, these electromagnetic flowmeters now operate across 15 cities in eight states, including Gujarat, Rajasthan, Odisha, and New Delhi, with approximately 2000 units currently deployed.

The AquaMaster, recognized as the world's first battery-powered electromagnetic flowmeter, has significantly improved the management and conservation of water resources in India. It provides precise, real-time flow measurements that enable water utilities to monitor and optimize water distribution, crucial for both urban and rural areas, especially those lacking electricity.

Krishana Prashanth, Global Product Line Manager for Electromagnetic Flowmeters at ABB Measurement & Analytics, emphasized the importance of these flowmeters in combating global water scarcity. With their ability to detect low flow velocities and potential leaks, AquaMaster flowmeters are pivotal in reducing non-revenue water (NRW) through accurate measurement and early leak detection.

The device's latest iteration, the AquaMaster 4 Mobile Comms, introduced in 2022, features bidirectional connectivity, enhancing its functionality in remote monitoring and management of water distribution. This innovation has not only supported sustainable water use but has also earned the distinction of "Test and Measurement Product of the Year" at the Instrumentation Excellence Awards.

By providing cutting-edge solutions for water management, ABB continues to support India's efforts in securing a sustainable water future, highlighting its role as a leader in technological innovation in the water industry.

Innovative LEWA Pump Enhances Efficiency in Groundbreaking Hydrogen Production System

The "Electrolysis Made in Baden-Württemberg" project features a key innovation in hydrogen production technology with its scalable 1 MWel alkaline water electrolysis system, aimed at industrial applications. A critical element of this system is the LEWA ecoflow diaphragm metering pump, designed to enhance the process's efficiency and safety. Equipped with an explosion-proof motor, the pump accurately feeds water into the electrolysis process, adjusting flow rates in real time to match hydrogen production rates, ensuring optimal operation.

The ecoflow pump handles high pressures and temperatures up to 90 °C, conditions necessary for efficient hydrogen production. It is crafted from materials highly resistant to the harsh environments of electrolysis, such as exposure to demineralized water and alkaline electrolytes. Its stainless steel 316/316L construction offers excellent resistance to chemical corrosion, while its robust PTFE sandwich diaphragm is supported by patented LEWA DPS technology to prevent leaks, contributing to the system's long-term reliability and operational stability for up to 20 years. This pump is integral to the project's goal of scaling up hydrogen technology and advancing Germany's decarbonization initiatives. ■

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R.N.I. No. 11403/1966 Date of Publication: 29th of every month. Postal Registration No: MCS/095/2023-25
Posted at Patrika Channel Sorting Office, Mumbai 400001, on 30th of every month. Total Pages No.: 66

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3-6 February 2026

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Concurrent Events

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

Scope for ChemTECH World Expo 2026

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

Scope for Specialty Chemicals World Expo 2026

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

Scope for Biopharma World Expo 2026

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

FACT & FIGURES 2024

- 750 EXHIBITORS FROM 15+ COUNTRIES
- 25871 VISITORS FROM 53 COUNTRIES
- SCALE@CHEMTECH World Expo 2024: 60+ GLOBAL CLIMATE TECH STARTUPS FROM 20 COUNTRIES; 40 TECHNICAL PRESENTATIONS
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