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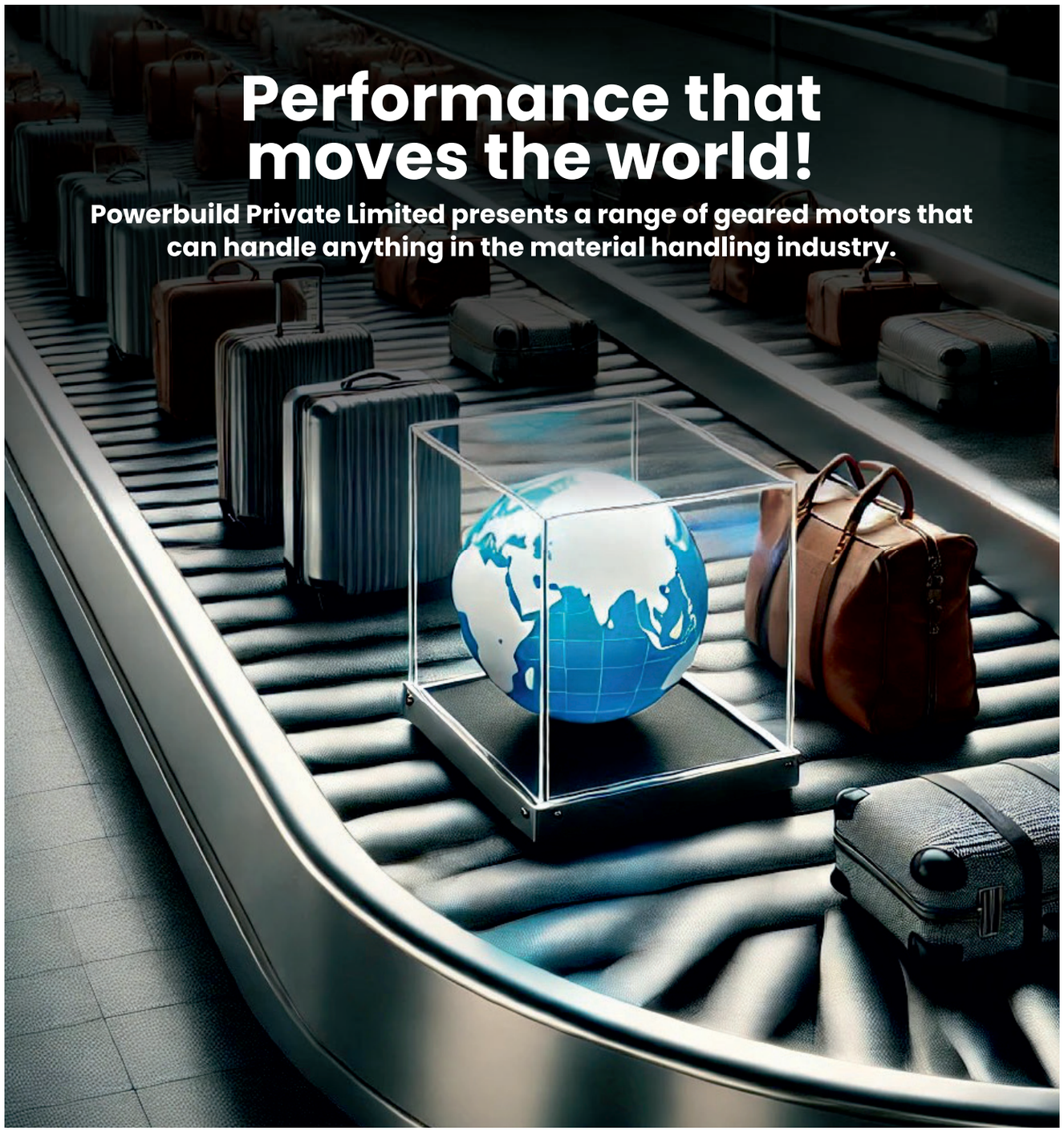

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Himadri Speciality Chemical secures ISCC PLUS Certification

Kolkata, West Bengal: Himadri Speciality Chemical Limited's flagship plant in Mahistikry, Haripal, Hooghly, India, has been awarded the prestigious ISCC PLUS (International Sustainability and Carbon Certification). This internationally recognized certification reinforces Himadri's leadership in embedding sustainability, transparency, and circular economy practices across its global value chain.

The ISCC PLUS standard is among the most rigorous global benchmarks for ecological and social responsibility. It ensures compliance with stringent criteria on greenhouse gas emission reduction, ecosystem protection, social accountability, and complete traceability of raw materials — positioning certified companies at the forefront of the circular economy transition across industries. Commenting on the milestone, Anurag Choudhary, CMD & CEO, Himadri Speciality Chemical Ltd, said, "As global industries shift towards sustainable value chains, Himadri is leading this transformation — delivering innovative and responsible solutions that create long-term value for society, the environment, and our stakeholders worldwide."

Sudarshan Chemical Industries achieves ISO 20400 certification for sustainable procurement

Pune, India: Sudarshan Chemical Industries Limited, a leading global manufacturer of pigments and color solutions, has been awarded the ISO 20400:2017 certification for sustainable procurement from Bureau Veritas Industrial Services (India) Private Limited.

The certification covers Sudarshan's procurement practices related to the manufacture and dispatch of organic pigments, inorganic pigments, phthalo blue and green pigments, effect pigments, cosmetic pigments, pigment preparations, high-performance pigments, solvent dyes intermediates and by-products.

ISO 20400 is an international standard developed by representatives from over 40 countries that provides guidance to organizations on incorporating sustainability into their purchasing strategy and procurement processes.

Mitsui Chemicals aims to become high-growth global specialty company

Tokyo, Japan: Mitsui Chemicals, Inc. has released its annual report *Mitsui Chemicals Report 2025*. The company produces this annual report each year as a communication tool to facilitate substantive dialogue with stakeholders including institutional investors.

Mitsui Chemicals Group aims to become a high-growth, high-profitability global specialty company in specialty

thyssenkrupp nucera appoints Kiran Joseph to head Indian office

The Management Board of thyssenkrupp nucera AG & Co. KGaA has appointed Kiran Joseph as the Chief Executive Officer of its India office in Mumbai, India. Kiran Joseph is currently the Chief Financial Officer of thyssenkrupp nucera India and Member of the Board, which has been operating since October 2023. In addition to his new role, he will continue to hold the office of Chief Financial Officer, until further notice. The appointment is effective October 1st 2025.

Kiran Joseph, shaped by his experience at thyssenkrupp Management Consulting, holds dual master's degrees in Technology Management (NIT Hamburg) and International Production Management (TU Hamburg), as well as a bachelor's in Mechanical Engineering (Anna University, Chennai).

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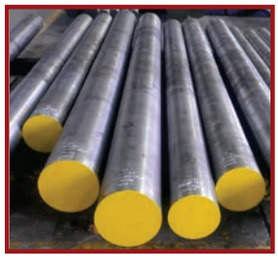

ROUND BAR

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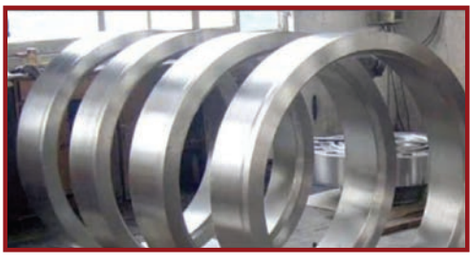
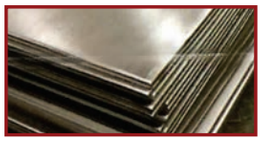


RING

FLANGES

NUT BOLT



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chemicals domains, while striving to establish its Basic & Green Materials (B&GM) business a strong basic and green materials company supporting Japanese industry. To achieve this vision, the Group accelerates business portfolio transformation with nothing off-limits, such as initiating a policy on the split-off of B&GM business.

The Report was prepared under the theme of "the strong will to achieve a global specialty company". It also provides an in-depth explanation of the path the Group is taking to improve its corporate value from the perspective of "integration of financial and non-financial performance."

Nobel Laureate Ben Feringa Honored with Evonik Friedrich Bergius Lecture Award

Essen, Germany: Dutch chemist Prof. Dr. Bernard Lucas Feringa, recipient of the 2016 Nobel Prize in Chemistry, has been awarded the prestigious Evonik Friedrich Bergius Lecture Award. Feringa, a professor at the University of Groningen, Netherlands, received the Nobel Prize in Chemistry in 2016 alongside Sir J. Fraser Stoddart and Jean-Pierre Sauvage. His research on the controlled movement of molecules has opened new avenues in nanotechnology and drug development. Feringa has also been a long-standing advocate for knowledge transfer between academia and industry – including collaborative projects with Evonik.

The Evonik Friedrich Bergius Lecture Award has been presented since 2014 to outstanding scientists whose research contributes to the advancement of chemistry. Named after Nobel laureate Friedrich Bergius, who worked for Th. Goldschmidt AG – a predecessor of Evonik – the award includes a lecture delivered at the Evonik meets Science forum. Christian Eilbracht, new Chief Innovation Officer at Evonik, said, "His work on molecular machines, asymmetric catalysis, and photopharmacology is not only scientifically ground-breaking but also highly relevant for sustainable industrial applications."

CO_2 as a raw material: New process makes climate gas usable for the chemical industry

Rostock/Bochum/Marl, Germany: Researchers from the Leibniz Institute for Catalysis (LIKAT), Ruhr University Bochum and Evonik Oxeno have developed a novel catalyst system that enables the use of the climate gas carbon dioxide (CO_2) as a raw material for the chemical industry. This breakthrough allows for the more sustainable production of key products such as fragrances and building blocks for plastics.

"Directly using CO_2 as a feedstock is a milestone for sustainable chemistry on an industrial scale," says Prof. Dr. Robert Franke, Project Leader at Evonik Oxeno. Carbonylation is a central process in chemical manufacturing, in which olefins - a group of hydrocarbons

Tuomas Mäkipeska appointed Chief Financial Officer of Kemira

Tuomas Mäkipeska has been appointed Chief Financial Officer and a member of Kemira's Group Leadership Team. He will start in his new role no later than in May 2026. He succeeds Kemira's current Chief Financial Officer Petri Castrén who will leave the company, as announced earlier.

He joins Kemira from YIT Oyj where he has served as Chief Financial Officer and Executive Vice President & Deputy to the CEO since 2021. Prior to YIT he spent nearly 10 years at Lassila and Tikanoja Oyj in various leadership roles, among them Chief Financial Officer and Interim President & CEO, and several years at Deloitte as a management consultant. He holds a masters degree from Helsinki School of Economics.

- are converted into esters or acids using carbon monoxide. These substances are essential components of many everyday products. The process yields both basic chemicals - such as methyl methacrylate, the precursor for acrylic glass - and specialty chemicals like the fragrance valeric acid methyl ester.

The newly developed bimetallic catalyst system replaces toxic carbon monoxide with climate-friendly carbon dioxide and green hydrogen. In the presence of the transition metals iridium and palladium, along with a proven industrial phosphine ligand, olefins are directly converted into esters. The system shows high selectivity for linear products, which are particularly valued in industrial applications.

"This catalyst system is a great example of how targeted research can contribute to the defossilization of the chemical industry. CO_2 is no longer seen as waste, but as a valuable resource," says Dr. Ralf Jackstell, Head of Research Group at LIKAT. ■

"The September 2025 issue was a great read."

Pratyasha Mohapatra,
Associate,
Adfactors PR

"The article [Going With (and Accurately Measuring) the Flow] and entire issue (September 2025) look great!

Darren Wight,
EVP of Client Success
DEANHOUSTON+

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Write in your valuable feedback about Chemical Engineering World to ***editorial@jasubhai.com***

Thank you so much for being a part of the Chemical Engineering World community!

ABB names Christian Nilsson as CFO

ABB has appointed Christian Nilsson as CFO and member of the Executive Committee effective February 1, 2026. He will succeed Timo Ihamuotila, who has decided to step down from the Executive Committee at the same time and leave ABB at the end of 2026 ensuring a smooth transition.

Christian Nilsson (50) joined ABB in 2017 as CFO of its Electrification business area, bringing with him a wealth of international finance leadership experience. Over the course of his career, he has lived and worked across the United States, Asia, and Europe. Prior to ABB, he held senior roles at DSM-Firmenich in Switzerland and TE Connectivity in China, where he served as CFO for their respective business areas. Earlier in his career, Christian spent over a decade at GE. Christian holds an MBA in International Finance from the European University Brussels and a Bachelor's degree in Accounting and Finance from Luther College, Iowa.

Paradeep Phosphates completes merger with Mangalore Chemicals & Fertilizers, strengthens national reach

Bengaluru, Karnataka: Paradeep Phosphates Limited (PPL) has merged with Mangalore Chemicals & Fertilizers Limited (MCFL), effective from 16 October, 2025. With this merger, PPL becomes one of the largest fertilizer producers in the private sector, as MCFL is now fully integrated into its operations, creating a unified company with a strong, consolidated national footprint.

The combined entity enhances PPL's manufacturing scale and market reach, increasing total fertilizer production capacity by over 23 per cent — from 3.0 million to 3.7 million metric tonnes per annum. The merger strengthens PPL's presence in southern India while complementing its established markets in the north, west, central, and eastern regions — further reinforcing its pan-India coverage. Together, the combined entity will benefit from a wider product portfolio and a more efficient supply chain. By pooling the assets and expertise of both companies, PPL can now offer a broader crop specific fertilizer mix, better inventory planning, and optimized distribution through an extensive network of dealers and partners.

Mr. Suresh Krishnan, Managing Director & CEO of Paradeep Phosphates, said, "This merger marks a significant milestone in PPL's growth journey. Together, we can operate at a larger scale and offer a stronger, more agile, and diverse product portfolio."

Tanfac Industries commissions 2nd phase of 5,000 TPA (AHF Basis) high purity solar grade DHF plant

Chennai, Tamil Nadu: Tanfac Industries Limited, one of India's leading players in fluorine chemicals, has successfully commissioned its second phase of 5,000 TPA (AHF Basis) solar grade dilute hydro fluoric acid plant post approval of the quality of the trial production batches after the product conformed to the stringent quality requirements of its customers. Tanfac had already commissioned the first phase of the project in June 2025 (5,000 TPA – AHF Basis), expanding the total solar grade DHF capacity to 10,000 TPA (AHF Basis). Speaking on the occasion, Afzal Malkani, Director, said, "The product from the new line conformed to the stringent quality requirements of its major and key Solar Energy producing customers. Tanfac is the first and only chemical company in India to achieve this. This is another milestone in the history of Tanfac and has the potential of increasing the top and bottom lines significantly."

Teadit opens new facility in India

Teadit team during the inauguration of its brand new facility in Vadodara, Gujarat.

Vadodara, Gujarat: Teadit has opened its brand new facility in Vadodara, Gujarat, India. To mark this milestone, Teadit's Annual Distributor Event, 'Our Partnership in Success', was held in celebration of the official launch. The two-day event brought together Teadit's key distributors, partners, and staff members, along with leadership from across the globe.

The Gala Dinner, the highlight of Day one, served as an ideal platform for the global leadership team, local staff, and distributors to connect. Day two featured several key presentations, including a Business Overview and a New Plant Overview, which was immediately followed by an exclusive first look at the facility.

Attendees then heard a global marketing update designed to further support Teadit distributors. The daytime sessions culminated in the official plant inauguration, celebrated with vibrant traditional Gujarati music and dance. The evening concluded with a memorable Awards Ceremony, where Teadit honoured distributors for their outstanding support and partnership.

Oil India Limited achieves mechanical completion of Numaligarh-Siliguri Product Pipeline

Noida, New Delhi: Oil India Limited (OIL) has achieved mechanical completion of one of its flagship infrastructure projects — Upgradation of Facilities of the Numaligarh-Siliguri Product Pipeline (NSPL). The project aims to enhance the transportation capacity of the existing pipeline from 1.72 Million Metric Tonnes Per Annum (MMTPA) to 5.5 MMTPA, thereby strengthening OIL's midstream infrastructure to handle increased product flows from the Numaligarh Refinery. This achievement underscores OIL's capability towards successful execution of the ongoing Numaligarh Refinery Expansion Project, which will increase refinery capacity from 3.0 MMTPA to 9.0 MMTPA. The NSPL upgradation project spans across Assam and West Bengal, comprising five pump stations and one receipt terminal. The completion of this critical milestone reaffirms OIL's unwavering commitment to enhancing energy infrastructure in the North-eastern region and contributing to the nation's growing demand for petroleum products.

Hindustan Zinc 2Q profit after taxes surges to ₹2,649 crore, up 19% QoQ

Mumbai, Maharashtra: Hindustan Zinc Limited, the world's largest integrated zinc producer, announced second quarter and half year ended September 30, 2025 results. 2Q Profit after taxes surged to ₹2,649 crore, up 19 percent QoQ, backed by highest-ever second quarter revenue and EBITDA. The highest-ever 2Q revenue of ₹ 8,549 crores during the quarter, up 10 percent QoQ was driven by higher commodity prices, stronger dollar, and higher by-product realisations, partly offset by lower production. Best-ever second quarter EBITDA of ₹4,467 crores, up 16 percent QoQ, driven by higher commodity prices, lower cost of production, higher by-product realisations, softened input commodity prices and stronger dollar was partly offset by lower production.

The company commissioned 160 Ktpa roaster at Debari, completed cell house debottlenecking at Dariba smelting complex. Completion of debottlenecking at Chanderiya Lead Zinc smelter is expected by 3QFY26. Together, they will increase the overall metal capacity by 21 Ktpa. The 510 Ktpa fertiliser plant is under progress and is expected to be completed by 1QFY27. The innovative hot acid leaching technology for recovery of lead and silver from smelting waste at Dariba is expected to be completed by 4QFY26. In June 2025, Board has approved plans for expanding the integrated refined metal capacity by 250 ktpa along with matching mines and mills capacity. Key EPC partners have been locked in, and completion is expected by 2QFY29. In August 2025, Board has approved India's first tailings reprocessing plant at Rampura Agucha with a feed capacity of 10 Mtpa and an investment of ₹ 3,823 crore with expected completion by 4QFY28.

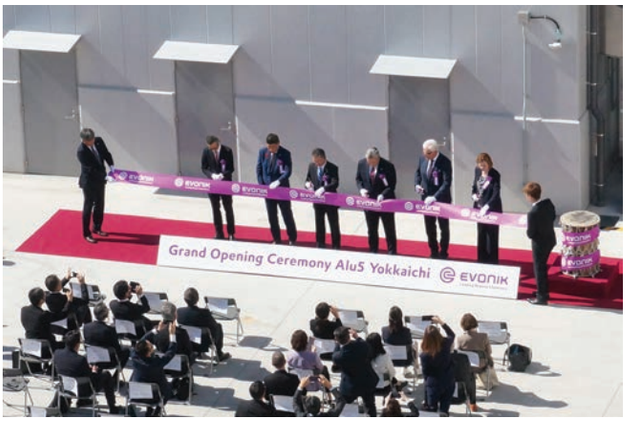
GPIL awards contract to John Cockerill India for cold rolling mill at Raipur

Godawari Power and Ispat Limited (GPIL), is setting up a 2 MTPA greenfield integrated steel plant, which will feature a state-of-the-art 6-Hi Reversible Cold Rolling Mill (CRM). GPIL has entrusted John Cockerill India Limited with the contract for the engineering, design, manufacture, and supply of this mill. The scope also includes supervision of erection and commissioning, ensuring full contractual performance guarantees.

The new Cold Rolling Mill (CRM) will have an annual capacity of 300,000 tonnes, capable of processing strip widths up to 1,500 mm and producing output thicknesses ranging from 2.0 mm down to 0.15 mm, at speeds of up to 1,400 mpm. This state-of-the-art mill will be equipped with the latest rolling technology and an advanced mill management system to ensure superior strip quality at optimized operating costs.

The project will be executed at John Cockerill India Limited's state-of-the-art manufacturing facility in Taloja near Mumbai.

Evonik strengthens Asian presence with new aluminum specialty plant in Japan



Inauguration of the first state-of-the-art fumed alumina production facility – Alu5 in Yokkaichi, Japan

Yokkaichi, Japan: Evonik has opened its first state-of-the-art fumed alumina production facility 'Alu5' in Yokkaichi, Japan, which marks a major step forward in the company's strategy to serve the Asian market with advanced aluminum oxide-based solutions. This mid-double-digit million Euro investment underscores Evonik's commitment to innovation, supply security, sustainability, and customer proximity in one of the world's most dynamic regions.

The new facility will manufacture AEROXIDE®, an advanced fumed aluminum oxide solution renowned for its exceptional properties for a variety of applications. AEROXIDE® is tailored for ultra-thin coating technology and does significantly enhance performance and durability for value chains ranging from electric mobility, consumer electronics to sustainable powder coatings. The product not only enhances efficiency and longevity, but also exemplifies sustainability by promoting durable and resource efficient solutions.

Equipped with the latest production technology, the Alu5 plant sets new standards for quality, efficiency, and environmental responsibility.

Evonik and Schneider Electric join forces to advance automation and efficiency in thermoplastic processing and recycling

Essen, Germany: Schneider Electric and Evonik have partnered to automate a thermoplastic processing plant at Evonik's Essen Goldschmidt site in Germany. The collaboration aims to enhance the efficiency of mechanical plastic recycling processes and improve the quality of recyclates, underscoring both companies' commitment to circular economy principles.

The first step of the new partnership is the digitization of an existing pilot plant at Evonik's Goldschmidt site. This facility will be equipped with an open automation approach, enabling the collection and contextualization of data from various machines into a central access point. This data-driven strategy aims to analyze performance, reduce or eliminate manual work, and streamline separate calculation steps.

The long-term objectives of the collaboration include leveraging laboratory experiences, improving the positioning of existing solutions supported by quantified data, decreasing time to market for new additive developments, and enhancing scalability from pilot plants to commercial units. The scope of this cooperation extends beyond plastic recycling; it encompasses the overall processing of plastics with a strong emphasis on circularity. ■

GUEST COLUMN

The Importance of Choosing the Right Technology Providers for Your Digital Transformation Journey in EPC

Ravikanth Dharmarajula
Principal Solution Consultant
Hexagon, Asset Lifecycle Intelligence Division

In today's era of digital transformation, Engineering Procurement and Construction (EPC) organizations rely on technology providers to drive innovation, improve efficiency, and maintain competitiveness. The best providers go beyond offering tools, they act as strategic partners, helping EPC companies implement cutting-edge solutions that align with project goals, timelines, and compliance requirements. Gaining a clear understanding of the core characteristics of technology providers is crucial. This article highlights those attributes within the EPC context, exploring the challenges contractors face when selecting technology partners and the criteria that should guide this decision-making process. **Ravikanth Dharmarajula, Principal Solution Consultant, Hexagon, Asset Lifecycle Intelligence Division,** further explains in detail this process.

"The next five years will be more disruptive than the last 15. This is NOT business as usual. A lot of technology that came in three years ago doesn't work anymore."

- Saul Berman, IBM

The process engineering sector is a prime illustration of how technology providers have improved customer workflows for increased efficiency and production. At first, engineers used labor-intensive, error-prone manual, paper-based drawings. These paper designs changed into digital versions with the introduction of CAD, which greatly increased speed and accuracy.

Transforming Engineering with Intelligent CAD Solutions

Data-driven solutions were the next big step, giving the drawings contextual intelligence to improve decision-making and system integration. Technology companies later introduced rule-based validation tools that could automatically verify the design integrity, consistency and compliance of drawings. Additionally, to lower manual labor, this development also decreased mistakes and rework, which accelerated project completion and increased overall productivity.

Enabling Seamless Digital Adoption

Technology providers offer the expertise and tools needed for a smooth digital transition. Whether it is cloud computing, AI integration or enterprise software solutions, their role is crucial in ensuring that EPC companies adopt new technologies. Additionally, the right technology provider not only provides solutions but also ensures that companies adopt to change effectively, ensuring that the intended value is realized while minimizing the short-term impact. For instance, an oil and gas company utilizing engineering and operations data for real-time insights can significantly enhance productivity, efficiency and safety — driving smarter decision-making and sustainable growth.

Providing Industry-Specific Solutions

Different industries have unique digital requirements, and technology providers tailor their solutions accordingly. In sectors such as oil and gas,

Why Choose Hexagon as Your Technology Partner?

- Hexagon's Vision: Enabling a Smart Digital Reality across EPC lifecycles from planning, design, procurement, and execution to operations, maintenance, and safety.
- Expertise & Innovation: Deep domain knowledge combined with cutting-edge technologies to keep you ahead of competitors.
- Long-Term Partnership: We align with your business goals and project challenges to deliver sustainable value.
- Scalable & Flexible Solutions: Our platforms grow with your business needs, ensuring seamless expansion across projects.
- Reliable Support: Continuous global software support ensures your systems remain optimized throughout project lifecycles.
- Continuous Improvement: Through our ideas portal, your feedback directly shapes product enhancements that drive EPC-specific business impact.

petrochemicals, pharmaceuticals, and mining and chemicals, providers offer specialized tools and regulatory-compliant technologies that help businesses navigate industry challenges while maintaining operational excellence.

As an example, to ensure compliance with industry-specific environmental and safety regulations—as well as international standards such as ISO, GDPR, HIPAA and OSHA—modern platforms are increasingly built on compliance-by-design principles. This approach facilitates technology partners to deliver solutions that not only enhance performance but also offer comfort to the end customers. Regulatory-compliant solutions are now central to enterprise digital transformation.

Driving Innovation and Competitive Advantage

Technology providers are constantly under pressure to innovate in the rapidly evolving digital ecosystem of today. Their objective? To assist customers in staying ahead of the curve and surpassing their rivals. However, what really is driving this unrelenting demand for innovation? Although there are numerous contributing variables, one in particular stands out: shorter project timelines.

Large-scale company projects are often complex and may take years to complete. But optimized schedules with confidence in meeting planned milestones without significant delays is a key goal in technology investments. In today's fast paced business world, fast delivery is expected, this is possible if companies choose right software technology providers.

Additionally, customer demands are constantly evolving, and technology providers rise to the challenge by continuously innovating. This relentless drive is why we are witnessing rapid breakthroughs in AI, automation, and big data analytics — reshaping how businesses operate and compete.

Choosing the right technology partner is often a complex decision, and many organizations struggle with it for several reasons. Common challenges include the absence of a well-defined long-term strategy, fear of being locked into a closed ecosystem and a lack of proper evaluation processes when assessing potential partners. To make a more informed decision, it is important to consider several key factors. These include learning from the success stories of peers, gaining a clear understanding of each partner's service and support methodologies and selecting a partner who aligns with your vision and is committed to growing with you.

Additionally, assessing the availability of skilled resources in the market for the chosen technology and evaluating the provider's reputation and credibility are both crucial steps in the selection process.

Final Thoughts

For EPC companies, the partnership with technology providers is not a transaction, it is a collaboration that drives digital success. By offering expert guidance, tailored EPC solutions, and continuous support, technology partners help contractors navigate the complexities of digital transformation. Digital transformation isn't optional anymore it is a matter of survival in an industry under pressure to deliver faster, safer, and more cost-efficient projects. To stay ahead, organizations must choose technology partners that align with their strategic vision. Consider providers based on their expertise, industry experience, scalability, and innovation track record. No one understands the challenges of EPC project execution better than you. Choosing the right technology partner ensures every step you take towards digital adoption builds a foundation for long-term, sustainable success.

Find out more about Hexagon and how we can support your EPC digital transformation journey: hxgn.biz/3JR33tV / www.hexagon.com ■

Artificial Intelligence in Engineering Procurement & Construction Phases

Artificial Intelligence (AI) integrates predictive analytics, machine learning, and process automation into Engineering Procurement & Construction (EPC) lifecycles. By embedding AI into planning, execution, and monitoring, EPC stakeholders — from asset owners to contractors — gain real-time insights and advantages such as enhanced decision-making with data-driven forecasting; reduced CAPEX/OPEX through optimized procurement and operations; and faster project execution with AI-enabled scheduling. **Rashid Hussain, Executive Director, 3C (Corporate Consulting Contracting),** explains in detail role of AI in EPC phases and emphasizes that AI must be viewed not as a cost but as a strategic investment that safeguards quality, reduces risk and ensures sustainability.

Artificial Intelligence (AI) has proven to be a transformative force across every stage of the EPC lifecycle — from the earliest phases of project development and engineering to procurement, construction, commissioning, and eventual handover to operations. Its integration strengthens decision-making, optimizes resources, enhances safety, and ensures transparency, offering significant value to owners, contractors, regulators, and end-users alike. While challenges such as high upfront costs, skills gaps, and data security must be addressed, these are outweighed by the potential for reduced project delays, improved quality assurance, and sustainable long-term asset performance.

1. Lifecycle of Quality Management

EPC quality management rests on four pillars: planning, monitoring, improvement, and control.

Advantages:

- Automated quality checks using computer vision.
- Predictive defect detection in components.
- Standardized documentation through AI-driven DMS.

Challenges:

- Variability in supplier quality data.
- Integration of AI tools with existing ERP systems.

Recommendations: Use AI for supplier audits, component life prediction, and automated compliance with Indian standards (MNRE, CEA).

Conclusion: AI-driven quality management ensures durability and reliability of assets, improving investor confidence.

2. Risk Management during EPC Phase

Risk spans financial, regulatory, technical, and environmental domains. AI provides proactive risk mapping.

Advantages:

- Real-time risk quantification with predictive analytics.
- AI-enabled FMEA scoring to prioritize risks.
- Simulation of regulatory or weather impacts.

Challenges:

- Difficulty in capturing low-probability but high-impact risks.
- Reliance on continuous data input.

Recommendations: Adopt AI-powered early warning systems, coupled with human oversight for residual risks.

Conclusion: AI transforms risk management from reactive to preventive, aligning with ISO 31000 principles.

3. Environment, Health & Safety (EH&S)

AI-driven safety monitoring strengthens EPC compliance with national EH&S guidelines.

Advantages:

- Drone-based environmental inspections.
- Wearable devices for worker health monitoring.
- AI video analytics for PPE compliance.

Challenges:

- Data privacy concerns for workforce monitoring.
- High cost of IoT and sensor integration.

Recommendations: Balance AI monitoring with workforce acceptance programs. Employ AI in predictive safety audits.

Conclusion: EH&S enhanced with AI minimizes accidents and environmental damage, boosting social license to operate.

4. Personnel Training

AI personalizes EPC workforce training through adaptive learning platforms.

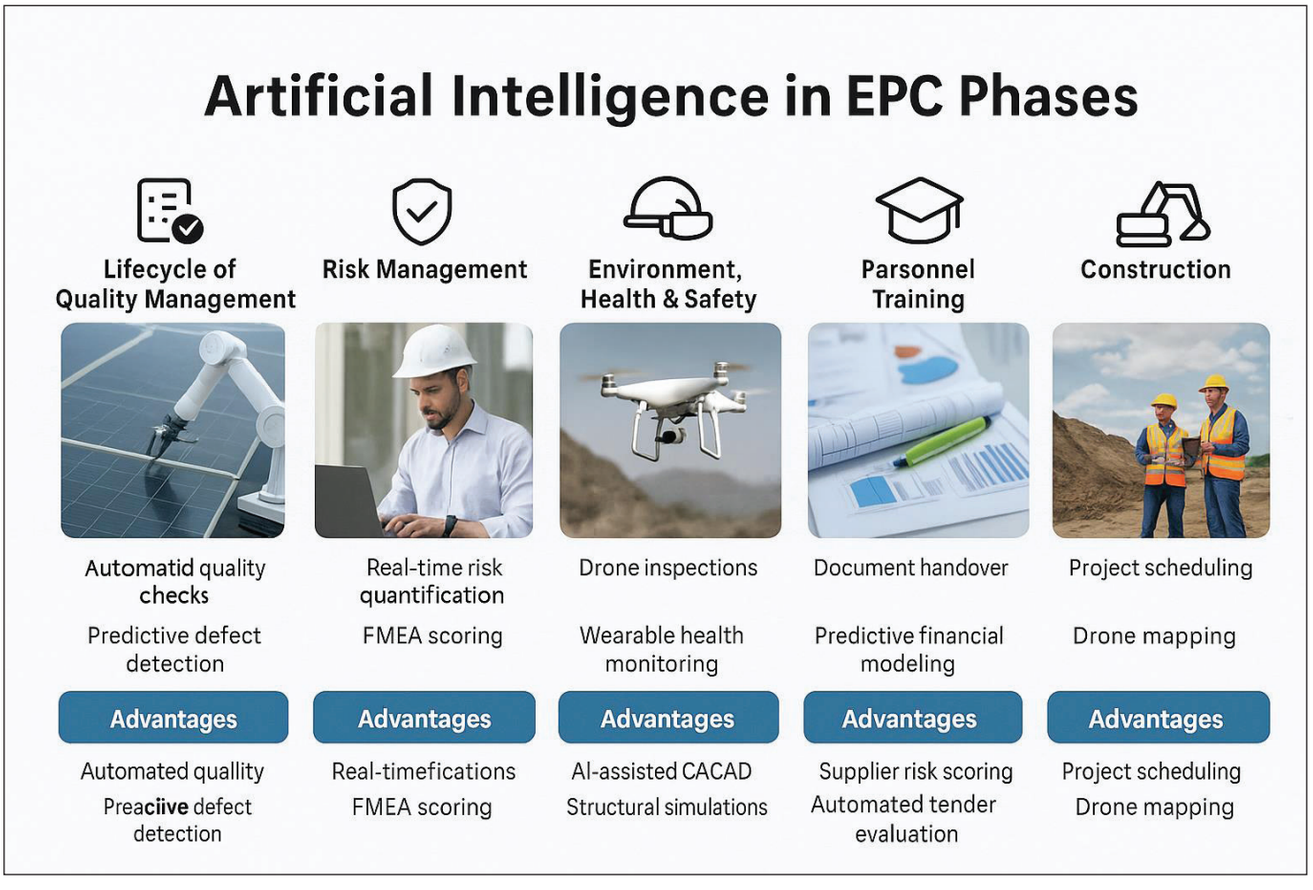
Advantages:

- Virtual simulations for construction safety drills.
- AI-driven skill gap analysis.
- Continuous learning via chatbots.

Challenges:

- Cultural resistance to AI-based training.
- Need for multi-language modules in India.

Recommendations: Combine AI e-learning with hands-on workshops to build hybrid training models.



Conclusion: AI ensures a competent EPC workforce, bridging technical and soft-skill gaps.

5. Transition from Project Development to EPC

Smooth transition avoids data loss between development and EPC phases.

Advantages:

- AI-driven document handover with smart tagging.
- Predictive financial modeling for EPC profitability.

Challenges:

- Misalignment of project developer vs EPC provider data standards.
- Contractual ambiguities.

Recommendations: Mandate AI-supported digital twins for project handover.

Conclusion: AI assures continuity, reducing disputes in EPC commencement.

6. Engineering

AI-driven engineering enhances design phases — basic to as-built.

Advantages:

- AI-assisted CAD design optimization.
- Structural simulations for mounting systems.
- Digital twin models for design validation.

Challenges:

- Dependence on large datasets for accuracy.
- Integration with legacy design software.

Recommendations: Employ AI in geotechnical analysis and system design to reduce future corrosion and failure risks.

Conclusion: AI makes engineering resilient and cost-efficient.

7. Procurement

Procurement quality is central to EPC outcomes.

Advantages:

- AI supplier risk scoring.
- Automated tender evaluation.
- Blockchain-AI integration for transparency.

Challenges:

- Supplier reluctance to share data.
- Potential bias in AI models.

Recommendations: Mandate AI for supplier qualification and predictive inventory management.

Conclusion: AI enhances procurement efficiency, ensuring timely and cost-effective component delivery.

8. Construction

The construction phase carries execution risks.

Advantages:

- AI-based project scheduling with weather forecasts.
- Robotics for repetitive site tasks.
- Drone mapping for progress validation.

Challenges:

- Initial capex for automation tools.
- Resistance from subcontractors.

Recommendations: Use an AI-powered site monitoring integrated with SCADA.

Conclusion: AI-enabled construction reduces delays and improves safety.

9. System Commissioning

Commissioning validates performance.

Advantages:

- AI automated performance ratio testing.
- Early fault detection through digital twins.

Challenges:

- Variability in test conditions.
- Dependence on robust sensors.

Recommendations: Adopt AI for predictive PAC/FAC validation and anomaly detection.

Conclusion: AI-driven commissioning builds investor trust by assuring compliance and reliability.

10. Handover & O&M Service Provider

Smooth handover ensures operational success.

Advantages:

- AI predictive maintenance scheduling.
- Automated punch list management.
- Centralized monitoring system integration.

Challenges:

- O&M providers' readiness for AI adoption.
- Cybersecurity risks.

Recommendations: Ensure AI-enabled SCADA and monitoring access for O&M providers at handover.

Conclusion: AI-driven O&M handovers increase plant life and reduce downtime.

11. Key Performance Indicators (KPIs)

KPIs measure deviations in time, cost, and quality.

Advantages:

- AI dashboards for real-time KPI tracking.
- Predictive KPI benchmarking.

Challenges:

- Over-reliance on AI-generated metrics.
- Need for human interpretation of insights.

Recommendations: Employ AI in continuous KPI review cycles.

Conclusion: AI ensures transparent, objective KPI measurement for EPC stakeholders.

12. Contractual Framework

Contracts govern risk, payments, and liabilities.

Advantages:

- AI-enabled contract analytics for risk allocation.
- Smart contracts (blockchain + AI) for automated compliance.

Challenges:

- Regulatory acceptance of AI contracts.
- Complexity in multi-party projects.

Recommendations: Adopt AI-powered contract review tools for dispute prevention.

Conclusion: AI ensures clarity and fairness in EPC contracts, reducing litigation risks.

For the EPC sector, the road forward lies in balancing human expertise with AI-enabled insights, creating a hybrid model that is not only technologically advanced but also inclusive and adaptable. By embracing this vision, EPC players can move beyond traditional reactive practices toward proactive, intelligent project execution that delivers on cost, quality, and sustainability, ultimately redefining industry standards for the future.

Importantly, AI should not be seen merely as a tool for automation but as a strategic enabler that embeds resilience, accountability, and foresight into complex infrastructure delivery. Organizations that adopt phased AI deployment — starting with high-impact areas such as procurement, risk management, and quality monitoring — position themselves for competitive advantage in an industry defined by tight margins and strict regulatory requirements. Moreover, the use of digital twins, predictive analytics, and smart contracts paves the way for greater collaboration and trust between stakeholders, reducing disputes and ensuring contractual clarity. ■

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HIPO-POTA-MUST: Indeed a Must for Advanced Chemical Recycling of Plastics!

Harini R
Scientific officer
Entity1 Value Emissions Pvt Ltd

Did you know - 91 per cent is the immense amount of all plastic ever produced that has ended up in landfills, incinerators, or littered in our environment. This isn't just a visual issue. Plastic production and disposal could use up to 13 per cent of our remaining carbon budget to keep global warming to 1.5°C by 2050. The question isn't if we need a solution. It is if we have one that truly works. Entity 1 Value Emissions Private Limited has developed Hyper Intense Performance Oriented Plastic and Olefin Transforming Application Reactor for Monomer Undoer and Stabilization Technology (HIPO-POTA-MUST), which acts as a complete solution for plastic recycling. **Harini R, Scientific Officer, Entity1 Value Emissions Pvt. Ltd,** throws more light on this new product.

Traditional recycling methods face a tough reality. Most recover only 50 to 70 per cent of materials. The materials that are recovered are often of lower quality. Pyrolysis and thermal cracking, while attractive, produce complicated mixtures of hydrocarbons that need costly upgrades. Incineration just burns away value and releases harmful emissions. This creates a linear economy masquerading as a circular one. We are not fixing the problem; we are simply managing the symptoms.

The licensed and proprietary technology of Entity 1 Value Emissions Private Limited, 'Hyper Intense Performance Oriented Plastic and Olefin Transforming Application Reactor for Monomer Undoer and Stabilization Technology - HIPO-POTA-MUST' represents a major change in chemical recycling. Instead of burning or melting plastic, this innovative depolymerization process chemically changes plastic waste back into its original building blocks, which are monomers like disodium terephthalate and ethylene

glycol. Think of it as 'un-making' plastic at the molecular level.

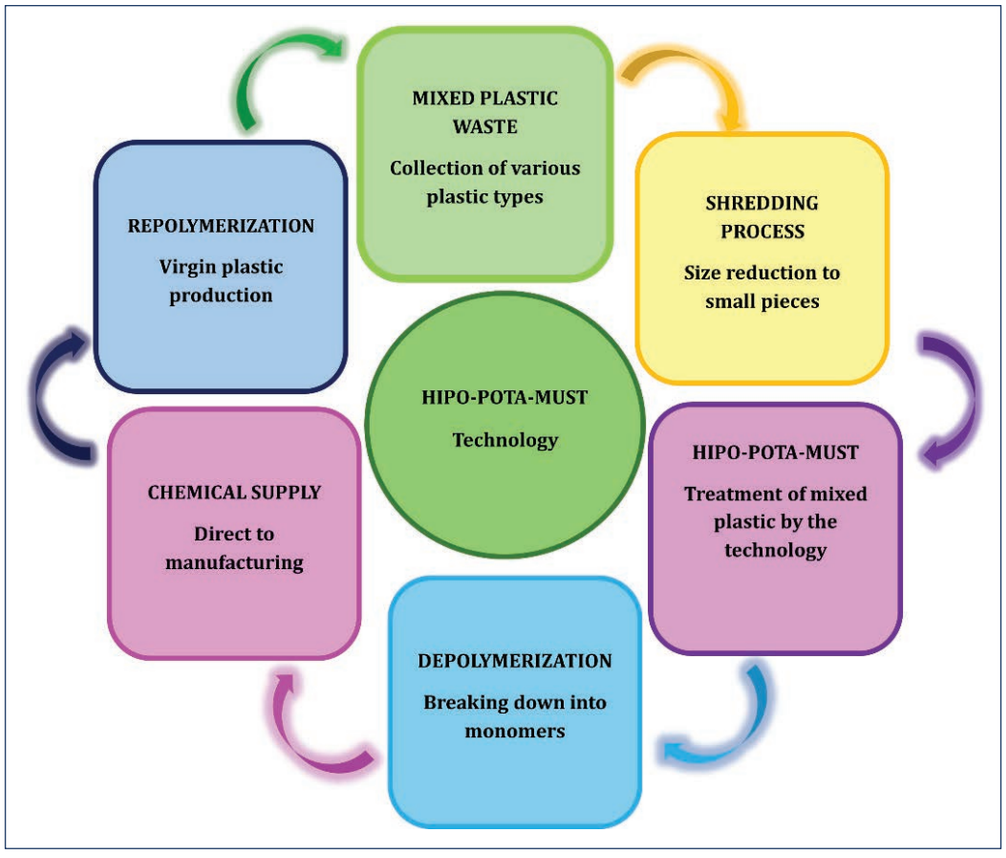
1. **True Material Recovery:** Unlike pyrolysis that produces crude oil-like mixtures, HIPO-POTA-MUST generates specific, high-purity monomers ready for repolymerization - creating virgin-quality plastic from waste.
2. **Real-World Ready:** While conventional depolymerization demands pristine, sorted feedstock, HIPO-POTA-MUST processes heterogeneous and pigmented plastic waste - the messy, mixed reality of actual waste streams - without extensive pre-treatment.
3. **Cleaner Operations:** By operating under controlled chemical conditions rather than extreme heat, the process suppresses hazardous by-product formation - no dioxins, no PAHs, no toxic emissions threatening community health.

This advanced reactor system efficiently breaks plastics down into their fundamental chemical building blocks, creating a portfolio of valuable products. From common Polyethylene Terephthalate (PET), it cleanly recovers the primary monomers disodium terephthalate and ethylene glycol. (This has been done at commercial level and reactors are placed with customers.

When processing complex, mixed, and dyed plastics, the technology unlocks a wider range of high-value chemicals, including:

- N-[4-[(4-cyano-3,7-dimethylpyrido[1,2-a] benzimidazol-1-yl)amino]phenyl]acetamide
- 4-Pentyn-2-ol
- TRIS(TERT-BUTYLDIMETHYLSILYLOXY) ARSANE (likely from dyes)

Method	Type	How it Works	Key Limitations	Value of HIPO-POTA-MUST from Entity 1 Value Emissions Pvt Ltd (The Solution)
Shredding & Melting	Mechanical Recycling	Plastic is shredded, melted, and remolded into new products.	Downcycles quality; only works with clean, sorted plastics; cannot remove colors/ contaminants.	**Produces virgin-quality plastic** from waste; handles mixed and coloured plastics without extensive pre-treatment.
Burning (Incineration)	Disposal	Waste is burned at high temperature, sometimes to generate energy.	Permanently destroys material value; releases toxic emissions and CO_2; no resource recovery.	**Recovers valuable raw materials** (monomers); operates with no toxic emissions, preventing air pollution.
Blending for Roads	Downcycling	Mixed plastic waste is melted and used as a binder in road construction	Traps plastic in a low-value product; the plastic cannot be recycled again; potential for environmental leaching.	**Creates a circular economy** by turning waste back into high-value chemicals for new plastic production, infinitely.
HIPO-POTA-MUST	Advanced Chemical Recycling	Chemically "un-makes" plastic waste back into its pure, original building blocks (monomers)	N/A - This is the solution.	**It is the complete solution:** It handles real-world waste, produces high-value output, and is clean and circular.



- Acetyl amino diethyl sulphonium hydroxide salt
- Styrene
- 1-methyl-2-nitroso benzene
- Benzoic acid
- Benzyl alcohol

This ability to extract a suite of premium, market-ready chemicals from mixed waste streams sets a new benchmark for value recovery. Efficiency is at the core of the technology. Depending on the volume and type of plastic, a complete conversion cycle takes a remarkably short 15 minutes. This rapid processing time makes it a practical and scalable solution for industrial deployment, moving far beyond the timelines of traditional methods.

With these reactors being commercially placed with key recyclers in India, the product is now a viable scaleable and commercial solution, with reactors from the size of 1 tpd to 500 tpd being commercially designed for sales in India.

In conclusion, HIPO-POTA-MUST technology offers a complete solution to the environmental, economic, and social issues in plastic waste management. It reduces climate impact, ensures effective emission control, and prevents environmental contamination while promoting responsible resource use.

Beyond environmental benefits, it builds strong revenue systems, allows to produce high-value materials, and boosts economic stability through the efficient reuse of waste. Most importantly, HIPO-POTA-MUST helps promote social equity by improving job safety and public health. This ultimately leads to a cleaner, safer, and more sustainable future. ■

GUEST COLUMN

Enabling Circular Economy through Chemical Innovation

Vishal Sharma
Executive Director & Chief Executive Officer
Godrej Industries Limited (Chemicals)

India's chemical industry is expanding quickly. Domestic consumption is rising, and exports are becoming more significant. With that growth comes a responsibility to adopt circular practices rather than repeat the mistakes of the linear model. The idea of a circular economy, where waste is treated as a resource and materials circulate rather than end up in landfills, is now more than an aspiration. In chemicals it is becoming a necessity. The country's biodiversity offers a wide range of raw materials for bio-based inputs. Its pool of engineers and scientists gives it the capability to develop and scale new technologies. **Vishal Sharma, ED & CEO, Godrej Industries Limited (Chemicals)**, throws more light on circular economy in chemical industry through chemical innovation.

Chemicals sit quietly behind practically everything we use. They keep clothes clean, make food packaging possible and drive advances in medicine and construction. For years, the sector worked to a simple model: dig up resources, manufacture what was needed and throw away the rest. It brought growth, but it also filled rivers, air and soil with by-products that were never designed to return safely to nature.

That linear approach is showing its limits. The idea of a circular economy, where waste is treated as a resource and materials circulate rather than end up in landfills, is now more than an aspiration. In chemicals it is becoming a necessity. New tools in biotechnology, green chemistry and process engineering are offering ways to cut waste at the source and design systems that give materials a second or third life.

India is central to this conversation. The country's chemical industry was valued at $220 billion in 2024, with projections to reach $300 billion by 2026.[1] This scale underlines both the challenge and the opportunity of embedding circular practices in one of the world's fastest-growing chemical hubs.

Biodegradable Surfactants: Lowering the Environmental Load

Take surfactants. They are the agents that help soaps and shampoos foam and detergents lift grease. They are also widely used in industrial cleaning. Their drawback is persistence. Conventional petrochemical surfactants can move through wastewater treatment systems unchanged and accumulate downstream.

Alternatives are beginning to emerge. Biodegradable surfactants, often produced from natural oils, sugars or through microbial fermentation, break down more readily. Sophorolipids and rhamnolipids are two well-studied examples that are already being tested in commercial formulations. They do the cleaning job but leave behind far less residue.

What holds them back is cost and scale. Yields from fermentation are still modest, and the steps needed to process these molecules remain expensive. Researchers are working on improving microbial strains, optimising fermentation cycles and simplifying downstream recovery. Progress here will decide whether biodegradable surfactants stay niche or move into the mainstream, where they could cut a large share of the environmental burden linked to daily-use products.

Circular Strategies in Chemical Manufacturing

Circularity is not only about end products. It has to be built into the way plants operate. Waste valorisation is one route. By-products that once went to disposal are being re-used as inputs. Glycerol from biodiesel production is being channelled into surfactants and solvents. Carbon dioxide, once treated only as an emission, is being captured and turned into polymers and specialty chemicals. Agricultural residues are supplying feedstocks for enzymes, plastics and personal care ingredients.

Processes themselves are also changing. Solvent-free synthesis and enzymatic catalysis reduce reliance on hazardous chemicals. Closed-loop water use helps cut both cost and environmental impact. Designing polymers so they can be more easily recycled at end of life is another step. These are not futuristic concepts; many are already being tested at pilot scale, and some are beginning to show up in commercial production.

Collaborations and Partnerships

No single company can manage this transition alone. The scale of the task is too wide and the expertise too varied. Partnerships with universities are driving work on biosurfactants and green solvents. Start-ups are contributing ideas in areas such as enzymatic recycling and carbon capture.

Cross-sector collaborations are becoming more common as well. Consumer goods companies are joining forces with chemical suppliers to create biodegradable ingredients that meet both safety and performance requirements. International platforms such as the Ellen MacArthur Foundation are providing spaces for regulators and industry to align standards and share knowledge.

In India, the Waste to Wealth Mission has been set up to encourage industrial symbiosis, where one sector's waste feeds into another's production system. This kind of approach is practical evidence that competitiveness and resource efficiency do not have to be at odds.

India's chemical industry is expanding quickly. Domestic consumption is rising, and exports are becoming more significant. With that growth comes a responsibility to adopt circular practices rather than repeat the mistakes of the linear model. The country's biodiversity offers a wide range of raw materials for bio-based inputs. Its pool of engineers and scientists gives it the capability to develop and scale new technologies

The Way Forward for India's Chemical Sector

India's chemical industry is expanding quickly. Domestic consumption is rising, and exports are becoming more significant. With that growth comes a responsibility to adopt circular practices rather than repeat the mistakes of the linear model. The country's biodiversity offers a wide range of raw materials for bio-based inputs. Its pool of engineers and scientists gives it the capability to develop and scale new technologies.

One area that needs urgent attention is research funding. The 2024–25 budget allocation for the Ministry of Science and Technology stands at ₹16,628 crore,[2] of which ₹8,029 crore is earmarked for the Department of Science and Technology. While this reflects the government's commitment, it also highlights the need for greater private sector participation. Without stronger industry investment, advances in biotechnology, green chemistry and waste valorisation may remain confined to labs rather than reaching industrial scale. Expanding R&D budgets across both public and private domains is essential if India is to turn the promise of a circular economy into practice.

There are clear goals set for the way forward. Fermentation and biotechnology can help reduce dependence on petrochemicals. Infrastructure for waste recovery, carbon capture and advanced recycling must also be built. Meeting international standards on biodegradability and safety will strengthen India's role in export markets where sustainability is already a baseline requirement.

And the investment case is strong. Between April 2000 and September 2024, FDI inflows[3] into India's chemicals sector (excluding fertilisers) reached ₹1,39,776 crore or about $22.8 billion. These numbers reflect both confidence in the industry's growth and the need to ensure it follows a sustainable path.

Consumer behaviour will play a role, too. Younger buyers are more aware of environmental issues and are more willing to try sustainable products. That domestic pull, combined with global demand for greener supply chains, positions Indian manufacturers to lead in this space.

Innovation Powering Regeneration

A circular economy is not a slogan. It is a redesign of how production works. For chemicals, it means moving from being a source of waste to being part of the solution. Biodegradable surfactants show one route forward. Waste valorisation and green chemistry show another. Collaborations prove that no single actor can carry the load on its own.

For India, the choice is clear. By embedding circular principles into research, manufacturing and partnerships, the chemical sector can set a benchmark for sustainable growth. The opportunity is not only to supply products that perform but also to create systems that regenerate. That is where growth and responsibility meet. ■

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How Specialty Chemicals are Transforming Global Supply Chains

Dr Amitt Nenwani
Managing Director
Shivtek Spechemi Industries Limited

Globally, the chemical industry, including specialty chemicals, has faced high volatility, regulatory strictures and environmental concerns. In recent months, the situation has been exacerbated by US tariffs, evolving carbon border norms and overcapacity pressure in Chinese supply chains. Considering this scenario specialty chemical companies in India have sought to review and revise their business models. By leveraging digital transformation and green chemistry opportunities, domestic firms are seeking to ride out the storm even as new trade partnerships such as the Free Trade Agreement between India and the UK, hold out hope for all stakeholders. **Dr. Amitt Nenwani, Managing Director, Shivtek Spechemi Industries Limited,** explains in detail this scenario.

As some readers may be aware, specialty chemicals refer to high-value, performance-linked chemicals meant for precise applications, not widespread use. Accordingly, specialty chemicals are customized to boost functionality, efficiency or performance of end products, unlike bulk chemicals that are manufactured in huge quantities through standardized compositions.

Industry Applications and Tariff Barriers

Specialty chemicals enjoy wide applications in agriculture, food, pharmaceuticals, cosmetics, construction and electronics. Some examples include lubricants, surfactants, adhesives and coatings. Such chemicals are critical for enhancing efficiency, spurring technological advancements and boosting product quality. Besides these advantages, the market has been recording rapid growth due to rising industrialisation,

a burgeoning manufacturing base and conducive government policies.

The Central Government's concerted drive to ensure an 'Atmanirbhar Bharat' or self-reliant India has seen a series of incentives to encourage domestic manufacturing. The Trump tariffs have only increased the government's resolve to promote self-reliance across industries. Reciprocal tariffs of 25 per cent by the Trump administration have hit multiple sectors, including the chemical segment comprising refrigerant gases, fluorochemicals and specialty chemicals.[1] These new duties are squeezing margins and hurting the nation's export competitiveness.

Decoding Supply Chains Hurdles and Allied Issues

Considering this scenario, specialty chemical companies in India have sought to review and revise their business models. By leveraging digital transformation and green chemistry opportunities, domestic firms are seeking to ride out the storm even as new trade partnerships, such as the FTA (free trade agreement) between India and the UK, hold out hope for all stakeholders. In 2025, the domestic specialty chemicals market is estimated to be $65.55 billion. By 2034, it is projected to reach $96.73 billion, recording a CAGR of 4.41 per cent between 2025 and 2034.[2]

Meanwhile, the unreliability of Chinese supply chains has nudged many countries to embrace a China+1 strategy to diversify the sourcing of materials. This has benefited India as it is deemed to be a more reliable supply partner. All these elements have contributed to the greater growth of specialty chemicals manufacturing in India. To capitalise on these opportunities, domestic firms are focusing on innovative high-performance chemicals while shifting towards sustainable solutions as per export market demand.

The unreliability of Chinese supply chains has nudged many countries to embrace a China+1 strategy to diversify the sourcing of materials. This has benefited India as it is deemed to be a more reliable supply partner. All these elements have contributed to the greater growth of specialty chemicals manufacturing in India. To capitalise on these opportunities, domestic firms are focusing on innovative high-performance chemicals while shifting towards sustainable solutions as per export market demand.

Until recently, most Indian specialty chemical exporters were primarily focused on the U.S. market. However, the imposition of new tariff measures prompted companies to diversify and explore alternative geographies. This diversification helped uncover strong, previously untapped demand from Latin American customers, opening new avenues for growth. What initially appeared to be a trade setback has, in fact, become a positive turning point that has broadened India's customer base and strengthened its global trade presence.

The Transition Towards Green Energy

Worldwide, as regulatory pressures rise to adopt sustainable solutions that heed environmental concerns, specialty chemical makers in the country are paying greater attention to sustainable operations and green chemistry. The emphasis on sustainability and green chemistry has influenced companies to invest greater resources and increase Research and Development (R&D) spending to ensure better product performance, along with innovative solutions. Consequently, bio-based feedstock, recycling of chemicals and eco-friendly manufacturing are gaining popularity to curb the industry's carbon trail. These efforts have led to the creation of eco-friendly crop protection solutions supported by sustainable practices. Apart from helping companies increase their competitiveness in global markets while meeting dynamic customer needs, these measures are helping the country meet its UN SDG (Sustainable Development Goal) targets.

The national and international transition towards renewable energy has also generated tailwinds for the industry. In the manufacturing and maintenance of solar panels, battery systems and wind turbines, varied specialty chemicals are needed because they enhance the durability and efficiencies of renewable energy applications. Specialty chemicals like base epoxy resins and allied ingredients are crucial for photovoltaic panels and wind turbine blades. Domestic production of specialty chemicals is accelerating the country's sustainability goals by reducing its dependence on overseas suppliers.

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Diverse Operational Challenges

However, adherence to environmental norms comes at a greater compliance cost as it inflates operating expenses while delaying the overall time taken to introduce specialty chemicals in the market. While the large companies manage to absorb these costs despite lower profit margins, smaller enterprises find it challenging to meet compliance requirements while maintaining their profitability. Given these issues, this is an aspect that the government should study so that the viability of smaller entities can be safeguarded.

Maintaining consistent quality of products across different production facilities and batches is another big operational hurdle that specialty chemical manufacturers face. A robust standardisation process could ensure sound quality management. But this can be extremely resource-heavy, especially when dealing with export clients who are the most demanding. In the case of crop protection chemicals, the variability of crops adds extra levels of complexity in the quality of raw materials and the manufacturing processes. In turn, this erodes customer confidence and operational efficiencies in global markets.

The other ongoing challenge is fluctuations in prices, leading to high raw material costs due to economic uncertainties and geopolitical flashpoints. Increased input costs raise the total production expenses and shrink the industry's profit margins. Global disruptions in supply chains and currency fluctuations only worsen the situation. Failure to procure raw materials at fixed or predetermined rates increases cost pressures and ultimately results in increased prices of finished products.

This is particularly true for nations like India that have faced higher tariffs from Trump, while countries such as Vietnam benefit from lower tariffs. The competitiveness of Indian companies is then affected badly both in the domestic and global markets. It is hoped that India signs FTAs with the EU and other friendly regions at the earliest to offset the impact of illogical US tariffs.

Why the Industry Outlook Remains Bright

Here, one must highlight the successful signing of a landmark FTA between India and the UK that removes 99 per cent of tariffs on Indian exports and 90 per cent on the latter's exports. One of the key beneficiaries in this case is the chemical industry. In 2024, India's chemical exports to the UK stood at $435 million, which is slated to reach $1 billion by 2027 because of the almost wholly duty-free access.[3] Raw materials such as aniline, iodine and specialty molecules sourced from the UK will be more affordable due to the tariff cuts.

This will boost quality, margins and industry innovation, benefitting customers and companies. Expanded exports and trade will then attract greater investments, generate more jobs and augment the country's manufacturing base. Going well beyond trade, the FTA will increase supply chain robustness while offering both India and the UK a mutually beneficial partnership that helps stabilise their economies in an uncertain global landscape.

Notwithstanding constraints and challenges, the industry's outlook is bright. Increasing domestic demand, conducive government policies, a greater focus on innovation and sustainability, alongside expanding export orders, are poised to ensure India's specialty chemicals industry emerges as a global manufacturing destination. Finally, going by the role that specialty chemicals play in enhancing the efficiency of various products in diverse domains, it will also help the government in realising its vision of *Viksit Bharat*@2047. ■

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Engineering a Complete Power Transmission Ecosystem: Power Build's Full Product Spectrum

Series M

Series C

Series F

Series K

Series PBWR

Loose Gear

Series A

Series PN

Series J

Power Build has engineered one of the most diverse and powerful portfolios in mechanical power transmission. Built on decades of precision engineering, reliability, and innovation, the company's comprehensive range of geared motors, gearboxes, pumps, and drive systems delivers tailored solutions to industries across the globe.

At the core of Power Build's offerings are the four flagship geared motor series:

Series M – Compact Helical Inline Geared Motors delivering up to 160kW and 20,000 Nm torque, ideal for high-efficiency, space-conscious applications.

Series C – Right-angled Heli-Worm Geared Motors, combining quiet operation and high torque up to 10,000 Nm, perfect for constrained environments.

Series F – Parallel Shaft Mounted Geared Motors with integral torque arms, widely used in material handling and steel industries.

Series K – Right-angle Helical Bevel Geared Motors offering up to 50,000 Nm torque, trusted in heavy-duty sectors like cement, power, and mining.

Complementing these are specialized series tailored for unique industrial requirements:

Series PBWR – A universal-mount Worm Gear Reducer crafted from aluminium and cast iron, ideal for compact drive solutions with gear ratios up to 100:1.

Series H – Hoist-duty geared motors supporting lifting capacities up to 12.5 tons, equipped with crane-specific features and brake options.

Series PN – PN Series is a compact yet powerful planetary gearbox solution offering 23 sizes and gear ratios from 3.6:1 to 2250:1. Available in inline and right-angle configurations, it features a wide range of input/output options and mounting styles. Designed for high torque, flexibility, and space efficiency, it's ideal for automation, material handling, and heavy-duty applications. The PN Series reflects PBL's commitment to engineering excellence, durability, and smart power transmission.

Series A – Compact, grease-filled geared motors with a small footprint, perfect for light industrial use and available across India through retail partners.

Series J – Shaft Mounted Speed Reducers featuring the user-friendly KIBO mounting system, favored in industries like ceramics, paper, and mining.

Further enhancing its product ecosystem, Power Build offers:

Loose Gears & Pinions – Manufactured up to DIN Class 6 precision and 1000 mm diameter, supporting customized solutions across sectors like defense, railways, and construction.

Roloid Gear Pumps – Rugged and reliable pumps built for lubrication, cooling, fuel, and viscous fluid transfer in complex industrial setups.

PBL VFD Solutions – Variable Frequency Drives (up to 400 kW) with built-in high-duty ratings, enabling precise speed, torque, and energy control across all motor products.

This cohesive and wide-ranging product suite positions Power Build not merely as a component supplier, but as a complete transmission partner delivering customized, high-performance solutions that keep industries in motion across the globe . ■

For more details, visit: http://www.powerbuild.in
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thyssenkrupp nucera: New BM and improved BiTAC generation offers Higher Performance with Easier Maintenance & Simpler Installation

thyssenkrupp nucera has recently launched the latest generation of its BM (bipolar membrane) technology and improved BiTAC (bipolar ion exchange membrane process electrolyzer) technology for safe and efficient chlor-alkali electrolysis.

Bipolar ion exchange membrane process electrolyzer

The latest-generation electrolyzers BM2.7 v7 and improved e-BiTAC v7 achieve power consumption of less than 1,960 kWh per ton of NaOH at 6 kA/m^2. With this leap in performance, BM2.7 v7 and e-BiTAC v7 set new standards in specific energy consumption and contribute to more climate-friendly chlor-alkali electrolysis. While BiTAC technology is a filter press concept, BM technology features a single-element design. With their different design concepts for efficient chlor-alkali electrolysis, different customer requirements can be met. This strategic advantage allows the worldwide leading supplier of efficient chlor-alkali technology to offer numerous additional performance improvements with its two chlor-alkali technologies BM2.7 v7 and e-BiTAC v7.

These benefits include, in particular, easier maintenance and installation, a membrane-friendly elastic cathode structure, and a wide range of coating and membrane options. As usual, both new electrolyzers are compatible with existing plants.

The newly developed tools and design solutions shorten electrolyzer assembly and service downtimes. These

Bipolar Membrane Electrolyzer

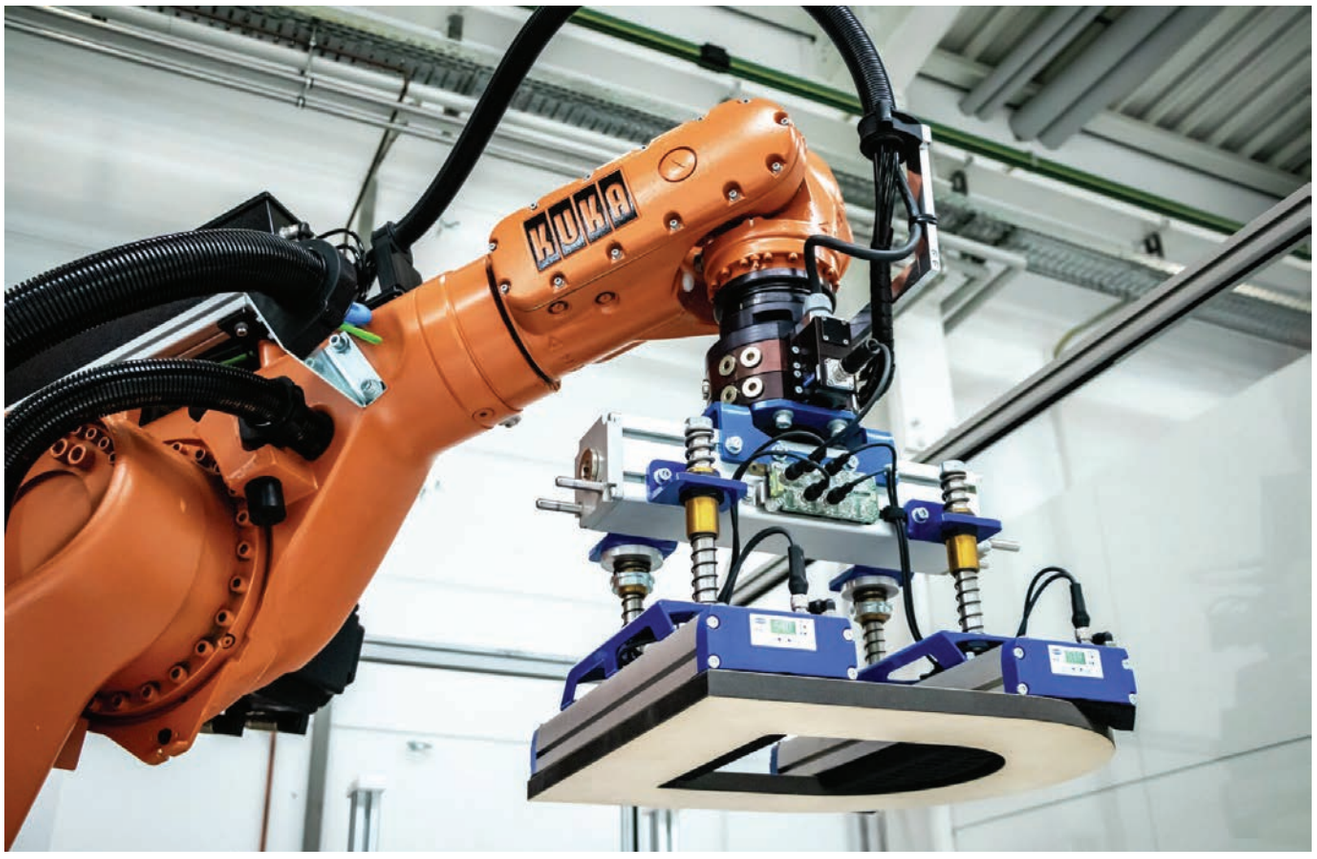
new developments include Resilient Elastic Element Structure (REES) technology, incorporated into the new BM2.7 v7 cathode design. REES enables quick cathode installation in existing systems and easier cathode replacement. New element holders for e-BiTAC v7 electrolyzers also significantly optimize maintenance and installation processes. Both technologies ultimately lead to greater efficiency and lower operating costs.

Since 1989, thyssenkrupp nucera has been continuously developing the BiTAC and BM series. This includes several generations of BiTAC and BM, which represents more than three decades of improvements and innovations.

"The numerous innovative features and improvements in our latest BM and BiTAC generations build on over 30 years of development are a direct response to our customers' needs. The new generations from thyssenkrupp nucera increase the efficiency and reliability of Chlor-Alkali electrolysis plants and offer our customers the best solutions for their electrolysis plants. Now with the BM2.7 v7 and e-BiTAC v7 we are setting another milestone in Chlor-Alkali technology," says Dr. Roland Beckmann, Executive Director Chlor-Alkali at thyssenkrupp nucera. ■

Schmalz Launches New Vacuum Area Gripping Systems FA-X / FA-M: Pack Flexibly, Save Efficiently

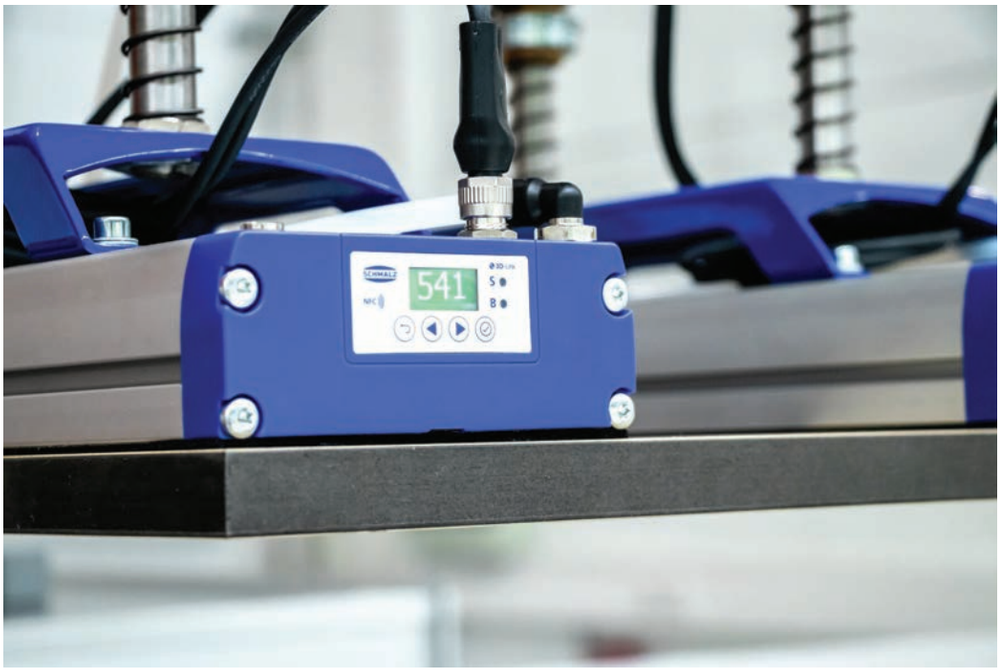
Schmalz is proud to announce the launch of its latest innovation in vacuum automation: the vacuum area gripping systems FA-X and FA-M. Designed to meet the growing demands of modern logistics, packaging, and wood processing industries, these new grippers offer unmatched flexibility, energy efficiency, and intelligent technology for handling diverse workpieces.



The vacuum area gripping systems FA-X / FA-M handle different workpieces precisely and very energy-efficiently.

Grip whatever comes your way: Different materials, changing workpieces and increasing cost pressure require systems that can adapt flexibly. With the vacuum area gripping systems FA-X / FA-M, launching two solutions that move parts of all kinds safely and save energy at the same time.

If you want to palletize, depalletize, pick or sort automatically, you need to handle different workpieces safely and efficiently. This is a real challenge in logistics, wood processing and packaging. With the vacuum area gripping systems FA-X and FA-M, Schmalz presents a solution that is both flexible and energy-efficient. Applications use them to move workpieces made of wood, sheet metal, glass and plastics. These can also be porous, flexible and irregularly shaped. Thanks to their low weight and minimal interfering contours, the end effectors are ideal for robot arms. The surface gripping



The optional LED display informs the user about energy and condition monitoring.

systems are optimized for sustainable processes and versatile material handling and offer maximum efficiency with minimum consumption.

Intelligent Technology for Sustainable Processes

The surface gripping systems have a vacuum booster that ensures very short cycles. The FA-X variant has an integrated vacuum generator, while the FA-M model is designed for external vacuum sources. They are available with either suction cups or a flexible sealing foam with adhesive film. Both area gripping systems offer variants for different requirements: from the basic version to the intelligent version with LED display, energy-saving function and integrated sensors. The smart version shows data on energy consumption and system status directly on the display, but also sends it to a smartphone via IO-Link or an app. This allows companies to keep an eye on their processes at all times and optimize maintenance intervals in a targeted manner.

Save Energy, Lower Costs

The energy-saving function reduces energy consumption by up to 80 percent because individual nozzle lines can be switched in a targeted manner. This not only reduces operating costs, but also saves resources. Downtimes cost money. That's why Schmalz focuses on simple maintenance: workers can replace the sealing foam in just a few minutes thanks to the quick-change adhesive film. The ejector is easily accessible. As an optional extra, an integrated sensor system in the sealing foam detects whether the workpiece has been gripped correctly - this increases process reliability and minimizes waste.

With the vacuum area gripping systems FA-X / FA-M, Schmalz offers a solution that automates processes, lowers operating costs and makes production fit for the future. Customers benefit from flexible, maintenance-friendly and intelligent technology that can be seamlessly integrated into existing systems. ■

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Precision Green Chemistry: Driving Down Solvent Footprints in Continuous Processes

Dr. Kamlesh Fondekar
Head - Research & Development
Astec LifeSciences

Precision green chemistry are processes that ensure carefully controlled solvent usage, removing incidental use out of the equation. With the help of continuous flow technologies, precision green chemistry integrates reactions, simplifies clean-up and embeds solvent recovery directly into the process. Green chemistry is often discussed in aspirational terms. Precision solvent management through continuous processes proves it is practical and measurable. **Dr. Kamlesh Fondekar, Head - Research & Development, Astec LifeSciences** throws more light on this process.

When we talk about chemical manufacturing, solvents are an integral part of the conversation by default. Solvents dissolve reagents, facilitate reactions, enable purification and also acts as a heat sink for exothermic reactions. But they are also responsible for fire and explosion hazards and create large volumes of waste, carrying risks for workers and the environment. This is why we have precision green chemistry. Precision green chemistry are processes that ensure carefully controlled solvent usage, removing incidental use out of the equation. With the help of continuous flow technologies, precision green chemistry integrates reactions, simplifies clean-up and embeds solvent recovery directly into the process.

Merging Multiple Reaction and Work-up Steps in One Uninterrupted Flow Train

Traditional batch chemistry often isolates intermediates after each reaction step. Typically, isolation requires filtration, washing with fresh solvent and drying. Each cycle consumes significant volumes of solvent, creating waste streams that must be treated or incinerated.

Continuous processes avoid this pattern. By linking reactions and work-up in one uninterrupted flow train, intermediates move directly to the next stage without isolation. This design eliminates entire washing cycles and the extra solvents they demand.

Published studies confirm the impact. The Royal Society of Chemistry highlights that continuous multistep synthesis[1] reduces solvent use and waste creation compared to equivalent batch operations. In one example, a three-step sequence was telescoped without solvent swaps, lowering waste and simplifying production. Less solvent use automatically implies lower disposal costs, shorter cycle times and leaner processes. For R&D, it also means designing sequences with efficiency at the centre.

Swapping Harsh Solvents for Milder, Recyclable Green Alternatives

Choice of solvent is another powerful lever to consider. Many industrial solvents create working hazards and complicate waste management. This is even more so with chlorinated or highly volatile solvents. Substituting with milder, recyclable green alternatives improves safety and cuts disposal needs. Reports suggest that solvent recovery can reclaim between 40 and 99 percent[2] of spent solvent depending on contamination and method. This indicates the opportunities available when solvent substitution and recovery are combined.

Having said that, swapping solvents does not mean compromising performance. For example, esters or alcohols often provide suitable polarity while being easier to recycle. In a continuous-flow study,[3] researchers demonstrated that coupling a nanofiltration unit directly to the reaction stream enabled solvent recovery efficiencies above 90 per cent. Cleaner solvents improve reaction control and deliver safer working environments. For operators, this means less exposure to toxic vapors and fewer hazards in handling.

From a safety perspective, inline recycling reduces the need to move large volumes of solvent to and from storage tanks or offsite recovery units. Each transfer step is a potential exposure risk. Minimizing these transfers heightens plant safety while shrinking solvent footprints.

Using Simple Equipment Tweaks to Recycle Solvents Inline

Continuous flow creates opportunities to recover and reuse solvent without large, external recovery units. Relatively modest equipment modifications can make a difference. Inline filters, small distillation loops or phase separators can clean used solvent on the fly. And then, the cleaned solvent flows back into the process.

This approach lowers both procurement and waste costs. Studies have shown that embedding separation and recovery modules directly into continuous processes reduces energy use and solvent demand compared to batch methods. These are not high-tech investments reserved for large companies. They are practical tweaks that many industrial plants can implement during process development or scale-up.

From a safety perspective, inline recycling reduces the need to move large volumes of solvent to and from storage tanks or offsite recovery units. Each transfer step is a potential exposure risk. Minimizing these transfers heightens plant safety while shrinking solvent footprints.

Combining Reaction and Cleanup Stages to Cut Wash Steps

Another precision strategy is designing flow trains that merge reaction and clean-up stages into one smooth sequence. A classic example is linking a reaction directly to neutralization and crystallization. In batch mode, these steps are usually separated, each requiring fresh solvent washes and intermediate isolation. In a continuous flow train, the product stream can move directly from reaction to purification without stopping.

This telescoping avoids repeated washing cycles. Research on continuous multistep synthesis shows[4] that integrating just two or three stages can eliminate hundreds of liters of solvent per batch equivalent. The savings are significant at scale. For a commercial product, even a 20 percent solvent reduction translates into thousands of liters conserved each year.

Designing telescoped trains requires careful control of conditions and compatibility between steps. However, advances in flow reactor technology, inline sensors and microreactors make it increasingly practical. Reviews of microreactor use show benefits in heat and mass transfer, rapid mixing and safe operation, all of which support integrated solvent-lean processes.

Measuring Progress and Creating Value

The value of solvent reduction is more than environmental. It improves cost margins, reduces regulatory burden, and strengthens resilience against volatile solvent prices. Measuring solvent use in terms of input per kilogram of product, recovery rate, purity after recycling and E-factor provides tangible metrics. Each improvement creates both environmental and financial value.

Green chemistry is often discussed in aspirational terms. Precision solvent management through continuous processes proves it is practical and measurable. By merging steps, choosing recyclable solvents, embedding recovery modules and telescoping reaction trains, R&D teams can design processes that are cleaner, safer and more competitive. The companies that embed solvent efficiency in process design today are most likely to lead in both sustainability and profitability tomorrow. ■

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BRB launches low carbon footprint viscosity modifiers

BRB Lube Oil Additives & Chemicals, a leading global supplier of lubricant oil additives and specialty chemicals, has launched the new Viscotech® LR series, a low carbon footprint viscosity modifier solution, dissolved in high quality re-refined base oils (RRBO), as alternative to virgin base oils.

Viscosity modifiers formulated using recycled base oils are ready for introduction into the value chain as high-value products, currently used in automotive and industrial lubricants. They are drop in alternatives for standard Viscotech, with the only difference being that they contain re-refined base oil, reducing the product carbon footprint by approximately 60 per cent cradle to gate, compared to using virgin base oil. Using re-refined raw materials support the shift from virgin fossil dependence towards a circular economy. ■

Lubrizol introduces HybriCal™ Lithium-Free Grease Thickener Technology

Lubrizol has launched HybriCal™ lithium-free grease thickener formulation designed to meet the performance needs of modern industrial applications. HybriCal™ formulation is based on anhydrous calcium and answers the demands of grease manufacturers and end users for a lithium hydroxide alternative. This innovative new solution meets the High-Performance Multiuse (HPM) Grease Specification from the National Lubricating Grease Institute (NLGI).

HybriCal™ benefits include lower processing temperatures and reduced dehydration time compared to lithium-based greases, enabling faster production and reduced energy consumption in manufacturing. Its versatility makes it suitable for a wide range of applications, including bearings, mining equipment and general manufacturing. The formulation also provides an alternative to the regulatory uncertainty and pricing volatility of the current lithium market. ■

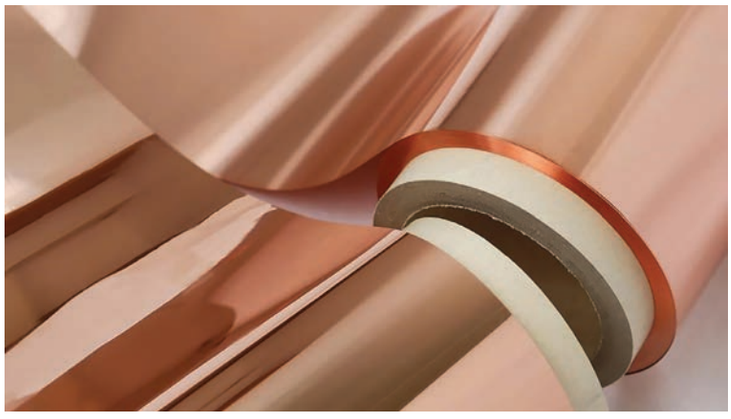
Canned Motor Pumps from Star Pump Alliance

Large quantities of wastewater and sour water (sulfur-containing wastewater) are generated daily in the chemical industry – particularly in processes such as crude oil processing, ammonia synthesis, or the production of intermediate products. These fluids often contain toxic, corrosive, or explosive components such as hydrogen sulfide (H_2S), ammonia, or organic residues. Safe and emission-free handling of these media is therefore not only required by law, but also essential from an economic and ecological perspective. Star Pump Alliance has launched Canned motor pumps, which are hermetically sealed and operate without dynamic seals, thus preventing leaks and emissions – a decisive advantage when pumping hazardous liquids. The HERMETIC V-Line is specifically designed for such applications: It combines a compact design, high chemical resistance, and ATEX certification with a standardized, cost-effective design. With its modular design, short delivery times, and high operational reliability, the V-Line is a future-proof solution for the growing demands of industrial wastewater management. ■

Evonik launches Noblyst® F catalysts for flow applications

Evonik, a leader in innovative catalyst solutions, has launched the new Noblyst® F catalyst portfolio, specifically designed for flow applications. This cutting-edge range is set to revolutionize processes and deliver superior performance for customers. The Noblyst® F series features commercially available precious metal catalysts based on carbon granules, offered in two distinct particle sizes. Customers can request these grades individually or opt for a dedicated sample kit, which is now readily available. To assist in selecting the best option for specific catalytic reactions, an application table is also provided. In addition to the current offerings, Evonik is actively exploring options that include various support material types, sizes, and shapes. "We are excited to bring the Noblyst® F series to our customers," said Max Preisenberger, Head of Catalysts at Evonik. "We see that more companies in pharma and fine chemicals are moving toward continuous processing." ■

Chemetall brings in chromium- and fluoride-free Gardolene® D passivation solution



Chemetall, the global surface treatment business unit of BASF Coatings and a leading provider of innovative surface treatment solutions, has introduced the first chromium-free and fluoride-free passivation technology for copper foils, Gardolene D. This pioneering solution offers superior corrosion protection as well as improved performance of copper foils used in electric vehicle battery packs, energy generation and storage systems.

The new Chemetall Gardolene D passivation solution for copper foils enhances battery performance, is more sustainable, and is fully compliant with the European Union's new Battery Regulation (EU 2023/1542), which mandates carbon footprint declarations, digital battery passports, and strict limits on hazardous substances. From 2027, only batteries meeting these standards will be allowed on the European market, driving the need for green manufacturing and chromium-free pretreatment technologies.

Gardolene D directly enables superior battery performance in the end product. A key feature of the new Gardolene D for copper foils is the improvement of surface energy, which enables better adhesion of anode active materials and reduces electrical resistivity, which results in higher battery efficiency. Intensive analyses and tests have proven that batteries treated with Gardolene D benefit from extended lifespans and improved capacity retention, extending lifetime by up to 6 percent after 1,000 cycles at 25 degrees Celsius. ■

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