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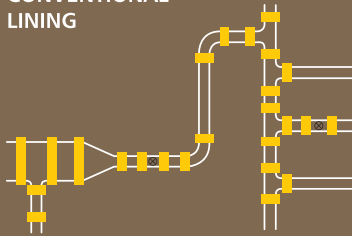
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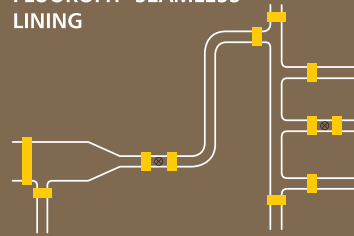
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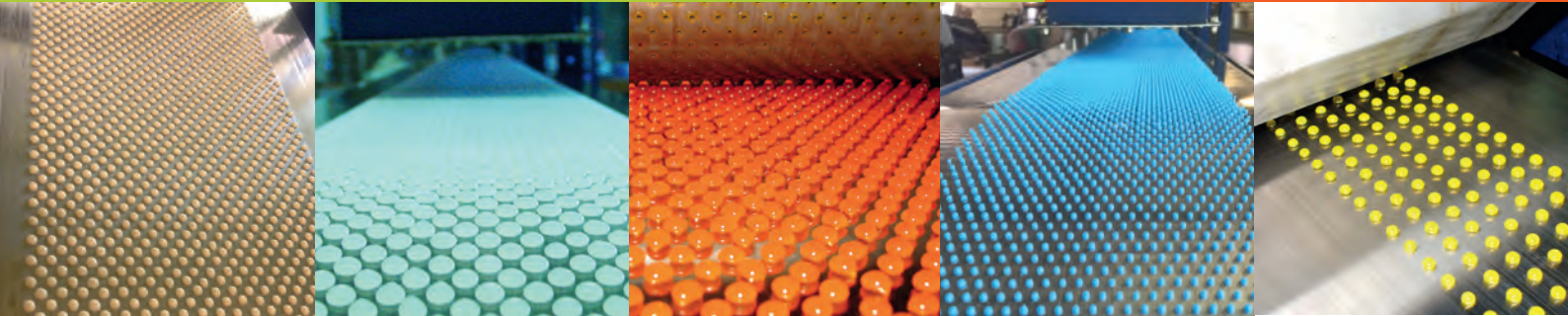
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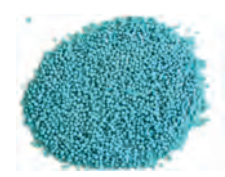
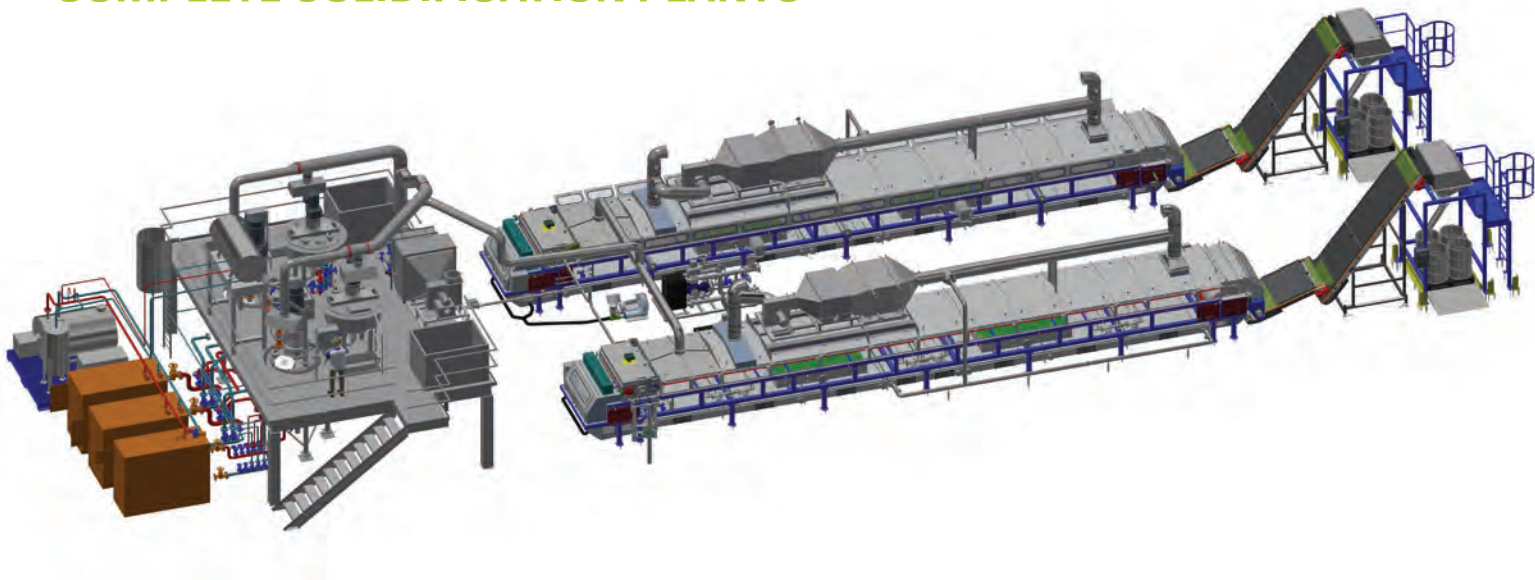
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- Plant Machinery & Industrial Consumables
- Engineering Consultants
- OEMs for Chemicals & Pharmaceutical Processing Equipment
- Metals & Metallurgy
- Bioprocessing Equipment
- Construction Services Providers
- Plant Maintenance Services Providers
- 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 2022

- 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 2022

- 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

FACTS & FIGURES - CHEMTECH WORLD EXPO 2019

612 EXHIBITORS	18962 VISITORS	18 COUNTRIES	85 SPEAKERS	923 DELEGATES	2150 STUDENTS
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Dr SSV Ramakumar gets Extension as Director (R&D) on IndianOil Board



Dr SSV Director (R&D), IndianOil

New Delhi, India: The Appointments Committee of Cabinet (ACC) has approved the extension of Dr SSV Ramakumar as Director (Research & Development), IndianOil Corporation w.e.f 01.02.2022 till 31.07.2023 i.e. the date of his superannuation. He had joined the IndianOil Board as Director (R&D) on 1st February 2017.

A distinguished alumnus of IIT-Roorkee, Dr Ramakumar has more than three decades of rich and versatile experience in research, development & deployment in the downstream hydrocarbons sector, notably in the areas of lubricant technology, refinery process research streams, catalyst development and nanotechnology. As a champion of alternate energy technologies, Dr Ramakumar is stewarding IndianOil R&D's journey as one of the coveted research institutes in the country pioneering the development of new and innovative

technologies. Currently, he is helming an ambitious project of constructing the world's largest renewable energy research centre of IndianOil with net-zero power and water credentials.

With his experience and stature, Dr Ramakumar is regarded as a leading voice in the industry on matters spanning the entire energy portfolio. He has been co-opted by the Government of India several times to lead or be part of key policy committees to draw the roadmap for India's smooth transition to a non-fossilized economy in the years to come.

DS Nanaware takes over as Director (Pipelines), IndianOil



DS Nanaware, Director (Pipelines), Indian Oil Corporation Limited

New Delhi, India: DS Nanaware has taken charge as Director (Pipelines), Indian Oil Corporation Limited, one of India's largest

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commercial enterprises and among the leading Indian companies in the Fortune Global 500 listings.

D S Nanaware, Director (Pipelines) of IndianOil, is a Mechanical engineering graduate from Walchand College of Engineering, Sangli under Shivaji University, Kolhapur with a rich and varied experience of over 36 years. He is also the Chairman of IHB Ltd. a JV of IndianOil, HPCL and BPCL which is building the world's longest LPG pipeline from Kandla to Gorakhpur. Before he assumed the office of Director (Pipelines), he was Executive Director (Projects) at the Pipelines Division Head Office. Earlier, as the head of Southern Region Pipelines (SRPL), he was instrumental in starting the prestigious Ennore-Tuticorin Gas Pipeline Project and successfully commissioning its Ennore-Manali and Ramanathapuram-Tuticorin sections.

Cairn Oil & Gas wins Sustainability 4.0 Award 2021 by Frost & Sullivan and TERI

New Delhi, India: Cairn Oil & Gas, India's largest private oil and gas exploration company, has won the 'Leaders Award' at the Sustainability 4.0 Award 2021, jointly convened by Frost & Sullivan and The Energy & Research Institute (TERI). Cairn has also emerged as 'Sustainability Front Runners Companies' under the 'Mega large business' category, scoring 947 out of 1200. The award was acknowledged by Prachur Sah, CEO, Cairn Oil & Gas, during a live virtual award ceremony.



Prachur Sah, CEO, Cairn Oil & Gas

These awards are the 12th edition of the prestigious legacy organised by Frost & Sullivan, which has over 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from more than 40 offices on six continents, and TERI.

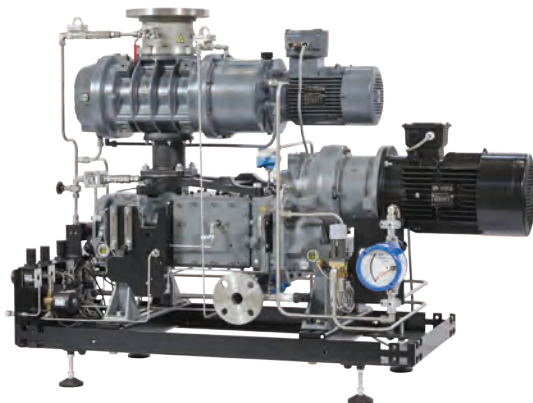
Receiving the award, Prachur Sah, CEO, Cairn Oil & Gas said, "We stand by our commitments towards ESG goals, and this award further confirms our tireless efforts in this direction. We are glad to receive this recognition from Frost & Sullivan and TERI. The Sustainability 4.0 Award is a testament to the positive transformation at Cairn's areas of operations by intertwining the 4 Ps: Purpose, Partnership, Planet, and People. This award will further motivate us to drive our vision of ensuring holistic socioeconomic development while achieving our goal of ensuring energy Aatmanirbharta for India."

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Reliance Industries Signs Mou for Investment of Rs 5.95 Lakh Crore in Green Energy



(L to R) RIL group president Parimal Nathwani, Gujarat chief minister Bhupendra Patel, Additional Chief Secretary to industries department Rajiv Kumar Gupta and Chief Principal Secretary to CM K Kailashnathan

16 Ahmedabad, India: Reliance Industries Limited (RIL) signed MoU with the Government of Gujarat for a total investment of Rs 5.955 lakh crore as part of Investment Promotion Activity for Vibrant Gujarat Summit 2022. These projects will create 10 lakh direct / indirect employment opportunities in the State.

To make Gujarat net zero and carbon free, RIL proposes to invest Rs 5 lakh crore in the State over the span of 10 to 15 years to set up 100 GW Renewable Energy Power Plant and Green Hydrogen Eco-System development. RIL will develop an eco-system for assisting Small and Medium Enterprises (SMEs) and encourage entrepreneurs to embrace new technologies and innovations leading to captive use of Renewable Energy and Green Hydrogen.

Engineering Plastics Expands its Production Capacity at Greater Noida Plant of Covestro

New Delhi, India: Covestro recently inaugurated its new production lines for polycarbonate compounding at their Greater Noida Plant in India. Through its advanced capabilities, the company offers one of the broadest product portfolios and industry-leading solutions to enhance their customer service. To meet the demands and to support the 'Make in India' movement, Covestro planned this expansion in India. This high-tech plant was recently put into operation.

The plant has undergone several de-bottlenecking exercises in the past and as of 2017 it was able to support about 50% of the domestic requirements, while the remaining

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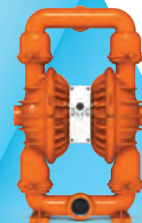
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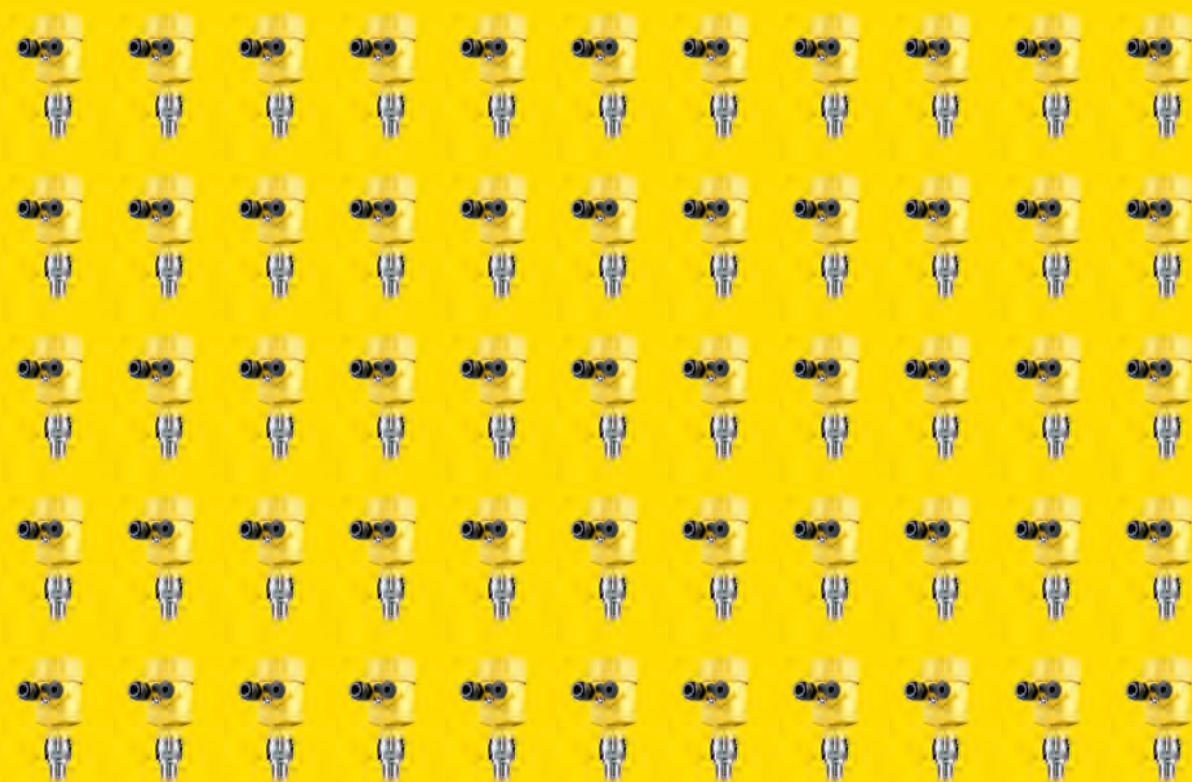
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OPERATIONAL HIGHLIGHTS are Overall plant utilization is at 86% for 9MFY22 which is up by 8% on YoY basis, H₂O₂ production capacity increased by 190% for 9MFY22 on YoY, plant capacity ramped up to 76% , In Q3FY22, Caustic Soda ECU realisation up by 145% YoY; Caustic Potash up by 60% on a YoY basis, In Q3FY22, CMS sales realisation up by 106% on YoY basis; Hydrogen Peroxide up by 25% on YoY basis.

9MFY22 FINANCIAL HIGHLIGHTS Revenue up by 85% to ₹ 1052 Cr on YoY, backed by increase in volume, higher utilization and higher realisation for all the products, EBITDA increased by 85% to ₹ 334 Cr on YoY; margins maintained at 32% despite surge in raw material prices, ROCE improved to 26% as on 9MFY22 due to higher profitability backed by improved realization in all products and contribution from new capacities of Hydrogen Peroxide and Caustic Soda.

Commenting on the results Maulik Patel, Chairman and Managing Director, MFL said,"We are glad to report a good performance during the quarter. We have achieved the highest ever topline for 9 months of ₹ 1,052 Cr. The commissioning and optimal utilisation of CMS & H₂O₂ drove our revenue & profit growth. The investments undertaken in the last couple of years for diversification of products continue to drive growth and increase our competitiveness."

Dow India recognized as a Gold Employer in IWEI 2021 Report



Chandrakant Nayak, President & CEO, Dow India

Mumbai, India: Dow Chemical International Pvt Ltd. (Dow India) is the recipient of the Gold Employer status in the India Workplace Equality Index (IWEI) 2021 Report for successfully embedding LGBT+ inclusion in its policies, hiring practices, and external communication, thereby demonstrating a long-term and in-depth commitment towards LGBT+ inclusion. Out of 72 organizations registered to participate, 26 organizations were handpicked to be the Top Gold Award recipients. Dow India was also recognized for its community engagement with Humsafar Trust as a creative and inspirational approach in supporting the LGBTQ community.

IWEI, India's only comprehensive benchmarking tool for organizations to measure their progress on LGBT+ inclusion

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in the Indian context, was brought to India by Keshav Suri Foundation and Stonewall, and follows in the footsteps of Stonewall's UK WEI. Employers have used this benchmarking tool over the last 15 years to assess their achievements and progress on LGBT+ workplace equality in the UK. Keshav Suri Foundation, Pride Circle, and Stonewall have been working closely over the last year to adopt the UK WEI and bring it to life in the Indian context.

Commenting on the occasion, CEO and Country President. Chandrakant Nayak iterated, "At Dow India, we look at diversity and inclusion as must-have business imperatives. It goes beyond a ten-pointer mandate and finite list of boxes to check – it is embedded and entrenched in the way we do business. We recognize that a diverse and inclusive workplace is happier, brings new ideas and innovations, grows faster, and performs better – which is why we are governed by a structure that demands top-down commitment to the cause."

Aramco Signs 10 Agreements during Saudi-Korean Investment Forum

Dhahran, Saudi Arabia: The Saudi Arabian Oil Company announced the signing of one agreement and nine Memoranda of Understanding (MoUs) with leading Korean entities, which aim to advance its downstream strategy and support development of low-carbon energy solutions, while creating new financing options for the Company.

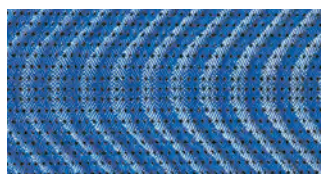
The signings took place at the Saudi-Korean Investment Forum in Riyadh, an event hosted by Saudi Arabia's Ministry of Investment which was also attended by the President of the Republic of Korea, H.E. Moon Jae-in, Aramco President & CEO Amin H. Nasser, and senior corporate executives from both countries.

Aramco signed an agreement with Korea's Doosan Heavy Industries & Construction Company and the Saudi Arabian Industrial Investments Company, Dussur. This partnership aims to establish a casting and forging facility that could supply the Kingdom's manufacturers with industrial and process equipment such as valves, pumps, compressors, wellheads, flanges, heat exchangers, and gas and wind turbines, with the objective to enhance local content. The planned joint venture has a production target of 60,000 tons per year, primarily from sand-casting and open-die forging processes, complemented by machining capabilities. It also has potential to supply original equipment manufacturers (OEMs) in the rig, drilling, maritime and engine fields, with the possibility of expanding to the wider GCC market.

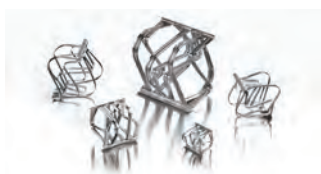
Amin H. Nasser, Aramco President and CEO, said: "Our partnership with Korean companies spans decades and now we are pleased to broaden these ties in technology, manufacturing and finance."

Aramco is also expanding its global downstream presence with investments in Poland's refining, wholesale, and jet fuel

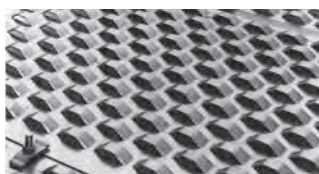
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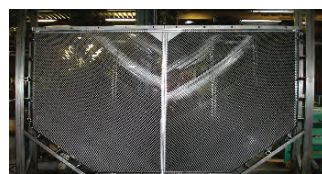
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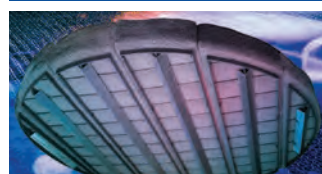
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marketing segments. The Company has agreed to acquire equity stakes of 30% in a 210,000 barrels per day refinery in Gdansk; 100% in an associated wholesale business; and 50% in a jet fuel marketing joint venture with BP. The acquisitions will be made from Polish refiner and fuel retailer PKN Orlen following its proposed merger with Grupa Lotos.

Aramco and the China Building Materials Academy (CBMA) announced the launch of NEXCEL, a new Nonmetallic Excellence and Innovation Center to further advance the use of nonmetallic materials in the building and construction sector. The center that was launched in Beijing will leverage CBMA's expertise and resources to promote the development and application of nonmetallic technologies that offer superior lifecycle cost, efficiency and environmental advantages over their metal alternatives.

Ingenza Collaborates with Johnson Matthey for Efficient Industrial Enzyme Synthesis



Roslin, United Kingdom: Biotechnology company Ingenza is excited to report the successful conclusion to its recent six-month project with Johnson Matthey, a speciality chemicals and sustainable technologies supplier. Together, the companies have developed new, efficient approaches for the production of industrially-relevant enzymes – including cytochrome P450 – through judicious selection of suitable microbial hosts.

Ingenza combined its comprehensive panel of microbial hosts, including *Pichia pastoris*,

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Saccharomyces cerevisiae, *Escherichia coli* and *Bacillus subtilis* with its visABLE® platform, and a proprietary predictive codon modification algorithm to select favourable genetic elements and significantly increase expression of the candidate enzymes. This approach was combined with automated high throughput screening of thousands of colonies performed at the Edinburgh Genome Foundry, using highly sensitive functional enzyme assays designed by Ingenza to rapidly identify the optimally performing clones with the highest level of enzyme secretion and activity towards different substrates.

Aspen Technology Awarded Digital Technology Provider of the Year 2021

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Mumbai, India: Aspen Technology, a global leader in asset optimization software, has received the prestigious Federation of Indian Petroleum Industry (FIPI) 2021 Digital Technology Provider of the Year Award, which recognizes companies for implementing the most cutting-edge digital technologies

in the industry. Launched in 2007, FIPI Oil and Gas Awards were created to recognize leaders, innovators, and pioneers, in the oil and gas industry. An industry interface with government and regulatory authorities, members of FIPI includes all major companies operating in the oil and gas sector in India.

A landmark Bharat Petroleum Corporation Limited (BPCL) customer case study anchored this win by showcasing how the Mumbai Refinery adopted a real-time digital twin, based on the use of AspenTech's digital twin and Advanced Process Control (APC) products. The digital twin has been implemented online and integrated with an associated advanced process control (APC) solution, such that the optimization engineer uses the digital twin on an hourly basis to inform the adjusting of the APC levers for optimum steam use efficiency and amine utilization effectiveness.





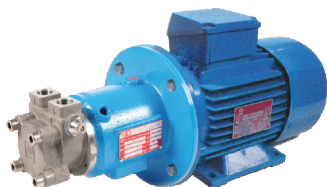
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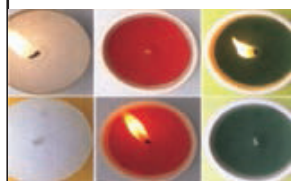
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Clariant Oil Services Brings Chemical Expertise and Global Manufacturing Resources to Angola

Houston, United States of America: Clariant, a world leader in specialty chemicals, has expanded its commitment to Africa with two recent sites in Angola. The company has a 20-year record of supplying local customers, and the two recently opened facilities in Soyo and Viana bring a wide range of technical and operational capabilities to the region. In January, the Soyo site directly supplied the first chemical to offshore customers—a landmark for Clariant's deepwater operations in Africa.

"Over the last few years, we've significantly grown our operational footprint and capabilities in Angola," commented Mark Swift, Head of Oil Services Africa. "This base is of strategic importance to Clariant in Angola and makes a statement that we are ambitious and determined to grow the business in this area."

The new facility in the Kwanda Base, near Soyo, is located at the mouth of the Congo River on Kwanda Island, a site designed to provide logistical support for oil and gas operations. To fulfill the QC requirements for chemical supply, the laboratory is fully equipped with all conventional methodologies, as well as state-of-the-art infrared spectroscopy. These resources will assist the efficient supply of chemicals for subsea applications and make it possible to meet all testing requirements. The 3400m² complex also comprises offices and a covered

warehouse with decanting and filtering equipment, and the processing capacity is expected to reach up to 1000 tonnes per month.

The Soyo facility was preceded by a warehouse and laboratory complex in Viana, near Luanda, which was commissioned and designed to support business expansion in the oil and gas industry in Angola.

Haldor Topsoe Signs €45 million Funding Deal with European Investment Bank



Roeland Baan, CEO, Haldor Topsoe

New Delhi, India: In line with its strategy to become the global leader in carbon emission reduction technologies by 2024, Danish technology provider Haldor Topsoe has signed a €45 million loan agreement with the EIB to support its R&D investments in that domain. The EIB financing is supported under the European Fund for Strategic Investments (EFSI), the main pillar of the European

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Commission's Investment Plan for Europe. The European funding highlights the company's commitment to developing new technologies to support a wide range of energy intensive industries in their transition towards a low-carbon future.

Roeland Baan, CEO of Haldor Topsoe, said: "Transitioning society towards clean energy solutions is vital in the battle against climate change. This funding will support our research into innovative hydrogen technologies that will ultimately enable our customers to produce low-carbon products for society. We are thankful for the funding, which is a testimony to our strong cooperation with the EIB."

"The development of innovative products requires sizeable and sustained investment, and I am glad that we can once again support Haldor Topsoe's R&D investments," said EIB Vice-President Christian Kettel Thomsen. "Supporting this type of cutting-edge research by a European company is of strategic importance in terms of safeguarding technology and know-how, but it obviously also benefits economic growth and employment. Haldor Topsoe's research and development tackles key challenges of our times by protecting our climate and the environment, which is fully in line with the EIB's climate action objectives."

Heubach Group and SK Capital Partners Close Acquisition of Global Colorants Business of Clariant

Langelsheim, Germany: The Heubach Group a leading global producer of pigments and SK Capital Partners ("SK Capital"), a private investment firm focused on the specialty materials, chemicals and pharmaceuticals sectors, announced the completion of the acquisition of Clariant's Global Colorants Business ("Clariant Pigments"). The combined business will operate under the Heubach brand, creating a global pigment technology and industry leader.

The newly combined Heubach Group ("the Company") is a leading global provider of comprehensive color solutions, supplying a broad portfolio of organic, inorganic, and anti-corrosive pigments, pigment preparations, dyes, colorants and specialty materials. The Company is a technological and quality leader and operates its global business from 19 manufacturing facilities across Europe, the Americas, Asia and Africa, employing approximately 3,000 people. The headquarters of the Heubach Group will be established in Vienna, Austria.

Johann Heubach of the Heubach Group, stated "The new Heubach is a world-class organization with great talent, technology and assets. For us, product excellence and sustainability are core. We are well-positioned to create significant value for our customers and business partners across the many industries we serve."



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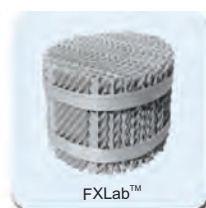
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Aaron Davenport, a Managing Director of SK Capital, noted “The combination of Heubach and Clariant Pigments creates an industry leader committed to the highest standards in manufacturing, quality and service. We look forward to supporting management in the growth and improvement of the Company by investing into talent, innovation and market expansion.”

Yokogawa Launches OpreX Managed Service -Cloud edition



32 Tokyo, Japan: Yokogawa Electric Corporation announces the release on this day of OpreX™ Managed Service -Cloud edition-, a solution that supports remote monitoring and maintenance of OT/IT field assets using a cloud platform provided by Yokogawa. By visualizing information on each device's performance, reliability, and security for the entire plant system, the solution will help minimize unexpected plant shutdowns. The new service solution will be offered as part of the OpreX Sustainable Maintenance lineup.

Unexpected plant shutdowns result in unscheduled work and increased maintenance costs and lead to lost production opportunities, substantial economic losses, and lowered corporate credibility. As OT/IT convergence accelerates and production facility monitoring systems are increasingly integrated with production management and

information systems to improve efficiency, there is a growing need for solutions that enable appropriate maintenance activities for the entire complex system, protect the system from security threats, and optimize production efficiency in terms of both safety and efficiency. In order to meet these needs, Yokogawa launched the OpreX Managed Service in September 2020 to digitize the monitoring and maintenance of production assets. With the development of the OpreX Managed Service -Cloud edition-, it is now possible to provide a solution that more customers can deploy with minimal lead time and cost for standardized functions.

Shared-cloud dashboard provides real-time information on the performance, reliability, and security of OT/IT devices. The shared-cloud dashboard provides real-time information on the performance, reliability, and security of all registered OT/IT devices. Customers can monitor and analyze the information on OT devices such as production equipment monitoring systems and field devices, and monitor the health and security status of IT devices such as computer assets and network devices. The powerful remote access function provides secure access even from outside the plant. Flexible session control with various combinations of conditions, such as limiting connections based on user role settings, site manager approval, connection time limits, and standard security features like the automatic recording of access activities, provide a more secure remote access environment. Proactive 24/365 monitoring and prompt maintenance support using IT Service Management (ITSM)

ticketing system.

Yokogawa's Network Operation Center (NOC) and Security Operation Center (SOC) monitor plant operations 24 hours a day, 365 days a year, to protect against security threats that are becoming more sophisticated every day. When an incident is detected, it is immediately registered in the ITSM ticketing system and troubleshooting is quickly initiated. This information is always shared online with the customer, who can check the status of the plant and resolve the issue as soon as possible.

The following services are available for customers who have subscribed to this service. More remote services will be developed in the future. Distribution of Microsoft security updates and virus definition files, and provision of security diagnosis reports, Provision of health diagnostic reports for production equipment systems and field assets, Main target markets, manufacturing industry in general. Applications- Efficiency improvement and outsourcing of maintenance and preservation activities and Remote operation monitoring infrastructure for safe access to plants. ■

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GAIL, IPICOL Sign Mou for Developing Clean Energy Projects in Odisha



Sharma, the Principal Secretary to the Odisha government's Industries Department, praised GAIL's active interest in establishing a Green Hydrogen plant

Sharma told the media that Odisha has a large pre-existing market for hydrogen and that by working together to produce green hydrogen in bulk, the cost of green hydrogen for industrial use will be reduced. GAIL is laying natural gas pipelines in Odisha, establishing a CGD project,

and establishing a coal gasification plant in a joint venture, according to MV Iyer, Director.

GAIL (India) Limited and the Industrial Promotion and Investment Corporation of Odisha (IPICOL) signed a Memorandum of Understanding (MoU) on Wednesday for cooperation in the areas of green hydrogen, green ammonia, and renewable energy for the production of eco-friendly fuels in Odisha.

Green hydrogen would assist industries in reducing aggregate greenhouse gas (GHG) emissions, thereby contributing to the overall goals of the central government's INDC targets. Odisha, as a power surplus state, is looking to strengthen its position in the power sector, and these new plants will help. Odisha-based heavy industries meet their growing power needs. Hemant

GAIL (India) Limited is India's leading natural gas company, with diversified interests in trading, transmission, LPG production and transmission, LNG regasification, petrochemicals, city gas, E and P, and other areas of the natural gas value chain. It owns and operates a natural gas pipeline network spanning the length and breadth of the country, totalling 13,340 km. It is also executing multiple pipeline projects at the same time to increase the spread. GAIL has a 70% market share in gas transmission and a 50% market share in gas trading in India.

BPCL inaugurates SAP demonstration plant at Kochi Refinery



The Bharat Petroleum Corporation (BPCL) has set up a superabsorbent polymer (SAP) technology demonstration plant of 200 tpa at the Kochi Refinery.

Using the in-house acrylic acid as feedstock, SAP technology is used in various hygiene products such as diapers and other incontinence products. BPCL R&D team has developed the technology for production of hygiene grade SAP. SAP is produced using acrylic acid which is manufactured at the new Propylene Derivatives Petrochemical Complex at Kochi Refinery.

The technology, piping and instrumentation diagram, detail engineering and equipment specification were all in-house developed jointly by the Corporate Research & Development Centre (CRDC) and Kochi Refinery team.

No external agency was engaged in the project. Both polymerisation reactor and the drying units were shifted from BPCL's Corporate Research & Development Centre at Noida. Other units like feed preparation unit, milling, coating and packing units were indigenously engineered and procured by the project team. The project was completed in just seven months.

Heavy Engineering Dispatches Mega Tubular Reactors



Anil V. Parab, Member – L&T Executive Committee, Senior VP & Head Heavy Engineering

The Heavy Engineering arm of Larsen & Toubro dispatched two large Ethylene Oxide Reactors, weighing 1,200 Tons each from Hazira, Gujarat to a large petrochemical complex overseas.

This was a repeat order after four identical Reactors were supplied by L&T to the same client in 2020 amidst Covid-19 pandemic during the first wave. The Reactors were manufactured at L&T's state-of-the-art Heavy Engineering Complex located at Hazira near Surat.

These highly complex reactors are crucial equipment for production of Mono Ethylene Glycol in the petrochemical complex. Commenting on the occasion, Anil V. Parab, Member – L&T Executive Committee, Senior VP & Head Heavy Engineering said, "Such a repeat order is testimony of our unique ability to handle these large & complex equipment and customer's confidence on our reliable delivery performance even during the unprecedented Covid-19 pandemic."

"Our focus on high-end products, in-house development of distinctive manufacturing technologies and various digitalization initiatives have helped us to become a reliable partner to our clientele. Delivering such a key equipment to our client, meeting all the requisite international quality and safety standards, is a matter of great pride for us," added Mr. Parab.

L&T's 'A. M. Naik Heavy Engineering Complex' is a globally benchmarked, state-of-the-art, fully integrated,

digitally-enabled manufacturing facility. It continues to contribute to the "Make in India" mission. All L&T

L&T Construction Awarded (Large*) Contracts for its Water & Effluent Treatment Business

The Water & Effluent Treatment Business of L&T construction has secured a slew of orders from various prestigious clients. The Department of Water Supply and Sanitation, Punjab has awarded two EPC orders for the Bulk Supply of Treated Water to 10 lakh people across 412 villages and 15 dhanies in the Fazilka and Ferozepur districts of Punjab on a DBOT (Design Build Operate Transfer) basis.

The aggregate scope of work comprises Design & Construction of raw water intake systems, storage & sedimentation tanks, water treatment plants of a total capacity of 114 MLD, clear water reservoirs with pumphouse, supply & laying of transmission pipelines, and associated Electromechanical & Instrumentation works. The project also involves automation works that include measurement of inflow & outflow water quantity and quality through suitable SCADA & other instrumentation works.

Previously, the business commissioned the Moga Water Supply Project for the

same client. The Department of Water Resources, Government of Odisha has given a repeat EPC order to execute the Under Ground Pipeline Irrigation System for the Rengali Right Irrigation Project (Phase-I).

Under the project, water for irrigation to 24,063 Ha. of Culturable Command Area (CCA) and 26,334 Ha. of Command Area Development (CAD) is envisaged for the Dhenkanal and Cuttack districts of Odisha by way of gravity flow taken from the Rengali Right Bank Canal and its distributaries. The scope includes survey, design, procurement, construction and installing of DI, HDPE & PSC pipelines of various diameters and pipeline distribution networks with all allied works.

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Reimagining a Healthier Planet



Rajnish Sarna

Joint. Managing Director
PI Industries Ltd.

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What are the key aspects & priorities for sustainability strategy & low carbon technologies on radar of your organization?

For PI Industries, sustainability means more than just countering risks. We view sustainability as a source of competitive advantage and key to our business continuity & success. We believe the shared-value can only be co-created by cumulative contributions from all stakeholders and their representation can be ensured through relevant policies and proxies at the highest governing and operational levels. Our priorities are:

Creating shared value for all: Through our products and services, we contribute

to sustainable agriculture and livelihood development of farmers. Ensuring satisfaction of our customers is of paramount importance to us. Key tenets to meeting the customer requirements in a responsible manner include innovation, product stewardship, and operational excellence. We also strive to create long-term economic value for our shareholders. Our community development programs drive socio-economic development in the areas we operate.

Reducing our ecological footprint:

Constantly reducing the consumption of resources (water and energy), improve raw material efficiency, enhance circularity in operations, and reduce emissions and waste production.

Empowering our people: We aim to become an employer of choice by empowering individuals to reach their full potential. We aim to build an inclusive culture where diversity is valued. We respect human rights of all and strive to uphold them across our operations. High standards of safety and good health of our employees across operations and locations is paramount to us.

Tell us about the goals you have set for your organization to over the next 5 years for the roadmap to achieve net zero?

With a strong focus on contributing and reimagining building a healthier planet, we have set for ourselves following sustainability Goals till 2025 by incorporating 7 SDGs:

1. Increase Operational Eco efficiency and reducing ecological footprint.

- a. Increase renewable energy usage to 20% of total
- b. Reduce CO2 emission by 25%
- c. Reduce landfill Hazardous waste by 25%
- d. Reduce fresh water consumption by 25%

2. Achieve best in class employee's safety, health and wellbeing standards and diversified culture at workplace.

- a. Reduce lost-time injury frequency rate to 0.20
- b. Ensure NIL fatal injury in plant operations

c. Increase employees average training hours per FTE by 25%.

d. Increase women participation in leadership positions by 25%

3. Contribute to improve farm productivity and prosperity of the farmers and inclusive development & wellbeing of the society.

a. Introduce new technologies/product /services and intensify farmers' education to improve the farm productivity and reduce environment impact of agriculture by saving water usage.

b. Conduct skill development training for women and youth to improve their employability and independence.

c. Contribute for education and healthcare of underprivileged in the society.

Tell us about your plan to implement low carbon technologies across the portfolio to handle Scope 1, Scope 2 & Scope 3 emissions till 2030.

As a company, we aim to reduce the carbon footprint levels and the total greenhouse gas emissions by adopting the green chemistry processes. We are committed towards addressing the problem of environmental pollution control, resources efficiency and improvement of financial parameters by implementing 'fuel emulsification system', establishing better effluent systems, converting facilities into ZLD facilities, and adopting safer chemistries.

To achieve the desired levels and minimized emissions, we have adopted two important strategies; Atom Economy and E-factor. With the adoption of these strategies, consumption of the total number of atoms is optimized and fully reflected in the desired product. The 'E-Factor' strategy ensures that the quantity of waste generated per kg production of any substance remains very low.

Apart from revising and innovating the production process basis green & safer chemistries, we also aim to reduce water consumption by our customers by conducting awareness session on our Direct Seeded Rice Technology (DSR) which not only eliminates the requirement of transplantation but further reduces the carbon emissions & improves soil porosity. This technology also provides monetary benefits to farmers by significantly increasing their savings up to a 25-30% on costs related to energy, water conservation, labor, etc. which amounts to nearly `7,000 per hectare to the farmer.

For increasing energy efficiency, we are taking more initiatives by adopting the renewable sources of energy. We have taken measures to replace fuel oil with light diesel oil at our sites. Additionally, for reducing Sulphur di oxide and Nitrogen di oxide emissions, we are utilizing the use low Sulphur fuel in boilers and high efficiency burners respectively. Overall, this will have a long-term positive impact on our operations and reduce GHG emissions.

A lot of our focus is also put towards the sustainable procurement of various packing materials within a close vicinity of our manufacturing unit(s). Our target has been to procure more than 90% of our packing material is procured from the local vendors who are within a periphery of 150 Kms from our manufacturing units.

Tell us the major challenges and cost implications for implementing low carbon technologies? How do you plan to address these?

To achieve a robust low carbon future, we need an overall ecosystem supporting this cause. As on date, various factors are missing out to support a desired low carbon future such as lack of favorable policy and regulatory framework supporting the industries who desire to transit to build an infrastructure which shall support low carbon emission. Requirement of huge capital investment in R&D activities to bring the best and sustainable carbon capture solutions and technologies remains a bigger challenge as on date. Large funding requirement is needed to develop solutions and reduce costs and this also stays as one of the top challenges which Industries face till today.

As a company we have already invested in scaling up technology e.g.: continuous/ flow chemistry, bio-catalysis and green chemistry processes etc. to minimize the manufacturing foot space, reduce the carbon foot print and to enhance circularity in operations. ■

Integrated Automation from Command Control Centres



ontrol rooms have technologically evolved with components ranging from Panels with dial type meters, paper recorders and push button stations to LED monitors, Remote workstations and interactive mobile phones leading to selective data availability in every nook and corner of the world with internet facility. Regardless, Control rooms across the world are exponentially innovative due to influx of automation.

Classic example is development of control rooms for smart cities in India. Further to rapid urbanisation and associated infrastructure development, resultant demand-supply gaps across related functionalities like water supply, street lighting, waste management, environment, healthcare, education, safety and surveillance, traffic management, emergency and disaster management, civic services management, etc. have led

to prioritisation and launch of smart cities with conceptualised integrated command control centres enabling better monitoring, efficient operation, quality and timely service to citizens.

Integrated Command Control Centre empowers the system by collating real time data systematically, thus enabling decision or policy making with up to date situational awareness in comparison to silo-ed sectoral administrative approach. Also, Integrated Command Control Centre diminishes the complexity of dealing with multiple systems guided by multiple platforms by integration into a single platform to leverage human intelligence enabling informed decisions.

Further, current thermal power plant installations include few command control centres with integrated CCTV camera, Access control and perimeter intruder detection system monitoring. Hydro power plant installations include integrated



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automatic or supervisory centralised control operations of the entire plant through suitable system engineering solutions. In continuation, concept of Integrated command control centres are being evolved by technology experts in the fields of Power, Oil and Gas and Chemical industries. Origin of Integrated command control centre concept is ensued with due consideration of centralised and secure command centre enabling configuration of industrial applications wherein data aggregation and visualisation in combination with technology expertise benefits plant operations and productivity.

This Article articulates basic design considerations, challenges and moderation, Future and way forward for integrated command control centres.

Integrated command and control centre (ICCC) comprise the following basic attributes:

- Integrated data
- Centralised operations / control and maintenance
- Collaboration and decision making
- Compliance of objectives (Operational efficiency and maintenance improvement, Health- Safety- Environment (HSE) compliance, etc.

Location wherein different technologies come together to create an efficient and productive operation management, leveraging on existing data locked in multiple enterprise(s) and operational systems to enable “fact-based” decisions is referred to as “Integrated command control Centre “. ICCC concept promotes situational awareness with integrated , holistic control and monitoring ; organizational awareness, production planning and optimisation within the envisioned budget.

Basic design considerations for Integrated command control centre

Role of a central control room or integrated command control centre is of utmost importance for the industry since these are

often referred analogous to “Nerve centre” of human body. Well-designed control room is a basic requirement for an efficient automated industrial production system to handle multiple simple as well as complex configurations by simplifying work flow and data prioritisation, thus decreasing operator fatigue and increasing operator efficiency ensuring stable plant operation.

Control rooms are designed to ensure that risk(s) to operators in control room are within acceptable limits; warranting emergency response plan for plant maintenance and control as required, following any predictable and detrimental event within the plant.

Designing professional and aesthetic control room involves careful consideration of following:

Human factors:

Analysis of organisation structure, Personality types in the control centre, task to be performed or each operator role, Information to be conveyed to operators, collaborative operation between people / teams, nature of collaboration, communication systems and associated interfaces; culture alignment including leadership

Periodic analysis of progress in monitoring and operations regarding hierarchal

structure, decision making evaluation criteria, roles of operators in emergency condition,

Review of operator interfaces like operator stations and Large video screens, training simulators.

Design factors:

Operator workstations and graphics are to be designed to ensure that monitoring and control information are simple and clear; Letters of appropriate indication size, brightness and angle with respect to human eyes. Since optimal vision is normally in the center of eyes. it is significant that critical information /indications are allocated within human visual angle of 30 degrees; also considering the fact that frequent eye movement could cause eye fatigue and time loss of 0.2 to 0.3 seconds while moving to focus on the required information.

Distance between operator workstations should be maintained so that operators are not seated within each other's 'intimate zones'- minimum space should be between 300 to 700 mm. It is also important to select chairs that support and suit the operators with due consideration of features like adjustable seat height, angle and back support.

Working environment:

Control rooms are air-conditioned dust free rooms with air flow and temperature adjustments. Partitions or columns within control room shall be avoided as far as possible. Low noise levels and noise transmission values shall be maintained. Control rooms generally have a small lobby followed by entrance doors to the control room; Lobby ensures that Heat losses due to frequent opening/closing of control room door is reduced enabling optimum design of Air conditioning system. Emergency exit door to be maintained to ensure operating personnel safety in case of inadvertent emergency(s). Floor finish, suspended ceiling, false ceiling or false floor depending on project requirement, adjustable lighting, colour schemes of walls/panels, Room layout, Screen area, Workstation arrangement for effective operation, Console orientation, expansion provision, redeployable design features like viewability, Ergonomics play an important role in Aesthetics of control room.

ISO design stages include:

- a. Predesign analysis: Site surveys, information gathering visits, Compilation of details like IT infrastructure, power, communication systems availability, Client's needs, operational requirements, Standards and space planning.

- b. Control room design: Ergonomics, choosing the right furniture, positioning furniture, defining lateral workspace per workstation, etc.
- c. Control room interior design: Define colours, texture, lighting ambience, acoustics requirements, civil works, Noise levels (less than 55dBa), layout / arrangement so that control operations are un interrupted by either inadvertent visual or audible instructions
- d. Control room security & maintenance: includes threat and risk assessment, secure and resilient control room design, ease and streamlined evacuation from control room in case of Hazard, maintenance access to workstations, etc.
- e. Ergonomics: Ergonomics is a scientific design correlating humans and other elements of the system. Ergonomic design promotes productive and healthy workspaces, also considering posture changes and flexibility to move around.

Typical control system architecture for an integrated remote command and control centre for industrial plants is illustrated in Figure below which is self-explanatory

Typical application is Smart city command control centre which enables manage

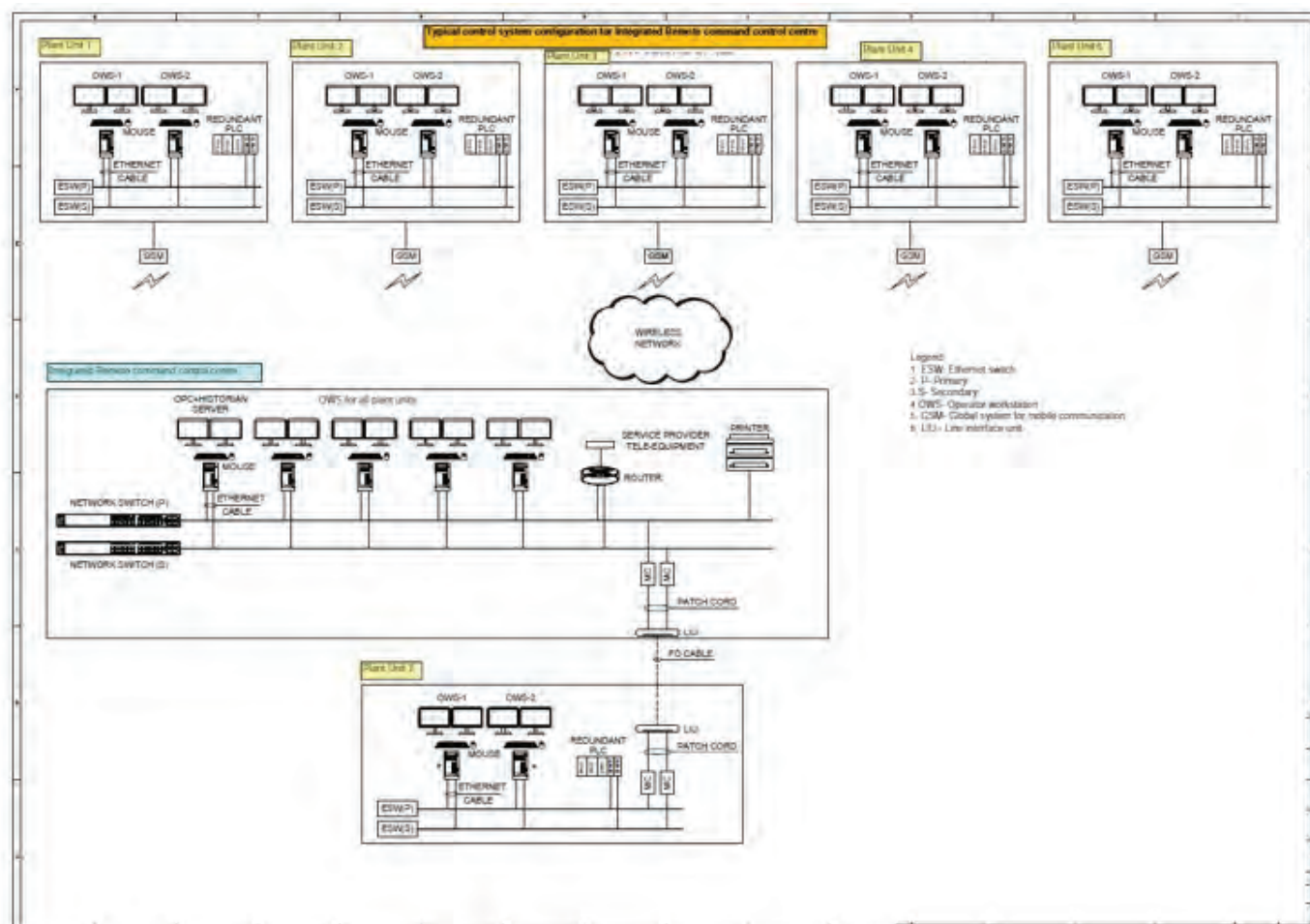
emergency incidents, environment, traffic, faster city response operations by means of integrated real time data monitoring combined with analytics of similar but different systems and human intelligence.

Challenges and moderation:

Challenges driving ICCC are: Monitoring the 'hidden plant' – a wide range of equipment falls outside the monitoring of normal process control systems, such as mobile equipment. This equipment represents the 'hidden plant' and typically is manually inspected.

Siloed operation – a clear need for implementing best practices between each of the functions and operations to save costs and mitigate risks. Cost and performance monitoring-high cost and performance efficiency problems can be ignored or overly summarized and may not be available to senior management.

Workforce turnover and training – loss of skill due to retirement of employees; other turnover results leading to depreciation of skill and continuous training cost; loss of best practices knowledge.



Merger and acquisition – non-standard processes and tools can hamper the integration of acquired sites. Increasing Technology dependency. Closed Proprietary Networks -different Teams working on different Silos independently in different locations. Disparate Systems impact Operational efficiencies of the Businesses driving up costs

ICCC tackles current challenges by-

Creating collaborative workspace regardless of the geographical locations, Eagle Eye View for the – “the decision makers”, Leveraging technology as a tool, Improving strategic & tactical operations, Convergence, Collaboration – Action versus Reaction approach ,Open Scalable Architecture, IP Based Networks which are non-proprietary networks, Automating Policies and Response Plans, Control, Monitoring and Maintenance of disparate networks, Providing a single customized dashboard interface with situational awareness, Faster and better decisions

Retaining skills for optimal control; More refined measurement and control to minimize production interruptions, Operate safely without damaging the environment, Improving production forecast ensuring better field management, Minimizing downtime, including faster maintenance turnarounds, Better use of existing global expertise including access to specialist expertise in service companies, Collating

and sharing intelligence to identify and address external hazards early, Accelerate development from discovery lower training cost, through increased use of standard practices and remote training, and Lower costs of operation, including lower labor costs and lower travel costs.

Future or way forward

As operations in plants expand, the need for command centres that run 365(6) days a year only continues to grow. Operators can monitor & control various aspects of an enterprise; operation in multiple locations across the country and globe, all in real-time on a command centre video wall installation from a Remote Integrated command control centre (RICCC). Generally, RICCC includes “Enterprise automation system” wherein multiple plants at different locations are visualised as a single entity with implementation and deployment across multiple company levels and locations.

Innovative trends in RICC / ICCC design include:

a. Universal communication standards (Universal connection – mobile and home broadband connections extend the enterprise; Increasing bandwidth, including new wireless protocols ;Reducing communication costs – convergence of technologies – voice, video, data; WiMAX and mesh networks);

b. Terabyte data storage area networks (increasingly delivered as a service, Expandable high availability servers – in managed secure data centers); Virtual teaming(real time collaboration over distance with large and complex data sets; Online meetings and team rooms; video-conferencing; instant messaging; Information and knowledge management: Document management; search engines; email management and archive; Best practice repositories; People finders; communities and knowledge networks; application integration, operations management) ;

c. Remote control of equipment (Digital dashboards with key metrics continually displayed; Event driven systems routing critical information appropriately; Distributed database systems; dynamic and scenario scheduling)

d. Maintenance management (Data warehouses for what-if analysis, KPI tracking and executive scorecards)

e. Artificial intelligence (troubleshooting with minimal human interaction; Process optimization and self-learning systems; virtual reality: Operator training covering the full range of scenarios; Geospatial: GIS; sustainability:

f. Operational safety and health systems (Environmental monitoring; crisis management)

In addition, Internet newsfeeds; reference searching; Web services – service oriented architecture (SOA); Enterprise application integration (EAI); enterprise data models and XML data transfer; Security; site access; intrusion detection and prevention; network and security management; data and information confidentiality; fleet management systems; integrated logistics and warehouse management – including RFID tracking shall be utilized on case to case basis depending on requirement enhancing capabilities of RCCC. ■

Author

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Upcoming Technologies for Reducing GHG Emissions in Process and OSBL of Polymer Industries

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The Green House Gas (GHG) emissions from the plastic industry increased 9% from 73.8 to 80.1 million tonnes between 2012-2018 and is projected to reach 143.6 million tonnes by 2025. The fluorinated gases (Hydrofluorocarbons, Perfluorocarbons, Sulfur Hexafluoride, and Nitrogen Trifluoride) are powerful GHGs emitted in small quantities by various industrial processes and are also referred to as High Global Warming Potential (GWP) gases. Several industrial processes emit Carbon Dioxide through the consumption of fossil fuels. Humans have largely contributed to the climate change by adding harmful gases into the environment. Continuously increasing production and emission of greenhouse gases is an important global issue resulting in climate change. According to the Intergovernmental Panel on Climate Change (IPCC), these emissions are

responsible for anthropogenic hazards. In 2020, greenhouse gas emissions in the US fell 10.3%, primarily due to COVID-19.

Polymers form a wide range of products for an array of applications across the world. They are extremely important for manufacturing of several materials as they are heat resistant, lightweight, and possess extrudability characteristics. Polymer production is one of the major sources of greenhouse gas (GHG) emissions as polymer industries are highly reliant on fossil fuels. The Carbon Footprint (CFP) methodology helps estimate GHG emissions associated with the production of Polymers.

Currently, among the rising trends in the research associated with polymer technology is the reduction in the environmental impacts of plastic. One of the widely known approaches

is the recycling of polymeric waste. Whereas other approaches usually focus on incorporating waste products from industries into plastic production technologies. Some of the solutions include using waste rubber to produce polymer composites, manufacturing of polyurethanes from waste oils or crude glycerol, liquefaction of biomass resulting in immediate compounds for the synthesis of Polymers, and others. Reducing the carbon intensity during the manufacturing of plastics by attaining sustainable feedstocks while simultaneously enabling effective polymer recycling represents a massive change needed in the 21st century. To evaluate technologies that could possibly bring such changes, it is important to compare the sustainability of bio-based products to necessary manufacturing patterns.

Upcoming Technologies

The Dow Chemical Company, Michigan, one of the largest chemical producers in the world, announced on 17th January 2021 that it will address climate change and plastic waste by aligning 2025 sustainability goals to become the world's most innovative, customer-centric, inclusive, and sustainable science company. Dow also introduced new mechanically recycled plastic resins for flexible and rigid plastic packaging applications that have the potential to reduce carbon and energy footprints by up to 30%. New sustainability goals include:

- a) The reduction of Dow's net annual carbon emissions by 5 million metric tonnes by 2030.
- b) The company will enable 1 million metric tons of plastic to be collected, reused, or recycled by 2030 through direct actions and partnerships to promote "stop the waste." Dow is investing in emerging technologies and infrastructure to increase global recycling effectively.
- c) By 2035, Dow will have 100% of its products sold into packaging applications as the company is committed to offering reusable or recyclable solutions for packaging applications.

Covestro AG, one of the leading players that produces a variety of polyurethane-based raw materials, has developed a CO₂-based technology with partner RWTH Aachen, which is more than a technical innovation in plastics and synthetic production. In this process, conserved fossil fuels, like crude oil, reduce the amount of atmospheric carbon dioxide because carbon from CO₂ gets recycled. It is an innovative contribution to resource conservation and promotes the circular economy. The CO₂ technology developed by Covestro is widely being used to produce a binder for sports floors and in the production of foams for the automotive industry. These sustainable foams are called Cardyon, laminated with textile and then used in automobile parts.

Royal DSM, a global science-based company, took an initiative to halve its 2016 greenhouse gas (GHG) emissions from its own operations by 2030. The motive of its 30% reduction target is based on the progress over the past few years. Along with this initiative, the company continues to be an ambitious climate leader in its sector and aims to achieve net-zero emissions by 2050.

Exxon Mobil Corporation, a global leader in Carbon Capture and Storage (CCS), having an equity share of about one-fifth of the world's CO₂ capture capacity, is working with TDA Research in Colorado to co-develop a new adsorption process of carbon capture. This technology offers various advantages over conventional methods by reducing energy-intensive process steps. The technology achieved up to 90 percent CO₂ capture from flue gas as it has been tested at the National Carbon Capture Center (US Department of Energy-sponsored research facility).

Conclusion

The polymer industry needs to shift towards renewable feedstocks like Biomass and Carbon Dioxide as both of these help in reducing the GHG emissions during the manufacturing of polymers. The use of CO₂ in the production of polymers is an example of Carbon Capture and Utilization (CCU). This technology captures CO₂ from industrial point sources and converts the captured CO₂

into fuels, chemicals, etc. Some CCU technologies are already present on an industrial scale, such as for producing Polymers like Polyols for Polyurethanes. This technology has proven great for reducing GHG emissions by the Polymers. At the same time, biomass is used to produce Polymers such as Polyethylene or Polyurethanes. The combined use of CCU-based and Bio-based technologies can be effective in the production of polymers while reducing harmful emissions at the same time. Other innovative technologies that help in reducing greenhouse gases emissions include FuelGems, Climeworks as it captures and recycles CO₂ emissions, and Terramera. Climeworks technology provides direct air capture. It contains a filter designed to capture atmospheric carbon, drawing in air and binding the CO₂. The gases in this technology can then be used in several industrial applications. Polymer industries are taking further initiatives to reduce GHG emissions with the help of upcoming technologies, which will prove beneficial in the forthcoming years. ■



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Unlocking the Full Benefits of IoT Technology



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Advances in asset health management, driven by breakthroughs in internet of things (IoT) technology, are creating tremendous excitement in the industry. This technology can deliver immediate benefits in industries ranging from water and desalination to thermal power generation, fertilizer, steel and cement, oil and gas, general chemical and petrochemical.

This revolutionary approach to equipment monitoring enables plant reliability

engineers, operators and maintenance personnel to predict equipment and system behaviors and proactively prevent unplanned downtime. While many of these technologies have been discussed for years, they've only recently evolved to a level that makes IoT more viable for industrial users. Implemented correctly, they can deliver significant benefits such as:

- **Predict equipment behavior.** Reduce equipment lifecycle expenses by minimizing unscheduled downtime

and lowering maintenance costs, while preventing expensive repairs and maintenance delays.

- **Focus maintenance on assets that need attention.** Optimizing your maintenance efforts means you spend less time evaluating healthy equipment while avoiding unplanned downtime.
- **Detect and address unacceptable operating conditions.** IoT can improve reliability and availability by detecting and addressing unacceptable operating conditions before they evolve into significant issues.
- **Enhance equipment efficiency.** By knowing where all your assets are on their respective operating curve, you can optimize for maximum efficiency.
- **Reduce costs.** Reduce total cost of ownership (TCO) by easily recognizing when to schedule equipment maintenance and lowering spare part inventories.

Increase safety. By identifying exactly where the problem is and what it will take to fix it, IoT helps your team to respond to performance issues quickly, limiting the time they spend in hazardous environments. These benefits and more have been made possible by new synergies among three components of IoT technology: architecture, devices and monitoring.

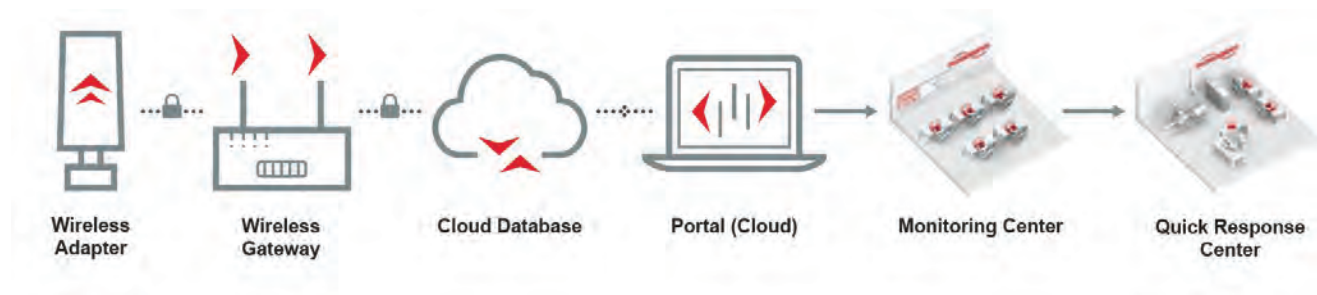
Architecture

An ideal IoT solution consists of five key components:

- **Equipment sensors** that collect data for analysis
- **A communications infrastructure** that transmits data from equipment sensors via a secure, encrypted network
- **Application-specific analysis** technology designed for pumps, valves and seals
- **A reporting platform** which provides insights into equipment performance over time, while sending emails and alerts so immediate action can be taken when an asset experiences a problem
- **A reporting center** staffed with experienced human professionals watching over alarms to provide help

The most basic use of this type of IoT system is condition monitoring, which sends periodic “snapshots” of equipment performance from the sensors to a central hub for analysis. In this way, you can proactively detect changes that could be early indicators of failure and uncover insights to improve your plant’s efficiency, productivity and profitability.

A more sophisticated approach made possible by the latest IoT systems is



predictive analytics, which captures a far more detailed stream of continuous, full-spectrum data that is transmitted close to real-time speed. This enables you to estimate when and why critical assets could fail earlier, and take preventive action before potential problems lead to downtime.

Devices

At the heart of any IoT system are instruments embedded with technology that enables them to connect with the architecture. These devices can capture and transmit a variety of equipment data. This includes, but is not limited to: temperature, pressure, flow, vibration, torque and other conditions.

This data can be transmitted to central gateways that communicate wirelessly with cloud infrastructure. Today's most reliable and user-friendly technologies use open and secure architectures and have seamless interfaces so you can easily scale your device infrastructure as your needs evolve.

One of the most groundbreaking innovations has been the development of long-range wireless sensors that enable

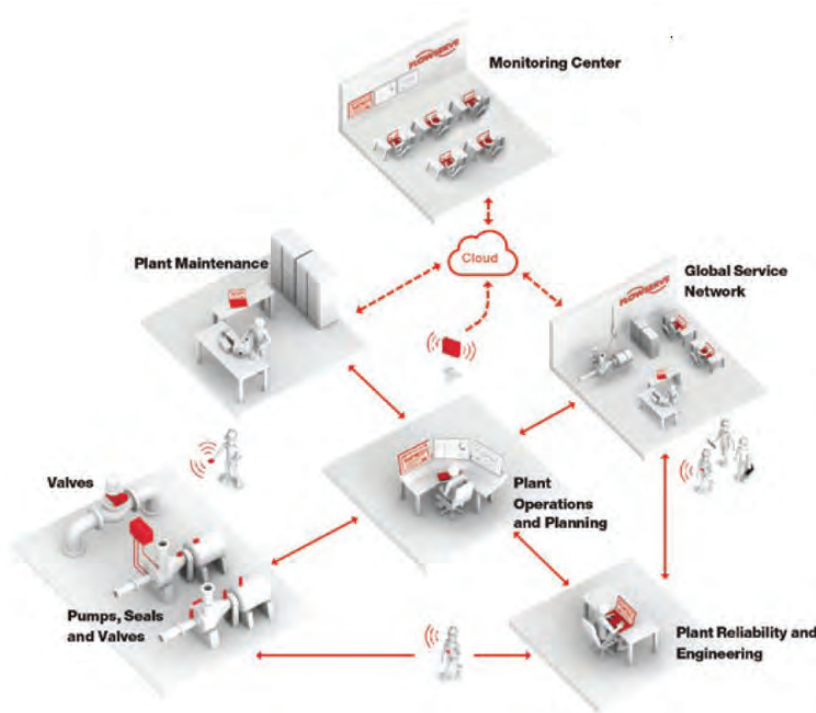
cost-effective monitoring of thousands of assets over sprawling facilities. Combined with gateway receivers capable of managing up to 2,000 wireless devices, data can now be securely transmitted 1.6 km (1 mi) or more, eliminating the limitations of short-range transmission technologies like Bluetooth.

Monitoring

Accurately capturing equipment performance is only one part of the IoT puzzle. Over time, instrumentation devices capture thousands of datasets. Effectively monitoring this information and analyzing it for trends are critical to unlocking IoT's full predictive analytics capabilities.

Data trends and algorithms analyze equipment performance data, detect fault conditions, predict imminent failures, and recommend corrective actions. By reviewing this information, reliability engineers can instantly see when vibration, temperature or other conditions begin to deviate from the norm in a pump, valve or seal. Observing these trends enables your team to assess and repair failures before they happen.

It's important to understand that



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algorithms are based on proprietary models, methodologies and industry experience, so the company providing the algorithms has a significant impact on what an operation can achieve by using them.

Ideally, monitoring software should work with existing infrastructure built by any manufacturer and run on any platform, from the plant control room to a maintenance technician's handheld, an engineer's laptop or in a cloud-based portal. It should also be backed by an off-site monitoring center staffed with experienced human monitors who can advise on best responses.

Recent advances in instrumentation and monitoring enable plant operators, reliability managers and maintenance teams to maximize their time by focusing

on critical assets that need the most attention.

From reactive to predictive

Years ago, IoT seemed like a dream, given the high cost of incorporating wired instrumentation systems into existing infrastructures. The labor — which included breaking up concrete, burying wires, and filling it all back in — was cost-prohibitive. Add in the high cost of instrumenting and underwhelming, reactive analytics capabilities and you

can

understand why IoT wasn't a viable option for most operations.

Today's advanced IoT architectures, devices and monitoring solutions can be implemented in weeks rather than months at a fraction of the cost, making IoT a reliable way to avoid

equipment failures, downtime and costly repairs while increasing predictability and productivity. ■



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ITALVACUUM - more than 1000 vacuum pumps in India!



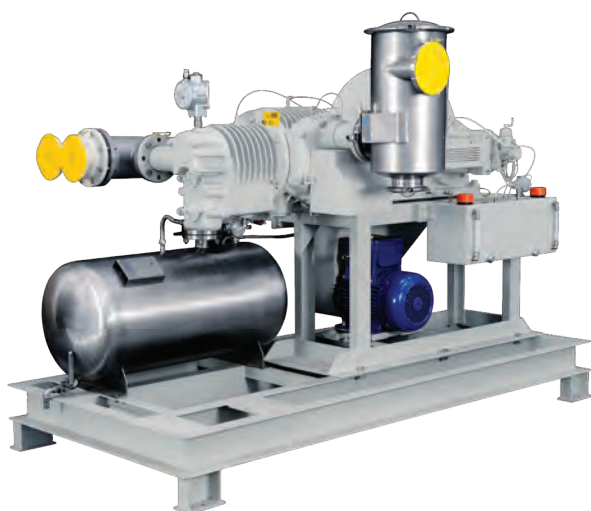
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Italvacuum - one of the leading international manufacturers of vacuum pumps and vacuum dryers has now made a breakthrough, reaching over a thousand vacuum pumps installed in India. This fantastic result has been possible thanks also to the cooperation with Vacuum Drying Technology India LLP, based in Mumbai, sole agent for Italvacuum in India, since many years. With a very competent staff, Vac Enterprises India LLP is able to understand every customer's process requirement. This is also due to the training provided to all the salesmen and technicians, that are constantly updated with regular courses at Italvacuum headquarters.

Italvacuum offers excellent solutions for the treatment of wet powders from filtering and centrifuging processes. Striving to serve its customer's needs all around the world, the firm offers multiple versatile turn-key installations, as well as tailor-made equipment and systems, according to the client's individual process requirements in the chemical, fine-chemical and pharmaceutical industry. The Italian company provides users working with Active Pharmaceutical Ingredients (APIs), Fine Chemicals and Intermediates with utmost quality, innovation and safety. Moreover, their original and patented product selection complies with all the general international regulations (ATEX, UL, PED and ASME) and with the latest FDA and cGMP norms.

Apart from the cutting-edge technology, the Italian manufacturer was able to succeed in India by providing top-tier training and in-house courses to the technicians from Vacuum Drying Technology India LLP so that Italtvacuum is able to understand and fulfil all the requirements of their customers.

Saurus939® - Italtvacuum's trademark



The vacuum pump that guarantees best performances, ensuring total recovery of extracted solvents, even in severe operating conditions. A simply designed machine, that combines traditional robustness and reliability with the most evolved technology. Resistance, strength and consumption of oil virtually eliminated thanks to the innovative LubriZero® system. A solution which guarantees perfect operation and optimum results with total respect for the environment. Saurus939® has no fear of aggressive and corrosive solvents, powders and condensates, nor distillation by-products. But above all it does not fear confrontation

because it is designed and manufactured to work 24 hours a day with a constant excellent performance and minimum operating costs, thanks to a low-energy motor, negligible oil consumption and easy, immediate maintenance. Powerful, efficient, but absolutely safe: Saurus939® guarantees optimum safety through the whole process and complete purity of the final product. In other words, ensures an uncontaminated vacuum. Saurus939® has a wide range of use and could be employed in different sectors: Chemicals, Pharmaceuticals, Cosmetics, Oil & Gas, Plastics & Rubber, Bioscience and Waste Management. Especially effective in the processes of drying, reaction, distillation, crystallization, filtration, evaporation and polymerization.

Tradition, Innovation and technical support

Since 1939 Italtvacuum produces vacuum pumps with great technical know-how and a thorough knowledge of the needs of its customers, which has also progressed along with the developments in chemical and pharmaceutical industries. The company's awareness on those changes over time, enabled its engineering services to build up unparalleled expertise in vacuum processes.

Focusing on individual needs, pilot tests can be arranged at the manufacturer's headquarters to determine the best possible solution for the clients.

Since efficiency and safety are of highest priority, Italtvacuum's qualified personnel



provides the following services after an installation:

- 1) Scheduled Preventive Maintenance;
- 2) Technical Assistance; 3) Service Parts;
- 4) System Upgrading and Overhaul.

In giving assistance in all of these areas, the firm ensures the proper function as well as durability of the product and a fruitful production process.

Not only Saurus939®: the dryer series

Multispray Cabinet Dryer®, tray vacuum dryer with C.I.P. (Clean in Place)
Multispray® patented fast-washing system.



Multispray Cabinet Dryer® is not a conventional tray dryer. It achieves high quality results and promises efficiency, safety and flexibility for any product batch. However, what sets this dryer apart from all others, is a guaranteed total cleanliness of the inner chamber and all heating plates, in compliance with the latest FDA and cGMP standards. Due to the C.I.P. (Clean in Place) Multispray® patented fast-washing system, the equipment can be completely cleaned in just a few minutes, minimizing washing liquid consumption and enabling the user to change batches quickly.

Criox® System, rotary vacuum dryer / powderer with electric lump-breaking units.

This rotary vacuum dryer consists of a double cone chamber, characterized by smooth surfaces without edges and sharp corner and a powderer with electric lump-breaking units, ensures continuous revolution of the processed mass and allows a homogenous and delicate mixing. This also increases the product surface exposed to evaporation and thus enhances the system's efficiency. Furthermore, it

prevents the forming of lumps and allows for grinding and powdering during the last phase, limiting the use of the mill, making Criox® versatile and profitable.

LaboDry®, laboratory-scale tray vacuum dryer.

LaboDry vacuum tray drying ovens have been designed and manufactured to meet the requirements of small batches and high potency API. Featuring a construction with separate cells and skid-mounted auxiliary accessories, these static vacuum dryers are designed for glove box installation. Regarding the materials in contact with the product, LaboDry® can be manufactured in AISI 316L (1.4404), AISI 904L (1.4539) and ALLOY C-22 (2.4602).

Bi-Evolution Dryer®, bi-conical rotary vacuum dryer available with a wide range of accessories.

This biconical rotary vacuum dryer, capable of totally extracting solvents and water from moist masses - mainly from centrifugation or filtration processes - can be used for a wide range of products, such as intermediate or fine chemicals. It allows efficient drying of friable, easily degradable, temperature and photosensitive products, as well as sterile/injectable active pharmaceutical ingredients (APIs) or chemical reagents.

Planex® System, patented horizontal vacuum dryer with ZeroFriction® planetary movement eccentric agitator.

Planex® System provides another ideal solution for drying powders from filtration

and centrifuging processes. This multi-patented dryer's eccentric agitator with two independent movements is able to rotate simultaneously on its own axis and tangentially to the drying chamber, which guarantees a better mixing of the whole product. The reduced size of the agitator in relation to the diameter of the chamber allows higher rotation speeds, with a lower energy consumption than conventional industrial dryers, ensuring the best end results.

CosmoDry® System, horizontal vacuum dryer with concentric agitator available with a wide range of accessories. The innovative horizontal paddle vacuum dryer is the result of highly advanced research and a careful analysis of the production requirements of the most demanding customers. CosmoDry® System ensures power, loading flexibility, drying speed, easy unloading and most importantly; the highest quality of the dried product. Compared to conventional dryers, the special design of the agitator with heated shaft means that the internal parts can be dismantled into several sections, quickly and conveniently. ■

For more information

<https://www.italvacuum.com/en/>

www.jasubhaimedia.com

Dynamic Platform
to
Connect with Chemical Industry Ecosystem
Direct Reach
to
>200,000 Readers
across
>25 countries



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embedded features Contact: sales@jasubhai.com

FM Approved - Underground Fire Protection Systems



The Plastics Experts.

Since more than 10 years, AGRU is a successful manufacturer of high-quality underground fire protection systems made of PE100 (RC). Many positive references in various application fields confirm that impressively. AGRU offers the widest product range from dimension 63mm up to 630 mm, for 175 and 200 psi operating pressure. As full-range supplier, AGRU provides comprehensive information and documentation.

For the application of underground fire protection systems, AGRU provides a complete range of FM approved pipes, fittings and special items. These high-quality products are intended to protect assets and to minimise potential losses. FM approved products are objectively tested and in accordance to demanding international standards. AGRU underground fire protection systems have been installed and operated successfully since more than 10 years. FM approved pipes and fittings are tested under extreme conditions for the application in firefighting systems.

Underground fire protection systems made of PE 100(-RC) are maintenance-



free, leak-proof and resistant against:

- Seismic activities (soil settlements)
- Pressure surges (water hammers)
- Resistant against abrasion
- Point loads
- Rapid crack propagation
- Root penetration

Further advantages are:

- Corrosion free (particle free)

SUPPLY RANGE

FM class 175 psi (12 bar, SDR 11)

Pipes: OD 63-630 mm

Fittings: OD 63-500 mm

FM class 200 psi (14 bar, SDR 9)

Pipes: OD 63-500 mm

Fittings: OD 63-500 mm

- Easy to install (flexible system)
- No incrustations (no pressure loss - low energy costs)
- Reliable performance

By using FM approved products, a high reliability and operational safety can be expected.

Ensuring quality, dependability and performance



FM global is the world's largest commercial and industrial property insurance and risk management organisation specialising in property protection. FM Approvals certifies products and services for thousands of companies worldwide to help improve and advance property loss prevention. Globally recognized and respected, the FM APPROVED mark assures product or service has been objectively tested and conforms to appropriate FM Approvals, national and international standards. Customers rely on FM Approvals for assurance that FM Approved products and services will perform as intended and support property loss prevention.

Firefighting lines



The water supply of fire protection system is often considered as the most critical component of the system. Moving the water from it's source to the entrance of the building, is the function of underground fire protection piping. This piping system must be extremely reliable to withstand internal and external stresses over long periods of time. 100-RC pipes and fittings can be welded together homogeneously by heated tool butt welding or electrosocket welding. The welded joints are as strong as the pipe itself, providing continuous leak-tight system. On the other hand, 100-RC pipes do not corrode or incrustate. This is key point as in case of fire emergency valves will be opened immediately and if pipes are corroded or incrustated - particles may be flushed and clog the sprinklers inside the building.

Since FM approved products are tested for high quality and safety, the cost of property insurance can be reduced significantly. ■

For more information

<https://www.agru.at> or
office@agru.in

Why should you use Tapflo Plastic AODD Pumps in the Chemical Industry?



There are multiple chemical pump options on the market today that can be used to transfer hazardous fluids such as solvents, acids, petrol and alcohol. Tapflo manufactures suitable solutions for the chemical industry using high-quality, premium materials to ensure a long life of your pump.

All Tapflo Plastic Diaphragm Pumps (Air Operated Double Diaphragm Pumps) are made from polyethylene (PE) or virgin PTFE and are suitable for handling almost any kind of liquid whether it is viscous, chemically aggressive or with solids.

Polyethylene (PE) has a superior wear resistance which is 6 – 7 times better than for polypropylene (PP). This fact makes the pump suitable for handling abrasive slurries etc. PE is resistant to most kinds of aggressive chemicals such as concentrated acids and alkalis. Maximum liquid temperature is 70°C. Tapflo uses different grades of PE depending on the part. For valve seats and



ball stoppers, which are most vulnerable to wear - UHMW PE1000 is used for best mechanical strength and abrasion resistance. PTFE (polytetrafluorethylene) is a thermoplastic polymer with superior chemical resistance. The PTFE pump can handle even the most aggressive acids. The maximum liquid temperature is 110°C.

Tapflo also supplies Barrier Diaphragm Pump (available in PE and PTFE) that are equipped with a barrier system on both sides of the pump. It protects the pump internals from chemical attack in case

of diaphragm break and, with dedicated accessories, also protects the environment from contamination and product from waste.

Tapflo diaphragms are of composite construction, superior for continuous heavy-duty service, with a completely smooth surface in contact with the liquid.

Our TD series Drum pumps are designed for mobility, easy and safe handling. They are mostly used for unloading barrels and IBC containers. If you need pumps that are intended also for use in explosion hazardous environments Tapflo can offer ATEX rated pumps that can be utilized in Ex-zone 1 and Ex-zone 0. The conductive material ensures that no electrostatic loads will be accumulated on the pump. The conductive pigment in the material reduces the surface resistance. Transfer of alcohol and solvents are examples of applications for the Tapflo TX and TZ pumps. ■

For more information

<https://www.tapflo.com/en/diaphragm-pumps/pe-ptfe-pumps>

CHEMICAL ENGINEERING WORLD

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to
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ECOM Presents Tab-Ex® 03 Third Generation of its 8-Inch Android Tablet Series



well as Android 11 with update guarantee. Samsung Knox ensures high security for data and devices. The Samsung DeX

feature supports a quick switch to the desktop version. In addition, the tablet offers more RAM and external storage than the previous models.

Tab-Ex® 03 DZ2 and D2 delivers industry-leading performance in mobile devices for hazardous areas with a slim and lightweight design. It is easy to operate with gloves or the S Pen stylus. A desktop version as well as peripherals for industrial use make the Tab-Ex® 03 the perfect companion for the modern mobile worker. Digital products

The Pepperl+Fuchs brand ECOM Instruments continues the success story of its 8-inch Tab-Ex® series with the intrinsically safe Tab-Ex® 03 tablet in the DZ2 (for Zone 2/22 & Division 2) and D2 (for Division 2) variants. The successor model to the Tab-Ex® 02 is thus the third generation of Samsung devices in variants for industrial use in hazardous areas. Based on the Samsung Galaxy Tab Active 3, the Tab-Ex® 03 offers state-of-the-art technology for harsh environments as

and services from ECOM complete the all-round solution. Thus, the Tab-Ex® 03 can be fully adapted to individual requirements and offers optimal support for everyday work.

Contact:

www.schwartzpr.de/en

ABB Launches Flameproof Low Voltage Motors for Explosive Atmospheres



ABB India has unveiled its new range of flameproof (FLP) motors that are safe choice for applications in potentially explosive environments. Manufactured at the company's Faridabad facility, these low voltage motors offer considerable benefits including low vibration levels with increased reliability for an extended lifetime, and reduced maintenance requirements for a lower cost of ownership. The flameproof motors can operate reliably, withstanding extreme temperatures, corrosive dust and humidity. They comply with Indian and International Electrotechnical Commission (IEC) standards and the most demanding requirements of chemical, oil & gas industry and pharma.

Designed for enhanced safety, reliability and energy efficiency "With this launch, we have set a new benchmark for safety and energy efficiency in the flameproof

market segment. Our locally manufactured motors are designed with improved safety features and ensure a more energy-

efficient operation for customers in India," said Sanjeev Arora President, ABB Motion India.

ABB's low voltage flameproof motors have an advanced surface

treatment that resists even extreme environmental conditions. The motors have a strong frame with integrated feet for rigidity and to ensure vibration-free operation with foot mounted applications. The machined surfaces which form the flame path are more stringent than required standards & thoroughly inspected and protected against any kind of even slightest damage, to ensure safe and reliable enclosure. There are also cast shrouds on the bolts which provide additional mechanical safety and protection. In explosive atmospheres, it is crucial to ensure the safe use of electrical apparatus.

Contact:

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