

# CHEMICAL ENGINEERING WORLD

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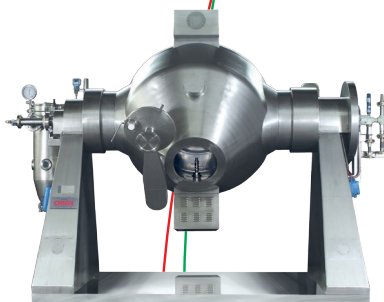
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## NEWS

**NEWS** 5 to 10, 12

## FEATURES

**Indian Oil & Gas Industry: Process Optimization** 13  
**in Logistics Operations**  
 Indrajit Singh, General Manager – Ports and Logistics, Envision  
 Enterprise Solutions

**Manufacturing in the Face of Disruption:** 15  
**Role of Industry 4.0 & Innovation**  
 Rajiv Kumar, QLeap Academy  
 Dr Arvind Chinchure, QLeap Academy

**Role of Digitalization in Achieving Process Efficiency** 18  
 Reginaldo D'Souza, AVP and Head, Sales & Marketing,  
 Godrej Process Equipment

## GUEST COLUMN

**The Impact of COVID-19 Pandemic on Chemical Logistics** 20  
 Pavithran M Kallada, Managing Director – India, BDP International

**The Impact of COVID-19 Pandemic on Investments in the Indian as well as Global Chemical Industry** 21  
 Ajay Garg, Founder, Equirus Capital (P) Limited

## INDUSTRY INSIGHTS

**Industry 4.0: Creating Positive Disruptions in Manufacturing Sector** 23  
 Arun Prasath, Senior Consultant, Industrial Practice, Frost & Sullivan

## PRODUCTS

**PRODUCTS** 30

## EVENTS

**EVENTS** 36

## PROJECT UPDATE

**PROJECT UPDATE** 37

## BOOK SHELF

**BOOK SHELF** 41

## INTERVIEW

**Indian Polycarbonate Market is Projected to Cross USD 476 million by 2023** 42  
 Anand Srinivasan, Managing Director, Covestro India

## AD INDEX

**AD INDEX** 45



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## Enabling the Enabler: Chemical & Petrochemicals (C&Pc) Industry Playing Vital Role in Combating Covid-19

**Mumbai, India:** The Chemical & Petrochemical Sector in India provides various inputs for essential products such as pharmaceuticals, agricultural, hygiene and healthcare. Keeping the importance of the sector in mind for the growth of economy and general well-being of the nation during current COVID-19 outbreak, the Indian Chemical Council, India's largest and apex body representing the chemical sector feels that the entire C&PC sector value chain should be declared as 'essential' during the current COVID-19 led lockdown period. The chemical industry in India has multiple cross linkages to other industries and thus it is a critical industry in the value chain of essential goods viz food, edible oil, drug, fertilizer, to name a few amongst others.

The chemical industry is the industry of industries; and is currently suffering due to global lockdown because of the rapid outbreak of the current epidemic. Many essential supplies from C&PC sector are either stuck at various checkpoints in the country, or the manufacturers are not able to produce even if they are permitted to operate, due to their employees not being able to report to work.

According to Indian Chemical Council, "Chemicals are indispensable and it gets widely used in our modern lives. Chemicals have direct interface with essential commodities like pharmaceuticals. For instance, very few realize that key raw materials for manufacturing of Paracetamol, an essential drug, include a large number of chemicals like benzene, sulphur, caustic, chlorine, hydrogen, nitric acid, sulphuric acid, acetic anhydride. Due to lock down of majority of C&PC plants, many of paracetamol plants are being forced to shut. Also, polymers are life-saving with applications in catheters, blood transfusion pipes, blood bags, Personal Protection Equipment (PPE), etc. Therefore the plastic downstream industry should also be treated essential due to its vast application in agriculture, potable water, food, process-flow, etc. Chemical plants in China, Korea, Taiwan, Europe, and US are already operational as they consider Chemicals as Essential."

It also implies to many essential life-saving drugs which cannot be manufactured without uninterrupted supply of key chemicals. Food grains, the most essential commodity for any country, cannot continue its production without judicious usage of agrochemicals and Fertilizers. Irrigation process in agriculture has also been suffering without durable and economical water pipes.

On highlighting the operational aspect of the sector, Indian Chemical Council, added "In most continuous processes, there is a certain minimum turndown ratio, i.e. the minimum percentage of rated capacity that a plant can operate which can vary from 50-80 percent, depending on the product. Also, continuous process plants cannot be easily stopped and started".

While domestic demand in other countries has dropped sharply in correlation with exports, the inventory is piling up. This poses a dumping danger for countries like India. Export incentives

provided by many countries will further add burden to the industry in India.

ICC strongly recommends the Chemical sector should be declared as essential and be exempt from lockdown. To ensure safe restart of the sector's operations, ICC as the leading Indian Chemical Industry body recognized by the International Council of Chemical Association (ICCA), has interacted with its peers in CEFIC (Europe) and ACC (America), and has procured guidelines on safe operations.

These guidelines include hygiene and sanitization at workplace, social distancing, and all other guidelines covering safe operations which are in line with the Government's objectives of preventing the recurrence of any COVID-19 spread.

Indian chemical industry is always pro-active and we are sure we will convert this adverse situation into new opportunities which will ultimately benefit Indian chemical industry and Indian economy with timely support from the ever cooperative government.

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## NFL Ensuring Unhindered Supply of Fertilizers to Farmer Community despite National Level COVID-19 Lockdown

**Delhi, India:** A leading Fertilizer company, National Fertilizers Ltd. under department of fertilizers, Chemical and Fertilizers ministry, Govt of India, is ensuring adequate supply of fertilizers to farmer community during National level lockdown due to COVID-19 in the country.

Shri Manoj Mishra, Chairman & Managing Director, NFL has said that production work in Nangal, Bathinda, Panipat and two units of Vijapur plants are going on in full swing. These five plants are producing more than 11 thousand MT of fertilizers on daily basis and they are being regularly dispatched to the market.

NFL maintaining optimum operations of these plants in difficult times is a big success story especially towards fulfilling Government's commitment to the farming community of the country.

Government of India, under Essential Commodities Act has allowed operation of fertilizers plant in the country so that agriculture sector may not feel the heat of lockdown and can get adequate fertilizers for the upcoming Kharif season.

As loading and unloading, dispatch and distribution activities are in full swing in these plants no compromise is made with precautions to avoid COVID-19. A special task force has been constituted at all Units to ensure adequate preventive measures against spread of COVID-19. Masks are provided to labourers and all other staff working in the premises of these plants. Frequent washing of hands is also ensured.

NFL and its employees are also helping Government in its effort to prevent the spread of corona virus by taking active part in distributing essential items like food and medicines to the needy people. They have also contributed their one month salary to PM CARES fund.

*Source: Press Information Bureau*



## COVID-19 Outbreak Impact on Energy Sector

According to the IEA short-term oil market report, world demand growth assessments for 2020 have decreased substantially from 1.19 mb/d in January to 0.83 mb/d in February – the lowest annual growth since 2011. OPEC's February monthly oil market report, meanwhile, forecasts growth closer to 1 mb/d but that is also down by 230 kb/d from last month. Although part of this decline can be attributed to a correction from January's growth figures (as is usually the case at the start of every year compared to assessments from the prior year), the coronavirus and its associated uncertainty is bringing volatility to global energy markets with low Brent oil prices.

Over the years, energy demand has shifted from OECD countries to non-OECD Asia. However, the onset of the virus has seen a reduction in air travel, road transportation, and manufacturing – which has impacted oil demand. It's worth mentioning about the geopolitical instability in the Middle East, supply disruptions in Venezuela and Libya, and a US-China trade conflict that has seen tariffs on US energy products. A sudden force majeure virus epidemic in an energy market with existing demand-eroding elements has further exacerbated supply-demand fundamentals.

From a supply perspective, any particular country's inability to absorb incremental supply means that more supply will be on the market thus creating greater volatility and market uncertainty. A greater focus will now be placed on the role of OPEC+ to see whether further supply adjustments will be made or if partners will take a wait-and-see approach as the situation develops. If prices continue to fall, US shale production may also slow. Uncertainty related to timelines and how the outbreak will fully manifest itself at its peak has become the greatest challenge to plan effective actions towards the maintenance of energy market stability.

Apart from bringing instability to oil supply-demand fundamentals, the coronavirus could also have knock-on effects in other areas of the energy sector, viz –

1. Natural gas – Falling oil prices are also causing natural gas prices to fall given energy demand as a whole is being impacted. LNG Exports are being allocated to new buyers to absorb the additional supply that has come online in the last few years. The dwindling demand for natural gas could result in a greater natural gas supply glut in the short- to medium-term. Buyers tied to long- term LNG contracts may also try to opt out to take advantage of a slump in spot prices.
2. Renewables – Extended closure of these companies could impact the global solar supply chain in the short- to medium-term depending on the duration and severity of the outbreak. Wind turbine component production can also be impacted due to production delays.
3. Petrochemicals – Although demand for plastics decreases during the Lunar New Year, the coronavirus outbreak may cause a slowdown in retail activity which will impact demand for packaging. Petrochemical plants have already lowered their

operating rates to process feedstock which can decrease in price due to sluggish demand and affect producer margins. Other petrochemical projects slated to come online in 2020 could be delayed as well.

Source: *International Energy Forum*

## Coronavirus to Hit LNG Demand at World's Largest LNG Importers

**London, UK:** LNG demand in 2020 from the world's three largest importers is now set to fall year on year, as per recent ICIS forecast.

LNG demand destruction, caused by the impact of the coronavirus pandemic, will cause imports to be lower in China, Japan and South Korea this year, compared to 2019.

"The forecast weakness in over half of the world's LNG import market for 2020 will only exasperate the current oversupply and keep pressure on key natural gas and LNG prices," said ICIS LNG Analyst Tom Marzec-Manser. "While Japan and South Korea have been contracting as LNG markets for a few years, a shrinking Chinese market will cause major headaches for those producers looking to find demand for their increasing output."

Noticeably lower macroeconomic indicators have driven much of the downward revision from ICIS, which updates its LNG demand forecasts monthly and in response to market moving developments.

Chinese LNG demand for 2020 is forecasted as 58.1m tonnes, a drop of 3.2m tonnes on cargo arrivals in 2019. In the first three months of 2020, imports have already been fallen by 4.6 percent compared to that of previous year. ICIS expects further declines over the year as gas inventories fill.

The world's largest importer, Japan, is now to receive 76.2m tonnes of LNG in 2020, down from 77.1m tonnes in 2019 as per forecast. During Q1 '20, the country's LNG imports were already down by 2.6 percent year on year at 21.6m tonnes, thus indicating a revival in the later part of the year.

ICIS forecasted that the South Korean LNG imports this year will fall from 1.9m tonnes to 38.5m tonnes. While imports, over the opening three months of the year, have been sharply on the higher trail than that of the year ago, this was largely driven by environmental policies that will have little impact on the rest of the year.

In 2019, China, Japan and South Korea collectively imported 179m tonnes of LNG, which was 51 percent of the 354mt tonnes that was imported globally.

ICIS' LNG demand forecast covers the rolling 24-month horizon, on a monthly granularity.

m tonnes	Actual 2018	Actual 2019	Forecast 2020	Forecast 2021
Japan	82.7	77.1	76.2	73.0
South Korea	44.4	40.4	38.5	39.3
China	57.6	61.3	58.1	64.0

Source: *ICIS*

## Clariant's New ReforMax® 330 LDP Plus Catalyst Increases Significantly Energy and Production Efficiency at OCI's Ammonia Plant

**Munich, Germany:** The first commercial reference for Clariant's ReforMax 330 LDP Plus catalyst is a major success. Installed at OCI Nitrogen's ammonia production plant in Geleen, Netherlands, the new steam reforming catalyst has significantly reduced pressure drop, allowing the customer to benefit from a considerable increase in energy and production efficiency leading to savings of more than 300,000 over the catalyst lifetime.

OCI Nitrogen is one of the European market leaders in mineral fertilizers and the world's largest producer of melamine. As the company synthesizes its ammonia for both of these products, efficiency is of great importance. The company's AFA 2 ammonia plant is a Bechtel design with a capacity of 1550 mtpd and runs a side-fired Foster Wheeler reformer. Before the turnaround in 2018, pressure drop over the front end was a crucial production limitation for OCI at AFA 2. The installation of the new ReforMax 330 LDP Plus catalyst, and optimization of catalyst volumes in other reactors, have removed this limitation, significantly increasing the plant's energy and production efficiency.

Since its start-up in June 2018, ReforMax 330 LDP Plus has demonstrated very stable operation and provided a significant reduction in pressure drop across the catalyst bed in the reformer tubes. This improvement will avail the plant with savings of more than 300,000 over the expected catalyst lifetime of 8 years, compensating for the catalyst investment.

Andy Vluggen, Chemical Engineer at OCI Nitrogen, commented on the improvements, saying, "We are extremely pleased with the performance of Clariant's new primary reforming catalyst, which started up in our plant one year ago, and I recommend ReforMax 330 LDP Plus for all plants with similar pressure drop limitations."

Recently launched by Clariant, ReforMax 330 LDP Plus is a novel steam reforming catalyst for ammonia, hydrogen and methanol production. The catalyst owes its pressure drop reduction capacity to an innovative proprietary 8-hole floral LDP Plus shape, which allows higher gas throughput and/or lower pressure drop as well as improved heat transfer. Combined with the catalyst's high activity and selectivity, these factors enable extremely efficient operation with reduced energy consumption.

Besides the supervision of loading and start-up of the new catalyst, Clariant also provided thermal imaging services for accurately monitoring tube wall temperatures to evaluate the catalyst's performance and identify potential problems of the steam reformer to optimize the reforming process. The thermal imaging evaluation at OCI Nitrogen's ammonia plant demonstrated optimal heat distribution throughout the furnace, as well as excellent catalytic activity.

Stefan Heuser, Senior Vice President & General Manager at Clariant Catalysts, expressed his satisfaction with the results, stating "OCI Nitrogen's ammonia plant is the first commercial reference for ReforMax 330 LDP Plus. We are grateful for the close cooperation with the OCI team and delighted that our novel steam reforming catalyst delivered the solution they sought and the advantages we promised. The catalyst's innovative 8-hole design and exceptional capacity to reduce pressure drop are outstanding in the industry." ReforMax® is a trademark of Clariant registered in many countries.

## Covestro Nominated at the German Innovation Award 2020

### Leverkusen, Germany:

Among numerous innovative projects and business models, the German Innovation Award jury has honored Covestro as one of three finalists in the category "Major Companies" for the development of a new technology for chlorine



*Energy saving chlorine production of Covestro*

production – the oxygen depolarized cathode (ODC). The award honors outstanding, groundbreaking innovations developed by German companies, which are improving markets and industries with their innovative capabilities. It is awarded under the patronage of the Federal Ministry of Economics by the magazine WirtschaftsWoche, the consulting firm Accenture and the energy supplier EnBW.

"We congratulate the company Dürr on winning first place," is how Dr. Klaus Schäfer, Chief Technology Officer of Covestro, commented the result. "We have made the leap into the group of the best which comprises a large, strong field. This nomination by an independent jury of experts reflects the high level of our innovative strength and the outstanding expertise and engagement of our employees, who made this success possible in the first place." Schäfer continued.

### The decisive volt less

Covestro employee Andreas Bulan and his team, together with Thyssenkrupp Uhde Chlorine Engineers, were responsible for developing the ODC technology. It is based on the conventional membrane method, which uses rock salt, water and electricity to form chlorine, caustic soda and hydrogen. The ODC process replaces the usual hydrogen-producing electrode with an oxygen depolarized cathode. This suppresses the formation of hydrogen, leaving only chlorine and caustic soda lye.

What's so special about this process is that the voltage required is only about two volts instead of three. Energy consumption and CO<sub>2</sub> emissions are reduced by up to 25 percent. This means that the constantly growing demand for the basic chemical chlorine can be met in a much more resource- and environmentally friendly way than before. And that's not all: with the same plant size, the new process can produce about 30 percent more chlorine.

### New process has potential for further applications

"Our innovation has two positive effects at the same time: lower emissions in generating the required electricity and more efficient management of – ideally – regenerative energies," says Hanno Brümmer, who is responsible for the production of base chemicals at Covestro. "We have successfully mastered this challenge with persistence throughout a long process."

Worldwide, about 80 million tons of chlorine is currently produced annually – and the trend is rising. If this were to be based entirely on ODC technology, some 35 million tons of CO<sub>2</sub> could be saved worldwide each year. At the same time, the potential of this technology extends far beyond the production of chlorine: it can also be used, for example, in stationary energy storage systems, for enhanced power generation from hydrogen or for decentralized water treatment. Covestro uses ODC technology in a chlorine production plant in Krefeld-Uerdingen and is currently constructing the first large-scale production plant based on ODC technology at its Spanish site in Tarragona.

## Nacero Selects Topsoe's TIGAS™ Technology for USD 3 billion Natural Plant



*The world's only large-scale natural gas-to-gasoline plant produces 15,500 barrels-per-day of gasoline. Nacero's planned facility will have more than double that capacity.*

**Lyngby, Denmark:** Nacero has signed agreements with Haldor Topsoe for basic engineering and license for a planned natural-gas-to-gasoline facility in Casa Grande, Arizona, with a capacity of 35,000 barrels-per-day of finished gasoline. Pending final investment decision, Topsoe will also supply proprietary hardware, catalysts, and services.

The plant will use Topsoe's proven TIGAS™ gas-to-gasoline technology to produce clean, high-value gasoline from low-cost natural gas. The gasoline meets local quality specifications. In May 2019, the world's first TIGAS™ natural gas-to-gasoline plant started production of 15,500 barrels-per-day of gasoline in Turkmenistan. This is the only large-scale natural gas-to-gasoline plant in the world. The owner and operator is Turkengas, and Kawasaki Heavy Industries and Rönensans were EPC contractors.

Gasoline from TIGAS™ is free of sulfur, cost-competitive, and seamlessly replaces traditional gasoline in car engines. The TIGAS™ process utilizes large amounts of natural gas, which today is often vented or flared, and converts the gas into a useful product.

"By making an environmentally superior gasoline from natural gas rather than crude oil, Nacero will enable drivers to keep their cars and help the planet. Using existing vehicles, markets, infrastructure, and proven technology affords Nacero the opportunity to quickly and predictably create meaningful benefits at world-class scale," says Jay McKenna, CEO, Nacero.

Nacero selected Haldor Topsoe and TIGAS™ after careful consideration of competing technologies. A highly influential factor was that the TIGAS™ technology is industry-proven and backed by a strong commitment from Topsoe. Topsoe initially developed the TIGAS™ technology and catalysts in the late 1970's and has continuously improved the solution through an extensive R&D program for over 40 years.

"We are proud that Nacero has made TIGAS™ their technology of choice in their ambitious plan to bring gasoline security and jobs to Arizona. This cutting-edge technology will help communities and producers monetize natural gas resources, and reduce imports by producing high-quality gasoline locally," says Kim Knudsen, Executive Vice President, Haldor Topsoe.

TIGAS™ comprises Topsoe's proprietary and widely used SynCOR Methanol™ technology that secures exceptional economy of scale. The Nacero plant will produce more than 10,000 metric tons per day (MTPD) of methanol, which is further processed to gasoline. The only byproduct from the process is purified water which is a valuable resource in the dry area.

The TIGAS™ process has a very high carbon efficiency, and the Nacero facility will have the flexibility to meet various specifications and grades of gasoline.

## LanXESS Performs with Reverse Osmosis Analyzing Software PerformMem

**Cologne, Germany:** The specialty chemicals company LANXESS has developed a new normalization software for analyzing reverse osmosis. PerformMem automatically imports system data from templates in standard process control systems and quickly normalizes even large volumes of data.

"In addition to system data, laboratory measurements can also be entered and displayed alongside each other. To the best of our knowledge, no other normalization software offers this level of flexibility," says Dr. Jens Lipnizki, head of Technical Marketing Membranes in the Liquid Purification Technologies business unit at LANXESS. "Programs like these are often Excel-based and thus cannot conveniently manage and analyze large volumes of data," says the membrane expert.

PerformMem also provides a much more detailed graphical representation of process data and normalized values. Normalized values can then be converted to various formats for further processing or analysis if necessary.

Whenever membrane processes suffer from falling retention or reduced performance, this could be due to changes in the water quality or temperature, or deposits in the reverse osmosis system. To allow interference factors to be localized more easily, plant operators should continuously document a range of basic parameters such as temperature, flow, pressure, yield, and conductivity. It can also be helpful to measure the pressure drop, ideally between the concentrate stages.

This data should be normalized – in other words, set in relation to a standard condition. This allows operators to see whether the impaired performance can be attributed to the reverse osmosis system or altered feed parameters.

Digitalization of plant data is one of the focal points and challenges in today's water management sector. This involves digitalization of not only large-scale plants, but also medium- and small-scale plants. The collection of plant data in a cloud in combination with remote maintenance makes economic sense no matter what size the plant. The data can be used for process optimization and troubleshooting – provided that it can also be analyzed. "This is frequently a weak point because, in practice – meaning, when the water treatment plant is in operation – huge volumes of data are recorded very quickly, but are rarely subject to any kind of analysis," says Lipnizki.

The new PerformMem software quickly and accurately calculates current plant and laboratory data in relation to a reference point. This makes it easy to establish whether performance is impaired due to changed feed composition or fouling. If fouling, such as salt deposits, is the problem, countermeasures can be quickly implemented so that the plant can continue to run for as long as possible under optimum conditions.



## Azelis Enters New Distribution Agreement with Merck for Vietnam

**Mumbai, India:** Azelis, a leading distributor of specialty chemicals and food ingredients, is proud to announce its new distribution agreement with Merck. Effective on April 1st 2020, Azelis will distribute Merck Performance Materials' complete range in Vietnam for personal care, CASE (coatings, adhesives, sealants and elastomers), food & health, and industrial chemicals.

This partnership is an extension of existing distribution agreements between Azelis and Merck in other countries and covers Merck Performance Materials' range for personal care, CASE, food & health and industrial chemicals in Vietnam. To ensure business continuity and the best customer experience, former Merck's employees will join Azelis' team in Vietnam, reinforcing Azelis' local sales and customer service for the Personal Care and CASE market segments.

Merck Performance Materials' portfolio includes first class pigments, active ingredients and high quality chemical raw materials. This agreement underlines Azelis' commitment to organically grow with its key partners in Asia Pacific.

Azelis is proud to have a longstanding partnership with Merck, a leading global specialist of Healthcare, Life Science and Performance Materials. The partnership between Merck and Azelis started back in 1968 with one of the companies Azelis later acquired. Over the years, Azelis extended its partnership with Merck across Europe. Vietnam is the latest country to be added to this list.

Azelis' commitment to growth and dedicated organization for each industry, coupled with technical and market expertise, proved crucial for Merck's decision to entrust Azelis with the distribution of their specialty portfolio. Azelis' business ethic and compliance, financial stability, and transparent business practices gave Merck confidence to collaborate with Azelis in new territories.

Laurent Nataf, CEO and President Asia Pacific at Azelis, comments: "Merck Performance Materials' high-quality range will be a great asset for Azelis Vietnam, enabling us to offer innovative, tailor-made solutions to customers for their entire lateral value chain. Our dedicated application laboratories in Vietnam will play a critical role, allowing us to support our customers in formulation of innovative concepts that shorten their time to market and help them become and remain market leaders in their industries. This new agreement is also an important acknowledgement of our continuous efforts to be a preferred and trusted partner on a global scale."

Panutin Tantichuwet, Head of Commercial Southeast Asia and Australia/New Zealand at Merck, adds: "Azelis is a global leader in specialty chemicals distribution. Their local technical sales team will help us focus on enhanced services to our customers in Vietnam, where we aim to improve customer intimacy, innovation and technology effort. We are confident that thanks to our strong collaboration with Azelis, we will be able to serve Merck's customers even better for future business growth."

Azelis has significantly grown in Asia Pacific during the last five years, establishing presence in 11 countries and opening more than 25 laboratories.

## L&T Heavy Engineering Secured Key Gasification Equipment Order for Talcher Fertiliser

**Mumbai, India:** The Heavy Engineering arm of Larsen & Toubro (L&T) has won contracts in Q4/FY20. The unit secured orders for key gasification equipment from Wuhan Engineering, China against

Chinese competition for Talcher Fertiliser which is the first-of-its-kind coal gasification project in India. It will produce 1.27 million tpa of urea through the gasification of mixed feedstock of Indian coal with high ash content and pet coke.

Other notable orders include reactors and heat exchangers for process plant and nuclear power sectors against global competition. Other notable orders include reactors and heat exchangers for process plant and nuclear power sectors against global competition. International orders were also secured mainly from USA, Canada, Mexico, Middle East and South-East Asia. The value of the order is ranging between ₹ 1,000 crore and ₹ 2,500 crore.

## Thaioil Chooses SNOX™ Air Quality Control for Sriracha Refinery



Thaioil will use Topsoe's SNOX™ technology to remove sulfur and nitrogen oxides and dust emissions from their Sriracha Refinery.

**Lyngby, Denmark:** Thai Oil Public Company Limited (Thaioil) has signed an agreement for Topsoe's SNOX™ solution to efficiently remove sulfur and nitrogen oxides and dust emissions from their Sriracha Refinery in the Chonburi province in the east of Thailand. This is part of Thaioil's 5-billion-dollar Clean Fuel Project to produce cleaner transport fuels in a more environmentally friendly way. The project is expected to boost capacity from 275,000 to 400,000 barrels per day – while improving energy efficiency and the impact on the environment.

The agreement comprises proprietary equipment and catalyst supply for Haldor Topsoe's air quality control technology SNOX™. This initiative, to secure compliance with air emission regulations for a new energy recovery unit at the Sriracha Refinery, is the part of Thaioil's Clean Fuel Project. The Sriracha Refinery's new energy recovery unit will use three parallel SNOX™ lines to remove sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and dust from the new circulating fluidized bed boilers. Sulfur is recovered as commercial grade concentrated sulfuric acid and the nitrogen oxides are reduced to free nitrogen.

The SNOX™ process includes energy recovery by recycling of surplus heat to reduce energy consumption in the boilers. Another benefit of using SNOX™ in a refinery is that it can also handle additional sulfurous waste streams such as H<sub>2</sub>S gas, sour water stripper gas, and Claus tail gas. Thaioil has also chosen other Topsoe technologies and licenses for its new and environmentally friendly Sriracha Refinery, including hydrotreater.

## Clariant's New ReforMax® 330 LDP Plus Catalyst Increases Significantly Energy and Production Efficiency at OCI's Ammonia Plant

**Munich, Germany:** The first commercial reference for Clariant's ReforMax 330 LDP Plus catalyst is a major success. Installed at OCI Nitrogen's ammonia production plant in Geleen, Netherlands, the new steam reforming catalyst has significantly reduced pressure drop, allowing the customer to benefit from a considerable increase in energy and production efficiency leading to savings of more than 300,000 € over the catalyst lifetime.

OCI Nitrogen is one of the European market leaders in mineral fertilizers and the world's largest producer of melamine. As the company synthesizes its ammonia for both of these products, efficiency is of great importance. The company's AFA 2 ammonia plant is a Bechtel design with a capacity of 1550 mtpd and runs a side-fired Foster Wheeler reformer. Before the turnaround in 2018, pressure drop over the front end was a crucial production limitation for OCI at AFA 2. The installation of the new ReforMax 330 LDP Plus catalyst, and optimization of catalyst volumes in other reactors, have removed this limitation, thereby significantly increasing the plant's energy and production efficiency.

Since its start-up in June 2018, ReforMax 330 LDP Plus has demonstrated very stable operation and provided a significant reduction in pressure drop across the catalyst bed in the reformer tubes. This improvement will avail the plant with savings of more than 300,000 € over the expected catalyst lifetime of 8 years, compensating for the catalyst investment.

Andy Vluggen, Chemical Engineer at OCI Nitrogen, commented on the improvements, saying, "We are extremely pleased with the performance of Clariant's new primary reforming catalyst, which started up in our plant one year ago, and I recommend ReforMax 330 LDP Plus for all plants with similar pressure drop limitations".

Recently launched by Clariant, ReforMax 330 LDP Plus is a novel steam reforming catalyst for ammonia, hydrogen and methanol production. The catalyst owes its pressure drop reduction capacity to an innovative proprietary 8-hole floral LDP Plus shape, which allows higher gas throughput and/or lower pressure drop as well as improved heat transfer. Combined with the catalyst's high activity and selectivity, these factors enable extremely efficient operation with reduced energy consumption.

Besides the supervision of loading and start-up of the new catalyst, Clariant also provided thermal imaging services for accurately monitoring tube wall temperatures to evaluate the catalyst's performance and identify potential problems of the steam reformer to optimize the reforming process. The thermal imaging evaluation at OCI Nitrogen's ammonia plant demonstrated optimal heat distribution throughout the furnace, as well as excellent catalytic activity.

Stefan Heuser, Senior Vice President & General Manager at Clariant Catalysts, expressed his satisfaction with the results, stating "OCI Nitrogen's ammonia plant is the first commercial reference for ReforMax 330 LDP Plus. We are grateful for the close cooperation with the OCI team and delighted that our novel steam reforming catalyst delivered the solution they sought and the advantages we promised. The catalyst's innovative 8-hole design and exceptional capacity to reduce pressure drop are outstanding in the industry". ReforMax® is a trademark of Clariant registered in many countries.

## Quarter of European Ethylene Capacity Threatened by Refinery Cuts

**LONDON, UK:** At least 6.6m tonnes/year, or 26%, of Europe's ethylene production capacity is threatened by oil refineries running at reduced rates or ceasing production, according to new analysis by ICIS.

The ethylene is produced by crackers attached to refineries hit by collapsing demand for petroleum products including jet fuel as coronavirus-linked restrictions cut road and air transport; aviation has come to a standstill across the region.

These ethylene crackers may be forced to reduce operating rates or close because they rely mainly on naphtha or liquified petroleum gas (LPG) feedstocks sourced from the refineries to which they are linked.

ICIS analysis suggests the 6.6m tonnes/year represent about 50% the refinery-linked steam cracking capacity in Europe, and 26% of the region's steam cracking capacity.

For propylene, 5.9m tonnes/year of capacity is linked, while for benzene the figure is 4.0m tonnes/year.

The analysts are aware of around 6.5m bbl/day of oil refining capacity that is not operating at typical capacity.

There are some planned stoppages, but most are due to reduced fuels demand from coronavirus and associated lockdowns. The experts believe that at least 2.2m bbl/day of reductions are in place, versus the expected forecast throughput of 12.2m bbl/day for Europe.

"The reduction is almost certainly even higher in reality and could be as high as 5m bbl/day when considering those sites which do not share such information," according to Michael Connolly, Senior Consultant at ICIS global refining team.

The refineries are operating in the range of 50-60% utilisation, which reflects the typical minimum turndown for most distillation units.

However, the crackers that are directly linked are probably able to run at higher utilisation rates than this.

Connolly said that while the normal feedstock of light naphtha is reduced in tandem to refinery utilisation, the mid-portion of naphtha that is generally used in the gasoline pool (via further processing) can be directed to steam cracking instead, which produces a lower quality feed than light naphtha.

"This would assist in decoupling refinery-cracker utilisation rates, to enable the better margins on naphtha cracking to be captured and meet supply demand for the types of polymers that are essential for the fight against coronavirus," added Connolly.

This ability could be maintained while the upstream refinery is operating. But if the refinery is forced to shut down completely, many of these crackers are unlikely to have the logistics to support importing sufficient feedstock to maintain operations, particularly inland crackers which represent 2m tonnes/year of this ethylene capacity.

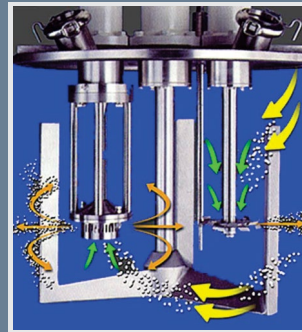
Source: ICIS

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# "World is a Beautiful Place: Be Good, Do Good, and Derive Pleasures from Little Things", says Daksh Malhotra, Director & CEO, Everest Blowers Pvt Ltd

I will start with some known facts about the recent COVID-19 Pandemic. To put Life over Livelihood, I think the Central Government has definitely taken some bold steps well in time. This is commendable. The whole world is appreciating India for the way the Pandemic has been controlled here; On top of it, the distribution of Covid prevention drug – Hydroxichloroquine – has further added to the positive sentiments in World's outlook of India.

However, after listening to various interviews from the medical fraternity, ICMR, CSIR, WHO and other eminent bodies, what I comprehend is: this disease is highly infectious, but has a very low Fatality rate. In the young & healthy, it's less than 1 percent. Symptoms are mild; internal immunity may have been recovered without them even knowing.

Although the 1<sup>st</sup> case was officially declared by China on 30<sup>th</sup> of December, rumor says – it was discovered on 17<sup>th</sup> November which is approximately six weeks before the reporting date. However, we would have no certain way of knowing it given the state of Media and strict controls within China. India however was prepared with broad outlines of Stage-1, Stage-2, and Stage-3 by the mid-of-January. The 1<sup>st</sup> case reported in India was around the 30<sup>th</sup> of Jan.

According to my perspective, the anti-China sentiment of western world will surely act in our favor. Even in post-lockdown period, the virus is not going anywhere. We will have to take care of the old-and-vulnerables. As of now, more than 87 vaccines are under development and 7 of them are being developed in India. One, out of the mentioned seven, is already under human trail. And if all is going good, we should have it before the end of this year. As per the historical data, humanity has dealt with many viruses; and therefore, for India it's not the 1<sup>st</sup> time. Way back in the year 2009, over 16.5 Lac people were infected and over 1.89 Lac people were died due to Swine Flu. Even before the incident of Swine Flu, HIV Aids came in India in 1983; and first close medicine was made in the year 2000, which is after 17 years of the first incident. Against an initial prediction of over 4.5 crores, the actual number of infected people in India was bring down to approximately 21 Lacs.

The Government was very proactive at that time and did a great job in awareness creation to the extent of absolute bottom of the pyramid. The fight was people driven. Now, Herd Immunity – to some extent – is the way forward ensuring that the positive cases are identified and quarantined at community levels.

The impact of COVID lockdown on the entire community due to this is bound to happen and there is no denying of the fact that it will also impact the waste water treatment and allied industries. However, it will be much more cushioned compared to other businesses especially Airlines, Hotels, Shopping Malls, etc. Water & wastewater (Effluent or Sewage) treatment are a definite need of the hour for a country like ours. And the Government, with all its bureaucratic bodies, understands the importance of wastewater recycling. United Nations, on 22<sup>nd</sup> of March, stated that poor water infrastructure is a greater risk than Coronavirus. The return on investment on water sanitation can be high, with reduced diseases and good health of citizens. Norms have to be stricter to check the water pollution from sources viz various industries, agriculture, and household wastewater.

The current sewage management infrastructure is relatively poor in both urban and rural India. Under-treated sewage water can also contribute to the widespread impact of diseases in the times to come. As per the report published by CPCB India, our sewage treatment capacity extends up to the extent of only 37% of total population. In short term perspective, good hygiene habits like use of soaps and sanitizers are remedial; however, keeping the overall human resource benefits in mind, an overhaul current STP capacity is the need of the hour to eradicate major causes of various diseases from the root.

We at Everest Blowers have been evolving and changing ourselves to meet the market demand and to help the frontline, which is the wastewater treatment plants in this case, in all possible ways. We have been operating our factory from the 15<sup>th</sup> of April under special permission from Govt. of Haryana, maintaining all the norms applicable to the lockdown

situation. Everest Blowers has been very adaptive to technology and we have been on the digitization track for some time now – be it the use of ERP, the AI enabled Chat-Bot, or our very own E-Commerce Portal (shop.everestblowers.com) – with a constant touch with various stakeholders. We do that keeping all channels of communication open. Presently we have been conducting various webinars to appraise our latest offerings on Turbo Blowers & Centrifugal Blowers, and also for the telecom discussions. Most of our team members are well equipped to work from home barring the ground level operators. Being a manufacturing company, work-from-home culture is very new to us; however, I am glad that we are coping up well. Our Business Continuity Plan Committee is doing a good job. Members of Everest Blowers have even donated their one day's salary to PM CARES FUND in early April and devoted to help even more. We are keenly exploring all the possibilities of how to bring more technologies in use to promote remote working even in better times ahead. Everest Blowers is sitting on good stock of blowers and allied accessories, thus enabling to cater the customers – even in this time.

Like all other manufacturing companies, we have also suffered from time and revenue losses owing to the less usage of man-days. In March, the working is only for half of the month; for April it was at the extent of 20-25% approximately; and for the future, it is uncertain. However, we have surely been looking forward in terms of strategy. With some tweaking, short term proceedings will be managed. Having said that, the future for Indian Industries is seeming bright and Everest is on its way to get ready for such future. ■

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# Indian Oil & Gas Industry: Process Optimization in Logistics Operations

This article narrates the scope of process optimization in logistics operations in context of Oil and Gas industry. The author here has given a special emphasize on installation of easy-to-adapt and quick-to-implement IT systems to make the logistics scalable

**T**he geographical intricacies and diversities in oil and gas projects include, but not limit to, complex transportation networks, inventories, material handling, trade competitiveness, and information technology system; thus always requiring a sophisticated logistics system. Right from extensive seabed exploration of the gas involving seismic, geological, and geophysical operations to extraction involving drilling of the seabed, rig installation, and engineering to the complex refinement process for the final transmission to the end consumer whether wholesale

or retail; the logistics system not only merely requires meticulous planning and execution, but also optimization induction at every single stage; and all this with calculated cost-benefit analysis which is most pronounced in oil and gas industry.

Having said this, the wide varieties of input materials and services required at varied but short frequencies for the operations to move the extracts when challenges prevail all pervading. Production operations become the customers that use the output of

exploration. Oil exploration from seabed or river bed has a customer, refining has a customer, and selling the final product has a customer; this certainly has multi-party interest distribution and transportation.

Procurement, production, distribution, and transportation in energy sector can be significantly addressed by careful market segmentation. A good on-hiring and management of offshore supply vessels including route optimization techniques, and proper cargo lashing & security aboard OSV's for multiple





rigs rotation always helps optimizing oil logistics. Having a decent fleet of trucks suited to the carriage of materials and parts for oil rigs and multi-modal transportation coordination for door to door or base to base has high yields. Deploying an excellent health, safety, and environment policy at the management and operational level has always helped in reducing the logistics expenses. It has been observed that cross platform partnerships and increased sharing of responsibilities among the multiple players of logistics system plays lasting impacts on oil and gas production and transmissions – be it shipper or carrier. Drilling companies working with material suppliers, equipment lessors, logistics

service providers, and multi-modal operators have successful contribution in diminishing the overall logistics cost.

The rapid advancement in the field of virtualization in oil and gas industry demands flexibility in a way these companies work, in simplifying the data management and access with a view to convert the entire logistics chain into a value chain rather than the service chain. And the ongoing consolidation in the industry requires: an easy-to-adapt and quick-to-implement IT systems for logistics which is scalable enough to handle the predicted volumes in future, a logistics software which can cater to user-needs featuring visibility,



optimization, cost reductions, and quick decision support right from field workers to the top management level.

In times when AI/ML has ensconced in all the sectors, it's application in material requirement forecasting the oil platforms, and thus getting advance visibility kindles an effective supply logistics planning ensuring responsiveness at the same time given very wide portfolio of requirements for the platforms. Not just materials forecasting but also the entire demand forecasting of the final produce of the wells, demand planning, and getting it embedded into operational planning will have effective logistics system. Demand variability, creating ripples upstream and downstream, can be kept under control by quantifying it. Consolidating hundreds of suppliers into a single sourcing point requires the acumen and support of good IT systems.

### Conclusion

Firms should also pay close attention to offering a tailored suite of products and services which in turn will increase the revenue per unit spent on logistics; let's name it personalization of the logistics services, which actually means that – right from Government bodies, to facility operators, to marketers, to drilling companies, to economic experts, and to engineers: all coming under a single and tightly knit umbrella for studies, exploration, and execution of the oil and gas projects amalgamated with logistics network planning that helps the entire ecosystem. ■

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# Manufacturing in the Face of Disruption: Role of Industry 4.0 & Innovation

This article speaks about the potential impact of ongoing COVID-19 disruption in manufacturing industry and with this context, how Industry 4.0 deals with this disruption through smart manufacturing.

The world is in a COVID-19 pandemic shock and experiencing a disruption that has never been seen in the last few decades. Major manufacturing around the world has ground to a halt. The full extent of business and economic impact due to the pandemic is still unknown. To sense the potential impact of the ongoing disruption, the Maratha Chamber of Commerce, Industries and Agriculture (MCCIA), Pune surveyed close to 400 manufacturing and services companies. The results of the survey indicate that the cash flow and fear-of-future-business are the top two concerns for over 95 percent of the companies. This disruption impacts every manufacturer in some way or the other and many companies fear an existential threat.

The manufacturing will become complex during the crisis to prevent another surge of COVID-19. The manufacturing plants will have to create a new floor plan, develop new work processes, and produce products that market demands by ensuring the health and safety of workers. The production plan will have to be dynamically adjusted based on the changing market demands, availability of staff and availability of raw materials. Manufacturing companies are compelled to rethink their production, sourcing and business strategies to deal with the crisis.

## Role of Industry 4.0 in Dealing with the Disruption

Industry 4.0 is revolutionising manufacturing in the way products are

designed, manufactured, and distributed through rapid, end-to-end digitisation of all physical assets and their integration into digital ecosystems. Industry 4.0 can enable factories, connect the supply chain network and logistics capabilities, and informed planning & inventory processes, along with a host of other capabilities required to manage demands of the ongoing disruption.

The investment in automation and remote operation has brought forward an unexpected outcome during the crisis. The Parisian purveyor of Dior perfume is distilling hand-sanitiser, Mahindra and General Motors, Tesla want to make ventilators by reconfiguring and repurposing factory lines. While P2i makes nanotechnology coatings for electronic devices, operating and inspecting factory in China previously was only accessible from their headquarters in Oxford at a level of detail to someone on the spot.

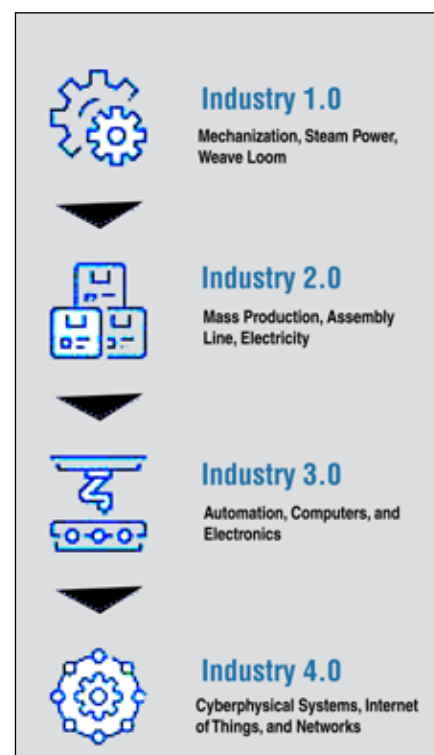
This is possible as smart manufacturing enables devices and machines to communicate with each other and make effective decisions on production planning as well as on actual production, based on triggers in the demand of the product, thus efficiently managing manufacturing as well as distribution. The implementation of Industry 4.0 enables manufacturing companies to

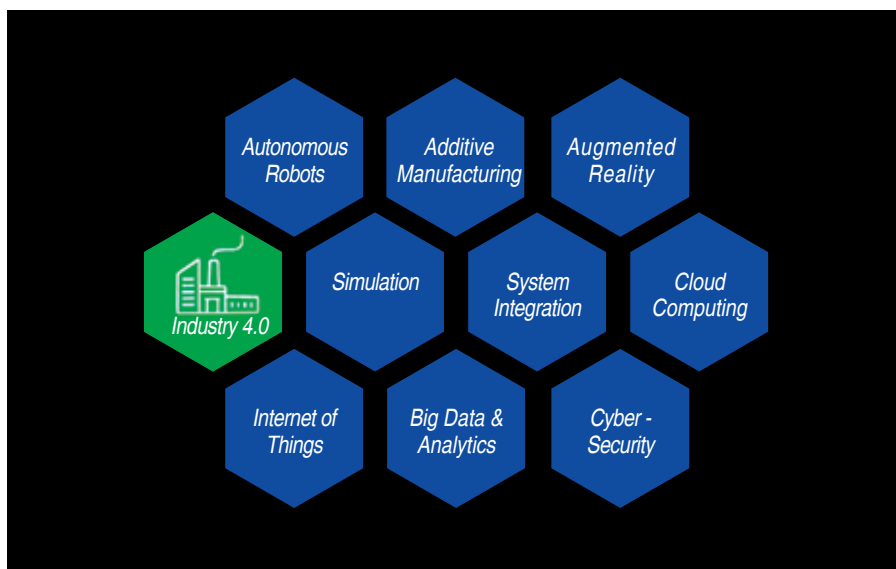
- Increase the productivity by drastically shortening the period between the development of a new product and its delivery to customers in the market

- Increase the efficiency through automation for greater flexibility, the better quality of products, more efficient production, and
- Energy savings

Industry 4.0 offers flexibility, efficient use of resources, as well as integration of customers and business partners in the business process. The immediate opportunities for developing smart manufacturing solutions that benefit small and large manufacturing companies from Industry 4.0 include:

1. Application of big data and analytics to optimize production quality, to save energy towards improving the services, and to allow real-time decision-making





2. 3D computer simulations for product development, optimizing production processes, and rapid prototyping as well as testing for faster innovation
3. IoT solutions to monitor, collect, exchange, analyse and deliver valuable new insights to improve efficiency, save time and cost through condition monitoring, predictive maintenance, improved safety and other operational efficiencies, and to enable real-time responses
4. 3D printing to produce small batches of individual components, complex customised products and designs to reduce transport distances, and inventory management costs – particularly for spare parts that were stuck in the supply chain
5. Virtual and augmented reality-based solutions for selecting parts in a warehouse, sending repair instructions over mobile devices, and for enabling

the workers to perform tasks they were not trained for more easily. This could have assisted with skill shortages due to self-isolation or repurposing of manufacturing

6. Cyber-security solutions to protect systems, networks, and data from cyber attacks
7. Cloud services to provide real-time information from a multitude of devices and sensors, collaborate with suppliers and distributors.
8. Develop autonomous, flexible and cooperative robots to tackle complex assignments in the assembly lines and assemble products alongside humans with flexible hands, feeding systems, camera-based part location and control systems. Use of autonomous electric vehicles and drones to reduce the reliance on people and to further assist with social distancing.

**The manufacturing will become complex during the crisis to prevent another surge of COVID-19. The manufacturing plants will have to create a new floor plan, develop new work processes, and produce products that market demands by ensuring the health and safety of workers. The production plan will have to be dynamically adjusted based on the changing market demands, availability of staff, and availability of raw materials. Manufacturing companies are compelled to rethink their production, sourcing and business strategies to deal with the crisis.**

In the longer run, manufacturing companies will have to develop and adopt advance technologies like digital twin and cognitive systems. The digital solutions backed by simulation & modelling, big data analytics, AI algorithms, and machine & deep learning can help companies in:

- Efficient real-time tracking & monitoring of machines, driving predictive analysis to eliminate downtime, and reduce the unplanned shutdowns resulting in enhanced plant performance
- Analysing real-world data to extract insights into how the product is being used and its user experience – to improve the product, to assist in decision making, and also for process advancement
- Testing and accelerating innovations to take products to market faster
- Controlling inventory shrinkage in supply chains

A digital twin enables small and large companies to increase plant reliability, to optimise the resource usage, to minimise the downtime, and to improve the performance & efficiency in factories by intelligently using data and simulating & modelling conditions quickly to make changes in the physical world. As a result, large and small organisations across industries can benefit from the capabilities of digital twin solutions.

Whereas the application of cognitive systems can transform the entire manufacturing value chain by utilising connected sensors, analytics, and cognitive capabilities to:

- Sense, communicate, and self-diagnose the issues to optimize performance and reduce unnecessary downtime in improving operational efficiency
- Automate tasks by analyzing a variety of information from workflows,

context, process, and environment to drive quality, enhance operations & decision-making, and overall customer satisfaction

- Combine various forms of data from individuals, location, usage, and expertise with cognitive insight to optimize and enhance resources
- Keep learning unsupervised, and continuously adjusting to the new information resulting in higher-quality insights and business intelligence
- Open up opportunities to harness untapped data sources to provide highly personalised services, improved service consistency and quality, and enhanced knowledge sharing

A cognitive system synthesises the data residing across machines, systems, and processes to derive intelligent and actionable insight across the horizontal and vertical value chain to drive key productivity improvements in reliability, quality, and efficiency of the manufacturing environment.

### **Industry 4.0 Skilling: Key Enabler in Navigating the Disruption**

One of the critical challenges in the widespread adoption of Industry 4.0 is the lack of skills and expertise in the current workforce and leadership to apply new-age technologies to navigate the disruption. The adoption of Industry 4.0 is likely to be radically faster than anything yet experienced due to the crisis. The availability of adequate talent – both at a strategic leadership level as well as on the factory floor – can prove to be a significant challenge for industries.

The technologies that enable Industry 4.0 include smart sensors, automation devices, advanced robots, Internet of

Things (IoT), cloud computing, location detection technologies, human-machine interfaces, augmented reality, 3D printing, artificial intelligence (AI), big data analytics, and mobile devices, to name a few amongst others. We need to consider the fact that for the development of Industry 4.0, industries need to go through a change in both technical and social aspect and develop to the necessary skills.

On the technical side, a soft transition between different departments and areas within a single manufacturing facility for efficient automation and intelligent manufacturing is necessary. Therefore, the technical competency profile will be more interdisciplinary than specialised. Engineers and programmers will have to get out of the comfort zone of their domain knowledge and learn cross-functional concepts, production processes, machine technology, and data-related procedures.

We at the QLeap Academy are on a mission to create Industry 4.0 professionals and leaders using our innovative “Design Solution” methodology which combines principles of smart manufacturing, innovation tools, and building solution in the laboratory. Our efforts in large and small companies have resulted in rapidly building Industry 4.0 capability within the organisation along with benefits in terms of cost and quality.

### **Conclusion**

Companies are beginning to prepare for the post-COVID world. The focus for many manufacturers now is the survival and to limit the damage. Moving forward, the adoption of Industry 4.0 for smart manufacturing will keep companies alive and grow in the future. The focus of the next few months for companies is to deal

with human life and safety while planning for the future. The companies have to start connecting its manufacturing equipment to the internet so that it can make the adjustments remotely, infuse of data-enabled decision and services, to get real-time visibility across the business, and to see this acceleration as offering new possibilities for reinvention, even resurrection. The pandemic has a profound, far-reaching, and unprecedented impact that will spur a new wave of innovation in the manufacturing to deal with this level of disruption.

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**Digital twin enables small and large companies to increase plant reliability, to optimise the resource usage, to minimise the downtime, and to improve the performance & efficiency in factories by intelligently using data and simulating & modelling conditions quickly to make changes in the physical world. As a result, large and small organizations across the industries can benefit from the capabilities of digital twin solutions.**

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# Role of Digitalization in Achieving Process Efficiency

In this article, the author narrates the importance and how-factor of using digitalization in achieving optimum process efficiency.

In simple words, 'Digitalization' is about using the latest digital technologies in our day-to-day work to make it more data driven, predictable, sustainable, and more importantly – easier. These days we see a lot of examples on digitalization and how it has transformed the way organizations use data, plot trends, and enable informed decision making. It also helps in connecting all the assets seamlessly to get real-time feedback from machines in terms of performance & predicting breakdowns, and also to provide enriching customer experiences pre and post order.

In the heavy fabrication industry, digitalization is a vital tool to improve process efficiencies across all levels and functions. The key is how well one can seamlessly integrate the customer needs to organizational processes by reducing the touch points. This would ideally result into optimum efficiencies, thereby fulfilling the needs of our customers. Digitalization is ultimately about having a more agile system.

Let us look at digitalization in three broad phases.

**1. Pre-Manufacturing:** Design being the most crucial part of this phase, it presents a great opportunity. An example is our CREO design software, currently in the final stage of development, which would help to standardize the designs and to facilitate the generation of 3D drawings for all complex pressure vessel designs. This when fed to the shop floor, provides

flexibility such as identification of complex manufacturing steps, detection of interferences, etc. It also helps to plan the sequence of operations to suit the ease of fabrication and thereby to avoid the rework. It also aids in avoiding human errors due to misinterpretation of drawings and deskillling of the design aspect to some degree. When coupled with the standardized MTO (material take off) process, it ensures the finalization of BOM (Bill of Material) for faster procurement. The digitalization of this entire process produces data in a digital form which could be used to retrieve and to link documents, project man hour costing, better estimate, and to provide a feedback loop from the shop floor. It is all about operating in real-time, and integrating the design & the manufacturing seamlessly.

**2. Manufacturing:** Digitalization is also about how other support functions of the business can help in building and maintaining a strong business growth. Critical assets such as machines and tools can be interlinked through sensors, RFIDs, etc to the main business process architecture delivering critical real-time information to assist in planning, resource allocation, supply

chain decisions, course corrections if needed, maintaining shutdowns, and so on. It ensures that the entire business process is managed in a more structured manner leading to producing just-in-time, huge reductions in inventory and working capital, and more. Industry 4.0 is a perfect step in this direction.

With regard to manufacturing processes, it's not only moving from manual operations to automation, but also about facilitating process parameter controls that provide a high degree of efficiency, achieving the first-time-right, and reduction of rework. For instance, the GO-DETECT feature on our semi-auto welding machines helps to detect welding defects in real-time to avoid heavy rework. Especially on critical metallurgy, it provides feedback to the controller for auto parameter corrections that would maintain the desired weld parameters. Several other data points in terms of the welder, weld parameters, time period etc which are linked directly with our ERP system, are provided making it a perfect closed loop system.

Replacing large sized physical paper drawings with digital screens on the shop

**Digitalization is ultimately about having a more agile system. In the heavy fabrication industry, digitalization is a vital tool to improve process efficiencies across all levels and functions. The key is how well one can seamlessly integrate the customer needs to organizational processes by reducing the touch points. This would ideally result into optimum efficiencies.**

floor is another example of providing flexibility and direct real time interface with design.

**3. Customer Connect:** Creating a meaningful and enriching customer experience is always a priority. The real-time dash boards aiding a robust internal review process of critical business pulse parameters, provide confidence to the customers about our control over the business processes. Strong data analytics facilitate informed and timely decisions. Our marketing portal is an example. The entire business development and marketing data is stored in a web-based portal which serves as a handy resource for our sales representatives to access, while on-the-go. A simple click retrieves information in order to facilitate productive

discussions, be it historical data on past order executions, customer data, data on metallurgy, sector-wise and process-wise reports, etc.

The sales data is seamlessly integrated with estimation, procurement, thus becoming a solid tool for understanding the competitiveness, loss analysis, and in helping to create a winning formula.

#### Conclusion:

In summary, Digitalization for us is all about:

- Building predictable and sustainable processes
- Seamlessly integrating all our business processes
- Standardizing the processes to avoid errors
- Reducing touch points in our value chain

- Deskilling
- Building an agile system enabling quick response to any change
- Doubling our turnover with the existing manpower resource

As we embark on a challenging growth path to double our turnover in the next 3 years, our Digitalization Road Map is one of the most pivotal success factors. ■

#### Author Details



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## Contribute to CEW

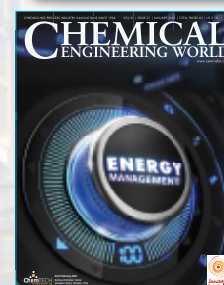
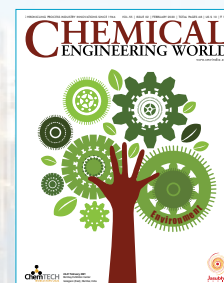
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# The Impact of COVID-19 Pandemic on Chemical Logistics

“According to IBEF, India employs more than 40 million people and contributes USD 200 billion to the Indian economy. This vast segment is considered to be the lifeline of the country and holds critical importance since it connects various markets, suppliers, and customers. The impact will be more severe to the Indian chemical industry than to other industries”, says **Pavithran M Kallada, Managing Director – India, BDP International**, on global COVID-19 outbreak



**Pavithran M Kallada**  
Managing Director – India  
BDP International

In this troubled time of global lockdown and disruptions across the industrial sector caused by the COVID-19 pandemic, companies are finding it difficult to operate and manage their supply chains and logistics. The impact of this pandemic on the chemical industry is also no different. It is possible that the effect on the chemical industry supply chain is greater than in some other industry verticals, especially when the percentage of digital adoption in the chemical industry is comparatively less than in other industry segments.

## Economic Fallout

Significant economic fallout due to the endemic has been creating inefficiencies across an already overburdened logistics landscape. According to IBEF, India employs more than 40 million people and contributes USD 200 billion to the Indian economy. This vast segment is considered to be the lifeline of the country and holds critical importance since it connects various markets, suppliers, and customers. The impact will be more severe to the Indian chemical industry than to any other industries viz. automotive, etc. This is largely because, in India, there are few chemical clusters of feed stock, intermediates, and finished products (including storage/warehousing) like those seen in China and the western world. Hence, the domestic trucking disruption and lockdown have a greater impact in connecting suppliers, customers, and markets.

## Supply Chain Disruptions

Worldwide, logistics and shipping have

been currently experiencing unprecedented disruption. As early as in January 2020, disruption began with the Chinese New Year. Then Wuhan began reporting the extent of the COVID-19 virus and a longer shutdown was declared in China, affecting Chinese exports to the world. India has seen the impact from early February. Feed stock, intermediaries, and specialty chemical supply from China started drying up causing problems in the Indian chemical sector. Further, as China started manufacturing with staged capacity, the COVID-19 virus gripped Europe, USA, and India. This led India to a complete lockdown resulting in supply chain and logistics breakdowns. India was affected not just in the import aspect of raw material, feed stock, intermediate, and specialty chemicals but also the global supply from India.

Considering the high dependency on labourers and sizeable transportation of material across the country, the impact on chemical logistics has been acute. Though the Indian government has issued directions to allow transport, international border clearances and logistics under the ‘essential category’, the reality on the ground is different due to: unavailability of drivers and operators already in lockdown villages, millions of stranded trucks loaded with nonessential categorized materials unable to move to their destination or off-load to warehouses, local restrictions by authorities and police, and social stigma attached to leaving home & housing preventing people from working.

## Logistics Impact:

- Capacity issues of trucks, vessels, and storage space
- Areas of high risk or under local containment that impact regular supply of goods
- Availability of public transportation networks affecting labourers
- Loss of trained/skilled labours moving to new jobs including farming in their village instead of migrating to industrial areas, resulting in a shortage of skilled labours in cities post pandemic
- Interstate movements of non-essential goods: this would still be a challenge considering the local containment process and state-wide control mechanism to curtail the spread
- Vessel blank sailings due to insufficient cargo impacting supply chains and delaying material availability
- Financial liquidity affecting truckers, warehouse operators, and logistics service providers
- Consumption may not return to pre-COVID-19 levels, resulting in demand issues.

## Conclusion:

State and national governments are taking steps to address these issues. However, it is important that we, in the chemical industry, consider the current challenges and possible solutions. No doubt we will encounter extended challenges even after the pandemic is over. ■



# The Impact of COVID-19 Pandemic on Investments in the Indian as well as Global Chemical Industry

“The COVID-19 pandemic – in terms of its geographical coverage, scale, and global response – is unprecedented in recent history. It confers to an external force that will have far reaching implications on societies in general and commerce in particular. While the current lockdown (or various versions of it across the globe) will significantly impact the economy and chemical industry, we foresee that Government & central banks will ensure a rapid recovery and impact on global GDP is transient in nature. Despite the affirmative actions, we believe that globally, this crisis will lead to a renewed aversion to debt along with postponing of capex and capacity additions in medium term”, says **Ajay Garg, Founder, Equirus Capital Pvt Ltd** on the far-reaching impact of present prolonged COVID-19 pandemic on Indian as well as Global economy.



**Ajay Garg**

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Isaac Newton, in his seminal work titled ‘Philosophiæ Naturalis Principia Mathematica’, published the laws of motion. The work included the treatise that – given an absence of external force, all bodies tend to maintain inertia. While Newton’s work was supposed to cover physical bodies, the same is also true for civilizations and societies tending to demonstrate the same resistance to sudden changes. The COVID-19 pandemic – in terms of its geographical coverage, scale, and global response – is unprecedented in recent history. It confers to an external force that will have far reaching implications on societies in general and commerce in particular.

While the current lockdown (or various versions of it across the globe) will significantly impact the economy and chemical industry, we foresee that Government & central banks will ensure a rapid recovery and impact on global GDP is transient in nature. Despite the affirmative actions, we believe that globally, this crisis will lead to a renewed aversion to debt along with postponing of capex and capacity additions in medium term.

However, this crisis is expected to intensify a few global trends that were visible even prior to COVID-19 and have been enumerated below.

## **Global markets for chemical products**

The longer-term impacts will be felt in the way businesses and supply chains are structured. The complete disruption of logistics has made many countries and purchase managers realize the perils of outsourcing and over dependence on China for significant percentage of their product requirements. This will further hasten the process of de-risking supply chains in chemical industry away from China, which started as a result of China strengthening its pollution norms and got further accelerated during the Sino-American trade dispute and concomitant tariffs. This has already led to the businesses looking at geographical diversification. The key traits of any location to emerge as a credible competition to China includes availability of petrochemical feedstock, sizable domestic market, ease of doing business, and the factors alike.

India scores well on most of the parameters and is ideally placed to emerge as a credible alternative to China in chemicals manufacturing sector. India’s share in global chemicals trade by value is ~3% with established credential across the specialty chemicals segments like intermediates for APIs, agrochemicals, flavours and fragrances, dyes and pigments segments with a total value in global trade of over USD 220bn. China’s share in the above segments is ~3 times of India, and we foresee the gap to reduce over the next decade with companies shifting their production units / capacities to India.

## **Indian markets – focus on domestic manufacturing**

India is the sixth largest producer of chemicals globally and the third largest in Asia in terms of output. For agrochemicals production, the country ranks third globally and contributes around 16 per cent to the global dyestuff and dye intermediates production. Indian chemical industry is a ~USD 175bn industry which is expected to grow to

USD 300bn by 2025 at an estimated CAGR of 9 percent.

### Low per capita consumption offers large untapped opportunity

As per FICCI report on the sector, the per capita consumption of chemicals in the country is one-tenth of the world average with India being one of the low consumption countries even amongst developing nations. The COVID crisis is expected to cause long standing changes to personal hygiene habits across the social and economic spectrum which, when combined with Government initiatives like Swachh Bharat Abhiyan, should help sustain the strong domestic demand in the long term.

### Import substitution

India imports ~USD 50bn chemicals with a trade deficit of ~USD17bn. Petrochemical building blocks, intermediates and polymers form over 50 percent of India's chemical imports by value. These intermediates are vital links in the Indian chemical industry and act as feedstock for specialty chemicals, which in turn are used to produce a vast majority of consumer and technology products. This high dependence is despite the fact that India is largely self-sufficient in Naptha, the key raw material for a large set of petrochemical building blocks and polymers.

Over the past few years, India has been pushing its chemical industry to reduce its dependence on China and to manufacture the key raw materials in India. As per the industry body Indian Chemical Council, to reduce the import dependency and to improve the exports, Indian chemical industry will need an investment of ~USD 75bn including an investment of USD 10bn over the next decade to make basic chemicals such as butadiene, ethylene, propylene, and other derivatives required for the petrochemical industry to meet the Indian chemical industries' raw material requirements. Indian companies have tried to address this through a combination of incremental capex in India

and partnerships with entities outside India to secure alternative and cheaper feedstock.

While on the feedstock side, Indian petrochemical companies have already announced plans to invest over USD 15bn in building incremental petrochemical capacities over the next 5 years, companies in specialty chemicals space are expanding manufacturing capabilities to take advantage of the increased demand in India as well as exports.

The sector is being supported by various Gol initiatives including the renewed focus on reviving the four 'Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR)'. The four PCPIRs in Andhra Pradesh, Gujarat, Odisha, and Tamil Nadu are aimed to reduce overall capital expenditure of chemical companies by building common infrastructure of utilities, pipelines, and Effluent Treatment Plants; and strategically located at ports for easier access to both domestic and global markets.

### Focus on sustainability

Sustainability and adherence to global best practices as well as environmental norms will play an increasingly prominent role in selection of industry partners and suppliers with various stakeholders placing a premium on it. While Indian companies may need to re-evaluate their business processes and policies, their long track record in working with leading pharmaceutical and consumer companies will help them in being better placed to rise to the occasion as compared to other competitors.

### Conclusion:

All of this leads us to believe that Indian chemical sector is entering a golden period witnessing a rapid growth for the industry. While this will require significant capital, we do not foresee it as a challenge as we are witnessing significant interest from pools of capital (debt as well as equity) to be a part of the growth story and to enable the sector's growth. ■

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# Industry 4.0: Creating Positive Disruptions in Manufacturing Sector

In this article, the author narrates how the adoption of Industry 4.0 helps the manufacturing sector to improve their process efficiency, not only just to survive, but also to thrive.

**M**anufacturing companies constantly focus on improving their process efficiency to maintain or increase their market competitiveness. In the past decade, there has been a shift from continuous production to intermittent manufacturing due to constantly changing customer needs. The only way manufacturers can stay ahead of competitors and win market share is: to embrace new technologies to improve process efficiency. Manufacturing companies are now leveraging Industry 4.0 technologies – not just to survive, but also to thrive.

## Industry 4.0 Adoption across the Manufacturing Sector

Industry 4.0 is a connected network of cyber-physical systems that transforms manufacturing efficiency and agility. Across the sectors, Industry 4.0 has been changing the traditional manufacturing relationships. In addition to this, the adoption of Industry 4.0 helps the manufacturers to enhance machine-to-machine communication, monitor processes and resources, and improve the overall safety by providing connected and productive manufacturing.

Sustainable developments in Industry 4.0 include:

- Using resources and optimizing processes: Processes with excess resource consumption can be identified and optimized, or eliminated through the incorporation of smart materials / processes
- Labor productivity: Worker training can

be improved by combining new ICT technologies

- Inventory management: Optimal manufacturing component utilization can be achieved by using Industry 4.0 applications
- Quality improvement: Real-time problem-solving, advanced process control, or real-time error corrections for sustainable manufacturing
- Supply-and-Demand Matching: Receiving accurate demand forecasts by using Industry 4.0

Discrete (automotive and aerospace) and hybrid (food-and-beverage, and life sciences/pharma) industries lead the way in Industry 4.0 adoption for manufacturing sector. At the global level, process industries (oil and gas, chemicals) are considered as the front-runners in Industry 4.0. The adoption levels of metals-and-mining and pulp-and-paper industries are behind the curve, but are expected to increase.

## Industry 4.0 in Chemical Manufacturing

Chemical manufacturers have been facing multiple challenges due to the current economic uncertainty and rapidly changing end-user requirements. They are striving to retain their market

position and customer base in a cyclical environment. A large portion of their strategic efforts is focused on achieving production efficiency, reducing risk, promoting safety, and reducing operations-related cost.

Industry 4.0 plays a pivotal role in addressing these critical challenges across the value chain from manufacturing and product innovation, to supply chain and customer services. Because cost reduction and production efficiency are critical goals for several manufacturers, digital technologies are also expected to offer greater control and visibility across the plant and business operations.

The implementation of the Industrial Internet of Things (IIoT) in chemical manufacturing is expected to enable the chemical industry to reach new heights. Through digital infrastructure, chemical manufacturers are offered real-time monitoring that helps achieve safety, minimizes product variations, and promotes optimal utilization of plant assets. Additionally, it supports product development activities through data accessibility that helps understand the nature of chemical composites and materials to develop sustainable and renewable products.

**Across the sectors, Industry 4.0 has been changing the traditional manufacturing relationships. The adoption of Industry 4.0 helps the manufacturers to enhance machine-to-machine communication, monitor processes-and-resources, and improve the overall safety by providing connected and productive manufacturing.**



Exhibit 1: IIoT Adoption Index by Industry Vertical

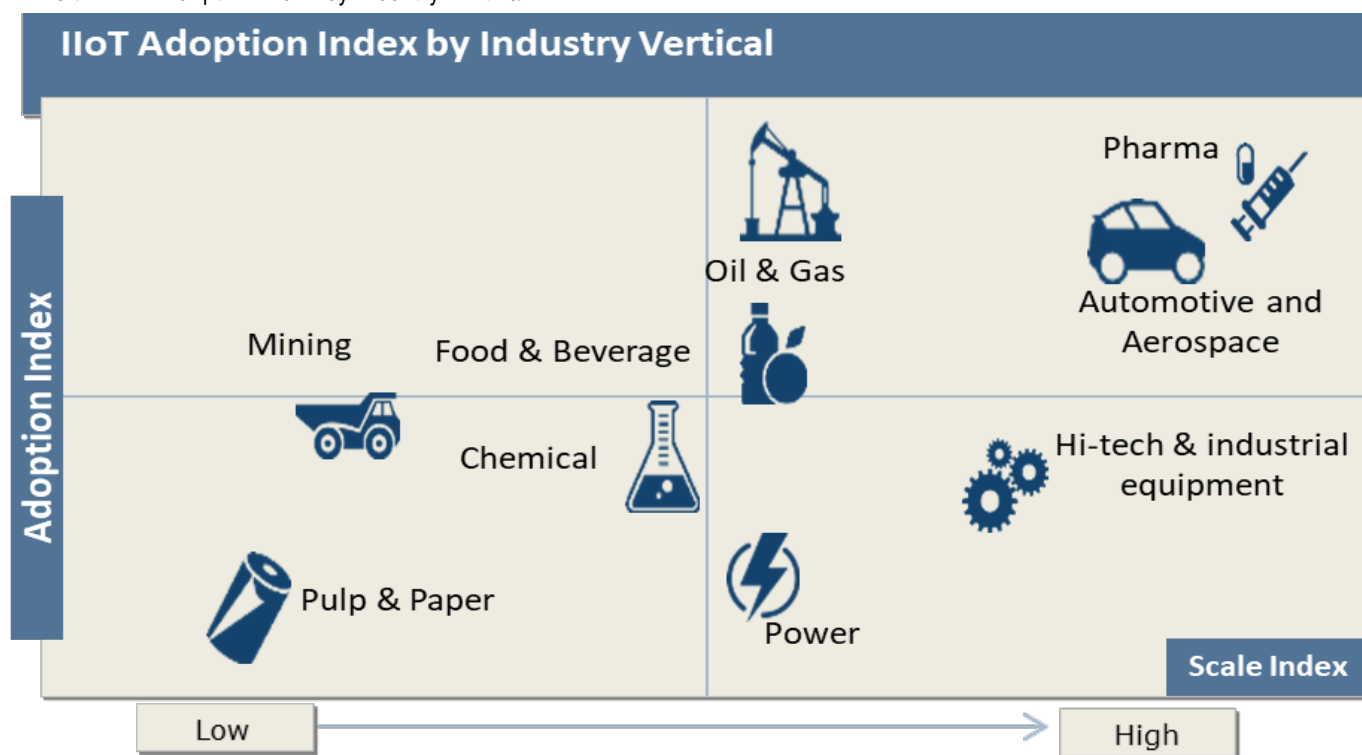


Image Source: Frost & Sullivan

Industry 4.0 has been establishing a strong link between Information Technology and Operational Technology to offer better visibility across the production process and supply chain. The support of data enables chemical manufacturers to gain visibility on quality and equipment longevity and helps prevent the production stoppage.

#### Industry 4.0 in Food and Beverage Manufacturing

Across the globe, food and beverage is an economically significant and rapidly advancing industry; and it is primarily driven by high regulatory standards, food safety, and quality requirements.

**Chemical manufacturers have been facing multiple challenges due to the current economic uncertainty and rapidly changing end-user requirements. They are striving to retain their market position and customer base in a cyclical environment. A large portion of their strategic efforts is focused on achieving production efficiency, reducing risk, promoting safety, and reducing operations-related cost**

The manufacturers operating in the F&B segment are under pressure to innovate and optimize productivity without compromising on the quality of products.

As food safety regulations continue to become more stringent across the globe, manufacturers should contemplate the implementation of several best practices to make processes and production future-proof. Industry 4.0 is expected to emerge as an important concept that will solve several problems and serve as the backbone of the F&B industry. A completely integrated F&B value chain is expected to lower the downtime, to

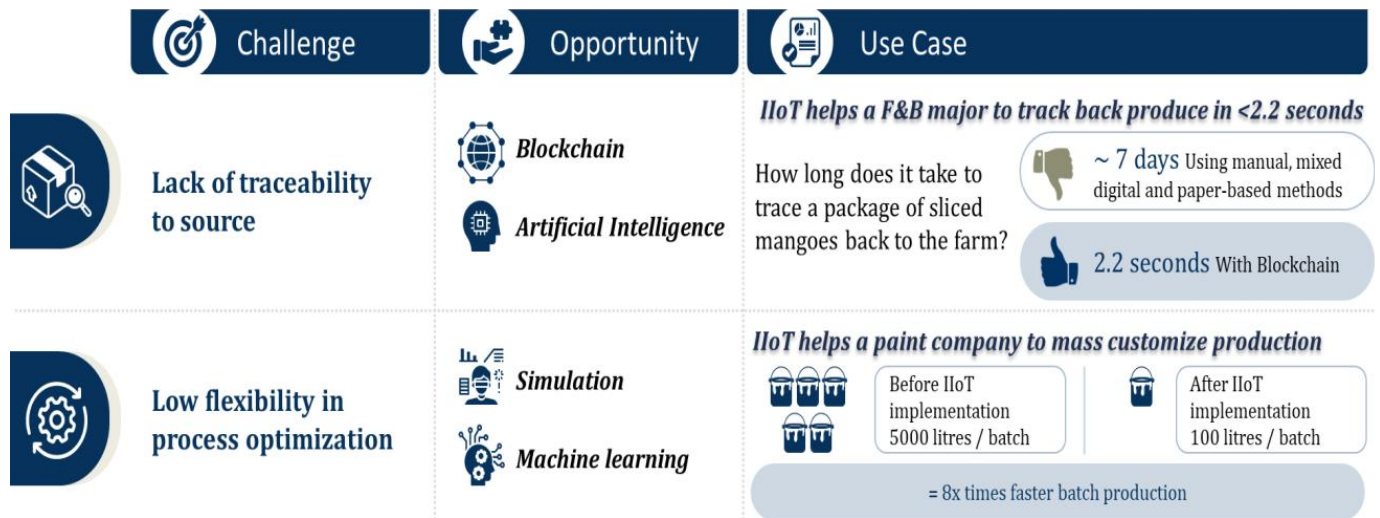
provide the maintenance alerts, and to deliver greater visibility across the entire value chain including supply, logistics, and distribution.

The F&B sector is adopting digital technologies, and the impact is felt across the globe. IIoT offers solutions across the length and breadth of the F&B value chain, and can help solve many traditional food industry challenges. Some of the key areas where IIoT is bringing out a positive change in this sector include greater transparency of processes, improved supply chain visibility, waste management, increased production rate, automated tracking of materials and packaged goods, quality maintenance, reduced downtime, better interoperability of systems, decentralized decision-making, tracking, and traceability.

#### Industry 4.0 in Pharmaceutical Manufacturing

The current COVID-19 crisis will undoubtedly make the pharmaceutical industry more important than ever. Key

Exhibit 2: B2B Use Cases and Proof of Concept across Industries



Source: Frost & Sullivan

challenges facing the pharmaceutical manufacturing industry include improvement of process efficiencies, reduction of cycle times, and the need to enhance product quality, track products, ensure adherence to regulatory guidelines, and reduce the downtime. Besides, pharma companies have been facing the challenges of increasing the diversity of their product portfolios. Automation solutions are playing a key role in eliminating silos and making it easier to implement new IIoT technologies.

The industry demands a good understanding of manufacturing processes and strict adherence to stringent regulatory standards that guide these processes. Due to the regulatory compliance issues in this sector, it has become mandatory for companies to implement digital technologies. IIoT is helping pharmaceutical manufacturers to ensure proper documentation during production for compliance.

The other important benefit of IIoT in pharmaceutical manufacturing is the modular automation of pharmaceutical production plants, which enables a faster time-to-market of pharmaceutical products. The industry also has extremely sensitive storage conditions. The manufactured products typically have a high value and a short storage life. They need to be stored under prescribed storage temperatures, which cannot be monitored without critical components of IIoT, such as sensors and connectivity.

The Industry 4.0 initiative in the pharmaceutical segment is expected to not only address productivity issues but also provide the industry with smarter tools that can help ensure drug safety. The pharmaceutical industry has been a forerunner in adopting these digital technologies, which can help improve process efficiencies, reduce efforts, and increase profits. Though IIoT may be in its nascent stages of development, its future

impact on pharmaceutical manufacturing is indisputable.

**The Way Forward**

With new proofs of concept and use cases on the rise, Industry 4.0 in manufacturing will continue to gain momentum globally. Industry 4.0 adoption is expected to surge with the growing influence of AI. Moreover, in the next five years, Industrial IoT will see a gradual shift from concept to reality, globally. After the initial hype, IIoT is expected to be adopted gradually as an increasing number of early adopters begin to reap benefits from implementation. It is pivotal for the industry to embrace the positive disruptive changes that Industry 4.0 can bring to the manufacturing sector. ■

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**Industry 4.0 has been establishing a strong link between Information Technology and Operational Technology to offer better visibility across the production process and supply chain. The support of data enables chemical manufacturers to gain visibility on quality and equipment longevity and helps prevent the production stoppage.**

# Powerful Edge Device Provides Compact, Fanless Control with IP 65/67 Rating

**Pune, India:** With the new C7015 ultra-compact Industrial PC, Beckhoff combines its extensive expertise with PC-based machine control and IP 65/67 components. The result is an Industrial PC (IPC) designed with IP 65/67 protection for direct installation on the machine or other equipment. The edge device is ideal for decentralized installation and provides powerful multi-core computing performance. When used as a full-fledged control computer, the device also reduces the required control cabinet space. This simplifies machine design as well as subsequent system expansions.

The C7015 ultra-compact IPC, which measures 85 x 167 x 43 mm, is an economical yet high-performance IP 65/67 device designed for installation within machine environments. The space-

saving, fanless device is universally suited to high-performance automation, visualization and communication purposes. Its applications range from classic machine control to the decentralized edge computing utilized in advanced Industrie 4.0 concepts.

**High-performance edge device:** The C7015 is equipped with a powerful Intel Atom® multi-core CPU with up to four processor cores. Compared to conventional ARM-based edge devices, it is able to support far more demanding applications as well as decentralized data pre-processing and the acquisition of large data volumes. The device housing with IP 65/67 protection rating is another feature that makes the C7015 ideal for use in modern edge applications, even in harsh production environments.

**Decentralized machine control with EtherCAT P:** The IP 65/67 IPC also serves as a highly functional machine controller. Installing it directly in the field can save valuable electrical cabinet space. This reduces machine footprints significantly, especially when combined with other Beckhoff components with a high protection rating, such as the AMP8000 distributed servo drive system and the EPP series of EtherCAT P I/O modules. These solutions can vastly simplify machine design while also minimizing the effort of subsequent system expansions, such as the addition of an energy data acquisition system.

The integrated EtherCAT P connection of the C7015 creates a range of new options for efficient sensor/actuator connection via the IP67 protected EPP modules. In this way, even complex diagnostic or condition monitoring tasks can be decentralized and supported with minimal installation effort. For that purpose, a special mounting plate enables direct attachment of an EPP module to the C7015. If required, additional EPP modules can be flexibly connected via EtherCAT P for specific applications. ■



*The IP 65/67 rated C7015 ultra-compact control device (left) can be installed on machines even in confined spaces and further minimizes footprint requirements with directly attached EPP series EtherCAT I/O modules (as shown on the right).*

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# A Complete Range of Cutting-edge Vacuum Pumps and Vacuum Dryers Include the Best of Italtvacuum Experience Serving the Chemical and Pharmaceutical Industries

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Today Italtvacuum manufacturing capabilities include a wide range of original and patented equipment and systems, complying with the main international regulations (ATEX, UL, PED and ASME) and with the latest FDA and cGMP norms, including:

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Italtvacuum is able to provide turn-key installations and also tailor-made equipment and systems, according to customer's process requirements. Italtvacuum has its presence all over the world, with a continually growing

number of installations in both consolidated and emerging markets, is a tangible sign of the company's reliability.

## **Saurus939<sup>®</sup>, fit and forget**

A vacuum pump that guarantees unrivalled 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<sup>®</sup> system. A solution which guarantees perfect operation and optimum results with total respect for the environment. Saurus939<sup>®</sup> 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<sup>®</sup> guarantees optimum safety through the whole process and complete purity of the final product. In other words, ensures an uncontaminated vacuum. Saurus939<sup>®</sup> has a wide range of use and could be employed in different sectors: Chemicals, Pharmaceuticals, Cosmetics, Oil & Gas, Plastics & Rubber, Bioscience and Waste Management. The processes are drying, reaction, distillation, crystallization, filtration, evaporation and polymerization.

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But that is not all, because the important added value that differentiates Multispray Cabinet Dryer<sup>®</sup> from conventional tray dryers is that it guarantees total cleanliness of the inner chamber and all heating plates, in compliance with the latest FDA and cGMP standards. In fact, thanks to the C.I.P. (Clean

in Place) Multispray<sup>®</sup> patented fast-washing system, the equipment can be completely cleaned in just a few minutes, minimizing washing liquid consumption.

Multispray Cabinet Dryer<sup>®</sup> can be used in any type of application, as there are two available versions: the fixed plate and the removable plate ones. The latter is particularly indicated for multiproduct usage. Also, for the production of highly Active Pharmaceutical Ingredients (High Potency APIs) and for Research & Development activities, Italtvacuum has developed the laboratory-scale vacuum dryer LaboDry<sup>®</sup>.



Multispray Cabinet Dryer<sup>®</sup>

## **Criox<sup>®</sup> System, powdering while drying**

An international great success patent, which consists of a rotary vacuum dryer / powderer, counting more than 400 units installed in more than 30 countries world-wide.

The central body is made of a double cone chamber, characterized by smooth surfaces without edges and sharp corners. During the rotation, this structure helps the total and continuous revolution of the mass to be dried and allows a homogenous and delicate mixing. The double cone shape of the rotary chamber would not be effective in itself if it did not contain inside the two powerful electric lump breaker units – which are a peculiar characteristic of the Criox<sup>®</sup> System – allowing for the increase of the product surface exposed to the evaporation and to enhance the agitation efficacy of the system. The lump-breaking units not only break down the eventual pre-existing agglomerates in the wet powders thus preventing the forming of lumps, but they also allow for grinding and

powdering during the last drying phase, limiting the use of the mill. This helps having bulk products ready for bagging or powders with checked final particle size distribution, where the next operation is often limited to a sifting phase. Criox® is versatile and profitable: specific solutions have been studied for the products automatic loading and unloading and also in order to wash, to clean through and to inspect the plant before changing the batch. This means the opportunity to pass quickly from one product campaign to another, as production demands.

### **CosmoDry® System, the evolution of the species**

An innovative horizontal vacuum dryer, the result of highly advanced research by Italtvacuum and of a careful analysis of the production requirements of the most demanding customers.

Power, load flexibility, drying speed, easy unloading, maximum quality of dried product. All important and fundamental values, but Italtvacuum went even further. The great innovation of CosmoDry® System as opposed to conventional horizontal vacuum dryers is in the particular structure of the agitator: the inner parts can be dismantled in different parts, quickly and easily. Which means very easy internal cleaning, maintenance and inspection: a mix of qualities guaranteeing that the machine is always kept in perfect working order and optimize the production processes, making CosmoDry® System also the perfect solution for multi-product applications.



*CosmoDry® System*

### **Planex® System, a revolutionary drying philosophy**

A patented machine which is conquering the most demanding operators from all around the world, by guaranteeing results that were unthinkable with conventional vacuum dryers, both horizontal and vertical ones.

Planex® System is a horizontal vacuum dryer with an eccentric agitator featuring two independent

movements, allowing it to simultaneously revolve around its own axis and to rotate tangentially to the drying chamber, ideal for the production of Active Pharmaceutical Ingredients (APIs).

The combined rotations of the agitator and its small size compared to the drying chamber diameter, ensures the perfect mixing of the entire batch, and allows consuming at least three times less energy than conventional dryers with concentric agitators. This means a threefold reduction in mechanical and thermal stresses on the batch – analysis carried out by the Department of Materials Science and Chemical Engineering of the Polytechnic University in Turin. As a result, even the most delicate temperature-sensitive products are treated with maximum care.

But there is more. Planex® System, thanks to its agitator's ZeroFriction® planetary movement, prevents the product from being rubbed against the drying chamber walls and thus heating up due to friction, a typical problem in conventional paddle systems. In addition, the rotation of the paddles tangentially to the chamber walls, conveys the product into the small clearance between the agitator and the chamber surface, preventing lumps formation and guaranteeing an even more effective drying and a controlled final particle size distribution, which is impossible to achieve with conventional dryers. Thanks to the agitator movement controlled by the "Stop & Swing" program, it is also ideal for drying small batches.

### **Italtvacuum services: from Pilot Trials to Project Engineering right through to a comprehensive After Sales Service**

Customer care, for Italtvacuum, means supporting the customer from the very first contact. Italtvacuum offers the opportunity to conduct pilot drying trials and involves the customer in system design and manufacturing. Once the system is up and running, Italtvacuum also provides all the technical support the customer may need to ensure year after year of fault-free operation.

#### **Pilot Trials**

The Italtvacuum facility comprehends a full range of pilot systems for carrying out semi-industrial and laboratory scale drying tests on customer's products.



*Pilot Trials*

#### **Project Engineering**

Outstanding technical know-how and a thorough knowledge of the needs of the chemical and pharmaceutical industries have enabled Italtvacuum engineering services to build up unparalleled expertise in vacuum processes.

#### **After Sales Service**

With highly qualified personnel, Italtvacuum After Sales Service provides the following assistance: scheduled preventive maintenance, technical assistance, service parts, and system upgrading & overhaul

#### **Italtvacuum in India**

Concerning sales strategy, Italtvacuum can count on a world-wide network of highly qualified agents. For the promotion of vacuum pumps and vacuum dryers in India, Italtvacuum cooperates with Vacuum Drying Technology India LLP, which is based in Mumbai. 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 Italtvacuum headquarters. ▀

**For details contact:**



[www.italvacuum.com](http://www.italvacuum.com)

# NORD UNIVERSAL Motor Available from 0.12 to 45 kW Power

**N**ORD has introduced its new class-leading UNIVERSAL Motor, with 20 models in the range extending from 0.12 to 45kW power.

The NORD UNIVERSAL Motor is certified to CE, UL, CSA, CCC, ISI and EAC and meets appropriate minimum efficiency levels to ensure suitability for markets

that include Europe, US, Canada, Russia, China, India and others. The motor is also certified to Bureau Veritas for marine and offshore applications. The 3-phase NORD UNIVERSAL Motor can be used with four standard voltage supply noted on the motor nameplate: 380V 50Hz, 400V 50Hz, 415V 50Hz, and 460V 60Hz, additionally however it can also be used at 440V 60Hz and 480V 60Hz.

Available in 4-pole configuration, the robust motors suit IEC frame sizes from 63 to 225, they are available in B3 foot, B5 flange or B14 face mounting and to suit the US market It, can be supplied as NEMA C-face and NEMA foot mount. The motor can also be directly mounted to NORD gearboxes providing a compact and more efficient drive solution.

As standard, the motor is protected to IP55 and is totally enclosed by Fan Cooled TEFC & Class F Insulation.

Other options available for the NORD UNIVERSAL Motor include quick connectors, single or double protection canopies, space heater, spring applied brake and forced ventilation. If required, the motor enclosures can also be provided in IP66 rating, which means they are dust tight and protected against heavy seas or powerful jets of water.

The new range of energy-efficient, high-quality UNIVERSAL Motors from NORD is available now. ■

#### For details contact:

Monika Mishra  
NORD DRIVESYSTEMS Private Limited  
282/2 & 283/2, Plot No.15, Village Mann,  
Taluka Mulshi, Adj. Hinjewadi MIDC Phase II  
Pune 411057, Maharashtra INDIA  
Phone: +91 20 39801- 217  
www.nord.com



Image source: NORD DRIVESYSTEMS

The new premium-efficient UNIVERSAL Motor from NORD DRIVESYSTEMS is available in the power range 0.12 to 45 kW



Image source: NORD DRIVESYSTEMS

CE, UL, CSA, CCC, EAC, ISI and UA certifications make the new NORD UNIVERSAL Motor suitable for the markets of Europe, USA, Canada, China, India, Russia, Ukraine



## Softstarters



Whilst traditional softstarters handle the most common start challenges, Emotron MSF 2.0 offer a lot more. Start and stop sequences are optimized. Advanced bracking techniques increase

productivity. Built-in monitor functionally protects your process from inefficiency, damage and downtime. Easy installation and setup save time and money. In addition, the Emotron MSF is developed for selected applications, which means optimized and functionally adapted to your specific needs.

For details contact:  
CG Power and Indl Solutions Ltd  
Drives and Automation  
Plot No: 9, MPAKVN, Phase 2  
New Indl Area, Mandideep  
Madhya Pradesh 462 046  
E-mail: drives.mktg@cgglobal.com  
drives.service@cgglobal.com

or Circle Readers' Service Card 01

## Electronic Softstarters



Emotron TSA softstarters take motor control to a new level soft torque starting, intelligent load monitoring and smart stop are all included and accompanied by a robust and compact design. By developing the Emotron TSA range of electronic softstarter, CG has taken a major step towards the ideal motor controller for applications where variable speed is not required. You simply get everything, expect variable speed.

For details contact:  
CG Power and Indl Solutions Ltd  
Drives and Automation  
Plot No: 9, MPAKVN, Phase 2  
New Indl Area, Mandideep  
Madhya Pradesh 462 046  
E-mail: drives.mktg@cgglobal.com  
drives.service@cgglobal.com

or Circle Readers' Service Card 02

## Power Cage Clamp – High Current Rail-mount Terminal Blocks



Engineered to provide the proper contact pressure, WAGO's power cage clamp high current terminal blocks have earned approvals for severe duty in energy-intensive applications such as machinery and equipment manufacturing, as well as, energy production.

The 285 Series rail-mount terminal blocks for 35-mm<sup>2</sup> and 50-mm<sup>2</sup> (2 and 2/0 AWG) as well as 95-mm<sup>2</sup> conductors are also approved for hazardous areas, making them ideal for "Ex e" increased safety applications.

The approvals acc to DIN EN 60079-0 and DIN EN 60079-7 apply for light gray, 2-conductor through terminal blocks, as well as green-yellow, ground conductor terminal blocks with suffix number ".../999-950". Select accessories are also certified to provide switchgear manufacturers with full flexibility when high-current,

rail-mount terminal blocks and used in hazardous locations.

In addition to the range of high-current terminal blocks, WAGO also offers TOPJOB S rail-mount terminal blocks – including terminal blocks – that are suited for hazardous locations. Altogether, WAGO offers a complete range of rail-mount terminal blocks with spring pressure connection technology for "Ex e" applications and conductors ranging from 0.14-mm<sup>2</sup> to 95-mm<sup>2</sup>.

For details contact:  
WAGO Kontakttechnik GmbH & Co KG  
Postfach 2880 - 32385 Minden  
HensastraBe 27 32423 Minden  
Germany  
Tel: +49 571/887 - 0  
+49 571/887 - 222  
E-mail: info@wago.com

or Circle Readers' Service Card 03

### IloT Data Gateway



TagLink is software dedicated to industrial IoT applications. The name represents the two key features necessary for making data transition easier.

Tags are for users to make customised and advanced setting changes, while Link means the software makes the data link between edge devices and the cloud become smarter and safer.

With integrated applications for protocols and software, and the open SDK/API, TagLink is dedicated technology for future IloT Data Gateway applications. Currently, Advantech has two IloT Data Gateways with TagLink: the ADAM-3600 Series with 20-50 local I/O points for oil, gas and water industries, and the small but robust ECU-1152 for power and energy applications.

For details contact:

Advantech Industrial Computing India Pvt Ltd  
79/2 City Centre, 5<sup>th</sup> Floor  
Outer Ring Road, Ballari  
Opp: Hebbal Bus Stop  
Subramani Nagar, Hebbal  
Bengaluru, Karnataka 560 024

or Circle Readers' Service Card 04

### IoT Wireless I/O Modules



As wireless applications become a more common and preferred solution, Advantech has introduced a variety of wireless remote I/O devices to the market to become an important IoT enabler. With the Wi-Fi-based WISE-4000

Series and the WSN-based ADAM-2000 Series, users are free from worrying about a wired layout and extra associated costs, for a more flexible deployment.

Furthermore, the WISE-4000 Series brings an authentic IoT experience to the market. By realising an anytime, anywhere solution, users can retrieve data via mobile devices and can now configure modules and troubleshoot from mobile devices to save time.

For details contact:

Advantech Industrial Computing India Pvt Ltd  
79/2 City Centre, 5<sup>th</sup> Floor  
Outer Ring Road, Ballari  
Opp: Hebbal Bus Stop  
Subramani Nagar, Hebbal  
Bengaluru, Karnataka 560 024

or Circle Readers' Service Card 05

### Gloss Meter



Gloss meter – three-angle gives good correlation with visual gloss or shining provided the sample is flat. The degree of correlation decreases as the sample deviates from being flat. This method is widely used as a partial measure of the surface quality and shining

appearance of coated paper.

It is compact, portable, sensitive and accurate instrument available in models: mains-operated laboratory purpose and handy battery-operated for the measurement of geometry 20°. It can be used for the measurement of gloss/brightness of paints; opaque glasses, plastics, ceramics, porcelains, paper, cloths, pigments, powder, etc. The instrument is also useful to measurement of brightness/whiteness for plantation of white sugar and measurement of reflectance of fabrics.

For details contact:

Presto Stantest Pvt Ltd  
I042 DLF Indl Area, Phase I, Delhi Mathura Road  
Faridabad, Haryana 121 003  
Tel: 0129-4272727  
E-mail: info@prestogroup.com

or Circle Readers' Service Card 06

### Hot Process Bromine Recovery



The acidified feed containing bromide sales is preheated and fed to reaction-cum-stripping tower, where chlorine gas and steam are injected. The chlorine gas liberates free bromine, which is stripped out by live steam in form of vapours. These vapours are condensed in series of condensers, and condensate is collected in phase-separator. The water-phase is refluxed to the tower and separated crude bromine goes for distillation to remove dissolved chlorine.

Pure bromine after distillation is collected as bottom product. This bromine is cooled and collected in product receiver/s. A vent condenser condenses most of the bromine and recycles into the system. The non-condensibles are taken to the vent scrubber. The debrominated effluent from the stripping tower exchanges heat with the feed and is relatively cooled down. It may be taken for neutralisation and effluent treatment.

For details contact:

Ablaze Glass Works Pvt Ltd  
E-52 Sardar Estate, Ajwa Road  
Vadodara, Gujarat 390 019  
E-mail: srshah@ablazeglassworks.com

or Circle Readers' Service Card 07

### Cold Process Bromine Recovery

The acidified feed containing bromide sales is fed to reaction-cum-air blowing tower, where dry chlorine gas and low pressure air are injected. The chlorine gas liberates free bromine, which is stripped-out by air in the form of vapours.

These vapours enter absorption tower where alkali solution is circulated and a bromide-bromate solution is formed. The bromine content in the resultant solution is highly enriched compared to original content. The unabsorbed air is vented out.

The enriched bromide-bromate solution is subjected to acidification in the liberation tower, where bromide vapours are liberated and stripped out by steam injected at the bottom of the tower. The vapours leave the top of the tower.

These vapours are condensed in series of condensers, and condensate is collected in phase separator. The water phase is separated from bromine and is refluxed to the tower. The bromine so separated is crude bromine and is subjected to distillation.

Under distillation, chlorine is removed and pure bromine collected as bottom product. This bromine is cooled through product coolers and collected in product receiver/s.

A vent condenser condenses most of the bromine and recycles into the system. The non-condensibles are taken to the vent scrubber.

The debrominated effluent from the air blowing tower may be taken for neutralisation and effluent treatment.

For details contact:

Ablaze Glass Works Pvt Ltd  
E-52 Sardar Estate, Ajwa Road  
Vadodara, Gujarat 390 019  
E-mail: srshah@ablazeglassworks.com

or Circle Readers' Service Card 08

### Solar Pumping System

CRI Pumps present the range of CRI solar pumping systems, which harness the power of sun and effectively pumps out water for demanding applications like agriculture, farms, gardens, drinking water, households, commercial and industrial, throughout the day. CRI solar pumping systems are easy-to-deploy in a shadow free space, in any remote locations, village and rural areas, new construction sites where there is no grid power at all or with the availability of limited grid power. Solar power is also an alternate source of energy to power the existing pumps and save millions of units from the grid in a clean, green and efficient way.

For details contact:

CRI Pumps Pvt Ltd  
7/46-1 Keeranatham Road, Saravanampatty  
Coimbatore, Tamil Nadu 641 035  
Tel: 0422-3027000, Fax: 91-0422-3027005  
E-mail: corp@cripumps.com

or Circle Readers' Service Card 09

### Self-priming Centrifugal Pumps



Self-priming centrifugal pumps come in flow range up to 132-m<sup>3</sup>/hr and head range up to 37-metres. It finds application in industries, public utilities, civil engineering, construction industries, marine, waste treatment, agriculture, etc.

For details contact:

Lubi Industries LLP  
Naroda Road, Nr Kalyan Mills  
Ahmedabad, Gujarat 380 025  
Tel: 079-30610100, Fax: 91-079-30610300  
E-mail: indsales@lubipumps.com

or Circle Readers' Service Card 10

### Corrosion-resistant Thermoplastic Pumps



Corrosion-resistant thermoplastic pumps come in flow range up to 22.5-m<sup>3</sup>/hr and head range up to 22-metres. It finds application in chemical process, pharma, food and beverage processing, steel plants, automobile, marine/seawater, water supply, booster service, cooling water, water treatment/purification, etc.

For details contact:

Lubi Industries LLP  
Naroda Road, Nr Kalyan Mills  
Ahmedabad, Gujarat 380 025  
Tel: 079-30610100, Fax: 91-079-30610300  
E-mail: indsales@lubipumps.com

or Circle Readers' Service Card 11



### Multi-stage Multi-outlet Fire Pumps



Multi-stage multi-outlet fire pumps come in flow range 100 to 3,000 US gpm; and head range 3 to 15-bar.

They are available with diesel engine drive, as well as, electric motor drive and

controllers. It finds application in commercial complexes and high-rise buildings, petrochemical industries and gas plants, airports and ports, jetties, marine applications, power stations and transformer stations, chemical industries, manufacturing plants, fire-work industries, warehousing/godowns, etc.

For details contact:  
Lubi Industries LLP  
Naroda Road, Nr Kalyan Mills  
Ahmedabad, Gujarat 380 025  
Tel: 079-30610100  
Fax: 91-079-30610300  
E-mail: [indsales@lubipumps.com](mailto:indsales@lubipumps.com)

or Circle Readers' Service Card 12

### Swimming Pool Pumps



Swimming pool pumps come in flow range up to 119-m<sup>3</sup>/hr and head range up to 21-metres.

It finds application in recycling and filtering of water in small, medium and large size swimming pools. The pump incorporates

a removable basket filter to filter out leaves, twigs and other large solids. Therefore, these pumps must be installed between the skimmer and the pool filter. These pumps are designed for pumping the pool water after being disinfected by chlorine.

For details contact:  
Lubi Industries LLP  
Naroda Road, Nr Kalyan Mills  
Ahmedabad, Gujarat 380 025  
Tel: 079-30610100  
Fax: 91-079-30610300  
E-mail: [indsales@lubipumps.com](mailto:indsales@lubipumps.com)

or Circle Readers' Service Card 13

### IE3 Asynchronous Motors



NORD has optimised the design of its proven IE3 asynchronous motors. The model maintenance applies to numerous details that further improve the electric motors' function, assembly and operation. The facelift

of the IE3 asynchronous motors from NORD involves no change of electrical data and outer dimensions. They can be seamlessly used without adjustments in any existing application with NORD IE3 motors. The optimised cooling fin shape, an assembly-optimised fan and a new modern fan cowl enable a better heat dissipation and assembly. The fan cowl can be simply assembled in case a motor-mounted frequency inverter is used. The new cooling fins design enables an unhindered airflow around the terminal box. The revised terminal box is without sharp edges and corners and has reinforced feet for a better motor stability. Another important detail is the optimised incremental encoder mounting. Due to the fan cowl, the encoder is fully shock-resistant and not within the airflow, which further improves the cooling power. Retrofit mounting is also possible due to a plug-on shaft.

For details contact:  
NORD DRIVESYSTEMS Pvt Ltd  
282/2 & 283/2, Plot No: 15, Village Mann  
Tal: Mulshi, Adj Hinjewadi MIDC Phase II  
Pune, Maharashtra 411 057  
Tel: 020-39801217, Fax: 91-020-39801416  
E-mail: [monika.mishra@nord.com](mailto:monika.mishra@nord.com) / [pl.muthusekhar@nord.com](mailto:pl.muthusekhar@nord.com)

or Circle Readers' Service Card 14

### Gas Calibration



Signal Group offers highly accurate but simple to operate version of its gas divider, the Model 821S. Designed for

testing the linearity and calibration of almost any gas analyser, the 821S only requires one calibration gas and a zero gas in order to conduct a full range calibration check. The linearity of all gas analysers should be checked regularly as part of an effective QA/QC regime. To conduct a reliable, accurate check, users simply connect the calibration gas, the zero gas and the outlet flow connector to the analyser to be tested, and then switch the calibration gas in 10 equal steps from zero to the full concentration. These steps are accurate to within 0.2 percent and a calibration certificate is supplied with each instrument. Repeatability is 0.5 percent of the dilution step, and the European and US Standards specify 2 percent accuracy, so if the 10 percent dilution is selected, 500-ppm will be diluted to 50-ppm with an uncertainty of 0.25-ppm – significantly better than the +/-1 ppm required by international standards.

For details contact:  
Signal Group Ltd  
12 Doman Road, Camberley  
Surrey GU15 3DF, U.K.  
Tel: +44 (0) 1276 682841  
Fax: +44 (0) 1276 691302  
E-mail: [sales@signal-group.com](mailto:sales@signal-group.com)

or Circle Readers' Service Card 15

## SS Rolling Shutters



Avians range of SS roller shutters are the best and most suitable option for the users if they are looking for max security, strength combined with stylish and good looks. These shutters are designed to maintain high

level of hygienic environment and provide security. Constructed from high grade stainless steel material, Avians SS rolling shutters are mostly made considering the standards specifically meant for food, pharma, hotels, hospitals and chemical industry. Their SS rolling shutters have excellent corrosion resistance with robust and attractive profiling of shutter slats which look good even after many years.

For details contact:

Avians Innovations Technology Pvt Ltd

Gat No: 60/61

Dehu-Moshi Road, Chikhali

Pune, Maharashtra 412 114

Tel: 020-71400600

Fax: 91-020-71400654

or Circle Readers' Service Card 16

## Aluminium Rolling Shutters



Equipped with the superior solution for max security combined with stylish good looks Avians presents its wide range of aluminium rolling shutters.

Constructed from interlocking aluminium slats with an integrated bottom rail, the shutters provide trouble-free operation.

Designed with extruded aluminium section and fabricated using superior grade aluminium, these roller shutters are light in weight, corrosion-free and give good aesthetic appearance. Their aluminium shutters are all manufactured to suit your exact requirements and efficiently provide protection against adverse weather conditions.

For details contact:

Avians Innovations Technology Pvt Ltd

Gat No: 60/61

Dehu-Moshi Road, Chikhali

Pune, Maharashtra 412 114

Tel: 020-71400600

Fax: 91-020-71400654

Fax: 91-020-71400654

or Circle Readers' Service Card 17

## Vertical Multi-Stage Pump



CRI vertical multi-stage pump, MVHS Series, maximizes performance, demonstrates high degree of consistency and is economical.

Pumps with VFD last longer as they can adjust the work load to meet the system requirement.

It is extremely quiet and low in vibration when in operation. The smooth, automated start and stop, reduces water hammer.

It also serves as the best replacement for the traditional roof tank water supply way, which is a source of water pollution.

It avoids water pollution caused by roof tanks.

For details contact:

CRI Pumps Pvt Ltd

7/46-1 Keeranatham Road

Saravanampatty

Coimbatore, Tamil Nadu 641 035

Tel: 0422-3027000

Fax: 91-0422-3027005

E-mail: corp@cripumps.com

or Circle Readers' Service Card 18

## Agitator Drives



Complementing to the range of product offerings including permanent magnetic couplings, canisters, SSIC ceramic plain bearings and the patented BOROARDCAN, DST also provides agitator drives made from SS-1.4435 / 1.4404 (other SS on request). It finds application in pharma, bio

technology and food industry

The overhead drive prevents the escape of any hazardous gases or the ingress of contamination during agitation.

By using a bottom-mounted agitator drive, the agitator is hermetically sealed, thus preventing any contamination of the product.

For details contact:

Bedaflow Systems Pvt Ltd

W-7, Sector-11

Noida, Uttar Pradesh 201 301

Tel: 0120-43299 - 90

Fax: 91-0120-43299 - 20

E-mail: info@bedaflow.com

or Circle Readers' Service Card 19

### Double Planetary Mixer

The double planetary mixer includes two blades that rotate on their own axes, while they orbit the mix vessel on a common axis. The blades continuously advance along the periphery of the vessel, removing material from the vessel wall and transporting it to the interior. After one revolution the blades have passed through the entire vessel; after three revolutions most materials have been mixed: and after only 36 revolutions, the blades have contacted virtually the entire batch.

Ross can offer many of their mixers including their powermix with this option, which can dramatically increase production in your plant. While one vessel is wheeled away for remote discharge and cleaning, another wheels into place to start the next batch immediately.

The patented HV blade is ideal for mixing and kneading viscous pastes or putty-like materials. They are available in capacities from 1/2-pint through 400 gallons. A wide variety of options include vacuum/pressure, thermal jacketing, and sanitary designs.

For details contact:

Ross Process Equipment Pvt Ltd  
 Plot No: D-233/3, Chakan Indl Area  
 Phase II, Village: Bhamboli  
 Tal: Khed, Dist: Pune, Maharashtra 410 501  
 Tel: 02135-628400, 628401, 628402, 628403

or Circle Readers' Service Card 20

### High-performance Extraction Equipment

The DC11-Module, which comes in several models, is an optimised stand-alone unit for source extraction and industrial cleaning. It has been designed to service up to six normal extraction points or several cleaning outlets at a time and is modularly built, meaning it can be tailor-made to suit any manufacturing and production environment.

As with all of Dustcontrol UK's equipment, the DC11-Module can be fitted with HEPA 13 filters, meaning exhaust air can be safely returned to the work environment.

The company based in Milton Keynes are experts in capturing dust at its source - both where and when it is created.

For details contact:

Dustcontrol UK Ltd  
 7 Beaufort Court  
 Roebuck Way Knowlhill  
 Milton Keynes MK5 8HL, U.K.  
 Tel: 01327 858001  
 E-mail: sales@dustcontrol.co.uk.

or Circle Readers' Service Card 21

### Solar Pumping System

CRI Pumps presents the range of CRI solar pumping systems, which harnesses the power of sun and effectively pumps out water for demanding applications like agriculture, farms, gardens, drinking water, households, commercial and industrial, throughout the day. CRI solar pumping systems are easy-to-deploy in a shadow free space, in any remote locations, village and rural areas, new construction sites where there is no grid power at all or with the availability of limited grid power. Solar power is also an alternate source of energy to power the existing pumps and save millions of units from the grid in a clean, green and efficient way.

For details contact:

CRI Pumps Pvt Ltd  
 7/46-1 Keeranatham Road  
 Saravanampatty  
 Coimbatore, Tamil Nadu 641 035  
 Tel: 0422-3027000  
 Fax: 91-0422-3027005  
 E-mail: corp@cripumps.com

or Circle Readers' Service Card 22

### SSIC Plain Bearings



Predominantly for use in centrifugal pumps, DST produces complete SSIC ceramic plain bearings. The bearings are available as axial and radial types and can be combined with the DST Standard permanent magnetic couplings. SSIC Ceramic plain bearings are produced using new material combinations and modern manufacturing techniques. The complete temperature range of up to +350°C (660°F) is covered with a single bearing design.

SSIC ceramic plain bearings have no dry running properties.

For details contact:

Bedaflow Systems Pvt Ltd  
 W-7, Sector-11  
 Noida, Uttar Pradesh 201 301  
 Tel: 0120-43299 - 90  
 Fax: 91-0120-43299 - 20  
 E-mail: info@bedaflow.com

or Circle Readers' Service Card 23



## NATIONAL

## Chemspec India

**Dates:** 19 to 20 August 2020

**Venue:** Bombay Exhibition Centre, Goregaon, Mumbai

**Event:** The Fine and Specialty Chemicals Exhibition features exhibits of organic and fine chemicals, active pharma ingredients, drug intermediates, dyes and pigments, agrochemicals, contract and toll manufacturing, coatings, cosmetic chemicals or ingredients, pigments and solvents, surfactants, laboratory chemicals and a host of specialty chemicals.

For details contact:

Chemical Weekly

602, Godrej Coliseum, B-Wing, 6<sup>th</sup> Flr

B/h Everard Nagar, Off Eastern Express Highway

K J Somaiya Hospital Road, Sion (E), Mumbai 400 022

Tel: 022-24044477

Fax: 91-022-24044450

E-mail: corporate@chemicalweekly.com

## IFAT India

**Dates:** 13-15 October 2020

**Venue:** Bombay Exhibition Centre, Mumbai

**Event:** IFAT India focuses on water treatment systems and services, water extraction, water desalination, sewage treatment services, sewers, water disposal solutions and services, water recycling techniques, sewage recycling techniques, air pollution control systems, energy from waste materials, environmental services and management, control and laboratory technologies and other related services and solutions.

For details contact:

Messe Muenchen India Pvt Ltd

Unit No: 762/862, Solitaire Corporate Park Bldg No: 7

167 Guru Hargovindji Marg

Andheri (E), Mumbai 400 093

Tel: 022-42554700

Fax: 91-022-42554719

E-mail: info@mm-india.in

## SRW India Water Expo

**Dates:** 07-09 January 2021

**Venue:** Chennai Trade Centre, Chennai

**Event:** SRW India Water Expo aims to bridge the Component Manufacturers, Distributors and Dealers to create a network for their business and aims to provide world-class products to the market. SRW India Water Expo has established itself as a leading organizer of water events across the country. It is the one-stop destination for companies developing their teams or establishing their operations in the water segment.

For details contact:

SRWTEMT Association India

## INTERNATIONAL

## Plastics Recycling World Expo

**Dates:** 07-08 October 2020

**Venue:** MESSE ESSEN GmbH, Essen, Germany

**Event:** Plastics Recycling World Expo will feature an international array of manufacturers of plastics recycling machinery and equipment, as well as suppliers of materials, additives and related services for plastics recyclers. The target audience will encompass all types of companies carrying out plastics recycling. These range from recycling operations sorting and handling mixed, municipal, industrial and post-consumer waste through to polymer producers and processors that are reclaiming scrap material in-house. The event will also appeal to policymakers and to companies using recycled plastics in their products.

For details contact:

Applied Market Information Ltd

AMI House, 45-47 Stokes Croft

BRISTOL, Avon BS1 3QP, U.K.

Tel: 0117 924 9442

Fax: 0117 924 1598

## Analytica

**Dates:** 19 October – 22 October 2020

**Venue:** Exhibition Munich, Munich, Germany

**Event:** Analytica provides the attendees with the opportunity to explore the areas of laboratory technology, analytic and biotechnology.

For details contact:

Messe Munchen India Pvt Ltd

INIZIO 507 & 508

Cardinal Gracias Road

Chakala, Andheri (E)

Mumbai 400 093

Tel: 022-42554700

Fax: 91-022-42554719

E-mail: info@mm-india.in

## Valve World Expo

**Dates:** 01-03 December 2020

**Venue:** Messe Düsseldorf-P2, Düsseldorf, Germany

**Event:** Valve World Expo will showcase products like a unique platform for education professionals looking to maximise access to the latest trends and innovations in education and reach the largest potential mass market, etc.

For details contact:

Messe Dusseldorf GmbH

Postfach 101006, 40001 Düsseldorf

Stockumer Kirchstr. 61, 40474 Düsseldorf

Germany

Tel: +49-211-4560-01

Fax: +49-211-4560-668

## New Contracts/Expansions/Revamps

The following list is a brief insight into the latest new projects by various companies in India.

### CHEMICALS

**Tata Chemicals**, the world's second largest soda ash manufacturer, has received green nod for expansion of its soda ash plant in Gujarat at an estimated cost of ₹ 1,042.07-crore. The proposal is for expansion of its soda ash plant located in Devbhumi Dwarka district from 10.91 to 113.16-lakh TPA and enhance captive power plant capacity from 84 to 125-MW.

The proposal was first vetted by a central government constituted green panel and based on its recommendations the Union Environment Ministry has given the environment clearance (EC) for the expansion of soda ash plant in Gujarat, subject to compliance of certain conditions and prior clearance from the wildlife angle, including clearance from the standing committee of the national board for wildlife.

As per the proposal, the expansion will be carried out within the existing plant premises of 231 hectare (including cement plant). The cost of the project is pegged at ₹ 1,042.07-crore and will be completed in two years.

Soda ash is the common name given for the technical grade anhydrous sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) finds application mainly in the production of detergents, glass, chemicals, sodium silicate, water treatment and pulp/paper.

India has the advantage of abundance of raw materials, ie, limestone and salt and growing domestic demand that favours the establishment of soda ash plants.

**Insecticides (India) Ltd** has announced a ₹ 200-crore expansion plan to increase its capacity in the next three years. In the first two years, it would spend about ₹ 100-crore, followed by an investment of ₹ 100-crore in 2020.

The firm is planning to set up an Export Oriented Unit (EOU) in Gujarat with an eye on increasing export component of the business. Exports contributed about ₹ 35-crore in the total turnover of ₹ 1,109-crore in 2017-18. The firm has a share of about 5 per cent in the ₹ 18,000-crore crop protection market in the country.

### MINING

**Jindal Steel and Power Ltd (JSPL)** recently said its 1.80-MTPA coal gasification-based DRI (direct reduced iron) plant at Angul District in Odisha has resumed operation. The plant was not operational for long due to the scarcity of coal. Now Coal India Ltd (CIL) and its arm Mahanadi Coalfields Ltd have started selling coal in adequate quantity, therefore gasification and DRI operations have resumed targeting an additional production run-rate of 1.50-million tonnes per year of steel in FY20-21 through CGP (coal gasification process) and DRI route.

Direct reduced iron, also called sponge iron, is produced from the direct reduction of iron ore (in the form of lumps, pellets or fines) to iron by reducing gas or elemental carbon produced from natural gas or coal. Many ores are suitable for direct reduction. The plant was set up by JSPL to ensure the availability of chemical and thermal energy required to produce DRI at an affordable price to reduce environmental impact of coal in the long run.

The coal gasification process converts high-ash grade coal into synthesis gas or Syngas. The syngas has replaced the costlier natural gas being used by other DRI manufacturers across the globe. The syngas is used as a reductant in converting iron ore/iron pellets into DRI/sponge iron.

The syngas produced from coal gasification contains methane, carbon monoxide, hydrogen and other such useful gases, in a particular ratio,

which are required to produce DRI from iron ore/pellets. This gasification process has a lesser impact on the environment as compared to the coal combustion process.

**Thriveni Earthmovers Pvt Ltd (Thriveni)** operates the NTPCs flagship Pakri Barwadih Coal Mining Project (PBCMP) in Jharkhand has awarded Zyfra – a joint project between Finnish-Russian digital solutions provider, the contract to implement its Intelligent Mine solution.

Zyfra's Intelligent Mine solution includes a mine fleet management system, automated drilling and blasting control system, payload and fuel level monitoring system, which allow allocating mining equipment, creating a schedule and assigning routes to mobile equipment according to the production objectives in real-time. Payload and fuel level monitoring system allow optimizing average payload of haul trucks and eliminating under and over loading.

Artificial intelligence has generated lot of interest among India's scientific community. India has made it to the top 10 countries with the largest number of publications on the artificial intelligence scientific projects and commercial rollouts conducted by research organizations and companies.

Artificial intelligence techniques help to solve such problems as optimal equipment control, raw materials consumption and quality checking. The relatively new area of computer vision is gaining popularity in industrial robotics and autonomous systems (cars, unmanned aerial vehicles, ships) fields.

Typically, machine learning techniques have been used in discrete manufacturing (44 per cent), in the process industry (22 per cent) and in the electric power industry (11 per cent). A further 23 per cent of projects belong to the industries where AI applications are at early stages of development.

**Universal Autofoundry Ltd** (539314/UNIAUTO) has opened a new unit (UNIT-II) with installed capacity of 1,800-MT per month to manufacture CI/Ductile Iron Castings at B-51, SKS Industrial Area, Reengus, Dist: Sikar, Rajasthan. The company has made an investment of ₹ 40-crores (approx) raised from banks to set up this new unit.

Universal Autofoundry Ltd is a world class manufacturer and exporter of Grey Cast Iron and Ductile Iron, which has now made expansion by setting up a new manufacturing unit in the name of UNIT-II with installed capacity of 1,800-MT per month, which is just double as compared to the existing capacity of the Company.

**Singareni Collieries Co Ltd (SCCL)** has received a boost for its plans of increasing the coal production to 70-million tonnes in 2019-20 by getting the green nod for Kistaram open cast mine recently after suffering some setbacks in getting environmental clearance for its proposed new mines and expansion of existing ones earlier this year. The coal company has achieved a production of 64.4-million tonnes in 2018-19 and getting the environmental clearance for Kistaram open cast mine, with a capacity of 2-million tonnes per annum (MTPA), in Sathupalli Mandal of Khammam district is expected to go a long way in its plans to jack up the production by nearly 6-million tonnes. The green nod to the proposal has come three years after public hearing conducted on it. According to SCCL officials, a committee of experts in the Ministry of Environment and Forests (MoEF) that has gone through the proposal has recommended clearance to the mine earlier and stipulating several conditions to keep impact of the mining activity under check on air, water and local people. Environmental

conditions in and around Sathupalli Town were also appraised separately by the panel before giving its nod.

**MOIL** said production at its Parsoda manganese mine is expected to begin soon. The mine will be operated by open cast mining method. MOIL has been granted mining lease of Parsoda manganese mine near village Parsoda, 46-km from Nagpur in the year 2016. The lease extends for 50 year period, ie, from April 22, 2016 to April 21, 2066 and the project cost is estimated to be ₹ 19.54-crore. MOIL, under the Ministry of Steel, operates around 10 mines, including six in Maharashtra and four in Madhya Pradesh. Balaghat mine is its largest, which produces top quality manganese ore.

**Hindustan Copper Ltd (HCL)**, on 2<sup>nd</sup> February, 2019, held a groundbreaking ceremony at Ghatsila Unit of HCL for construction of concentrator plant at Rakha, initiating Chapri-Sidheswar mine, a new mine development and Rakha mine re-opening projects. CMD informed that considering the opportunity to further increase the resource base of copper mineral in the State has finalized plan to undertake depth exploration up to 1,000-meter from surface in its existing lease area in next two years. HCL, in its Unit located at Ghatsila planned to implement total five mine expansion projects to increase the mine capacity from current 4.0 to 72.0-lakh tonne. Successful implementation of the project will also reduce country's dependence on imported copper concentrate.

**NTPC Ltd** hopes its captive coal production will reach 100-million tonne as soon as its five coal blocks commence operations, aided by faster regulatory clearances and the part-privatization model of Mine Development and Operator (MDO). The success of the plan would determine fuel security of the operations of India's largest power producer.

**CIL, ONGC** to produce coal-bed methane from 10 new mines: support SAIL in one more. The Coal Ministry has identified 11 mines to produce coal bed methane (CBM). Initially, ONGC will harness the gas and then CIL will extract coal from them. In addition to the mines with CIL, the two (ONGC and CIL) will also help develop SAIL's Parbatpur coal block (Jharkhand). Here too, ONGC will first harness the CBM. SAIL had surrendered the Sitanala and Parbatpur coal mines. SAIL had engaged MECON to prepare a techno commercial viability report, which declared the project unviable.

**JSW Energy**, part of the Sajjan Jindal-led JSW Group, is believed to be in the race for buying out the thermal power assets of Monnet Power and Jindal India Thermal Power Ltd (JITPL) in Odisha. Monnet Power's 1,050-MW coal-based power plant near Angul was in advanced stage of commissioning. Monnet Power's parent company, Monnet Ispat & Energy had won the Mandakini coal block in Odisha in competitive bidding, it surrendered the block later on grounds of economic unviability. Besides Monnet Power, JSW Energy is also eyeing takeover of BC Jindal controlled JITPL's 1,200-MW coal-based plant at Derang near Angul. The first unit (600-MW) of the 1,200-MW plant had begun commercial operations and started power supplies to the Odisha grid. This project has been completed at a cost of ₹ 7,537-crore which includes a debt component of ₹ 5,900-crore. JITPL has power purchase agreements (PPAs) with Odisha's Gridco Ltd, Kerala State Electricity Board and Tata Power Trading Corp. Apart from JSW Energy, JITPL also had competing offers from Adani Power and Singapore's SembCorp. The valuation of the prospective deal is not known.

NLC India (formerly Neyveli Lignite Corpn) which is in the hunt for buying out power assets is understood to have shown interest in the 700-MW Odisha plant of Hyderabad-based Ind-Barath Power Infra Ltd (IBPIL). The power plant located at Sahajbahal, near Jharsuguda, has commenced commercial operations. In August last year, NLC India had floated an EoI from companies owning coal and lignite-based power projects, for a possible acquisition. NLC India's installed thermal power capacity is 3,240-MW. It runs a 10-MW solar power unit and wind power assets with a capacity totalling 37.5-MW.

**Western Coalfields** has received the environment clearance for its ₹ 263-crore expansion project in Nagpur district, Maharashtra. The proposal is to enhance the production capacity of the Gokul open cast mine to 1.875-million tonnes per annum (MTPA) from the existing 1-MTPA. The mine, located in 767.17-hectare, has a mineable reserve of 14.50-million tonnes. The clearance to the project is subject to certain conditions. The company has been asked to get 'Consent to Operate' certificate from the State Pollution Control Board for the existing production capacity of 1-MTPA and also the 'Consent to Establish' for the proposed capacity of 1.875-MTPA prior to enhancing the production capacity.

## OIL & GAS

**The Kochi-Salem Pipeline Pvt Ltd (KSPPL)**, the LPG pipeline project implemented by a 50:50 joint venture between BPCL and IOCL, will finally be commissioned up to Palakkad in April 2020.

The overall length of the pipeline has also been reduced to 206-km till Palakkad from 428-km, which was initially up to Salem. Failure in getting clearance from the Tamil Nadu government forced the company to terminate the pipeline at Palakkad, as of now.

The ₹ 1,000-crore worth project is being implemented in three phases.

The first phase from BPCLs Kochi Refinery to IOCLs bottling plant at Udyamperoor was completed about 4-5 months back. The first phase has a capacity of 12,000-15,000 tonnes a month.

The second phase of the project is from Kochi to Palakkad. The third phase (Kochi Refinery to Puthuvypeen) pipeline works lag behind with only about 30 per cent completion.

With works at Puthuvypeen resuming again recently, the 44-km pipeline works from BPCL Kochi to Puthuvupeen is back in full swing.

In the BPCL to Udayamperoor phase alone, a total of 800 LPG tanker lorries will stay away from the roads per month while in the Kochi-Palakkad stretch, over 2,200 LPG trucks will be off the roads once the project becomes operational in May-June.

**Indian Oil Corporation (IOC)** has proposed a Solapur-Hyderabad petroleum product pipeline is likely to be implemented as a strategic link by the national oil company at an estimated cost of a little over ₹ 1,006 crore.

The pipeline will serve as a crucial connection between the Koyali and Paradip refineries of IOC.

The combined capacity of the two refineries is 28.7-million tonnes. Post an augmentation of the Koyali refinery that IOC is planning, the total capacity will be nearly 32-MT. In other words, the Solapur-Hyderabad Link Pipeline (SHLP) will facilitate movement of petroleum products between the east and west coast. This, it will do by becoming a key link between two cross country facilities – Koyali-Ahmednagar-Solapur Pipeline; and Paradip-Hyderabad Pipeline – that will be 2,335-km long.

Reconnaissance survey for the pipeline from Solapur to Hyderabad has been completed. The length will be about 376-km and traverse through Gulbarga District of Karnataka. IOC has a marketing depot in Gulbarga, at a location about 130-km from Solapur. In 2018-19, the depot received petroleum products of about 360-TMT from various sources through rail and as per a study, estimated to touch about 604-TMT by 2029-30.

The proposal, in view of alignment of the depot along the proposed route of SHLP, is to connect Gulbarga depot too with the pipeline, according to official documents. While Solapur has a marketing depot, Hyderabad end of the pipeline will be connected to Malkapur, where a terminal is to be developed under the Paradip-Hyderabad Pipeline project.



An important task SHPL will undertake is maintaining supplies, in case of a planned maintenance of one of the refineries or in case of exigencies, to Maharashtra, Andhra Pradesh and Telangana. The three States together accounted for 20 per cent of petroleum products consumption in the country during 2018-19. Now, IOC sources products from other oil marketing companies in these States and rest by product movement from own sources through coastal, rail and road mode.

Thus, the pipeline will reduce dependence on other refineries and movements, and also be cost economical over time.

Considering the significance of the facility, senior officials of IOCs Pipeline and Marketing Divisions in November had decided the pipeline should be taken up on strategic basis. A detailed feasibility report has been prepared. IOC has initiated the process of appointment of financial institution/agency for financial appraisal of SHLP.

**Brahmaputra Cracker and Polymer Ltd (BCPL)** Lepetkata in Dibrugarh, foundation stone for HPG 2<sup>nd</sup> Stage Plant was laid by The Union Minister for Chemicals and Fertilizers.

A press release from BCPL said, "The proposal for setting up a Butene-1 and second Stage Hydrogenation of Pyrolysis Gasoline (HPG) plant at Lepetkata at a cost of ₹ 386-crore, has been approved by Government of India."

"In the first phase, BCPL shall set-up an HPG 2<sup>nd</sup> Stage plant at a cost of ₹ 125.99-crore. This project having the capacity of 52,000-TPA will produce a value-added product which can be blended with motor spirit," the release said.

The release further said that BCPL was commissioned on January 2, 2016 at a cost of ₹ 9,965-crore and was dedicated to the Nation by the Prime Minister, on February 5, 2016. The plant was stabilized within 8 months of commissioning and achieved full capacity operation during 2018-19.

In the current financial year also, the plant is operating at above 100 per cent capacity. Company has made remarkable progress in the last fiscal, achieving its maiden profit and is witnessing a consistent increase in its market share of Polymer, the release said.

**Essar Exploration & Production Ltd (EEPL) and ENI**, the Italian oil major, have discovered the presence of gas and condensates in the Ken Bau prospect at Block 114, Song Hong Basin, Offshore Vietnam.

ENI Vietnam is the operator of the block with 50 per cent participating interest while EEPL holds the remaining 50 per cent.

Confirming the discovery, ENI in a statement said, "Its exploration well located at Block 114, Song Hong Basin, Offshore Vietnam, has proven the presence of gas and condensate in the Ken Bau prospect. The well result indicates a significant potential of the hydrocarbon accumulation."

The exploration well Ken Bau 1X has been drilled at a depth of 95-m below water level, and reaches a total depth of 3,606-m, encountering several intervals of gas and condensate sandstone interbedded with Miocene age shale, with an estimated net reservoir thickness in excess of 100-m.

Ken Bau 1X well was plugged and abandoned ahead of the original plan due to certain technical issues, prior to reaching deeper levels that could hold significant additional resources.

"ENI is already planning to start a drilling campaign early next year to fully assess the substantial upside of the discovery," said the statement adding that Ken Bau 1X results represent a significant breakthrough for evaluating the exploration potential in the Song Hong Basin.

Mauritius-based EEPL has so far invested over \$1.1-billion in the exploration and production business in Vietnam, Nigeria and India.

Company's unconventional Hydrocarbon acreages in India are through wholly-owned subsidiary Essar Oil and Gas Exploration and Production Ltd (EOGEPL)

EOGEPL's Raniganj CBM asset in West Bengal is the first CBM asset in India to cross the threshold of 1-million cubic metres per day of gas production.

**Tokyo Gas and Centrica LNG Co** will be co-purchasing 2.6-million tonnes per annum (MTPA) of natural gas from ONGC Videsh-partnered Rovuma Offshore Area 1 project in Mozambique.

The agreement with the Tokyo Gas and Centrica LNG Co will be effective from the date production begins to the early 2040s. This takes the long-term sale tie-ups from the project to more than 9.5-MTPA, OVL said in a statement.

The development plan for the project was approved in February 2018.

Under the existing agreements, CNOOC Gas and Power Singapore Trading & Marketing have a commitment to procure 1.5-MTPA over 13 years. Shell International Trading Middle East has an agreement to procure 2-MTPA over 13 years.

Bharat Gas Resources, a wholly-owned subsidiary of Bharat Petroleum Corporation will get 1-MTPA of gas over 15 years. State-owned oil and gas company of Indonesia, Pertamina has an agreement for 1-MTPA of gas over 20 years.

The Mozambique Rovuma Offshore Area 1 project will be developed initially as an onshore LNG plant consisting of two LNG trains with total nameplate capacity of 12.88-MTPA to support the development of the Golfinho-Atum field located entirely within Offshore Area 1.

ONGC Videsh presently holds 16 per cent net interest in the Mozambique Rovuma Area-1 Offshore Project out of which 10 per cent Participating Interest (PI) is held directly by ONGC Videsh and another 6 per cent is held through its 60 per cent shareholding in Beas Rovuma Energy Mozambique Ltd (BREML). The remaining 40 per cent shares in BREML are held by Oil India Ltd.

Anadarko Petroleum Corporation is the operator of this project with 26.5 per cent PI. The other partners are: Mitsui (20 per cent), ENH (15 per cent), BPRL (10 per cent) and PTTEP (8.5 per cent).

**ONGC** will pump in ₹ 6,000-crore in drilling 200 wells over the next seven years in Assam in order to increase the output from the State.

The investment will take place in Sivasagar and Charaideo districts of Upper Assam, besides planning to hire over 300 persons in the State.

The wells are proposed to be drilled during the next seven years starting from the previous financial year.

**Cairn Oil and Gas**, which is part of the Vedanta Group, has drawn up plans to spend over \$ 1.1-billion in coming 18 months to improve the crude oil production from the Mangla, Bhagyam and Aishwarya fields in Barmer.

The announcement comes at the heels of Cairn Oil and Gas completing a decade of operations at the Mangla Processing Terminal in Barmer recently. "With implementation of Alkaline Surfactant Polymer (ASP) enhanced oil recovery, we aim to increase the recovery factor from 36 per cent to over 50 per cent. This means that we will be able to extract more than half the crude oil present in the fields," said Ajay Kumar Dixit, Chief Executive Officer at Cairn Oil and Gas.

The current production from the Mangla, Bhagyam and Aishwarya fields is to the tune of 135,000-140,000 barrels of oil equivalent per day (kboepd).

Cairn Oil and Gas currently produces a fourth of India's total domestic oil production and targets an immediate production of 300-kboepd by 2020-2021. The target by financial year 2021-22 is to have a production of 500-kboepd.

**Hindustan Petroleum Corpn Ltd (HPCL)** has informed that there are no roadblocks in setting up the 9-MMTPA refinery-cum-petrochemical complex at an approved cost of ₹ 43,129-crore at Pachpadra in Barmer district of Rajasthan.

In addition to motor spirit and diesel, the refinery envisages production of major products like Ethylene and Propylene derivatives. These derivatives are used as feedstock in various ancillary industries, viz, packaging, textile, petrochemical industry, etc.

**Haldia Petrochemicals (HPL)**, plans to deploy an innovative technology for its project that seeks to convert crude oil into chemicals and petrochemicals directly. As opposed to the customary production of refined petroleum products, HPL's plant will concentrate on higher output of petrochemicals. "They will be setting up the refinery to produce chemicals and petrochemicals. The direct conversion of crude to petrochemicals will be the first of its kind in the country unlike other refineries, which are producing petroleum products. Such technologies are used widely in China," said an official privy to the development. HPL, is setting up an integrated refinery with aromatic complex for production of paraxylene and purified terephthalic acid (PTA) units in the first phase. The production capacity of paraxylene unit will be 1.6-million tonne per annum (MTPA) and PTA will have 2.5-MTPA capacity. The first phase of the HPL project approved is expected to be operationalised within five years of allotment of land. HPL has committed an investment of ₹ 28,700-crore (\$4.05-billion) in the first phase on its Odisha project. Recently, the High Level Clearance Authority (HLCA) in Odisha headed by Chief Minister gave its nod to the proposal, which HPL submitted on March 1, 2019. Official sources have touted HPL's proposal as the country's single-largest domestic investment in the last 12 months.

**Vedanta Ltd** has received environment clearance for the expansion of its oil and gas operation in Rajasthan that would entail an investment of ₹ 12,000-crore. The proposal is to expand onshore oil and gas production from the existing 3,00,000-BOPD (barrels oil per day) to 4,00,000-BOPD and 165-MMSCFD (million standard cubic feet per day) to 750-MMSCFD from the 'RJ-ON-90/1' block located in Barmer and Jalore districts, Rajasthan. The environment clearance (EC) is, however, subject to compliance to certain conditions. The estimated project cost is ₹ 12,000-crore. The company aims to implement the project in a phased manner during seven years. The project involves oil augmentation to produce up to 4,00,000-BOPD and 250-MMSCFD of associated gas from the oil field and natural gas augmentation to produce up to 500-MMSCFD.

Total area of the oil and gas block is 3,111-sq km. Out of it, the project presently covers an area of 1,501.7-hectare in Barmer and Jalore districts. Additional 150 hectare of land in Barmer district will be used for the proposed expansion. The 'RJ-ON-90/1 block' comprises of Vedanta Ltd and state-run ONGC for hydrocarbon exploration, development and production activities in the block, while Cairn Oil and Gas division (part of Vedanta Group) is the operator of the block.

**BPCL-Kochi Refinery** is going ahead with its second petrochemical project to produce polyols at an investment of ₹ 11,300-crore. An import substitute, polyols are used in the production of polyurethanes used in diverse products such as automotive seats, mattresses and shoe soles.

The project is expected to go on stream by 2022. BPCL is in talks with various global firms to finalise the technology for six different products. There is a huge

demand for polyols and it is growing at 10 per cent per annum providing good scope for MSMEs to set up units in the complex. The first petrochemical project of BPCL-KR constructed at a cost of ₹ 5,500-crore is all set to commence operations. It will produce acrylic acid, acrylates and oxo-alcohol that are used in the manufacture of paints, super absorbent polymers, detergents, adhesives, sealants and solvents. The technology has been sourced from Mitsubishi, Air Liquide Global and Johnson Matthey Davy. The two projects will facilitate ₹ 13,000-crore forex savings per annum for the country. With the completion of the second petrochemical project, BPCL-KR is expecting around 16 per cent increase in its turnover in three years. BPCL-KR is slated to complete its fuel upgradation project to comply with BS-VI norms this year. The project cost is around ₹ 3,300-crore.

**Vedanta Ltd** announced an oil discovery in its Krishna Godavari basin block in the Bay of Bengal. The block previously had a gas discovery in the very first well drilled.

Vedanta holds 100 per cent participating interest in the block. "Multiple reservoir zones were encountered in the well H2 within the Mesozoic sequence between the depths of 3,310 to 4,026-metres with hydrocarbon indications during drilling and downhole logging," it said. The zone from 3,403 to 3,431-metres was tested through conventional well testing (Drill Stem Test) and flowed oil to the surface. "Further appraisal will be required to establish the size and commerciality of the oil discovery. The first exploration well A3-2 drilled in the block was a gas discovery. Cairn India, the company Vedanta bought and merged with itself, had in June 2010 won the KG-OSN-2009/3 block in the 8th round of New Exploration Licensing Policy (NELP). It had committed to drill six exploratory wells on the block. These were expandable to 10. The KG basin is a proven basin where there have been many hydrocarbon discoveries. The company acquired around 1,000-sq km of 3D seismic data based on which it drilled two wells. KG-OSN-2009/3 offshore block in the Bay of Bengal was originally spread over in an area of about 1,988-sq km which was later reduced to 1,298-sq km due to exclusion of area within firing range. It is located in the shallow waters of the Indian Ocean along the East coast of India, approximately 1.5 km from the Indian coastline.

**Chennai Petroleum Corpn Ltd (CPCL)**, the Indian Oil Corpn's (IOC's) group company is planning to set up a greenfield refinery at Nagapattinam in Tamil Nadu, at a cost of ₹ 27,460-crore. The products, including motor spirit (MS) and high speed diesel (HSD), which will be produced from the refinery will help meet the latest BS-VI specification in the southern States. The new refinery will be part of the Government of India's plan to set up a petroleum, chemicals and petrochemicals investment region (PCPIR) in this region. The boards of CPCL and IOC have accorded in-principle approval for the 9-million metric tonne per annum (MMTPA) refinery at CBR at an estimated investment of ₹ 27,460-crore, plus or minus 30 per cent. The investment includes ₹ 2,800-crore for setting up a polypropylene unit of around 500 thousand metric tonne (TMT) per annum capacity. Detailed feasibility report (DFR) preparation is underway. The refinery is expected to be operational by 2023-24. The products from the refinery will meet the latest BS-VI specifications. It will produce valuable products, including liquefied petroleum gas, petrol, diesel, aviation turbine fuel, polypropylene, etc, besides petrochemical feed stocks. The petrochemical complex will also feed stocks to downstream industries, including pharma, paint and lacquer, printing inks, adhesives, coatings, chemicals, automobile lubricants, and PVC, among others. CPCL operates two refineries with a total capacity of 11.5-MMTPA (10.5-MMTPA at Chennai and 1-MMTPA near Nagapattinam) in Tamil Nadu. The company's crude throughput increased to 10,789-TMT in 2017-18, from 10,256-TMT in 2016-17. Its profit after tax stood at ₹ 913-crore in 2017-18, as compared to ₹ 1,030-crore in 2016-17.

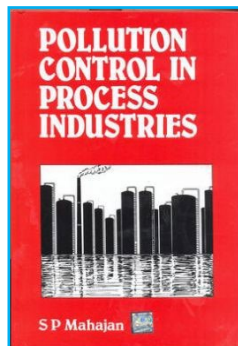
## Pollution Control in Process Industries

**Author:** S P Mahajan

**Publication:** McGraw Hill Education

**No of Pages:** 260 pages

**Price:** ₹700.00



**About the Book:** This book comes in a single volume; and presents the most important aspects of industrial pollution along with the steps to be taken for its abatement. The book contains analysis of liquid gaseous effluents and the control of specific pollutants. It also presents the pollution control aspects of selected process industries such as fertilizer industries, petroleum refineries, and petro-chemical units. Actual pollution data and recommended practices for pollution control without specific reference to Indian industries are also included in the book. Legislation aspects and problems of their enforcement are highlighted. With its application-oriented and interdisciplinary approach and comprehensive coverage, the book would be immensely useful to undergraduate and postgraduate students of chemical engineering, environmental science and engineering, and ecology. Practising engineers would also find it a useful reference.

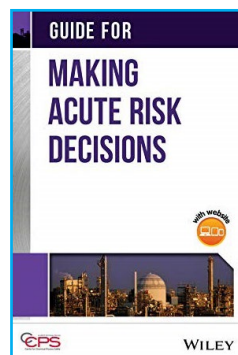
## Guide for Making Acute Risk Decisions

**Author:** Centre for Chemical Process Safety (CCPS)

**Publication:** Wiley-AIChE

**No of Pages:** 224

**Price:** ₹ 4042.50



**About the Book:** The book has been authored by CCPS, which has so far published more than 100 books and held dozens of international conferences for process safety. CCPS is supported by the contributions and voluntary participation of more than 160 companies globally.

This book presents a guidance on a large range of decision aids for risk analysts and decision makers in industry so that vital decisions can be made in a more consistent, logical, and rigorous manner. It provides good industry practices on how risk decision making is conducted in the chemical industry from many risk information sources as well as all the elements that

need to be addressed to ensure good decisions are being made.

Topics Include: identifying risk decisions; a risk decision strategy for process safety; case studies in risk decision making failures; guidance on selecting decision aids; templates for decision making in risk-based process safety; understanding process hazards & worst possible consequences; management of change as an exercise in risk identification; inherently safer design as an exercise in risk tradeoff analysis; using LOPA and risk matrices in risk decisions; using CPQRA and safety risk criteria in risk decisions; group decision making; avoiding decision traps; and documentation of process safety risk decisions.

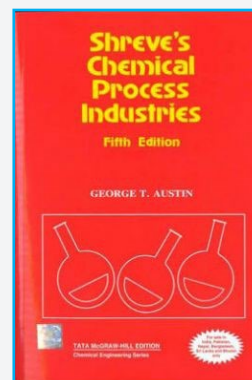
## Shreve's Chemical Process Industries (5<sup>th</sup> Edition)

**Author:** George T. Austin, R. Norris Shreve, Joseph A. Brink

**Publication:** McGraw Hill Education

**No of Pages:** 876 pages

**Price:** ₹ 980.00



**About the Book:**

This edition of the authoritative reference is widely acclaimed as the best reference for up-to-date coverage of the major chemical processes, and their technical and economic relationships. For timely and expert guidance in the designing and operating of processing units, this is the book that professionals and students have turned to. A few highlights of the content of the book are: chemical processing and the work of the chemical engineer; water conditioning and environmental protection; energy, fuels, air conditioning, and refrigeration; coal chemicals, fuel gases, industrial gases; industrial carbon; the ceramic industries; portland cements, calcium and magnesium compounds; glass industries; salt and miscellaneous sodium compounds; chlor-alkali industries: soda ash, caustic soda, chlorine; electrolytic industries; electro-thermal industries; phosphorus industries; potassium industries; nitrogen industries; sulfur and sulfuric acid; hydrochloric acid and miscellaneous inorganic compounds; nuclear industries; explosives, toxic chemical agents and propellants; photographic products industries; surface-coating industries; food and food by-product processing industries; agrichemical industries; fragrances, flavors, and food additives; oils, fats, and waxes; soap and detergents; sugar and starch industries; fermentation industries; wood chemicals, pulp and paper industries; plastics industries; man-made fiber and film; rubber industries; petroleum refining, petrochemicals, intermediates, dyes and their application; and the pharmaceutical industry.





## Indian Polycarbonate Market is Projected to Cross USD 476 million by 2023

**Anand Srinivasan**  
Managing Director  
Covestro India

In an exclusive interaction with **Chemical Engineering World**, **Anand Srinivasan** spoke about various aspects of Covestro's polycarbonate business. He mentioned, "Indian polycarbonate market is expected to witness comprehensive growth for polycarbonate's across-the-industry diverse application. Covestro being one of the leading PCS supply players across the globe, we have been continuously working on to improve efficiency and effectiveness throughout the company, and to thereby ensure competitive cost structures. Our focus, from the future perspective, is on bringing in innovation across all our businesses to remain a step ahead".

**You have taken over from the-then MD Mr Ajay Durrani. Because of the change in Master-Mind, is there any revision expected in Organization's strategy and operation?**

Change is an inevitable part of any organisation and like many successful companies across the world, Covestro is a simplified and decentralized organization. I worked closely with Mr. Durrani for some time to allow a smooth transition of business ensuring continuity of leadership. Soon after moving to India from the USA, I took over as the Plant Manager of the Ankleshwar facility and went on to head the Supply Chain Center in Mumbai. Prior to taking over from Mr. Durrani, I was heading the Polycarbonates business in India which I continue to do even now.

With change, there also comes a new emphasis on things that will bring value to all stakeholders across the verticals. India is one of the growing markets in the world. I understand the vision of the company intrinsically and I am committed to take initiatives to build our product portfolio.

I am not only pleased, but confident to take over this role at an exciting phase of the company. Though we are all faced with the global epidemic now, together with our team and partners – our focus will be to strengthen our collaborations and build new relationships for future growth.

**Please acquaint us with the footprint of Covestro's Polycarbonate (PC) Business.**

Covestro is one of the leading global suppliers of polycarbonates. The polycarbonate granules, composites, and semi-finished products manufactured by Covestro have become an integral part of everyday life.

**We plan to rejuvenate and deepen Covestro relationships across the business to implement the 'One Covestro' approach, thus to offer best possible holistic solutions to each industry.**

Polycarbonate is used in numerous automotive components, including panoramic roofs, rear spoilers, and headlights. It primarily contributes to reducing weight, being up to 50 percent lighter than glass. That's important because every gram saved reduces the fuel consumption and / or increases the battery life of electric cars.

Because of these features, we expect the share of Covestro materials to rise significantly in electric vehicles. Apart from its weight advantage, polycarbonate offers design freedom so car designers can go beyond what's currently possible with conventional materials.

In addition, polycarbonate is used in the electronics industry, where it makes laptop covers ultra-lightweight and is found in many other high-tech devices, such as smartphones, tablets, and televisions. Because it is transparent, durable, and easily sterilized, polycarbonate also plays an important role in medical equipment such as dialysis machines. Our Polycarbonates (PCS) segment leads the development of a lightweight, transparent, virtually unbreakable and easy-to-shape material. Primarily sold under the brand name Makrolon® by Covestro, the premium plastic is an excellent substitute for materials such as glass.

**How do you perceive the Indian as well as the global polycarbonate (PC) market and how do you position Covestro in it with respect to its contemporaries?**

The Indian polycarbonate market is expected to replicate the global polycarbonate market and witness comprehensive growth owing to the diversified application of polycarbonate sheets and films in various industries.

Increasing focus from the Government of India to develop and deploy electric vehicles, investments in the repair of existing infrastructure along with the development of commercial and industrial roofing is further expected to push the demand for polycarbonate products across India in the coming years.

Some industry reports suggest that the Indian polycarbonate market is projected to cross \$ 476 million by 2023. As far as the global polycarbonate market is concerned, it is expected to grow with 5-6.5 per cent CAGR according to various research reports on the sector. Though there may be some temporary slowdown in the next couple of months, this market is likely to pick up again once the lockdown is over.

In terms of application, the market can be divided into the following sectors viz. Automotive Electronics, Construction, Optical Media, Packaging, Medical Equipment, and Tableware amongst others. Geographically the market is divided into the following regions: North America, Europe, Asia Pacific, Middle East & Africa, and South America.

Being one of the leading players in PCS supply across the globe, at Covestro, our focus is on bringing in innovation across all our business to be a step ahead from the future perspective.

**China being a major contributor to Global PC Market and India's close business neighbor, how is the recent COVID-19 outbreak going to impact India's PC market and Covestro's PC business? And what is the plan for overcoming it?**

We, as well as the rest of the World, are in a very challenging situation which has no precedence in global history. It's too early to comment on such impact -- not just on India's PC market, but on the overall market.

Many key end-user industries are not fully functional as of now; and there is uncertainty about when things would get back to normal. That said, the Asia-Pacific region dominated the global market for polycarbonate in 2019. The region also dominated the market in the construction industry, owing to rapidly growing infrastructure and residential construction activities in the region, especially in India and China.

The construction industry has been one of the hardest hit by the current situation, so no-one knows how this will shape up in the immediate future. The issue of migrant workers, which the industry is dependent on to a large extent, is also going to be an influential factor to when and how fast the construction activity will take off.

Furthermore, there is also a question mark on other key sectors like automobiles and consumer electronics, the demand for which mirrors increasing household incomes, particularly in the emerging markets like India. Due to various such factors, further developments in the coming time period will be crucial to assess the demand for polycarbonate consumption in the region for the 2020 forecast period.

**Increasing demand for Extensive Engineering Thermoplastics (ETP) in end-user industries is one of the key drivers of PC market growth. What is Covestro's outlook towards it?**

Covestro is present in almost all segments of the ETP end-user market – be it electronics, electrical and appliances, automotive, construction, energy, healthcare, industrial and agricultural applications, marine and ships, packaging and print, rail, security

and protection, sports and leisure, or wood and furniture. To mention a few common examples, stain-resistant phone cases with low signal blocking, mobile phone protection with a new class of TPU that absorbs far more energy impact, or footwear knitting fibers which cut both cost and wastage in the footwear industry, Covestro has products in each category. This is why we are positive in our outlook towards this segment of the industry over the long term.

**To strengthen its R&D activities towards Sustainability and Circular Economy, Covestro has recently signed a EUR 225 million loan facility with European Investment Bank. Please walk us through your forthcoming plan for your Indian PC business.**

In autumn 2019, Covestro published a global strategic program to establish the theme of circular economy throughout all areas of the company. The main principles are to improve recycling from plastic waste, alongside the development of innovative technical and production methods in the use of alternative raw materials.

Covestro is further developing its offerings and capabilities in continuous fiber-reinforced thermoplastic (CFRTP) composites in response to market trends and a growing demand from customers. The EIB loan provides a further commitment of Covestro towards sustainability.

As far as India is concerned we plan to rejuvenate and deepen Covestro relationships across business to implement the 'One Covestro' approach offering best possible holistic solutions to each industry. We are continuously working to improve efficiency and

effectiveness throughout the company and to thereby ensure competitive cost structures.

**Covestro explicitly advocates the comprehensive and global approach of UN Sustainable Development Goals (UNSDGs). As a World-leading supplier of high-tech polymer materials, what approach does Covestro follow for its Indian PC business?**

Covestro has been advocating a global approach of UN Sustainable Development Goals (UNSDGs) for years now. We are committed to build our product portfolio and take initiatives that touch many lives and make the world a brighter place – not just in India, but across all our markets.

In India we follow Covestro's approach to circular economy, including reuse and recycling of materials throughout the value chain without sacrificing on quality. Our manufacturing units use innovative processes such as the oxygen depolarized cathode technique in chlorine production which leads to a 25 percent saving in electricity consumption while maintaining high responsibility towards raw material and energy consumed. Lastly, at the core of Covestro is ensuring reduction of its carbon footprint through technology via use of IoT and digitalization. ■

**We follow the circular economy approach including reuse and recycling of materials throughout the value chain without sacrificing on quality. At the core, Covestro ensures the reduction of its carbon footprint through technology via use of IoT and digitalization.**

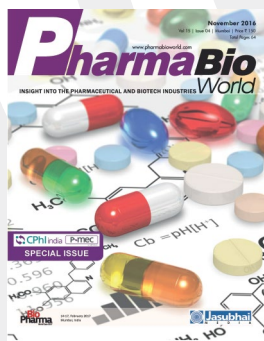


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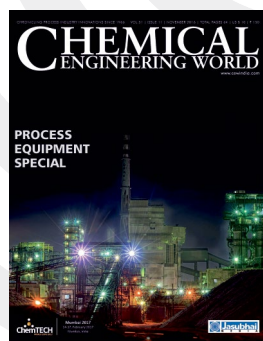
Sr.	Company Name	Page No.
1	Atomic Vacuum Company (Exports)	Inside Cover I
2	ChemTECH World Expo 2021	Inside Cover II
3	Paint & Surface Coating World Expo 2021	46
4	ReistoTech Industries Pvt Ltd	Back Cover
5	Ross Process Equipment Pvt Ltd	11
6	Vacuum Drying Technology India LLP	3

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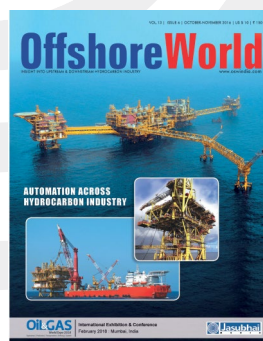
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- Pipes & Fittings
- Packaging Solutions
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### Scope for Specialty Chemicals World Expo 2021

- 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

### FACTS & FIGURES - CHEMTECH WORLD EXPO 2019

<b>612</b>	<b>18962</b>	<b>18</b>	<b>6</b>	<b>85</b>	<b>923</b>	<b>2150</b>
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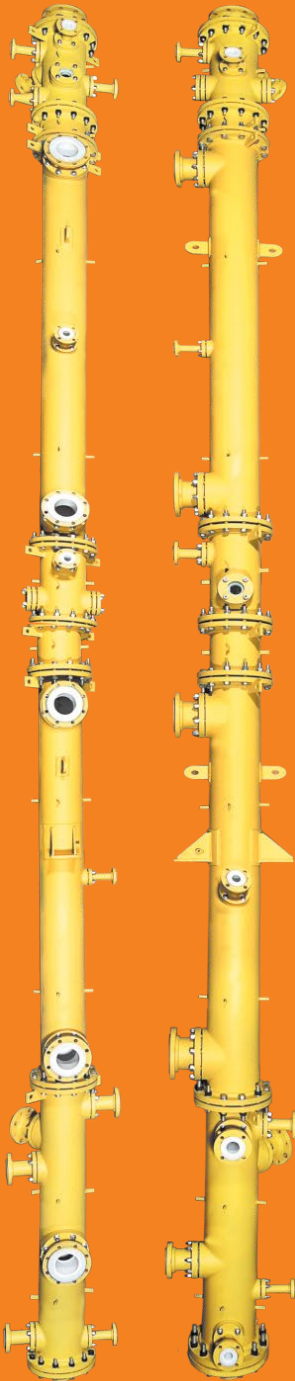






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