ACHEMA2024

PPMAI

PROCESS PLANT & MACHINERY
ASSOCIATION OF INDIA

LEADING THE PATH TO A GREENER PROCESS INDUSTRY

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CHAIRMAN'S DESK

Dear Readers,

It gives me immense pleasure to present this compendium on behalf of the Process Plant & Machinery Association of India (PPMAI), specially released for ACHEMA 2024.

Over the years, ACHEMA has provided an excellent platform for a confluence of Plant Owners, Process Designers & EPC Contractors of the World and Indian Process Plant Machinery industry.

PPMAI, as the Pioneer Association for Process Plant Industries with over 60 years of existence, has played a significant role in promoting advancements in technology, promoting innovation, and fostering a conducive environment for growth and development in the industry such as Oil & Gas, Petroleum Refinery, Petrochemical, Chemicals and Fertilizer, Energy Transition sectors. The association members have been instrumental in providing a complete range of products and services to the process industry, from concept to commissioning.

PPMAI provides a platform for networking, knowledge sharing, and capacity building among its members, thus enabling them to stay ahead in the competitive global market.

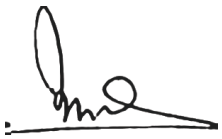
Like every edition, PPMAI is proud to be part of the ACHEMA 2024 exhibition along with leading Process Plant Machinery Manufacturers / EPC Companies from India showcasing their capabilities and skills.

I invite you to visit the India Pavilion facilitated by PPMAI and interact with the people representing our member companies.

PPMAI will be happy to assist you in expanding and leveraging the network to make meaningful contributions to your projects.

With Best Wishes!

Yours Sincerely,



ABHIJIT DANI
Chairman, PPMAI

PPMAI HAS IMMENSELY CONTRIBUTED TO THE GROWTH OF THE PROCESS PLANT & RELEVANT INDUSTRY SEGMENTS IN INDIA AND WORLD OVER.

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Deputy Secretary General

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PPMAI
PROCESS PLANT & MACHINERY ASSOCIATION OF INDIA

EMBRACING CHANGE AND INNOVATION

PPMAI is an association of highly qualified and experienced companies in India associated with various process industries right from "concept to commissioning", providing entire gambit of engineering and project management services covering all disciplines of engineering as well as complete range of supplies including fabricated equipment / pipes & fittings / instrumentation / utility packages etc.

MISSION

To work towards realizing the growth of the Indian Process Plant & Machinery Industry to becoming a preferred supplier of systems, equipment and services to the global process industry.

VISION

- Speaking with one strong, credible voice on behalf of the Process Plant and Machinery Industry
- Leading the industry and focusing its energies on issues and opportunities
- Having a sense of urgency in responding to members' needs and requirements, thus providing them with a significant competitive advantage
- Ensuring value through quality, performance, achievement of results and enhancements of the industry's image
- Providing an environment which encourages staff development, team spirit and mutual respect

The Process Plant and Machinery Association of India (PPMAI) was established on 31 March 1964.

It is a **'not for profit'** organization incorporated under the relevant Indian laws.

Process Plant and Machinery Association of India (PPMAI) is managed by a Board of Directors, which is elected by its members during the Annual General Meeting of the Association. The Board then elects a Chairman and two Deputy Chairmen amongst the elected Directors.

VALUE

- Interface with Government and media in order to present the perspective of the engineering and process plant manufacturing services offered by its members
- Promote and encourage members through presentation and awards for their achievements
- Networking with international bodies with a view to gain better visibility for members in overseas market / industries
- Convene meeting and discussions to evaluate policies having direct or indirect bearing on the business of members. Make suggestions/ communications to the Government / policy makers on issues and concerns
- Sponsor and participate in events, workshop/seminars, exhibition, delegation and promotional activities related to members business

ENSURING VALUE THROUGH QUALITY PERFORMANCE, ACHIEVEMENT OF RESULTS AND ENHANCEMENTS OF THE INDUSTRY'S IMAGE.

PPMAI SERVICES

Services Provided to Members

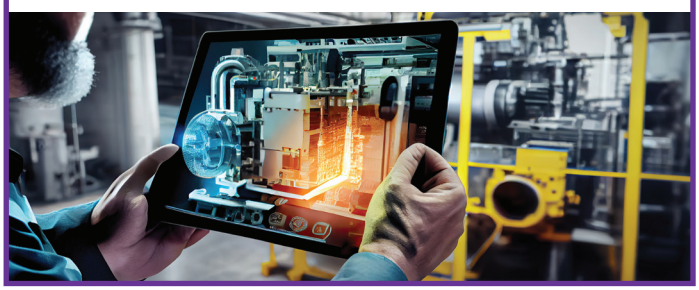
- Conduct training programs to enable members to update and improve technical and managerial skills
- Providing a platform for members to interact closely with each other to arrive at solutions to common problems and to make a joint effort to benefit from emerging opportunities
- Contributing to member's efforts in self-improvement by organizing and promoting seminars, workshops and training
- Administer special projects towards capability building, capacity building and business development for small- and medium-scale members with the support Government and other Develop-mental Funding Agencies
- Collecting and providing information to the members about various developments taking place within India and abroad in the fields of Technology, Management, Commerce and other related areas
- Providing exposure to members for business development by promoting, sponsoring and participating in exhibitions and trade events relevant to the industy
- Publishing PPMAI Bulletin (soft copy) monthly, with Tender enquiries, Project Information, intimating new projects and business opportunities to members to further develop their business.
- Providing information to members on areas of interest, such as new projects in India and abroad, country information, changes in statutory regulations, taxation, logistics, raw material, national and international exhibitions, important seminars and meets and so on by periodic communication over e-mail
- Providing information on codes and standards and assisting members in funding accrediting efforts through Government and developmental agencies

Services Provided to Non-Member

- Providing member capability and interest information
- Providing a platform to promote products and services through 'Meet the Vendor' programmes and through advertisements in the Bulletin
- Providing information and facilitating discussions for joint venture and other partnership proposals
- Organizing network and buyer-seller meeting

ACTIVITIES OF PPMAI

- Organizing networking meetings amongst the members and with other interested parties.
- Organizing and promoting seminars, workshops and training for members' self-improvement and for providing information.
- Creating awareness about the capabilities and strengths of the Indian process plant and machinery industry globally, to enhance its export potential by buyer-seller meetings.
- Promoting, sponsoring and participating in exhibitions and trade shows relevant to the industry.
- Making representations to various Government, Taxation Authorities and other statutory bodies to resolve the common problems faced by the members.
- Providing relevant information about the process plant and machinery sector to foreign organizations wanting to form joint ventures with similar Indian companies; also acting as a facilitator between the two organizations.
- Holding events like 'Meet the Vendor' program to strengthen the supply chain of the members.
- Establishing liaison with various industrial and trade organizations for promoting the interests of the process plant and machinery industries.
- Establishing liaison with associations of customers of process plant and machinery and providing information to members on marketing opportunities in those sectors. Liaison with national and international government and non-government agencies such as CII, FICCI, EEPC, Exim Bank, Development Bankers of various regions, Commercial Attaches of Indian Missions abroad and Foreign Missions in India.
- Establishing liaison with codes and standards organization and organizing relevant programmes on the subject.
- Publishing PPMAI Bulletin (soft copy) monthly, with Tender enquiries, Project Information, intimating new projects and business opportunities to members to further develop their business.



Member Profile

PPMAI draws its membership from the following types of companies, all serving the process industry:

- **Process Equipment Manufacturing Companies and Fabricators**

  These companies manufacture plant equipment and machinery like heat exchanges, pressure vessels, towers, tanks, reactors, pumps, valves and centrifuges.

- **Manufactures of Components for Process Equipment**

  These companies produce components like pipe, pipe fittings, flanges, tower internals, tower packing and fasteners.

- **Turnkey Process Packages and Utility Packages Suppliers**

  These companies provide process packages including utility packages like steam generation, waste water treatment, sulfuric acid plant and granular making plant.

- **Design, Engineering and Project Management Consultants**

  These companies do the basic engineering and provide project management and construction supervision.

- **Engineering, Procurement and Construction (EPC) Contractors**

  These companies offer turnkey services, with or without process technology, for the whole or a part of the plant.

- **Inspection and Quality Assurance Agencies**

  These companies offer quality assurance services and inspection during manufacturing, construction and commissioning stages.

- **NDT, Heat Treatment and Other Service Providers**

  These companies provide allied services for production of process plants.

INDIAN PROCESS PLANT & MACHINERY (PPM) INDUSTRY

Indian Process Plant and Machinery (PPM) industry, which has an estimated capacity of US$ 7 billion per annum, has made significant contribution in establishing the Indian process industry. The association represents a world-class pool of talent in engineering and management skills, having proven track record in basic design, multi-disciplinary detailed engineering, manufacturing of plant and equipment, transportation, installation, construction at sites, and erection and commissioning of process plants.

India, having 3.28 million square kilometres of land mass and over a 1.44 -billion-strong population, is one of the fastest growing economies in the world. It has a very large and well-developed process industry. India has a petroleum-refining capacity of over 253.92 million metric tonnes per annum (MMTPA). The world's largest grassroots refinery with a 33 MMTPA capacity is located in India. It has an ethylene capacity of 1.7 MMTPA with downstream facility producing 5.8 MMTPA plastics and polymers. India produces 20.75 MMTPA of fertilizers and has the widest range of chemicals and petrochemicals to offer. It includes heavy chemicals such as caustic (4.76 MMTPA), soda ash (3.7 MMTPA) and sulfuric acid, dyes and dye intermediates and fine chemicals. India also has a fast growing pharmaceutical industry with well-developed drug intermediate manufacturing facilities.

PPMAI members provide products and services to a diverse range of industries in India and abroad. These include oil and gas, hydrocarbon refining and processing, fertilizer, chemical, paper and pulp, synthetic fibre, food and dairy and environment control. The members also participate in infrastructure projects like power generation, ports, water and effluent management and airports. The PPM industry, which has developed 360-degree skills with ingenuity in the former closed economy, has now become globally competitive in the new liberalized environment in India. It has exported its systems, equipment and services to almost every part of the globe. Its contribution to process industry in the Middle East, South East Asia and Africa is significant. Each sector of PPM industry has special features and attributes. These are described here. Process equipment manufacturing companies and fabricators and manufacturers of components for process equipment.

The Indian process equipment and fabrication sector has a solid foundation of over 6 decades of experience and has contributed significantly to the development of the Indian process industry. The sector has large companies having over 2000 employees. It also has vibrant SMEs specializing in specific equipment or providing support products to the larger companies.

It designs and manufactures a wide variety of equipment like regenerator, hydro-treaters, hydro-crackers, tabular reactors, towers, columns, shell and tube heat exchangers, pressure vessels, centrifuges, furnaces, boilers and so on. It is capable of manufacturing very large equipment.
It uses all kinds of materials of construction like alloy steel, aluminium, other non-ferrous metals, plastics, FRP and so on. Lined equipment and piping (rubber, polymer and thermoplastics) are also manufactured in India.
The industry is supported by competent component suppliers that manufacture pipes, pipe fittings, fasteners, tower internals and so on.

Engineering, Procurement and Construction (EPC) Sector

The Indian EPC and LSTK contractors offer very wide range of EPC services at a very competitive cost. Many companies from the aforementioned EPCM sector also offer EPC contracts. On the other hand, several Indian companies with large manufacturing facilities also offer such services.

The EPC services offered cover processes for industries such as oil and gas, refining, chemical and petrochemical, polymer and synthetics, rubber, fertilizer, bulk drug and pharmaceuticals. Many companies specialize in associated areas like environment protection, steam generation, water treatment, effluent treatment, waste heat recovery captive power plants, co-generation power plants, heating and cooling solutions and so on.

Most India-based companies also export EPC services to the Middle East, to South East Asia and to African countries.

Inspection and Quality Assurance Sector

This service sector of the industry ensures quality of the products as well as the services being delivered from the country meets the national, international and/or customer specifications. India has subsidiaries or representatives of the world-renowned certification and inspection agencies. These companies provide certification as per the norms globally followed by their counterparts all over the world. There are reputed local Indian companies that also offer similar services.

All the agencies, with local resources, provide quality assurance services, including design appraisal, in the workshop as well as construction sites.The companies have rich experience and expertise, which they have acquired in the last four decades in the Indian environment as well as in other countries.

Design, Engineering and Project Management (EPCM) Sector

This sector of industry consists of large consultancy firms employing between 500 and over 2000 people and capable of managing mega projects such as refineries and petrochemical complexes. It also has smaller companies focused on specialized areas like specific product range, environment control and protection, sub-systems and plant utilities.

THE SECTOR HAS INTERNATIONAL AS WELL AS INDIAN CAPABLE OF PROVIDING OVER 30 MILLION ENGINEERING MAN-HOURS PER YEAR

Indian strength in software needs no introduction. The Indian companies use the latest internationally known design software as well as 3D plant engineering tools. The companies also use indigenously developed software modules for specific applications. They have effective communication apparatus for data transfers.

The companies offer services for: pre-investment and feasibility studies, environmental impact studies, basic engineering and design, detailed engineering, in process, mechanical, piping, electrical, instrumentation, architectural & civil works, procurement services, construction management, & project management and commissioning assistance.

PUBLICATIONS

PPMAI Speak: The bi-monthly bulletin
(hard copy publication).

A mouthpiece of PPMAI, it carries both technical and commercial articles to update members with intimation and latest techniques, commercial changes happening from time to time by government notifications.

AFFILIATIONS

- Confederation of Indian Industry (CII), New Delhi
- Federation of Indian Chambers of Commerce & Industry (FICCI), New Delhi
- Engineering Export Promotion Council (EEPC), Mumbai
- Indian Chemical Council (ICC), Mumbai
- Indo German Chamber of Commerce

EXHIBITIONS PROMOTED BY PPMAI

ACHEMA

International exhibition congress on chemical engineering, environmental protection and biotechnology.

GSSE GLOBAL STAINLESS STEEL EXPO

Strives to embody the spirit of "Make in India". Providing a platform for stakeholders & end users of the stainless steel sector meet.

INDIA CHEM

It is one of the largest composite events of the industry in the Asia-Pacific region and comprises of an international conference and exhibition.

IPEC INDIA PROCESS EXPO & CONFERENCE

Brings the finest in the process engineering sector on a single platform-manufacturers, end users, service providers.

PPMAI
PROCESS PLANT & MACHINERY ASSOCIATION OF INDIA

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CURRENT TRENDS IN THE PROCESS INDUSTRY

The process industry sector is experiencing a sea change that is reshaping how businesses operate and thrive. This is driven by societal pressure regarding environmental issues, need to reduce carbon footprint, development of innovative technologies, supply chain disruptions, Covid pandemic, competition etc.

Sustainability has emerged as a central focus for the process industry, driven by increasing regulatory pressure and growing public awareness. Companies are investing in renewable energy sources, eco-friendly production methods, and circular economy initiatives to minimize environmental impact and meet sustainability goals. From reducing carbon emissions to minimizing waste and water usage, sustainability is becoming a key differentiator and driver of innovation in the sector.

Another notable trend is the rapid adoption of digitalization and automation across the value chain. Companies are leveraging advanced data analytics, artificial intelligence, and Internet of Things (IoT) solutions to optimize processes, enhance efficiency, and drive informed decision-making.

Another trend shaping the process industry is the rise of smart manufacturing and adoption of Industry 4.0. Integrated digital systems, interconnected machinery, and real-time monitoring are revolutionizing traditional factory operations enabling predictive maintenance, remote monitoring and agile production processes.

Furthermore, the industry is witnessing a growing emphasis on supply chain resilience and risk management in the wake of global disruptions. Companies are re-evaluating their supply chain strategies, diversifying sourcing, and implementing robust contingency plans to mitigate disruptions and ensure business continuity.

KEY LATEST TRENDS ARE OUTLINED BELOW:

1.Energy Transition

- **Shift from Fossil Energy Sources**

  Serious concerns about global warming and pollution have prompted governments to incentivize the use of cleaner sources of energy over fossil fuels such as coal, petrol and diesel. A clear trend can be seen in shift to the use of Electric Vehicles, which run on renewable sources of electricity such as solar power and wind power. However, the transition faces challenges such as infrastructure limitations and the need for policy support to ensure a smooth and sustainable shift. To meet the growing demand of solar power, a number of projects have been announced to increase the installed capacity of solar PV power plants globally. This, in turn, has led to announcements for setting up solar giga factories for manufacturing of polysilicon, wafers and ingots, cells, PV modules and glass at a single location.

- **Shift from Crude Refining to Petrochemicals**

  With the projected decline in demand for refined fuels such as petrol and diesel, petroleum refiners are focusing on shifting from crude refining to petrochemical production. This shift is driven by several factors, including the growing demand for petrochemical products such as plastics, fertilizers, and synthetic materials. With advancements in technology, companies are investing in petrochemical plants to meet this demand and capitalize on higher profit margins compared to traditional refining. Moreover, the shale gas boom has resulted in an abundance of feedstock for petrochemical production, further incentivizing this transition. However, concerns about environmental impact and sustainability remain, prompting efforts to develop more eco-friendly processes and alternative materials.

- **Shift from Coal for Power Generation to Coal for Gasification**

  Shift from using coal for power generation to utilizing coal for gasification, particularly for production of chemicals has been picking up. This transition is driven by several

factors, including the increasing demand for chemicals used in various industries such as manufacturing, agriculture, and pharmaceuticals. Coal gasification allows for the conversion of coal into synthesis gas (syngas), which can then be further processed into a wide range of valuable chemical products such as methanol, DME, olefins, formaldehyde, acetic acid etc. China has successfully implemented methanol economy using its indigenous resources of coal through the gasification route. China is blending methanol with petrol and DME with LPG and thus, reducing its dependence on imported crude oil. Indian government aims for 100 million ton (MT) coal gasification by 2030, with investments worth over Rs. 4 trillion. This will help to reduce India's dependence on imported crude oil and enhance its energy security.

However, challenges such as carbon capture and storage, as well as regulatory considerations, remain important factors in shaping the future of coal gasification for chemical production.

2. Green Energy: Small Modular Reactors (SMR), Green Hydrogen, Green Ammonia, Renewable Diesel

A green portfolio reflects a comprehensive approach to sustainable energy production and decarbonization.

Small Modular Reactors (SMR) offer a reliable and carbon-free source of electricity, providing a stable base load complementing intermittent renewable sources. Their modular design allows for flexible deployment in diverse settings, including remote areas or industrial complexes, contributing to energy security.

Green hydrogen, produced through electrolysis powered by renewable energy, is a clean alternative to fossil fuel-derived hydrogen. It has various applications, including energy storage, fuel for transportation, and industrial processes like steel and chemical production, contributing to decarbonization across sectors.

Green ammonia production involves utilizing renewable energy sources, such as wind or solar, to produce ammonia through electrolysis of water and nitrogen capture from the air. Green ammonia serves as a versatile energy carrier, suitable for power generation, fuel for transportation, and feedstock for fertilizer production, with minimal carbon emissions.

Renewable diesel, produced from sustainable feedstocks such as waste oils, fats, and agricultural residues, offers a low-carbon alternative to conventional diesel fuel. Renewable diesel is a drop-in fuel and its compatibility with existing infrastructure and diesel engines makes it a viable solution for reducing emissions in transportation and heavy-duty sectors.

Sustainable aviation fuel (SAF) is gaining traction due to its potential to reduce carbon emissions in aviation. Trends include increased investment in research and development, scaling up production facilities, and regulatory incentives to encourage adoption. Additionally, partnerships between airlines, fuel producers, and governments are driving innovation and expansion in the SAF market.

Collaboration among governments, industries, and investors is crucial to accelerating the deployment and adoption of these technologies at scale, unlocking economic and environmental benefits for society.

3.Digitalization: Smart Manufacturing – Digital Factory / Smart Equipment – Diagnostic

In the era of digitalization, smart manufacturing is revolutionizing traditional factory operations by integrating advanced technologies to enhance efficiency, productivity, and flexibility. One key aspect of smart manufacturing is the concept of the digital factory, where production processes are interconnected and optimized through real-time data exchange and analysis.

Digital factories leverage technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and big data analytics to monitor and control manufacturing processes in real time. Smart equipment equipped with sensors and actuators collect data on performance, condition, and operational parameters. These data are then analyzed using AI algorithms to identify patterns, detect anomalies, and predict potential failures before they occur. This proactive predictive maintenance helps to minimize downtime, reduce costs and optimize equipment performance.

Moreover, smart equipment enables remote monitoring and control, allowing manufacturers to oversee operations from anywhere, enhance safety and respond quickly to changing demands or unexpected events.

In conclusion, the process industry is undergoing a profound transformation driven by climate change, sustainability, digitalization, smart manufacturing and supply chain resilience. Embracing these trends presents both challenges and opportunities for businesses to innovate, adapt, and thrive in an ever-changing landscape.

Article By:
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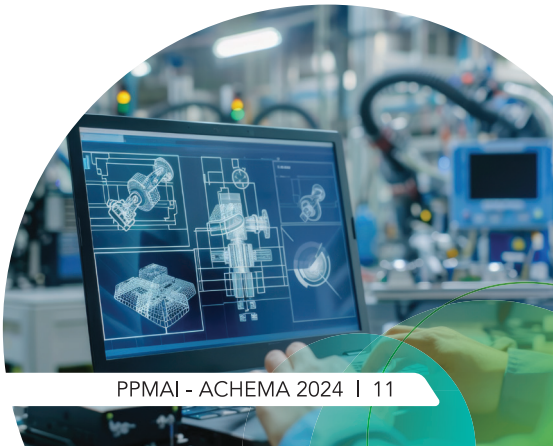


RETURN OF HUMAN CONTRIBUTION IN AUTOMATED MODULE FABRICATION

Fabrication and construction of Structural Modules was conventionally human intensive process. With a rising demand of Process Modules, the automated approach in fabrication provides solution to meet the customer delivery expectations. Although the technological shift from manual fabrication to automated fabrication is trending, sustaining the human involvement in the fabrication process needs a deeper thinking.

This article provides the insights on the reintroduction of humans in automated manufacturing in fabrication industry without sacrificing the benefits of automation. The need of this reintroduction is largely based on the principles of Industry 5.0 which is popularly termed as I5.0 with focus on human – machine collaboration.

Industry 4.0 in Structural fabrication:

Non-repetitive nature of products or projects is one of the major roadblocks in the way of fabrication industry in becoming smart. I4.0 mainly supports repetitive processes and provides same speed and accuracy time and again. PLCs, CNC controls and robotics were fully dependent on the part-programming and teach-in programming. The Smart machines were demanding smart and costly labour for generating newer CNC programs and teaching the robots about their trajectory. The operational cost was hence prohibitive.

As a result, the world started looking at low-cost countries as fabrication hubs. Ease of availability of low-cost labour, was forcing these countries to continue manufacturing without embracing the I4.0 revolution.

However, the missing element in smart fabrication was to handle the non-repetitive processes. Applications that use variety of welding processes, nonstandard fabrication sequences and multiple metallurgy were standing in the way of I 4.0.

Intelligence, a boon or curse?

In the last decade, the introduction of intelligence in machines has made it possible to deal with the challenges in fabrication industry. The industry started looking at features like Programming of machines and robots directly from the Engineering designs of products. Vision systems and image processing algorithms were also added to enhance the performance & accuracy of these intelligent systems. The Smart machines became intelligent.

On the other hand, the employment opportunities started reducing due to intelligent machines. I5.0 is the solution to harvest the benefits of intelligence without forcing unemployment.

Industry 5.0 approach:

Even after the world adopted I4.0 and its benefits, it took long time to reach the low-cost countries. The countries with high population were not able to afford I 4.0 which could increase unemployment. Industry 5.0 brings back concepts like Human centric, resilient, sustainable, and agile manufacturing are perfectly useful for low-cost countries and also for fabrication industry.

Most attractive feature of I5.0 is Co-working of cobots and humans on one worktable and complementing each other. However, for the fabrication industry, there are challenges due to technological limitations on cobots. The fabrication industry deals with components which have high weights and intricate shapes. The restrictions on the lifting capacity of cobots does not suit this. This is limiting the opportunities of co working of machines and humans which induced innovative concepts for implementation of I5.0.

Advantage India:

IT industry and Mechanical Designing have been India's strengths since last couple of decades. India is second largest steel producer and fourth largest automobile manufacturing country. Recently, the Indian economy has risen to be the 5th highest economy in the world. The policies of federal government in India are conducive for international business and manufacturing. India has highest young population in the world. The country is now emerging as a global hub for Steel fabrication.

Indian industries have already adopted Industry 4.0. The use of Computer Numeric controls, Robots, VR, AI are common in India.

I 5.0 at Praj GenX:

We at Praj GenX, are greatly dedicated for wellbeing and improvement of life of our stakeholders. While designing the I4.0 digital processes in our manufacturing facility, we have taken care human centricity. We are the pioneers in India to provide the carbon Index of every product that we manufacture. We are using technology to lower the CI of products.

Upskilling of the Craftsmen, VR based welding skill monitoring and collaborative working of humans and robots are the pillars of our resilient transformation to I5.0.

Sustainability at Praj GenX:

An engineering industry extensively relies on design drawings, reports, procedures and structured formats in paper form. Without the use of large size LED smart screens and softwares like EDMS (electronic document management system) it was impossible to avoid papers.

At Praj GenX, we replaced the papers on whiteboards, drawing boards, heaps of files of various manufacturing records by digital displays. Plastic radiography films were replaced by digital data. These are only some of the steps which realized our sustainable manufacturing. We are in process of implementing large digital walls to meet the needs of enormous size of our shop floors.

We are using latest nesting softwares for optimized usage of steel structures. Our cutting, drilling and coping machines leverage the output of these softwares in achieving desired results. In the next step, we are introducing Bio Diesel for heat treatments & transport vehicles within the factory.

Our concept of planting exotic trees having medicinal value will soon make our factory become even more sustainable.

Upskilling Praj GenX:

Our machine operators are trained engineers. Their skills of operating simple machines were improved and now they operate the intelligent machines and work collaboratively with these machines. They are also trained to use the design softwares. The ultramodern machinery needs special skills related to planning and control, inspections, and machine operation. These skillsets are key success factors for rapid, error free, safe, and economical production. Our operations team has adapted to these unique skills. Our design team is now versed to design the modules and projects to suit the features of the machines. Our Maintenance teams have learnt the modern ways of preventive and breakdown maintenance by using Camera vison and wireless communication systems.

Collaborative Shop floors:

The CNC machines and Robots convert the raw material to finished or semifinished sub-assemblies. The transfer of parts between these machines takes place with roller conveyor and floor conveyors. These systems are additionally equipped for optical safety, fumeless welding and cutting, self-inspections and audit trails. The critical decisions of humans are facilitated by machines. Our employees are now performing such intelligent jobs of for synchronization between two workstations and assisting the machines to perform with higher productivity and better quality. While the machines are performing the jobs which are not suitable for humans.

Resilient manufacturing:

Predictive tool life monitoring, remote breakdown assistance, flexibility of simultaneously executing multiple projects, interchangeability of manufacturing sequences, shifting to manual process after any workstation are the major features of the machine layout that improve the resilience of GenX factory.

Our journey to become the true representation of I5.0 has just begun, and the team GenX is looking forward for expanding the horizons of sustainability.

Article By:
Mr. Sandeep Kinkar
Head – Operations,
PRAJ Genx Limited

Industrial Equipment
Manufacturer & Supplier

ENGINEERING | PROJECTS | MANUFACTURING | TECHNOLOGY

Chemtrols Industries Pvt. Ltd. stands at the forefront as a premier solutions provider in an array of critical industrial domains including Process Analytics, Continuous Emission and Environment Monitoring, Terminal Automation, Flow Metering, Process Control Instruments, Steam Engineering solutions, and Utility Management Systems. Our specialized services cater to a diverse spectrum of industries such as Cement, Steel, Oil & Gas, Power, Fertilizer, Chemicals & Petrochemicals, ensuring operational excellence and regulatory compliance.

Driven by a steadfast commitment to excellence, we uphold the highest standards across all facets of our operations. Through relentless pursuit of innovation and continuous improvement in our products, processes, and systems, we strive to surpass the expectations of our valued customers, suppliers, employees, and stakeholders alike. Our unwavering dedication extends to ensuring that all our processes and products adhere to stringent safety, health, and environmental standards.

6 DECADES OF MANAGING THE MANUFACTURING PROCESS

With a robust presence in all major cities across India and an established foothold in the UAE, our extensive network enables us to seamlessly serve diverse markets with efficiency and agility. Bolstered by a state-of-the-art manufacturing unit located in Goa, and fortified by certifications conforming to globally recognized standards, Chemtrols epitomizes excellence in the realm of instrumentation.

Our enduring partnerships with customers and collaborators underscore our prominence in engineering and instrumentation services. Our approach is characterized by a meticulous understanding of project requirements, a systematic delineation of methodologies, and swift implementation of tailored solutions, all to secure customer approval and satisfaction.

Key highlights of Chemtrols Industries Pvt. Ltd.

- Manufacturing facilities strategically located in Goa and Ambernath (Mumbai), boasting cutting-edge infrastructure spanning over 1,25,000 square feet.
- In-house expertise in R&D, coupled with profound process knowledge, empowers us to deliver comprehensive turnkey solutions.
- Accredited with ISO 9001 certification, alongside endorsements from esteemed international agencies including ATEX, CE, PED, and ASME, among others.
- Our nationwide presence is fortified by a highly qualified and proficient engineering workforce, supported by an extensive network of sales and service offices.

Strategically nestled in Mumbai, our headquarters serves as the dynamic nucleus of our nationwide sales and service network, orchestrating seamless coordination and support across all operational fronts.

At Chemtrols Industries Pvt. Ltd., our unwavering commitment to excellence propels us forward, fuelling a culture of innovation and continuously raising the bar in the sphere of industrial solutions and instrumentation services. We are not just providers; we are pioneers, shaping the landscape of our industry with ground-breaking advancements and unparalleled dedication to our craft.

Reach us at: **Chemtrols Industries Pvt. Ltd.**
Amar Hill, Saki Vihar Road, Powai, Mumbai - 400 072, INDIA
Direct: +91 (022) 6715 1200, 6715 1413 | **Fax:** +91 (022) 2857 1913
Email: chemtrols@chemtrols.com | **Website:** www.chemtrols.com

Chemtrols

Engineering | Projects | Manufacturing | Technology

Engineering Growth

Chemtrols Industries Pvt. Ltd. is a leading Solutions' provider in managing the manufacturing processes of varied industries with ingenious solutions.

The **ISO 9001:2010** company provides specialized system integration services to industries like the Oil & Gas, Cement, Power, Fertiliser, Chemicals & Petrochemicals etc. in India and the international market, with highest standards of excellence.

ANALYTICS

- Process Analytics & Specialised Analytical Solutions
- Analyser House (Shelter) with HVAC for Hz and non Hz areas
- Closed Loop Sampling Systems
- CEMS : Continuous Emission Monitoring Systems
- CAAQMS : Continuous Ambient Air Quality Monitoring Stations

TERMINAL AUTOMATION

- Wagon & Truck Loading Systems & related hardware
- Terminal Automation System Software
- Security Surveillance CCTV and Access Control Systems
- Tank Farm Management & SCADA
- Turnkey Solutions & CAMC Services

MEASUREMENTS

Flow :

- Variable Area Flowmeters (Metal Tube Rotameters)
- Orifice Plates and Flange Assemblies
- Restriction Orifice
- Flow Nozzles
- Venturi Tubes

Level :

- Displacer Level Transmitters
- Level Gauges (Reflex, Transparent, Magnetic & Tubular)

Mechanical :

- Condensate Pots
- Sample Coolers
- Air Heaters
- Sight Flow Indicators
- Plug Valves – 2 & 3 ways
- Lined Plug Valves
- PTFE Sealed Plug Valves
- Jacketed V Port Valves.

STEAM ENGINEERING

- PRDS & DUMP PRDS
- DeSuperheaters
- Control Valves
- Turbine Bypass Valves

UTILITY MANAGEMENT SYSTEMS

- Power Grid Network Management
- Power Distribution Network Management
- SCADA
- Monitoring & Control RTU's & FRTU's for Substation & RMU's

Chemtrols Industries Pvt. Ltd. Amar Hill, Saki Vihar Road, Powai, Mumbai - 400 072 INDIA
Tel : +91-22-6715 1200, 2857 5089, 2857 0557, Fax : +91-22-2857 1913, Email : chemtrols@chemtrols.com, Web : www.chemtrols.com

Registered Office : 910, Tulsiani Chambers, 212, Nariman Point, Mumbai - 400 021 INDIA T:+91-22-22830636, F:+91-22-2287 3573.

CPP®

CONVEYING FLUIDS EFFICIENTLY™

Chemical Process Piping Pvt. Ltd. (CPP), has its roots in Chemical Process Equipments Pvt. Ltd. (CPE), a pioneer and a market leader for over 60 years in the field of design, manufacture and installation of GRP/FRP/RTRP Equipment and GRE Piping.

In the year 2004, CPP was incorporated to focus on the fast growing Fibreglass Reinforced Plastic (GRP/FRP/RTRP) Piping and Thermoplastic lined GRP/FRP/RTRP market for the Chemical, Power, Pharmaceutical, Metallurgical, Water, Waste Water and Offshore industries.

CPP has capability to design, manufacture and install GRP/FRP/RTRP, Thermoplastic lined GRP/FRP/RTRP & GRE Piping with references in several countries.

The pipe designs have been validated by TÜV, Germany.

CPP uses state-of-the-art CNC machines to manufacture the best in class Pipes, Ducts, Headers and Stacks that can sustain highly corrosive fluids at elevated temperatures & pressures.

The installation of all our products are carried out by our own team to ensure that the best designed products are also installed in the right manner thereby ensuring one point responsibility.

We design, manufacture and install the following GRP/FRP/RTRP, Thermoplastic lined GRP/FRP/RTRP & GRE products:

- Pipes
- Fittings
- Headers
- Ducts
- Stacks
- Launders

CPP has the capability to design & manufacture according to the following standards:

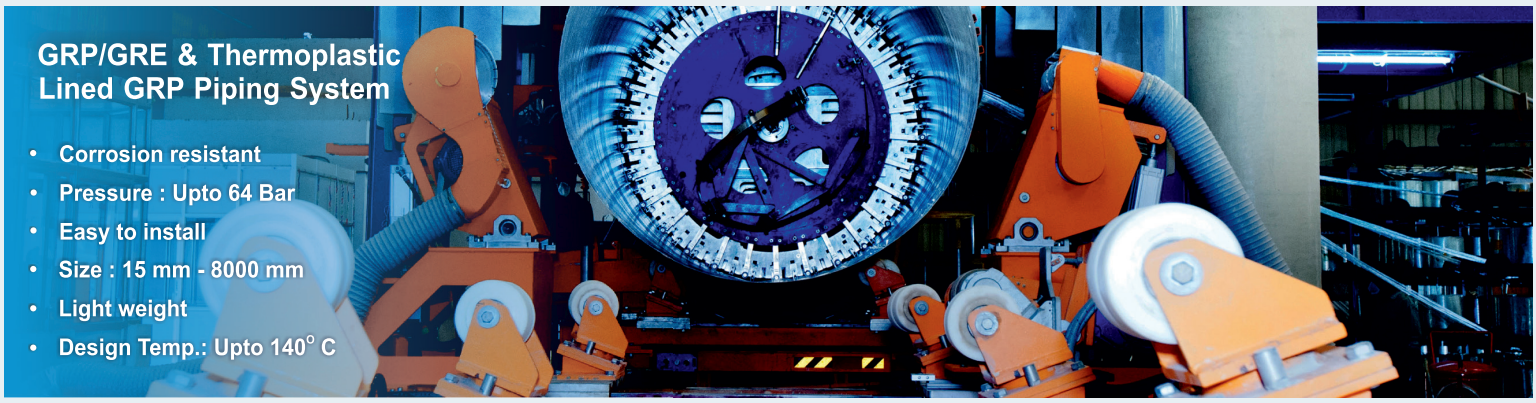
- DIN 16965/16966
- AWWA C950
- API 15LR
- ISO 14692
- PS 15-69
- AS 2634
- AWWA M45
- IS 14402
- BS 7159
- ASTM D2310/D2992/D2996
- ABS
- IS 12709

We are an ISO 9001, ISO 14001 & ISO 45001 Certified Company

IS 12709:1994
CM/L-7980402

OIL & GAS ★ DESALINATION ★ CHEMICAL ★ POWER ★ WATER ★ OFFSHORE/ONSHORE

www.cppiping.com



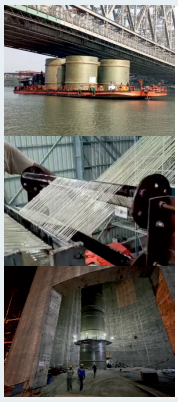
GRP/GRE & Thermoplastic Lined GRP Piping System

- Corrosion resistant
- Pressure : Upto 64 Bar
- Easy to install
- Size : 15 mm - 8000 mm
- Light weight
- Design Temp.: Upto 140° C

Desalination Plants / Water Reuse

TUAS-1 SINGAPORE 2004	POWERSERAYA SINGAPORE 2006	LAYYAH UAE 2007	KALBA UAE 2008	HAMRIYAH UAE 2008	CHENNAI INDIA 2008	CHANGI NEWATER SINGAPORE 2009	KHORFAKKAN UAE 2009	UDUPI THERMAL POWER INDIA 2009
MELBOURNE AUSTRALIA 2010	PERTH AUSTRALIA 2010 & 2011	ADANI POWER INDIA 2011	QINGDAO CHINA 2011	TUAS-2 SINGAPORE 2012	BARKA UAE 2012	MONG DUONG II VIETNAM 2013	PAME PUTATAN PHILIPPINES 2014	MIRFA UAE 2015
TUAS-3 SINGAPORE 2017	JAMNAGAR GUJARAT 2017	JEDDAH AIRPORT SAUDI ARABIA 2017	MARINA EAST SINGAPORE 2018	ADNOC CFP ABU DHABI 2019	AMSA MINERA LOS PALAMBRES CHILE 2020	NEMMELI PHASE-II INDIA 2020	DAHEJ INDIA 2021	TANAJIB SAUDI ARABIA 2022
MUNDRA INDIA 2023	DAHEJ INDIA 2023							

To be continued....



FRP/GRP Stacks

CPP is the only company in India with a global exposure in the field of Design, Manufacture & Installation of Abrasion Resistant FRP Piping, Stack & Spray Headers for FGD plants in the Power industry.

CPP has the capability to Design, Manufacture and Install the following FRP Products:

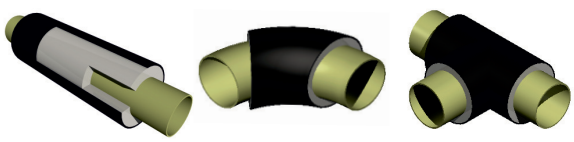
- Abrasion Resistant Recycle Piping & Supports
- Abrasion Resistant Spray Headers
- Mist Eliminator Flushing Piping
- Stacks & Chimney Liners
- Ductwork & Supports
- Cooling Water Piping : Above Ground & Underground
- Cooling Tower Headers
- Cooling Tower Risers
- Seawater Intake & Discharge Piping

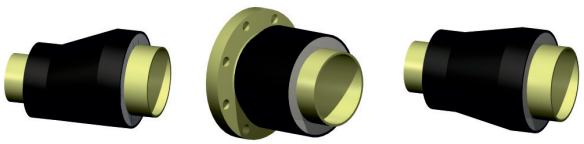
CPP has capability to design, manufacture and install fiberglass chimneys, stacks and stack liners that are either free standing or supported upto 10 mtrs. dia.

We have the experience to design virtually any size necessary to accommodate the exhaust stream from almost any process & transport highly corrosive gases at elevated temperatures.

For More Information Write To Us At: sales@cppiping.com

ThermoPipe-X





An outstanding product...

CPP has experience of over 60 years in design, manufacturing & installation of corrosion resistant GRP / GRE piping for Chemical, Water, Power and Oil & Gas Industries.

...with added value !

We now combining our corrosion resistant GRP / GRE piping with thermal insulation to achieve low thermal conductivity thus resulting in less thermal losses.

Applications.

District heating (Hot Water System)
District Cooling (Chilled Water System)
Oil & Gas
Industrial Application
(Chemical / Steam / Mining Industry
Pharmaceutical / Petrochemical)

Advantages

Corrosion resistance
UV resistance
Thermal insulation
Light Weight
Maintenance free
No special aluminium cladding required

★ **Manufacturing Facility 1**
Vadsala, Vadodara, INDIA.

Manufacturing Facility 2
Khopoli, INDIA

Manufacturing Facility 3
Bamangam, Vadodara, INDIA

Manufacturing Facility 4
Sholavaram, Chennai, INDIA

CPP®

CHEMICAL PROCESS PIPING PVT. LTD.

B.S.D. Marg, Govandi, Mumbai 400088, INDIA
Phone : + 91 22 67230607 Fax : + 91 22 67230618
E-mail : sales@cppiping.com Website : http://www.cppiping.com

★ Vadsala Facility is certified for ISO 14001:2015 & ISO 45001:2018
Vadsala & Khopoli Facilities are certified for ISO 9001:2015

www.cppiping.com

CPP

CELEBRATING 20 YEARS
2004-2024

Conveying fluids efficiently!

GRP/GRE PIPING HEADERS DUCTS & STACKS

Meet us at

ACHEMA2024

Hall 6.0 Stand B80

10th to 14th June 2024

Contact us at
+ 91 22 67230604

E-mail : sales@cppiping.com
Website : http://www.cppiping.com

Chemical Process Equipments Pvt. Ltd.

India's largest manufacturer of GRP Equipment

2 Nos. GRP Scrubbers exported to Denmark
(Size: 10m Dia x 35m Height)

6 Nos. GRP Reactors exported to Singapore
(Size: 8.5m Dia x 8.5m Height)

ABOUT CPE:

Founded in Mumbai, India in 1964, Chemical Process Equipments Pvt. Ltd. (CPE) is a global pioneer in the field of design and manufacturing GRP and Dual Laminate GRP equipment. In its rich experience of 60 years, CPE has and continues to cater to a variety of industries such as Chlor Alkali, Speciality Chemicals, Steel, Metal refining, Water Treatment, FGD, Nuclear Power, Green Hydrogen, etc. Having manufactured over 40000 equipment thus far, it boasts a strength of 750+ skilled professionals including some of the most experienced personnel in the field. A truly global company, CPE's majority revenue share comes from the global markets and has exports to over 50 countries worldwide.

Material We Use:

- GRP
- PP/GRP, PVDF/GRP
- PVC/GRP, C-PVC/GRP
- E-CTFE/GRP, HDPE/GRP
- FEP/GRP, PFA/GRP
- PTFE/GRP

Product & Services:

- Shop Fabrication
- On-Site Fabrication
- Erection & Installations
- Supervision of Commissioning
- On-Site Glass Flake Lining

Equipment Manufactured:

- Storage Tanks
- Pressure Vessels
- Scrubbers
- Wet Gas ESPs
- Polymer Concrete Cells
- Other Process Equipment

CATERING ACROSS INDUSTRIES

Chemical & Allied

- Basic Chemicals
- Fine/Speciality Chemicals
- Fertilizers
- Petrochemicals

Metals

- Ore Refining
- Solvent Extraction
- Gas Cleaning Plants
- Semiconductors

Power & FGD

- Green Hydrogen
- Waste-to-Energy Plants
- Biogas Power Plants
- Coal Fired Power Plants

Water Treatment

- Ultra Pure Water
- Demineralization
- Zero Liquid Discharge
- Sea Water Desalination

Chemical Process Equipments Pvt. Ltd.

B.S.D. Marg, Govandi, Mumbai - 400 088, India.
Tel.: +91 (22) 6723 0500 | E-mail : sales@cpel.com

Visit us at our website : www.cpel.com

WHERE INDUSTRIAL EQUIPMENT SPARKS INNOVATION IN ENERGY AND CHEMISTRY

Offers wide range of Heavy Industrial & Process Plant Equipment using corrosion resistance Alloys.

MECh Engineers was founded in 1986 with the office as well as manufacturing facilities located in the thriving state of Gujarat (India). Since our inception, we maintained a core focus on safety, reliability, innovation and complete customer satisfaction. Our team of expert engineers have the requisite entrepreneurial skills coupled with thorough understanding of global engineering quality standards that enable us to deliver quality products to our clients.

Custom Fabrication is our specialty; Design, Manufacturing & supply of Heavy Industrial & Process Plant Equipment, catering heavy industrial equipment for process industries like Petrochemical, Chemical, Fertilizers, Refineries and Oil & Gas, manufactured as per most Indian & international codes from various material of construction like Stainless Steel, Alloy Steel, Carbon Steel, LTCS, NACE, Cladded Steel, Exotic & Nickel Alloys is our core strength. Quality Inspection and Testing is carried out as per project specific Inspection & Test Plans. Selection of an NDE method and the extent of testing as per requirements of our client / Code.

Furthermore, the company has deep expertise in manufacturing various heat transfer internals like spiral coils and limpet coils which are used for heating and cooling in the chemical reaction applications.

MECh Engineers have developed all inhouse facilities and competencies to manufacture the equipment. They have always been striving to innovate and explore new and better ways to manufacture shell and tube heat exchangers, to meet every demand of their clients.

"We are shell and tube heat exchanger manufacturers for a wide range of industries including chemicals, fertilizers,

petrochemicals and power generation, among others. Our major clientele is in chemicals and the existing clientele have plans for major expansions which will fuel up demand of new heat exchangers for us," explains Girishkumar Bhootaka, CEO at MECh Engineers.

Furthermore, MECh Engineers have always made positive investments in infrastructure and technical development, so as to perfectly meet expectations to the fullest and help clients overcome various techno-commercial challenges. The company is also a member of HTRI (Heat Transfer Research, Inc.) Consortium.

MISSION

Enhancing value for all stakeholders by delivering premium products through operating efficient manufacturing systems with sustainable business practices.

VISION

Being a premier global manufacturing organisation for making world-class special purpose products, thereby establish MECh Engineers as "Preferred One Stop Solution Supplier" with major worldwide engineering consultants, EPC contractors and end customers of Heavy Industrial & Process Plant Equipment.

PRODUCT RANGE

Design, Manufacture, Supply & Install of "Heavy Industrial & Process Plant Equipment" such as:

Static Process Equipment	Custom Build Process Machinery	Skid Mounted Packages & Modular Assemblies
Pressure Vessels	Agitators for Stirred Reaction Vessels / Tanks	VOC Recovery Systems
Heat Exchangers	Rotary Spherical Ball Digester	Solvent Recovery Systems
Distillation Columns / Towers	Ribbon Blender / Rotary Vacuum Dryer	Mixing Equipment Systems
High Pressure Autoclaves		Tailored Skid Mounts & Equipment
Chemical Reactors		
Storage Tanks, Mounted Bullet Etc.		

MECh Engineers produces vessels either in several pieces or in one piece according to customers drawings and specifications, vessels having a height of 57 m and a diameter of up to 7.8 m & 252MT in weight can be produced in one piece.

STATE-OF-THE-ART MANUFACTURING FACILITY

The present manufacturing facility is suitable to manufacture different kinds of equipment across various sizes from 1MT to 252MT in single piece and up to 7800mm diameter and three inches shell thickness. Moreover, MECh Engineers have the needed expertise in working a wide range of Metallurgies including Stainless Steel, Nickel & Alloys, Titanium, Carbon Steel (HIC), LTCS, Duplexes, Clad Plates etc.

"Our shop is IMS certified (ISO 9k, 14k & 45k) and has authorization from ASME for "U" & "U2" and National Board "R" Stamp. MECh Engineers can deliver PED-certified equipment for the EU market. We have obtained approvals from regulatory authorities such as Indian Boiler Regulations, Petroleum & Explosive Safety Organizations (CCOE) for pressure vessels and heat exchangers under code compliance. Further, for our company comply to SA8000 standard, our management systems have been evaluated as being among the top performers in our business category; it is also a tool that enables us to obtain and maintain competitiveness and pursue innovation in our field," highlights Girishkumar.

SERVED 100+ PROMINENT CLIENTS INCULDING THOSE ENGAGED IN HIGH-PRESSURE OPERATIONS

FOR BUSINESS ENQUIRIES:
Call: +91 96017 38725 / +91 9727797495 / +91 9898821199
Email: marketing@mechengineers.net / info@mechengineers.net

www.mechengineers.com

MECh ENGINEERS
SINCE 1986

... where Industrial Equipment
Sparks Innovation in ENERGY & CHEMISTRY

Distillation column with internals and U-tube heat transfer bundle

Why Choose MECh Engineers ?

INNOVATIVE SOLUTIONS
Delivering pioneering solutions in heavy industrial and process plant equipment

SUSTAINABILITY
Dedicated to sustainable engineering practices across all operations

GLOBAL STANDARDS
Committed to the highest standards of quality, meeting international certifications

Reaction vessel with limpet coil

Mechanical agitators and internal heat transfer coils

Liquefied gas storage/ process vessel

Titanium tube bundle heat exchangerfor highly corrosive process applications

Utility shell and tube condenser

Accreditations and Certifications

IMS for Quality, Health, Safety & Environment

ISO 9001:2015 COMPANY · ISO 14001:2015 COMPANY · ISO 45001 COMPANY

Social Responsibility

International Compliance

ASME U & U2 · NBIC · PED certified 2014/68/EU

Statutory Compliance

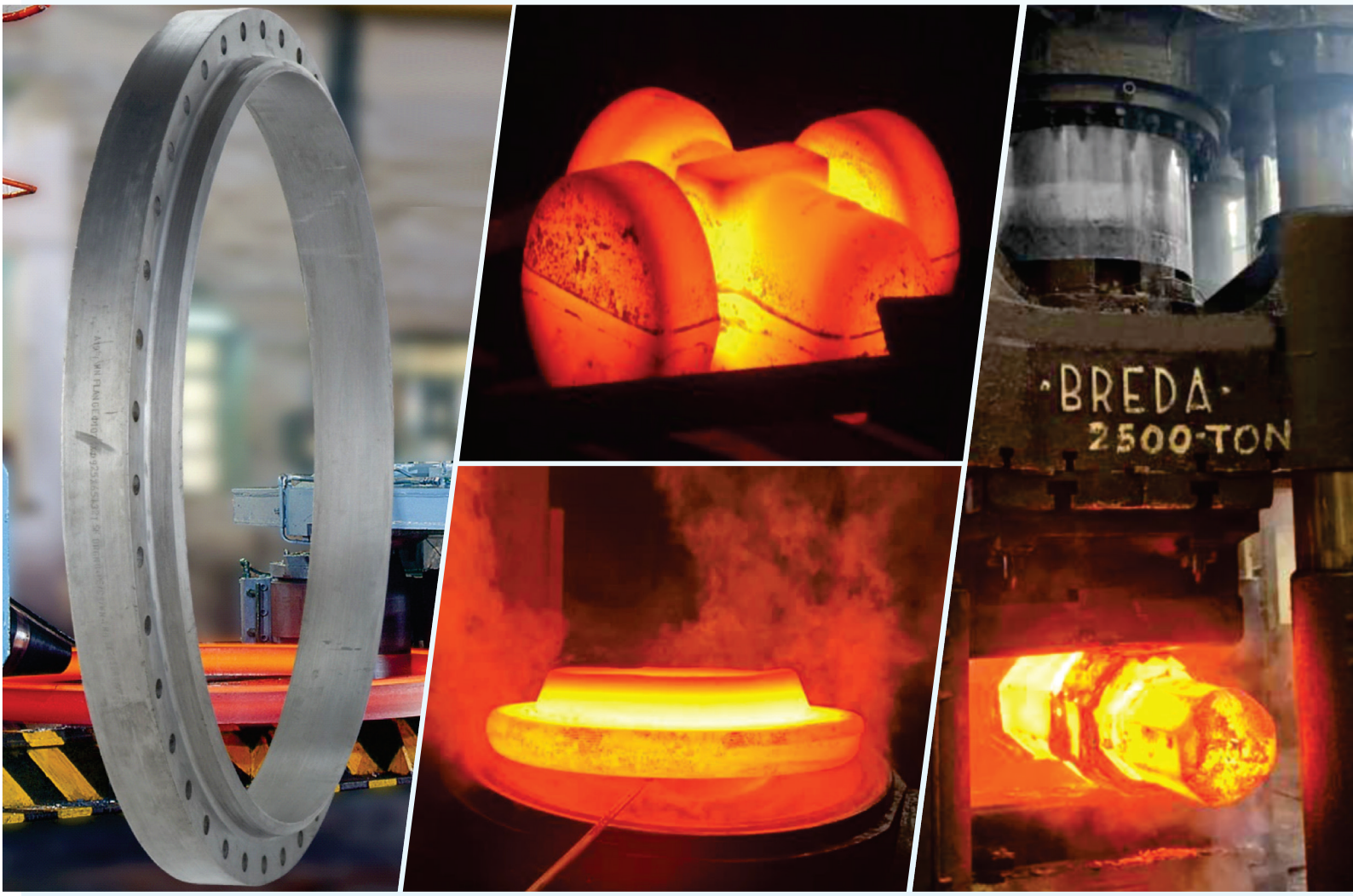
IBR Approved

Plot No. 803/1,2,3 & 1003, New GIDC, Gundlav, N.H. No-48, Valsad, Gujarat, 396035, India

+91 97277 97495 www.mechengineers.com

METAL FORGINGS PVT. LTD.

SPECIALIST IN CLOSE DIE - OPEN DIE PRESS FORGINGS - RING ROLLING



Unit-1

METAL FORGINGS PVT. LTD

Works : B-1, Mayapuri Industrial Area,
Phase-1, New Delhi - 110064, India

Unit-2

MF RING & BEARING RACES LTD.

Works : Plot No. 6, Sector-4, Industrial Estate,
Ballabhgarh, Haryana-121004, India

Corporate Office & Works:

B-1, Mayapuri Industrial Area,
Phase-1, New Delhi - 110064, India

Ph.: +91-11-40777333, 28117388

Email : sales@metalforgings.com
web : www.metalforgings.com

METAL FORGINGS PVT. LTD.

SPECIALIST IN CLOSE DIE - OPEN DIE PRESS FORGINGS - RING ROLLING

Metal Forgings Pvt. Ltd. is a renowned forging company where craftsmanship meets innovation. With a legacy spanning over six decades, we have mastered the art of forging and stand tall for producing superior quality components.

Through the talents and can-do initiatives of our team we leaverage cutting edge metallurgical technology to supply forging tailored to specific requirements of industries like Oil & Gas, Petrochemical Refinement, Power Generation, Nuclear, Mining, Infrastructure, Heavy Pressure Vessel Equipment and various other Engineering sectors.

Committed to sustainability, we prioritize eco-friendly practices in manufacturing processes. At the heart of our company is a passion for forging excellence, delivering products that test of time and exceed expectations.

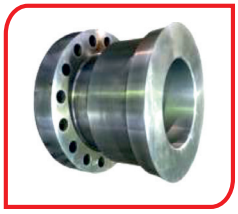
We go beyond forging products: **We forge meaningful relationship and a reputation for reliability.**

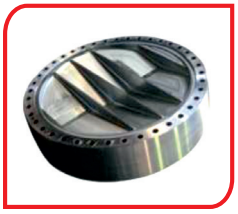
MOC - CARBON STEEL GRADES

SA 266 Gr.2, Gr.3, Gr.4, SA 105, SA 181, SA 508,
SA350 LF1, LF2, LF6, SA 765, Gr.II, Gr.IV,
A694 F52, F6O, F65, F70, S355JR. EN8, EN9
20C8, 30C8, 40C8, 45C8

MOC - ALLOY STEEL GRADES

SA182/SA336 F1, F5, F9, F11, F12, F22, F22V, F91,
SA 350 LF3, LF5, 21 CrMoV57, X22CrMoV12-1,
40NiCrMo65, 30CrNiMo8, 28CrMoNiV59,
31CrMoV9, 34CrNiMo6,18CrNiMo6-7, 16MnCr5,
X8CrNimoVNb1613, 25CrMo4, 20MnCr5,
27NiCrMoV11-6, 40NiCrMo7, 42CrMo4, EN19.
EN24, EN25, EN31, EN353, AISI 4130, 4140,
8620, SAE52100, 15CDV6, 45XH2MØAW





MOC-SS & DUPLEX STEEL GRADES

SA182/SA965 F304/304L/304H, F316/F316L /
F316Ti, F317/317L, F321/F321H. F347/347H
SA182 F6a, F6NM, X12Cr13, X8CrNiMoVNB 16-13,
X3CrNiMo13-4, X20Cr 13, HNS-X8CrMnN 18-18,
SA182 F51, F53, F60 (Duplex/Super Duplex Grades)

NEW GRADES BEING DEVELOPED

Aluminium AA2014, AA2219, AA6061, AA7075
Titanium Ti-6AL-4V, Ti-6AL-6V2Sn, Ti-6AL-4V ELI
Nickle Alloys INCONEL 718, INCONEL 625, INCONEL 825

CERTIFICATION & ACCREDITATION

- Certified by world renowned agencies for:
  - ISO 9001:2015
  - AS 9100 REV.D
  - ISO 14001:2015
  - ISO 45001:2018
  - PED/AD2000
- Approved as well known forge by IBR
- Enlisted with Engineers India Limited
- Registered and obtained CRN to Export Flanges to Various Provinces in Canada.
- Our Testing Lab is Accredited in Accordance with ISO/IEC17025:2017 by NABL
- Green Channel Certificate Awarded by Thyssenkrupp

FOR BUSINESS ENQUIRIES:
Call: +91 11 4077 7333
+91 11 2811 7388
Email: sales@metalforgings.com

www.metalforgings.com

FORGING RANGE

PRODUCT TYPE	SIZE	MIN (mm)	MAX (mm)	MAX WEIGHT (kgs)
Tubesheet/Solid Circle/Blind	OD	100	2800	11000
	Thickness	25	850	
Nozzles/Shell/Hollow Cylinder (Draw on Mandrel Route)	OD	370	1400	11000
	ID	170	1000	
	Length	500	3500	
Nozzles/Shell/Hollow Cylinder (Saddling Route)	OD	500	2300	11000
	ID	350	2000	
	Thickness	200	1400	
Rolled Ring/Girth Flange/Y-Ring	OD	400	3000	5000
	ID	300	2860	
	Thickness	70	500	
Forged Bar/Shaft/Rotor Shaft	OD	100	1000	11000
	Length	250	6500	
Blocks/Plates	Thickness	50	850	11000
	Width	100	1400	
	Length	250	6500	
Closed Die Forgings	We can do single piece forging up to 650kg			
Flanges (WN/BL/SO/SW/LWN/THD/LJ)	Size: 1/2" to 110" & Pressure Rating 150# to 2500#			

HEAT TREATMENT FACILITY

EQUIPMENT DETAILS	PROCESS
40T Gas Fired Furnace Size: 6300 x 3000 x 1700mm	Annealing, Normalizing, Hardening & Tempering
30T Gas Fired Furnace Size: 6000 x 2700 x 1500mm	Annealing, Normalizing & Tempering
20T Gas Fired Furnace Size: 6000 x 2700 x 1000mm	Annealing, Normalizing, Hardening & Tempering
10T Gas Fired Furnace Size: 2500 x 2000 x 1200mm	Annealing. Normalizing & Tempering
10T Gas Fired Automated Furnace Size: 3000 x 3000 x 2000mm - 2 Nos	Annealing, Normalizing, Hardening & Tempering
Muffle Furnace - 3 Nos	Simulation Heat Treatment & Step Cooling Test
Water Quenching Tank Size: L 6000 x W 4000 x Depth 5500 & Capacity:1,10,000 Ltrs	
Polymer Quenching Tank Size: L 3000 x W 3000 x Depth 5500 & Capacity: 40,000 Ltrs	

MAJOR SOURCES OF RAW MATERIAL (INDIGENOUS)

- Arora Iron & Steel Rolling Mills Pvt Ltd.
- Arcvac
- Arjas Modern Steel Pvt. Ltd.
- ASP-Durgapur (SAIL)
- Avtar Steel Ltd.
- Bansal Alloy and Metal Pvt Ltd.
- Jindal Steel & Power Ltd
- Jindal Stainless (Hisar) Ltd.
- Laxcon Steel Ltd.
- L&T Steel
- Mahindra Sanyo Spl. Steel
- Punjab General Industries
- Rajputana Stainless Ltd.
- RINL Vizag
- Saarloha Advanced Material Pvt. Ltd.
- Star Wire India Ltd.
- Sunflag Iron & Steel Co. Ltd.

MAJOR SOURCES OF RAW MATERIAL (OVERSEAS)

- Acciaierie Bertoli Safau SpA (ABS)
- Acciaierie Venete SpA
- Aceil Celik San. Ve Tic
- Hyundai Steel
- Interpipe Steel
- NLMK Verona
- Outokumpu
- Sandvik

FORGING FACILITY

Press
-2500T, 1600T & 1000T Open Forging Hydraulic Press
-150T, 250T, 630T & 1000T Mechanical Trimming Press

Seamless Ring Rolling
-Max OD 3000 mm & Max OD 1100 mm Ring Roller

Open Hammers:
-Open Forging Hammers - 3 Nos.
-Electro Hydraulic Hammer
-MPM Hammer

Close Die Hammers:
-13T, 25T & 32T Counter Blow Hammer
-2T Belt Drop Hammer

Manipulators
-15T, 8T, 5T, 2T & 1T Electric Manipulator

MACHINING FACILITY

- Horizontal & Vertical Lathe
- Horizontal/Turret Lathe
- CNC Vertical Lathe
- CNC Lathe
- CNC Horizontal Milling Machine
- CNC Vertical Milling Machine
- Double Column Machining Centre
- Milling & Planner Machine
- Radial Drilling Machine
- Multi Spindle Drilling Machine
- Band Saw Machine

TESTING FACILITY

NON DESTRUCTIVE TESTING

- Ultrasonic Testing
- Magnetic Particle Testing
- Liquid Penetrate Testing
- PMI (Positive Material Identification)
- Hardness Testing
- Ferrite Content Testing
- In-Situ Microscopy
- RSM (Residual Stress Measurement)

DESTRUCTIVE TESTING

- Spectro Analysis
- Impact Testing (Upto -196°C)
- Tensile Testing
- Hot Tensile Testing (Upto 700°C)
- Metallurgical Testing (Micro, Macro & Inclusion Rating)
- Hardness Testing (Rockwell, Brinell & Vickers)
- IGC Testing

www.metalforgings.com

Munters

Munters Mass Transfer equipment for biogas purification

The biogas challenge: More clean energy and optimum space for conversion of raw biogas to bio-methane. Biogas producers face a constant challenge in maximizing clean bio-methane production while dealing with limited space constraints. This case study showcases how Munters expertise in mass transfer solutions helped a European biogas to biomethane upgrade unit manufacturer overcome these very limitations.

Munters solution: Enhancing the process within existing footprint

By leveraging our in-depth knowledge of the industry and high-performance internals and packing solutions, we were able to help the client meet targeted performance goals. This impressive result was achieved within their existing facility, demonstrating the ability of Munters mass transfer technology to optimize production without requiring additional space.

Greener operations: Reduced CO_2 emissions

The new process helped to reduce CO_2 emissions, contributing to a greener operation for our client. This case study highlights some of the many benefits of partnering with Munters for your biogas upgradation needs.

Munters: Your partner in biogas success

We offer a comprehensive range of mass transfer solutions designed to:

- → Maximize biomethane production
- → Reduce footprint
- → Minimize environmental impact

Case study:
Munters mass transfer equipment for biogas

- → Location: Italy
- → Client: Biogas to biomethane upgrade manufacturer
- → Solution: Munters mass transfer equipment

Case study

An experienced European manufacturer of biogas to biomethane upgrade units asked Munters to support them again, this time on their internals in a new green project in Italy.

Key components in the process needed to be selected. And Munters had the equipment, experience and industry understanding to get the job done. "Our 3rd generation random packing and column internals were successfully designed by our team and their performance was confirmed on the field" said Markus Karbach, Business Unit Manager, Munters Clean Technologies.

Background

The European client has a proven, proprietary technology for biogas to biomethane conversion. Originally produced from OFMSW (Organic Fraction of Municipal Solid Waste), the biogas is then upgraded to renewable and CO_2-neutral bio methane, an energy source that helps reduce reliance on fossil fuels.

Biomethane has many sustainable uses, from vehicle fuel and cogeneration to usage in the natural gas grid after final conditioning. Carbon balance is negative since recovered CO_2 can be reused as raw material in many areas, and even has food grade quality.

"Our 3rd generation random packing and column internals were successfully designed by our team and their performance was confirmed on the field"

Markus Karbach, Business Unit Manager
Munters Clean Technologies.

Case study

- Mass transfer equipment for biogas upgrading

Benefits

- Munters application expertise helped define optimal solution
- Premium Munters equipment helped client to achieve the expected performance
- Carbon footprint further reduced thanks to Munters solutions

Products featured

- Munters Medal-Pak™
- Munters riser deck distributors, DRD503
- Munters support plates, SPM522
- Munters support plates, SPM522

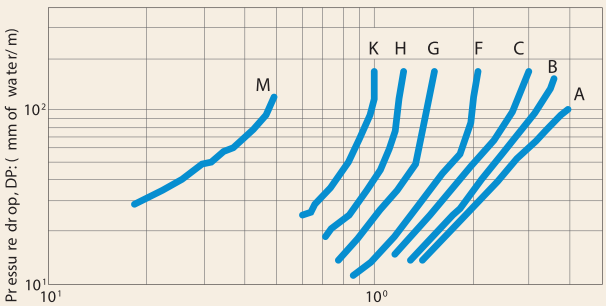
Process overview

Biogas is usually compressed for the selective removal of CO_2 and then recovered from the top of the absorption column as biomethane. A CO_2-enriched solution then leaves the bottom of the absorption tower and is fed to a regeneration column where the absorbed CO_2 is released and recovered from the top of the regeneration column at high purity.

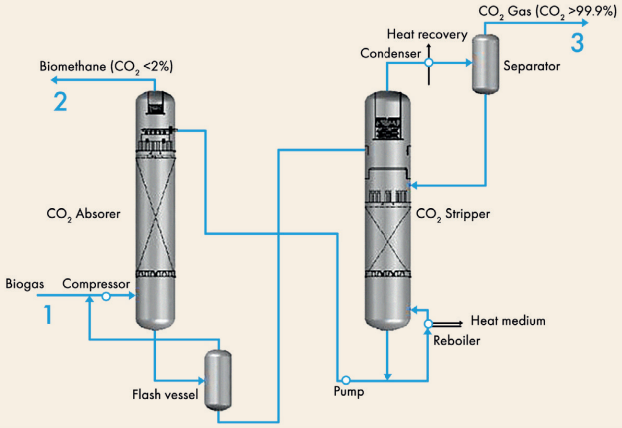
The biogas to biomethane manufacturer approached Munters for a second time and requested help with key components for their process.

Their aim was to achieve maximum capacity levels using as little space as possible. This project is in line with the European climate targets and renewable energy utilization.

Air water pressuredrop data, Medal-Pak™
 # 25, random packing



A: *0 m³/m² hr*
B: *10 m³/m² hr*
C: *25 m³/m² hr*
F: *49 m³/m² hr*
G: *74 mm³/m² hr*
H: *98 m³/m² hr*
K: 122 m³/m² hr
M: 147 m³/m² hr



1. Biogas
Pressure: any
CO_2: *20–60%*
CH_4: *80–40%*
Other gases: as per grid injection regulation/fuel standard

2. Dried biomethane
Pressure: 4–15 bar (g)
CO_2: *0.5–1%*
CH_4: balance
Other gases: as per grid injection regulation/fuel standard
Dew point: -5°C@70 bar (g)

3. Off-gas

The Munters solution

Thanks to deep application knowledge and proven track record as international mass transfer equipment suppliers, Munters was able to help our European client enhance their biogas to biomethane process, while also reducing their carbon footprint. Some of the initiatives included: Internals for the absorber and stripper were selected after comprehensive discussions with Munters engineers.

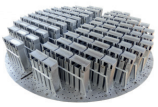
3rd generation tower packing with Munters Medal-Pak was selected, offering high mechanical strength and a large effective interfacial area.

Other internals selected included Munters riser deck distributors, which propagate liquid crossflow and enhance distribution quality. Support plates, SPM522 for efficient gas injection were also provided. "Accurate hydraulic calculations and detailed technical support during the engineering phase of the projects lead to the appropriate selection of column internals," concluded Markus Karbach.

Mass transfer equipment

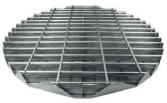
Medal-Pak™

Medal-Pak™ (formerly IMTP®) delivers both low-pressure drop and high efficiency, ideal for high-pressure and vacuum towers. Its monolithic design avoids end "opening out" issues found in ring-shaped packings.



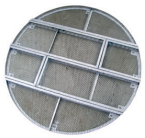
Riser deck distributor/redistributor

The riser deck distributor improves liquid distribution by using gas risers between orifices on its base, enhancing distribution quality. It's typically multi-piece with sealed joints and attaches via clamping to a ledge/support ring welded to the column wall.



Support plate

Designed for towers under 900mm (36 inches) diameter, the support plate can be multi-piece or single-piece based on installation method. Slot size matches packing size, and it rests on a ledge/support ring or bolts/clamps to a tray support ring.



Bed limiter for random packing

The bed limiter adjusts to fit various sizes and supports loads. Under high-performance distributors, an expandable design with jack screws eliminates the need for a ledge/support ring, ensuring good distribution near the column wall.

Would you like to find out if Munters has a solution for your production process? If so, please visit www.munters.com/en/solutions/mass-transfer/

Munters

Munters mass transfer equipment for biogas–CS–EN–202405

praj GenX
Wholly owned Subsidiary of Praj Industries Ltd.

PARTNERING WITH CUSTOMERS TO ENGINEER SOLUTIONS

IN ENERGY TRANSITION AND CLIMATE ACTION FOR A SUSTAINABLE WORLD

PRAJ started off as an entrepreneurial venture four decades ago, is today India's most successful company in the field of bio-based technologies and engineering with presence all over the world. The zeal of working toward making the world a better place has stayed with us till today and will continue to do so.

With a humble beginning as a supplier of ethanol plants, today Praj is a globally leading company with a bouquet of sustainable solutions for bioenergy, high purity water, critical process equipment & Modules, breweries and industrial wastewater treatment. Headquartered in Pune, India, Praj has spread its presence across the globe with 1000++ References in 100+ countries across all 5 continents.

Praj GenX Ltd. is wholly owned Subsidiary of Praj Industries Ltd.

Praj Industries intends to develop cutting edge modular solution for the various technologies such as Green Hydrogen, Green Ammonia, Waste to energy, torrefaction, carbon capture etc. To achieve this goal, PRAJ has incorporate a new subsidiary Praj GenX Ltd on 15-March-2023.

Praj GenX will focus on cutting edge research & development of modular solutions for green technologies. This will also include the production of these modules fully fitted with equipment, structure, piping, instruments etc.
Praj GenX Ltd. will be working for the Design, Procurement, Manufacturing and Supply of Modular Solutions for the Energy Transition and Climate Action sector (ETCA).

Products & Offerings

Modular Process Skids

Standard Process Skids, Modular Pilot & Demo Plants, Modular Production Plants

Critical Static Process Equipment

Pressure Vessel, Heat Exchanger, Reactor, Columns, Customized equipment

Water & Waste Water Solutions

Modularized ZLD Plant

Modular Process Skids: Standard Process Skids, Modular Pilot & Demo Plants, Modular Production Plants.

Our Multidisciplinary Engineering capabilities, State of the Art Manufacturing facility, connectivity are leveraged across industries. With India emerging as a sourcing hub for the world, we have established ourselves as a reliable partner for our global clients. We meet clients' expectations with affordable, safe solution of highest quality.

Praj GenX is uniquely positioned for Modularization

- Process know how & understanding – Owns multiple technologies
- Multi-disciplinary Engineering – All major disciplines
- Reliable Supply Chain (Indian & Global)
- Huge experience of Manufacturing & Assembly
- Experience in global logistics
- Strong track record for Stick-built & Modular plants across all continents
- Flexibility :
  - Fully modularized – Containerized.
  - Fully modularized – Truckable
  - Mixed modularized – Containerized + Truckable
  - Partially modularized – Large Equipment Off-Module

Modular Process Skids

Critical Static Process Equipment: Pressure Vessel, Heat Exchanger, Reactor, Columns, Customized Equipment

Our capabilities are leveraged across industries. With India emerging as a sourcing hub for the world, we have established ourselves as a reliable partner for our global clients. We meet clients' expectations with affordable, safe solution of highest quality.

Praj GenX offers customized Critical Equipment

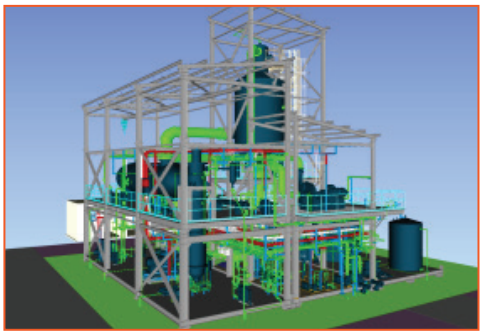
- Reactors
- High Pressure Vessels
- Shell & Tube Heat Exchangers
- Process Columns / Towers
- Client Specific Proprietary Equipment

Water & Waste water Solutions: Modularized ZLD Plant

- Physiochemical process
- Biological treatment- Aerobic
- Biological treatment- Anerobic

- Ultrafiltration
- Reverse Osmosis

- Evaporation (Modularized & conventional MEE)
- Distillation
- Dryers
- Crystallizer



praj GenX

Wholly owned Subsidiary of Praj Industries Ltd.

www.prajgenx.net

State-of-the-Art Mega Manufacturing Facility

Total Area - **124 Acre**

Total covered shed area - **129,000 Sq meter**

Yard - **58,000 Sq meter**

Key Offerings

Large Modules

Static Process Equipment

Serving for Energy Transition & Climate Action

PrajGenx Limited, Praj Tower, 274 & 275/2, Bhumkar Chowk-Hinjewadi Road, Hinjewadi, Pune-411057. INDIA

+91 20 71802000/22941000 Website : www.prajgenx.net

Scan to Explore

www.pecpl.com mktg@pecpl.com +91 98848 90117

PRECISION EQUIPMENTS

SUPPLYING SINCE 1981 | COST & QUALITY EFFECTIVE TECHNIQUES | CUSTOMIZED DESIGN | GLOBAL SUPPLY CHAIN

"HEAT TRANSFER IS OUR STRENGTH & PROCESS EQUIPMENT IS OUR BUSINESS"

01 TECHNOLOGY

01

LNG VAPORIZER
EXCLUSIVE MANUFACTURER

02

ROD-BAFFLE
LICENSED MANUFACTURER

03

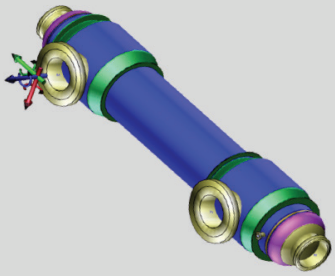
HELIXCHANGER
LICENSED MANUFACTURER

04

PLATE & SHELL
EXCLUSIVE MANUFACTURER

05

EJECTORS
MANUFACTURER



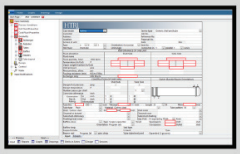
02 DESIGN

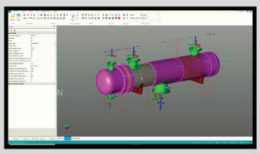
THERMAL ENGINEERING

- Offer expertise in Thermal design from FEED stage and provide feasibility study.
- End-to-End solutions with internationally renowned software like HTRI and Aspen-tech to provide economical design.
- We help clients choose raw materials, taking into consideration factors such as corrosion prevention and size reduction.

MECHANICAL ENGINEERING

- Expertise in Critical Heat exchanger like High pressure Exchanger, Rod Baffle Exchanger, Hair pin Exchanger & Exchanger with Proprietary internals.
- Quality Documentation with complete in-house design & drafting.
- Expertise in review of FEA and CFD results.
- 3D Modelling of critical exchanger.





CODES & STANDARDS

ASME SETTING THE STANDARD | THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS | PED 97/23/EC | energy API AMERICAN PETROLEUM INSTITUTE | ASTM INTERNATIONAL Standards Worldwide | TEMA | HEAT EXCHANGE INSTITUTE INCORPORATED HEI

SOFTHAND TOOL

Xchanger Suite | aspentech | PV | AutoCAD | AUTODESK INVENTOR | Ansys

03 MANUFACTURING

SHELL & TUBE HEAT EXCHANGER

- High Pressure
- Falling Film
- Helical Baffle
- Low Fin
- Cryogenic
- Hair Pin
- Rod Baffle
- Double Pipe
- High Flux

MAXIMUM CAPABILITIES

-30M LENGTH | -300MT WEIGHT | -500MM TUBESHEET THK | Ø -5M DIAMETER

C2 Hydrogenation CC Exchanger Weight: 400 MT (Stacked HX)

LP & MP Steam Exchanger

V-450 Condenser

PRECISION EQUIPMENTS

HEAT TRANSFER IS OUR STRENGTH & PROCESS EQUIPMENT IS OUR BUSINESS

PRECISION EQUIPMENTS

SHELL & TUBE HEAT EXCHANGER

FALLING FILM | ROD BAFFLE | HIGH PRESSURE | HELICAL BAFFLE | CRYOGENIC | TITANIUM HX | HAIR PIN | DOUBLE PIPE | LOW FIN | HIGH FLUX

WHO WE ARE

Precision Equipments was established in the year 1981. Ever since its inception, it has been steadily growing and now it is one of the most preferred suppliers for the design & manufacture of Process Equipment, mainly Shell and Tube Heat Exchanger

WHAT WE DO

Our Product range includes all TEMA types of Heat Exchanger, Pressure vessels, Reactors, Columns for Oil & Gas, Power, Fertilizers & Chemical Sectors Worldwide

MAXIMUM CAPABILITIES

- Ø -5M DIAMETER
- -30M LENGTH
- MT -300MT WEIGHT
- -500MM TUBESHEET THK

- SUPPLYING SINCE 1981
- COST & QUALITY EFFECTIVE TECHNIQUES
- CUSTOMIZED DESIGN
- GLOBAL SUPPLY CHAIN

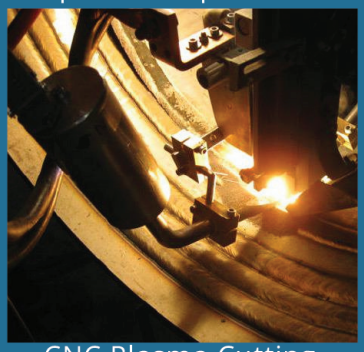
REBOILERS | CONDENSERS | EVAPORATORS | COOLERS | WASTE HEAT BOILERS | HEATERS, PRE-HEATERS & SUPER HEATERS | REACTORS | STRIPPERS | CONVERTERS | ABSORBERS | REGENERATORS | CONCENTRATORS & PRE-CONCENTRATORS | LNG VAPORIZERS

ACCREDITATIONS

ASME U Stamp
ASME U-2 Stamp
ASME R Stamp
ASME S Stamp
BV Marine
National Board (NB)
ISO 9001:2015; ISO 14001:2015; ISO 45001:2018

IN-HOUSE CAPABILITIES

Strip Weld Deposit - ESW



BTA Drilling for Tube Sheets - Upto 500 mm Thk

Orbital TIG for Tube to Tubesheet Joint

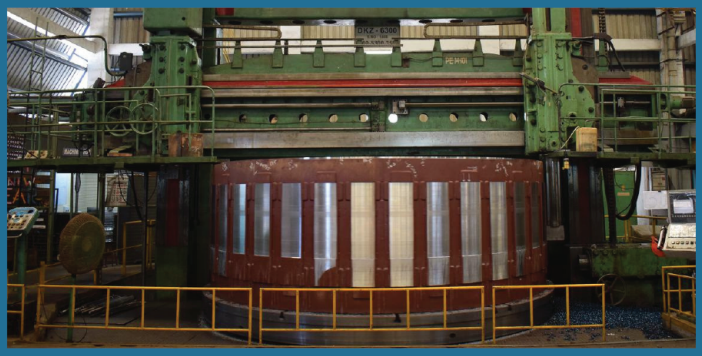
CNC Plasma Cutting

Titanium Clean Room Facility

Hydraulic Expansion

Double Column VMC for Baffle Drilling

CNC VTL - 6300 mm Dia x 3500 mm Ht



UNIT 1
B-70/1, SIPCOT Industrial Park,
Thandalam, Irungattukottai, Sriperumbudur
Chennai- 602 105, Tamil Nadu, India.

UNIT 2
Unit-2 -No.126, S.No.1364/2A,
Perambakkam main road, Usain Nagar,
Mappedu,Tiruvallur- 631402,
Tamilnadu, India.

For Business Enquiries:
mktg@pecpl.com
+91 98848 90117

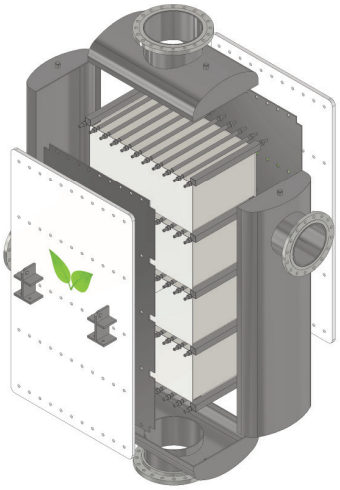
PRECISION EQUIPMENTS

CEES
RESPECTING NATURE

GERMAN ENGINEERING,
LOCAL MANUFACTURING

GASKETTED PLATE-TYPE HEAT EXCHANGER

WELDED PLATE TYPE HEAT EXCHANGER - HYBRID

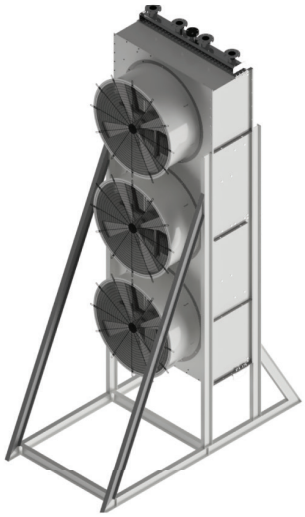


MATERIAL OF CONSTRUCTION FOR GASKETTED, WIDE GAP, SEMI-WELDED AND FULLY WELDED RANGE

• SA240 TP304 • SA240 TP316L • SA240 TP316Ti • SMO-254 • INCOLLOY • HC-276 • NICKEL 201 • TITANIUM • TITANIUM-PALLADIUM

WELDED PLATE TYPE HEAT EXCHANGER - BLOC

AIR-COOLED PROCESS CONDENSERS



OUR ESTEEMED CUSTOMER BASE

ETHANOL

DAIRY

EDIBLE OIL

NUCLEAR

WASTE-WATER

ENERGY SAVING

CEES
RESPECTING NATURE

GERMAN ENGINEERING, LOCAL MANUFACTURING

Clean Earth Energy Solution (CEES) is formed under 'Make in India' initiative; the only initiative of India; by World's highest experienced team of Plate heat exchanger specialists from India, Germany, Denmark & France. We excel in conceptualizing & developing dies and tools, thermal designs, engineering, and manufacturing using cutting edge technology & Robotic facilities complying with Environmental, Safety and Sustainability norms.

Our state-of-the-art plant located in the prime manufacturing hub of MIDC Chakan, Pune enjoys excellent connectivity via Express Road transport, Seaport, and international airports.

Clean Earth Energy Solution is India's first company in the field of Plate type heat exchanger. We employ the best talent in the field of efficient heat transfer on corrugated surface with a world class Engineering center located in Pune India, Dorsten Germany & Rhône-Alpes, France.

We commit to each customer that a **CEES PRODUCT IS BUILT TO LAST** with longest service life. We have proven the same in each Industry with toughest of applications. Experience us with a difference!

HTRI ISO 9001:2015 CE 0045

VIRAL™
V Care

SCAN TO KNOW MORE

We care for future...

WE SERVE FOLLOWING SERVICES TO INDUSTRIES ACROSS THE GLOBE

- DEALING IN TURNKEY INDUSTRIAL PROJECTS
- CONSULTANCY AND SOLUTION PROVIDERS IN VARIOUS TYPES OF INDUSTRIES
- WE HAVE MORE THAN 100 TECHNICAL ENGINEERS AND 250+ SKILLED FABRICATORS TO PROVIDE SERVICES TO INDUSTRIES

APPLICATIONS WE SERVE

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viralvcare.com

VIRAL™ V Care

The largest manufactures of complete range of Industrial Pipes, Valves & Support systems

Electrofusion
Pipe & Fittings

PERT
Industrial Pipes

V-strut & Modular
Support System

Industrial
Valves

VIRAL™
V Care

SCAN TO KNOW MORE

V-STRUT MODULER SUPPORT SYSTEM

- Easy and fast to install with esthetic view
- Specialized Clamping support system
- Different from conventional way

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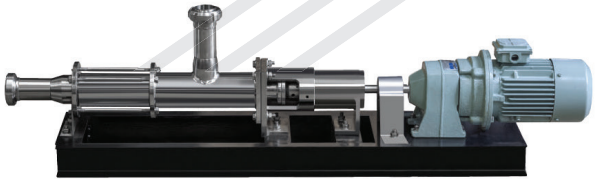
Made for offshore
Outokumpu is dedicated to meet the exacting standards of today's offshore industry.
We offer the **broadest range of stainless steels available**, bringing you superior corrosion resistance, excellent mechanical properties and significant cost savings.
Discover more:
outokumpu.com/oil-and-gas
outokumpu

40 Countries Being Served

250 Thousand Installation

POSI+VE

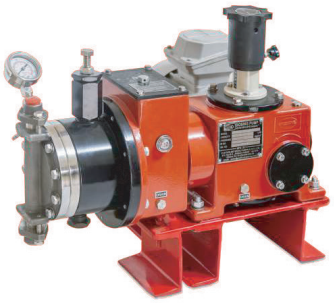
28 Years Of Business



Progressive Cavity Screw Pump

Solenoid Driven Electronic Dosing Pumps

Diaphragm Dosing Pumps Mechanically Actuated



Diaphragm Dosing Pumps Hydraulically Actuated

Agitator / Mixer

Skid Mounted Chemical Dosing Packages

Anything with a good 'Flow' is a favourite type of music to our Dosing Pump

Positive Metering Pumps (I) Pvt. Ltd.

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