

World-class Modular Plant Design & Fabrication



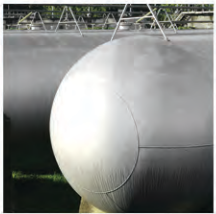
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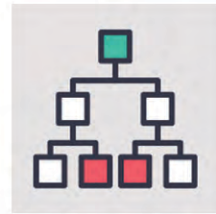
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ABOUT CRYSTALEPC

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25
YEARS
EXPERIENCE

Crystal Industrial has a rich engineering, procurement and construction experience of over 25 years, guided by ethics and fairness. We provide world-class modular EPC solutions that make our clients and business associates proud. Backed by solid references we have a proven history of success and of delivering what we promise.

Our primary business approach is to provide reliable and reduced risk, shorter delivery solution and objectively ensuring the long-term profitability of our customers without compromising on the health and safety standards of our employees, clients and other associated personnel.

Crystal Industrial specializes in engineering and building modular process plants and functional skid with complete scope of Equipment, Piping, Elements, Instrumentation, Insulation etc.

Modulization helps in reduced delivery time and cumbersome site activities without compromising the functional and operational requirements of the client.



The degreed and experienced engineers of Crystal Industrial are trained to build plants from the P & I Diagram and basic process data provided by customers process Licensors. The scope could include:

1. Detailed engineering including elaborate P & I Diagrams, Data sheet, Plant Modeling, Piping drawings, Equipment drawings, Electrical and Instrumentation drawing, Bill of Material, Structural Cut Sheets and other required engineering documents.
2. Procurement of Quality Materials from approved and qualified vendors.
3. Crystal Industrial's construction team has earned two decades of experience in building complex process plants. Our team can be further enhanced any time, thanks to a fleet of trusted and approved Sub Contractors.

Crystal Industrial believes safety and health are of prime importance in all its business activities whether at its own office or manufacturing or at our vendor/ Contractor /Customer facilities.

ENGINEERING



Crystal Industrial's engineers are a combination of degreed and highly experienced professionals in their respective field of expertise.

They have worked in a variety of global projects to develop comprehensive, integrated solutions to meet the most stringent client objectives.

Our teams consist of engineers who have worked on multiple projects in diverse industries.

Our Engineering capabilities Include:

1. Plant Modelling (PDMS)
2. Development of P&ID's based on the basic process flow diagrams and process P&ID's

3. Layouts
4. Data Sheet preparation
5. Equipment data sheets.
6. Electrical and instrumentations data sheets.
7. Equipment Drawing
8. Piping Drawing and Bill of Materials
9. Electrical and Instrumentation drawing and B.O.M.
10. Structural Drawing and Cut sheets.
11. Other related documents required for project.



PRESSURE VESSELS



Crystal Industrial has over 25 years of experience in manufacturing Pressure Vessels, Heat Exchangers, Columns, Storage Drums and vessels including these equipment with ASME 'U' Stamp.

Our in-house design engineers have constructed some of the largest and most critical equipment for demanding applications around the world.

Crystal Industrial has the capability to work with a variety of complex materials. Some of them are:

1. Carbon Steel in different grades.
2. Low alloy Steels including P11, P22 and P91 grades.
3. Cladded Vessels and exchangers.
4. Stainless Steel Vessel and Heat Exchangers in different grades.
5. Exotic metals like Inconel, Hastelloy, Monel etc.

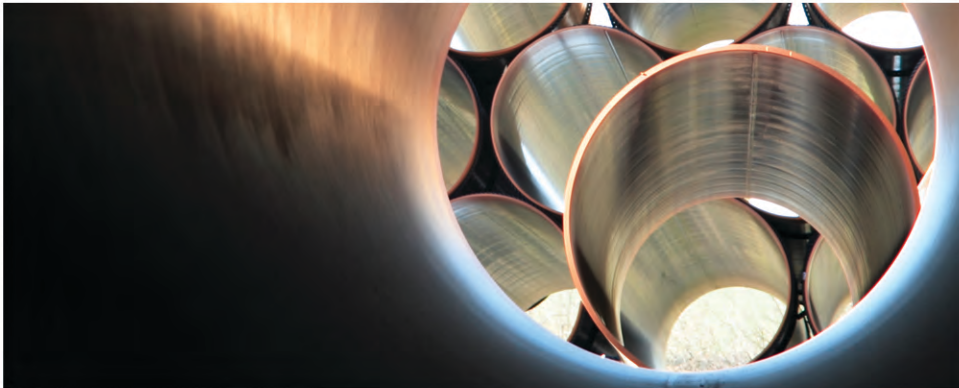
Having built what is probably two of the world's largest Ethylene Oxygen Mixers is a testimony to our engineers' capability to design and fabricate complex pressure vessels & Heat exchangers.



Our state-of-the-art fabrication facility located near Navi Mumbai provides a conducive atmosphere to meet the challenges provided by the critical projects of our global customers.



PIPING FABRICATION & ASSEMBLY



Crystal's in-house shop construction assures greater Quality Control and efficient use of man hours.

High safety procedures used in the shop provides greater health and safety standards in human working. Abundant skilled manpower supply at the shop location provides for Scalability and Flexibility for peak / slack day manpower requirements.

Crystal industrial shop facilities provides for all calibrated and tested lifting equipment like EOT and mobile cranes. The shop also provides for high clearance ceiling and load / lock doors.

Fabrication capability includes:

- Carbon Steel - Structures, Pressure Vessel, Heat Exchangers, Columns etc.
- Stainless Steel – Pressure Vessels, Heat Exchanger, Columns etc.
- Low alloy steel - Pressure Vessels, Heat Exchanger, Columns etc.

- Exotic Metals with Inconel/ Hastelloy
- Piping in carbon steel, Stainless steel, Exotic Metals and Low alloy steel
- Fabrication mostly NACE MR 0175 standard
- FAT Testing
- Green Tags
- Instrumentation Installation
- Cable trays and Cabling
- Mechanical assembly
- Painting
- Tube fitting, binding and installation
- Welding: - TIG, MIG, SAW, MMAW etc.
- Automatic welding machine
- R Stamp and U stamp in pressure vessel fabrication
- Hydrotesting and pneumatic testing
- Non-destructive testing: RT/ UT / DPT etc.



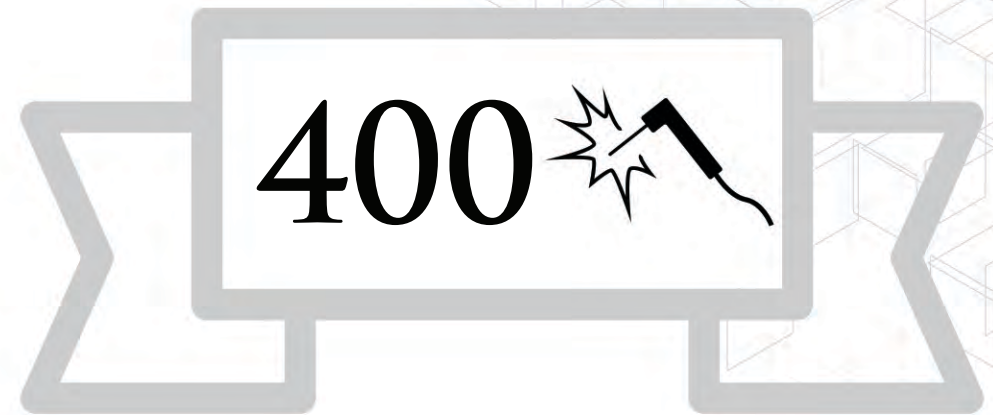
WELDING ENGINEERING & PROCESS CONTROL



Crystal Industrial employs degreed and experienced Metallurgical and Welding engineers who can write all the required welding documents like Weld Plan, WPS / PQR etc. and also the different NDE and Testing procedures.

The over 400 different combinations of welding procedures developed is a testimony to our engineers' ingenuity and competence.

Exotic metal fabrication in Inconel, Hastelloy, Monel, Titanium and Weld Overlay cladding of vessels, Pipe fittings with computer controlled **Fronius** automated welding machines, makes us the specialists who can cater to the diverse and critical requirements of the Oil, Gas & Refinery industries.



Over 400 Welding procedures have been developed by the engineering team of Crystal Industrial



ELECTRICAL & INSTRUMENTATION



Crystal industrial has the unique advantage of being experienced in both Client Side operations and integration of controls and equipment during project management. Control equipment are chosen by engineers based on a checklist of operational concerns:

- Functional Objective
- Compatibility of Chemicals
- Simplicity of operation
- Capacity
- Equipment reputation and Brand
- Base in Maintenance
- Use of Expert advice from experienced vendors
- Standardization wherever possible

Equipment is procured by maintaining vendor neutrality and considering the possibilities to maintain common spares without compromising the availability of the product in the long run. Our engineers ensure that customer's process Skids has accurate instruments to observe, measure, position, record and command the intricacies involved in the process technology.

We automate and integrate the process with our experienced automation, electronics and instrumentation engineering team.

Instrumentation expertise include control valve, ON-OFF Valves, Transmitters, analyzers, gauges etc. Crystal industrial has the capabilities to design and execute process instrumentation devices to change/control field parameters via. PLC, DCS or Control system.

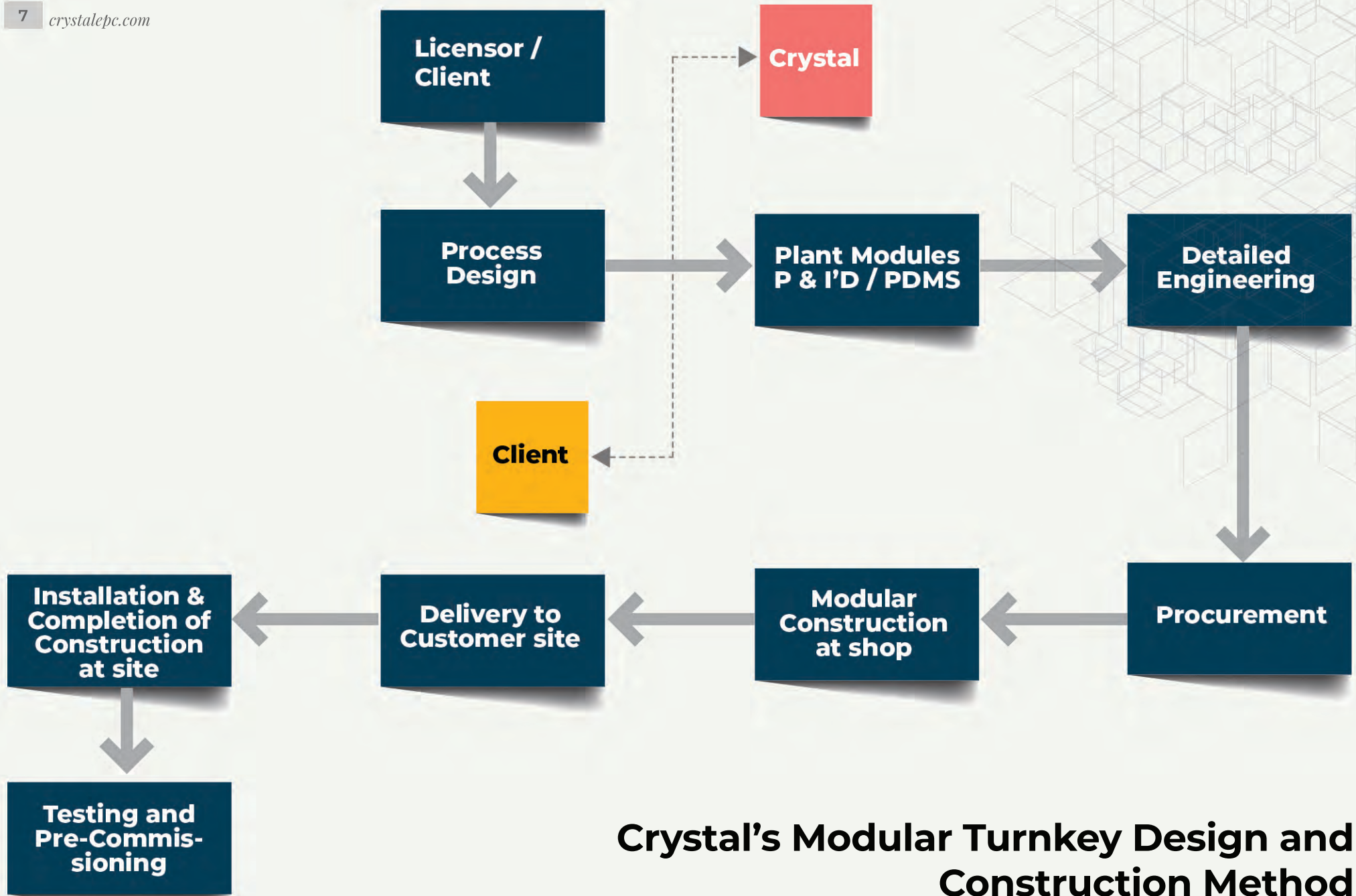
Our expertise includes:

- Flow
- Density
- Humidity
- Concentration
- Level Measurement
- Conductivity
- Color
- ORP
- P/d
- Position
- Pressure
- Salinity
- Temperature
- Vacuum
- Weight etc.

Electrical design and execution capacity includes the following:

- Using a centralized or decentralized power distribution
- Electrical schematics based on Client /Process needs
- Hazardous classifications
- Customer Parameters
- Explosion proof enclosure
- Intrinsically safe devices
- Isolation barriers
- Proper grounding
- Purge electrical cabinets
- Circuit breaker protective devices
- Other special improved requirements





Crystal's Modular Turnkey Design and Construction Method

CASE STUDY # 1



Skid Based Modular Process Plant

Customer/Contractor

Reliance Industrial Limited, Jamnagar, India.

Project

Extract Hydro treater- EHT

Description

Complete process plant containing Columns, Reactors, Heat Exchanger, Pressure Vessels with piping, Electricals, Instrumentation and Installation built on EPC basic with process engineering from AXENS and Reliance. The scope included fabrication of 30 modules at crystal fabrication shop and shifting then to Reliance Jamnagar site. Including site alignment, electrical & instrumentation synchronizing, PWHT of site joints, Radiography, Process testing and pre-commissioning activities.

The approximate work content included 800 MT of structural, 33 units of Pressure Vessels, Reactors, Columns, Heat Exchangers and Drums, 327 units of motorized control/ON-OFF valves and transmitters, 28000-inch diameter low alloy steel, stainless steel, carbon steel and Inconel pipe and many of them meeting NACE MR 0175 standard.

Completion Time

Supply 14 month from date of purchase order and start up within 18 months from date of purchase order.

Year of Completion

September 2017

CASE STUDY # 2



Skid of Indorama

Customer/Client

Indorama Eleme Fertilizer & Chemicals Limited

Project

ZN /002/13 – IEFCL Gas Pipeline Project

Process Description

Corrosion Inhibitor (KL-3940) neutralizing amine injected.

Description

Complete Corrosion Inhibitor System (Skid Mounted) containing 2 units of dosing tank having 2" neutralizing corrosion Inhibitor nozzle, 3 units of dosing pump with motor, VFD, Electronic Capacity Controller, Pulsation Damper, Pressure Relief Valve, Level switches, Level gauges, Calibration cylinder, Unloading / Peristaltic Pump Ball Valves, NRV, Transmitters and necessary piping spool etc.

Scope of supply included Design, Engineering, Procurement, Fabrication, Factory acceptance test, inspection, Seaworthy packing & dispatch to client's project site in Nigeria.

Start Date

26th July 2014

Completion Date

28th March 2015

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