

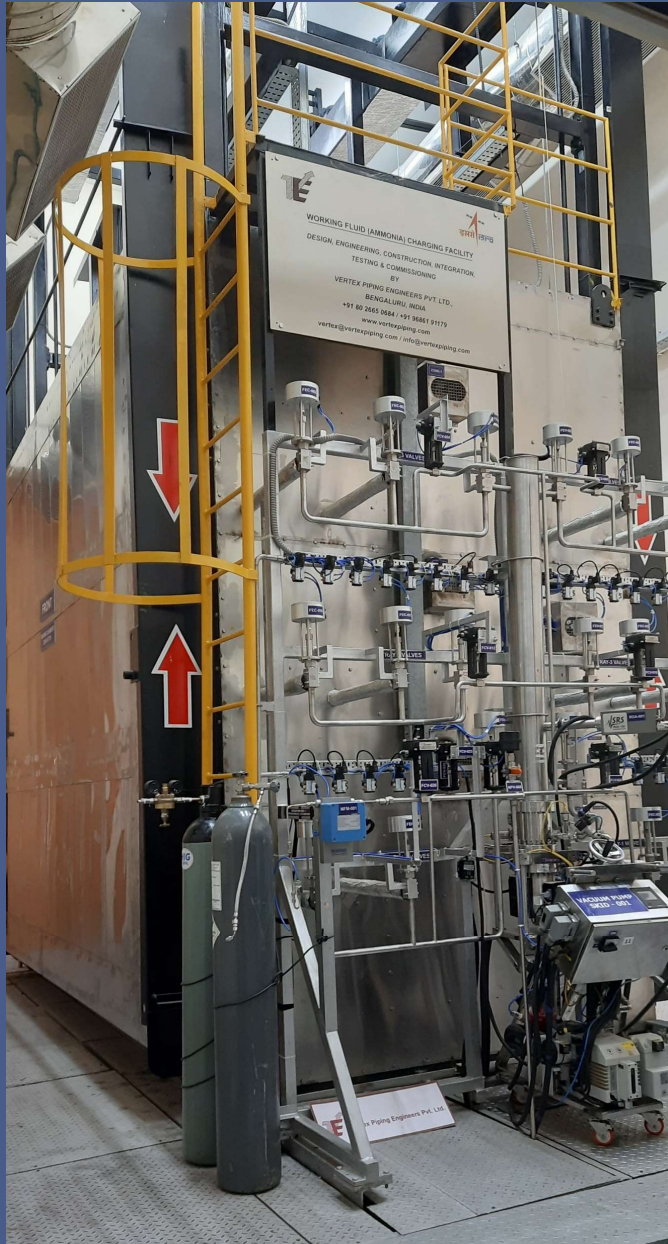
A light gray world map is centered on the blue background, showing the outlines of the continents.

Vertex Engineers Private Limited

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24 Years of EPC Activities



Core Business
EPC Projects

**Engineering and
Design**

**Procurement &
Material Supply**

**Construction
Management**

**Total Skid
Integration**

**Electro
Mechanical
Systems**

**Adv. Prototype
Experimental
Test Rigs**

Engineering and Construction Team



- **Project Managers**
- **Structural Engineers**
- **Design Engineers**
- **Mechanical Engineers**
- **Electrical Engineers**
- **CAD Designers**
- **Administrative Staff**
- **Construction Managers**
- **Site Engineers**
- **Construction Support Teams**
- **Welders**
- **Fitters**
- **Riggers**
- **Contract Workers**



Important EPC Projects - 1



- High Pressure High Temperature (HPHT) Experimental Helium Cooling Loop (EHCL) for High Heat Flux Test Facility - Fusion Reactor - Institute for Plasma Research, Ahmedabad, India.
- Working Fluid (Ammonia) Charging Facility - Design, Engineering, Installation, Integration, Testing & Commissioning - Indian Space Research Organization (ISRO), Bengaluru, India.
- Design, Supply, Fabrication, Installation, Testing and Commissioning of INTF Cooling Water System, ITER India, Ahmedabad, India.
- Utility Piping Systems (LPG, Cooling Water, Chilled Water, Compressed Air, etc.,) for Toyota Kirloskar Motor Pvt. Ltd., Bengaluru, India.



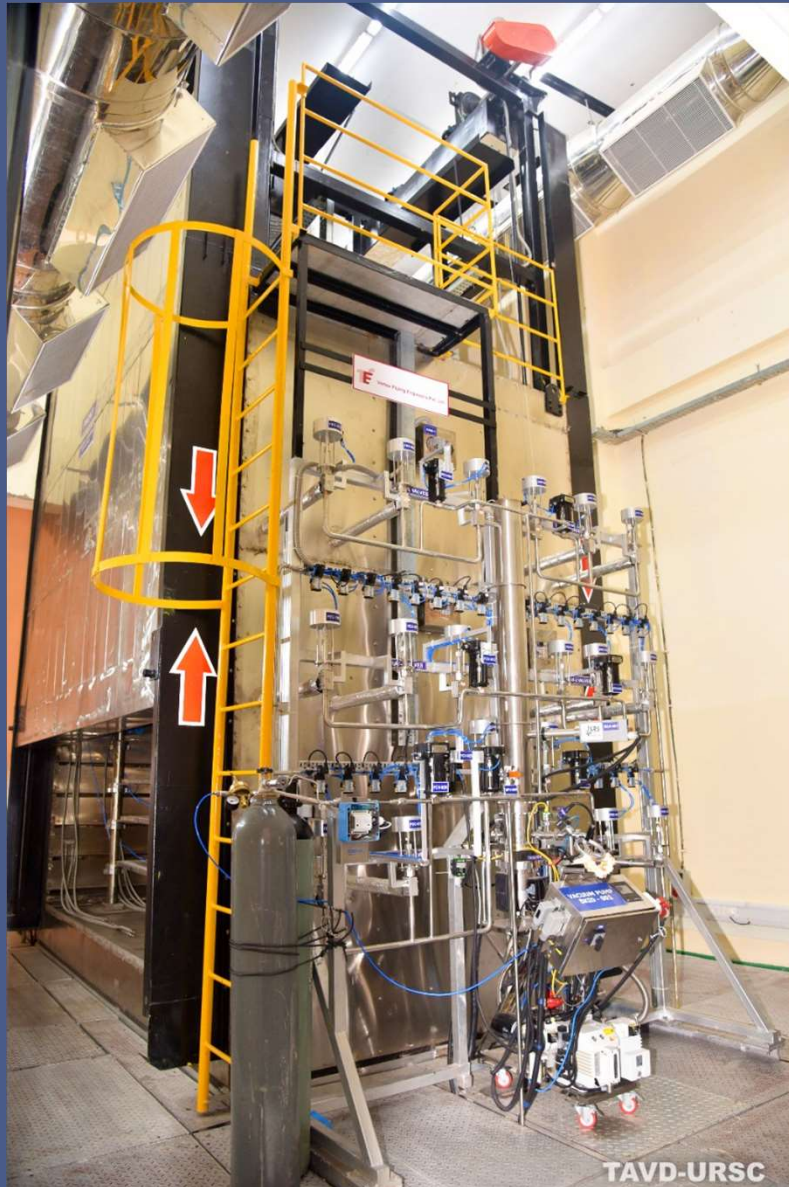
Important EPC Projects - 2



- **High Pressure High Temperature (HPHT) Closed Loop Cooling Water System for High Heat Flux Test Facility - Fusion Reactor - Institute for Plasma Research, Ahmedabad, India.**
- **Air – Preheater Ducting System, High Temperature Intake System for Jet Engine Combustion Chamber Test Facility - Gas Turbine Research Establishment (GTRE), Bengaluru, India.**
- **Exempt Low Activity Liquid Water Collection & Disposal System for Medical Use of Fission Based Mo-99 Production Facility - Department of Atomic Energy (DAE), Mumbai, India.**



Working Fluid (Ammonia) Charging Facility U R Rao Satellite Centre (URSC), ISRO, Bengaluru



- Engineering, Procurement, Fabrication, Installation, Integration, Testing & Commissioning of Ammonia Liquid Charging System for Heat Pipes used in Satellites.
- Integration of Turbo Molecular Pumps, Vacuum Pumps, Cryostat, Baking Chamber, Ammonia Charging Units, Nitrogen Charging Units, Piping and Data Acquisition Control System (DACS).
- Develop Control System Logic and Philosophy and Implementation.
- Start-Up and Commissioning and establish Operational Parameters of System.
- Achieved 10^{-6} mbar Vacuum at Heat Pipe Inlet and 10^{-9} mbar at Pump Inlet as per ISRO requirement.
- Provide Calculations for Vacuum, Flow Hydraulics and Pipe Insulation Thickness.

Working Fluid (Ammonia) Charging Facility U R Rao Satellite Centre (URSC), ISRO, Bengaluru



■ Engineering Calculations and Reports

- Extreme Vacuum Generation Calculation
- Electrical Load Calculations
- Insulation Thickness for Baking Chamber
- Piping and Tubing Wall Thickness Calculation
- Facility Heat Load and A/C
- Cryo-System Hydraulics
- Control System Philosophy
- Start-Up and Commissioning Reports



■ Engineering Drawings

- 3D Modelling of Facility
- Baking Chamber GA Drawings
- Facility GA Drawings
- P&ID's
- Instrumentation Tubing Layout
- Controls Input – Output Configuration Diagram
- Controls Architecture
- Cable Routing Drawings

Working Fluid (Ammonia) Charging Facility U R Rao Satellite Centre (URSC), ISRO, Bengaluru



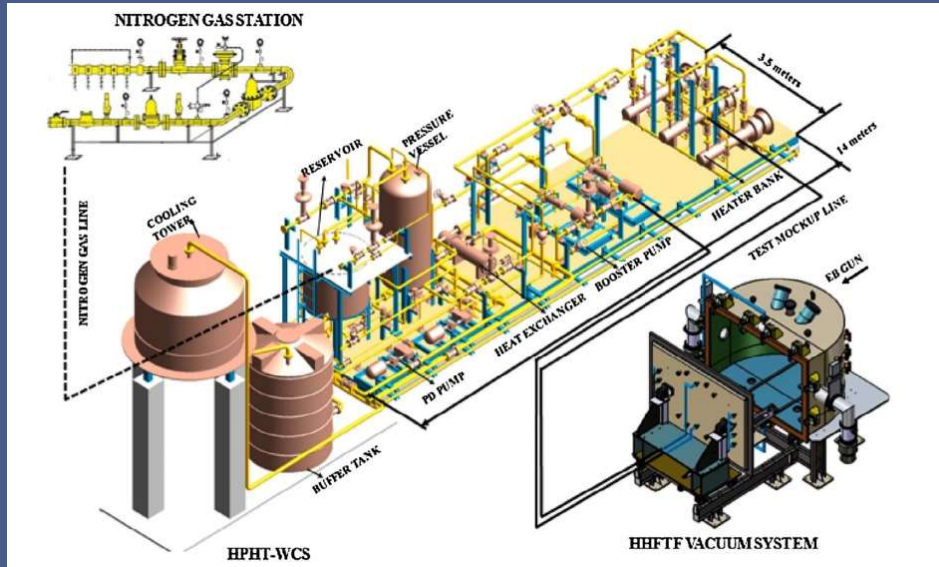
■ Equipment Data Sheets & Purchase Specs

- Cable and Tubing and Components MTO
- Turbo Molecular Pumps
- Rough Vacuum Pumps
- Mass Flow Meter, Residual Gas Analyzer
- Cryostat
- Electro- Pneumatic Valves
- Baking Chamber
- Ammonia Leak Detector
- DACS

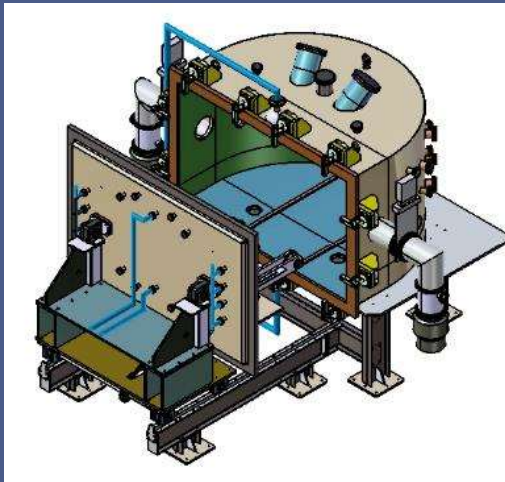
■ Installation, Integration and Commissioning

- Mechanical Completion Report
- Hydrotest Reports
- WPS & PQR
- Welder Qualifications
- Electrical Continuity Reports
- Loop Checking Reports
- DACS Operation Reports
- Vacuum Generation Reports

HPHT Cooling Water System For Plasma Reactor Institute for Plasma Research (IPR), Ahmedabad, India



Skid 3D Model



Test Chamber

■ Main System Parameters

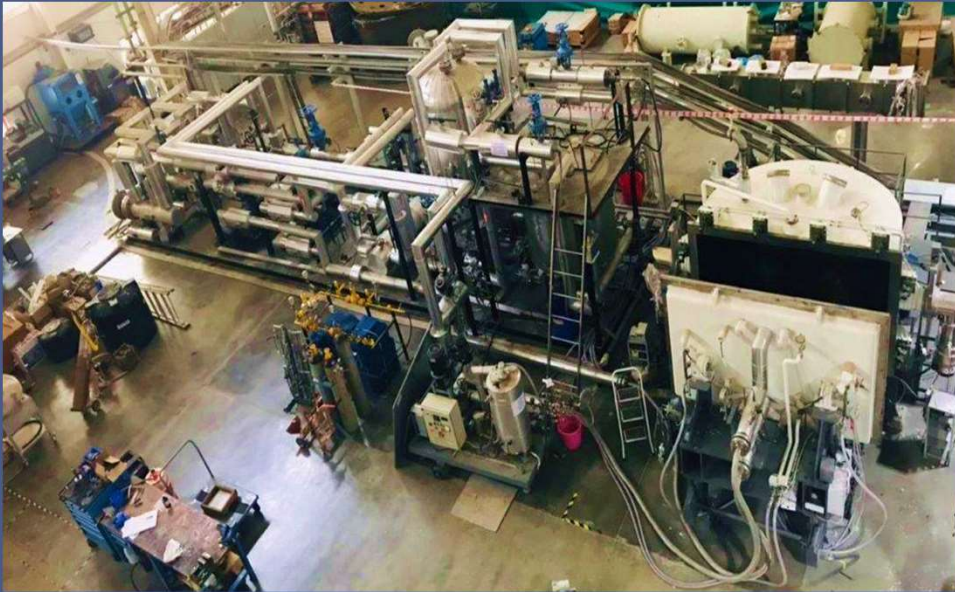
- Design Pressure - 96 bar.
- Design Temperature - 200°C.
- Heat Load - 210 kW.
- Nitrogen Bank Pr. - 50 bar.
- Cooling Tower Flow - 60m³/hr.
- System Flow Rate - 18m³/hr

■ Design & Engineering

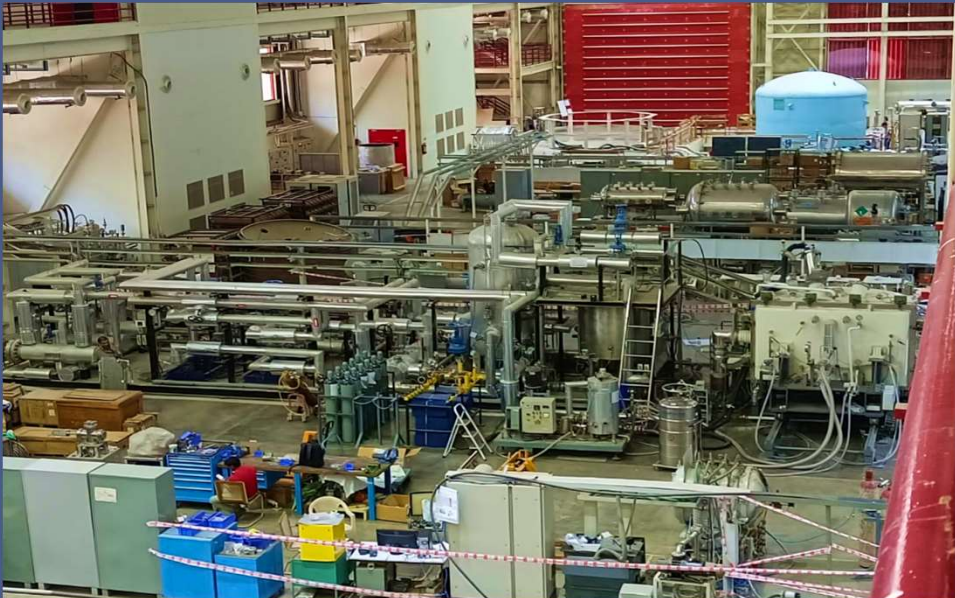
- Full 3D Modelling
- Piping GA Drawings and Isometrics
- Hydraulic Analysis
- Piping Stress Analysis
- Equipment and Instruments Procurement
- Data Sheets for Instruments & Equipment

■ Fabrication, Installation Tie-in and Commissioning of all Systems

HPHT Cooling Water System For Plasma Reactor Institute for Plasma Research (IPR), Ahmedabad, India

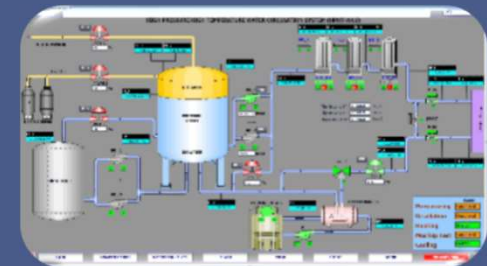


HPHT Cooling Water Test Rig



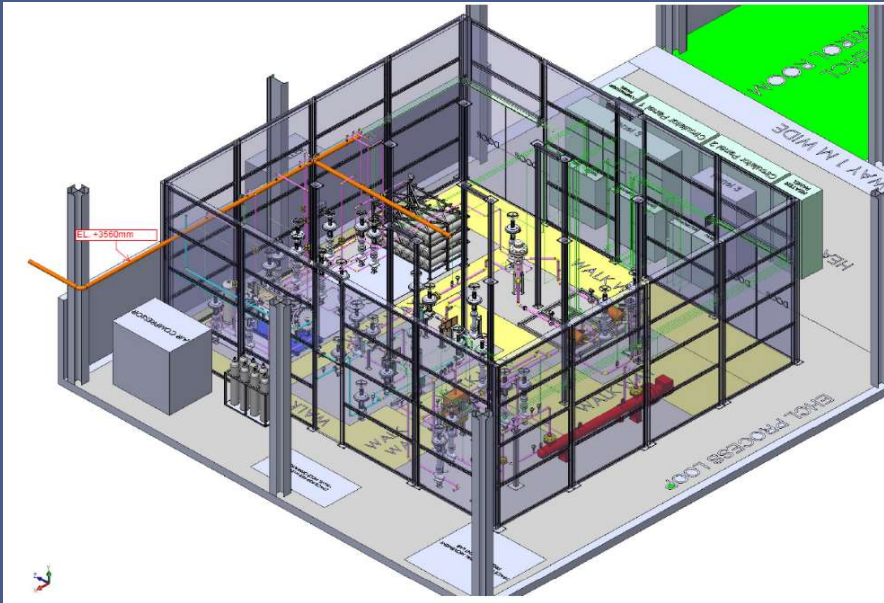
■ Main System Components

- Booster Pumps - 25 HP
- Pressure Vessel - 2000 Liters
- PD Pumps - 15 HP
- Heater Banks - 210 KW
- Heat Exchanger - 210 KW
- Reservoir - 1000 Liters
- Nitrogen Banks
- Cooling Tower - 125 TR
- Piping, Valves & Instruments
- Switch Gear - 1250 Amps
 - MCC for VFD
 - Thyristor - Heater Bank Control
 - SIEMENS PLC
 - ABB Air Circuit Breakers

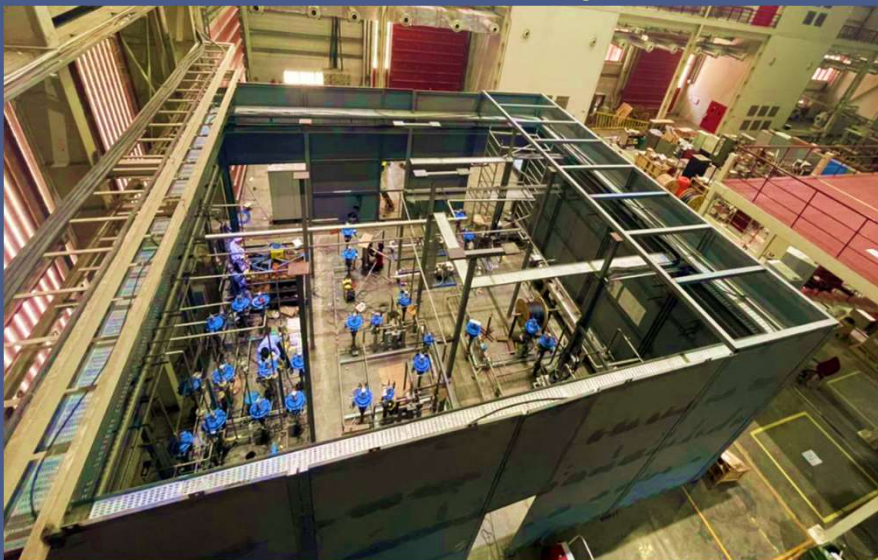


Data Acquisition and Control System

HPHT Experimental Helium Cooling System (EHCL) Institute for Plasma Research (IPR), Ahmedabad, India



3 D Model – EHCL Layout



EHCL Test Rig

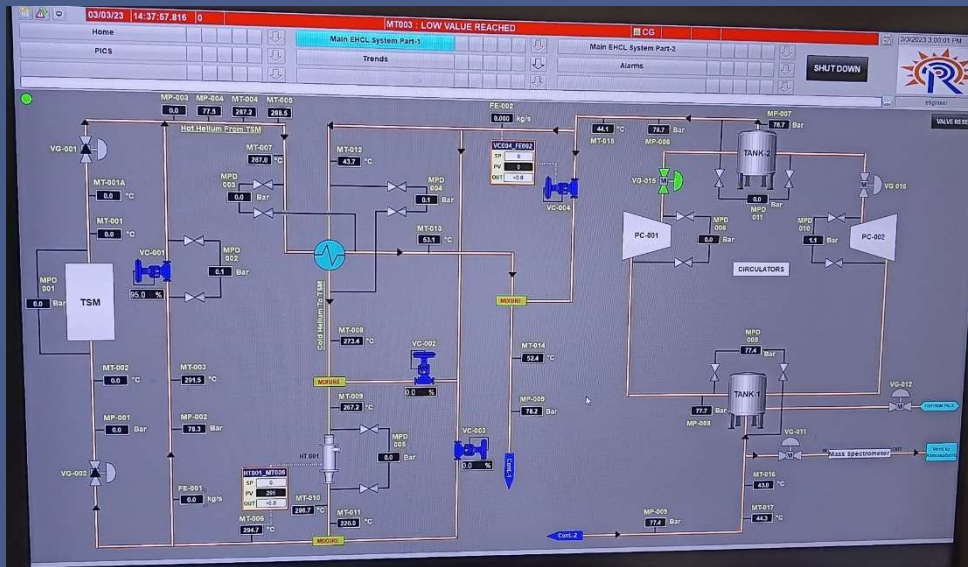
■ Main System Parameters

- Fluid / Gas handled - Helium Gas
- Design Pressure - 100 bar.
- Coolant Temperature - 300 - 450°C.
- Heat Load - 75 kW.
- Helium Flow Rate - 0.2 - 0.45 Kg/Sec.

■ Main System Components

- Helium Circulator
- Helium Compressor
- Helium-Helium Heat Exchanger
- Helium–Water Heat Exchanger
- Test Section Module
- Helium Control Valves
- Helium Inventory Banks
- Data Acquisition and Control System
- Temp, Flow and Pressure Sensors
- Pressure Regulation Systems
- Rupture Discs

HPHT Experimental Helium Cooling System (EHCL) Institute for Plasma Research (IPR), Ahmedabad, India



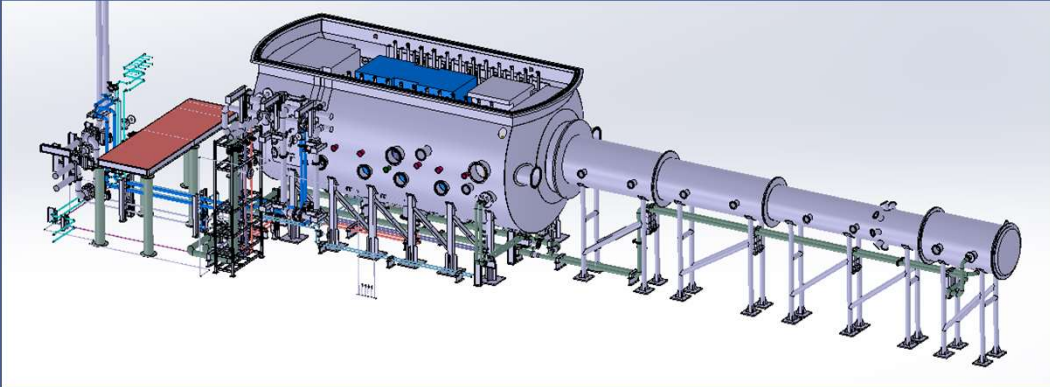
Data Acquisition and Control System



Helium Control & On/Off Valves

- **Design & Engineering**
 - Full 3D Modelling
 - Piping GA and Isometrics
 - Structural Barricade Drawings
 - Thermo-Hydraulic Analysis
 - Piping Dynamic & Static Stress Analysis
 - Control System Analysis Document
 - Electrical Load Calculations
 - Single Line Diagrams
 - Power & Inst Cable Sizing & Routing
 - Barricade Impact Studies
 - Equipment and Inst. Procurement
- **Design & Supply of Helium Control Valves**
 - Engineering with Forbes Marshall
 - Special Testing Requirements
 - QAP Finalization
- **Fabrication, Installation Tie-in and Commissioning of all Systems**

INTF Cooling Water System (International Thermonuclear Fusion Research Development) ITER India, IPR, Ahmedabad, India.



3 D Model – INTF CWS Layout



- Design, Engineering, Procurement, Fabrication, Installation and of Cooling Water System for Beam Source, Beam Line and Cryo - Cooler System for Negative Ion Beam Generator.
- Steady State Pipe Network Hydraulics, Surge Analysis, Pipe Stress and Piping Dynamic Earthquake Analysis .
- P&ID, 3D Modelling, Isometrics, Valve and Equipment Data Sheets.
- Procurement & Installation of Piping, Valves and other related Equipment.
- Generate WPS/PQR, Hydro Test, Leak Test Functional Test and Commissioning Procedures.

Mechanical and Piping Systems

Toyota Kirloskar Motor Pvt. Ltd., Bidadi



- Engineering, Procurement, Fabrication, Installation and Commissioning of more than 400 km of Plant Piping and associated systems.
- Preferred Vendor for Toyota Group since 2001.
- Pipe Sizes Varying from 1/2" to 24".
- GI, SS and CS Piping, Pumps, Valves and Other Piping Components.
- Design, Procurement and Installation of Utility Systems for LPG, Compressed Air, Cooling Water, Chilled Water, Fire Fighting, Diesel, Petrol, Oxygen, Acetylene, etc.

Mechanical and Piping Systems

Toyota Kirloskar Motor Pvt. Ltd., Bidadi



EPC - Petrol Vaporization Control and Pumping Project Toyota Kirloskar Motor Pvt. Ltd., Bidadi Bangalore, India



Diaphragm Pumping Station



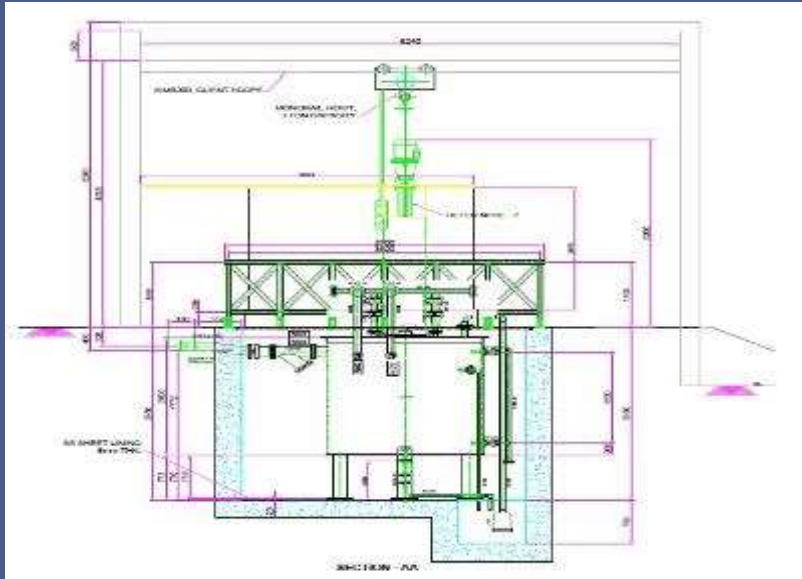
Underground Petrol Tanks

Vaporization of Petrol due to High Ambient Temperature and Low Pressure @ Pump Suction.

- Non-Delivery of Petrol due to Vapor Lock to Smart Dispensing Station 400 m away for 1 Car / Minute Roll Out
- Analysis of Pipe Suction Network with **HYSIS**
- Hydraulic Analysis of Total Piping Network with **Pipe Flow**
- Development of Detail P&ID
- Instrument and Piping Data Sheets
- DACS System and Control Philosophy
- Construction, Integration and Commissioning

Radioactive Waste Water Collection & Disposal System

Department of Atomic Energy - India



- **Engineering, Procurement, Fabrication & Installation of Radio Active Waste Water Collection and Disposal System.**
- **Main System Components & Parameters**
 - SS 316L Storage Tank – 30000 Liters
 - SS 316L Collection Tank – 3500 Liters
 - Submersible Pumps - 10HP, 15 m³/hr.
 - Centrifugal Pumps – 7.5HP, 85 m³/hr.
 - 5MT Hoist and Monorail
 - More than 300m of 3" SS316L Piping
 - Design Pressure - 10 Bar
 - Design Temp. - Ambient
 - SS 316L Pipe Material
 - Motorized Valves
 - Ultrasonic Level Sensors
 - Medium Voltage Control Panel
 - Standard Instruments, Valves & Pipe Fittings

Steam Turbine Skid Integration

Elliott Ebara Turbomachinery India Ltd.



■ Main System Parameters

- Steam Turbine Rating – 1500 kW.
- Inlet Steam Pressure – 46 bar g
- Exhaust Steam Pressure – 0.2 bar a
- Inlet Steam Temperature – 382 °C.
- Turbine Speed – 5200 RPM
- Speed Reduction – 596 RPM
- Overall Skid Weight - ~15 Tons
- No. of Skids – 7 Nos.

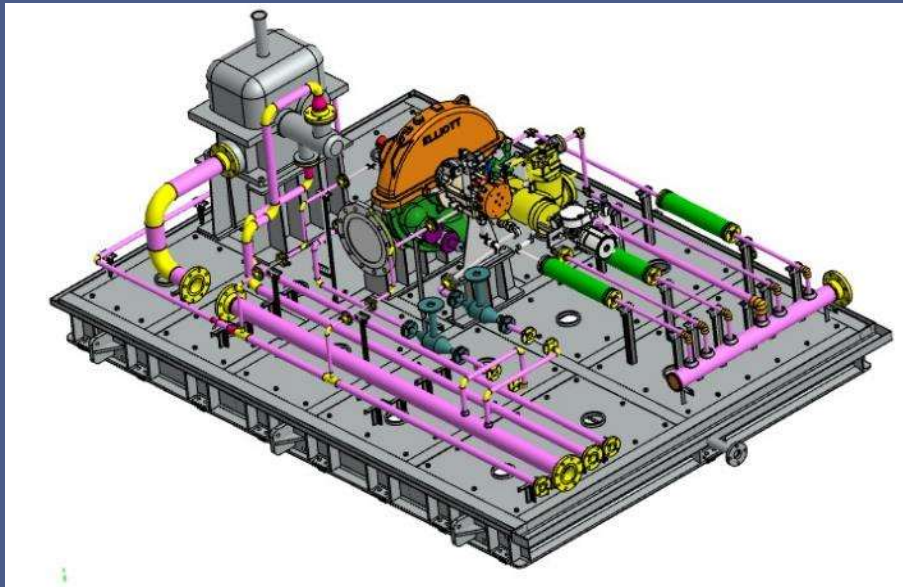


■ Design & Engineering

- Full 3D Modelling & Layout Design
- Piping GA Drawings and Isometrics
- FEA of Base Frame & Foundations
- Vibration Studies & Modal Analyses
- Data Sheets for Instruments & Equipment
- Skid Structural Lift Analyses and Pad-Eye Design

Steam Turbine Skid Integration

Elliott Ebara Turbomachinery India Ltd.

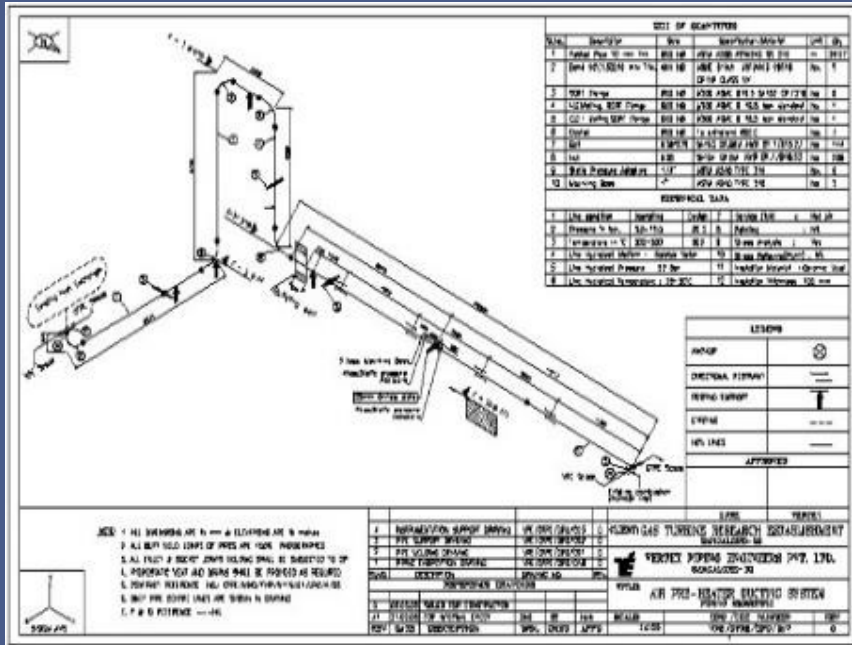


- 3D Solid Works Modelling and Design
- Piping GAD and Isometrics
- FEA of Base Frame and Foundations & Drawings
- Vibration Studies / Modal Analysis
- Procurement of Stainless, Alloy Steel Piping and Piping Components
- Erection and Integration of Skid and testing
- Electrical Cabling and Junction Box installation and Testing
- Alignment of Turbine and Gear Box
- Inspection and Approval by TOYO Engineering



Air Preheater System for Gas Turbine Combustion Chamber

Gas Turbine Research Establishment, DRDO, India



■ **Engineering, Procurement, Fabrication & Installation of Air Preheater Ducting System**

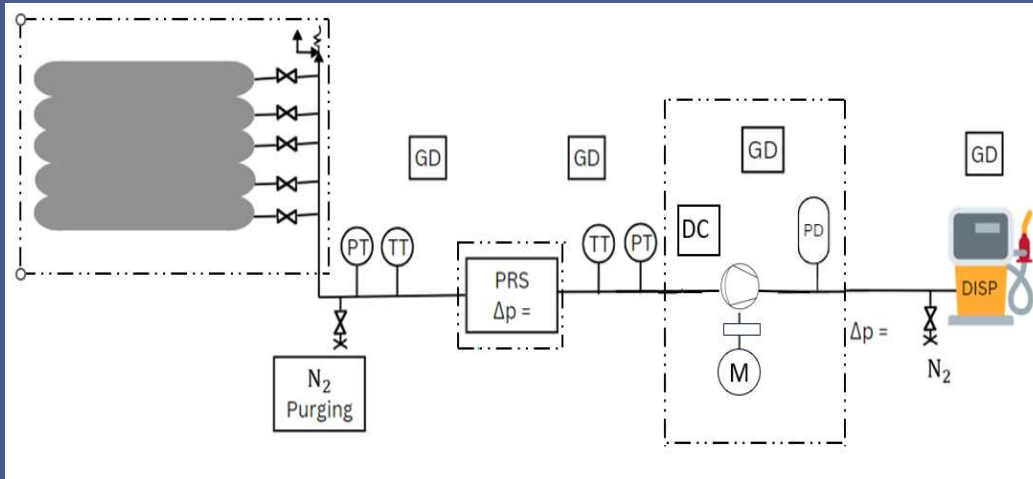
■ **Piping Flexibility Analysis, Support Design, Thrust Block Design, Thermal Insulation Calculation, Orifice Plate Design etc.,**

■ **Main System Parameters and Features**

- Duct Size - 24"
- Design Temperature - 600°C
- Design Pressure - 21 Bar
- Medium Hot Air
- Insulation 100mm Thick
- Orifice Meter Flow Measurement
- SS 316 Pipe Material
- Sliding and Thrust Block Supports



Future Expansion Areas - EPC Project Hydrogen Refuelling Station



HRS Major Equipments

- H2 Storage Cylinders (Source)
- Pressure Reducing Station
- Diaphragm Compressor
- H2 Dispenser
- Gas Detection System
- Instruments (PT, TT & MFM)
- Piping / Tubing & Vent System
- Overall Control System



Typical Design Parameters

- Storage Mass : 450 kg @ 200 barg
- Compressor Capacity : 270 Nm³/hr.
- Discharge Pressure : 450 barg
- Dispensing Pressure : 350 barg
- Dispensing Rate : 20 Kg/hr.

Available Engineering Analysis Software



Sl. No.	Software	Description
1.	CAESAR	Piping Static & Dynamic Stress Analysis
2.	PIPEFLOW	Hydraulic Network Analysis / Pump Sizing
3.	AFT ARROW	Thermo-Hydraulic Compressible Network Analysis
4.	SOLIDWORKS	Facility 3-D Modeling & Layout
5.	AUTOCADD	Design & Fabrication Drawings
6.	IN-HOUSE SPREADSHEETS	Wall Thickness Design, Vacuum Calculations, etc.

Health And Safety Policy



Safety Policy Statement:

Safety and Health of our employees and protection of the environment are one of our utmost concerns. We firmly believe that a clean work place free from hazards enhances productivity of our employees and the quality of our products. Accidents and pollution of environment not only causes suffering and losses to our employees and the organization, but it also affects our neighborhood and even society at large.

Our Commitment:

- To Provide Safe and Healthy Working Conditions and Ensure Good Housekeeping.
- To Provide Safe Plant Layouts, Machinery, Equipment, Processes, Methods, Tools and Facilities.
- To Educate and Train all concerned in Safety and to Impart Relevant Information Continuously.
- To Conduct Regular and Periodic Audits on Safety and Housekeeping.
- To Evaluate the Effectiveness of the Safety Procedures and Practices.

Our Major Clients





THANK YOU !