With the solution driven approach...namely comprehending requirements, translating into an efficient design, implementing with optimal instrumental solutions, expansive testing for safety and rigorous operation...the result is 'Total Chemical Engineering Solutions'.

Be it Standard Lab-scale Reactor Systems for Research and Process Screening, Pilot Plants for Scale-up, Customised Reaction Solutions, Bioreactors for fermentation, bio-synthesis, green chemistry etc. - the solutions offered are validated with decades of Chemito experience and pass through stringent in-house quality procedures.

These solutions are well supported by an experienced team of chemical, instrumentation, mechanical and electrical engineers, as well as backed by the trusted name of Chemito®.
Chemito offers a range of laboratory scale systems for research purposes. These pre-designed systems are a result of the experience and expertise culled over years resulting in optimised systems that excel in their performance. Notwithstanding, these pre-designed proven systems can be tailored to suit your specific needs.

**Catalyst Screening and Evaluation System**

The main purpose of the unit is to evaluate the catalysts developed. The system is designed for 10 bar pressure and 500°C temperature. The system is compatible to carry out reactions with gas, liquid and solid media. This fixed bed reactor system uses an electric furnace to reach the required temperatures. It is the product collection module where the product is cooled and collected. It is then analysed for its desired properties by coupling the unit with the required analyser. The MOC (Material of Construction) is SS 316 for the unit - including the reactor and all parts in contact with the process. Modules include fixed bed reactor, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing of gas and liquid vapours, product cooling.

**Vapour Phase Reactor**

This reactor system is used to carry out chemical reactions where efficient control over the vapour phase is needed and is designed for the study of vapour phase reactions at specific conditions. It is designed for 100 bar pressure and 500°C temperature. This fixed bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through a flange type arrangement provided at both ends. The gas mixture can be contacted with the catalyst in a special down-flow arrangement. The MOC is SS 316 for the unit - including the reactor and all parts in contact with the process. Modules include fixed bed reactor, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing of gas and liquid vapours, product cooling.
Fischer Tropsch Synthesis Reactor
This system is designed to study the FT reactions at test conditions and is rated for 25 bar pressure and 500°C temperature. This unique system is used for preliminary studies of different types of catalyst for FT applications. This also helps in developing new products through conversion of synthesis and producer gases into liquid products through varied combinations of catalysts. This fixed bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends. The MOC is SS 316 for the unit - including the reactor and all parts in contact with the process.

Modules include fixed bed reactor, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, product cooling.

Adsorption Measurement System
This system is used for the study of various adsorption breakthrough curves at specific conditions and is rated for 25 bar pressure and 400°C temperature. This fixed bed reactor system uses an electric furnace to reach the required temperatures. This system is being widely used in study of adsorption of CO₂ gas. The reactor can be opened through the flange type arrangement provided at both ends. The gas mixture can be contacted with the catalyst in a special down-flow arrangement. The MOC is SS 316 for the unit - including the reactor and all parts in contact with the process. The system is usually coupled with analytical instruments to monitor the adsorption data.

Modules include fixed bed adsorber, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing and product cooling, analyser.

And More...
- Hydrogenation Reaction Systems
- Fixed Bed Catalytic Reactors
- Fluidised Bed Catalytic Reactors
- TPD Reaction Systems
- Volumetric Adsorption Systems
Hydrogen Generation System
The purpose of the system is to study the generation of Hydrogen from HCl gas by contacting vapours with the developed catalyst. The system is designed to achieve the required generation capacity at 500°C and atmospheric pressure. Gas feed and liquid module includes the flow controller for controlling accurate flow of HCl gas as well as liquid feed to the reactor. Liquid is vaporised and mixed with HCl gas prior to reaction. Gas and vaporised liquid is preheated to achieve the required temperature.

This fixed bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends. The gas mixture can be contacted with the catalyst in a special down-flow arrangement for the fixed bed reactor and a special up-flow arrangement for the fluidised bed. The system is rated for 10 bar pressure and 500°C temperature. The MOC is specific to the process.

Modules include fixed bed reactor, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing and product cooling.

Simultaneous Fixed and Fluidised Bed System
A pioneering solution from Chemito, this customised system is used for studying varied reactions at designed conditions with 3 different gas and liquid inputs. Individual liquids are vaporised with precise temperature conditions and then mixed with the gas mixture. Gas and liquid flows are controlled with mass flow controllers and dosing pumps respectively. The gases and vaporised liquids are preheated before entering the reactor.

One of the reactors is a fixed bed reactor while the other is a fluidised bed reactor so as to assist different contacting conditions of the gas mixture with catalyst.

This reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends.

The gas mixture can be contacted with the catalyst in a special down-flow arrangement for the fixed bed reactor and a special up-flow arrangement for the fluidised bed. The system is rated for 10 bar pressure and 500°C temperature. The MOC is specific to the process.
Modules include fixed bed reactor, fluidised bed reactor, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing and product cooling.

**Multiple Reactor System**
This one-of-its kind system consists of multiple fixed bed reactors. It finds immense use in reducing shut down time of catalyst reloading. Properties of different catalyst can be studied in a single unit by placing them in different reactors and contacting the raw gas or liquids with same or different parameters.

The system is rated for 5 bar pressure and 500°C temperature. Special instrumentation includes mass flow controllers for controlling gas flows, special dosing pumps with precise flowrate for liquid flow control, overpressure safety valve, rupture disc assembly and very low flow controlling back pressure regulators to maintain the required pressure for system and temperature control.

This fixed bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends. The MOC is specific to the process.

Modules include multiple units of fixed bed reactors, gas and liquid feeding with controlled flow rates, liquid vapourising with electrical heating, premixing and product cooling, analysers.

**Waste Plastic Recycling System**
This very unique pilot plant is used for converting waste plastic into gas. The system is rated for 1 bar pressure and 500°C temperature. This fixed bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends. The MOC is specific to the process.

Modules include batch type pyrolyser, fixed bed reactor, cooling and condensation, alkali scrubber.
Pilot Plants
Solutions for Scale-up

Catalytic Hydrogenation Pilot Plant
This pilot plant is custom designed with a purpose to study the hydrogenation reactions at various conditions. The system is rated for 25 bar pressure and 500°C temperature. With a plant capacity of 100 litres/day of liquid feeding, the system is equipped with high pressure dosing pumps and high pressure gas flow controllers. This fixed bed reactor system uses an electric furnace to reach the required temperatures. The gas mixture can be contacted with the catalyst in a special down-flow arrangement. The product is cooled and condensed, while the uncondensed gas is vented out. The MOC is SS 316 for the unit - including the reactor and all parts in contact with the process.

Modules include fixed bed reactor, gas & liquid feeding with controlled flow rates, Liquid vapourising with electrical heating, premixing with preheater, product cooling.

Reactive Distillation System
Reactive distillation is a combination of reaction and distillation in a single vessel owing to which it enjoys number of advantages over conventional approach of reaction followed by distillation such as improved selectivity, better heat control and effective utilisation of reaction heat. It is more economical and helps reduce capital investment costs due to a lower consumption of resources.

Modules include liquid feeding, distillation with packings, top and bottom side cooling, separation.

Coal Gasification Pilot Plant
This pilot plant is used for converting coal into gas, with a typical capacity of 10-20 kg/hr of coal feeding. The purpose of the unit is to study the agglomeration characteristics of Indian coal under fluidised condition. During gasification, the coal is blown through with air and steam. It is also heated simultaneously and kept under fluidised condition where it gasifies and produces the product gas. Further, these gases can be cooled and analysed.

The system is rated for 5 bar pressure and 900°C temperature. This fluidised bed reactor system uses an electric furnace to reach the required temperatures. The reactor can be opened through the flange type arrangement provided at both ends. The MOC is unique to the process.

Modules include coal feeding, gaseous reactant supply, gasifier, bottom waste removal, cyclone separator, gas cooling, cleaning, flare stack.
Chemito provides services as a System Integrator for varied processes and technologies that you may wish to implement. Our engineering expertise, process understanding, skilled manpower and an efficient post-sales back-up will ensure a quality product to suit your specifications. These solutions would be cost-effective to build, operate and maintain.

Partial list of such technologies include:

- Adiabatic Reforming Pilot Plant
- Bio-mass Pyrolyser
- Bitumen Air blowing Unit
- Bubble Column Reactor
- High Pressure Hydrocracker Pilot Plant
- High Pressure Hydroprocessing Pilot Plant
- High Pressure Hydrotreating Pilot Plant
- Hydrocracking Microreactor
- Lube Hydrodewaxing Pilot Plant
- Micro Reactor Unit
- Micro Activity Test Unit
- Pre-reformer Systems
- Solvent De-asphalting Unit
- VGO/ Resid Hydrotreating Microreactors
Abilities and Capabilities
Chemical Engineering Solutions

Manufacturing
The manufacturing site is located at Nashik, 180 km from Mumbai. With a built-up area of 16000 sq. ft., this facility works within the quality guidelines stipulated under the quality management system as defined by ISO 9001:2008.

Skilled personnel implement advanced systems and techniques for timely project execution that exceeds the most exacting demands of the industry.

Continued research and development activities ensure the latest in product deliverables, capabilities, testing and installation procedures.

A large spectrum of industries is served by a varied mix of products and solutions. These include:
- Alternative Fuel and Energy
- Oil and Gas
- Petrochemicals
- Biotechnology
- Pharmaceuticals
- Chemicals
- Research Institutes
- Food and Additives
- Specialty Chemicals

More than Just a Product
Modular Construction
Modular construction so as to suit site requirements, provide ease of operation and maintenance as well as low cost of use.

Turnkey Solutions
Optimised combination for process and measurement through control technologies.

Upgradation
Study of the present system to comply with all current requirements as well as have the flexibility for future upgradation with utmost convenience.

Confidentiality
Chemito well understands the importance of confidentiality of projects and thus maintains strict discipline in this regard.

Nashik Factory
A Comprehensive Approach
- Design and Engineering
- Automation and Control
- Procurement
- Manufacturing and System Integration
- Assembly and Testing
- Safety Test Procedures
- Commissioning and Documentation
- Training
- Customer Support

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