With an experience of over several decades in the field of process control and steam engineering, Forbes Marshall provides end-to-end solutions in the form of complete automation packages for instrumentation and control, right up to erection, for various industries. A strong knowledge base coupled with an application oriented approach and precise engineering has made us the preferred supplier for these packages.

The concept of complete piping and valve stations with field instrumentation as well as control systems provide an enhanced value to the industry in terms of accurate control over process parameters, and ensures safety. Forbes Marshall has installed proven packages for industries like pharmaceutical and chemical.

Our team of finest engineers are dedicated to serve the process industry across diverse sectors. World class manufacturing facilities and technology enables us deliver quality solution globally. Our unique complimentary expertise enables us engineer customised systems that simplifies transfer operation and precise process control. We partner customers with our knowledge, comprehensive range of services, products and solutions for precise measurement and control of process.
Batch Reactor

Batch reactors are chemical mixing vessels in which the chemical reaction between two or more chemicals occurs under controlled temperature and pressure conditions, for a fixed duration, to obtain a desired product.

The reactions can be either exothermic or endothermic, hence the pressure and temperature needs to be maintained throughout the process to ensure completion of reaction. In order to maintain reaction, temperature, jacket or coil is provided through which utilities are circulated. If the desired process conditions are not maintained during the chemical reaction then the entire batch gets wasted and causes damage to the equipment.

A batch reactor automation system ensures production with the desired quality and quantity in optimum time. Some of the common control loops involved are

**Feed Transfer Control**
Reactor holding time control

**pH / Conductivity Control**
Post reaction discharge control
Selection of utilities for temperature control

**Reactor Pressure and control**
Recipe management - all the loops operate in a sequence. Pressure and temperature control is done simultaneously. Batch reactions may require several consecutive heating and cooling cycles, with pressure being maintained constant.

**Why is it Required?**

When two chemicals are mixed, the reaction may turn out to be exothermic, endothermic or stable. Such reactions, may undergo uncontrolled temperature changes in mixture. This temperature needs to be stabilized otherwise the resultant product may not be of desired quality and entire batch is wasted. Hence there is wastage of raw material, time and utilities. And in some extreme cases, reactor vessel also may get damaged. So, accurate control of temperature and pressure profile during the reaction is very essential. Manual operation of reactor vessel needs continuous monitoring of temperature and pressure. A minor operator negligence may lead to variation in reaction kinetics. Manual feeding of raw materials too is operator dependent, and incorrect quantity results in poor product quality.
The Forbes Marshall Solution

Batch reactor control is a critical aspect in chemical plants. The reactor could be a multiproduct reactor with either stainless steel or MSGL construction. Control schemes have been implemented for precise raw material additions and selection of utilities. Special control algorithms are programmed for temperature control for multi-utility, multi-batch and multi-product applications.

Forbes Marshall offers complete automation packages customised to suit needs of the process and batch reactor.

Offerings

- Forbes Marshall EDCL (error detection control logic) for accurate control of reactor temperature
- Field instruments required for control and measurement in batch reactor automation
- Control system (DCS / PLC) designed and customised as per requirements of client / OEM
- Configuration and operator software for dynamic graphics, process mimics, real-time and historical trends, group displays, faceplate displays, alarm management and report generation
- Relay based safety panel for safety interlocks
- Utility monitoring system to optimise the energy balance and heat recovery
- Erection and commissioning service

Automation of both jacketed vessel and limpet coils design with multi-utility or single fluid systems have been installed successfully. Special systems for thermic fluid heating applications and polymerisation reactions have also been successfully installed.

Benefits

- Single point accountability for functionality of control loop, both for software and instrument operation
- Central control for entire plant functionality
- Optimised control for reduction in wastage and improved product yield and throughput
- Consistent product quality
- Control on production rate to improve plant efficiency
- Flexibility of creating daily, weekly, monthly and yearly reports to assist in capacity and financial planning
- Safety interlocks avert damage to process equipment by overriding the control system
- User friendly design, customised considering all requirements right from operator level to administrator level
- Complete erection and commissioning package
World Class Technology from World Class Facilities