

COURSES MODULE For PIPING DESIGN ENGINEERING



Course Outline

- ❖ International codes & Standards using for piping system & its components.
- ❖ Plant layouts and work flow procedures
- ❖ Terminology and symbols used in plant layout
- ❖ Plot plans, Equipment Layouts, elevations and 3-D models
- ❖ Principles of chemical process technology
- ❖ Process flow diagrams (PFDs)
- ❖ Equipment used in process plants
- ❖ Instrument symbols and abbreviations
- ❖ Piping and instrumentation diagrams (P&IDs)
- ❖ Piping design and engineering principles
- ❖ Terminology, symbols and abbreviations used in piping design
- ❖ Piping materials
- ❖ Piping specifications and piping codes
- ❖ Components of piping systems - fittings, flanges and valves
- ❖ Piping isometrics and bill of materials

Piping Design & Detail Engineering

Introduction to Process Plant Layout and Piping Design

Plant layout fundamentals
Procedures and workflow

Introduction to Chemical Processing Methods

Unit operations and unit processes
Process flow diagrams (PFDs) & Piping & Inst. Diagrams (P&IDs)
Typical equipment specifications

Fundamentals of Pipe and Pipe Fittings

Pipe dimensions and pipe representation
Use of pipe data tables
Material Specification
Pipe joining methods
Pipe fittings
Fitting dimensions and tables

Piping System Components

Basics of flanges
Flange ratings and flange types
Flange data tables and their use
Different types of valves and their applications
Valve data tables
Piping restraints
Supports, anchors and guides

ASME/ANSI Codes & Standards

Introduction to B31.3 process piping codes
ASME standards for Common Piping Elements.
Piping specifications & Material selection

Pipe Hydraulics & Sizing

Flow rate, velocity, pipe sizing calculations
Reynolds number- laminar/turbulent flow
Darcy Weisbach & Hazen William equations
pressure drop calculations, NPSH calculations

Plant Layout and Plot Plans

Plant layout specifications
Codes and safety considerations
Development of plot plans
Plot plan use by disciplines
Sample plot plans and equipment arrangement drawings
Layout case studies

Equipments Used in Process Plants

Process equipment: Reactor Tower, Exchanger Furnace, Vessel, Column
Mechanical equipment: Pumps, Compressors, Storage tanks
Equipment foundations and supports
Equipment data sheets, Equipment sketches & Equipment drawings
Equipment nozzle specifications

Insulation & Heat Tracing

Insulation & Preparing an Insulation Specification
Data required to prepare Insulation Specification
Heat Tracing

Piping Isometrics

Piping Isometrics Drawings
Isometric Dimensions, Notes & Callouts
Isometric Offsets & Print Reading Exercises
Exercises on creation of Isometrics from plans and Sections

Pipe Supports

Classification of Supports & Pipe Arrangements
Anchors, Pipe Guides, Limit Stops, Pipe Shoe
Dummy Leg, Trunion
Field Support, Base Support
Rigid Hanger, Rod & Clevis, Flexible Hangers, Variable & Constant
Pipe Rack Design Types, Height & Width Calculations

Piping Materials and Material Specifications

Material properties & Classification of materials
Material specifications (as per ASTM)
Common piping materials & Piping specifications
Material selection, Material testing, inspection and QA

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