

Training Title

PIPING DESIGN CONSTRUCTION & MECHANICAL INTEGRITY

Training Duration

5 days

Training Venue and Dates

REF	Piping Design Construction				
ME011	& Mechanical Integrity	5	14-18 June 2020	\$4,500	Dubai, UAE

In any of the 5 star hotels. The exact venue will be intimated once finalized.

Training Fees

4,500 US\$ per participant for Public Training. Fees includes course materials/handouts, tea/coffee, refreshments, international buffet lunch.

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

This course comprises two sections. The first examines the design requirements for process plant piping systems. The second section examines the maintenance requirements for these systems. In each case, the course goes beyond merely repeating the material contained in the governing standards. It discusses practical applications and typical procedures. The course also contains sample problems that are put together with written exercises for you to complete.

TRAINING OBJECTIVES

The aim of this course is to provide the participants with a complete and up-to-date overview of the area of Piping Technology with an emphasis on process piping. The course covers design, fabrication, examination and testing requirements of ASME B31.3. It covers Code requirements from design through start-up of new piping systems, as well as standards for inspection and repair of piping systems that have been in service, as provided in API 570, Piping Inspection Code.

After completion of the course the participants will be able to:

- **Understand the total structural integrity of process plant piping systems throughout their useful life**
- **Discover how the ASME B31.3 code has been correctly and incorrectly applied.**
- **Ensure the total structural integrity of process plant piping systems throughout their useful life.**

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- Discuss and apply the design requirements of the ASME B 31.3 Code.
- Achieve higher levels of maintenance excellence in refineries and other process plants.
- Examine and apply the maintenance and inspection requirements of API 570 to process plant piping systems.

WHO SHOULD ATTEND?

This course provides an overview of all significant aspects and considerations of piping for those who are involved in the design, analysis, fabrication, installation, maintenance or ownership of piping systems. Engineers, Senior Draftsmen, maintenance, quality assurance, and manufacturing personnel who work in the chemical, petroleum, utility, plastic processing, pulp and paper, and manufacturing, and those who must comply with Code requirements.

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

TOPICS

- Piping Codes Overview
- Committee Organization and Scope
- Organization of Code
- Standards for Piping Components
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- Pipe Manufacturing
- Pipe Manufacturing
- Failure Modes and Criteria
- Design Conditions and Criteria
- Pressure Design
- Pressure Design (cont.)
- External Pressure Design

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- Piping Layout and Support
- Design of Spring Supports
- Design Criteria for Cyclic Stresses
- Piping Flexibility
- Flexibility Analysis Methods
- Method of calculations, Flexibility Analysis Demo.
- Equipment Load Limits
- Cold Spring
- Elastic Follow-up
- Fluid Service Requirements

- Material Requirements Fabrication, Assembly and Erection
- Inspection, Examination and Testing
- Overpressure Protection
- Nonmetallic Piping
- Piping for Category M Fluid Service
- High Pressure Piping
- Flanges *Expansion Joints *Buried Piping *API 570 - Piping Inspection Code

DAILY OUTLINE

Following topics will be covered in 5 days

Overview of piping Codes

- Process plant piping and ASME B 31.3
- Liquid transportation piping & ASME B 31.4
- Gas transmission piping & ASME B 31.8
- General comparison of ASME B 31.3, B 31.4 & B 31.8

Pipe Manufacturing Processes & Material Selection

- Introduction
- Pipe manufacturing processes
- Applicable standards for pipe and piping system components
- Material selection considerations
- Piping specification.

Pressure Design of Pipe & Piping System Components

- Introduction
- Straight Pipe
- Curved sections
- Branch connections
- Pressure ratings of pipe fittings

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Flanges, Gaskets & Bolting

- **Introduction**
- **Flange types**
- **Flange standards & ratings**
- **Gaskets**
- **Bolting**

Piping system layout, Supports & Restraints

- **Introduction**
- **General system layout considerations**
- **Layout considerations for specific piping systems**
- **Support & restraint considerations**
- **Types of pipe support**
- **Estimating maximum permitted support span**
- **Estimating loads at supports**
- **Types of pipe restraints**

Piping flexibility

- **Introduction**
- **Fundamentals**
- **Flexibility analysis**
- **Identifying lines with adequate flexibility**
- **Simplified flexibility analysis methods**
- **Special considerations for specific piping systems**

Valve selection

- **Introduction**
- **Valve functions & applications**
- **Valve types**
- **Valve stem packing**
- **Valve selection procedure**
- **Valve inspection & testing**

Piping Fabrication, Erection, Examination & Testing

- **Fabrication**
- **Erection**
- **Examination**
- **Testing**

Piping Vibration

- **Introduction**
- **Basic concepts**

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- Fatigue stress and other failure consideration
- Types of vibration analysis
- Common causes of piping vibration
- Vibration measurement
- Screening vibration problems
- Vibration control
- Overall design considerations

Piping Maintenance

Piping Materials & Modes of Failure

- Material considerations
- Corrosion rate & remaining life calculations
- Cracking mechanisms in piping
- Piping deterioration

Piping Inspection & Evaluation

- API 570 requirements
- Piping inspection planning and data analysis
- Inspection techniques for piping & components
- Piping retirements

Piping System Repair, Alteration, Re-rating & Pressure Testing

- Valve repair and maintenance
- API 570 piping repair, alterations, re-rating & testing requirements
- Piping system repair
- Piping system alterations & re-rating
- Pressure testing after repairs or alterations

Flange Joint Assembly & Bolt Up Procedures

- Introduction
- Establishing flange joint categories
- Identifying and listing flange joints in critical services
- Determining required bolt tightening methods
- Developing flange joint assembly and bolt up procedures
- Procedure qualification
- Hot bolting
- Additional leakage control procedures

Guide for Hot Tapping (Pressure Tapping)

- Necessary conditions for performing a hot tap
- Hot tap design considerations
- Selecting the hot tap site
- Installation

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- Inspection
- Pressure tests before cutting pipe
- Hot tap operations
- Special safety considerations
- Hot tap machines

NOTE: Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.



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