Piping Systems

Training Program

Introduction:

This seminar is composed of two sections. The first section discusses the design requirements for process plant piping systems. The second section discusses the maintenance requirements for these systems. In each case, the seminar goes beyond merely repeating the material contained in the governing standards and discusses practical applications and typical procedures. The seminar also contains sample problems that are worked together and written exercises that are completed by the participants.

Who Should Attend?

Engineers and operators in maintenance, design and operation fields.

Methodology:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include:

- Lectures
- Workshop & Work Presentation

- Case Studies and Practical Exercise

Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Course objectives:

To understand the piping system design, selection, installation, troubleshooting and safety instructions

Course outline:

Introduction to piping systems:

- Types, Functions, and Components.
- Chemical Plant and Petroleum Refinery Piping.
- Function.
- Liquid Petroleum Transportation Piping.
- Gas Transmission and Distribution Pipelines.
- Submarine Pipelines.
- Codes and Standards for Piping Systems.
- Engineering Requirements.
- ASME/ANSI B31.3, Chemical Plant and Petroleum Refinery Piping.
- ASME/ANSI B31.4, Liquid Petroleum Transportation Piping.
- ASME/ANSI B31.8, Gas Transmission and Distribution Piping.

Material Selection:

- Factors That Affect Material Selection.
- Material Strength.
- Corrosion Resistance.
- Material Toughness.
- Fabricability.
- Suitability for Wet, Sour Service.
- Primary Pipe Manufacturing Processes.
- Seamless Pipe.
- Electric Resistance-Welded Pipe.
- Submerged Arc-Welded Pipe.
- Furnace-Welded Pipe.
- Spiral-Welded Pipe.
- Limitations on Metallic Pipe.
- Determining Applicable Standards for Pipe and Piping Components.
- Standards for Pipe and Piping Components.
- Standards for Pipe, Fittings, Flanges, Valves, Gaskets and Bolting.
- Selecting Materials.

Pipe wall thickness calculation:

- Overview: determining pipewall thickness.
- Calculating the minimum required thickness for the internal design pressure.
- Adjusting pipewall thickness for external pressure.
- Identifying the procedure for evaluating other loads that are applied to buried pipe.
- Selecting pipe schedule that takes into account the manufacturer's tolerances minimum requirements for pipewall thickness.
- Calculating the maximum allowable operating pressure (maop).
- Guidelines for calculating maop.

Branch Connection Reinforcement:

- Identifying requirements for branch reinforcement.
- Calculating required and available reinforcement areas.
- Designing required reinforcement pads.
- Steps for calculating required and available reinforcement areas.

Piping Layout, Support, And Flexibility:

- Identifying operational, maintenance, and safety factors that influence pipe layout.
- The function of the different types of supports and restraints used in plant and transportation piping.
- Determining the maximum support spacing based on weight and deflection criteria and design loads.
- Determining the need for a piping thermal flexibility weight analysis.
- Determining the required design conditions for a thermal flexibility/weight analysis.
- Use of anchors for buried piping systems and design tools.
- Criteria for determining maximum support spacing.

Inspection And Testing Of Piping Systems:

- Introduction on inspection of piping systems.
- Specifying applicable methods of weld inspection and acceptance criteria.
- Determining test pressures required for a piping system.
- Guidelines for specifying methods of weld inspection.
- Guidelines for determining pressure tests and calculating test pressure.

Safety Instruction Sheets For Plant Piping And Cross-Country Pipelines:

- Determining the information required for plant piping.
- Determining the information required for cross-country pipelines.
- Procedures for determining the information to complete a safety instruction sheet for plant piping.

- Procedures for determining the information to complete a safety instruction sheet for cross-country pipelines.

Flanges And Fittings: Types And Classes:

- Identifying Types of Flanges and Fittings, standards, calculation and installation.

Valve Selection: Types And Classes:

- Describing valves in terms of their functions, types, and components.
- Selecting the type and size of a valve that is suitable for process applications.

Piping Maintenance And Repair:

- Identifying the typical types of piping system defects and their acceptance criteria.
- Identifying the various repair methods and techniques and their applications.
- Identifying the design, calculation, inspection, and testing requirements for a hot tap.
- Checklist for identifying repair methods and techniques checklist for pipe repair.

Checklist for identifying design, calculation, inspection, and testing requirements for a hot tap..