



N736: Process Piping Code, P&IDs and Engineering Drawings Interpretation

Format and Duration
Classroom - 3 Days

Instructor(s): Prof. David Newman

Summary

The use of piping and piping systems plays a critical role within a range of industries – oil and gas, process, petrochemicals, nuclear, etc. As with other operational assets all piping systems may be susceptible to damage from mechanical forces, vibration, corrosion, fatigue, etc. One of the most significant damage mechanisms on piping is known as Corrosion Under Insulation (CUI).

This course will present delegates with a detailed insight into piping and piping systems covering design, materials, fabrication, piping protection, piping codes and standards, piping and instrumentation diagrams (P&IDs) and their interpretation. It is noted for clarification that there is often a lot of confusion between What Is Piping and What Is A Pipeline – sometimes these terms are used interchangeably which is incorrect as piping is governed under international standard ASME B31.3 whereas pipelines are governed under ASME B31.4 (liquid pipelines) and ASME B31.8 (gas pipelines).

Learning Outcomes

Participants will learn how to:

1. Acquire good understanding of Process Piping Codes and Standards (key piping codes (e.g., ASME B31.3, API 570).
2. Understand piping engineering materials – factors used for materials design and selection with respect to types of fluids and gas being transported and under operational conditions
3. Understanding piping materials properties and testing
4. Learning piping manufacturing methodologies – seamless and welded pipe, extruded
5. Become familiar with ‘Piping Classes’ and ‘Piping Classification’
6. Learn about piping and piping system fittings - end connections, bends, reducers, flanges, valves, pipe supports
7. Insight into piping systems design in process plant design, plot plans, battery limits
8. Understanding what can go wrong with piping – failures modes and consequences of failure
9. Getting to know and interpretation of what P&IDs are and what they tell us – symbols for piping, valves, instrumentation
10. Getting to know Process Flow Diagrams (PFDs)
11. Understand material take-offs (MTOs) and Bill Of Materials (BOM)
12. Regulatory and safety requirements in piping design.

Training Method

This is a 3-day classroom course consisting of lectures, videos, discussions sessions, case studies and course assessments.

Who Should Attend

The 3-day course is intended for graduate engineers, piping, materials and corrosion, integrity, facilities,



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operations & maintenance and health and safety engineers.

Course Content

Part 1

Process Piping - Codes and Standards and Piping Design

- Introduction to Process Piping Codes (ASME, API, ANSI, ISO)
- Overview of ASME B31.3 (Process Piping) and other key standards (B31.1, API 570, API 650).
- Importance of codes in design, safety, and compliance.
- Understanding material classifications and specifications.
- Key Design Considerations in Process Piping - Pipe strength, pressure-temperature ratings, and stress analysis basics.
- Types of pipes, fittings, flanges, and valves.
- Welding procedures, NDT (Non-Destructive Testing), and inspection requirements.

Case Studies & Exercises

Part 2

Piping & Instrumentation Diagrams (P&IDs)

- Fundamentals of P&IDs
- Introduction to P&IDs and their role in process industries
- Symbols, line types, abbreviations, and legends in P&IDs
- Reading and Interpreting P&IDs
- How to trace fluid flow paths and piping arrangements
- Equipment, valves, and instruments in P&ID
- Control systems, alarms, interlocks, and process safety features
- Fundamentals of PFDs and Block Diagrams
- Looking at P&IDs, PFDs, UFDs - Practical Exercises & Group Work
- Interactive session: Analyzing and interpreting real P&IDs from industry projects
- Group challenge: Troubleshooting piping issues using P&IDs

Case Studies & Exercises

Part 3

Engineering Drawings Interpretation & Practical Application

- Types of Engineering Drawings in Piping



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- Introduction to piping isometrics, orthographic projections, and sectional views.
- Understanding weld maps, fabrication drawings, and spool drawings.
- Reviewing bill of materials (BOM) and material take-offs (MTOs).
- Piping Layouts & Construction Considerations
- Fundamentals of piping support, expansion loops, and routing.
- Pipe insulation, heat tracing, and stress analysis basics.
- Pipe corrosion protection – CUI
- Construction, fabrication, and site installation guidelines.
- Final Case Study & Assessment
- Hands-on project review: Reading and interpreting engineering drawings.
- Assessment: Participants analyse a full set of P&IDs and piping drawings.

Case Studies & Exercises