



ASME B31.3 Process Piping Code Design Requirements

Training Program



Introduction:

This intensive five-day course is designed to give the participants a thorough understanding of Process Piping Code, ASME B31.3, and its practical use for all aspects right from Piping Design to testing and certification. It offers detailed insight of code requirements pertaining to design of Piping components, branch connections, selection of flanges, fittings, flexibility considerations, materials requirements, fabrication, welding, NDT examination and Pressure testing. The course will cover the Piping systems typically used in Petroleum Industries, Refineries, Petrochemical plants etc. The course emphasizes understanding of 'stated' and 'implied' requirements (i.e. content and intent) of the code.

Important code requirements will be explained in a simple, straight forward manner, including the short-cut methods in designing of Pipes, Pipe fitting and Flanges. The participants would be explained in detail the mechanics of adopting and applying the code rules for day-to-day use in their professional work.. Lessons are enhanced by actual in-class problem solving, directly applying the rules and equations of the B31.3 Code for various design and operating conditions. This training course is the complete answer to the demands of piping engineers to know the ASME B31.3 Pressure Piping Code and Upon completion of the training course the participant shall be a complete ASME Code Professional.

The course further provides concepts and methods for assuring the mechanical integrity of existing piping systems. It presents a overview of how the methodology of API 570 can be applied for assessing the present structural integrity of the piping system, and deciding its fitness for continued service as well as the projected remaining life.

Each attendee must bring a Scientific Calculator

Who Should Attend?

Ideally suited for Piping engineers and designers, Plant engineers who need an understanding of the requirements for compliance to the Code for piping design and analysis, and testing. Managers, Engineers, Supervisors, and Plant operation personnel who work in the Refineries, Petrochemical plants, and other process industries will find this course immensely useful

Course Objectives:

- Familiarize participants with the organization and intent of the B 31.3 code
- Know how to read the code, and interpret its stated and implied requirements
- What issues to take into consideration when designing process piping
- Pressure design of piping and piping components
- How to analyze piping flexibility and gauge the limitations of piping and piping components
- Provide participants step-by step approach to piping design, including the design optimization techniques.
- Introduce participants with various material selection, fabrication, erection and testing of piping systems.
- Be able to understand the mandatory requirements, specific prohibitions and optional stipulations given in the code and other service restrictions on piping systems.
- How to conduct and certify the pressure testing.
- Understand principles of piping integrity assessments as per API 570 and to make run-repair-replace decisions.
- Know how to calculate Remaining life, and MAWP of piping system

Course Outline:

DAY 1

- Objectives and intent of ASME B 31.3 Code
- ASME B 31.3 Scope and applicability

- Understanding of the Codes, what means SHALL, SHOULD & MAY in Code
- Code contents, Stated & implied stipulations in the Code
- What are design conditions, design pressure & design temperature
- What are various fluid services generally encountered
- Definitions of Category D, M, U, Normal and High Pressure Services
- Concept of Weld Strength reduction factor
- Weld Quality factor
- Allowable stresses and the basis for its calculations
- Design of piping components for internal pressure

DAY 2

- Design of piping components for External pressures.
- Design of branch connections –reinforcements
- Selection of Flanges
- Design of pipe fittings such as elbows, tees and blanks
- Service considerations in Design
- Flexibility considerations
- **Case studies in flexibility calculations**
- Methods to incorporate flexibility in Piping systems
- U - loops, Expansion Joints

DAY 3

- Extensive case studies on Piping Design
- Piping Span Calculations
- Selection of Supports and Hangers
- Material Identification, Certification and Traceability
- Code accepted Materials and material testing
- Listed, unlisted materials
- General requirements to be checked before selection of Material

- Limitations imposed by code on materials
- Impact testing requirements
- Acceptance Criteria as per ASME B 31.3

DAY 4

- Design interface with Fabrication, Assembly and Erection
- Code requirement for preheating and PWHT
- Design interface with Inspection, Examination and Testing
- How to Conduct and certify pressure testing.
- Hydrostatic testing of piping system
- Pneumatic testing of piping system
- Service leak test
- NDT in lieu of leak test
- **Case studies**

DAY 5

- Additional Code requirements for special fluids services
- Specific Design Requirements for Toxic Fluid (M Category) services
- Design Requirements for High Pressure Fluid services
- Design Requirements for High Purity (U category) Fluid services
- Design Requirements for High Pressure (Category K) Fluid services
- Overview of flanges as per ASME B 16.5
- Piping integrity assessments as per API 570
- Making run-repair-replace decisions.
- Calculation of Remaining life and MAWP of piping system

Real-world examples and case studies