

# € TRAINING

ASME Boiler with Pressure Vessel Code and  
B31 Pressure Piping Codes





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## Introduction:

The training program covers ASME Boiler & Pressure Vessel Code and B31 Pressure Piping Codes, vital for industry compliance. Participants learn to interpret and apply these standards, ensuring safety and regulatory compliance. The program combines theory, examples, and case studies for effective learning.

## Program Objectives:

At the end of this program the participants will be able to:

- Understand what, where, when, and how to use various ASME codes.
- Provide a clear understanding of the intent and requirements of the codes, including terminology and interpretations.
- Show how and where the codes are to be applied.
- Explain the code applications for different industries and who is responsible for selecting the appropriate code.
- Ensure the understanding that Codes developed by standards committees, such as the ASME, rely on the use of sound engineering practices by knowledgeable engineers.
- Provide an understanding of Due Diligence in design i.e. to be seen to be doing the right thing.

## Targeted Audience:

- Refinery, Petrochemical and Process Plant Mechanical and Process Engineers.
- Technical Professionals.
- Inspectors, Maintenance Personnel.
- Project and Consulting Engineers.
- Engineering and Technical Personnel involved in plant mechanical integrity and reliability.

## Program Outlines:

### Unit 1:

Overview of Pressure Equipment and Piping and Related Codes and Standards:

- Review of General Engineering Principles.
- Design conditions and specifications.
- Basic stress and strain calculations.
- Hoop and radial stresses in vessels and piping.
- Welding processes.
- Importance of codes and standards.
- Codes and standards organizations - ASME, ASTM, ISO, API, ANSI, EN.
- Development of codes and standards - consensus.
- Limitations of codes and standards - they are not designed handbooks.
- ASME history and general policies.

## Unit 2:

### ASME Boiler and Pressure Vessel Code - Service Sections:

- ASME BPV Code Service Sections - II, V, and IX.
- ASME Section II - Materials, including Ferrous and Nonferrous Material Specifications, Welding Rods, Electrodes, and Filler Metals, and Properties.
- ASME Section V - Nondestructive Examination, covering Scope, Types of NDE, Usage Guidelines, Examples, and Personnel Qualification.
- ASME Section IX - Welding and Brazing Qualifications, detailing Authorized Inspectors, Interpretation of Results, and Reporting Procedures.
- Basic Coverage of Nondestructive Examination.
- WPS Welding Procedure Specification Preparation and Review.
- PQR Procedure Qualification Record Preparation and Review.
- Illustrative Examples for WPS.
- ASME Section IX - Additional Welding and Brazing Qualifications.
- ASME Section V - Further Nondestructive Examination Guidelines.

## Unit 3:

### ASME Boiler and Pressure Vessel Code- Design and Fabrication per Section VIII Div 1:

- ASME Section VIII Division 1 Scope and Structure.
- Design Conditions and Loadings.
- Weld Joint Efficiency and Corrosion Allowance.
- Design for Internal Pressure
- Design for External Pressure and Compressive Stresses.
- Design of Nozzles, Flanges, and Reinforcement of Openings.
- Other Design Considerations such as supports, external local loads, and vessel internals.
- Pressure Vessel Materials and Acceptable Welding Details.

#### Unit 4:

##### ASME B31 Code for Pressure Piping - Part 1:

- Overview of ASME B31 Code for Pressure Piping.
- Background.
- Scope.
- Overview of B31.1, Overview of B31.3, Overview of B31.4, Overview of B31.8.
- Selecting applicable piping code - Responsibility.
- Overpressure protection.

#### Unit 5:

##### ASME B31 Code for Pressure Piping - Piping Design per B31.3:

- Piping Design Methodology, Procedures, and Guidelines.
- Pressure integrity - internal and external pressure.
- Mechanical integrity - static and dynamic loads.
- Specification and Selection of Piping Components - Flanges, Valves.
- Expansion, Flexibility, Supports, and Restraints.
- Piping Stress Analysis and Pipe thickness calculations.
- Simplified flexibility analysis methods.



- Demonstration of computer-assisted piping flexibility analysis.