
ASME Vessels and Pipework in Practice: Design Rules, Welding, Examination and Hydrotesting Course

18 – 22 April 2027
Muscat





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Programme Summary

ASME vessels and pipework are the focus of this one-week training course for mechanical, piping, inspection and project engineers and managers, ending in a code application file for one pressure vessel and piping system. Plant teams meet the codes through drawings, data reports and weld records, yet few can trace a requirement to its rule. The programme moves from the structure and scope of the codes, through design rules and fabrication requirements, to examination and testing, then applies them to one system. Mars Training Centre UK delivers this programme on ASME vessels and pipework for mixed-organisation cohorts.

The Business Case

When ASME codes are read second-hand, specifications drift from the rules, welding and examination scope is argued late, and test failures surface at the end of a project. Teams that can locate the governing rule and recognise what a record must show settle queries faster.

- Rework and Repair: Falls as design basis, welding and examination requirements are fixed before fabrication.
- Review Time: Shortens as engineers trace each requirement to the rule that governs it.
- Documentation Quality: Improves as data reports and test records are checked against what the code asks for.

Principles and Evidence Base

- ASME Boiler and Pressure Vessel Code, Section VIII Division 1: It frames the pressure vessel design, fabrication and examination work of Sessions 1, 2 and 3.
- ASME B31.3 Process Piping: It frames the process piping design, examination and testing work of Sessions 2, 3 and 4.
- ASME B31 pressure piping series: It shows how scope and jurisdiction boundaries separate one piping code from another in Session 1.

Intended Participants

- Mechanical and piping engineers who prepare or review designs.
- Inspection and quality engineers who verify records.
- Project engineers who review vendor submissions.
- Maintenance engineers who assess repairs and alterations.
- Engineering managers who decide how code requirements apply.

Typical sectors include oil and gas, petrochemicals, power generation and process manufacturing, where pressure vessels and process piping are widespread.



Learning Outcomes

1. Participants will be able to locate the code, section and scope that govern a given vessel or piping system.
2. Participants will be able to construct a design basis stating pressure, temperature, materials and corrosion allowance for a vessel and a line.
3. Participants will be able to evaluate wall thickness and material choices against the stated design conditions.
4. Participants will be able to specify welding, examination and pressure testing requirements for a vessel and a piping system.
5. Participants will be able to diagnose gaps in data reports, weld records and test records.
6. Participants will be able to present a code application file for one pressure vessel and piping system.

Programme Structure

Day 1: Structure and Scope of the ASME Codes

How are the codes organised and which rules govern which equipment?

- Code Map for Section VIII Division 1
- Scope and Jurisdiction Boundary Sketch
- Piping Code Selection Table for the B31 Series
- Terms and Definitions Glossary
- Governing Rule Trace Sheet

Day 2: Design Rules for Vessels and Pipework

How are design conditions turned into thicknesses and material choices?

- Design Basis Statement
- Design Pressure and Temperature Worksheet
- Wall Thickness and Corrosion Allowance Calculation
- Materials Selection Table
- Piping Flexibility and Support Review

Day 3: Fabrication and Welding Requirements

What must fabrication and welding show before equipment is accepted?

- Welding Procedure and Qualification Record Review
- Weld Joint Type and Detail Chart
- Fabrication Control Plan
- Vendor Fabrication Record Review
- Repair and Alteration Decision Sheet



Day 4: Examination, Testing and Documentation

How is quality shown through examination, pressure testing and records?

- Non-Destructive Examination Plan
- Examination Extent and Acceptance Table
- Pressure Test Procedure Outline
- Data Report Checklist
- Test Record Gap Log

Day 5: Applying the Codes to One System

Does the code file hold when tested on one vessel and piping system?

- Applying the Session 1 Governing Rule Trace to the System
- Checking the Session 2 Design Basis Against Drawings
- Testing the Session 3 Fabrication Control Plan on Vendor Records
- Reviewing the Session 4 Examination Plan with Peers
- Completing the Code Application File

Methodology

The programme uses a structured exercise method built on anonymised drawings, data reports, weld maps and short written cases from oil and gas and power plants. Participants work in small groups on one vessel and piping system, explain which rule governs each requirement to peers, and receive facilitator feedback on each work product.

- Suggested activity: Tracing a vessel nozzle detail back to the rule that governs it.
- Suggested activity: Reading a weld record pack and listing what is missing.
- Suggested activity: Drafting an examination and test plan for a process line.

Capstone Output

Each participant completes a code application file for one pressure vessel and piping system. It holds a governing rule trace, a design basis statement, a fabrication control plan, an examination and test plan and a record gap log. The file is used at work to brief colleagues and question vendor submissions.

Frequently Asked Questions

Is training on ASME vessels and pipework suitable for engineers new to the codes?

Yes. It assumes basic engineering knowledge and plant familiarity, not earlier study of the codes.



Which codes does the ASME vessels and pipework programme rest on?

It rests on the ASME Boiler and Pressure Vessel Code, Section VIII Division 1, ASME B31.3 Process Piping and the wider ASME B31 pressure piping series.

How is the code application file for ASME vessels and pipework used at work?

You use it to brief colleagues, question vendor and contractor submissions and prepare for inspection of your own vessel and piping system.

How does learning ASME vessels and pipework differ from a programme on risk-based inspection?

It centres on applying design, fabrication, examination and testing rules, while risk-based inspection centres on ranking equipment by risk.