

Course No. 1142

Pressure Vessel Design Training Course

MECHANICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Pressure Vessel Design Training Course is a comprehensive professional development program designed to equip engineers, technical specialists, project professionals, and engineering managers with the knowledge and practical skills required to design, analyze, inspect, and manage pressure vessels in accordance with internationally recognized engineering codes and industry best practices. Pressure vessels are critical components in oil and gas facilities, petrochemical plants, power generation stations, refineries, chemical processing plants, pharmaceutical industries, and manufacturing facilities, where safe and reliable operation is essential for protecting personnel, assets, and the environment.

Pressure vessel design requires a thorough understanding of engineering principles, material selection, stress analysis, fabrication methods, inspection requirements, and regulatory compliance. Improper design or inadequate maintenance can result in equipment failure, operational disruption, safety incidents, and significant financial losses. This course provides participants with practical engineering knowledge based on internationally accepted design methodologies and code requirements, enabling organizations to improve equipment integrity, operational reliability, and long-term asset performance.

Throughout the program, participants will develop a comprehensive understanding of pressure vessel fundamentals, including pressure vessel classifications, design calculations, stress analysis, material properties, corrosion allowance, welding considerations, nozzle design, support systems, fabrication processes, inspection techniques, hydrostatic testing, non-destructive testing (NDT), failure mechanisms, maintenance planning, lifecycle management, and integrity assessment. Practical engineering exercises and real industrial case studies help participants translate engineering theory into effective workplace solutions.

The Pressure Vessel Design Training Course also demonstrates how pressure vessel engineering integrates with mechanical integrity programs, asset management, reliability engineering, risk management, maintenance planning, process safety, operational excellence, and regulatory compliance. By completing this course, participants will be prepared to improve pressure vessel reliability, support engineering design decisions, strengthen inspection and maintenance programs, reduce operational risks, and enhance engineering performance across government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, petrochemical industries, power generation facilities, manufacturing organizations, utilities, and multinational corporations.

Objectives

- Analyze the engineering principles governing pressure vessel design and operation.
- Develop practical knowledge for designing pressure vessels in accordance with internationally recognized engineering codes and standards.
- Evaluate pressure vessel performance using engineering calculations, stress analysis, and integrity assessment techniques.
- Apply mechanical design principles related to pressure loading, material selection, and structural integrity.
- Design pressure vessel components that satisfy operational, safety, and regulatory requirements.
- Improve engineering decision-making through effective design verification and engineering review processes.
- Strengthen troubleshooting capabilities by identifying common pressure vessel failure mechanisms and root causes.
- Implement inspection, testing, and maintenance strategies that support mechanical integrity and equipment reliability.
- Assess operational risks associated with pressure vessels and recommend effective mitigation measures.
- Align pressure vessel engineering practices with organizational objectives for safety, reliability, asset management, and operational excellence.

Who Should Attend

This course is designed for mechanical engineers, design engineers, pressure vessel engineers, process engineers, maintenance engineers, inspection engineers, reliability engineers, project engineers, piping engineers, fabrication engineers, welding engineers, quality engineers, plant engineers, engineering consultants, engineering technicians, equipment inspectors, and professionals responsible for pressure vessel design, fabrication, inspection, maintenance, or integrity management.

The program is equally valuable for engineering managers, maintenance managers, project managers, construction managers, plant managers, asset management professionals, procurement engineers, technical advisors, HSE professionals, quality assurance specialists, executive managers, and decision makers responsible for equipment integrity, engineering compliance, industrial safety, and lifecycle management.

Professionals working within government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, petrochemical facilities, refineries, power generation plants, chemical processing industries, manufacturing organizations, utility providers, infrastructure developers, marine industries, and multinational engineering organizations will benefit significantly from the practical engineering methodologies and internationally recognized pressure vessel design practices presented throughout the course.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain the engineering principles and industrial applications of pressure vessels.
- Apply engineering calculations to support pressure vessel design and verification.
- Select appropriate materials based on operating pressure, temperature, corrosion, and service conditions.
- Analyze stress distribution and evaluate structural integrity using engineering methodologies.
- Identify common pressure vessel failure mechanisms and perform engineering assessments.
- Apply inspection, hydrostatic testing, and non-destructive testing techniques to verify equipment integrity.
- Develop maintenance and mechanical integrity programs for pressure vessels.
- Interpret engineering drawings, fabrication documentation, and technical specifications.
- Apply engineering safety principles throughout the pressure vessel lifecycle.
- Support operational excellence through effective pressure vessel design, inspection, maintenance, and integrity management.

Course Outline

DAY 01

Fundamentals of Pressure Vessel Design

- Principles of pressure vessel engineering
- Pressure vessel classifications and industrial applications
- Design codes, engineering standards, and regulatory requirements
- Material selection and mechanical properties

DAY 01 — CONTINUED

PRACTICAL

Practical workshop on interpreting pressure vessel drawings and technical specifications

DAY 02

Pressure Vessel Design Calculations and Engineering Analysis

- Internal and external pressure design calculations
- Stress analysis and structural integrity principles
- Shells, heads, nozzles, and reinforcement design
- Corrosion allowance and design considerations

PRACTICAL EXERCISE

Practical exercise on pressure vessel design calculations and engineering verification

DAY 03

Fabrication, Welding, and Inspection

- Pressure vessel fabrication methods
- Welding processes and quality requirements
- Inspection procedures and quality control
- Hydrostatic testing and non-destructive testing (NDT)

PRACTICAL

Practical workshop on fabrication inspection and quality assessment

DAY 04

Mechanical Integrity and Failure Analysis

- Pressure vessel degradation mechanisms
- Corrosion, fatigue, creep, and fracture analysis
- Root cause analysis of pressure vessel failures

DAY 04 — CONTINUED

- Reliability improvement and mechanical integrity management

PRACTICAL APPLICATION

Practical application involving pressure vessel failure investigation and integrity assessment

DAY 05

Advanced Pressure Vessel Engineering and Operational Excellence

- Pressure vessel lifecycle management
- Risk management and engineering safety
- Performance monitoring and engineering best practices
- Continuous improvement for pressure vessel reliability

FINAL WORKSHOP

Final workshop involving the development of a comprehensive Pressure Vessel Design and Integrity Management plan integrating engineering design, code compliance, inspection, maintenance planning, mechanical integrity, risk assessment, lifecycle management, and continuous improvement to maximize equipment reliability, operational safety, and engineering excellence.

Register or Request More Information

Course page: <https://quest-training.com/courses/pressure-vessel-design-training-course>

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