



Best Technology Solutions (BTS)

## **Design & Fabrication of Pressure Vessels, Repairs & Alterations Training program**

### **Introduction:**

This comprehensive course, through the use of examples, case studies and group workshop problem solving, and the extensive professional experience of the instructors, deals with the design, fabrication, inspection, repair and alterations of pressure vessels and how to comply with the relevant ASME Codes. Based on the rules for pressure vessel design and construction, you will gain a comprehensive introduction to the requirements of Section VIII, Division 1 including background, organization, design, materials, fabrication, inspection, testing and documentation of pressure vessels. The more commonly used subsections and paragraphs will be covered, and a discussion of individual problems or situations will be included.

The candidates will also be provided with a comprehensive introduction to the requirements of various codes and standards, regarding inspection, repairs and alterations of pressure equipment, and in particular pressure vessels. The requirements of the National Board Inspection Code and the API-510 will be covered in detail. A brief introduction to API-579, Fitness for Service will also be included. Simple flaw evaluation procedures will be evaluated.

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### Who Should Attend?

Anyone involved with the purchase, design, fabrication, or inspection of pressure vessels including users, manufacturers, repair organizations, inspection agencies and other organizations involved with the design, maintenance and repair of pressure equipment. Some technical background will be helpful, but attendees are not required to have an engineering degree or previous work experience in the subject matter

### Course Objectives:

**By the end of this course delegates will be able to:**

- Understand the background of the Code rules
- Apply the Code rules to more common design and fabrication situations
- Perform calculations for some of the loadings and situations not addresses by the Code
- Prepare design specifications, design reports, data reports, and other documentation
- Understand how to prepare and submit an inquiry to the Code Committee for Code Interpretation, Code Cases or Code revision.
- Understand the background of the Code rules
- Identify the responsibilities of the users, manufacturers, repair organizations, regulatory agencies and authorized inspectors



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- Apply the Code rules to more common inspection, repairs and alterations situations
- Be up to date on the latest developments in the rapidly advancing field of pressure equipment inspection and repairs
- Receive an overview of the work being performed by API, ASME, and PVRC, in the related areas

## Course Outline:

### Module I: Design & Fabrication of Pressure Vessels

- Code rules, scope and jurisdiction
- General requirements related to materials and testing
- Material toughness and impact testing requirements
- Joint categories and joint efficiencies
- General requirements related to stamping, reports and testing
- PWHT, tolerances and NDEs
- Welding requirements
- Committees, operation and voting procedures
- Editions, addenda and interpretations
- Design Requirements
- Design loadings and allowable stresses
- Design criteria and strength theory for Division 1
- Formulas for internal pressure and tensile loading
- Procedures for external pressure (vacuum) and compressive loads



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- Openings and reinforcement
- Hydrostatic and pneumatic testing
- Background of the design rules
- Example design problems and solutions
- Cylindrical shells and formed heads
- Seismic loading on vertical vessels
- Nozzle reinforcements
- Other special components
- External pressure and stiffening rings
- Reinforced openings and ligament efficiency

## Module II: Inspection, Repairs & Alterations of Pressure Vessels

- Introduction to post construction codes and standards
- The interrelation of various documents
- Explanation of the responsibilities of the users, manufacturers
- Repair organisations, regulatory agencies and authorised inspectors
- How to obtain a National Board stamp
- Detailed requirements of the NBIC
- Differences between the NBIC and API-510
- Examples of repairs, alterations and the documentation requirements for each
- An introduction to API-579
- Simple Level 1 evaluation procedures for various flaws
- An introduction to the ASME Post Construction Committee





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- Introduction to ASME post-construction standards
- Overview of work being performed by API and ASME
- PVRC related to post construction issues
- Examples demonstrating the application of the rules