Best Technology Solutions (BTS)

Materials, Fabrication, Inspection & Testing Requirements
Training program

Introduction:

This is an introductory course to provide the basic understanding of the materials, fabrication, inspection and testing portions of ASME B31.3 for new construction and how it may be applied for post construction inspection, repairs, and alterations. To achieve these objectives the first part will cover ASME B31.3 and the last part will cover API 570. The course also includes an introduction to ASTM material standards and AWS filler metal standards. , However, in this course the application of the principals expressed in the Code will be extrapolated to deal with operation and maintenance issues and how they work with API 510 for post construction inspection, repairs and alterations. The course also includes a brief introduction to ASME Section II Part A (Ferrous Material Standards) and to ASME Section IX - Welding Qualifications.

Who Should Attend?

Inspectors, engineers, maintenance and QA personnel who work for owner-user companies, inspection companies, fabricators, maintenance service and repair companies, inspection companies and EPC's from petrochemical plants, refineries, power plants, gas/oil pipeline companies, and pulp mills. This course will also assist CSA W178.2 exam candidates who plan to write the B31.3 code exam

Course Objectives:

By the end of this course delegates will learn about:

Have an understanding of the materials, fabrication, inspection and testing portions of ASME B31.3 for new construction and how it may be applied for post construction inspection, repairs, and alterations.

Course Outline:

Introduction to Laws, Regulations, Jurisdiction & Related Codes & Standards

- Alberta Safety Code Act and hierarchy of related regulations, codes, and standards
- Brief introduction to the Alberta Pressure Equipment Safety Regulations (PESR)
- Brief introduction to the Alberta Pressure Welders Regulations
- ABSA's Role as the Jurisdiction Administrator and Authorized Inspection Agency
- Brief introduction to ABSA forms for pressure equipment

Responsibilities

- Owner, designer, manufacturer, fabricator, erector, and owner's inspector
- Brief Introduction to B31.3 Design Requirements for New Construction
- Design minimum temperature
- Quality factors for castings and welds
- Pressure design of straight pipe
- Pipe under-tolerance and how to order pipe accordingly

Steels and ASTM Specifications

- Introduction to Steel Metallurgy, Fe-Fe3C diagram and how to use it with B31.3
- Grains, grain boundaries, grain size, and how they relate to the brittle fracture rules in B31.3
- Heat treatment of steel and related terms and definitions as used in ASTM standards
- ASTM A941, review of B31.3 steel and heat treatment terms/definitions
- How they differ from ASTM A941, API 570 and NACE standards
- Roles of alloying elements in steels and stainless steels

Steels and ASTM Specifications (continued)

- ASTM Specifications, ASTM General Specification requirements (A530, A999, A450)
- How they work with ASTM piping product specifications
- ASTM Piping Product Specifications
- A106 (A530) seamless carbon steel piping for high temperature service
- A333 (A999) carbon steel piping for low temperature service
- A335 alloy steel piping for high temperature service
- A312 (A450) austenitic stainless steel piping
- Material Test Reports
- Review of sample A106, A333 and A312 material test reports
- Understanding the importance of material test report data
- Using material test reports to make critical purchasing decisions

Materials and Requirements

- B31.3 Listed, unknown and reclaimed materials terms and definitions
- B31.3 Requirements for low temperature toughness tests for metals

Welding Metallurgy

- Regions of the heat-affected zone (HAZ) in carbon steel
- Carbon equivalent, ASTM specifications and various formulas
- Heat input of welding
- Brief introduction to the welding metallurgy of austenitic stainless steel

Fabrication by Welding

- Responsibilities
- Weld and joint types
- Preheat requirements
- Postweld heat treatment requirements
- Hardness testing requirements

Inspection and Testing for New Construction

- Responsibilities of the fabricator, purchaser and inspector
- Examination requirements: extent, supplementary and typical weld imperfections
- Examination methods for evaluating weld imperfections and acceptance criteria

Leak Testing for New Construction

- General requirements, Preparation for leak testing
- Brittle fracture considerations for leak testing
- Hydrostatic testing
- Pneumatic testing

Inspection Data Evaluation, Analysis & Recording

- Corrosion Rate Determination
- Maximum Allowable Working Pressure Determination
- Retirement Thickness Determination
- Assessment of Inspection Findings
- Reporting and Records for Piping System Inspection

Frequency and Extent of Inspection

- Piping Service Classes
- Inspection Intervals
- Extent of Visual External and CUI Inspections