Best Technology Solutions (BTS)

Construction & Inspection Requirements for Pipelines (ASME B31.3CSA Z662) Training program

Introduction:

Understand the basics of Canadian Standards Association CSA Standard Z662 for pipeline design, materials, welding, installation, inspection and testing requirements for new construction, and post construction operation, repairs and maintenance work. Upon completion, attendees will appreciate what is required for design calculations, differences between CSA and other materials (API, ASTM), notch toughness requirements, material test reports and markings, CSA welding qualifications, ASME welding qualifications, basic pipeline construction and installation requirements, visual inspection, nondestructive inspection, sour service requirements, pressure testing, and operating requirements. Attendees will also be aware of the various pipeline regulatory agencies, associated pipeline legislation, the influence of CSA Standard B51, and the use of ASME B31.3 within the scope of CSA Z662 pipeline construction. While the design of pipelines is introduced, the discussion does not include details of pipeline stress analysis, design for buoyancy control, limit states design, arrest of long running brittle or ductile fractures, selection and installation of pipeline coatings, design and installation of cathodic protection systems, directional drills, girth weld alternative acceptance criteria, or other fitness-for-service calculations

This course will assist companies with management of the recent CAPP Guide, Competency Assessment for Upstream Oil and Gas Pipeline Installation Inspectors. It covers most of the CAPP knowledge base with respect to CSA Z662 requirements, but it does not deal with details concerning OH&S, WHIMIS, permitting and licensing, land management, the environment, in-line inspection tools, and Criminal Code requirements.

Who Should Attend?

Pipeline and utility operators, designers, welders, supervisors, inspectors, engineers and maintenance personnel who work for pipeline companies, EPC's, inspection companies, fabricators, and repair/maintenance companies involved with oil and gas transportation pipelines. This course will be of assistance to personnel seeking recognition as meeting CAPP competency requirements as a pipeline inspector, and CSA W178.2 pipeline weld inspector exam candidates

Course Objectives:

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

- Be familiar with the correct inspection requirements for oil and gas transmission pipelines, processing piping and related steel structures.
- Cover key topics relating to the scope of the standard with respect to welding and inspection, use of applicable tables and charts
- Be able to determine correct inspection methods, and the correct fit-up and inspection of critical welded components as they relate to the safe operation of oil and gas related piping and structures
- Gain knowledge of, and be tested on, key topics

Course Outline:

Introduction to the Regulations

- Federal Acts and Regulations
- Provincial Acts and Regulations
- Canadian Pressure Equipment Standards – CSA B51 requirements

Damage Mechanisms Addressed by Codes

- Common damage mechanisms that form the basis for the Code rules:
- Strength, ductility, fatigue, stress concentration, brittle fracture, creep, corrosion, and hydrogen damage.

Introduction to Materials

- What constitutes a mild carbon steel, a low alloy steel, and a high alloy steel
- Manufacture of pipe

Application of Z662

- B31.3 vs Z662
- Code definitions

Joining

- Z662 Section 7
- Welding procedure specifications; Z662 Sections 7 and 10
- Welder qualification; Z662 Sections 7 and 10
- Welded joint design and fit-up considerations
- Mechanical joints
- Special requirements for aluminum
- Joint quality requirements

Basic Design Requirements

- Standard thickness formula
- Design factors
- Essential design considerations

- Branch connections
- Flexibility analysis
- Pipe support
- Soil to pipe interaction
- Crossings
- Station design
- B31.3 design option
- Pressure control
- Tanks and process equipment

Materials

- Line pipe materials and their characteristics
- Considerations for fittings and appurtenances
- Plastic liners and pipe for distribution and transmission lines
- Other materials
- Inspection of materials
- Sour service requirements

Construction Practices

- Importance of specifications/contracts
- Inspection and quality control
- Care and handling of line pipe
- Bending of pipe
- Record keeping
- Construction of non-steel lines
- Construction of distribution lines

Joining

- Welding procedure specifications, ASME IX and CSA Z662
- Welder qualification

- Welded joint design and fit-up considerations
- Mechanical joints
- Joint quality requirements

Hydrostatic Testing

- Strength test requirements
- Leak test requirements
- Test head requirements

Operations and Maintenance Procedures

- Manuals, emergency response plans
- In line inspection
- Records
- Personnel training
- Integrity Management
- Corrosion control prevention and mitigation
- Change of service

Pipeline Repairs

- Engineering assessments
- Critical engineering assessments
- Defects that can be repaired
- Types of repairs Repair methods