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ASME Section I and B31.1 Power Boilers and Components

HSB, a Munich Re company, is a technology-driven company built on a foundation of specialty insurance, engineering and technology, all working together to drive innovation in a modern world.

Course description: This seminar is a basic introductory overview of the Section I Power Boiler Code (2023 Edition) and related requirements of ASME B31.1 Power Piping (2022 Edition). It focuses on the ASME certificate holder engaged in welded construction, and repair organizations working on ASME Code Power Boilers under the National Board Inspection Code (NBIC).

The course describes the formatting and structure of Section I, its scope, and its implementation in a Code Power Boiler fabrication program. The ASME B31.1 segment focuses on Boiler External Piping (BEP) construction details, including weld joint preparation and alignment, tack welds, required weld sizing, welding qualification requirements, final weld acceptance criteria, preheat recommendations, postweld heat treatment (PWHT) requirements and exemptions, NDE requirements, pressure testing, Section I Code stamping requirements, and Data Report preparation.

Who should attend?

The intended audience is for first-time users of Section I and ASME B31.1, as well as those with more extensive Code experience. It is most useful for the ASME certificate holder engaged in welded construction, and repair organizations working on ASME Code Power Boilers under the National Board Inspection Code (NBIC). Although design formulas are reviewed and discussed, experience in design calculations is not required.

Topics covered

Overview of ASME Section I

Organization and Formatting of Section I

Scope of Section I Power Boilers

Other Section I Components

ASME B31.1 – Power Piping
- Code Jurisdictional Boundaries
- BEP – Boiler External Piping
- NBEP – Non-Boiler External Piping

Design Requirements
- Basic Design Philosophy
- Stress Values
- Formulas for Internal Pressure
- Openings and Compensation
- Part PA – Alternative Rules

Material Requirements
- Pressure Retaining
- Non-Pressure Retaining
- Heat Treat of Austenitic Stainless Steels
- Creep Stress Enhanced Ferritic Steels
- Joint Stress Reduction Factors
- Acceptability and Selection
- Receiving Inspections
- Identification and Marking
- Documentation Requirements
- Material Recertification (PG-10)
- Prefabricated/Preformed Pressure Parts
- Furnished Without a Certification Mark
  - (PG-11)
- Authorized Inspector Involvement

Fabrication Requirements
- Cutting Plates and Other Stock
- Joint Preparation

Welded Fabrication Requirements
- Acceptable Welding Processes
- AWS Standard Welding Procedure Specs
- Procedure and Performance Qualifications
- Final Welding Inspection Criteria
- Postweld Heat Treatment
- NDE Requirements
  - Examination Methods
  - PG-75 Visual Examinations
  - Acceptance Criteria
  - Personnel Qualifications
  - Sequencing of NDE
  - Nonmandatory Appendix E - UT
- Defect Repairs
- Welded Attachments
- Inspection Openings

Pressure Testing
- Test Pressure Determination
- Test Application
- Testing of Replacement "Parts"

Code Stamping
- Location & Required Information

Manufacturer's Data Reports
- Preparation, Certification, and Distribution
- Record Retention

Overview of ASME B31.1

Structure and Organization of B31.1
- Scope, Definitions, and Exemptions
- Section I Referenced Edition

Materials
- Acceptable Materials
- Allowable Stresses
- BEP Restrictions
- Components

Welding
- Procedure (WPS) Qualification
- WPS Qualification by Others
- Filler Metal Selection

Backing Rings
- Joint Preparations

Tack Welds

Girth Butt Welds

Weld Reinforcement

Longitudinal Butt Welds

Welding Preheat

Postweld Heat Treatment
- Nominal Material Thickness
- Control Thickness

Welder Performance Qualification
- Previous Qualification
- Collective Qualification

NDE Requirements
- Examination Methods
- Personnel Qualifications

Pressure Testing

BEP vs. NBEP

Code Stamping for BEP

Manufacturer's Data Reports for BEP
- Preparation, Certification, and Distribution
- Record Retention

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