Best Technology Solutions (BTS)

Welding & Brazing Qualifications (Conforms to ASME Codes)

Training program

Introduction:

This is a basic course that will train the candidates to comply with the layout, scope, use and requirements of ASME Section IX, Welding and Brazing Qualifications. Participants will gain a working knowledge of ASME Section IX. A review of the welding processes and variables, and a review of basic welding metallurgy will be conducted in order to provide all participants with sufficient background in welding technology to interpret and understand Section IX. The mechanics of using Section IX and how to address its requirements will be explained in a simple, straightforward manner. Emphasis will be placed on writing welding procedures so that they contribute positively to the manufacturing process and on qualifying procedures in a cost effective manner. The requirements for welders, brazers and operators will be examined with particular emphasis on minimizing the cost and maximizing the usefulness of qualifications. Time will be provided to address individual participant's problems and concerns.

It explains and demonstrates the rules for qualification of welding and brazing procedures and personnel. You will learn about the basic rules for the use of Section IX in conjunction with other construction codes. These rules include the identification of responsibilities for procedure and personnel qualification as well as the activities that can be subcontracted by the manufacturer. The course also presents basic characteristics of the welding processes as a basis for understanding the essential and nonessential variables that are listed for the qualification of procedures and personnel. Some basic metallurgy is presented to explain the philosophy supporting the essential variable rules of the Code.

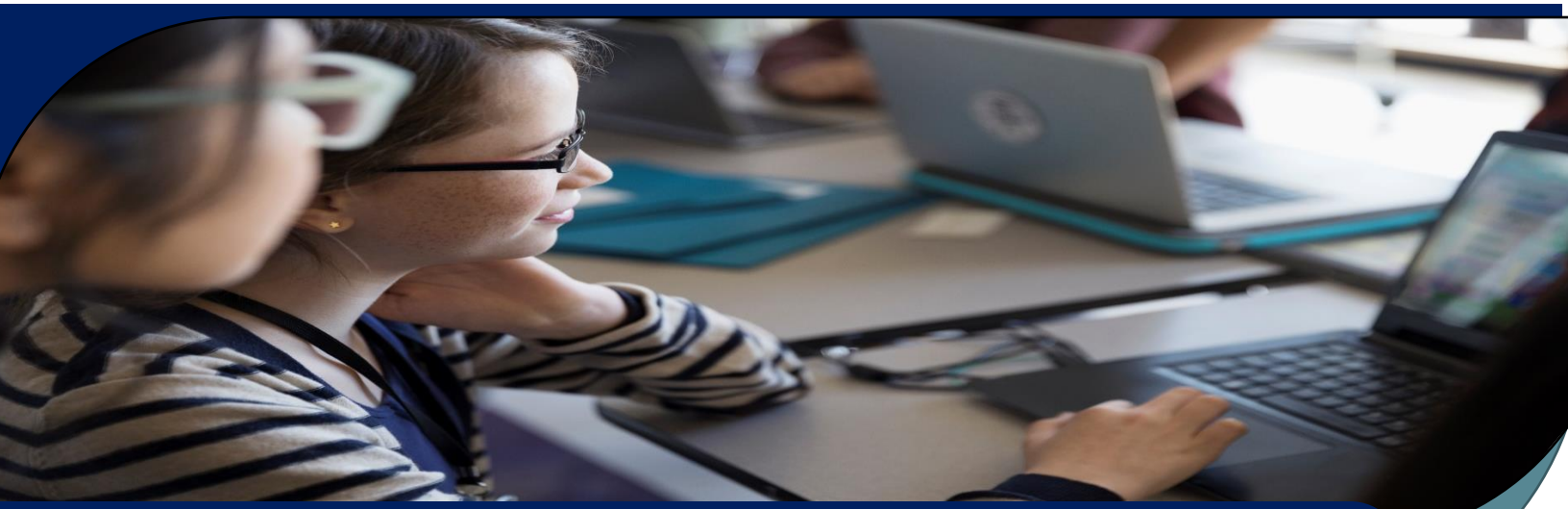
Who Should Attend?

Engineers, supervisors, welders, brazers, quality assurance, control personnel, auditors, or anyone working in the boiler, pressure vessel, petrochemical, or any other industry whose welding qualifications are governed by Section IX of the ASME Boiler and Pressure Vessel Code.

Course Objectives:

By the end of this course delegates will learn about:

- Learn how to achieve economical compliance with ASME Code requirements
- Gain experience to interpret, understand and comply with ASME Section IX
- Understand welding processes /variables and basic welding metallurgy
- Review the recent changes to Section IX & describe its layout and scope
- Explain the qualification of procedures & personnel in Section IX
- Identify basic features of the commonly used welding processes
- Explain the concept of carbon equivalent and hardenability of steels
- Identify nonessential variables and essential variables in the WPS
- Explain how to prepare and modify the PQR and WPS from fundamental data
- Identify supplementary essential variables



Course Outline:

History and Structure

- Historical Development of Section IX
- Relationship of Section IX to Other Codes, Organization and Structure
- Mechanics of Using Section IX - Essential, Nonessential and Supplemental Essential Variables

Review of Welding Processes and Variables

- Fuel Gas Welding, Shielded Metal Arc Welding
- Gas Tungsten Arc Welding, Gas Metal Arc Welding, Submerged Arc Welding
- F-Numbers, A-Numbers, SFA Specifications, non-SFA Filler Metals
- P-numbers, S-numbers and non-code metals, steel metallurgy, hardenability, preheat and post weld heat treatment, Filler metal specifications including F-numbers; A numbers, SFA
- Specifications, non SFA filler metals, Variables for other common processes

Steel Welding Metallurgy

- Effects of Alloying, Transformations, Hardening, Preheating, Post-weld Heat treating, Sensitization

Selecting and Preparing the Test Coupon

- Obtaining Maximum Cost-effectiveness from Test Coupons
- Preparation and Welding of the Test Coupon recording
- Necessary and Worthwhile Data, Demonstrating Code Compliance

Writing the Welding Procedure Specification

- Meeting Code Requirements, Addressing Customer Requirements
- Providing Direction to the Welder
- Sources of Information for Preparing Intelligent and Meaningful Welding Procedure Specifications

Supplemental Variables: Special Considerations for Notch-Toughness

- How Welding Influences Toughness, Measuring and Recording Heat Input Data
- Translating Heat Input Data into Useful Directions for a Welder
- Typical Construction Code Requirements (Section VIII as example)

Welder and Welding Operator Qualifications

- Selection of Test Coupons to Minimize Testing Costs and Simplify Record Keeping
- Conducting Performance Tests, Organizational Responsibility and Ownership of Test Records

- Testing of Coupons and Recording of Test Data, Maintaining Continuity of Qualification

Brazing

- Brazing Technology, Comparison of Brazing Rules to Welding Rules, Review of Brazing Variables

Brazing Qualifications

- Review of Brazing processes and variables
- Differences between the QW (welding) and QB (brazing) sections
- Qualification of the brazing procedure and brazers
- Differences in testing between welding and brazing

Welding Procedures

- Review WPSs and PQRs for compliance with Section IX
- Review WPSs for suitability to fabricate a vessel
- Develop a WPS qualification plan to build a vessel
- Develop preliminary WPSs and PQRs to build that vessel

Welder & Operator Qualification

- Review various Section IX welder and welding operator qualification records
- Select test coupons for various production welds
- Develop welder qualification records for each weld and weld type
- Maintaining qualifications over time