

**PART 1 GENERAL**

**1.1 REFERENCE STANDARDS**

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  - .1 ANSI/ASME B31.1, Power Piping.
  - .2 ANSI/ASME B31.3, Process Piping.
  - .3 ANSI/ASME Boiler and Pressure Vessel Code:
    - .1 BPVC 2007 Section I: Power Boilers.
    - .2 BPVC 2007 Section V: Nondestructive Examination.
    - .3 BPVC 2007 Section IX: Welding and Brazing Qualifications.
- .2 American National Standards Institute/American Water Works Association (ANSI/AWWA).
  - .1 ANSI/AWWA C206, Field Welding of Steel Water Pipe.
- .3 American Welding Society (AWS).
  - .1 AWS C1.1M/C1.1, Recommended Practices for Resistance Welding.
  - .2 AWS Z49.1, Safety in Welding, Cutting and Allied Process.
  - .3 AWS W1, Welding Inspection Handbook.
- .4 Canadian Standards Association (CSA International).
  - .1 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
  - .2 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .3 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.
  - .4 CSA-W117.2, Safety in Welding, Cutting and Allied Processes.
  - .5 CSA W178.1, Certification of Welding Inspection Organizations.
  - .6 CSA W178.2, Certification of Welding Inspectors.

**1.2 QUALITY ASSURANCE**

- .1 Qualification:
  - .1 Welders:
    - .1 Welders must have the experience and qualifications in accordance with CSA B51.
    - .2 Use qualified and licensed welders possessing a certificate issued by authority having jurisdiction for each procedure performed.
    - .3 Each welder must identify his/her work by a symbol issued by authority having jurisdiction.
    - .4 Companies of welding by fusion of aluminum must be certified in accordance with CSA W47.2.

- .2 Inspectors:
  - .1 Inspectors must have the experience and qualifications conform to CSA W178.2.
- .2 Certifications:
  - .1 Registration of welding procedures in accordance with CSA B51.
  - .2 Copy of welding procedures available for inspection.
  - .3 Safety in welding, cutting, and allied processes in accordance with CSA-W117.2.

## **PART 2 PRODUCT**

### **2.1 ELECTRODES**

- .1 Electrodes: in accordance with relevant W48 Series CSA standards.

## **PART 3 EXECUTION**

### **3.1 APPLICATION**

- .1 Manufacturer's instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, as well as datasheets.

### **3.2 QUALITY OF WORK**

- .1 Welding: in accordance with ANSI/ASME B31.3 and B31.1, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX, as well as ANSI/AWWA C206, using procedures conform to AWS B3.0, AWS C1.1, and applicable to relevant requirements of provincial authorities having jurisdiction.

### **3.3 INSTALLATION REQUIREMENTS**

- .1 Identify each weld with welder's identification symbol.
- .2 Backing rings:
  - .1 If applicable, fit to minimize gap between ring and pipe bore.
  - .2 Do not install at orifice flanges.
- .3 Fittings:
  - .1 NPS 2 and smaller: install welding type sockets.
  - .2 Branch connections: install welding tees or forged branch outlet fittings.

### **3.4 INSPECTION AND TESTS—GENERAL REQUIREMENTS**

- .1 Do not conceal welds until they have been inspected, tested, and approved by inspector.
- .2 Allow to the inspector to visually examine welds during early stages of welding procedures, in accordance with Welding Inspection Handbook. If necessary, repair or replace defects as required by codes and as specified.

### **3.5 SPECIALIST EXAMINATIONS AND TESTS**

- .1 General:
  - .1 Perform examinations and tests by specialist qualified conform to CSA W178.1 and CSA W178.2 and approved by Consultant.
  - .2 Perform inspections and tests conform to ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51, as well as requirements of authorities having jurisdiction.
- .2 Hydrostatically test welds conform to ANSI/ASME B31.1.
- .3 Visual examinations: include the entire circumference of weld externally and, wherever possible, internally as well.

### **3.6 DEFECTS CAUSING REJECTION**

- .1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.

### **3.7 REPAIR OF WELDS WHICH FAILED TESTS**

- .1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.

**END OF SECTION**