

1. PART 1 - GENERAL

1.1 References

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1-1998, Power Piping.
 - .2 ANSI/ASME B31.3-1999, Process Piping.
 - .3 ANSI/ASME, Boiler and Pressure Vessel Code -1998:
 - .1 Section I: Power Boilers.
 - .2 Section V: Non Destructive Examination.
 - .3 Section IX: Welding and Brazing Qualifications.
- .2 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C206-88, Field Welding of Steel Water Pipe.
- .3 American Welding Society (AWS)
 - .1 AWS C1.1-66, Recommended Practices for Resistance Welding.
 - .2 AWS Z49.1-1999, Safety Welding, Cutting and Allied Process.
 - .3 AWS W1-1980, Welding Inspection.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-48.2-92, Spot Radiography of Welded Butt Joints in Ferrous Materials.
- .5 Canadian Standards Association (CSA)
 - .1 CSA W47.2-M1987 (R1998), Certification of Companies for Fusion Welding of Aluminum.
 - .2 CSAW48 Series-M1980(R1998), Electrodes.
 - .3 CSA B51-M1991 (R1997), Boiler, Pressure Vessel and Pressure Piping Code.
 - .4 CAN/CSA-W117.2-94, Safety in Welding, Cutting and Allied Processes.
 - .5 CSA W178.1-1996, Certification of Welding Inspection Organizations.
 - .6 CSA W178.2-1996, Certification of Welding Inspectors.

1.2 Welders qualifications

- .1 Welding qualifications to be in accordance with CSA B51.
- .2 Use qualified and licensed welders possessing certificate for each procedure to be performed from authority having jurisdiction.
- .3 Furnish welder's qualifications to Departmental Representative.
- .4 Each welder to possess identification symbol issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of aluminum to be in accordance with CSA W47.

1.3 Inspectors qualifications

- .1 Inspectors to be qualified to CSA W178.2.

1.4 Welding procedures

- .1 Registration of welding procedures in accordance with CSA B51.
- .2 Copy of welding procedures to be available on site for inspection at all times.
- .3 Safety in welding, cutting and allied processes to be in accordance with CAN/CSA W117-W117.2.

1.5 Waste management and disposal

- .1 Separate and recycle waste materials in accordance with provincial and municipal requirements and standards.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

2. PART 2 - PRODUCTS

2.1 Electrodes

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

3. PART 3 - EXECUTION

3.1 Workmanship

- .1 Welding to be in accordance with ANSI/ASME B31.1 B31.3, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, and applicable requirements of provincial authority having jurisdiction and special procedures specified elsewhere in Divisions 21, 22 and 23.

3.2 Installation requirements

- .1 Identify each weld with welder's identification symbol.
- .2 Backing rings:
 - .1 Where used, fit to minimize gaps 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.

3.3 Inspections and tests – General requirements

- .1 Review all weld quality requirements and defect limits of applicable codes and standards with Departmental Representative before any work is started.
- .2 Formulate "Inspection and Test Plan" in co-operation with Departmental Representative.
- .3 Do not conceal welds until they have been inspected, tested and approved by inspector.
- .4 Provide for inspector to visually inspect all welds during early stages of welding procedures in accordance with AWS W1. Repair or replace all defects as required by codes and as specified herein.

3.4 Specialist examinations and tests

.1 General

- .1 Perform examinations and tests by specialist qualified in accordance with CSA W178.1 and CSA W178.2 and approved by the Departmental Representative.
- .2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.
- .2 Hydrostatically test all welds to requirements of ANSI/ASME B31.1.
- .3 Visual examinations: include entire circumference of weld externally and wherever possible internally.
- .4 Failure of visual examinations
 - .1 Upon failure of any weld by visual examination, perform additional testing as directed by Departmental Representative of a total of up to 10% of all welds, selected at random by Departmental Representative by radiographic and particle tests.

3.5 Defects causing rejection

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

3.6 Repair of welds which failed tests

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