

PIPE WELDING

1. GENERAL

1.1 Related Sections

.1 Section

1.2 References

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

.1 ANSI/ASME B31.1, Power Piping.

.2 ANSI/ASME Boiler and Pressure Vessel Code:

.1 Section I: Power Boilers.

.2 Section V: Nondestructive Examination.

.3 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 C1.1, Recommended Practices for Resistance Welding.

.2 AWS Z49.1, Safety Welding, Cutting and Allied Process.

.3 AWS W1, Welding Inspection Handbook.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-48.2, Spot Radiography of Welded Butt Joints in Ferrous Materials.

.5 Canadian Standards Association (CSA)

.1 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.

.2 CSA W48 series, 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.

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1.3 Qualifications

- .1 Welders
 - .1 Welding qualifications in accordance with CSA B51.
 - .2 Use qualified and licensed welders possessing certificate for each procedure performed from authority having jurisdiction.
 - .3 Furnish welder's qualifications to Contract Administrator.
 - .4 Each welder to possess identification symbol issued by authority having jurisdiction.
 - .5 Certification of companies for fusion welding of aluminum in accordance with CSA W47.2.
- .2 Inspectors
 - .1 Inspectors qualified to CSA W178.2.

1.4 Quality Assurance

- .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.

2. PRODUCTS

2.1 Electrodes

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

3. EXECUTION

3.1 Workmanship

- .1 Welding: in accordance with ANSI/ASME B31.1, 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.

3.2 Installation Requirements

- .1 Backing rings:
 - .1 Where used, fit to minimize gaps between ring and pipe bore.
 - .2 Do not install at orifice flanges.
- .2 Fittings:

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- .1 50mm and smaller: install welding type sockets.
- .2 Branch connections: install welding tees or forged branch outlet fittings.

3.3 Inspection and Tests - General Requirements

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

3.4 Defects Causing Rejection

- .1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.
- .2 In addition, chilled water systems below 1000 kPa:
 - .1 Undercutting greater than 0.8 mm adjacent to cover bead on outside of pipe.
 - .2 Undercutting greater than 0.8 mm adjacent to root bead on inside of pipe.
 - .3 Undercutting greater than 0.8 mm at combination of internal surface and external surface.
 - .4 Incomplete penetration and incomplete fusion greater than total length of 38 mm in 1500 mm length of weld depth of such defects being greater than 0.8 mm.
 - .5 Repair cracks and defects in excess of 0.8 mm in depth.
 - .6 Repair defects whose depth cannot be determined accurately on basis of visual examination tests.

3.5 Repair of Welds Which Failed Tests

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

END OF SECTION