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**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 23 05 01 – Common Work Results for Mechanical.

**1.2 REFERENCES**

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  - .1 ANSI/ASME B31.1-2020, Power Piping.
  - .2 ANSI/ASME B31.3-2020, Process Piping.
  - .3 ANSI/ASME Boiler and Pressure Vessel Code-2021:
    - .1 BPVC 2021 Section I: Power Boilers.
    - .2 BPVC 2021 Section V: Nondestructive Examination.
    - .3 BPVC 2021 Section IX: Welding and Brazing Qualifications.
- .2 ANSI/AWWA C206-17, Field Welding of Steel Water Pipe.
- .3 American Welding Society (AWS)
  - .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
  - .2 AWS C1.1M/C1.1-2019, Recommended Practices for Resistance Welding.
  - .3 AWS Z49.1-2012, Safety in Welding, Cutting and Allied Process.
  - .4 AWS W1-2000, Welding Inspection Handbook.

**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 Submit 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 in accordance with CSA W47.2.
- .2 Inspectors:
  - .1 Inspectors qualified to CSA W178.2.
  - .2 Certifications:
    - .3 Registration of welding procedures in accordance with CSA B51.
    - .4 Copy of welding procedures available for inspection.
    - .5 Safety in welding, cutting and allied processes in accordance with CSA-W117.2.

**1.4 DELIVERY, STORAGE AND HANDLING**

Deliver, store and handle in accordance with Section 01 61 00-Common Product requirements.

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Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

**Part 2 Products**

**2.1 Electrodes**

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

**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, and datasheets.

**3.2 QUALITY OF WORK**

- .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.

**3.3 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 DN 50 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 Review weld quality requirements and defect limits of applicable codes and standards with Departmental Representative before 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 welds during early stages of welding procedures in accordance with Welding Inspection Handbook. Repair or replace defects as required by codes and as specified.

**3.5 INSPECTION AND TEST-SPECIALIST**

- .1 General:
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- .1 Perform examinations and tests by specialist qualified to CSA W178.1 and CSA W178.2 and approved by Departmental Representative.
  - .2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.
  - .3 Inspect and test 30% of welds in accordance with "Inspection and Test Plan" by non-destructive visual examination and magnetic particle (hereinafter referred to as "particle") tests.
  - .4 Hydrostatically test welds to ANSI/ASME B31.1.
  - .5 Visual examinations: include entire circumference of weld externally and wherever possible internally.
  - .2 Failure of visual examinations:
    - .1 Upon failure of welds by visual examination, perform additional testing as directed by Departmental Representative up too 10% of welds, selected at random by Departmental Representative by particle tests.

### **3.6 REPAIR OF FAILED WELDS**

- .1 Re-inspect and re-test reworked or repaired welds at contractor's expense.

### **3.7 CLEANING**

- .1 Work site to be cleaned and maintained in a clean state everyday.