

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.3-2013, Process Piping.
- .2 American Petroleum Institute
 - .1 API Std 1104-21 Welding of Pipelines and Related Facilities
- .3 American Welding Society (AWS)
 - .1 AWS C1.1M/C1.1-2012, Recommended Practices for Resistance Welding.
 - .2 AWS Z49.1-2005, Safety in Welding, Cutting and Allied Process.
 - .3 AWS W1-2000, Welding Inspection Handbook.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
 - .2 CSA B51-09, Boiler, Pressure Vessel and Pressure Piping Code.
 - .3 CSA-W117.2-12, Safety in Welding, Cutting and Allied Processes.
 - .4 CSA W178.1-08(R2013), Certification of Welding Inspection Organizations.
 - .5 CSA W178.2-08(R2013), Certification of Welding Inspectors.
 - .6 CSA Z662-11 Oil and Gas Pipeline Systems

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

- .1 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.
 - .2 Welding of steel pipes shall conform to API Standard 1104 - Welding Pipelines and Related Facilities or CSA-Z662, Oil and Gas Pipeline Systems.
 - .1 The welding work shall be carried out by fully qualified tradesmen, in accordance with appropriate CSA and API Standards, using good trade practices.

- .2 Welder qualification for work on pressure piping and fuel tanks shall be as per Section XI of the ASME Code - Boiler and Pressure Vessel Code: Welding Qualifications. All welders, to be accepted, must be registered in the Nunavut prior to starting work and possess a valid 'B' Pressure Welding certification.
- .3 Welding electrodes are affected by humidity and therefore, to retain their quality, special precautions must be followed when same are not maintained in dry environments or when containers are opened. Prior to utilization, electrodes in open containers shall be maintained heated in proper sized ovens as per manufacturer's recommendations at all times.
- .4 Prior to commencing work, qualified welding procedures shall be submitted to the Departmental Representative in accordance with Section 01 33 00 Submittal Procedures.
- .5 Welders shall be qualified to the procedures in accordance with the latest CSA-Z662 - Oil and Gas Pipeline Systems, ASME Code Section IX and /or CSA W47.1 or W55.2 Specifications.
- .3 Inspectors:
 - .1 Inspectors qualified to CSA W178.2.
- .4 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.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 ELECTRODES

- .1 Electrodes: 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, repairs and radiographic inspections shall be in accordance with CSA-Z662, Oil Pipeline Systems, latest publication.

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 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 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 SPECIALIST EXAMINATIONS AND TESTS

- .1 General:
 - .1 Perform examinations and tests by specialist qualified to CSA W178.1 and CSA W178.2 and approved by Departmental Representative.
 - .2 Inspect and test 100 % of welds in accordance with "Inspection and Test Plan" by non-destructive visual and full gamma ray radiographic (hereinafter referred to as "radiography") tests].
- .2 Hydrostatically test welds pipeline as indicated in Section 23 08 01 Performance Verification of Mechanical Piping Systems.
- .3 Visual examinations: include entire circumference of weld externally and wherever possible internally.
- .4 Full radiographic tests for the new piping systems, of both internal and external pipes.
 - .1 Radiographic film:
 - .1 Identify each radiographic film with date, location, name of welder, and submit to Departmental Representative. Replace film if rejected because of poor quality.
 - .2 Interpretation of radiographic films:
 - .1 By qualified radiographer.
- .5 Failure of Radiographic or Visual tests: all welds to be repaired and retested until they are passed.

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.

3.8 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 CLEANING AND START-UP OF MECHANICAL PIPING SYSTEMS

- .1 In accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

1.2 FUEL OIL SYSTEMS

- .1 Notify authorities having jurisdiction to enable witnessing of tests as required.
- .2 Hydrostatic test of piping system.
 - .1 Testing of the piping, prior to connection to the existing piping systems shall be done hydrostatically at 1034 kPa, isolated with blind flanges. The pressure shall be maintained for 2 hours minimum, and all joints inspected. Any leak shall be repaired immediately.
- .3 Air pressure test of interstitial space.
 - .1 Testing of the interstitial space in the double walled pipe system shall be air (soap bubble) tested at 415 kPa. The pressure shall be maintained for two (2) hours. Any leak shall be repaired immediately.
- .4 For buried piping,
 - .1 Conduct holiday testing of buried pipe coatings prior to backfilling.
- .5 Once the hydrostatic and/or air testing are completed and accepted, the Contractor shall connect all piping to the existing systems proceed to the start-up and trial operation.
 - .1 Once connected conduct a final hydrostatic test using fuel oil as the test medium at 415 kPa pressure for 2 hours. All flanged connections to be inspected. Any leak to be repaired immediately.
 - .2 Demonstrate resumed operation of fuel transfer to the dispenser pumps and to the plant.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Procedures and cleaning solutions for cleaning mechanical piping systems.

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
- .2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions: submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 PIGGING OF PIPELINES

- .1 Prior to connecting the new pipelines to the existing and after the hydrostatic testing of the pipelines is completed, the pipelines shall be drained and pigged with T.D. Williamson Inc. FJR Pig, or equivalent, to remove debris and all water from the lines.
- .2 Collect water from hydrostatic test and any materials from pigging and dispose of water in a manner approved by the Departmental Representative.

- .3 The pig shall be moved with air pressure not exceeding 1034 kPa. A minimum of three passes of the pig in each line shall be made to assure cleanliness and that the pipelines are free of water.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME-B16.3-12, Malleable-Iron Threaded Fittings: Classes 150 and 300.
 - .2 ASME-B16.9-12, Factory-Made Wrought Steel Buttwelding Fittings.
- .2 ASTM International
 - .1 ASTM A47/A47M-12, Standard Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A333/A333M-13, Standard Specification for Seamless and Welded Steel Pipe for Low Temperature Service and Other Applications which Require Notch Toughness.
 - .3 ASTM A350/A350M-13, Standard Specification for Carbon and Low Alloy Steel Forgings requiring Toughness Resting for piping Components.
 - .4 ASTM A105A/ A105M -13 Standard Specification for Carbon Steel for Pipe Applications
- .3 Canadian Environmental Protection Act (CEPA)
 - .1 CCME PN 1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
 - .2 Storage Tank Systems for Petroleum Products and Allied Petroleum Products (SOR/DORS/2008-197).
- .4 CSA International
 - .1 CSA-B139-09, Installation Code for Oil Burning Equipment.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 National Fire Code of Canada (NFCC 2010)

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Charts.
 - .1 Verify project requirements.
 - .2 Review installation conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheets for piping, fittings and equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Provide copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
- .3 Certificates:
 - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Manufacturers' Instructions: provide manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

- .1 Ensure piping is installed by individual authorized by authority having jurisdiction.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

Part 2 Products

2.1 PRODUCT PIPE

- .1 Pipe and pipe nipples, unless otherwise specified, shall be low temperature carbon steel (seamless or welded) ASTM Specification A333, Grade 6 carbon steel pipe conforming to the following:
 - .1 Pipe 100 mm dia. and larger to be ERW.
 - .2 Pipe 75 mm dia. and smaller to be seamless.
 - .3 Pipe 50 mm dia. and larger to be Schedule 40.
 - .4 Pipe 38 mm dia. and smaller to be Schedule 80.

2.2 DOUBLE WALLED PIPE

- .1 All secondary containment piping shall be an engineered and totally prefabricated double pipe type containment system. Product pipe to be protected from exterior environment by the secondary containment. System supplier to have 5 years experience in the manufacture of secondary contained pipe systems.
- .2 Product pipe to match product pipe specifications in 2.1 above.

- .3 Secondary containment pipe to also match product pipe specifications in 2.1 above.
- .4 Cladding:
 - .1 Secondary pipe jacket to be a fibreglass reinforced plastic (FRP) external cladding at least 2.5mm thick. The cladding shall be applied to a shot basted steel surface that meets SSPC SP-7 surface finish.
 - .2 The cladding on straight sections shall consist of multiple layers of helical windings of continuous glass reinforcements applied at a winding angle of 58 to 62 degrees. The cladding on fittings shall consist of either a chopped spray-up plastic resin/fibreglass reinforcement composite, or wrapping of glass cloth fully saturated with a two part catalyst adhesive.
 - .3 All field joints to be covered with a wrapping of glass cloth, fully saturated with a two part catalyst adhesive, identical in properties to the factory applied cladding system. The minimum thickness of the field hand lay-up shall be 2.mm
 - .4 All containment piping shall be subjected to a holiday test using a 35,0000 volt electric resistance holiday detector.
- .5 Pipe supports inside the secondary containment to be steel and shall be designed and factory installed by the secondary containment manufacturer.

2.3 JOINTING MATERIAL

- .1 Except where shown otherwise. all joints to be welded.

2.4 FITTINGS

- .1 All butt weld piping fittings shall be wrought carbon steel for low temperature service ASTM specification A420, Grade WPL-6.
- .2 Fittings shall be carbon steel, butt weld type, seamless, black, conforming to ASTM A234 Grade B, unless otherwise specified.
- .3 Fittings 50 mm and larger shall be Schedule 40 and butt weld fittings 38 mm and smaller, shall be Schedule 80.
- .4 Socket weld and threaded type fittings shall be forged steel, black, conforming to ASTM A-350, Grade LF2, 20680 kPa (Class 3000), unless otherwise specified, with dimensions to ANSI B16.11 and threads to ANSI B1.20.1.

2.5 Flanges, Gaskets, Nuts and Bolts

- .1 Flanges shall be 1034 kPa, ANSI B16.5, raised face, ASTM A-350, Grade LF2, faced and drilled, forged steel, welding neck, slip-on or threaded as called for, unless otherwise specified.
- .2 Gaskets shall be ring type for raised face flanges, and full face type for flat faced flanges. Gaskets shall be John Crane Style 2160, non-asbestos, or approved equal, 1.6 mm thick suitable for use with petroleum products. Do not apply a surface treatment of any kind to the gasket.
- .3 Flange bolting shall be alloy steel stud bolts, threaded full length, to ASTM Spec. A-320, Grade L7, sizes and lengths to suit. Nuts for stud bolts shall be alloy steel, semifinished, hexagonal head nuts of standard heavy duty series per ASTM Spec. A-194, Grade 4 Stud

Bolts, threaded in accordance with ANSI B1.1, coarse thread series, Class 2A fit. Nuts tapped in accordance with ANSI B1.1, coarse thread series, Class 2B fit.

2.6 GATE VALVES

- .1 Forged steel threaded gate valves shall have conventional port opening, bolted bonnet, O.S.&Y., ANSI Class 600 and as follows:
 - .1 Body material: Carbon steel to ASTM A105N.
 - .2 Trim material: Wedge - stainless steel 316 stellited.
 - .3 Seat - stainless steel 316 stellited.
 - .4 Stem - stainless steel 316B.
 - .5 Standard of Acceptance: Crane #B-3604 LU-T or equivalent Velan, Kitz or Newman-Hattersly.

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 PIPING

- .1 Install oil piping system in accordance with NFCC.
- .2 Above ground piping to be protected from physical impact due to impact.
- .3 Install buried piping or piping run in culverts in double-wall piping to CSA-B139.
- .4 Layout and Installation
 - .1 All pipe, fittings, appurtenances and equipment, shall be laid out and installed in accordance with the lines, elevations, and grades indicated on the Drawings.
 - .2 Equipment shall be set in place and final alignments completed before connections are made. Flexible connectors shall be installed straight, in a relaxed condition, as their inclusion into systems is intended to offset minor future misalignments that may occur due to natural conditions.
 - .3 Pipes shall be joined and supported so that no undue stress or strain is created in the lines or in connected equipment.
 - .4 Flanges shall be installed with holes straddled about the vertical axis and tightened evenly in balanced fashion. Flanges shall not be used to force parts into position.
 - .5 The Contractor shall install pipelines with gradual uniform slopes as specified on the Drawings, with no low areas which will trap water.

3.3 JOINTING OF THREADED FITTINGS

- .1 Jointing of threaded fittings shall be with the use of Gasiola Thread Lubricating Compound suitable for gasoline and petroleum products use. The compound shall be applied to the male threads only at the connection point.
- .2 Teflon tape is not allowed.

3.4 DOUBLE WALLED PIPING

- .1 Install the system in accordance with the directions furnished by the manufacturer.
- .2 Ensure all pipe ends of both the primary and secondary piping are sealed during transportation and installation to prevent the entry of contamination to the piping.
- .3 Secondary containment to be kept clean and dry at all times during the installation process.

3.5 VALVES

- .1 Install valves with stems upright or horizontal unless approved otherwise by Departmental Representative.
- .2 Install gate valves as indicated.

3.6 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Test system to CSA-B139 and authorities having jurisdiction.
 - .2 Isolate tanks from piping pressure tests.
 - .3 Maintain test pressure during backfilling.

3.7 CLEANING

- .1 Clean in accordance with Section 23 08 02 - Cleaning and Start-Up of Mechanical Piping Systems, supplemented as follows:
 - .1 Ensure entire installation is approved by authority having jurisdiction.
 - .2 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION