

**Wharf Construction****Port Bickerton East****Guysborough County, Nova Scotia****Project No. R.082082.001****FACILITY FUEL-OIL PIPING**

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**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 61 00 – Materials and Equipment
- .3 Section 01 74 11 – Cleaning
- .4 Section 01 78 00 – Closeout Submittals

**1.2 REFERENCE STANDARDS**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME-B16.3-2016, Malleable-Iron Threaded Fittings: Classes 150 and 300.
  - .2 ASME-B16.9-2012, Factory-Made Wrought Steel Buttwelding Fittings.
- .2 ASTM International
  - .1 ASTM A47/A47M-99(2014), Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - .3 ASTM A182/A182M-16a, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
  - .4 ASTM A312/A312M-17, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
  - .5 ASTM B61-15, Standard Specification for Steam or Valve Bronze Castings.
  - .6 ASTM D3034-16, Standard Specification for Type PSM Poly(Vinyl Chloride)(PVC) Sewer Pipe and Fittings
- .3 Canadian Environmental Protection Act (CEPA)
  - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.
  - .2 CCME PN 1326-2003, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)
  - .1 MSS-SP-80-2013, Bronze Gate, Globe, Angle and Check Valves.
- .6 National Research Council Canada (NRC)
  - .1 National Fire Code of Canada 2015(NFC).
- .7 Government of Nova Scotia

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- .1 NS Regulation 44/2002 "Petroleum Management Regulations – Environment Act".
- .2 Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems.
- .8 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S601-14(R2015), Standard for Shop Fabricated Steel Aboveground Tanks for Flammable and Combustible Liquids.
  - .2 CAN/ULC-S661-10(R2016), Standard for Overfill Protection Devices for Flammable and Combustible Liquid Storage Tanks.
  - .3 ULC ORD-C107.12-1992, Line Leak Detection Devices for Flammable Liquid Piping.

**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 Indicate on manufacturer's catalogue literature the following:
      - .1 Reference standards
      - .2 Location of installation,
      - .3 Exact model number
      - .4 All technical information available
    - .2 Provide two copies of WHMIS MSDS.
- .3 Piping pressure test report signed by licensed installer:
- .4 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .5 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 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 system is installed by petroleum storage tank installer, licensed in Nova Scotia.

**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.

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- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

**Part 2 Products****2.1 FILL VENT AND CARRIER PIPE**

- .1 Materials as per CEPA SOR-/2008-197.
- .2 Stainless Steel: to ASTM A312/A312M, Schedule 40, grade 316 or 304.

**2.2 UNDERGROUND DRAINAGE PIPING**

- .1 PVC conforming to ASTM D3034, SDR 26.
- .2 Underground piping joints shall be gasketed using material compatible with petroleum products (example nitrile)
- .3 Exposed surface drainage pipe end to be protected by means of an animal screen cap to prevent animal entry into drainage system. Contractor to provide appropriate cap shop drawing for approval.

**2.3 JOINTING MATERIAL**

- .1 threaded joint sealant: Teflon Tape or liquid thread sealant, petroleum resistant
- .2 Raised face flanged joint: gasket 1.6mm thick, ring gasket, petroleum resistant, fire rated to 650 degrees Celsius.

**2.4 FITTINGS**

- .1 Stainless Steel Piping:
  - .1 Threaded fittings to ASTM A182, banded, Class 150, threads to ASME-B16.3.
  - .2 Socket weld fittings to ASTM A182, class 3000, grade 316 or 304.
- .2 Underground drainage piping:
  - .1 In conformance with ASTM D3034, SDR 26, gasketed using material compatible with petroleum products (example nitrile)

**2.5 OIL STOP VALVE**

- .1 Stainless steel construction.
- .2 Slave valve for automatic priming
- .3 Freeze protection package included
- .4 Gravity Operation, automatic close when specific gravity reached 0.95, failsafe operation.
- .5 Installed inside 1050 mm diameter catch basin.
- .6 Outlet piping installed through cored hole in catch basin complete with petroleum resistant seal.

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**2.6 BALL VALVES**

- .1 NPS 2 and under: stainless body, grade 316 or 304 screwed ends, TFE seal, hard chrome ball, 4 MPa, WOG

**2.7 DRAINAGE SHUTOFF VALVE**

- .1 Butterfly or ball style, CPVC, rated for 150 psi, petroleum resistant wetted components.
- .2 Quarter turn operation, with open/closed indicator.
- .3 Valve stem handle extension to surface level manhole for operation.
- .4 Compatible with underground drainage piping.

**2.8 SWING CHECK VALVES**

- .1 NPS 2 and under, stainless steel body, grade 316 or 304, screwed: renewable composition disc suitable for oil service, screw in cap, regrindable seat

**2.9 SOLENOID VALVE**

- .1 NPS 2 and under, stainless steel body, grade 316 or 304, screwed.
- .2 Normally closed, failsafe closed, coil rated for continuous duty, internal pressure relief

**2.10 HOSE REELS**

- .1 Diesel Dispensing hose reel:
  - .1 Heavy Duty Stainless steel construction
  - .2 Electric power rewind
  - .3 Xp rated motor with thermal overload protection
  - .4 chain driven
  - .5 Suitable for specified hose
  - .6 Momentary contact push button rewind control mounted at hose reel
  - .7 Complete with removable handle for manual operation during power failure

**2.11 DISPENSING HOSE**

- .1 Marine grade fuel-dispensing hose with nozzle
  - .1 ULC listed – CAN/ULC S612 – Standard for Hose and Hose Assemblies for Flammable and Combustible Liquids
  - .2 25mm (1") diameter
  - .3 43m length

**2.12 SUBMERSIBLE PUMP**

- .1 Submersible Pump:
  - .1 ¾ horsepower
  - .2 Variable length to suit diesel tank

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- .3 Precision check valve
- .4 Thermal pressure relief
- .5 Single phase, 208-230 VAC, 60 Hz
- .6 Controller mounted in heated enclosure

**2.13 SUPPORTS, HANGERS, INSERTS**

- .1 Support piping as indicated on the design drawings.
- .2 Provide rollers and pipe guides at all corners of dock ramps to provide ease of operation to operators.

**2.14 FUEL FILTER**

- .1 Diesel: particulate, supply one filter complete with housing along with a spare filter to remain on site
  - .1 spin on canister style,
  - .2 max flow 68 lpm,
  - .3 max working pressure 50 psi,
  - .4 10 micron

**2.15 TURBINE METER**

- .1 Stainless steel construction
- .2 Max flowrate 380 lpm
- .3 Accuracy +/- 1.0%
- .4 Operating temperature -40 to 60 degrees C
- .5 LCD display, reads in liters
- .6 2 totals: resettable and cumulative

**2.16 Flex Hose**

- .1 ULC rated,
- .2 Dn 40mm, length 450mm
- .3 Stainless steel hose and braid
- .4 Ends flanged or NPT male, with swivel end

**2.17 Nozzle**

- .1 ULC listed
- .2 Body aluminum
- .3 Hold open device not permitted
- .4 Automatic shut-off
- .5 Supply with handwarmer, and spill guard (yellow)
- .6 Diesel spout to be Dn 25mm

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**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 piping as specified in drawings.
- .2 Install oil piping system in accordance with NFC, CEPA SOR /2008-197.
- .3 Slope piping down in direction of storage tank unless otherwise indicated.
- .4 Above ground piping to be protected from physical impact due to impact.
- .5 Piping at tanks:
  - .1 STP Suction: terminate 150mm from bottom of tank.

**3.3 VALVES**

- .1 Install valves with stems upright or horizontal unless approved otherwise by Departmental Representative.
- .2 Install swing check valves on discharge of pumps and as indicated.

**3.4 OVERFILL AND SPILL PROTECTION**

- .1 Ensure all nozzle hold-open devices are removed prior to installation.
- .2 Refer to 33 56 13 – Aboveground Fuel Storage Tanks for tank overfill protection details

**3.5 PRODUCT TRANSFER AREA**

- .1 Tank concrete slab equipped with containment curb and catch basin, refer to drawings for installation details.
- .2 Catch basin equipped with frame and grate, and all joints to be sealed liquid tight with petroleum resistant sealant.
- .3 Catch basin equipped with oil stop valve and outlet piping to surface. Maintain minimum 2% slope from catch basin outlet to surface discharge location.
- .4 Oil stop valve to be anchored to catch basin bottom using manufacturer recommended anchors, additional concrete to be poured in catch basin bottom to ensure integrity of catch basin bottom is not compromised by oil stop valve anchors.
- .5 Piping outlet from catch basin to be sealed liquid tight using petroleum resistant components.
- .6 Discharge piping from catch basin to be equipped with shut-off valve equipped with valve extension handle to grade level manhole access, refer to drawings for orientation details.
- .7 Oil stop valve vent to be piped to above the slab curb elevation using stainless steel piping and fittings. Install vent piping and field fit to ensure tripping hazards are minimized.

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- .1 Site Tests/Inspection:
  - .1 Piping pressure test to be completed by licensed installer:
    - .1 Min 1.5 x working pressure or 690 kPa (100psig),
    - .2 Test media: nitrogen
    - .3 Duration: minimum 2 hrs
    - .4 During test:
      - .1 Record date, time, test pressure.
      - .2 At incremental time periods record, gauge readings, ambient temperature and weather conditions
      - .3 Soap all joints and inspect for leaks.
    - .5 Complete and sign test report including
  - .2 Isolate tanks from piping pressure tests.
- .2 Weld testing:
  - .1 At minimum provide mag particle testing of 50% of welded joints.
  - .2 Provide test reports to Departmental Representative.
  - .3 In the event of any failed joints, 100% of welded joints to be tested, and reports to be forwarded to Departmental Representative.
- .3 Manufacturer's Field Services:
  - .1 Have manufacturer of products, supplying materials for Work of this Section, review Work involved in handling, installation/application, protection and cleaning, of its product[s] and submit written reports, in acceptable format, to verify compliance of Work with Contract.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .4 Drainage system:
  - .1 Hydrotest drainage system for 24hrs.
  - .2 Provide permanent level indicator at top of tank containment slab curb for test duration.
  - .3 Close drainage piping shut-off valve and fill area to top of curb with clean water.
  - .4 Provide test document that records product level, water temperature, atmospheric temperature, and weather conditions at periodic increments during the 24hr test period (minimum 6 readings).

**3.7 CLEANING**

- .1 Clean in accordance with manufacturer's written recommendations, supplemented as follows:
  - .1 Flush after pressure test with product for a minimum of 1 hour. Clean strainers and filters.
  - .2 Dispose of flushing liquids used for flushing out in accordance with requirements of authority having jurisdiction.

- .3

Ensure vents from regulators, control valves are terminated in approved location and are protected against blockage and damage.
- .4

Ensure entire installation is approved by authority having jurisdiction.
- .5

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

Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION