

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 33 56 13 - Underground Fuel Storage Tanks.

**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 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 A105/A105M-14, Standard Specification for Carbon Steel Forgings for Piping Applications.
  - .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 B75M-11, Standard Specification for Seamless Copper Tube (Metric).
- .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 Canadian Standards Association (CSA)
  - .1 CSA-B139 Series-19, Installation code for oil-burning equipment.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)
  - .1 MSS-SP-80-13, Bronze Gate, Globe, Angle and Check Valves.
- .7 National Research Council Canada (NRC)
  - .1 National Fire Code of Canada 2015 (NFC)
- .8 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC S615-14, Standard for Fibre Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.

- .2 CAN/ULC S642-16, Standard for Compounds and Tapes for Threaded Pipe Joints,
- .3 CAN/ULC S660-08, Standard for Non-metallic Underground Piping for Flammable and Combustible Liquids,
- .4 CAN/ULC S661-10, Standard for Overfill Protection Devices for Flammable and Combustible Liquid Storage Tanks
- .5 CAN/ULC S663-11(R2016), Standard for Spill Containment Devices for Flammable and Combustible Liquid Aboveground Storage Tanks
- .6 CAN/ULC S664-17, Standard for Containment Sumps, Sump Fittings, and Accessories for Flammable and Combustible Liquids.

### 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 for the following:
      - .1 Valves
      - .2 Aboveground single walled piping
      - .3 Underground double walled piping and fittings
      - .4 Transition sumps
      - .5 Tank sump
      - .6 Aboveground spill containment devices
      - .7 Grade level access manhole
      - .8 Sump entry fittings
      - .9 Electronic sump leak sensors
      - .10 Electronic tank interstice sensor
      - .11 Electronic leak monitoring console
      - .12 Electronic remote alarm equipment
      - .13 Product Transfer Area containment box
- .3 Test Reports:
  - .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 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 As required in the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (CEPA SOR/2008-197), work by the Contractor will be overseen by the Departmental Representative. The cost associated with this oversight is not part of the Contractor scope.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .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, CSA-B139, and NFC.
- .2 Vent, and aboveground distribution piping at buildings:
  - .1 Bare steel: to ASTM A53/A53M, Schedule 40, continuous weld or electric resistance welded, screwed, size as noted on design drawings.
  - .2 Provide liquid and vapour-tight connection at fill pipe.
- .3 Fill Pipe
  - .1 Stainless steel, SCH 40 to ASTM A312/A312M-17.
- .4 Underground piping:
  - .1 Double walled flexible piping system inside tertiary duct to ULC – S660
    - .1 Pipe end fittings to be clamshell style with threaded secondary containment port.
    - .2 Mechanical joints on buried piping is not permitted.

#### **2.2 STEEL PIPE COATING**

- .1 Aboveground tank vent piping: hot dip galvanized.
- .2 Aboveground product piping:
  - .1 Assembled piping system surface preparation to SSPC SP-10/NACE No. 2 near white metal blast.
  - .2 Prime coat with one coat 2-3mils Dry Film Thickness (DFT) moisture cure polyurethane zinc primer.

- .3 One intermediate coat 2-3 mils DFT moisture cure polyurethane.
- .4 One topcoat 2-3 mils DFT aliphatic polyurethane, rated for ultraviolet exposure.
- .5 Color:
  - .1 Aboveground piping: black.
  - .2 Valves as per Canadian Fuels Agency (CFA) Identification, valves to be color coded as follows:
    - .1 Diesel: Yellow (Pantone Yellow C)

### **2.3 JOINTING MATERIAL**

- .1 Screwed fittings:
  - .1 Non-toxic, non corrosive, non hardening PTFE thread sealant, suitable for diesel exposure, conforming to CAN/ULC-S642-16.
- .2 Flanged fittings (raised face):
  - .1 1.6mm (1/16") thick ring gasket, compressed high strength aramid fibres bonded with high grade nitrile NBR synthetic rubber, suitable for gasoline and diesel service.

### **2.4 FITTINGS**

- .1 Steel:
  - .1 Forged ASTM A105/A105M: threaded, class 150 to ASME-B16.3
  - .2 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A47/A47M.
  - .3 Nipples: Schedule 40, to ASTM A53/A53M.

### **2.5 BALL VALVES**

- .1 NPS 2 and under: steel or stainless body, screwed ends, TFE seal, hard chrome ball, 4 MPa, WOG, fire rated to API 607.

### **2.6 SWING CHECK VALVES**

- .1 NPS 2 and under, screwed: renewable composition disc suitable for oil service, screw in cap, regrindable seat.

### **2.7 SOLENOID VALVES**

- .1 20mm diameter, Class 150, threaded, WOG, materials as per CCME, 120VAC, continuous duty coil, normally closed, failsafe closed, suitable for operation in 0-100psi differential pressure

### **2.8 FILTER / DE-AERATOR DEVICE (BOILER SYSTEM)**

- .1 Installed as per design drawings, one per heating system boiler. Sized to suit boiler manufacturer specifications.

**2.9 FILTER (GENERATOR SYSTEM)**

- .1 Replaceable cartridge type as recommended by generator manufacturer.
- .2 Furnish spare filter cartridge.

**2.10 PIPING TRANSITION SUMP**

- .1 Polyethylene, 2-part construction, weatherproof lockable cover, exterior anchoring system.

**2.11 SUMP ENTRY FITTINGS**

- .1 Transition sump aboveground:
  - .1 Flexible entry boot or rigid entry boot, suitable for steel pipe sizes and conduit sizes.
- .2 Transition and tank sumps below ground:
  - .1 Flexible double entry boot, seals access duct on sump exterior and double wall piping on the sump interior, suitable for underground pipe and access duct sizes.

**2.12 SIGNAGE**

- .1 Site specific signage – refer to drawings for construction, wording, location and mounting details:
  - .1 Product transfer area standard operating procedures – as indicated on design details.
  - .2 Fuel shut-off signage at valves located at entrance to building

**2.13 DAYTANK FLOAT CONTROLS**

- .1 See section 33 56 16 for details

**2.14 ELECTRONIC LEAK MONITORING CONSOLE**

- .1 See section 33 56 16 for details

**2.15 PTA SPILL BOX**

- .1 As indicated on the design drawings:
  - .1 Welded aluminum construction.
  - .2 On 4 legs typical, c/w anchors to anchor to concrete tank slab.
  - .3 Complete with weather tight locking hinged cover, handle and shocks to ensure smooth operation and eliminate slamming or overextension of cover.
  - .4 Install safety chain between box and cover to prevent overextension of box cover.
  - .5 Install flexible sump entry boot in floor of box to facilitate fill pipe entry into box.
  - .6 Suitably sized to ensure proper clearances for operation of inner ULC S663 approved spill containment manhole.

## **2.16 DUPLEX TRANSFER PUMPSET**

- .1 Two positive displacement rotary type, direct driven from TEFC motor, mounted on common base. Complete with mechanical seal, permanently sealed ball bearings, relief valve, compound gauge on inlet, pressure gauge on discharge, high and low pressure switch on discharge, and drip tray with leak sensor. One Duplex pumps set and controller for each day tank (typical, both tanks)
- .2 Capacity:
  - .1 Pumped fluid: fuel oil.
  - .2 Flow rate: 3 GPM;
  - .3 Motor: 120V, ½HP, 60Hz, 1750 RPM

## **2.17 DUPLEX PUMP CONTROLLERS**

- .1 ULC listed, NEMA rated enclosure, configured to monitor and control the following:
  - .1 Duplex pump set motor selection, and start stop.
  - .2 Auxiliary supply tank level sensors (refer to Section 33 56 16 for sensor details)
  - .3 High/low pressure switch
  - .4 Leak sensor in pump set containment pan
  - .5 Auxiliary supply tank selection solenoid valves (typical, both tanks)
- .2 Equipped with indicator lights for the following:
  - .1 Duty pump motor running
  - .2 Pump set containment pan leak
  - .3 Pump high / low pressure
  - .4 Auxiliary supply tank high level (typical, both tanks)
  - .5 Auxiliary supply tank low level (typical, both tanks)
  - .6 Pump fail to start (typical, both tanks)
  - .7 Auxiliary supply tank solenoid power (typical, both tanks)

## **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 indicated on design drawings.
- .2 Install oil piping system in accordance with CEPA SOR/2008-197, CSA-B139, and NFC.
- .3 Slope piping down in direction of storage tank or transition sump unless otherwise indicated. Overflow vents must be installed without dips or sags and maintain positive slope to either the auxiliary supply tank or the main supply tank.

- .4 Above ground piping to be protected from physical impact.
- .5 Fill pipes: install to comply with CEPA SOR/2008-197.
  - .1 Include liquid and vapour tight connection.
  - .2 Complete with ULC S663 approved spill containment manhole.
- .6 Clearly label piping runs in legible form indicating;
  - .1 Piping product content.
  - .2 Direction of flow.
  - .3 Identify transfer points in piping systems to CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification

### **3.3 VALVES**

- .1 Install as indicated on the design drawings
- .2 Install valves with stems upright or horizontal unless approved otherwise by Departmental Representative.

### **3.4 LEAK DETECTION**

- .1 Aboveground single walled piping subject to visual inspection
- .2 Underground double walled piping continuously monitored by electronic leak detection system.
- .3 Underground tank interstice continuously monitored by electronic leak detection system.

### **3.5 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Isolate tanks from piping pressure tests.
  - .2 Test complete piping system to 50 psi for minimum 2 hrs.
  - .3 Test underground secondary containment piping to 5 psi for minimum 2 hrs
  - .4 Maintain test pressure during backfilling.
  - .5 All sumps to be hydrostatically tested at same time as piping pressure test. Monitor water level for 24 hr period to verify integrity.

### **3.6 CLEANING**

- .1 Clean in accordance with manufacturer's written recommendations, 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**