

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

**1.2                REFERENCES**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME-B16.3-2006, Malleable-Iron Threaded Fittings: Classes 150 and 300.
  - .2 ASME-B16.9-2007, Factory-Made Wrought Steel Buttwelding Fittings.
- .2 ASTM International
  - .1 ASTM A47/A47M-99(2004), Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - .3 ASTM B61-08, Standard Specification for Steam or Valve Bronze Castings.
  - .4 ASTM B75M-99(2005), Standard Specification for Seamless Copper Tube.
- .3 Canadian Environmental Protection Act (CEPA)
  - .1 CEPA SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.
- .4 Canadian Council of Ministers of the Environment
  - .1 CCME PN 1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
- .5 CSA International
  - .1 CSA-B139-15, Installation Code for Oil Burning Equipment.
  - .2 CSA-B140.0-03, Oil Burning Equipment: General Requirements.
  - .3 CSA-C282-09, Emergency Electrical Power Supply for Buildings.
- .6 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-11-2008, 2nd Edition, Paints and Coatings.
- .7 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .8 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)
  - .1 MSS-SP-80-08, Bronze Gate, Globe, Angle and Check Valves.
- .9 National Research Council Canada
  - .1 National Fire Code of Canada (NFCC) 2010.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-Installation Meeting:

- .1 Convene pre-installation meeting one (1) week prior to beginning on-site installations.
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building subtrades.
  - .4 Review manufacturer's installation instructions and warranty requirements.

#### **1.4 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: valves, flexible hoses, fuel oil tank devices.
    - .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
    - .3 Submit shop drawings in accordance with 01 33 00 – Submittal Procedures.
- .3 Indicate VOC's for adhesive and solvents during application and curing.
- .4 Test Reports:
  - .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
  - .2 Contractor to complete piping system leak detection test for new aboveground piping. Test to be conducted at a minimum of 50 psi for a minimum of 2 hours using either compressed air or nitrogen, unless otherwise specified by product manufacturer. Test results shall indicate no indication of a leak in order for a leak detection test to be considered successful.
  - .3 Submit piping leak detection test results to Departmental Representative prior to filling the system with petroleum product.
- .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.

#### **1.5 CLOSEOUT SUBMITTALS**

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

## **1.6 QUALITY ASSURANCE**

- .1 Ensure piping is installed by an individual authorized by authority having jurisdiction to do so.
- .2 Contractor to provide five (5) working days' notice to Departmental Representative for their witness of pipe leak detection test.

## **1.7 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.
- .3 Packaging Waste Management: remove for reuse of pallets, crates, padding, packaging materials (as applicable) in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 FILL AND VENT PIPE**

- .1 Materials as per CSA-B139-15, CEPA SOR/2008-197, NFCC 2010.
- .2 Steel: to ASTM A53/A53M, Schedule 40, continuous weld or electric resistance welded, screwed.

### **2.2 CARRIER PIPE**

- .1 Materials as per CSA-B139-15, CEPA SOR/2008-197, NFCC 2010.
- .2 Steel: to ASTM A53/A53M, Schedule 40, continuous weld or electric resistance welded, screwed.
- .3 Copper: type K or L, soft copper tubing, to ASTM B75M.
- .4 Flexible hose: ULC-certified, stainless steel braided hose for petroleum-product applications.

### **2.3 OUTER CASING**

- .1 Copper: polyethylene coating.

### **2.4 STEEL PIPE COATING**

- .1 Apply one coat epoxy primer and two coats epoxy paint.
- .2 Primers, paints and coatings: in accordance with manufacturer's recommendations for surface conditions.

### **2.5 JOINTING MATERIAL**

- .1 Steel:

- .1 Threaded fittings: all fittings must use petroleum-resistant seal only.
- .2 Threaded and welded pipe connections and valves shall have a minimum rating of 1034 kPa (150 psi) and shall meet the applicable approved standard.
- .2 Joints shall not be soldered.

## **2.6 FITTINGS**

- .1 Steel:
  - .1 Malleable iron: threaded, banded, Class 150 to ASME-B16.3.
  - .2 Welding: butt-welding to ASME-B16.9.
  - .3 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A47/A47M.
  - .4 Nipples: Schedule 40, to ASTM A53/A53M.
- .2 Copper:
  - .1 Piping: brazed type.
  - .2 Connections to equipment: flared-type c/w flared forged nuts only.
- .3 Compression fittings are not permitted.

## **2.7 BALL VALVES**

- .1 NPS 2 and under: bronze body, screwed ends, TFE seal, hard chrome ball, 4 MPa, WOG as specified under Section 23 05 23.01 - Valves - Bronze.

## **2.8 SWING CHECK VALVES**

- .1 NPS 2 and under, screwed: to MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, renewable composition disc suitable for oil service, screw in cap.

## **2.9 FLEXIBLE FUEL HOSE**

- .1 ULC-certified, stainless steel, wire braid hose for petroleum-product applications. Pipe shall be sized to suit piping, see drawings.

## **2.10 LABELING**

- .1 Piping to be labeled with product, flow direction and pipe purpose at intervals not less than 3m. Lettering to be black, minimum 13mm in height, on yellow background. Examples of pipe labels include: "FUEL OIL OVERFLOW/VENT", "FUEL OIL SUPPLY", "FUEL OIL RETURN".
- .2 All labeling, with the exception of fuel piping labels, to be bilingual with black lettering on white background.

## **2.11 SIGNAGE**

- .1 All signage to be bilingual on aluminum or UV-proof plastic backing, fastened using screws, bolts or rivets.

**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 CEPA SOR/2008-197, NFCC 2010, CCME PN1326, CSA-B139-15.
- .2 Slope piping down in direction of main storage tank unless otherwise indicated.
- .3 Above ground piping to be protected from physical impact due to impact.
- .4 Piping inside building:
  - .1 Piping shall not be installed in solid flooring.
  - .2 Use flare joints for copper piping and tubing in accordance with CSA-B139-15 only.
  - .3 Install valves as indicated in drawings.
- .5 Fill, vent, suction, return, overflow/vent piping outside building:
  - .1 Steel piping threaded throughout except at tanks where electrically isolating fittings are used.
  - .2 Grading: slope supply and overflow/vent piping a minimum of 1% back to main tank.
  - .3 NPS 2 liquid- and vapour-tight camlock fitting at main tank fill pipe connection.
- .6 Buried piping shall not be permitted.
- .7 Piping at tanks:
  - .1 Main Tank Fill Pipe:
    - .1 Install vapour- and liquid-tight camlock-type fitting inside existing tamperproof spill container.
    - .2 Install drop tube for new ULC-certified overfill prevention device on new main tank fill pipe inside tank. Drop tube shall terminate 150 mm from bottom of tank and be cut at 45-degree angle.
  - .2 Day Tank Generator Return:
    - .1 Install drop tube that shall terminate within 150 mm of bottom of day tank.
    - .2 Drill a 3mm hole on drop tube inside day tank within 50mm of top of day tank for anti-siphon.
  - .3 Day Tank Manifold Overflow/Vent: NPS 3 and terminate inside main tank within 50mm of top.
  - .4 Individual Day Tank Overflow/Vent: NPS 2 and terminate inside day tank within 50mm of top.
  - .5 Comply with CSA-B139-15, NFCC 2010, CEPA SOR/2008-197 and CCME PN1326 for piping for fill, vent and carrier piping at tanks.

- .8 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 valves with stems upright or horizontal unless approved otherwise by Departmental Representative.
- .2 Install ball valves at branch take-offs, to isolate pieces of equipment and as indicated.
- .3 Install globe valves for balancing and in by-pass around control valves.
- .4 Install swing check valves as indicated.

### **3.4 BUILDING PENETRATIONS**

- .1 Sleeve fuel oil piping and provide weather-tight, two-hour fire resistance rated seal for all new fuel oil piping building penetrations.
- .2 Insulate the fuel oil piping through building walls to match that of existing fuel oil pipes.
- .3 Insulate and seal the building penetration weather-tight formerly used for the existing 50mm fuel oil overflow/vent line.
- .4 Provide architectural paneling disturbed by fuel oil piping installation through the building to match existing, as required.

### **3.5 SIGNAGE**

- .1 Install identification signage on exterior building wall where the fuel oil lines enter the building:
  - .1 Comply with CSA B139-15, section 1.0, article 5.4.2.3.
  - .2 Aluminum backboard, rectangular in shape, minimum 300mm wide, 250mm high and min 3mm thick.
  - .3 Black lettering minimum 25mm high on yellow background.
  - .4 Shall be bilingual:
    - .1 “BUILDING SERVICES DIESEL FUEL/FUEL OIL SHUT-OFF VALVE”.
    - .2 “VALVE DE FERMETURE DE DIESEL ALIMENTATION / MAZOUT ÉQUIPEMENTS DE SERVICE DU BÂTIMENT”.

### **3.6 OVERFILL AND SPILL PROTECTION**

- .1 Shop-fabricated AST overfill protection. Main tank:
  - .1 Overfill protection device compatible with intended method of filling designed, built and certified to CAN/ULC-S661 with positive shut-off action. Pressure-rated overfill prevention valve to be installed on each fill pipe drop tube inside each main tank.

- .2 Remote electronic overflow alarm panel to be installed in vicinity of new outdoor fill pipe connection. Refer to Section 26 29 03 – Control Devices for further details.

### **3.7 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Test system to CSA-B139-15.
  - .2 Isolate tanks from piping pressure tests.
  - .3 Conduct piping system leak detection test for new aboveground piping. Test to be conducted at a minimum of 50 psi for a minimum of 2 hours using either compressed air or nitrogen, unless otherwise specified by product manufacturer to be more stringent. Soap test threaded connections to determine the location of leaking fittings and correct as required.
  - .4 Test results shall indicate no indication of a leak in order for a leak detection test to be considered successful.
  - .5 Submit piping leak detection test results to Departmental Representative prior to filling the system with petroleum product.
- .2 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 products 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.
  - .3 Schedule site visits, to review Work, at stages listed:
    - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
    - .2 Twice: during progress of Work at 60% complete and upon completion of the Work (after cleaning is carried out)
  - .4 Obtain reports, within 3 days of review, and submit, immediately, to Departmental Representative.

### **3.8 CLEANING**

- .1 Clean in accordance with manufacturer's written recommendations, supplemented as follows:
  - .1 Flush after pressure test with number 2 fuel oil for a minimum of two (2) hours or as otherwise indicated by the Departmental Representative. Clean pump strainers and filters to remove unwanted foreign matter in the fuel oil system.
  - .2 Dispose of fuel oil 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.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**