

1. GENERAL

1.1 References

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/NFPA-329-99, Handling Underground Releases of Flammable and Combustible Liquids.
 - .2 ANSI/API 650-2000, Welded Steel Tanks for Oil Storage.
- .2 American Petroleum Institute (API).
 - .1 API RP 651-1997, Cathodic Protection of Aboveground Petroleum Storage Tanks.
 - .2 API STD 653-R01, Tank Inspection, Repair, Alteration, and Reconstruction.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C618-01, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- .4 Canadian Council of Ministers of the Environment (CCME).
 - .1 CCME-PN1326-2004, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .5 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .6 Canadian Standards Association (CSA)/CSA International.
 - .1 CAN/CSA-B139-09, Installation Code for Oil Burning Equipment.
- .7 The Master Painters Institute (MPI).
 - .1 Architectural Painting Specification Manual - September 2002.
- .8 National Research Council/Institute for Research in Construction.
 - .1 NRCC 38727, National Fire Code of Canada (NFC)-1995.
- .9 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .10 Underwriters' Laboratories of Canada (ULC).
 - .1 ULC/ORD-C58.9-97, Secondary Containment Liners for Underground and Aboveground Tanks.
 - .2 ULC/ORD-C58.12-92, Leak Detection Devices (Volumetric Type) for Underground Storage Tanks.
 - .3 ULC/ORD-C58.14-92, Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks.
 - .4 ULC/ORD-C58.15-92, Overfill Protection Devices for Underground Tanks.
 - .5 ULC/ORD-C107.4-92, Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids.
 - .6 ULC/ORD-C107.7-93, Glass-Fibre Reinforced Plastic Pipe and Fittings.
 - .7 ULC/ORD-C107.19-92, Secondary Containment of Underground Piping.
 - .8 ULC/ORD-C142.23-91, Aboveground Waste Oil Tanks.

- .9 ULC-S601-2000, Aboveground Horizontal Shop Fabricated Steel Tanks.
- .10 CAN/ULC-S602-92, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil.
- .11 CAN/ULC-S603.1-92, Galvanic Corrosion Protection Systems for Steel Underground Tanks.
- .12 ULC-S630-93, Aboveground Vertical Shop Fabricated Steel Tanks.
- .13 ULC-S652-93, Tank Assemblies for Collection of Used Oil.
- .14 ULC-S653, Standard for Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids.

1.2 Action and Informational Submittals

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Territory of Nunavut, Canada.
- .2 Indicate details of construction, appurtenances, installation, leakage detection system.
- .3 Shop drawings to detail and indicate following as applicable to project requirements. Submit manufacturers product data to supplement shop drawings.
 - .1 Size, materials and locations of ladders, ladder cages, catwalks and lifting lugs.
 - .2 Tanks capacity.
 - .3 Size and location of fittings.
 - .4 Environmental compliance package accessories.
 - .5 Decals, type size and location.
 - .6 Accessories: provide details and manufacturers product data.
 - .7 Size, material and location of manholes.
 - .8 Size, materials and locations of railings, stairs, ladders and walkways.
 - .9 Finishes.
 - .10 Electronic accessories: provide details and manufacturers product data.
 - .11 Insulation types, locations and RSI values.
 - .12 Identification, name, address and phone numbers of corrosion expert where applicable.
Note: Grading drawings to be stamped by licenced corrosion expert.
 - .13 Piping, valves and fittings: type, materials, sizes, piping connection details, valve shut-off type and location, cathodic protection system complete with stamp of corrosion expert indicating that design complies with standards, Federal and Provincial regulations.
 - .14 Spill containment: provide description of methods and show sizes, materials and locations for collecting spills at connection point between storage tank system and delivery truck, rail car, or vessel.
 - .15 Thermometers: provide details and manufacturers product data.
 - .16 Anchors: description, material, size and locations.
 - .17 Concrete: type, composition and strength.
 - .18 Size and location of site pads.
 - .19 Level gauging: type and locations, include:
 - .1 Reporting systems, types of reports and report frequency.
 - .2 Maximum number of tanks to be monitored.
 - .3 Number of probes required and sizes.
 - .4 Provide details and manufacturer's product data.
 - .20 Ancillary devices: provide details and manufacturer's product data.
 - .21 Leak detection system, type and locations, and alarm system.

- .22 Grounding and bonding: provide details of design, type, materials and locations.
- .23 Corrosion protection: provide details of design, type, materials and locations.
- .24 Field-erected AST overfill-protection systems: provide details of design, type, materials and locations.
- .25 Containment system for spills, overfills and storm runoff water: provide details, materials used, and locations.
- 4 Provide maintenance data for tank appurtenances and leakage detection system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 Waste Management and Disposal

- .1 Separate waste materials for reuse, recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins in accordance with Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
- .5 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

2. PRODUCTS

2.1 Vertical double wall day tank (FOT-02)

- .1 Double wall fuel oil storage tank.
- .2 Capacity and dimensions as indicated.
- .3 Code and Regulations : Meet requirements of CAN/ULC-S602.
- .4 Finishes (see article 2.15 of this section):
 - .1 Exterior of tank: Painted.
 - .2 Interior of tank: Painted.
- .5 FOT-02
 - .1 Connections:
 - .1 Quantity: 5, on top of tank, 1 in the lower part.
 - .2 Sizes: 50mm diameter.
 - .3 Float connection to be coordinated with selected product.
 - .2 Accessories:
 - .1 Lifting hooks, multi-level switch.

2.2 Tank: Steel Dyked (FOT-01)

- .1 ULC approved.
 - .1 Horizontal tanks: to ULC-S601, factory primed and painted.
 - .2 Fittings: 8 100 mm diameter, plugged for service connections and venting.
 - .3 Capacity: As indicated
 - .4 Manway: 600 mm diameter x 150 mm high.
- .2 Tanks with integral formed dyke: to ULC-S653
 - .1 Welded steel construction, factory primed and painted (see article 2.15 of this section).
 - .1 Enclosed around tank with lockable access opening for viewing interior, with 100 mm sealed valved opening for draining purposes.
 - .2 Designed to contain 110% of capacity of storage tank.
 - .3 Tank saddles: integral with dyke and welded to base.
 - .4 Skids: 150 mm flanged steel, welded to dyke base.
- .3 Accessories:
 - .1 Ladder with cage in accordance with Canada Labor Code.
 - .2 Catwalk in accordance with Canada Labor Code.
 - .3 Lifting lugs.

2.3 Concrete

- .1 In accordance with Section 03 30 00 - Cast-in-Place Concrete.

2.4 Piping, Valves and Fittings

- .1 In accordance with Section 23 11 13 - Facility Fuel Oil Piping.
- .2 Piping located below product level equipped with either manual or automatic shut-off at storage tank.
- .3 Provide means for collecting spills at connection point between storage tank system and delivery truck in accordance with CCME Code of Practice.

2.5 Level Gauging

- .1 Tank gauging stick : to manufacturer's standard.
- .2 Tank level gauging and indicator.
 - .1 Mechanical direct reading device with 75 mm size dial.
 - .2 Gauge and gauge openings: protected against liquid overflow and possible liquid and vapour release.
- .3 Electronic solid state combination tank level sensor and leak detector: console containing visual LED display and printer algorithms to automatically compute required operations. System to be programmable for:
 - .1 Inventorying reporting with following features.
 - .1 Litres of fuel remaining.
 - .2 Temperature of fuel.

- .3 Millimeters of water in bottom of tank.
- .4 Millimeters of fuel in tank.
- .2 Fuel delivery report.
- .3 Single tank installation interstitial space leak detection.
- .4 Visual and audible alarm for:
 - .1 Overfill.
 - .2 Low product.
 - .3 High water.
 - .4 Theft.
 - .5 Leaks.
- .5 Probe diagnostics.
- .6 Leak tests.
- .7 Probes and sensors : factory calibrated and pre-set, to suit diameter of tank.
- .8 Ancillary devices:
 - .1 Provide Interface with Building Control System for monitoring and inventory reconciliation.
 - .2 Security key lock system to select normal operation, setup to enter or change system and tank parameters or operation, or diagnostics to check systems hardware and software.

2.6 Multi-point Level Switch

- .1 Brass mounting and stem.
- .2 Adjustable Buna N Floats.
- .3 Number of floats : as indicated.
- .4 NEMA 4 J-Box Electrical connection
- .5 Opening to be coordinated with tank.
- .6 CSA Approved

2.7 Leakage Detection System

- .1 To ANSI/NFPA-329.
- .2 Leak detector: cable system.
 - .1 Monitoring instrument.
 - .1 Temperature compensated solid state circuitry to continuously monitor leak detection circuits for open circuit or alarm condition. Alarm condition to be indicated by visual indicator light and audible alarm and operation of isolated relay to allow interface with other equipment.
 - .2 Supply voltage: 120 Vac.
 - .3 Module: complete with power-on lamp, alarm lamp, test switch and reset switch.
 - .2 Leak detection cable: twisted pair of 20 AWG woven conductors insulated with hydrocarbon degradable dielectric with loose interlocking aluminum alloy armour.
 - .3 Control cable: twisted pair of 20 AWG woven conductors with 300 V insulation and PVC jacket.

2.8 Grounding and Bonding

- .1 To Section 26 05 00 - Common Work Results - Electrical.

2.9 Corrosion Protection

- .1 Steel storage tank systems.
 - .1 Cathodic protection installed to API RP 651, designed by corrosion expert.

2.10 Overfill and Spill Containment

- .1 Shop-fabricated AST overfill protection.
 - .1 Automatic pump shut-off to terminate petroleum product flow upon detection of high levels in the storage tank.
 - .2 Overfill protection device compatible with intended method of filling designed, built and certified to ULC/ORD-C58.15 with positive shut-off action.
 - .3 Audible and visual alarm located where personnel are constantly on duty during transfer operation and can promptly stop or divert flow when detected levels are too high.
 - .4 Storage tanks with capacity of 50,000 L or less.
 - .1 Level gauge located on storage tank for frequent monitoring throughout transfer operation permitting personnel to promptly shut down flow, or communicate immediately with person controlling delivery for shut down.

2.11 Product Transfer

- .1 ASTs with normal vent and separate emergency vent.
 - .1 Liquid- and vapour-tight connection on fill pipes for flammable products.
- .2 Coupling at end of storage tank suction tube for connection to transfer used oil.

2.12 Liner Penetration

- .1 At high point or raised part of dyke floor.
- .2 Sealed.

2.13 Tank Bottom Water

- .1 Segregated from rainwater.
- .2 Disposed of in accordance with applicable provincial or territorial regulations, guidelines and policies.

2.14 Spills, Overfills and Storm Runoff Water

- .1 Contained, treated and disposed of in accordance with applicable provincial or territorial regulations, guidelines and policies.
- .2 Oil/water separator (for storm water runoff from product transfer area).
 - .1 Designed to produce discharge water with 15 mg/L, or less, of oil and grease.

- .2 Sized for hydraulic flow rate of 10 year return, 1hour storm event.
- .3 Designed for oil with specific gravity of 0.90.
Designed with hydraulic retention time required to separate oil with particle droplet size of 60 microns from storm water.

2.15 Paint

- .1 Interior – Mechanical room:
 - .1 Apply two (2) coats of paint, 75 to 125 microns per coat.
 - .2 Surface preparation: manual cleaning, SSPC-SP-2 method (see manufacturer's instructions).
 - .3 Colours: as chosen by Departmental Representative.
 - .4 Acceptable product: Carbogard 690 from Carboline.
- .2 Exterior:
 - .1 Apply two (2) coats of paint, 75 to 125 microns per coat (primer coat).
 - .2 Apply two (2) coats of finish paint, 50 to 100 microns.
 - .3 Surface preparation: manual cleaning, SSPC-SP2 method (see manufacturer's instructions).
 - .4 Colours: as chosen by Departmental Representative.
 - .5 Acceptable products:
 - .1 Primer: Carbogard 690 from Carboline.
 - .2 Finish paint: Carbothane 133HB, satin finish from Carboline.

3. EXECUTION

3.1 Installation

- .1 Install tanks in accordance with CAN/CSA-B139 and National Fire Code of Canada and manufacturer's recommendations and CCME PN 1326.
- .2 Position tanks using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.
- .3 Install tanks using licensed trained certified installers.
- .4 Provide certification of installation to Departmental Representative.

3.2 Field Quality Control

- .1 Test tanks for leaks to code requirements and in presence of authority having jurisdiction.

3.3 Touch-Up

- .1 Where coating is damaged, touch-up with original coating material.

3.4 Level Gauge System

- .1 Provide leak and vapour proof caulking at connections.

.2 Shield capillary and tubing connections in heavy duty 50 mm polyethylene pipe.

.3 Calibrate system.

3.5 Leak Detection System

.1 Install in accordance with manufacturer's recommendations.

3.6 Start-Up and Commissioning

.1 For general commissioning requirements refer to sections 01 91 13, 01 91 31, 01 91 33, 01 91 41 and 01 91 51.

.2 Have manufacturer certify installation.

.3 Have manufacturer present during start-up tests and start up units and certify performance.

.4 Submit written start-up and commissioning reports to Departmental Representative.

End of Section