

PART 1 - GENERAL

1.1 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/NFPA-329, Handling Underground Releases of Flammable and Combustible Liquids.
 - .2 ANSI/API 650, Welded Steel Tanks for Oil Storage.
- .2 American Petroleum Institute (API).
 - .1 API STD 653, Tank Inspection, Repair, Alteration, and Reconstruction.
- .3 Canadian Council of Ministers of the Environment (CCME).
 - .1 CCME-PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .4 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, (CEPA).
- .5 Canadian Standards Association (CSA)/CSA International.
 - .1 CAN/CSA-B139, Installation Code for Oil Burning Equipment.
- .6 The Master Painters Institute (MPI).
 - .1 Architectural Painting Specification Manual.
- .7 National Research Council/Institute for Research in Construction.
 - .1 NRCC 38727, National Fire Code of Canada (NFC).
- .8 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, (TDGA).
- .9 Underwriters Laboratories of Canada (ULC).
 - .1 ULC/ORD-C58.12, Leak Detection Devices (Volumetric Type) for Underground Storage Tanks.

- .2 ULC/ORD-C58.14, Leak Detection Devices (Non-volumetric Type) for Underground Storage Tanks.
- .3 ULC/ORD-C58.15, Overfill Protection Devices for Underground Tanks.
- .4 ULC/ORD-C107.7, Glass-Fibre Reinforced Plastic Pipe and Fittings.
- .5 ULC/ORD-C107.19, Secondary Containment of Underground Piping.
- .6 ULC/ORD-C142.23, Aboveground Waste Oil Tanks.
- .7 ULC-S601, Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids.
- .8 ULC-S602, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil.
- .9 ULC-S652, Tank Assemblies for Collection of Used Oil.

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, appurtenances, installation, and leakage detection system.
- .3 Shop drawings to detail and indicate following, as applicable to project requirements. Submit manufacturer's 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, locations of railings, stairs, ladders, and walkways.
 - .9 Finishes.
 - .10 Electronic accessories: Provide details and manufacturers product data.

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- .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.
 - .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, or vessel.
 - .15 Anchors: Description, material, size, and locations.
 - .16 Concrete: Type, composition, and strength.
 - .17 Size and location of site pads.
 - .18 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.
 - .19 Ancillary devices: Provide details and manufacturer's product data.
 - .20 Leak detection system, type, and locations, as well as alarm system.
 - .21 Grounding and bonding: Provide details of design, type, materials, and locations.
 - .22 Corrosion protection: Provide details of design, type, materials, and locations.
 - .23 Field-erected overfill-protection systems: Provide details of design, type, materials, and locations.
 - .24 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.
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1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of all packaging materials and appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .4 Separate for reuse and recycling and place in designated containers steel, metal, and plastic waste in accordance with Waste Management Plan.
 - .5 Place Materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, and Regional and Municipal regulations.
 - .7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .8 Ensure emptied containers are sealed and stored safely.
 - .9 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
 - .10 Divert unused concrete materials from landfill to local quarry facility as approved by Departmental Representative.
 - .11 Dispose of unused paint or coating materials at an official hazardous material collections site as approved by Departmental Representative.
 - .12 Do not dispose of unused paint, thinners, solvents, etc., into sewer system, into streams, lakes, onto ground, or in other location where it will pose health or environmental hazard.
 - .13 Fold up metal banding, flatten, and place in designated area for recycling.
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PART 2 - PRODUCTS

2.1 ABOVE GROUND FUEL OIL STORAGE TANK (DOUBLE WALL)

- .1 Provide packaged, factory fabricated, and tested fuel oil storage tank, as specified, including double walled steel tank welded to steel support legs.
- .2 Tank Construction:
 - .1 Horizontal cylindrical double walled (300°-360° secondary containment) fabricated and certified to ULC S 601 Standard.
 - .2 Material: Low carbon steel.
 - .3 Exterior coating: Factory-applied, primer coat to CAN/CGSB-1.181 Ready Mix Organic Zinc-Rich Coating, two (2) coats of suitable corrosion resistant epoxy paint, and one (1) top coat of suitable polyurethane paint.
 - .4 Fittings: Vent opening c/w vent pipe (size and length as required) with 180° close bend, fill opening c/w fill tube, locking cap, and spill containment device, 50 mm diameter tapping for each suction, 50 mm for return, one 100 mm tapping for level gauge, one 100 mm diameter spare tapping (threaded and plugged), and vacuum gauge tapping.
 - .5 Vacuum applied to interstitial space with vacuum gauge.
- .3 Tank Support:
 - .1 Two (2) steel support saddles welded to tank drilled for holddown anchor bolts.
- .4 Accessories:
 - .1 Spill containment device on fill pipe c/w locking 50 mm tight fill cap, collar, and drain valve.
 - .1 Level gauge, float type with site glass.
 - .2 Emergency vent device.
 - .3 Vacuum gauge (tank mounted).
 - .4 Lifting lugs.
 - .5 Grounding lug.
 - .6 Pipe support bracket on end of tank.

- .7 Overfill protection to CCME.
- .5 Size: 2,200 L, 1,828 mm long x 1,276 mm diameter.
- .6 Anchored to concrete base with four (4) anchor bolts.

2.2 DIESEL DAY TANK

- .1 Provide packaged, factory fabricated, and tested fuel-oil storage day tank consisting of one fuel tank, an Electronic Control Module (ECM), and fuel supply pumps. The fuel day tank system shall automatically maintain fuel levels specified within.
- .2 Fuel Day Tank capacity shall be based on NEC 2011, NFPA 70, Article 701.12 (B) (2) where internal combustion engines are used as the prime mover, an on-site fuel supply shall be provided with an on-premise fuel supply sufficient for not less than two (2) hours of full-demand operation of the system. The day tank shall be sized in accordance with these standards and the capacity shall not be less than 227 liter.
- .3 Fuel Day Tank shall be made of heavy gauge steel construction. Tank shall include removable, welded steel top cover for indoor applications. Tank shall be coated with rust inhibitor within inner tank, primed and finish painted on external tank. The installing contractor shall provide Schedule 40, ASTM A 53, black iron pipe connections to the day tank fittings. All connections to be made with pipe unions to facilitate tank service/removal. The tank shall include at a minimum the following fittings:
 - .1 NPT 1 engine supply.
 - .2 NPT 1 engine return.
 - .3 NPT 2 fitting for emergency vent, sized per the requirements of NFPA 30 and UL-142/ULC-S601 Requirements.
 - .4 NPT 1 overflow.
 - .5 NPT 2 normal vent.
 - .6 4 ½ in. sq. inspection port below electrical controls.
- .4 Emergency vent cap shall be spring-pressure operated. Opening Pressure shall be 0.5 psig; full opening pressure 2.5 psig. Flow rate shall be marked on top of each vent.
- .5 Fuel Day Tank Control, Alarm and Status Display.
 - .1 The microprocessor-based electronic control module (ECM) shall be specified for control of redundant pump operation. The ECM shall receive a signal from a single electrical analog float sensor. The ECM shall be provided with the

following indications: fuel level, alarm, function, and existing warning and shutdown conditions, and be located within a Type 1 zinc-plated enclosure for indoor use. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. All warnings shall be provided with normally open and normally closed, dry contacts for remote annunciation (3 amps at 120 VAC).

- .6 Fuel Level Display.
 - .1 Full - 100% Green LED indicator.
 - .2 95% - Green LED indicator.
 - .3 85% - Green LED indicator.
 - .4 75% - Yellow LED indicator.
 - .5 50% - Yellow LED indicator.
 - .6 25% - Yellow LED indicator.
 - .7 10% - Yellow LED indicator.
 - .8 Empty - 6% - Red LED indicator.
- .7 Alarm Display.
 - .1 High Fuel - 106% or greater of capacity.
 - .2 Low Fuel - 62% of capacity.
 - .3 Critical Low Fuel - 6% of capacity.
 - .4 Fuel within containment.
 - .5 ECM functional - Tank fault.
- .8 Function Display.
 - .1 Power on: This button activates the ECM after the "Off" button has been depressed. On any initial power up condition, after a power outage, the ECM shall be in an on condition.
 - .2 Pump running: For redundant pump operation fuel pump control panel shall indicate Pump A or Pump B running.

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- .9 Mode.
 - .1 On - Power available to ECM.
 - .2 Off - Turns off power within ECM.
 - .3 Test - Shall force supply pump(s) to operate at time of start-up to verify that overflow return line has been piped correctly and that there are no leaks within the system.
 - .10 Start-up test switch shall test contacts for high, low, critical low, ECM functional, and containment switch to assure wiring of remote contacts is correct.
 - .11 Critical high-level automatic discrete shut-off switch shall supply pump delivery to the fuel day tank at the tank critical high liquid level. The critical high-level fuel switch shall be hard-wired to override any other alarms or signals received by the ECM.
 - .12 Pump Operation.
 - .1 Two supply pumps and motors are supplied and the pumps shall alternate as the lead when refueling day tank. The lead pump shall activate when fuel level decreases to 87% of capacity; the lag pump shall activate in tandem with the lead pump if the fuel level decreases to 75% of capacity. The supply pump operation shall stop at 100% of tank capacity. The pumps shall provide a minimum of 17 feet of vertical lift at sea level. Appropriately sized check valves with fuel strainers shall be provided on the pump fuel inlets. The lead pump shall be sized to accommodate the motor and be supplied as:
 - .1 Two (2) - 7.6 LPM (2 USGPM) pumps with 1/3 HP, 115 VAC, 1 phase, 60 Hz, thermally protected motors.
 - .2 One (1) return pump system shall be supplied. The return pump operation shall be designed for automatic unattended operation when the day tank level exceeds 110% of its normal capacity. The return pump shall be activated by a separate, critical high level switch. The return pump shall exceed the delivery capacity of the fuel supply to the fuel day tank. The ECM is hard-wired to override any other indications given by the controller.
 - .13 Fuel Containment.
 - .1 The fuel day tank shall include a welded steel containment basin to prevent escape of fuel in the event of a tank rupture, sized at a minimum of 150% of the tank capacity. The basin shall be primed and finish painted.
 - .2 Indoor containment basin: The basin shall consist of an open-top, welded heavy gauge steel structure. Leak detection switch shall be wired into the electronic
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control module (ECM). This will shut down the supply pump and motor in case of a fuel leak into the containment basin.

- .14 Acceptable Products: Tramont TRS; Klein Corp.

2.3 ANTI-SIPHON VALVE

- .1 Automatic shut-off to prevent spillage in the event of line rupture, cast or ductile iron body, adjustable hydrostatic pressure, brass trim, corrosion-resistant steel spring, fluorocarbon seal, sized for application, and built-in thermal expansion pressure relief valve.
- .2 Installed at fuel supply from day tank to motor.

2.4 FILL SIGNAL DEVICE

- .1 Vent whistle and whistles when tank is being filled and stops whistling when tank is full, install on vent pipe at tank.

2.5 METALLIC PIPING, VALVES, AND FITTINGS

- .1 In accordance with Section 23 11 13 - Facility Fuel-Oil Piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install tank(s) and all piping, fittings, accessories, and associated systems in accordance with National Fire Code of Canada, CCME – “Code of Practice”, CSA B139 Standard (as applicable), provincial regulations, and manufacturer’s recommendations.
- .2 Position tank(s) using lifting lugs and hooks, and, where necessary, use spreader bars. Do not use chain in contact with tank walls.
- .3 Provide all registrations and permits as required by Provincial regulations.

3.2 FIELD QUALITY CONTROL

- .1 Test tank(s) for leaks to requirements of authority having jurisdiction and in presence of authority having jurisdiction.
- .2 Commission in accordance with Section 01 91 00 - Commissioning - Mechanical and Electrical Installation.

3.3 TOUCH-UP

- .1 Where coating is damaged, touch-up original coating material.
- .2 Shield capillary and tubing connections in heavy-duty 50 mm polyethylene pipe.

END OF SECTION