

PART 1 - GENERAL

- 1.1 REFERENCE STANDARDS
- .1 Department of Justice Canada (Jus.):
    - .1 Canadian Environmental Protection Act (CEPA).
    - .2 SOR/2008-197 - Storage Tanks Systems for Petroleum Products and Allied Petroleum Products Regulations.
  - .2 Canadian Standards Association (CSA)/CSA International.
    - .1 CSA B139- Latest Edition, CSA B139S1- Latest Edition and CSA C282-15.
    - .2 CAN4-S601- M- Latest Edition, CAN4-S602-M-Latest Edition, CAN4-S630-M-Latest Edition.
  - .3 National Fire Protection Association.
    - .1 NFPA-329- Latest Edition.
  - .4 American Petroleum Institute.
    - .1 API-650-80.
  - .5 Underwriters' Laboratories of Canada (ULC).
    - .1 ULC-S601 above ground horizontal shop fabricated steel tanks.
- 1.2 SHOP DRAWING AND PRODUCT DATA
- .1 Submit shop drawings in accordance with Section 01 33 00- Shop Drawings and Product Data.
- 1.3 CLOSEOUT SUBMITTALS
- .1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual specified in Section 01 78 00- Closeout Submittals.
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PART 2 - PRODUCTS

2.1 FUEL TANK AND  
SUPPLY PUMPS

- .1 The day tank shall be constructed in accordance with Underwriters Laboratories Standard ULC-142 and S601. The day tank shall also be constructed in accordance with Flammable and Combustible Liquids Code, NFPA 30; and The Standard for Installation and use of Stationary Combustible Engine and Gas Turbines, NFPA 30. The day tank shall be made of heavy gauge steel construction. Tank shall include removable, nonconductive top cover for indoor applications. Tank shall be coated with rust inhibitor. The tank shall include the following fittings:

DN25 NPS engine supply.  
DN25 NPS engine return.  
NPS fitting for emergency vent, sized as appropriate.  
DN25 NPS overflow.  
DN50 NPS normal vent.  
115 mm square inspection port below electrical controls.

- .2 The tank shall be provided with atmospheric (normal) vent connection and piped to atmosphere. Provide emergency vent cap which shall be spring-pressure operated. Opening pressure shall be 3.5 kPa full opening pressure 17.2 kPa. Limits shall be marked on top of each vent.

2.2 FUEL  
CONTAINMENT

- .1 The fuel day tank shall be double walled construction featuring a welded steel inner tank and welded steel outer tank to prevent escape of fuel in the event of a tank rupture. Containment shall be sized at a minimum of 150% of the tank capacity. The tank shall be primed and finish painted.
- .2 Outer Tank: The outer tank shall consist of a welded heavy gauge steel structure. The outer tank shall feature a welded steel top with an emergency pressure relief vent sized per the requirements of NFPA 30, ULC 142 and ULC S601.
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2.2 FUEL  
CONTAINMENT  
(Cont'd)

- .2 Outer Tank: (Cont'd)  
Emergency vent cap shall be spring-pressure operated. Opening pressure shall be 0.5 psig; full opening pressure shall be 2.5 psig. Limits shall be marked on top of each vent. Leak detection switch shall be wired into the electronic control module (ECM). This will shut down the supply pump and motor in case of a fuel leak into the outer tank.
- .3 Tank capacity: as indicated on drawings.

2.3 ELECTRONIC  
CONTROL MODULE (ECM)

- .1 The tank shall be provided with an electronic module (ECM). The system shall have a single electrical analog float sensor to provide level signal to the ECM. The following shall be provided as part of the system:
  - LED fuel indicator.
  - High fuel level warning (activates at 95% of tank capacity).
  - Low fuel level warning (activates at 62% of tank capacity).
  - Critical low level shut off (activates at 6% of tank capacity).
  - Pump control (Pump on at 87% of capacity, off at 90% of capacity). ECM functional signal.
- .2 All warnings shall provide contacts for remote annunciation (3 amps @ 120 VAC). All signals and warnings shall be indicated by LED lights. All warnings shall be provided with normally open and normally closed contacts for remote annunciation. The ECM shall be capable of being manually controlled with "On", "Off", and "Test" buttons. A secure internal test button shall be provided to verify relays' functionality. The system shall be UL-508 listed. Electrical characteristics shall be 120 VAC, 1 phase, 60 Hz.
- .3 At 90% capacity the ECM shall close solenoid valve on fuel oil supply pipe.

- 2.4 DUPLEX PUMPING SYSTEM PUMPS (2) .1 The tank shall include a duplex pumping system with two pumps and motor combinations. The pump/motors shall alternate as the lead when the tank is pumping fuel. The lead pump shall activate when the fuel level declines to 87% of tank capacity; the second pump shall activate and operate in tandem with the lead pump if the fuel level declines to 75% of capacity. Appropriately sized solenoid valves with strainers shall be provided on the pump fuel inlets.
- .2 For pump performance; Refer to schedule on the drawings.
- 2.5 REVERSE PUMPING SYSTEM PUMP .1 The tank shall include a reverse pumping system which will return fuel to the main tank in the event of an overfull situation (i.e. failure of the safety features). For pump performance refer to schedule on drawings.
- 2.6 DAY TANK CONTROLS .1 General:  
.1 The ECM shall have an electrical analog float gauge which sends a signal to the ECM for: fuel level indication, pump control, high fuel level warning, low fuel level warning, low fuel level shut off, fuel in rupture basin warning, low fuel in remote tank warning and an ECM function signal. All signals and warnings to be provided with N.O. and N.C. contacts for remote annunciation. The ECM shall be manually controlled by ON, OFF and TEST buttons. In addition, internal test button shall allow for periodic test of call warning LEDs and remote annunciation relays.
- .2 Functions:  
.1 The purpose of the ECM is to maintain the fuel level of the day tank by controlling the pump/motor. The pump is off at the normal fuel level and is activated at 87% full. A "pump running" indicator LED is on when the pump is activated. A motor control relay is prewired to pump motor.
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2.6 DAY TANK  
CONTROLS  
(Cont'd)

- .3 Options to be supplied:
  - .1 Duplex pumping system. Adds 2nd pump and motor for safety redundancy. Control alternates lead pump.
  - .2 Reverse pumping system: adds pump which provides return of fuel to the main storage tank if the day tank overfills.
  - .3 Pump running contacts for remote annunciation.
  - .4 Critical high shutdown. Separate float switch senses high fuel level, disengaging motor and closing N.C. solenoid valve. Warning relay supplied for remote annunciation.
  
- .4 Incoming Power:
  - .1 The ECM shall be powered by customer-supplied 120 VAC line. Power terminals to be accessible by removing four cover screws on the ECM and removing the ECM cover exposing the terminal strip.
  
- .5 Level Sensor:
  - .1 The day tank's level is determined by an electrical analog float gauge located beneath the ECM. The sensor sends a 0-90ohm signal to the ECM, which converts this signal into a precise fuel level. Fuel level is indicated by nine incremental LEDs on the ECM from EMPTY to FULL.
  
- .6 Alarms:
  - .1 The ECM shall have five standard alarm conditions. Each alarm shall be indicated locally by an LED and remotely by wiring to supplied relays. A normally open and normally closed contact to be provided for customer connections. Contacts to be rated at 1 amp tungsten, 120 VAC or 24 VDC.
    - .1 High fuel- activates at 106% of normal fuel level with two second change of state time delay.
    - .2 Low fuel- activates at 62% of normal fuel level. This enables the customer time to react to a potential problem before low fuel shutdown occurs.
    - .3 Low fuel shutdown- activates at 6% of normal fuel level. This enables customer to shut down engine generator before fuel runs out, preventing loss of prime or engine damage.

2.6 DAY TANK  
CONTROLS  
(Cont'd)

- .6 Alarms: (Cont'd)
  - .1 (Cont'd)
    - .4 Fuel in rupture basin- with a rupture basin float switch, the ECM will signal if fuel is in the rupture (containment) basin.
    - .5 ECM functional- the ECM shall performs many internal checks (including float sensor signal verification) to ensure proper operation.
  - .7 Mode:
    - .1 There shall be four modes of operation on the ECM:
      - .1 Off- This pushbutton disables the ECM for routine maintenance to the tank system without disrupting the ECM.
      - .2 On- This pushbutton activates the ECM after the Off pushbutton has been depressed. On any initial power up condition, after a power outage, the ECM will automatically turn on.
      - .3 Test- This pushbutton shall text all front panel LEDs for three seconds and activate pump/motor for as long as the button is depressed. All alarm relays shall not activate but will maintain their original state.
      - .4 Internal tests- this pushbutton located inside the ECM, shall test each LED and remote annunciation relay in sequential order- High fuel to ECM functional.

2.7 STANDARD OF  
ACCEPTANCE

- .1 Standard of Acceptance: `Tramont' TRS Series or approved equal.
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PART 3 - EXECUTION

3.1 INSTALLATION .1 Install as per the manufacturers instructions.