

SECTION 23 13 23
CONCRETE ABOVE GROUND FUEL STORAGE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide all labor, materials and equipment necessary to complete the work of this section.
 - 1. Furnish and install a 500 gallon Aboveground Storage Tank (AST) with two separate tanks, one for diesel and one gasoline storage 250 gallons diesel and 250 gallons gasoline maximum), each with integral weatherproof secondary containment, vehicle impact and projectile resistance, and complete operational and safety systems, pad mounted with integral fuel dispensing system.

1.2 RELATED WORK

- A. Section 03 30 53, SHORT FORM CAST-IN-PLACE CONCRETE
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS
- C. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
- D. Section 32 30 00, SITE FURNISHINGS, Pipe Bollards.
- E. Section 32 12 16, ASPHALT PAVING

1.3 SUBMITTALS

- A. Refer to Section 01 33 23 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
- B. Manufacturers' Literature and Data:
 - 1. Full details of all components of the systems from the manufacturer, with installation recommendations.
- C. Shop Drawing:
 - 1. Complete detailed shop drawings covering design of system showing layout, installation and all connection details. Do not start work before final shop drawing approval.

1.4 QUALITY ASSURANCE

- A. Manufacturer will have a minimum of 5 years experience in producing specified tank for commercial use and document at least 10 installations in satisfactory operation.
- B. The protected and insulated AST system shall be warranted against leakage for a period of 30 years from the date of installation.

1.5 REFERENCE STANDARDS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- B. Underwriters Laboratories, Inc. (UL):
 - 142 Steel Aboveground Tanks for Flammable and Combustible Liquids
 - 2085 Protected Insulated Aboveground Tanks for Flammable and Combustible Liquids
- C. National Fire Protection Association (NFPA):
 - 30-08 Flammable and Combustible Liquids Code
 - 70-08 National Electrical Code
 - 780-08 Standard for the Installation of Lightning Protection Systems
- D. The California Air Resource Board
Aboveground Filling/Dispensing Vapor Recovery
- E. American Welding Society (AWS):
 - D1.1/D1.1M-2008.....Structural Welding Code – Steel
- F. American Society for Testing and Materials (ASTM):
 - B117-07a..... Standard Practice for Operating Salt Spray (Fog) Apparatus

PART 2 - PRODUCTS

2.1 MATERIALS

- A. GENERAL
 - 1. Provide an Aboveground Tank System approved for listing under UL Standard 2085. The tank and its enclosure shall be a completed unit at the factory (shop fabricated). The tank system shall be approved for Phase I and Phase II Vapor Recovery by the California Air Resource Board for gasoline and methanol. The specifications for the tank system shall include separate components for each of the individual fueling tanks (diesel and gasoline).
- B. PRODUCTS
 - 1. Primary Tank: The primary tank(s) shall be rectangular in shape, constructed with a minimum of 10 gauge thick carbon steel, listed per UL Standard 142, and meet the requirements of NFPA 30. Welds shall be continuous on all sides, conforming to the American Welding Society Standard for continuous weld.
 - a. Concrete Encasement: The concrete encasement shall be 150mm (6 inch) thick with minimum design strength of 4000 psi. Concrete enclosure shall encase and

protect both the primary steel tank and the secondary containment. The concrete design shall include the following for long term durability: less than 3% air entrainment, water-reducing admixture, and steel reinforcing bars. Concrete placement shall be monolithic (without seams) and placement methods shall ensure the absence of voids on all sides and beneath the steel tank. An exterior steel jacket covering the concrete vault will NOT be permitted. The steel tank shall be pre-stressed at factory by pressurizing the primary steel tank to 34.4 kPa (5 psi) during concrete encasement to allow for expansion and contraction of the primary steel tank. Vault enclosure shall have concrete support legs of unitized monolithic construction raising the concrete enclosure minimum of 75mm (3 inch) above the ground to meet visual inspection requirements. A mid-level seam or other joint construction which could compromise the liquid tightness (secondary containment) and fire protection capability of the vault is not permitted.

- b. Fire Resistance: The tank system shall be designed and tested to provide 2 hour fire protection for the primary tank per UL 2085, 2 hour furnace fire test, and 2 hour simulated pool fire test. No steel members shall penetrate the walls or floor of the concrete encasement to assure isolation from pool fire heat.
- c. Thermal and Corrosion Protection: The tank construction shall include thermal insulation equivalent to 6mm (0.25 inches) of polystyrene to protect against temperature extremes, and to protect against corrosion by isolating the steel tank from the concrete or other corrosive material. All steel exterior to the concrete encasement shall be anti-oxidant powder coated to inhibit corrosion and meet ASTM B117.
- d. Spill/Overfill Containment: The tank system shall include a UL listed 26 liter (7 gallon) spill/overfill container manufactured as an integral part of the primary tank, surrounding the fill pipe, and protected by 2 hour fire rating of the enclosure. The spill/overfill container shall include a stick port and normally closed valve to release spilled product into the main tank. Exterior steel shall be antioxidant powder coated to inhibit rust.
- e. Overfill Protection: Overfill protection shall be provided by the following methods:
 - 1) Direct reading liquid level gauge with alarm, visible from fill pipe access.

- 2) Valve rated for pressurized delivery located within fill pipe to close automatically at 95% full level.
- f. Exterior Finish: The tank system shall be a low maintenance two coat fuel resistant manufacturer's standard paint coating system.
- g. Signage: Tanks shall be marked on all sides as per state and local codes. Signs will be attached after delivery as part of the setup operations and shall conform to placement requirements of local fire code officials.
- h. Venting: Tank system shall include a 50mm (2 inch) atmospheric vent and emergency venting in accordance with NFPA 30.

2.2 ACCESSORIES

- A. The tank shall be equipped with a Tank Mounted Pump Package in addition to the Basic Vent Package.
- B. The tank system shall contain the following minimum features and equipment: Level gauge, spare capped penetration 100mm (4 inch), fill cap adaptor 100mm (4 inch), spare capped penetration 100mm (4 inch), interstitial monitoring tube, atmospheric vent and standard vent cap, emergency vent (with vent package), spare capped penetration 100mm (4 inch), suction pipe for fuel supply to pump, fuel supply piping to pump, and remote register assembly (on/off switch/nozzle/meter).
- C. Provide and install a fully functional fill system with fill limiter.
- D. Provide and install a fully functional liquid level indicator, 50mm (2 inch) size.
- E. Provide and install a fully functional commercial fuel pump system designed for use with aboveground fuel tanks.
- F. Provide a high-hang hose retractor system.
- G. Provide 3.5m (12 feet) of hose for each pump.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. The tank system including accessories shall be installed in strict accordance with the manufacturer's recommendations and applicable fire and environmental codes. All state and local permits shall be obtained by contractor prior to installation.
- B. Tanks shall be installed on a reinforced concrete base slab designed to support the fully loaded tank. Protective bollards shall be installed as indicated on the drawings or where required by state and local codes.

- C. Tanks shall be marked on all sides with warning signs: “FLAMMABLE” or “COMBUSTIBLE”, “NO SMOKING”, product identification and other signs as required by applicable codes.
- D. Coordinate connection of the electrical conduit from the emergency disconnect switch located between 50-75 feet from tank AST. The emergency disconnect shall cut all power to the AST facility.
- E. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Electric feed for dispensing pumps, and any electrical devices at or serving the AST equipment location shall be connected to an emergency shutoff switch located per code requirements. Tanks shall be electrically grounded in accordance with NFPA 780. Once power is connected to the equipment, testing and start up of the equipment shall be performed by the manufacturer’s representative.
- F. The system installation shall be inspected and approved by the system supplier or its certified contractor. The system supplier shall submit a comprehensive checklist of quality and safety items critical to the system and verify that the installation has been in accordance with these standards and applicable fire and environmental codes.

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