

MASTER AST SPECIFICATION

Revised 12/12/99

(Important Notes: Italicized entries should be reviewed for applicability, some italicized instructions for the specifying engineer are included which should be omitted from the final specification)

SECTION 15600

Concrete Encased Rectangular Fuel Storage Tank with Dispensing System

1. PART 1 GENERAL

1.1 WORK INCLUDED

1. Provide complete, in place fuel storage and dispensing system as indicated on the drawings and specified herein, including but not necessarily limited to:
2. Leak Detection System
3. Automatic Tank Gauge
4. Product Dispenser
5. Accessory Fittings
6. Installation of Tanks and Piping System
7. All required Permits, Certifications, and Inspection

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Electrical: Section 16010
- B. Cast-in-Place Concrete: Section 03300
- C. Anchor Bolts: Section 05501
- D. Site Preparation:-Section-02100
- E. Earthwork:-Section-02200
- F. Trenching:-Section 02221

1.3 QUALITY ASSURANCE

A. Acceptable Manufacturers

Convault 201-462-0404 or Core Engineering 703-883-8176

1. Installation shall be in compliance with Petroleum Equipment Institute Publications RP100, and RP300, NFPA-30, 30A, and 31 and all manufacturer's current installation instructions.
2. A double wall 8000 diesel tank with two (2) compartments and all necessary accessories will be provided.
3. Design criteria limit the physical size of the unit to not greater than 23' 2" in length and 8' 1" in width.

B. Qualification of Contractor, Personnel and System Vendor:

1. The contractor shall have not less than five years continuous experience in the installation for fuel storage and dispensing systems.
2. Installation of equipment shall be performed only by workman who have a minimum of two years continuous

experience installing this type equipment and who have attended a training seminar put on by the tank manufacturer in the past two years.

3. Major elements of the packaged tank system shall be furnished by a single source vendor to assure design installation and service interface and to provide in-warranty and post warranty unified responsibility for owner and consulting engineers and architects. The system vendor shall coordinate product data presented by equipment manufacturers to provide a comprehensive set of sealed (NJ PE) interface electrical a civil (site specific tank pad) drawing and a SPCC plan as required by United States EPA.

C. Governing Standards:

1. Equipment and installation necessary to accomplish the work specified herein shall comply with the latest revisions of the applicable Federal, State, and Local codes and regulations concerning underground fuel storage and dispensing systems including but not limited to the following:
 - a. N.Y.S.D.E.C. Parts 613 & 614. Petroleum Bulk Storage Code.
 - b. The Commonwealth of Massachusetts 527 CMR 9, CMR 9.04 & 520 CMR 12.
 - c. State of Vermont Agency of Natural Resources, Department of Environmental Conservation, Underground Storage Tank Regulations
 - d. New Hampshire Code of Administrative Rules Part Env-Ws 411
 - e. State of Maine - CMR Chapter 691
 - f. The State of Delaware's Underground Storage Tank Act Chapter 74 of Title 7
 - g. The Annotated Code of Maryland Title 26, Subtitle 10
 - h. New Jersey Administrative Code 7:14B - 1,2,3,4
 - i. Suffolk County Department of Health Services Article 12
 - j. National Fire Protection Association: Flammable and Combustible Liquids Code. (NFPA 30) & Automotive and Marine Service Station Code (NFPA 30A)

- k. ASTM Specification D4021-86. Glass Fiber Reinforced Polyester Underground Petroleum Storage Tanks.
 - l. Uniform Fire Code -Standard 79-7 Testing requirements for Protected Motor Vehicle Fuel Storage Tanks.
 - m. UL# 2085 - Underwriters Laboratories, Inc., Outline of Investigation for Protected Insulated Aboveground Tanks for Flammable and Combustible Liquids.
 - n. California Air Resource Board (C.A.R.B.) Standards for insulated tanks used in Stage II Vapor recovery systems.
 - o. Underwriters Laboratories, Canada Inc., Glass-Fiber Reinforced Plastic Tanks for the Underground Storage of Petroleum Products, Alcohol and Alcohol-Gasoline Mixtures.
 - p. Underwriters Laboratories, Canada Inc., Nonmetallic underground piping for petroleum products, gasoline-alcohol blends, Alcohol's such as methanol and ethanol, and reformulated fuels (File MH9162).
 - q. National Electric Code (NEC), Article 513.
 - r. Meeting all standards recommended in the International Fire Code 2000.
2. All work specified herein shall conform to or exceed the requirements of the above referenced codes, regulations and Standards; provided, that whenever the provisions of said publications are in conflict with the requirements specified herein, the stringent requirement shall apply.

D. SUBMITTALS

- 1. Make submittals in accordance with Section 01300.
 - a. Include manufacturer's current catalog, installation manual and warranty for each supplied item.
 - b. Shop drawings: Submit complete shop fabrication and field installation shop drawings and date. Drawings shall include all critical dimensions and show locations of all fittings and accessories including stairs.
 - c. Calibration Charts: Contractors shall submit 6 copies of manufacturer's latest calibration charts for each tank capacity and diameter specified.

- d. If other than specified equipment is to be used submittals must be supplied at the time of bid and the contractor will bear the cost of engineers review.

2. PART 2 PRODUCTS

2.1 ABOVEGROUND CONCRETE VAULTED FIRE RESISTANT FUEL STORAGE TANK(S)

A. Tank Construction:- Internal Steel Tank

1. Steel Tank shall be doublewall and meet UL 142 standard for tanks
2. Tank shall comply with the normal and emergency venting requirements of NFPA 30.
3. Tank shall be rectangular in shape and have a wall thickness of 7 gauge minimum.
4. Tank shall carry a thirty year written warranty including materials and workmanship, internal corrosion, and external corrosion. **Should any fault occur a complete new tank will be furnished at no cost to the owner.** A copy of the warranty will be furnished as part of the O & M manuals.

B. Concrete Vault Assembly

1. Vault shall be 6" factory poured reinforced pre-cast concrete.
2. Concrete shall have a minimum compressive strength of 6000 psi at 28 days.
3. Reinforcement bars shall conform to ASTM designation A615, Grade 40 minimum. Weld wire fabric must conform to ASTM designation A185.
4. Vault shall be monolithic and placement methods shall ensure the absence of voids on all sides and beneath the steel tank. An exterior steel jacket will not be permitted. Seams, cold joint or other joint construction, which could compromise the liquid tightness and fire protection of the vault is not permitted. Vault enclosure shall have concrete support legs of unitized monolithic construction raising the concrete enclosure a minimum of 3" above the ground to meet visual inspection requirements.
5. Tank connections shall be so piped or closed such that neither vapors nor liquid can escape nor weather elements can enter into the interstitial air space. Pipe riser / Vault interface shall be sealed liquid tight with no concrete and steel contact permitted.
6. Vaulted Tank shall be painted or aggregate finish as determined by the owner or their representative.

7. Tanks shall be furnished with API color coded 7 gallon spill containers, overfill prevention drop tubes, neoprene bearing pads, vent packages as required by all National codes, seismic restraints, flood plain hold down system, galvanized stairs, platforms and dispenser mounting brackets, per manufacture's recommendations.
8. Signage: Tanks and alarm systems shall be marked on all sides as per state and local codes. Signs for the tank system will be recessed in concrete exterior to insure against damage during off-loading, refilling or general functions. Overfill Alarms to be clearly marked with Convault Model 513 Warning sign.
9. Anti-Spill and Safety Valves: Where product piping extends below the top of the tank, the piping shall include a shutoff valve and normally a closed safety valve. The safety valve shall be an approved anti-siphon valve or electric solenoid valve. ¼ turn valves and unions will be located at all pipe connections between fuel tank and day tanks.

LEAK DETECTION AND TANK GUAGEING SYSTEM FOR TANK

See Section

2.2 Vent / Vapor Systems

A. Atmospheric Vent:

1. Provide a Universal # 45 upward flow vent cap with a flame retardant 40mesh screen. Vent should be installed a minimum 12' above grade.
2. Provide a Universal # 40 upward flow 8 oz. emergency vents for both primary and secondary tanks.

B. Vapor Recovery

1. Stage I will be Universal # adapter with Universal #061C cap.
2. Stage II will be VST Membrane system with vapor vacumm

2.3 Fuel PUMP - ABOVEGROUND

A. Submersible Turbine Pump

1. Provide 4 U.L. Listed Submersible Turbine Pumps with the following capabilities:
 - a. Turbine shall include an integral check valve to hold operating pressure at 30 psi to minimize loss of pressure due to thermal contraction. Leak detector shall be designed to trip with loss of piping pressure.

- b. The entire pumping assembly shall have UL listing and shall meet all requirements of UL Standard UL 79.
- c. The pump discharge head and manifold assembly shall be manufactured from ASTM A48 Class 30 gray iron.
- d. The pump motor shall have a thermal over-current overload protector with automatic reset.
- e. The pump motor assembly shall be clearly marked with pertinent information including horsepower, voltage , phase, and manufacturer.
- f. The pumping unit shall not incorporate any flexible diaphragms and all sealing shall be accomplished with "O" rings or UL recognized fiber gaskets.
- g. The motor assembly height shall be field adjustable utilizing a UL listed telescoping shaft and set to a minimum of 6” from the bottom of the tank.
- h. Provide a piston style mechanical leak detector capable of slowing flow while detecting a 3 gph leak rate. Leak detector shall be all fuels compatible utilizing Teflon for all dynamic sealing surfaces. Leak detector shall be manufactured specifically for use with intended product and piping system.
- i. Provide a control box relay with as supplied by pump manufacturer.
- j. An NEMA 4 momentary emergency stop switch Sydney Model 1008 will be supplied for each dispenser.
- k. Two units will be provided for each product to allow continuous fueling during maintenance or repair.

2. Design Basis:

- a. Red Jacket model 75p

3. Operating Valve

- a. Provide a full ported ball valve with Teflon seats for emergency shut down of fuel supply piping, Universal Model # 213FP.
- b. Valves to be located at all piping change of directions or elevations.

2.4 Product Dispensers - Pressurized Supply

- 1. Provide two dual product dual hose UL listed full cabinet remote dispenser with the following;
 - a. Meter - Three piston positive displacement meter.
 - b. Register - Non-computer Electronic style.
 - c. Lights - Provide lighted dial.

- d. Filter - Factory installed external Centurion II filter with cartridge.
- e. Cabinet - Standard Heavy Duty stainless steel panels with Stainless Steel Top and Sides. Panels will have FRP API color coded decals. Cabinet shall have 2 inch high lettering for product being dispensed and Panel shall have 6" square FRP ID tag with API coded text and symbol. ex. -“ Diesel ”
- f. Electronic computer.
 - 1.one electronic computer module designed to be intrinsically safe for UL Class 1, Division 1 hazardous locations. The electronic computer module shall have:
 - a. one Central Processing Unit (CPU) / Master Transaction
 - b. one Display for side 1 of the dispenser.
 - c. one Auxiliary Transaction Display for side 2 of the dispenser.
 - d. one Input-Output (I-O) module combined with power supply specified at either 115 or 230 VAC. The I-O/Power Supply module shall have a rechargeable ni-cad battery system to hold the sales display for thirty seconds during short power outages with provision to recall the display of the last sale for repeated thirty second intervals.
 - e. one Memory Module that stores program parameters in non-volatile EEPROM memory. The Memory Module shall have a physical switch to access electronic calibration mode when the optional electronic meter calibration feature is present and the switch shall have a security provision to attach a wire seal.
- g. programable pulser will be provided to communicate with the fuel management system The pulser will be capable of 1000:1 ratio. The Pump reset switch will never requires any adjustment and not requires periodic care to ensure service
- h. The unit will be provided with Universal 870 high hose retrievers and hose bunts.
- i. Bennet Dispenser will be furnished with a factory provided 3 year warranty. A notarized copy of the warranty will be provided in the O & M manuals.

- j. A factory furnished spare parts kit will be supplied by the manufacture. It will contain 6 filters in additions to the recommended parts.
- k. Design Basis: Bennett Model # C 22WY-2

2.5 **PRODUCT NOZZLES, HOSES, AND HOSE RETRIEVERS**

- 1. Nozzles, hoses, brake-a-ways and retrievers shall be designed to operate for a heavy service application. All items will be compatible with VST stage II vapor vac system.
 - 1. Nozzles to be VST-CC7 7HB with API yellow scuff guard for Diesel and VST-EC7 with black scuff guard for gasoline.
 - 2. Dispensing hose to be 25 foot long for diesel and gasoline as manufactured by VST or Dayco. Provide 1" for diesel and 3/4" for gasoline.
 - 3. Hose retrievers to be Universal Model #870 with 16' schedule 80 2" pipe for diesel, retractor ropes with Universal Model # 100HB Hose Bun.
 - 4. Breakaway Coupling: VST, Inc., Husky Corp., or approved equal, coupling separation at 200 pounds maximum pulling force; integral flow preventing seals or valves activated upon coupling separation. Include a 6" whip hose at dispenser.
 - 4. Spare parts package will include a diesel and gasoline nozzle, hoses, breakaways and 12 filters.
 - 5.

2.6 **KEY ACTIVATED FUEL MANAGEMENT SYSTEM**

2.7

- A. Provide a complete microprocessor based, self contained unattended motor fuel management system with dual (2) key readers, Remote PC Pentium 1.5, modem, battery back-up, surge protection and all required software. Unit to have the capability to communicate with other State of NJ fuel management systems
- B. **STANDARD SOFTWARE FEATURES:**
 - a. User Capacity: 10,000
 - b. Memory Capacity: Up to 10,290 transactions
 - c. Configuration: Combination 1 and/or 2 card, key, rf system
 - 1. Pump Control:
 - a. Simultaneously controls up to 8 hoses
 - b. Automatic site shutdown at specified time
 - 2. Card Lockout:
 - a. By card number; up to 10,000 lockouts
 - 3. Transaction Printing:

- a. Direct printout of transactions as they occur
 - 4. Inventory & Pump Totals:
 - a. Maintains book inventory with loadable reorder point for up to 8 tanks
 - 5. Security:
 - a. Loadable sign on entry code for command mode
 - b. Personal ID Number (P.I.N.) entry with optional auto lockout after 3 consecutive bad entries
 - 6. Product Authorization:
 - a. Controls access to product type, 9 loadable authorization codes, card encoded
 - 7. Product Limitation
 - a. Limits amount of fuel dispensed in a transaction, 10 loadable limit codes, card encoded
 - 8. Odometer reasonability check
 - 9. Price Extension: Generates dollar totals for each
- C. STANDARD HARDWARE FEATURES:
 - a. Dimensions: System Head - 15" W x 12" H x 20" D
 - b. Height with S.S. Pedestal - 60"
 - c. Hose Control Capacity: Controls 2 hoses.
 - d. Sealable by Weights and Measures.
 - 1. Data Entry:
 - a. Dual Key reader
 - b. 3x 4 membrane keypad with tactile feel
 - c. Character .5" L.C.D. display
 - 2. Lighting:
 - a. Fluorescent lighting of system faceplate
 - 3. Memory:
 - a. 32K RAM, Battery backed
 - 4. Clock:
 - a. Real-time, Battery backed
 - 5. Emergency stop button on system faceplate
 - 6. Audible "key left in reader" alarm
 - 7. Manual System Override switches
 - 9. UPS System: as recommended by system vendor
- D. COMMUNICATIONS
 - 1. Communication: 2 Asynchronous ports, either may be
 - 2. RS232 or RS422
 - 3. Direct Connection: RS232-up to 100 ft. RS422 - up to 1500 ft
 - 4. Built-in modem, and back up external modem
 - 5. Training will be given in 4 hour sessions on day a month. A 2 year preventative maintenance program will be provided at no cost to the owner.
- 6. Design Basis: Convault System II, 201-462-0404

2.7 DISPENSER CONTAINMENT/MOUNTING ASSEMBLY

- A. Provide a FRP (Fiberglass Re-inforced Plastic) dispenser containment/mounting assembly which includes flex connector(s), shear valve(s) and all penetration assemblies for piping and conduit meeting the following specifications:
1. FRP dispenser containment / mounting assembly shall provide secure mounting assembly for the dispenser base and safety/shear valve that is anchored in concrete for transfer of stress and loading, such that shearing action occurs at the shear valve upon impact without damage to the mounting framework.
 2. Dispenser containment box shall have integral rain lip to prevent surface, ground, run-off or washdown water from entering the containment system.
 3. Shall contain any release of environmental contaminants from the dispenser and / or fittings contained within the system.
 4. Be suitable for petroleum products and blends including methanol and ethyl alcohol mixtures and not be weakened by exposure to these materials.
 5. System shall be provided with UL listed " Firesafe" flexible connectors as manufactured by Titeflex.
 6. System shall be provided with a zinc coated cast iron double poppet safety shear valve with fusible link as manufactured by Universal Valve Co.
 6. Design Basis: Fibrelite Model 1008-98, 201-568-1700

2.8 Dispenser / Bollards

- A. Provide a permanent steel concrete island form sized as shown on drawings.
1. for Tank pad a 2" reveal will be used and the bollards will be 6" diameter and U shaped.
 2. Design Basis: Units will be stainless steel Formex Model CV-8k for tank pad and SF-6M for bollards

2.9 Fuel Oil Day-tank System (not required)

C. EXECUTION

1. 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.

2. The tank system and accessories shall be installed in strict accordance with the manufacturer's recommendations and applicable fire and environmental codes. Contractor shall obtain all state and local permits prior to installation.
3. Tanks shall be installed on a reinforced concrete base slab designed to support the fully loaded tank.
4. 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.
5. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Electric feed for dispensing pumps shall include an emergency shutoff switch located per code requirements. Tanks shall be electrically grounded in accordance with N.F.P.A. 78.
6. The system installation shall be inspected and approved by the system vendor or its certified contractor.
7. The system vendor 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. Five complete sets of O & M manuals to include all warranty information shall be furnished to the owner. These manuals will be clearly indexed, labeled for site specific models provided.

END OF SECTION