

SECTION 231323 - FACILITY ABOVEGROUND FUEL-OIL STORAGE TANKS

PART 1 - GENERAL

1.01 BUY AMERICAN REQUIREMENTS

- A. Provide certificates to show that all products meet the following requirements.
 - 1. American Iron and Steel (AIS)
 - 2. Build America, Buy America Act
- B. See Supplementary Conditions for details.

1.02 SUMMARY

- A. Section Includes:
 - 1. Insulated, steel, fuel-oil aboveground storage tanks (ASTs).

1.03 DEFINITIONS

- A. AST: Aboveground storage tank.

1.04 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and dimensions of individual components and profiles.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 3. Fuel-oil storage tank accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and ballast pads and anchors, and lifting or supporting points.
 - 2. Indicate dimensions, components, and location and size of each field connection.
 - 3. Shop Drawing Scale: 1/4 inch per foot minimum.
- C. Seismic Qualification Data: For ASTs, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Welding certificates.
- E. Field quality-control reports.
- F. Sample Warranty: For special warranty.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuel-oil equipment and accessories to include in emergency, operation, and maintenance manuals.

1.06 QUALITY ASSURANCE

- A. EPA Compliance: Comply with EPA and state and local authorities having jurisdiction. Include recording of fuel-oil storage tanks and monitoring of tanks.
- B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.07 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of fuel-oil storage tanks that fail in materials or workmanship within specified warranty period.
 - 1. Storage Tanks:
 - a. Failures include, but are not limited to, the following when used for storage of fuel oil at temperatures not exceeding 150 deg F:
 - 1) Structural failures including cracking, breakup, and collapse.
 - 2) Corrosion failure including external and internal corrosion of steel tanks.
 - b. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design restraint and anchors for fuel-oil ASTs, and equipment, including comprehensive engineering analysis, using performance requirements and design criteria indicated.
- B. Seismic Performance: Factory-installed support attachments for AST shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.02 FUEL DAY TANK (DT-1)

- A. Reference Electrical Specification 263213.13 – "Diesel-Engine-Driven Generator Sets."

2.03 FUEL STORAGE TANK (FT-1)

- A. Manufacturers: Ace Tank or equal.
- B. Tank: UL listed and labeled, closed double wall type, heavy gauge welded steel, cleaned and coated with coal tar epoxy, urethane, or isophthalic polyester resin. Furnish and anchor straps

- and attachments, fittings, and taps for accessories and lifting lugs. Manufacturer will provide electrically isolated pipe connectors with striker plates below each opening.
- C. Fill Cap: 3-inch watertight cap with cam action locking lever.
- D. Tank Fittings:
1. Fill: 4-inch.
 2. Vent: 2-inch, galvanized, including "T" and elbow assembly with 1/4-inch square mesh screen over inlet.
 3. Suction: 1-inch anti-siphon connection to tank bottom with foot valve.
 4. Return: 1-inch.
 5. Gauge Fitting: 2-inch.
 6. Connections: UL 567, dielectric bushings.
- E. Man-way: 18-inch diameter, with cover and gasket, and extension sleeve; located at top of tank.
- F. Finish: Factory painted with industrial epoxy and urethane coating with dry film thickness of 4 milsColor: white.
- G. Fill Connection: Furnish fill containment assembly with capacity of not less than 15 gallons. Furnish with hinged locking cover, stainless steel hinges, handle, safety chain, and lock hasp.
- H. Normal Vent: Furnish each compartment of primary tank with 2 inchupdraft venting device exhausting upward at elevation of at least 12 feetaboveground. Size vent in accordance with NFPA 30.
- I. Emergency Vent: Furnish each compartment of primary tank with emergency vent sized in accordance with NFPA 30. Do not use access openings for emergency venting purposes.
- J. Monitor Port: Minimum 2 inchsteel pipe with locking cap to be used for detecting leaks between primary and outer tanks.
- K. Accessories:
1. Level Gage: Mechanical float activated level gage capable of indicating approximate fluid level in tank reading in feet and inches.
 2. Tank Decals: Furnish warning and tank identification signs located prominently on tank following local code requirements.

2.04 TANK MONITORING SYSTEM

- A. Provide UL listed tank monitoring system including sensors, wiring, and panels for detection of liquids. EBW Auto-Stik Jr. or equal.
- B. Provide a system to detect the following:
1. Presence of liquid at the bottom of the annular space between the inner and outer walls of the double wall fuel oil storage tank. Sensor type EBW LS-3A or equal.
 2. Presence of liquid in the surface access manhole at the tank supply and return piping connections. Sensor type EBW LS-3A or equal.
 3. Presence of liquid in the overfill catchment basin. Sensor type EBW LS-3A or equal.

4. Fuel level in the fuel tank. Sensor type EBW 960 Series or pre-approved equal.
 5. Sensor Alarm Console shall provide audible and visual indication of alarm condition. Franklin Electric S940 or approved equal.
- C. Provide sensors suitable for a minimum ambient temperature range of -60 degrees F to 130 degrees F and rated intrinsically safe per NFPA.
- D. Provide external annunciator to alarm on command from control panel at 90 percent fill level as sensed by liquid level sensor. External annunciator shall be suitable for exterior mounting. EBW 961-4501 or equal.
- E. Provide sensor wiring and raceway system in accordance with manufacturer's recommendations and Electrical Sections. Junction box at tank and fittings within access box shall be explosion proof.
- F. Provide control panel complete with all necessary controls relays, auxiliary contacts, and pilot lights as required to meet the control sequence and alarm as specified in Section 230900 "Instrumentation and Control for HVAC". Provide power supply transformer as necessary to energize panel.

2.05 TANK OVERFILL PREVENTOR

- A. Provide overfill protection device, capable of being set at 95 percent tank capacity. Warden AST or equal.
- 1.

2.06 SHOP PAINTING OF AST

- A. Prepare exterior steel surface of AST and tank supports.
- B. Shop Cleaning: After fabrication, blast clean according to SSPC-SP 10/NACE No. 2.
- C. After cleaning, remove dust or residue from cleaned surfaces.
- D. If surface develops rust before prime coat is applied, repeat surface preparation.
- E. Apply manufacturer's standard prime coat to shop-cleaned, dry surface same day as surface preparation.
- F. Apply manufacturer's standard two-component, epoxy finish coats.

2.07 FUEL-OIL AST ACCESSORIES

- A. Tank Manholes: 22-inch-minimum diameter; bolted, flanged, and gasketed; centered on top of tank.
- B. Threaded pipe connection fittings on top of tank, for fill, supply, return, vent, sounding, and gaging. Include cast-iron plugs for shipping.
- C. Striker Plates: Inside tank, on bottom below fill, vent, sounding, gage, and other tube openings.
- D. Lifting Lugs: For handling and installation.

- E. Ladders: Carbon-steel ladder outside tank, anchored to top and side wall. Comply with OSHA requirements.
- F. Supply Tube: Extension of supply piping fitting into tank, terminating 6 inches above tank bottom and cut at a 45-degree angle.
- G. Sounding and Gage Tubes: Extension of fitting into tank, terminating 6 inches above tank bottom and cut at a 45-degree angle.

2.08 SOURCE QUALITY CONTROL

- A. Pressure test and inspect fuel-oil storage tanks, after fabrication and before shipment, according to ASME and the following:
 - 1. Horizontal, Insulated, Steel ASTs: UL 142 and UL 2085.
- B. Affix standards organization's code stamp.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine roughing-in for aboveground fuel-oil storage tanks to verify actual locations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.
- B. Allow for cast-in-place, concrete base.

3.03 FUEL-OIL AST INSTALLATION

- A. Install tank bases and supports.
- B. Concrete Bases: Anchor AST to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Use 3000-psig, 28-day, compressive-strength concrete and reinforcement as specified in Section 033000 "Cast-in-Place Concrete."
- C. Connect piping and vent fittings.

- D. Install ground connections.
- E. Install tank leak-detection and monitoring devices.
- F. Install steel ASTs according to STI R912.
- G. Install insulated and concrete-vaulted, steel ASTs according to STI R942.
- H. Fill storage tanks with fuel oil.

3.04 LABELING AND IDENTIFYING

- A. Nameplates, pipe identification, and signs are specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.05 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Tanks: Minimum hydrostatic or compressed-air test pressures for fuel-oil storage tanks that have not been factory tested and do not bear the ASME code stamp or a listing mark acceptable to authorities having jurisdiction:
 - a. Double-Wall Tanks:
 - 1) Inner Tanks: Minimum 3 psig and maximum 5 psig.
 - 2) Interstitial Space: Minimum 3 psig and maximum 5 psig, or 5.3-in. Hg vacuum.
 - b. Where vertical height of fill and vent pipes is such that the static head imposed on the bottom of the tank is greater than 10 psig, hydrostatically test the tank and fill and vent pipes to a pressure equal to the static head thus imposed.
 - c. Maintain the test pressure for one hour.
- B. ASTs will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION