SECTION 231323 - FACILITY ABOVEGROUND FUEL-OIL STORAGE TANKS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Vertical, steel, fuel-oil ASTs.

Horizontal, steel, fuel-oil ASTs.

Containment-dike, steel, fuel-oil ASTs.

Insulated, steel, fuel-oil ASTs.

Concrete-vaulted, steel, fuel-oil ASTs.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. AST: Aboveground storage tank.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product.

Include construction details, material descriptions, and dimensions of individual components and profiles.

Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

Fuel-oil storage tank accessories.

* + - * 1. Shop Drawings:

Include plans, elevations, sections, and ballast pads and anchors, and lifting or supporting points.

Indicate dimensions, components, and location and size of each field connection.

Shop Drawing Scale: [**1/4 inch per foot] <Insert scale**>.

* + - 1. INFORMATIONAL SUBMITTALS
         1. Site Survey: Plans, drawn to scale, on which fuel-oil storage tanks are shown and coordinated with other services and utilities.
         2. Qualification Data: For qualified Professional Engineer.

Retain "Seismic Qualification Data" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 230548 "Vibration and Seismic Controls for HVAC." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Data: For ASTs, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

Retain "Brazing certificates" paragraph below if retaining procedures for brazing certification in "Quality Assurance" Article.

* + - * 1. Brazing certificates.

Retain "Welding certificates" paragraph below if retaining procedures for welder certification in "Quality Assurance" Article.

* + - * 1. Welding certificates.

Retain "Field quality-control reports" paragraph below if Contractor is responsible for field quality-control testing and inspecting.

* + - * 1. Field quality-control reports.
        2. Sample Warranty: For special warranty.
      1. CLOSEOUT SUBMITTALS
         1. Operation and Maintenance Data: For fuel-oil equipment and accessories to include in emergency, operation, and maintenance manuals.
      2. QUALITY ASSURANCE
         1. EPA Compliance: Comply with EPA and state and local authorities having jurisdiction. Include recording of fuel-oil storage tanks and monitoring of tanks.

Retain "Steel Support Welding Qualifications" paragraph for welded supports. Also retain "Welding certificates" paragraph in "Informational Submittals" Article.

* + - * 1. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
      1. WARRANTY

When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of fuel-oil storage tanks that fail in materials or workmanship within specified warranty period.

Storage Tanks:

Failures include, but are not limited to, the following when used for storage of fuel oil at temperatures not exceeding [**150 deg F] <Insert temperature**>:

Structural failures including cracking, breakup, and collapse.

Retain first subparagraph below for steel tanks.

Corrosion failure including external and internal corrosion of steel tanks.

Verify available warranties and warranty periods for units and components with manufacturers listed in Part 2 articles.

Warranty Period: [**30] <Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS

Retain "Delegated Design" paragraph below if Contractor is required to assume responsibility for design.

* + - * 1. Delegated Design: Engage a qualified Professional Engineer, to design restraint and anchors for fuel-oil ASTs, and equipment, including comprehensive engineering analysis, using performance requirements and design criteria indicated.

Retain "Seismic Performance" paragraph below with "Seismic Qualification Data" paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete paragraph if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with Structural Engineer.

* + - * 1. Seismic Performance: Factory-installed support attachments for AST shall withstand the effects of earthquake motions determined according to [**ASCE/SEI 7] <Insert requirement**>.

Retain subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Option is used for essential facilities where equipment must operate immediately after an earthquake.

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**]."

* + - 1. VERTICAL, STEEL, FUEL-OIL AST
         1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Ace Tank & Fueling Equipment, LLC.

Buffalo Tank Company, Inc.

Highland Tank & Manufacturing Company, Inc.

Watco Tanks, Inc.

Approved equivalent.

Retain one of first two "Description" paragraphs below. Double-wall tanks are recommended.

* + - * 1. Description: UL 142, single-wall, vertical, steel tank.
        2. Description: UL 142 [ **and STI F921**], double-wall, vertical, steel tank; with primary- and secondary-containment walls and interstitial space.
        3. Construction: Fabricated with welded, carbon steel suitable for operation at atmospheric pressure and for storing fuel oil with specific gravity up to 1.1 and maintained temperature up to 150 deg F.

If Project has more than one type or configuration of vertical, steel, fuel-oil AST, delete "Capacities and Characteristics" paragraph below and schedule tanks on Drawings.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert gal**.>.

Diameter: <**Insert feet**>.

Length: <**Insert feet**>.

Connection Sizes:

Fill Line: <**Insert NPS**>.

Vent Line: <**Insert NPS**>.

Outlet: <**Insert NPS**>.

Return: <**Insert NPS**>.

Gage: <**Insert NPS**>.

Manholes:

Number Required: <**Insert number**>.

Diameter: <**Insert inches**>.

Fuel-Oil Grade Number: [**Grade No. 1] [Grade No. 2] [Diesel] <Insert grade**>.

* + - 1. HORIZONTAL, STEEL, FUEL-OIL AST
         1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Ace Tank & Fueling Equipment, LLC.

Buffalo Tank Company, Inc.

Highland Tank & Manufacturing Company, Inc.

Steel Tank and Fabricating.

Approved equivalent.

Retain one of first two "Description" paragraphs below. Double-wall tanks are recommended.

* + - * 1. Description: UL 142, single-wall, horizontal, steel tank.
        2. Description: UL 142[ **and STI F921**], double-wall, horizontal, steel tank; with primary- and secondary-containment walls and interstitial space.
        3. Construction: Fabricated with welded, carbon steel; suitable for operation at atmospheric pressure and for storing fuel oil with specific gravity up to 1.1 and with maintained temperature up to 150 deg F.

Retain one of two "Supports" paragraphs below.

* + - * 1. Supports: Manufacturer's standard structural steel welded to tank.
        2. Supports: Manufacturer's standard type[ **and number**], steel or cast-iron cradles, for field installation.

Number of Supports: <**Insert number**>.

Concrete or steel supports for off-the-ground mounting must be specified or detailed on Drawings.

If Project has more than one type or configuration of horizontal, steel, fuel-oil AST, delete "Capacities and Characteristics" paragraph below and schedule tanks on Drawings.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert gal.>.**

Diameter: <**Insert feet**>.

Length: <**Insert feet>.**

Connection Sizes:

Fill Line: <**Insert NPS**>.

Vent Line: <**Insert NPS**>.

Outlet: <**Insert NPS**>.

Return: <**Insert NPS**>.

Gage: <**Insert NPS**>.

Manholes:

Number Required: <**Insert number**>.

Diameter: <**Insert inches**>.

Fuel-Oil Grade Number: [**Grade No. 1] [Grade No. 2] [Diesel] <Insert grade**>.

* + - 1. CONTAINMENT-DIKE, STEEL, FUEL-OIL AST
         1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Buffalo Tank Company, Inc.

Hall Tank Co.

Highland Tank & Manufacturing Company, Inc.

Watco Tanks, Inc.

Approved equivalent.

* + - * 1. Description: UL 142 and STI F911, single-wall, horizontal, steel tank; with [**open or enclosed] [enclosed**], secondary-containment dike with capacity greater than tank capacity.
        2. Construction: Fabricated with welded, carbon steel; suitable for operation at atmospheric pressure and for storing fuel oil with specific gravity up to 1.1 and with maintained temperature up to 150 deg F.

If Project has more than one type or configuration of containment-dike, steel, fuel-oil AST, delete "Capacities and Characteristics" paragraph below and schedule tanks on Drawings.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert gal.**>.

Diameter: <**Insert feet**>.

Length: <**Insert feet**>.

Connection Sizes:

Fill Line: <**Insert NPS**>.

Vent Line: <**Insert NPS**>.

Outlet: <**Insert NPS**>.

Return: <**Insert NPS**>.

Gage: <**Insert NPS**>.

Manholes:

Number Required: <**Insert number**>.

Diameter: <**Insert inches**>.

Fuel-Oil Grade Number: [**Grade No. 1] [Grade No. 2] [Diesel] <Insert grade**>.

* + - 1. INSULATED, STEEL, FUEL-OIL AST
         1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

Ace Tank & Fueling Equipment, LLC.

Brown Tank.

Highland Tank & Manufacturing Company, Inc.

Steel Tank and Fabricating.

Approved equivalent.

* + - * 1. Description: [**UL 142 and UL 2085] [UL 142, UL 2085, and STI F941**], thermally insulated and fire-resistant, double-wall, horizontal, steel tank; with primary- and secondary-containment walls and insulation and with interstitial space.
        2. Construction: Fabricated with welded, carbon steel and insulation; suitable for operation at atmospheric pressure and for storing fuel oil with specific gravity up to 1.1 and with test temperature according to UL 2085.

If Project has more than one type or configuration of insulated, steel, fuel-oil AST, delete "Capacities and Characteristics" paragraph below and schedule tanks on Drawings.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert gal**.>.

Diameter: <**Insert feet**>.

Length: <**Insert feet**>.

Connection Sizes:

Fill Line: <**Insert NPS**>.

Vent Line: <**Insert NPS**>.

Outlet: <**Insert NPS**>.

Return: <**Insert NPS**>.

Gage: <**Insert NPS**>.

Manholes:

Number Required: <**Insert number**>.

Diameter: <**Insert inches**>.

Fuel-Oil Grade Number: [**Grade No. 1] [Grade No. 2] [Diesel] <Insert grade**>.

* + - 1. CONCRETE-VAULTED, STEEL, FUEL-OIL AST
         1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Cardinal Tank Corp.

Commvault, Inc.

EcoVault, Inc.

Approved equivalent.

* + - * 1. Description: [**UL 142 and UL 2085] [UL 142, UL 2085, and STI F941**]; thermally insulated, fire-resistant and protected, double-wall, horizontal, steel tank; with primary- and secondary-containment walls and insulation and with interstitial space.
        2. Construction: Fabricated with welded, carbon steel and insulation and encased in concrete that will protect from bullets; suitable for operation at atmospheric pressure and for storing fuel oil with specific gravity up to 1.1 and with test temperature according to UL 2085.

If Project has more than one type or configuration of concrete-vaulted, steel, fuel-oil AST, delete "Capacities and Characteristics" paragraph below and schedule tanks on Drawings.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert gal.**>.

Diameter: <**Insert feet**>.

Length: <**Insert feet**>.

Connection Sizes:

Fill Line: <**Insert NPS**>.

Vent Line: <**Insert NPS**>.

Outlet: <**Insert NPS**>.

Return: <**Insert NPS**>.

Gage: <**Insert NPS**>.

Manholes:

Number Required: <**Insert number**>.

Diameter: <**Insert inches**>.

Fuel-Oil Grade Number: [**Grade No. 1] [Grade No. 2] [Diesel] <Insert grade**>.

* + - 1. SHOP PAINTING OF AST

Retain first paragraph below if field painting AST.

* + - * 1. Apply manufacturer's standard prime coat to exterior steel surface of AST[ **and supports**].

Retain remainder of this article if shop painting AST.

* + - * 1. Prepare exterior steel surface of AST[ **and tank supports**].

Retain first option in "Shop Cleaning" paragraph below for "Commercial Blast Cleaning"; retain second option for "Near-White Blast Cleaning."

* + - * 1. Shop Cleaning: After fabrication, blast clean according to [**SSPC-SP 6/NACE No. 3] [SSPC-SP 10/NACE No. 2**].
        2. After cleaning, remove dust or residue from cleaned surfaces.
        3. If surface develops rust before prime coat is applied, repeat surface preparation.
        4. Apply manufacturer's standard prime coat to shop-cleaned, dry surface same day as surface preparation.
        5. Apply manufacturer's standard two-component, epoxy finish coats.
      1. FUEL-OIL AST ACCESSORIES

Show fittings and accessories on plans, details, and piping schematics.

Retain one of two "Tank Manholes" paragraphs below. Retain first paragraph for horizontal tanks and some vertical tanks; retain second paragraph for vertical tanks.

* + - * 1. Tank Manholes: 22-inch- minimum diameter; bolted, flanged, and gasketed; centered on top of tank.
        2. Tank Manholes: 22-inch- minimum diameter; bolted, flanged, and gasketed; on top and at side of tank.

Retain one of first two paragraphs below. Retain first paragraph for horizontal tanks; retain second for vertical tanks.

* + - * 1. Threaded pipe connection fittings on top of tank, for fill, supply, return, vent, sounding, and gaging. Include cast-iron plugs for shipping.
        2. Threaded pipe connection fittings on top or sides of tank as indicated, for fill, supply, return, vent, sounding, and gaging. Include cast-iron plugs for shipping.
        3. Striker Plates: Inside tank, on bottom below fill, vent, sounding, gage, and other tube openings.
        4. Lifting Lugs: For handling and installation.

Retain one of two "Ladders" paragraphs below. Retain first paragraph for horizontal tanks and some vertical tanks; retain second paragraph for vertical tanks.

* + - * 1. Ladders: Carbon-steel ladder inside tank, anchored to top and bottom, and located as indicated. Include reinforcement of tank at bottom of ladder.
        2. Ladders: Carbon-steel ladder outside tank, anchored to top and side wall. Comply with requirements in Section 055000 "Metal Fabrications" for exterior steel ladder.

Cage: Include welded steel cage around ladders for tanks [**20 feet] <Insert dimension**> high or higher.

* + - * 1. Supply Tube: Extension of supply piping fitting into tank, terminating 6 inches above tank bottom and cut at a 45-degree angle.
        2. Sounding and Gage Tubes: Extension of fitting into tank, terminating 6 inches above tank bottom and cut at a 45-degree angle.
      1. LIQUID-LEVEL GAGE SYSTEM

Retain this article if liquid-level gage system is not specified in "Leak-Detection and Monitoring System" Article. Delete this article if liquid-level gage system is included in the leak-detection and monitoring system.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Caldwell Systems Corporation.

Highland Tank & Manufacturing Company, Inc.

INCON, Inc.

Rochester Gauges, Inc.

Approved equivalent.

* + - * 1. Description: Calibrated liquid-level gage system complying with [**UL 180 with floats] [UL 1238 with probes**] or other sensors and remote annunciator panel.

Alarms specified in "Annunciator Panel" paragraph below may be used as part of leak-detection system.

* + - * 1. Annunciator Panel: With visual and audible, high-tank-level and low-tank-level alarms; fuel indicator with registration in gallons; and overfill alarm. Include gage volume range that covers fuel-oil storage capacity.
        2. Controls: Electrical, operating on [**120] <Insert voltage**>-V ac.
      1. LEAK-DETECTION AND MONITORING SYSTEM

Retain one of two paragraphs in this article.

* + - * 1. Cable and Sensor System: Comply with UL 1238.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Caldwell Systems Corporation.

Highland Tank & Manufacturing Company, Inc.

INCON, Inc.

In-Situ, Inc.

Approved equivalent.

Visual and audible alarms in "Liquid-Level Gage System" Article may be used as part of leak-detection system.

Calibrated leak-detection and monitoring system with probes and other sensors and remote alarm panel for fuel-oil storage tanks and fuel-oil piping.

Include fittings and devices required for testing.

Controls: Electrical, operating on [**120] <Insert voltage**>-V ac.

Retain subparagraphs below for an optional feature that replaces system described in "Liquid-Level Gage System" Article.

Calibrated liquid-level gage complying with [**UL 180 with floats] [UL 1238 with probes**] or other sensors and remote annunciator panel.

Remote Annunciator Panel: With visual and audible, high-tank-level and low-tank-level alarms; fuel indicator with registration in gallons and overfill alarm. Include gage volume range that covers fuel-oil storage capacity.

Controls: Electrical, operating on [**120] <Insert voltage**>-V ac.

* + - * 1. Hydrostatic System: Comply with UL 1238.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Caldwell Systems Corporation.

Highland Tank & Manufacturing Company, Inc.

INCON, Inc.

In-Situ, Inc.

Approved equivalent.

Visual and audible alarms in "Liquid-Level Gage System" Article may be used as part of leak-detection system.

Calibrated leak-detection and monitoring system with brine antifreeze solution, reservoir sensor, and electronic control panel to monitor leaks in inner and outer tank walls.

Include fittings and devices required for testing.

Controls: Electrical, operating on [**120] <Insert voltage**>-V ac.

Retain subparagraphs below for an optional feature that replaces system described in "Liquid-Level Gage System" Article.

Calibrated liquid-level gage complying with [**UL 180 with floats] [UL 1238 with probes**] or other sensors and remote annunciator panel.

Remote Annunciator Panel: With visual and audible, high-tank-level and low-tank-level alarms; fuel indicator with registration in gallons; and overfill alarm. Include gage volume range that covers fuel-oil storage capacity.

Controls: Electrical, operating on [**120] <Insert voltage**>-V ac.

* + - 1. FUEL OIL

Second option in "Fuel Oil" paragraph below is grade typically used for fuel-oil-burning equipment.

* + - * 1. Fuel Oil: ASTM D396, [**Grade No. 1] [Grade No. 2**].

Last option in "Diesel Fuel Oil" paragraph below is typically used for automotive or other diesel engines.

* + - * 1. Diesel Fuel Oil: ASTM D975, [G**rade Low Sulfur] [Grade No. 1-D, special purpose] [Grade No. 2-D, general purpose**], high volatility.
      1. SOURCE QUALITY CONTROL

Do not include STI tests if tanks are not STI type.

* + - * 1. Pressure test and inspect fuel-oil storage tanks, after fabrication and before shipment, according to ASME and the following:

Retain one or more of subparagraphs below.

[**Horizontal**], Single-Wall Steel ASTs: UL 142.

[**Vertical] [Vertical or Horizontal] [Horizontal**], Double-Wall Steel ASTs: UL 142, STI F921, and STI R931.

Horizontal, Containment-Dike, Steel ASTs: UL 142 and STI F911.

Horizontal, [**Concrete-Vaulted] [Concrete-Vaulted and Insulated] [Insulated**], Steel ASTs: UL 142 and UL 2085.

* + - * 1. Affix standards organization's code stamp.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine roughing-in for aboveground fuel-oil storage tanks to verify actual locations.
          2. Proceed with installation only after unsatisfactory conditions have been corrected.
       2. EARTHWORK
          1. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

Coordinate this article with Drawings.

* + - * 1. Allow for cast-in-place, concrete base.
      1. FUEL-OIL AST INSTALLATION

Indicate size and location of concrete base on Drawings, including reinforcing steel.

* + - * 1. Install tank bases and supports.

Coordinate concrete work in this article with Section 033000 "Cast-in-Place Concrete."

* + - * 1. Concrete Bases: Anchor AST to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.

Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on [**18-inch] <Insert dimension**> centers around the full perimeter of the base.

Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

Install anchor bolts to elevations required for proper attachment to supported equipment.

Use [**3000-psig] <Insert dimension**>, 28-day, compressive-strength concrete and reinforcement as specified in Section 033000 "Cast-in-Place Concrete."

* + - * 1. Connect piping and vent fittings.
        2. Install ground connections.
        3. Install tank leak-detection and monitoring devices.
        4. Install steel ASTs according to STI R912.
        5. Install insulated and concrete-vaulted, steel ASTs according to STI R942.
        6. Fill storage tanks with fuel oil.
      1. LIQUID-LEVEL GAGE SYSTEM INSTALLATION
         1. Install liquid-level gage system. Install panel inside building where indicated.
      2. LEAK-DETECTION AND MONITORING SYSTEM INSTALLATION

Coordinate this article with fuel-oil storage tank and piping.

* + - * 1. Install leak-detection and monitoring system. Install alarm panel inside building where indicated.

Double-Wall, Fuel-Oil Storage Tanks: [**Install probes] [Install probes or use factory-installed integral probes] [Use factory-installed integral probes**] in interstitial space.

System in "Single-Wall, Fuel-Oil Storage Tanks" subparagraph below requires extensive description here or layout and details on Drawings.

Single-Wall, Fuel-Oil Storage Tanks: Install probes as indicated.

Float-type probes in tank containment sumps and at piping low points, if required, are the most often used. Cable sensors are also available.

Double-Containment, Fuel-Oil Piping: Install leak-detection sensor [**probes in fuel-oil storage tank containment sumps and at low points in piping] [cable probes in interstitial space of double-containment piping**].

Retain "Install liquid-level gage" subparagraph below for liquid-level gage that is part of leak-detection and monitoring system.

Install liquid-level gage.

* + - 1. LABELING AND IDENTIFYING
         1. Nameplates, pipe identification, and signs are specified in Section 230553 "Identification for HVAC Piping and Equipment."
      2. FIELD PAINTING OF AST

Retain this article only for AST with steel exterior surface.

Retain first paragraph below if shop painting AST.

* + - * 1. Prepare and touch up damaged exterior surface of AST [ **and supports**] as specified in "Shop Painting of AST" Article.

Retain remainder of this article if field painting AST.

* + - * 1. Prepare exterior steel surface of AST [ **and tank supports**].

Retain first option in "Field Cleaning" paragraph below for "Commercial Blast Cleaning"; retain second option for "Near-White Blast Cleaning."

* + - * 1. Field Cleaning: After fabrication, blast clean according to [**SSPC-SP 6/NACE No. 3] [SSPC-SP 10/NACE No. 2**].
        2. After cleaning, remove dust or residue from cleaned surfaces.
        3. If surfaces develop rust before prime coat is applied, repeat surface preparation.
        4. Prepare surface of AST[ **and supports**] and apply painting systems according to specifications in Section 099600 "High-Performance Coatings" for [**severe] [moderate] [mild**] environment [**high-gloss] [semigloss**] finish for ferrous metal.
      1. FIELD QUALITY CONTROL

Retain "Manufacturer's Field Service" paragraph below to require a factory-authorized service representative to perform tests and inspections.

* + - * 1. Manufacturer's Field Service: Engage a company field advisor to test and inspect components, assemblies, and equipment installations, including connections.

Retain "Perform the following tests and inspections" paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections[ **with the assistance of a company field advisor**]:

Tank and pipe test pressures in this article are required by NFPA 31. Verify requirements with authorities having jurisdiction.

Retain "Tanks" subparagraph below if storage tanks do not bear the ASME code stamp as required in "Source Quality Control" Article.

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:

Single-Wall Tanks: Minimum 3 psig and maximum 5 psig.

Double-Wall Tanks:

Inner Tanks: Minimum 3 psig and maximum 5 psig.

Interstitial Space: Minimum 3 psig and maximum 5 psig, or 5.3-in. Hg vacuum.

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.

Maintain the test pressure for one hour.

* + - * 1. ASTs will be considered defective if they do not pass tests and inspections.
        2. Prepare test and inspection reports.

END OF SECTION 231323