

SECTION 13202 ABOVEGROUND STORAGE TANKS

PART 1 -- GENERAL

1.01 WORK INCLUDED

- A. Provide new Aboveground Storage Tank (AST) systems in accordance with the drawings, the referenced publications, and the manufacturer's written instructions, checklists, and warranty requirements for each system component. AST systems include the products, equipment, and systems identified in this section.

1.02 RELATED SECTIONS

- A. Section 02050 - Excavation, Demolition and Disposal.
- B. Section 02223 - Backfill.
- C. Section 02231 - Aggregate Base Course.
- D. Section 03300 - Concrete

1.03 REFERENCES

Alaska Department of Transportation and Public Facilities

1988 Edition Alaska Standard Specification for Highway Construction.

American Society for Testing and Materials

ASTM D1557-78 Moisture density relations of soils and soil-aggregate mixtures using 10-lb (4.54 kg) rammer and 18-inch (457 mm) drop.

American Society for Testing Materials

ASTM D2922-81 Density of soils and soil-aggregate in place by nuclear methods (shallow depth).

American Society for Testing Materials

ASTM D3017-88 Standard test method for water content of soil and rock in place by nuclear methods (shallow depth).

American National Standards Institute (ANSI) Standards

Standard B31.3 Petroleum refinery piping

Standard B31.4 Liquid petroleum transportation piping systems.

American Petroleum Institute (API) Recommended Practices

Publication 1621 Recommended practice for bulk liquid stock control at retail outlets.

National Fire Protection Association (NFPA) Standards

Standard 30 Flammable and combustible liquids code.

National Institute of Occupational Safety and Health (NIOSH) Criteria

Criteria for a recommended standard -- working in confined space.

Uniform Fire Code

UFC 79 Flammable and Combustible Liquids.

1.04 QUALITY ASSURANCE

- A. Reference to a particular organization's standards shall be in accordance with those standards unless more restrictive criteria is indicated herein.
- B. Installation of new tanks shall be accordance with the tank manufacturer's installation instructions.
- C. All work and materials shall be in accordance with requirements of all applicable state and local codes, regulations and ordinances, the National Electrical Code, Uniform Building Code, Uniform Plumbing Code, Uniform Mechanical Code and Uniform Fire Code (locally adopted editions), the latest standards of the NFPA National Fire Codes, and the rules and regulations of all other authorities having jurisdiction. Nothing in drawings and specifications shall be construed to permit work not in conformance with applicable codes, rules, and regulations.
- D. Where drawings or specifications call for material or construction of a better quality or large sizes than required by the above mentioned codes, rules and regulations, the provision of the specifications shall take precedence.
- E. The Contractor shall furnish without any extra charge any additional material and labor when required for compliance with these codes, rules and regulations, even though the work may not be mentioned in the specifications or shown on the drawings. It shall be the responsibility of the successful bidder to bid in accordance with the minimum requirements of the applicable codes, rules, and regulations.
- F. All electrical motors, starters, controls, devices and wiring shall comply with standards of NEC and shall be UL listed and so identified.

1.05 DRAWINGS

- A. Drawings are diagrammatic and show the general design, arrangement and extent of the systems. Do not scale or attempt to use drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings for submittal. Coordinate work with shop drawings of other specification divisions.
- B. Contractor shall investigate the capacity and space requirements of the proposed equipment before submitting shop drawings.
- C. Where conditions necessitate a rearrangement, prepare and submit to the Contracting Officer, for review, drawings of the proposed rearrangement. Because of the small scale of the drawings, it is not possible to show all offsets, fittings, and accessories which may be required. Carefully investigate the conditions and the work of other trades and arrange work accordingly, furnishing such fittings, traps, valves and accessories as may be required to meet such conditions.

1.06 SUBMITTALS

- A. General: Submittals shall be in accordance with Section 01300, Submittals. Submit all product data and shop drawings in one complete submittal with each submittal copy in a binder with index and tabbed dividers. Partial submittals will not be acceptable except with the prior approval of the Contracting Officer and then only in special cases where an accelerated review is necessary so that the progress of the project is not impeded. Submittals not conforming in physical form and content with the provisions of the drawings and specification will be rejected without review and a complete resubmittal required.
- B. Product Data: Submit all catalog data and other descriptive literature to fully substantiate the conformance with specifications of equipment and materials submitted. Mark product data to indicate exactly those items that are to be provided and cross out unrelated or non applicable items. In addition, submit manufacturer's detailed installations instruction on all equipment and materials submitted.
- C. Shop Drawings: Submit drawings for fabrication and installation of all system components. Include fully dimensioned layout of all piping, equipment and all associated connection details. Coordinate shop drawings with work of other trades.

1.07 JOB CONDITIONS

- A. Fees, certificates, warranties:
 - 1. The Contractor shall arrange and pay for all required permits, fees, connection charges, taxes, and other miscellaneous charges necessary to execute the work. Submit drawings and specifications to the State

Fire Marshall and/or local Fire Marshall for review and approval prior to beginning construction.

2. The Contractor shall deliver to the Contracting Officer all certificates of approval issued by the state, county, local or other authorities having jurisdiction over the work performed. Certificates shall be forwarded promptly when received by the Contractor.
3. Equipment specified shall be covered by the manufacturer's standard warranty on the new equipment for 1 year from the date of issuance of the Certificate of Substantial Completion and as further protected by the manufacturer's standard warranty. If within 12 months from the Date of Substantial Completion any of the equipment herein described is shown to be defective in workmanship or materials, it shall be replaced or repaired free of charge by the Contractor.

B. Product Handling:

1. Contractor is responsible for protection of all material, equipment, and apparatus provided from damage, water, and dust, both in storage and when installed, until final acceptance.
2. Provide temporary storage facilities for material and equipment.
3. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected and replaced at Contractor's expense.

C. Special Requirements:

1. Maintain emergency and service entrances usable to pedestrian and vehicle traffic at all times. Where trenches are cut, provide adequate bridging for traffic when required by Contracting Officer.

D. Schedule of Work: Arrange work to comply with schedule of construction.

(Completed by Specifier)

E. Coordination of Work: The Contractor shall coordinate all trades whose work is adjacent, in order to avoid field interference and delay in execution of the work of all trades. Furnish detailed advance information regarding all requirements related to work by others.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01700, Contract Closeout.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. Materials and apparatus shall be new unless otherwise specified, and each shall have all necessary trimmings, accessories and controls required to make it functionally complete. All items of the same type shall be of the same manufacturer. All phases of the work will be performed by competent workmen, skilled in their respective trades.
- B. All materials, equipment and processes requiring approval of the Underwriters Laboratories or other nationally recognized testing agency shall be labeled so approved in accordance with the provisions of the State of Alaska.

2.02 ABOVEGROUND TANKS FOR STORAGE OF PETROLEUM PRODUCTS

- A. General: Tanks shall be constructed of steel. All tanks shall be of the same material of construction and guaranteed compatible with the contents indicated on the drawings. Tanks and appurtenances shall be Underwriters Laboratories (UL) listed for storage of petroleum products. They shall also meet the provision of NFPA 30 and 31, the Uniform Fire Code Article 79 and Environmental Protection Agency requirements.
- B. Fire rated tanks shall be as manufactured by Anchorage Tank (U-Fuel), Ace Tank Company (Fuel Safe), or equal:
 - 1. Size, capacity and appurtenances per drawings with UL label. Nominal diameter of 63 inches for 550 to 1,100 gallon tanks; 80 inches to 2,000 gallon tank; 92 inches for 4,000 gallon tank; and 112 inches for 6,000 to 10,000 gallon tanks. Tanks to be set on concrete pads below tanks as shown on drawings as required. Install tanks in strict conformance with manufacturer's instructions. Contractor shall be trained by the tank manufacturer for installation of the tanks.
 - 2. Tanks shall be insulated triple-wall aboveground steel storage tank for storing flammable liquids. Primary and secondary tank to be insulated with 8 inches of high-temperature insulation for fire resistance to 2,000 degrees F, and minimization of tank venting due to an external fire or day/night temperature fluctuations. Secondary containment provided by a steel tank inside the insulation fully enclosing the primary tank. Tank system to have a 2-hour fire rating and be rated for seismic zone 4 applications.

Both primary and secondary containment tank to be pressure tested for tightness per UL-142 requirements. Openings to primary tank provided for normal and emergency vents per UL specifications, tank fill, product removal, level gauge and automatic fill shut-off at 90% level. Openings to secondary containment chamber provided for normal and emergency venting and interstitial monitor, sized per UL-142. Both primary and secondary tank thickness, steel specifications,

welding procedures and testing methods per UL-142. External surfaces of tank system to be given a commercial blast and coated with white self-priming epoxy paint to a minimum of three mils dry film thickness. Tank system to include emergency vent for the primary tank. Storage system without pressure or vacuum testable primary and secondary containment and high temperature insulation will not be considered. All welding shall have weld spatter removed, welds sealed and corners chamfered. Sandblast and epoxy paint with a light color.

3. Tank penetrations shall be as shown on drawings.

2.03 TANK APPURTENANCES

- A. General: Tank appurtenances shall be as shown on drawings and specified below. Appurtenances shall be Underwriters Laboratories (UL) listed for storage of petroleum products. All appurtenances shall, where practical, be shop installed, tested and painted/coated with the same coating going on the tank before shipment to the site.
- B. Suction fire safety valve shall be Morrison 346, or equal.
 1. Ductile iron body, cap, plunger and swing arm.
 2. Stainless steel spring.
 3. Asbestos gasket.
 4. Teflon packing.
 5. 160 degrees F fusible link.
 6. 200 psi working pressure.
- C. Suction strainer shall be Emco Wheaton 157, OPW or equal.
 1. Brass body.
 2. Stainless steel 20 mesh screen.
 3. 2 inch size with threaded female NPT connection.
- D. Fill drybreak adapter shall be Emco Wheaton F 500, OPW 1611A, or equal.
 1. Die cast aluminum with hard anodized coating.
 2. Dual point fill systems.
 3. 4 inch size with threaded female NPT connection.
- E. Fill cap shall be Emco Wheaton F 499, OPW 1711T, or equal.

1. Aluminum body.
 2. Buna N replaceable gasket seal.
 3. Easy coupling and removal with padlocking capability.
 4. 4 inch size.
- F. Overfill prevention device shall be Clay Bailey Lafon Fill Limiter, or equal.
1. Install for shut-off at 90% tank capacity.
- G. Drop tube shall be Emco Wheaton EWA20-004, OPW 61T-7268, or equal.
1. Aluminum tube.
 2. 4 inch size with length cut to suit.
- H. Emergency vent shall be Clay Bailey 368, or equal.
1. Cast iron body.
 2. Design of top minimizes effects of weather.
- I. Vent cap shall be Emco Wheaton MR 354, OPW 23, or equal.
1. Aluminum body and cap for upward venting.
 2. Brass 40 mesh screen easily removed for cleaning.
 3. 2-inch size with threaded NPT connection.
- J. Isolation valves shall be Morrison 235B or equal.
1. Brass body, bonnet, discs and stem.
- K. Pressure/vacuum vent cap shall be Emco Wheaton, EWA 84, OPW 523, or equal.
1. Aluminum body and cap for upward venting.
 2. Stage I vapor recovery design.
 3. Brass 40 mesh screen easily removed for cleaning.
 4. 2-inch size with threaded NPT connection.
 5. UL listed.

2.04 INVENTORY CONTROL AND LEAK DETECTION SYSTEM

- A. Inventory control system shall be Veeder-Root Model TLS-350 or equal. The system shall be a modular designed electronic field programmable measurement system that shall continuously monitor the liquid in all underground tanks and provide detailed printout reports on tank liquid volume in gallons (± 15 gallons) liquid height in inches (± 0.1 inches), temperature in degrees F (± 1.5 degrees F), water level in inches (± 0.1 inches) and the time (± 1 minutes/week) and date. System shall include a wall mounted console, tank probes and all interconnecting wiring and conduit. Supplier shall provide, size and coordinate all system components to suit the application providing a complete, reliable, working installation. Supplier shall also provide on-site initial programming of unit, tests for accuracy, and instruction of the Department's representatives in programming and operation of system. Additional features shall include the following:
1. Automatic delivery report that confirms bulk delivery amounts automatically.
 2. Programmable high level alarm to warn of overfill during bulk deliveries, low-level fuel inventory alarm, high water limit alarm, and sudden-loss alarm to detect rapid inventory changes caused by theft or major tank failure during closed hours.
 3. Leak detection capability to monitor a single tank or all tanks in the system for product losses caused by small leaks. This leak detection method shall be supplementary to the system described in subarticle B below when the fluid is at equilibrium and no dispensing or deliveries are taking place. Capable of detecting product loss from a tank of 0.1 gallons per hour. The leak detect printout shall show the cumulative change sensed in tank volume by hour.
 4. Programmable automatic report times.
 5. Each console shall be able to monitor up to 8 tanks.
 6. Factory calibrated probes operated on a capacitance principle for the diesel or gasoline fuel tanks and magnetostrictive principle for waste oil tanks to sense liquid height and requiring only a two-wire connection to the console. Each probe length to suit tank with riser and ring kits and ballast rings as required for tank liquids.
 7. RS-232 port to interface with terminals.
 8. Power requirements shall be 120 volts, single phase, 60 Hz.
- B. Leak detection system shall be made up of accessories to the Inventory Control Veeder-Root 350 specified in subarticle A above or shall be a Owens-Corning Hydrostatic Tank Monitor Model AB0014A with switch

panel SP-4 and piping sump sensor Model PSS. The system shall be a UL listed electronic field programmable fluid detection system that shall continuously monitor locations shown on drawings for tank or piping leakage. System shall include a wall-mounted control console, fluid sensors, and all interconnecting wiring and conduit. Supplier shall size and coordinate system components to suit the application providing a complete, reliable, working installation. Supplier shall also provide on-site initial programming of units, tests for operation, and instruction of Owner's Representatives in field programming and operation of system. Additional features shall include the following:

1. Sensors shall be rated for Class I, Division 1, Group D locations. The sensors shall be stainless steel and be capable of detecting a 2-inch or more accumulation of liquid in the service manways. Sensors for a brine filled interstitial space shall be that specified by the tank supplier.
2. Each control console shall monitor up to 8 fluid sensors.
3. Audio and visual alarms at 75 dB at 100 cm.
4. Auxiliary relay output for remote alarm, phone dialer or pump shutdown.
5. Analog output for recording or control instrumentation.
6. Power requirements of 120 volt, single phase, 60 Hz and maximum power consumption of 2 watts per sensor.
7. Intrinsically safe interface between sensors and electronic control panel.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install new AST system in accordance with the drawings, the referenced publications, and the manufacturer's written instructions, checklists, and warranty requirements for each system component.
- B. Tanks shall be at least 36 inches apart.

3.02 TANK TESTING

- A. Perform aboveground air tests in accordance with the tank manufacturer's written instructions. Do not apply a high air pressure line directly to the interstitial space of the double wall tank at any time.

END OF SECTION