

SECTION 13201
UNDERGROUND STORAGE TANKS

PART 1 -- GENERAL

1.01 WORK INCLUDED

- A. Provide new Underground Storage Tank (UST) systems in accordance with the drawings, the referenced publications, and the manufacturer's written instructions, checklists, and warranty requirements for each system component. UST systems include the products, equipment, and systems identified in this section.
- B. Provide all bedding material as specified on the drawings and these specifications.

1.02 RELATED SECTIONS

- A. Section 02050 - Excavation, Demolition and Disposal
- B. Section 02223 - Backfilling
- C. Section 02231 - Aggregate Base Course
- D. Section 02680 - Fuel Distribution
- 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 D 1557-78 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 D 2922-81 Density of soils and soil-aggregate in place by nuclear methods (shallow depth).

American Society for Testing Materials

ASTM D 3017-88 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 1615 Installation of underground petroleum storage systems.
- Publication 1621 Recommended practice for bulk liquid stock control at retail outlets.
- Publication 1632 Cathodic protection of underground storage tanks and piping systems.

National Association of Corrosion Engineers (NACE) Recommended Practices

- RP-01-69 Control of external corrosion on submerged metallic piping systems.
- PR-02-85 Control of external corrosion on metallic buried, partially buried, or submerged liquid storage systems.

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.

Petroleum Equipment Institute (PEI) Recommended Practices

- RP-100-86 Recommended practices for installation of underground liquid systems.

Steel Tank Institute (STI) Standards

- ST1 (1983) Specification for STI-P3 system of external corrosion protection of underground steel storage tanks.
- STI (----) Standard for dual wall underground storage tanks.
- STI F894-89* Specification for external corrosion protection or FRP composite steel underground storage tanks.

Underwriters Laboratories (UL) Standards

UL 58	Standard for steel underground tanks for flammable and combustible liquids.
UL 567	Pipe connectors for flammable and combustible and LP gas.
UL 971	UL-listed non-metal pipe.
UL 1746	Corrosion protection systems for underground storage tanks.
UL 107	Glass fiber reinforced plastic pipe and fittings for flammable liquids.
UL CAN-4-G03.1-M85	Standards for galvanic corrosion protection systems for underground tanks for flammable and combustible liquids.
UL CAN-4-S603-M85	Standard for steel underground tanks for flammable and combustible liquids.
UL CAN-4-S631-M84	Isolating bushings for steel underground tanks protected with coatings and galvanic systems.
UL-CAN-4-S633-M81	Flexible underground hose connectors.

Uniform Fire Code

UFC 79	Flammable and Combustible Liquids
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U.S. EPA Regulations

40 CFR 280	Technical standards and corrective action requirements for owner and operators of underground storage tanks (UST).
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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 and API Recommended Practice 1615, "Installation of Underground Petroleum Storage Systems".
- 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 UNDERGROUND TANKS FOR STORAGE OF PETROLEUM PRODUCTS

- A. General: Tanks shall be constructed of steel with STI-P3 corrosion protection system. As an alternate if acceptable to the owner, steel/fiberglass composite or fiberglass tanks may be substituted. 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 underground 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. In addition, tanks shall have 30 year limited warranty against external corrosion.

- B. Steel tanks with STI-P3 corrosion protection system shall be as manufactured by Anchorage Tank, Greer Tank, Ace Tank Company, or equal:
1. Size, capacity and appurtenances per drawings with UL label. Nominal diameter of 47 inches for 550 to 1100 gallon tanks; 60 inches for 1500 gallon tanks; 64 inches for 2000 gallon tanks; 76 inches for 3000 to 4000 gallon tanks; and 95 inches for 5000 to 10,000 gallon tanks. Tanks to be anchored to concrete ballast pads below tanks as shown on drawings with hold down straps supplied by tank manufacturer. As an alternate, anchor to "deadman" anchors below tanks per tank manufacturer's specifications. Tanks shall be installed in strict conformance with manufacturer's instructions. Contractor shall be trained by the tank manufacturer for installation of the tanks. Wet hole installation techniques shall be rigidly followed if water is encountered in the excavation.
 2. Tanks shall be double wall construction conforming to UL-58/Type I and STI-P3 standards and be so labeled. The secondary containment outer wrap shall encompass 360° of the inner tank, fitting as tightly as possible while providing monitor well access on each end. Exterior shall be coated with a polyurethane resin and provided with zinc anodes for cathodic protection all per STI-P3 specification. Manufacturer will provide electrically isolated pipe connections with striker plates below each of these openings. Tank to be provided with Steel Tank Institute's 30-year limited warranty. Storage tanks without cathodic protection will not be considered.
 3. Tank penetrations shall be as shown on drawings. Manways shall include a gasket suitable for the material contained within the tank and stainless steel bolts, nuts and washers.
- C. Steel/fiberglass reinforced plastic composite tanks as manufactured by Anchorage Tank, Greer Tank, Ace Tank Company, or equal.
1. Size, capacity and appurtenances per drawings with UL label. Nominal diameter of 47 inches for 550 to 1,100 gallon tanks; 60 inches for 1,500 gallon tanks; 64 inches for 2,000 gallon tanks; 76 inches for 3,000 to 4,000 gallon tanks; and 95 inches for 5,000 to 10,000 gallon tanks. Tanks to be anchored to concrete ballast pads below tanks as shown on drawings with hold down straps supplied by tank manufacturer. As an alternate, anchor to "deadman" anchors below tanks per tank manufacturer's specifications. Tanks shall be installed in strict conformance with manufacturer's instructions. Contractor shall be trained by the tank manufacturer for installation of the tanks. Wet hole installation techniques shall be rigidly followed if water is encountered in the excavation.

2. Tanks shall be double wall construction composite tanks, conforming to UL-58/Type I and ACT-100 standards and be so labeled. The secondary containment outer steel wrap shall encompass 360° of the inner tank, fitting as tightly as possible while providing monitor well access on each end. Exterior shall be laminated with fiberglass reinforced polyester per ACT-100 specification to 125 mils nominal (100 mils minimum). Manufacturer will provide electrically isolated pipe connections with striker plates below each of these openings. Tanks without two steel walls with outer fiberglass coating and Steel Tank Institute's 30-year limited warranty will not be considered.
 3. Tank penetrations shall be as shown on drawings. Manways shall include a gasket suitable for the material contained within the tank and stainless steel bolts, nuts and washers.
- D. Fiberglass reinforced plastic (FRP) tanks shall be as manufactured by Xerxes, Owen-Corning or equal:
1. Size, capacity and appurtenances per drawings with UL label. Nominal diameter of 52 inches for 550 to 1,000 gallon tanks; 76 inches for 2,000 to 4,000 gallon tank; and 96 inches for 6,000 to 10,000 gallon tanks. Tanks to be anchored to concrete ballast pads below tanks as shown on drawings with tank manufacturer furnished hold down straps. As an alternate, anchor to "deadman" anchors below tanks per tank manufacturer's specifications. Install tanks in strict conformance with manufacturer's instructions. Contractor shall be trained by the tank manufacturer for installation of the tanks. Wet hole installation techniques shall be rigidly followed if water is encountered in the excavation.
 2. Tanks shall be double wall construction for containment of leaks with interstitial space between primary (internal) and secondary (external) tank walls to allow for free flow of all leaked product from the primary tank. The interstitial space shall also allow for filling with a brine solution as a hydrostatic leak detection monitoring device with a monitoring fitting and reservoir in the secondary tank wall. Fabricate tanks in conformance with ASTM D 4021-81 and UL File MH 9061 for storage of flammable liquids. Primary and secondary tanks shall be constructed and tested at factory and in the field at 5 psi pressure with 5 to 1 safety factor with no loss in pressure for 24 hours. Primary and secondary tanks shall also be vacuum tested by tank manufacturer to assure structural integrity. Primary tank shall be tested at 11.5 inches and secondary tank tested at 9.5 inches mercury vacuum. Tanks shall withstand surface H-20 axle loads when properly installed according to manufacturer's installation instructions. Tanks shall be designed to withstand external static pressure when buried in ground with 7-foot of overburden over the top of the tank, the hole fully flooded and a minimum safety factor of 7 to 1 against general buckling.

3. Tank penetrations shall be as shown on drawings. Manways shall include a gasket suitable for the material contained within the tank and stainless steel bolts, nuts and washers.

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 underground storage of petroleum products. All appurtenances exposed to the earth in final installation shall, where practical, be shop installed, tested and painted/coated with the same coating going on the tanks before shipment to the site.
- B. Monitor well handhole shall be Emco Wheaton EWA722-001, OPW 104AOW, or equal.
 1. Cast iron lid and rim with API recommended warning label and permanently attached stainless steel hold down bolts.
 2. Polyethylene or steel handhole skirt of approximate 12 inch diameter with additional API recommended warning label inside handhole.
 3. ABS plastic lockable cap and collar for 4 inch pipe.
 4. Buna N O-ring seal.
- C. Service manway manhole shall be Universal 78-3610 or equal.
 1. Steel diamond plate cover with gasket, recessed handle and four flush mount bolts rated for H-20 load.
 2. Steel 12 gauge skirt.
 3. Dimensions: 34-3/4 inch inside diameter, 36 inch cover diameter and 9-1/2 inch skirt depth.
- D. Service manway sump shall be Containment Technologies HD Series or equal:
 1. Polyethylene sump and lid with bolted water tight lid [optional: easy access water shed lid].
 2. Dimensions: 46 inch diameter base, 33 inch diameter riser and 20 to 40 inch height as required.
 3. Riser extension part no. 9033 with 33 inch diameter and 9 inch height each extension as required.
- E. Suction check valve shall be Emco Wheaton A464-002, OPW 32H-5055, or equal.

1. Cast iron body galvanized inside and out.
 2. Brass or bronze seats and discs.
 3. Double poppet internal assembly easily removed for inspection and replacement without disconnecting pipe.
 4. Buna N gaskets.
 5. 2 inch size with threaded female NPT connections.
- F. 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.
- G. 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.
- H. 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.
- I. Spill/fill containment box shall be Emco Wheaton EWA 1003-008, OPW 1-4580, or equal.
1. Aluminum non-sparking lid.
 2. Flexible expansion joint for frost heave or tank settlement.
 3. Pull-up internal drain.
 4. 5 gallon sump containment capacity.
 5. 4 inch threaded female NPT connection for fill pipe.

- J. Fill adapter shall be Emco Wheaton EWA 30-014, OPW 633T, or equal.
 - 1. Die cast aluminum with hard anodized coating.
 - 2. For conventional or dual point fill systems.
 - 3. 4 inch size with threaded female NPT connection.
- K. Fill cap shall be Emco Wheaton EWA 97-003, OPW 634TT, or equal.
 - 1. Aluminum body.
 - 2. Buna N replaceable gasket seal.
 - 3. Easy coupling and removal with padlocking capability.
 - 4. 4 inch size.
- L. Overfill prevention device shall be Emco Wheaton EWA 1100-001, OPW 61S0, or equal.
 - 1. Anodized aluminum body that fits into 4 inch gravity fill drop tube.
 - 2. Teflon vertical slide float design protected by shroud.
 - 3. Viton main poppet seal.
 - 4. Install for shut-off at 90% tank capacity.
- M. Drop tube shall be Emco Wheaton EWA 20-004, OPW 61T-7268, or equal.
 - 1. Aluminum tube.
 - 2. 4 inch size with length cut to suit.
- N. Vapor recovery fill adapter for coaxial vapor recovery shall be Emco, Wheaton EWA 96-001, OPW 633TC, or equal.
 - 1. Korloy or hard coated cast aluminum construction.
 - 2. Coaxial vapor recovery design.
 - 3. 4-inch size with threaded female NPT connection.
- O. Coaxial drop tube shall be Emco Wheaton EWA 90-001, OPW 61TC, or equal.
 - 1. Aluminum tube.
 - 2. 4-inch size with length cut to suit.

- P. Dual point vapor recovery handhole shall be Ace Tank AT717-12, OPW 104A-1066 or equal.
 - 1. Cast iron ring and cover.
 - 2. Non-skid cover surface.
 - 3. 12-inch diameter.
- Q. Dual point vapor recovery adapter shall be Emco Wheaton EWA 76, OPW 1611AV, or equal.
 - 1. Aluminum construction.
 - 2. Seals off vapor path when not coupled.
- R. Dual point vapor recovery adapter cap shall be Emco Wheaton EWA 99, OPW 1711T or equal.

2.04 FLEXIBLE PIPING SYSTEM

- A. Double wall flexible piping system shall be Enviroflex as manufactured by Total Containment, Inc. Piping shall be UL listed for underground piping of flammable liquids. The double-wall piping system shall consist of a flexible inner primary pipe contained within a flexible outer containment pipe, each making connection within a series of surface access containment chambers. All piping runs shall be continuous, whereby there shall be no fittings or piping connections, for either the primary or secondary containment pipe which are not visible or accessible from the above ground surface. The secondary containment system shall provide water tight containment of the primary piping.
- B. Product compatibility: All components of the double-wall piping system shall be compatible with the products to be stored.
- C. Corrosion resistance: All components of the double-wall piping system shall be made of noncorrosive materials, or if metallic, such as the fittings and couplings, isolated from corrosion causing elements.
- D. Structural integrity: The outer secondary containment system shall be of such a design and made of materials to have sufficient strength to withstand the maximum underground burial loads and tested in accordance with AASHTO M294. The flexible inner primary piping system shall be capable of withstanding liquid pressure five times greater than the designed operating pressures.
- E. Integrity testing: The outer secondary containment systems shall undergo an air pressure hold test (3 to 5 psi) after installation and before the final backfill. The flexible inner primary piping system shall be subject to 60 psi air pressure hold test prior to final backfill.
- F. Monitoring capability: The design of the secondary containment system shall permit any leak in the primary piping system to flow from its source to

a surface access containment chamber which shall be fitted with an electronic leak detection system.

2.05 FIBERGLASS PIPING AND FITTINGS

- A. Fiberglass piping and fittings shall be Ameron Dualoy 3000/L or equal. Piping and fittings shall be UL listed for underground piping of flammable liquids and shall conform to ASTM D 2310, D 2517 and D 2996. Pipe shall be filament wound fiberglass reinforced epoxy with integral epoxy liner and exterior coating. Fittings shall be compression molded and filament wound fiberglass reinforced epoxy. Joining shall be bell and spigot tapered adhesive bonded joint with two-part epoxy adhesive for primary product piping system and 2 part clamshell wing nut bolted fittings for secondary containment fittings. Secondary containment piping and fittings shall be one pipe size larger than primary product piping and fittings. Both primary and secondary containment piping shall be sloped to drain back to tank at slopes indicated on drawings. Primary piping systems shall be rated at 150 psig working pressure (-60 to 150 degrees F). Secondary containment piping system shall be 5 psig working pressure.

2.06 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 UST systems in accordance with the drawings, the referenced publications, and the manufacturer's written instructions, checklists, and warranty requirements for each system component.
- B. Excavation for tanks shall be large enough to provide a minimum clearance of 12 inches between the ends and sides of tanks and the sides of the excavation. Tanks shall be at least 12 inches apart.
- C. The excavation shall be deep enough to provide for a backfill depth of at least 12 inches below the bottom of the tank.
- D. The cover shall consist of a minimum of 36 inches of compacted backfill, or a minimum of 18 inches of compacted backfill plus at least 6 inches of reinforced concrete.

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.

3.03 PIPE TESTING

- A. Perform a pipe tightness test in accordance with API 1615, using compressed air and a soap solution.

END OF SECTION