

SECTION 114000 – FUEL DEPOT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide integrated fuel storage and delivery systems. The specification requires the detailed system design, equipment, installation, startup, and training to be the responsibility of a single specialized fuel system supplier. The specification section includes responsibility for mechanical, electrical, and control systems. Furnish and install complete, in place fuel storage and delivery system as indicated on the drawings and specified herein, including but not necessarily limited to:

1. 12,000 gallon above ground diesel tank.
2. 12,000 gallon above ground B20 bio-diesel tank.
3. 10,000 gallon above ground gasoline tank.
4. Tank saddles and support.
5. Off-load jockey pumps and other transfer and control equipment.
6. Tank level and leak monitoring systems.
7. Required containment systems.
8. Access ladders and inspection platforms.
9. Fuel Filtration
10. Piping systems
11. Dispensers and nozzles.
12. Computer system & fuel consumption monitor.
13. Pump controls and alarms.
14. Emergency shut offs.
15. Valving, piping, pits, sensors, leak detection equipment.
16. Steel Canopy.
17. Canopy lighting.
18. All required permits, certifications and inspections.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design fully operational Fuel Depot. Design required tanks and dispensers, including all equipment, parts and appurtenances necessary to ensure a satisfactory operating system. Equipment and installation necessary to accomplish the work herein shall comply with the latest revisions of the applicable federal, state, and local agencies', codes, requirements, regulations and standards concerning above ground fuel storage and dispensing systems.

1.3 SUBMITTALS

- A. Shop drawings: Signed and sealed by a qualified professional engineer licensed in the State where project is located including the following:
1. Product Data: Complete descriptions of product data for each type of product indicated; include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

2. Electrical System Design: Provide drawings and specifications that include the proposed conduit layout and wiring diagrams for equipment covered in this section that requires electrical connections. Indicate conduit size and material, number and size of wires, location of wiring in classified areas and location of intrinsically safe circuits and conduits.
 3. Coordination Drawings with Fuel Depot drawn to scale showing all pumps, piping, electrical conduits, wiring, canopy, dispensers, and tanks, on which components/accessories are shown and coordinated with each other. Indicate system layout, pipe sizes, location of supports, elevations, and equipment mounting details. Include adjustments necessary to avoid obstructions, such as signs, light standards, piping, posts, and other utilities.
 4. Qualification data for manufacturer and installer.
 5. Operation and Maintenance Data: For dispenser equipment, emergency vents and valves, leak detectors, tanks, and associated equipment. Provide four (4) copies.
 6. Calculations: Provide calculations for pump selection, pipe sizes, pipe support requirements, atmospheric vent sizing, and emergency vent sizing.
 7. Permits: Provide copies of all permit applications and approved permits.
 8. Structural Design: Provide drawings of reinforced concrete tank foundation slabs. Include conduit stub up locations, and bollard spacing. Provide drawings of structural steel for walkways or pipe trestles where required.
 9. Control System Design: Provide control system designs including electrical schematics, panel physical, and field wiring diagrams. Control panels shall include power conditioners
- B. Delegated-Design Submittal: For Fuel Depot materials and equipment indicated to comply with performance requirements and design criteria.
- C. Submit shop drawings for review and approval prior to beginning work.
- D. Equipment or materials installed or furnished without prior approval of the engineer will be rejected and such materials will be required to be removed and replaced with approved materials at the complete expense of the Contractor.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Upon delivery of materials to site, Contractor shall visually inspect all materials for defects or damage. If serious defect or damage is detected, Contractor shall notify Engineer immediately.
 - B. Store piping protected from direct sunlight. Support to prevent sagging and bending.
- 1.5 PROJECT CONDITIONS
- A. Underground Utilities and Elements: Locate all underground utilities and elements prior to digging and/or driving stakes. Take care to neither disturb nor damage any existing above ground or under ground utilities or elements. Should any damage occur, the Contractor shall repair or replace the damage to its original condition at his expense. Keep streets, sidewalks and site clean, free from debris, and affected drains open and free flowing at all times.
 - B. Should utilities not shown on the plans be found during excavations, the Contractor shall promptly notify the owner site agent for instructions as to further action. Failure to do so will make the Contractor liable for any and all damage that arises from his neglect.

- C. The Contractor shall take the necessary precautions to protect all existing site conditions. Should damage be incurred, the contractor shall repair or replace the damage to its original condition at his expense.

1.6 WORKMANSHIP

- A. Contractor shall follow the manufacturer's recommendations for installing all pipes, fittings, valves, electric valves, monitors, controllers, and all other appurtenances.
- B. The Contractor shall also follow all standards and installation practices that have been established by all related associations and local, state, and federal codes.
- C. The Contractor shall always perform his work in a professional and orderly manner. The Contractor at all times shall have a Project Superintendent on the site who is completely familiar with all installed materials and will be responsible for the installation of all materials.

1.7 COORDINATION

- A. All work shall be coordinated with other trades on the site; any conflicts shall be resolved by the project manager in order to proceed with the work as rapidly and efficiently as possible.
- B. The contractor responsible for the design and installation of the fuel depot shall coordinate with the owner's fuel supplier to guarantee all delivery requirements and procedures can be accommodated to guarantee supplier's acceptance and ability to supply fuel to the owner.

1.8 PREINSTALLATION CONFERENCE:

- A. Conduct conference at Project site.
- B. Review methods and procedures related to fuel depot system installation including, but not limited to, the following:
 - 1. System layout.
 - 2. Coordination between adjacent work.
 - 3. Construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Field quality-control procedures

1.9 PROJECT RECORD DOCUMENTS

- A. Record and submit actual location of piping system, storage tanks, wiring, conduit runs and system components.

1.10 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum five years documented experience.

- C. Only workmen 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 shall perform installation of equipment.
- D. The contractor shall be International Fire Code Institute certified in the installation of underground / aboveground storage tank equipment. Call 888-708-5423 for certification service information.

1.11 QUALITY ASSURANCE

- A. Installation shall be in compliance with the latest version of the Petroleum Equipment Institute Publications RP100, RP 200, and RP300, NFPA-30, 30A, and 31 and all manufacturers' current installation instructions.
- B. Comply with NFPA 30 "Flammable and Combustible Liquids Code" and NFPA 30A "Automotive and Marine Service Station Code" for design and construction, installation, inspection, and testing of fuel dispensing system components and accessories.
- C. Comply with NFPA 70 "National Electric Code" for equipment, wiring, and conduit installed under this section.
- D. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.
- E. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER'S

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or approved equal.

2.2 MATERIALS

- A. Provide all fuel depot materials and factory-fabricated products of size, types, pressure ratings, and capacities necessary for a satisfactory operating system. If there are any discrepancies in materials or interpretation or their use, the Contractor shall be responsible to obtain proper clarification before any materials are installed.
- B. All materials throughout the system shall be new and undamaged and in perfect working condition.

2.3 ABOVEGROUND HORIZONTAL STORAGE TANKS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Highland Tank UL-2085 Fireguard® Thermally Insulated, GF Double-Wall Aboveground Storage Tank", by Highland Tank & manufacturing Company, Inc., or approved equal.

- B. The tank shall be designed for aboveground storage of flammable and combustible liquids at atmospheric pressure. Tank shall include integral steel secondary containment and thermal insulation that provides a minimum two-hour fire rating.
- C. Each tank shall be delivered as a complete UL-listed assembly with two factory supplied, welded-on saddles. Size and location of saddles shall be as required by Highland Tank. Saddles to be set level on a solid foundation.
- D. Tank shall be designed for possible relocation at a future date. Concrete encased tank designs are not equal and will NOT be permitted.
- E. Tank shall comply with the latest edition of National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code. The tank's secondary containment must be tested for tightness in the factory and in the field before commissioning. Tank shall be supplied with emergency vents for the primary and the secondary containment tanks. Emergency venting by "form of construction" is not equal and will NOT be permitted.
- F. Inner and Outer Tank shall be manufactured in accordance with UL-142 Standard for Steel Aboveground tanks for Flammable and Combustible Liquids. Entire tank shall be labeled for Underwriters Laboratories UL 2085 Standard for Insulated Secondary Containment Aboveground Tank for Flammable Liquids. The tank design shall comply with UL 2085 "Protected" Tank standard and shall be tested for Ballistics, Impact, Hose Stream, and Pool Fire UL-2085 performance standards.
- G. Tank shall be manufactured and labeled in strict accordance with Steel Tank Institute (STI) Fireguard® Thermally Insulated, Double Wall Steel Aboveground Storage Tank standards as applied by a licensee of the STI. Tank shall be subject to the STI's Quality Assurance program and shall be backed by the STI 30 year limited warranty.
- H. The tank system shall also meet or exceed the requirements of:
 - 1. National Fire Protection Association NFPA 30A Automobile and Marine Service Station Code.
 - 2. 1997 Uniform Fire Cod (UFC) "Protected" AST criteria as per Appendix II-F, including ballistics protection.
 - 3. California Air Resources Board (CARB) testing requirements for air emissions.
 - 4. Southern Building Code Congress International (SBCCI) Standard Fire Prevention Code.
 - 5. 1993 Building Officials and Code Administrators (BOCA) National Fire Prevention Code.
- I. Tank shall be fabricated per UL-142 of mild carbon steel with shell seams of continuous lap weld construction. Tank shall be of double wall construction and provide complete secondary containment of the primary storage tank's contents by an impervious steel out wall.
- J. A minimum of 3" of porous, lightweight monolithic thermal insulation material shall be installed at the factory within the interstitial space between the inner and outer wall. Thermal insulating material:
 - 1. Shall be in accordance with American Society of Testing Materials (ASTM) Standards C-332 and C-495.
 - 2. Shall allow liquid to migrate through it to the monitoring point.

3. Shall no be exposed to weathering and shall been protected by the steel secondary containment outer wall (an exterior concrete wall or vault exposed to the elements will NOT be permitted).

K. Lifting lugs shall be provided at balancing points to facilitate handling and installation.

L. Exterior Protective Coating:

1. Surface Preparation: Grit blast – SSPC-SP-6 White Blast
2. Finish: White finish paint system 5-7 DFT on the shell and heads.

M. Threaded fittings with thread protectors shall be supplied as follows (all fittings must be located on tank top per UL):

1. One (1) 2” – Interstitial Monitoring
2. One (1) 2” – Normal Vent, Primary Tank.
3. One (1) 4”, 6”, or 8” – Emergency Vent, Primary Tank.
4. One (1) 4”, 6”, or 8” – Emergency Vent, Secondary Tank.
5. One (1) 4” or 6” – Product Fill.
6. One (1) 2” or 4” – Product Pump or Supply.
7. One (1) 4” – Product Return or Auxiliary (3,000 gal. and larger).
8. One (1) 2” or 4” – Liquid Level Gauge.
9. One (1) 4” – Stage 1 Vapor Recovery, Electronic Level Stage 1 Gauge, or Auxiliary (4,000 gal. 8’0” diameter and larger).
10. One (1) 18” Manway (min.) with emergency vent (4,000 gallons and larger).

2.4 TRANSFER PUMPS

A. Basis-of-Design Product: Subject to compliance with requirements, provide “Simplx SP-3GV Single Tank Smart Pumps” by Simplx® Inc., Springfield, IL or approved equal for diesel and gasoline as required.

2.5 DISPENSERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Gasboy model 9852KXTW1 electronic commercial grade remote controlled fuel dispenser. Dispenser shall be standard flow (up to 15 gpm), dual hose, and single fuel for each type of fuel specified.

2.6 OTHER ACCESSORIES

A. The contract drawings include other sample equipment which is the basis of design for the complete fuel depot system. Provide equal or better components. Provide all required submittals for approval for all components of the system regardless of whether included on the list or not.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Tank shall be installed on a reinforced concrete base constructed by the contractor. Installation and testing shall be in strict accordance with Steel Tank Institute Installation and Testing Instructions for Thermally Insulated, Lightweight, Double Wall Fireguard® Aboveground Storage Tanks.
- B. Backfill in lifts of 12” max. lift thickness. Compaction of backfill shall be 95% based on ASTM D-698.

3.2 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31 Section “Earth Moving.”
- B. Install piping and wiring in sleeves under sidewalks, roadways, and parking lots.
- C. All roots, rocks and surplus excavation shall be removed from the site unless otherwise directed.
- D. Backfill material shall be free-draining and restricted to GW, GP, SW or SP per ASTM D-2487.
- E. Other backfill materials may be used if approved by the Engineer or if otherwise noted on plans.

3.3 LAYOUT OF ABOVE GROUND HORIZONTAL STORAGE TANKS

- A. After approval of design submittal, alterations and changes in the layout may be made to conform to the ground conditions. All changes will be recorded on the as-built drawings for use by the Owner at completion.
- B. Before starting work, determine that work may proceed without disruption of activities of other trades.
- C. The contractor shall carefully check grades to ensure that area is ready to begin work.
- D. Contractor is responsible for taking all reasonable investigative actions and precautions when working around all utility systems.
- E. Trench for pipe shall be wide enough to allow for proper tamping around the pipe in accordance with the manufacturer’s recommendations. Trenches for pipelines shall be made of sufficient depths to provide minimum cover from finish grade as follows:
 - 1. Maintain all warning signs, shoring, barricades, flares and red lanterns as required by OSHA, and any local ordinances. The bottom of the trench shall be clean and smooth, with all rock, loose soil, and organic matter removed. The contractor shall insure that there are no conditions in the trench that could damage the pipe or the wires. Any deviations from the above must be approved by the Owner. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition and in a manner approved by the Owner.

- F. Install piping free of sags and bends.
- G. Install groups of pipes parallel to each other, spaced to permit valve servicing.

3.4 INSPECTION

- A. Materials shall be installed in strict accordance with the procedures recommended by the manufacturer and requirements of agencies having jurisdiction. All materials for this section shall be from a single source manufacturer with a minimum 5 years experience with products of the nature specified.
- B. Install work in strict accordance with manufacturer's recommendations and approved shop drawings.

3.5 PRODUCT HANDLING

- A. Delivery: Deliver materials to job site in unopened containers identified with product manufacturer's name, trade name and other applicable identification.
- B. Storage: Store all materials in dry and protected locations until installation.
- C. Remove and replace units that have been damaged or cannot be satisfactorily cleaned to the Engineer's acceptance, at no additional cost to the Owner. To clean materials follow manufacturer's written cleaning procedures.

3.6 FUEL TANK INSTALLATION

- A. Install tanks in strict accordance with the manufacturer's recommendations, PEI/RP200-92, and applicable fire and environmental codes. State and local permits shall be obtained prior to installation.
- B. Aboveground - Tank shall be clearly marked on all sides with warning signs: "FLAMMABLE" or "COMBUSTIBLE", "NO SMOKING", tank volume, product identification, and other signs as required by the applicable codes.
- C. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Tanks shall be electrically grounded in accordance with N.F.P.A. 78.
- D. The tank installation shall be inspected and approved by the tank supplier or its certified contractor. The tank supplier 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.

3.7 ELECTRICAL SYSTEM

- A. Design, provide and install all branch circuit conduit and wiring for equipment installed in this section. All wiring shall be designed and installed in strict accordance with NFPA 70.

3.8 FIELD QUALITY CONTROL

- A. Test fuel distribution system according to NFPA 30. Replace leaking joints and connections with new materials.
- B. Test and adjust fuel management and leak monitoring systems controls and devices. Replace damaged and malfunctioning controls and devices.
- C. Submit reports of test and procedures in writing to the Engineer.

3.9 DEMONSTRATION

- A. Train Owner's maintenance personnel on procedures and schedules related to start-up and shutdown, troubleshooting, servicing, and preventive maintenance.
- B. Representatives of equipment suppliers for the leak monitoring system shall provide necessary training and technical support to the Owner so that the Owner may properly operate and maintain the systems.

3.10 COMMISSIONING

- A. Before activating the system perform these steps:
 - 1. Flush system piping with grade of fuel to be used by owner to remove any debris and foreign matter in piping prior to filling tank for the first time. Service all system filters and screens and dispose of fuel in accordance with EPA and NFPA regulations after flushing.
 - 2. Open valves to correct position for system operation.

3.11 WARRANTIES

- A. Contractor shall warranty the complete Fuel Depot System installation to be free of defects and will perform as required in an acceptable manner to the owner.
 - 1. The warranty period shall extend for 3 years from the date of acceptance by the owner.
 - 2. Contractor shall make repairs to the system at no cost to the owner for any defect or operational problems that occur from equipment failure, electrical malfunctions, leaks, excessive wear, poor performance, software malfunctions or other problems that are deemed unacceptable to the owner.
 - 3. Contractor shall make said repairs immediately upon notice by the owner for problems preventing delivery of fuel or posing a safety hazard and within 7 days for other problems.
 - 4. Damage to the system by negligence of the owner or its employees or fuel supplier are not subject to repair at no cost by the owner during the warranty period.
- B. Contractor shall perform an anniversary inspection 11 months from the date of acceptance by the owner.
 - 1. Contractor shall inspect all systems for signs of rust, delamination, deterioration, leaks, and other defects with owner and engineer present.

2. Contractor shall photograph all defects and submit a report to the owner including proposed methods for making repair.
3. Upon owner's and engineer's acceptance of proposed repair methods contractor shall make repairs within 30 days to the owner's satisfaction.

END OF SECTION 114000