SECTION 23 10 00 Facility Fuel Systems

SECTION 23 11 13 Facility Fuel-Oil Piping

SECTION 23 12 12 Facility Fuel-Oil Pumps

SECTION 23 13 23 Facility Aboveground Fuel-Oil Storage Tanks

*Note to Engineers:*

*This document covers the introduction of the fuel oil specification. This serves as the starting point. Other specification sections are available to be plugged into this document or into your existing specification documents.*

*The 4 titles listed above are CSI section titles which can be used depending on the nature of your application.*

*Part 1 is a section to cover general overview topics.*

*Part 2 is from other specification section used to cover the products. These sections include:*

*Aboveground Main Fuel Tanks*

*Main Tank Gauging*

*Fuel Oil Pump Sets*

*Immersible Pump Sets*

*Oil Heating and Pumping*

*Day Tanks*

*Fuel Filtration (Polishing)*

*Fuel Oil Accessories*

*Controls*

*Part 3 is to cover execution including:*

*Tank Installation*

*Piping Installation*

*Main Tank Gauging Installation*

*Field Quality Control*

*Demonstration and Training*

*Commissioning*

*If at any time you have questions or concerns please contact Critical Fuel Systems, division of BFS Industries, LLC at 919-575-6711*

Part 1 – GENERAL

1. RELATE DOCUMENTS
2. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and other Specification Sections, apply to this Section.
3. WORK INCLUDED
4. Provide an integrated emergency power fuel oil system. The fuel oil system composed of pump sets, day tanks, filtration systems are connected to a common control system and shall be provided by one manufacturer. The specification requires the detailed system design, equipment, installation inspection, startup, and training to be the responsibility of a single specialized fuel system supplier. This specification section includes responsibility for mechanical, electrical, and control systems.
5. The system shall be in accordance with design standards and shall be designed and built to *N+1* redundancy against failure.

*N+1 indicates where N devices are used with one additional is held as a spare. Typically, in fuel oil systems this involves a spare pump to supply oil to the generator day tanks. A N+N system involves a total back up of the system typically involving a second set of pump sets with dual power feeds and dual PLC controllers. A N+N+1 system provides a complete backup plus one additional unit to be used in case any primary or secondary units are disabled.*

1. The system shall include:
2. Main fuel oil storage tank(s) and accessories.
3. Fuel oil distribution piping, valves and fittings.
4. Main fuel oil tank level and leak monitoring system.
5. Main fuel oil tank fill port and spill containment.
6. Fuel oil day tanks.
7. Fuel oil transfer and control – duplex pump sets.
8. Fuel oil day tank selector valves and back pressure valves
9. Fuel oil filtration system.
10. Fuel oil heating system.
11. All work shall be installed in accordance with all local and State codes.
12. All controls shall be provided by one manufacturer and shall be tested at the factory as a single system.
13. REFERENCES
14. API 650 - Welded Steel Tanks for Oil Storage.
15. API 2000 - Venting atmospheric and Low-Pressure Storage Tanks.
16. NFPA 30 - Flammable and Combustible Liquids Code.
17. NFPA 70 - National Electric Code.
18. PEI/RP100- Recommended Practices for Installation of Underground Liquid Storage Systems
19. PEI/RP200- - Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling
20. UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids.
21. UL 508A-Standard for Industrial Panels of 600 V or less.
22. UL 2085 – Protected Aboveground Tanks for Flammable and Combustible Liquids.
23. Uniform Fire Code: Article 52, Article 79 and Appendix II-F.
24. BOCA Fire Prevention Code
25. SUBMITTALS
26. See Section 23*XXXX* and General Conditions for additional requirements.
27. Mechanical System Design: Indicate system layout, pipe sizes, and location of supports, elevations, and equipment mounting details. For fuel tanks, indicate dimensions, vent sizes and location of all accessories including pumps, fill pipe, man ways, tank supports, tank gauge, and leak sensors. Provide a piping and instrument diagram for the system including a complete bill of material/ equipment list.
28. Control System Design: Provide control system designs including job specific electrical drawings and panel physical equipment layout.
29. Structural Design: Provide drawings of reinforced concrete tank foundation slabs. Provide drawings of structural steel for walkways or pipe trestles where required.
30. Calculations: Provide calculations for pump selection, pipe sizes, and pipe support requirements. Provide calculations for size and thickness of tank hold down slab and straps.
31. Equipment Data: Provide manufacturers information for all equipment.
32. Permit Applications: Provide copies of all permit applications.

*Permits are usually part of the general contractor scope of supply as they may involve many parts of the overall project. The main tank supplier/installer may secure the permits for the main tank installation due to its special requirements.*

1. Schedule: Provide a design and installation schedule.
2. Commissioning: Provide a detailed commissioning plan.

*Commissioning is normally performed by an independent third-party contractor under contract to the end user.*

1. Project Record Documents
2. Record and submit actual location of piping system, storage tanks, wiring, conduit runs and system components.
3. SUBSTITUTIONS
4. Where items of equipment and/or materials are specifically identified herein by a manufacturer’s name or model number, only such specified items may be used in the base bid. The successful contractor will be held responsible to furnish specified items under their base bid. If the contractor wishes to bid on equipment other than that specifically named in either the base bid or alternate, they must submit a request in writing, together with the full description and technical data on the equipment proposed, 7 days before opening of the bids. If such equipment is accepted as an alternate, all bidders shall be notified to allow them to include a price adjustment from the base on the accepted equipment. It is further understood that this alternate will include any and all modifications or extra cost(s), regardless of the trade(s) involved, for any changes necessary due to the alternate equipment.
5. Submittal or shop drawings, if other than the base named equipment, must show detailed changes required by all other trades involved. The contractor shall be responsible for all additional costs involved. Under no circumstances shall the Architect or Engineer be responsible for the installation, operation, or performance of substitute materials or equipment, even though accepted; this shall be the sole responsibility of the contractor. In addition to any specific warranty in the Heating, Ventilating, Air Conditioning, Plumbing, or Electrical specifications, the manufacturers of all equipment to be supplied under any substitution shall warrant the same against all costs, including labor and material, arising out of defects in material and/or workmanship, for a period coextensive with the guarantee period provided in the contract documents.
6. The calculations for capacities, quantities, dimensions, and all other attributes are based on the pertinent data of the Base Named Manufacturers. If submitted alternate manufacturer is accepted as an alternate, it shall be the contractor’s responsibility to investigate in detail the products of these other manufacturers. The contractor shall be solely responsible for all changes in design, location, dimension, function, and installation involved in selection of other than the Base Named Manufacturer. The contractor shall be responsible for, and bear all costs for, any and all changes including any required work of any and all other trades, or the owner and including all of the Architects and Engineer’s redesign or evaluation of submittal costs caused directly or indirectly by the use of equipment other than that listed on the drawings or called for in the specifications.
7. QUALITY ASSURANCE
8. Comply with NFPA 30 “Flammable and Combustible Liquids Code” for design and construction, installation, inspection, and testing of fuel system components and accessories.
9. Comply with NFPA 31 “Installation of Oil Burning Equipment” for the same as item A above.
10. Comply with NFPA 70 “National Electric Code” for equipment, wiring, and conduit installed under this section.
11. For Industrial Electrical Panels, comply with UL 508A.
12. Provide equipment and accessories that are listed and labeled.
13. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
14. QUALIFICATIONS
15. The company shall provide evidence of prior installation of 10 fuel oil systems of similar capability in the last 5 years.
16. REGULATORY REQUIREMENTS
17. Comply with requirements of the EPA and other state and local authorities having jurisdiction. Include permitting and registering of fuel storage tank.
18. DELIVERY, STORAGE, AND HANDLING
19. Comply with manufacturer's installation instructions for rigging, unloading and transporting units.
20. Protect all equipment and tanks from damage after arrival at site.
21. OPERATION AND MAINTENANCE MANUALS
22. Operation Data: Include installation instructions and assembly views.
23. Maintenance Data: Include maintenance and inspection data, replacement part numbers and availability, and service depot location and telephone number.

Part 2 – PRODUCTS

*Below are example sections that can be pulled in from other specification sections found on the CFS Website. Where noted, CFS does not provide this equipment, but is listed here for completeness.*

1. ABOVEGROUND FIRE RATED FUEL TANKS
2. ABOVEGROUND FUEL TANKS (NON-FIRE RATED)
3. UNDERGROUND FUEL TANKS

*Not provided by CFS, consult with a qualified supplier.*

1. FUEL DISTRIBUTION PIPE - UNDERGROUND

*Not provided by CFS, consult with a qualified supplier.*

1. FUEL DISTRIBUTION PIPE - SECONDARY CONTAINMENT

*Not provided by CFS, consult with a qualified supplier.*

1. TANK GAUGING AND LEAK MONITORING
2. FUEL OIL PUMP SET
3. OIL HEATING AND PUMPING
4. DAY TANK
5. FUEL OIL ACCESSORY EQUIPMENT
6. Anti-Syphon Valve
7. Back Pressure Regulating Valve / Pressure Reducing Valve
8. Base Pan Leak Switch
9. Check Valve
10. Containment Pipe Leak Sensors and Vent Overflow Sensors
11. DP Gauges and Switches
12. Fill Box
13. Overfill Alarm Panel
14. Fill Manifold
15. Fire Valves
16. Flow Limiter
17. Flow Switch
18. Foot Valve
19. Level Transmitter
20. Overfill Prevention Valve
21. Pressure Gauges
22. Emergency Relief Valve
23. Sight Flow Indicator
24. Spill Containment Kits
25. Strainers
26. Tank Gauge (Manual)
27. Tank Level and Leak Switches
28. Temperature Transmitter
29. Vacuum Breaker
30. Valves (Manual Ball Valve, Solenoid Valve, Motorized Valve)
31. Vents
32. FUEL FILTRATION
33. CONTROLS

Part 3 - EXECUTION