1. FUEL OIL SYSTEM ACCESSORY EQUIPMENT
2. Anti-syphon Valve
3. Anti-Syphon Valve: Furnish and install at the high point of the oil suction line an Anti-Siphon Valve. The Anti-Siphon Valve prevents oil spills caused by oil being siphoned from the storage tank onto the equipment room floor. The valve shall automatically shut off the oil flow in the event of a broken or inadvertently left open oil suction line. Anti-Siphon Valves are supplied with Aluminum bodies. Valve spring shall be factory set. Anti-Syphon valves that are easily field adjustable are not allowed. The valve shall be factory set to meet the flow and vertical pipe height requirements of the system. The valve shall be a Critical Fuel Systems Anti-Syphon Valve Model ASV.
4. Back-Pressure Valve / Pressure Reducing Valve
5. A Back-Pressure Valve shall be used as noted on the drawings. The Back-Pressure Valve shall be designed for use with fuel oil (diesel) and be sized to handle the required flows and pressures. The valve will allow for adjustments in the field to set the correct pressure to match field conditions. The drawings show the normal required pressure and the unit shall be provided with the correct springs to match this requirement and to allow field adjustability. The Back-Pressure Valve shall be a Critical Fuel Systems Model BPV.
6. A Pressure Reducing Valve shall be used as noted on the drawings. The Pressure Reducing Valve shall be designed for use with fuel oil (diesel) and be sized to handle the required flows and pressures. The valve will allow for adjustments in the field to set the correct pressure to match field conditions. The drawings show the normal required pressure and the unit shall be provided with the correct springs to match this requirement and to allow field adjustability. The Pressure Reducing Valve shall be a Critical Fuel Systems Model PRV.
7. Base Pan Leak Switch
8. Provide a leak switch mounted in the base pan of various pieces of equipment where oil may leak and be collected. These switches shall be mounted so that that detect the minimal amount of oil (lowest area of the base pan). The unit shall use a brass stem with a Stainless-Steel or Buna float. The unit shall include an electrical box to allow easy installation. The Base Pan Leak Switch shall be a Critical Fuel Systems Model PLS.
9. Check Valve
10. Spring Check Valves shall have a bronze body with a straight through design. The ends shall be threaded (NPT). The unit shall be designed for use with fuel oil (diesel). The Check Valve can be installed horizontally or in a vertical orientation with the flow going up. The Check Valve shall be a Critical Fuel Systems Model CV.
11. Containment Pipe Leak and Vent Overflow Sensors
12. Containment pipe leak sensors: Provide where shown on the drawings a leak sensor at each low point on the containment piping within the building. Leak sensor shall be lever float operated and be magnetically actuated. External to the containment pipe, switch shall be protected by a heavy duty cast aluminum NEMA 4 watertight and explosion proof wiring enclosure. Leak sensor shall be used for all storage (main and day tanks) tank vents to detect tank overflow into the vent line. Mount switch as close to the top of the tank as possible, no more than 1 ft. In tank vents the switch is installed in a “cross” to allow a plug to be removed to allow for testing of the switch. The containment pipe leak sensor shall be a Critical Fuel Systems Model CPLS. The overfill alarm switch shall be a Critical Fuel Systems Model OFS
13. DP Gauges and Switches
14. Provide a differential pressure sensor across all flow restrictions. This includes all strainers and filters. The sensor shall include a large 2.5” gauge with a dial that provides three color coded operational areas. Green will indicate that no blockage has occurred, yellow will indicate that the strainer or filter is starting to clog, and red will indicate that the strainer needs to be cleaned or the filter needs to be changed. A 0-3psid is used on strainer applications while a 0-25psid is used on filter applications.
15. A contact output is provided to alert the control system of a strainer that needs cleaning or a filter that needs to be replaced.
16. The body is constructed of aluminum with SS316 internals with ¼” ports on both sides. The unit shall be installed where it is easily viewed by the operators.
17. The DP Gauge and Switch shall be a Critical Fuel Systems Model DPS.
18. Fill Box
19. Acceptable manufacturers subject to compliance with the specifications:
20. Critical Fuel Systems Model FB
21. Morrison Brothers
22. OPW
23. Fill Box - Spill Container: (For above ground installations only where the fill box is mounted in the wall, on the wall, or free standing.) If the fill box is being used with a truck mounted pump it is strongly suggested to make use of an Overfill Prevention Valve (Model OPV) to prevent spills. The fill box - spill container shall have a total of five U.S. gallon holding capacity, be heavy construction with a neoprene gasket door seal, two-point latch locking handle (1.5, 2” or 3”) oil fill connection dry disconnect and dust cover. Provide with (2) 2” NPT flanges for mounting as free standing or with a stand as detailed on the drawings. The cabinet shall be 304 stainless steel or carbon steel 12-gauge construction with ½” NPT drain connection. Spill container is to be provided with an integral overfill alarm station, consisting of an explosion proof overfill alarm light(s), alarm horn, and Alarm silence pushbutton. The light and bell shall be automatically silenced in 90 seconds or instantly when the operator selects the Alarm Silence button. Include digital tank contents display if noted on drawings.

Fill Boxes can be mounted in the wall with a flange around the edge or one the wall where the box will stick out about 12 inches. These boxes can be heavily customized.

1. The fill box shall be 24, 30, or 36 inches square in size, 16 inches deep.

The fill box can be designed to be mounted on steel posts if required.

A fill box with any additional equipment other than the dry disconnect fitting will require a 30-inch or 36-inch size enclosure.

1. Fuel oil supply fill box enclosure shall come with 2 / 3 / 4" size oil fill connection dry break hose connection. The piping connection shall be through the back / top / bottom.
2. Major System Components shall include but not be limited to:
3. An overfill prevention annunciator shall be mounted on the inside of the fill box with overfill warning lights and audible alarm. Electrical devices shall be intrinsically safe low voltage. Maximum power allowed in panel is 49 volts.
4. Full port ball valve, position of handle to indicate valve position.
5. Check valve
6. Safety and environmental provisions
7. 5-gallon reservoir to contain spillage from connecting or disconnecting the hose.
8. 24vdc, oil tight, pilot devices
9. Green lamp– system ready
10. Amber lamp – tank full 85%
11. Red lamp – high level alarm 90%
12. High reservoir level alarm switch
13. Audible alarm which will automatically silence after 30 seconds.
14. Alarm silence push button and test push button
15. In box piping shall be schedule 40 or heavier black steel piping. No galvanized piping or fittings are allowed.
16. Provide permanently mounted and prominently displayed inside the Fill Station a durable nameplate displaying the main oil storage tank’s inventory capacity in US gallons. The system shall include a caution sign which shall read as follows: CAUTION WHEN ALARM BELL SOUNDS OIL TANK FILLED TO CAPACITY DO NOT OVERFILL. Lettering shall be in large letters with contrasting colors.
17. Environmental conditions shall be typical outdoors installation. All vents and penetrations shall be designed to reasonably prevent intrusion from rain, snow and other precipitation.
18. Wiring shall comply with NEC
19. Overfill Alarm Panel
20. Externally mounted within sight of the fill station shall be an audible/visual overfill alarm system for single tank installations to be activated by a high level switch when used in conjunction with a junction box or a tank gauge system. The station shall consist of an “Overfill Alarm” light, alarm horn, “Alarm Silence” pushbutton and a digital readout of tank contents in US gallons. All wiring shall be in Liquid-Tite waterproof flexible conduit. The alarm light and horn shall be automatically silenced in 90 seconds or instantly when the operator depresses the “Alarm Silence” button.
21. Fill Manifold
22. Fill Manifolds are used to control the filling of day tanks in multi-generator applications. The size is shown on the drawing to match the piping size. The manifold shall include the following:
23. Bypass Ball Valve
24. Two Isolation Ball Valves
25. Two solenoid valves or motorized ball valves with end switches
26. Flow Orifice
27. Adjustable Flow Limiter
28. Sight Flow Indicator
29. Deadman Bypass valve
30. Simplex Strainer
31. Globe Valve to manually control flow in the bypass line
32. Flex hose on the inlet and outlet
33. Fire Valve
34. Inlet and Outlet Pressure Gauges
35. Spin on Filters
36. Flow Switches

Include the options required above.

1. The fill manifold shall be a Critical Fuel System Model TFM
2. Fire Valves
3. Emergency Shut-Off Valves: Provide a fusible link spring valve, Critical Fuel Systems Model FSV.
4. Each FSV valve shall be equipped with;

* Spring to close actuator
* Replaceable fusible link

1. Major functions shall be

* Automatic shutoff of valve at 165-degree F

1. Install as noted on the project drawings.

OR

1. The fuel system shall be provided with completely self-contained fusible link valves with integral position proving switch, Critical Fuel Systems Model FSSV. The valve assembly shall be FM approved and certified to API 607. The fusible link shall be completely integral and not require any external cables or fixation. When the designated maximum ambient temperature is reached the fusible link will soften immediately allowing the spring pack to close the valve. The valve position will be automatically detected by the proving switch and reported to the master control panel.
2. Each FSSV valve shall be equipped with;

* API 607 carbon steel, fire safe ball valve
* Spring to close actuator
* UL listed, Class I, Div. 2 Integral non-contact position proving switch
* Replaceable fusible link

1. Major functions shall be

* Automatic shutoff of valve at 165-degree F
* The valve shall be useable as a manual shut-off without disarming fusible link
* Reporting valve position to master control panel

1. Safety and environmental safety provisions

* FM Approved valve actuator assembly
* API 607 certified as a firesafe valve

1. Interface and communication: Integral, non-contact, position proving switch
2. Install as noted on the project drawings.
3. Flow Limiter
4. Provide orifice based flow limiter to set the flow at XXXgph as sized by the manufacturer. The upstream pressure and the downstream pressures will need to be determined to properly size the orifice. Please consult with the fuel oil system manufacturer to properly size the unit. Orifice shall be provided by Critical Fuel Systems, Model OFL.

OR

1. Provide an adjustable flow limiter to be set during startup to manage the correct flow into the day tanks. Consult with the fuel oil system manufacturer to properly size this unit. The adjustable flow limiter shall be provided by Critical Fuel Systems, Model AFL.
2. Flow Switch
3. Where indicated on drawings supply a Critical Fuel Systems, Model FS flow switch. The switch is of brass construction with a SPDT switch used to indicate flow. Consult with the fuel oil equipment manufacturer for proper sizing and orientation of the flow switch.
4. Foot Valve
5. Where indicated on drawings supply a Critical Fuel Systems, Model FV double poppet foot valve of bronze construction, with lapped-in seats, flat poppets, and 20 mesh Monel screen. Where noted on drawings provide a foot valve extractor fitting to provide easy removal of a clogged foot valve.
6. Level Transmitter
7. Where indicated on the day tank detail drawings provide a Critical Fuel Systems, Model LT continuous level transmitter. The transmitter will measure levels up to 12 feet in depth and provides a 4-20ma signal of level with a resolution of + or – ¼”.
8. Overfill Prevention Valve
9. Overfill Prevention Valve: The tank shall have an overfill prevention valve installed in the fill pipe. The valve shall close automatically at 90% of tank capacity. The valve shall incorporate a drop tube extending to within 6” of the tank bottom. Valve will be rated for gravity fill only. Overfill prevention valve shall be as manufactured by Critical Fuel Systems Model: OPV

OR

1. Overfill Prevention Valve: The tank shall have an overfill prevention valve installed in the fill pipe. The valve shall close automatically at 90% of tank capacity. The valve shall incorporate a drop tube extending to within 6” of the tank bottom. Valve shall be rated for pressurized fuel delivery. An automatically actuated motorized ball valve in the fill pipe may be provided as an alternative.
2. Pressure Gauges
3. Provide pressure gauges as noted on the drawings. Pressure gauges shall be 2.5” / 4” in size. The ranges shown on the front for pressure gauges shall be such that normal pressures are typically in the middle of the gauge. For vacuum applications a compound gauge is used with a scale of 0-30” Hg vacuum and 0-30psi pressure (30” Hg – 0 – 30psig)
4. Provide Critical Fuel Systems Pressure Gauges, Model PG for pressure gauges, and Model PGC for compound gauges.
5. Emergency Relief Valve
6. As noted on the drawings provide Critical Fuel Systems Model RV relief valves. These valves are typically set at 10 percent above the maximum design pressure of the pump/motor combination. (50 psi system is set at 55, 100 psi system is set at 110, and a 150psi system is set at 165psi.) These valves are for emergency use and are not to be adjusted in the field. Consult with the fuel oil equipment manufacture for the proper sizing given the normal pump discharge flow and pressure.
7. Sight Flow Indicator
8. As noted on the drawings provide a Critical Fuel Systems Model SFI sight flow indicator. The indicator shall have a bronze body with a tempered glass window on both sides. The unit can be oriented in either a horizontal or vertical orientation. The indicator wheel shall be ABS material.

DO NOT USE ON APPLICATIONS WHERE PRESSURE CAN BE ABOVE 150 PSI. Should only be used on low pressure applications with 50 or 100 psi pumps. If used on a higher-pressure system, they shall be located just before the oil is flowing into an atmospheric tank with no isolation valves.

1. Spill Containment Kits
2. Provide as noted on the drawings a Critical Fuel Systems Model SPC Spill Kit. The kit will be self-contained in a 65 gallon drum with 100 pads, 15 – 3 inch diameter by 4 feet long socks, 6 – 21” by 17” pillows, pair of gloves, pair of goggles, guide book and 10 disposal bags.
3. Strainers
4. Provide as noted on the drawing Critical Fuel Systems Model STR-S Simplex Strainers or Model STR-D Duplex strainers. These units make sue of cast iron body and cover with Buna-N O-ring seals. The basket(s) shall be 304SS with 1/16 perforated basket, 80 mesh baskets, or 100 mesh baskets.
5. Tank Gauge (Manual)
6. Provide as noted on the tank drawings a manual operated tank gauge which makes use of a pull tape measure noted in inches from the bottom of the tank. This unit shall be sealed from leaks do to overfilling of the tank. Devices which can allow oil to seep out during overfilled conditions will not be allowed. Manual tank gauge shall be a Critical Fuel Systems, Model No. TG
7. Tank Level and Leak Switches
8. Main Tank overfill alarm switch: Tank shall be fitted with a high level switch. High level switch shall be arranged to positively stop the flow of oil into the main tank, activate the overfill alarm and notify the Fuel Oil Control Panel when the liquid level reaches 90 percent of tank capacity. Pump running circuit of the return pump(s) shall be interlocked with the High Level Switch, which shall provide electronic instructions to shut off all pumps in the system if a return pump is the source of the overfilling, or alarm only if the cause is due to a delivery filling error. Tank High Level Switch Unit shall be float operated, suitable for #2 oil at 150 psi, have brass and SS wetted parts, and be mounted in a 2" tapping in the tank top. Switch shall be hermetically sealed and fully isolated from tank contents and external atmosphere. Electrical connections shall be made externally to the tank in an explosion-proof head assembly approved by UL for Class 1, Group D applications. Switch shall be a Critical Fuel Systems. Model No. LLS.
9. Temperature Transmitter
10. Provide a temperature transmitter for day tanks as noted on the drawings. The transmitter shall extend to within 6 inches of the bottom of the day tank and provides a 4-20ma output. The transmitter shall provide a temperature in the range of -40 to +200 degrees F. Transmitters shall be a Critical Fuel Systems, Model No. TT
11. Vacuum Breaker
12. Where noted on the drawings provide a vacuum breaker to break the suction on a line that may cause problems with the fuel oil system. The vacuum breaker shall be sized by the fuel oil equipment manufacture to relieve the expected vacuum. The unit shall include a brass body with stainless steel ball and spring. A screen is used to protect from debris affecting the operation of the unit. The unit shall use NPT connections to the process and to the atmosphere. The unit shall be a Critical Fuel Systems, Model VB.
13. Valves (Manual Ball Valve, Solenoid Valve, Motorized Valve)
14. Manual Ball Valves: Bronze construction, two-piece body, stainless steel ball and stem. The valves shall be a Critical Fuel Systems Model VH
15. Motorized Ball Valves: Stainless steel body, stainless steel ball and stem, proof of closure and open switches. The valves shall be a Critical Fuel Systems Model VM
16. Solenoid Valves: Forged Brass, Minimum 5 PSIG pressure differential, normally closed or open per plans. The valves shall be a Critical Fuel Systems Model VS.
17. Vents
18. Vent: As shown on drawings, install at the vent pipe termination, an aluminum vent cap. Vent shall be the full size of the pipe according to NFPA 30 Flammable and Combustible liquids Code and NFPA 31 Standard for the Installation of oil burning equipment. The vent shall include a 40 mesh stainless steel screen and a rain cap. The vent shall be a Critical Fuel Systems Model VT-N
19. Emergency Vents: Emergency vents shall be equipped with aluminum vents sized to open at 8 oz pressure to provide the required capacity. If local code requires the emergency vent should be taken outside. The emergency vent shall be a Critical Fuel Systems Model VT-E