

# Reliant Series

Fire-Rated Fuel Tanks





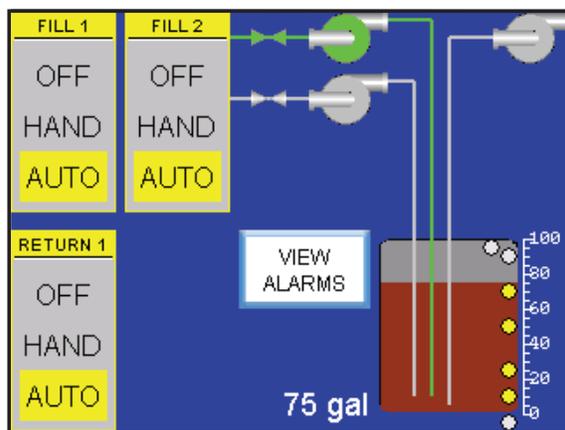
**UL2080 Fire Resistant Construction**  
**UL2085 Fire Protected Construction**  
**UL508 Controllers**



## Description

The Simplex Reliant Series Fire-Rated Systems Fuel Tank is a special variant of the Reliant Series. The Fire-Rated variant incorporates a UL2080 or UL2085 construction fuel tank into the Reliant Series System. In addition, special consideration is given to piping, valves, sensors and venting to maintain the overall Fire-Rated integrity of the system. A notable design feature is the incorporation of automatic, self-closing fusible link valves at all points of connection where the melt-out of the connection in a fire event could cause the discharge of fuel into the fire.

- UL2080 or UL2085 tank construction
- Addition of critical Fire-Rated devices
- All ferrous pipe, fittings, devices in fuel pipeline
- 10-400 gallons
- For use as day tanks, return tanks, source tanks
- For use with fuel oil
- UL508 digital and analog controllers



## ENGINEER'S SPECIFICATION

### Reliant FR

Sample spec for UL2085 Fire-Rated Day Tank with duplex on-board pumps drawing from remote Underground Main Tank (UST). The following defines a day tank with pump system designed for delivery of fuel from a source tank to a day tank located at grade, approximately (no greater than 18 feet vertical by 200 feet horizontal. Consult simplex when pipe runs are maximum) feet from the source tank via a pump set installed on the day tank. At this site, consideration must be given to suction lift characteristics of pumps: this system will operate in the suction lift capability curve of the pumps. Therefore, pipe size of both supply and return lines is paramount to both reduce friction in the supply line and allow for free flow return of fuel in the return line. A foot valve is required in this system if source tank is below day tank. Manual priming is required. Once primed, the system is flooded from the foot of the supply in the main tank to the foot of the drop tube in the day tank and the system will perform as designed.

See below for options required when the source tank is above the day tank.

This specification defines a Day Tank System consisting of a UL2085 Listed Fire-Rated tank. In order to preserve the fire resistant characteristics of the system, careful consideration must be given to emergency venting in accordance with UL, with the use of ferrous pipe and fittings and the judicious installation of Fire-Rated valves, fusible-link shutoff valves and other fire resistant devices.

A full flow overflow-return pipe from each day tank back to the bulk storage tank must be provided.

### Fuel Oil Day Tank

**1.0** General: Provide a packaged design fuel oil day tank for each prime mover. Day tank shall be complete in all respects in order to provide the prime mover with a reliable, local source of fuel. Day tank shall provide an automatic, self-refilling fuel supply system.

**1.1** The day tank shall be designed and supplied as an engineered system by the manufacturer. Each tank shall be of packaged design to include all inlet flow control devices, other valves, level controls, pump controls, indicators, alarms and all other devices as required to form an integrated, functional system such that field installation is restricted largely to external piping, wiring and such intermediate devices that are required by code and/or good engineering practice to interconnect the bulk source of supply to the day tank, the day tank to the prime mover and to provide for external vents as per local codes and UL2085, UL142, NFPA31 and NFPA37.

**1.1.1** The system shall be for use with fuel oil as described by NFPA321, "Basic Classification of Flammable and Combustible Liquids". As defined by this standard, the fuel supply system shall be for use with "combustible liquids", those having a flash point at or above 100°F and further defined as class II or class III liquids. In no case shall a liquid defined as "flammable", or as "class I" or as having a flash point less than 100°F be used. In every case, the system shall not be used or applied at a temperature in excess of the flash point of the contents. Electrical equipment used in the system shall be in accordance with NFPA30, section 5-7, wherein it states "For areas where class II or class III liquids only are stored or handled at a temperature below their flash points, the electrical equipment may be installed in accordance with provisions of NFPA70, National Electric Code, for ordinary locations..."

**1.1.2** The system shall be designed and installed in accordance with applicable sections of NFPA30, NFPA31, NFPA37, UL80 and UL142. The day tank shall bear the label of Underwriters Laboratories standard UL142, UL508, and UL2085.

**1.2** Installation General: The day tank shall be installed adjacent to the prime mover, on the same grade. Install (as shown on the plan drawings, [as detailed herein]) on a housekeeping pad adjacent to the prime mover. Anchor tank to the pad.

**1.2.3** Provide schedule 40, ASTM A 53, black iron pipe connections to the day tank as shown. Make all connections to fixed installed pipe with pipe unions to facilitate tank service/removal.

- (1) Supply to day tank, inlet to day tank pump
- (2) Day tank overflow to bulk supply
- (3) Supply and return to prime mover, as recommended by manufacturer.
- (4) Vent sizes shall be as shown and as required by local codes and by UL 142, NFPA31 and NFPA37 specification

**1.3** Day tank ratings

**1.3.1** Capacity: (SPECIFY 50-400 gallons)

**1.3.2** Power requirements: 115/230v, single phase; 230/460v, 3-phase) V AC, 60Hertz, dedicated branch circuit

**1.3.3** Day tank construction

**1.3.3.1** All welded steel, UL2085 Fire-Rated, protected secondary containment tank of double wall construction intended for atmospheric use with fuel oil. The tank shall consist of a primary tank and a secondary containment forming a double-wall structure. The interstitial space between the primary and secondary shall be filled with a thermal insulating medium such that heat transfer to the primary tank is limited to the requirements as listed in UL2085. Construction shall be 10-gauge steel.

**1.3.3.2** Pipe thread connections shall be provided for fuel oil supply from on-board pump set, supply to prime mover, return from prime mover, overflow to main tank, vent, and drain with Fire-Rated ball valve. A weatherproof, screened vent cap shall be provided as a loose item for field installation at the outdoor vent termination

**1.3.3.3** A weighted type emergency vent cap shall be supplied installed on both the primary and secondary emergency vent fittings.

**1.3.3.4** The tank shall be equipped with a welded steel channel base suitable for bolt attachment to a concrete pad

- 1.3.3.5** The tank shall have interior corrosion inhibitors to deter corrosion before installation and use.
- 1.3.3.6** The exterior of the day tank shall receive a heavy duty industrial anti-corrosion coating and be finish painted
- 1.3.3.7** All day tank system components shall be protected within an enclosure with a hinge-open and lockable door.
- 1.3.3.8** All intra-tank system piping shall be ferrous and all pipe fittings, valves and other piping devices shall be ferrous
- 1.3.3.9** The secondary containment shall be equipped with a leak detector that shall activate the "leak" alarm described below. A drain with Fire-Rated ball valve is to be supplied.
- 1.3.3.10** Supply Fire-Rated, self closing, cast iron construction, fusible link valves installed as follows:
1. Supply to day tank
  2. Supply to engine
- 1.3.3.11** Supply Fire-Rated ball valves as follows:
1. Primary tank drain
  2. Secondary tank drain
  3. Supply to tank from pump
  4. Hand pump shutoff
- 1.4** Fuel delivery system: Provide installed upon the day tank, a duplex fuel oil pump and duplex pump controller with automatic alternator for supply of fuel from the main tank to the day tank. This is a suction-lift application: adequate pipe sizes must be used in the system and a foot valve must be installed in the main tank. Manual priming of the system is required.
- 1.4.1** Duplex pumps: (Specify GPM, up to 25GPM) at 1725 rpm, when operating with fuel oil having a viscosity of 32SSU.
- 1.4.2** Direct drive, motor driven pumps coupled via flexible coupling.
- 1.4.3** Motors to be TEFC construction, HP as required for pump at 50 PSI NEMA type B, continuous duty at 40°C, 1725 RPM, 120V AC, 60 hertz, 1.15 service factor
- 1.4.4** Pumps to be directly driven, positive displacement, internal gear type with mechanical shaft seal and cast iron body, machined steel gears.
- 1.4.5** Fire-Rated shutoff ball valves on pump inlets
- 1.4.6** Pump check valve, spring-type, cast iron construction
- 1.4.7** Flowswitch each pump
- 1.4.8** Suction strainer, cast iron wye type fuel oil strainer on each pump suction
- 1.4.9** Provide a piston type, 0.1 gallon per stroke hand pump installed and piped and equipped with fire-rated shutoff valves.
- 1.4.10** (If source tank is above day tank) Inlet flow control solenoid valve each pump. Stainless steel construction, 120V, with fire-rated bypass valve.
- 1.4.11** (If source tank is above day tank) Supply an overflow return pump at 150% minimum capacity, as supply pump and of identical construction. Add overflow return pump controller to paragraph 1.5 below.
- 1.5** Day tank level controller. A UL Listed, integrated design, digital level controller shall be supplied which provides differential level control for activation of pumps, duplex pump alternator, tank level indication, system alarms and manual operating controls. Level controller shall be self-contained as a unit within a NEMA4 enclosure integral with the day tank assembly.
- 1.5.1** PLC based with 6-inch, color, touch-panel operator interface
- 1.5.2** Dual level sensor input:
- 4-20mA continuous sensor, analog-to-digital input
  - Point sensing float switches: low, refill start, refill stop, high, checkpoint for automatic cross check of sensors
- 1.5.3** Leak sensor
- 1.5.4** Spare I/O for options and design-build features
- 1.5.5** MODBUS and Ethernet network compatible
- 1.5.6** 4-20mA loop output for tank level
- 1.5.7** Operator touch-panel interface functions:
- HOA switch
  - Test
  - Reset
  - Alarm silence
  - Numeric display of tank level in gallons (liters)
  - Graphic condition display of tank level and pump/status/alarm condition
  - Message indicators for status and alarm, including:
    - Normal operation
    - Pump running (fill, return, single or multiple pumps)
    - Tank filling
    - Loss of flow
    - Low
    - Critical low
    - High
    - Critical high
    - Leak
- Not in auto
  - Controller failure with specific message
  - Other messages as determined by design-build option configuration
- 1.5.8** Relay dry contact outputs for the following (10A, SPDT):
- Low alarms
  - High alarms
  - Leak
  - Not in auto
  - Other alarms as determined by design-build option configuration
- 1.6** Day tank testing
- 1.6.1** The day tank shall be supplied with manufacturers test certificates as below Tank test: pressure test, leak proof test and structural integrity/appearance test
- 1.6.1.2** Level controller: operational test with liquid of level sensors, level indicator, level control, alarms, backup devices
- 1.6.1.3** Pump: vacuum test, flow test, pressure test, leak proof test, ampere/voltage test, load test, overload test.
- 1.7** Day tank manual
- 1.7.1** The day tank shall be supplied with an illustrated manufacturers manual, which includes the following:
- 1.7.1.1** Registration certificate
- 1.7.1.2** Glossary
- 1.7.1.3** Equipment list
- 1.7.1.4** Detailed description of operation
- 1.7.1.5** Pump specifications
- 1.7.1.6** Installation instructions
- 1.7.1.7** Troubleshooting instructions
- 1.7.1.8** Maintenance instructions
- 1.7.1.9** Piping diagram
- 1.7.1.10** Electrical drawing
- 1.7.1.11** Exploded view parts drawing/parts list
- 1.7.1.12** Dimensional drawing
- 1.7.1.13** Warranty card
- 1.8** Supply a manufacturer's 2-year field service warranty which covers all parts and all labor for guarantee of parts and workmanship as specified herein.
- 1.9** The day tank system, shall be designed and manufactured by a single supplier and be a standard product in serial production. The manufacturer shall have at least 10 years experience in the design and manufacture of these products. This system shall be an SRS-FR Series, Reliant Packaged Design Fuel Oil Day Tank as manufactured by Simplex, Inc., Springfield, Illinois.