



**PERFORMANCE STANDARD FOR
DIESEL FUEL SYSTEMS FOR
ENGINE GENERATOR SETS WITH
ABOVE GROUND STEEL TANKS
EGSA 100T, 1995**

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EGSA 100T 1995 PERFORMANCE STANDARD FOR DIESEL FUEL SYSTEMS FOR ENGINE GENERATOR SETS WITH ABOVE GROUND STEEL TANKS

1. SCOPE

This standard defines requirements for diesel fuel supply systems with above ground steel tanks for diesel engine driven generator sets.

2. REFERENCE STANDARDS

NFPA-30	Flammable And Combustible Liquid Code
NFPA-37	Stationary Combustion Engines And Gas Turbines
NFPA-110	Emergency And Standby Power Systems
UL-142	Steel Above Ground Tanks For Flammable And Combustible Liquids
UL-508	Industrial Control Equipment

3. DEFINITIONS

Automatic Day Tank. A steel atmospheric tank used to supply fuel to the generator set as specified. Includes controls, pump and motor assembly to automatically fill tank.

Control Panel. A panel mounted on tanks containing level switches, indicating lights, and relays to control operation for normal and abnormal conditions.

Day Tank. A steel atmospheric tank used to supply fuel to the generator set engine for 24 hours or as specified.

Double Wall. A closed secondary outer shell of a day tank or sub-base tank to catch leaking of the tank, that is capable of being monitored for leakage.

Fittings. Pipe connections and/or welded openings in a day tank and sub-base tank.

Fuel Level Controller. A device to control the fuel level in the day tank.

Fuel Supply System. Consists of a fuel tank, day tank or sub-base tank to provide a ready supply of fuel to the generator set.

Gauge. The thickness of metal.

Inspection Plate. A removable plate, with gasket, for inspection and periodic maintenance of day tanks.

Local Pumping Unit. A pump and motor assembly mounted on a base plate with cover which can be mounted on a tank to provide automatic day tank functions.

Fuel Tank. A steel atmospheric tank used to supply fuel to the generator set without automatic controls.

Main Storage Tank. A large steel atmospheric tank used to store fuel as a supply to local mounted fuel tanks or automatic day tanks.

Remote Pumping Unit. A pump and motor assembly mounted on a base plate with cover, located away from the day tank and controlled by the float switch on the day tank.

Removable Cover. An enclosure on a tank to protect its pump, motor and electrical controls and components that can be weatherproof for outdoor installations.

Rupture Basin. An open secondary containment tank or dike to catch overflows or leaking of day tank to prevent environmental contamination.

Sub-Base Tank. A steel atmospheric tank used to supply fuel to the generator set and designed to be placed under the generator set.

Testing Procedure. The use of air pressure and test soap to detect leaks in tanks.

Transfer Pump. A pump and motor assembly used to transfer fuel from the main storage tank to the day tank.

4. RATINGS

- 4.1 Tank capacities are given in gallons (liters).
- 4.2 Pumps are rated in gpm at 20 psi(1.38 BAR/M²)discharge pressure at atmospheric suction
- 4.3 Normal vent connections are sized at 1-1/4" NPT nominal pipe diameter for tanks 2500 gallons (4462.5 liters) or smaller.
- 4.4 Emergency vent connections are sized at 2" NPT nominal pipe diameter for tanks 30 square feet (2.70 square meters) or less of wetted surface, 3" NPT nominal pipe diameter for tanks 40 to 60 square feet(3.72 to 5.58 square meters), 4" NPT nominal pipe diameter for tanks to 100 square feet (9.30 square meters), 5" NPT nominal pipe diameter for tanks to 180 square feet(16.74 square meters), 6" NPT nominal pipe diameter for tanks to 300 square feet (27.90 square meters), and 8" NPT nominal pipe diameter for tanks to 900 square feet (83.7 square meters).
- 4.5 AC input ranges for 60 Hz. are 120 V, 1 Phase or 230/460 V, 3 Phase. AC input ranges for 50 Hz. are 220 V, 1 Phase or 380 V, 3 Phase. DC input ranges are 12 or 24 V DC.
- 4.6 Control voltages are 120 V, 1 Phase, 60 Hz.; 220 V, 1 Phase, 50 Hz; or 12 VDC or 24 VDC.
- 4.7 Rated ambient temperature range is 104 F (40 C) maximum and 14 F (-10 C) minimum.

5. CLASSIFICATION

Tanks are classified in respect to type, gallon (liter) capacity, and location.

6. APPLICATION - SPECIFYING CONSIDERATIONS

- 6.1 A day tank is not a pressure vessel.
- 6.2 Rupture basins, dikes or secondary containments should be installed for environmental protection.
- 6.3 Proper venting shall be observed (see section 4.3).
- 6.4 Double wall tanks require venting of outer walled area.
- 6.5 Main storage tank fuel level shall be adequate to maintain a fuel source for the day tank pump to keep the generator set running during the specified length of time.
- 6.6 Fuel strainers shall be installed between main storage and day tanks to remove foreign particles from fuel to prevent damage to transfer pump gears, and engine fuel pump and injectors.
- 6.7 Auxiliary hand pump shall be included to prime day tank pump at start-up time and as-needed back up.
- 6.8 Foot valves, check valves and/or solenoid valves shall be installed to keep fuel line from the fuel tank to fuel pump full in order to keep fuel pump primed and to prevent loss of prime.
- 6.9 Venting should be protected from water, debris, insects and other foreign objects.
- 6.10 Remote pump unit is required if day tank is located beyond the pump suction capacity.
- 6.11 Consideration should be given when sizing the pump regarding the return of fuel to the day tank or the main storage tank and the fuel needs of the generator set.
- 6.12 Tanks shall be labeled stating: Manufacturer, model number, and serial number. If specified, a UL listed tank shall be labeled UL-142.
- 6.13 Overflow connection shall be piped back to the main storage tank and must not be plugged.
- 6.14 Overflow shall be pumped back to main storage tank if the day tank is lower than the main storage tank.
- 6.15 Black pipe shall be used with diesel fuel. Galvanized pipe shall never be used.

7. TYPICAL PERFORMANCE SPECIFICATION

- 7.1 Tank capacity, gallons (liters).
- 7.2 The fuel pump shall be a bronze body high lift gear pump with bronze gears and stainless steel shaft rated at 20 feet of water (6.10 meters of water) suction lift and 20 psi (1.38 BAR/M²) discharge pressure.
- 7.3 The fuel pump motor shall be rated at that HP required to provide rated flow at 20 psi (1.38 Bar/M²) discharge pressure.

- 7.4 The fuel level controller shall be of a heavy duty construction with a stainless steel float and with a replaceable contact block rated to start a 1/3 HP, 115 V, 60 Hz, AC motor (1/3 HP, 220 V 50 Hz, AC motor).
- 7.5 The day tank control panel shall be provided with a press to test switch and pump running indicator light for periodic testing.
- 7.6 The day tank shall be constructed of steel plate with a gauge to provide a minimum deflection per industry design standards.
- 7.7 A sub base tank shall be constructed of formed steel channel and plate to support the weight of the generator set.
- 7.8 The tank shall be welded by properly trained and qualified welders.
- 7.9 The day tank fuel level controller shall close a contact and turn the pump on with a loss of more than 3" (1.8 cm) of level and turn the pump motor off when the tank is full in a automatic unattended operation.
- 7.10 The tank shall be furnished with a low fuel level and a high fuel level float switch with a local indicating light and replaceable relay with contacts wired to a terminal strip for remote annunciation.
- 7.11 The tank shall be provided with a minimum of the following fittings: engine fuel supply, engine fuel return (above fuel level), engine fuel return (alternate below fuel level), vent, overflow, fuel inlet, and fuel drain.
- 7.12 The tank shall be provided with a steel channel base, welded to the tank suitable for bolt attachment to a concrete pad.
- 7.13 The tank shall be mechanically cleaned inside and outside and washed with a solvent or cleaner and coated on the inside with a catalyzed epoxy and on the outside with a chlorinated rubber gray primer.
- 7.14 The tank shall be supplied with installation and operating instructions, and maintenance manuals.

8. OPTIONAL ACCESSORY SPECIFICATION

- 8.1 A critical low fuel level alarm shall be installed to ensure adequate time to locate and repair problems. Prevents loss of prime to engine fuel pump. Operates from engine battery.
- 8.2 A critical high fuel alarm system shall be installed to detect an over-fill condition. Stops the pump motor, provides a solenoid valve to prevent fuel from flowing through pump, and overrides the press to test switch.
- 8.3 A manual fuel fill shall be installed to serve as back-up in the event of power loss to day tank.
- 8.4 Local and/or remote fuel level control alarms shall be visible and audible.

- 8.5 A low flow switch shall be installed with a time-delay relay to warn of a "no fuel" condition in the incoming fuel line from main storage tank.
- 8.6 A second pump & motor and line shall be provided to reverse the flow of fuel back to main storage tank to prevent day tank overflow when the primary tank is higher than the day tank.
- 8.7 A fuel cooler shall be provided to cool the fuel being returned from the engine to the day tank.
- 8.8 Protective devices should be considered to protect motors and electrical circuitry from overload.
- 8.9 A low watt density heater with thermostat shall be provided when fuel is stored at low temperatures.
- 8.10 A containment basin, or double wall tank should be provided for environmental protection.
- 8.11 Duplex pumps and motors shall be provided to provide a back-up pump to the primary pump.

9. INSTALLATION

- 9.1 Day tank shall be installed indoors adjacent to engine generator set.
- 9.2 Elevation relative to engine shall be such that a positive head is not applied to the engine fuel injectors.
- 9.3 Black iron connections to the day tank shall be provided and sized to be consistent with the recommendations of the mechanical engineer.
- 9.4 Venting shall be as required by local codes and specifications.

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