



Fuel Storage Tank Program
Design Guidelines for Generator Fuel Storage Systems
Issued: January 1, 2012

PART 1: GENERAL

- 1.01 DESCRIPTION: This document provides design guidelines for the fuel storage systems associated with standby and emergency generators located at State of Georgia facilities.
- 1.02 CODES: The generator fuel storage system (tank, piping, and accessories) shall comply with the following National Fire Protection Association (NFPA) Codes and Standards and the International Fire Code as amended by Chapter 120-3-3 and Chapter 120-3-11 of the Rules of Safety Fire Commissioner:
- A. International Fire Code
 - B. NFPA 30, Flammable and Combustible Liquids Code
 - C. NFPA 37, Standard for Installation and Use of Stationary Combustion Engines & Gas Turbines
- 1.03 SUBMITTALS:
- A. Plans and specifications for all proposed generator fuel storage tanks, including additions to or relocations of tanks at existing facilities, with more than a 120 gallon capacity must be submitted to the Georgia Environmental Finance Authority (GEFA) FST Group for screening with the guidelines prescribed herein.
 - B. Plans must also be submitted in duplicate to the State Fire Marshal for approval in accordance with the requirements of Chapter 120-3-11 of the Rules of Safety Fire Commissioner.
 - C. Procurement documents for generator fuel systems shall require the following shop drawing submittals:
 - 1. Manufacturer's tank shop drawing showing tank size, weight, listing, and pipe connection sizes and locations.
 - 2. Product data cut-sheets for all manufactured components; including catalog illustrations, dimensions, pipe connection sizes, and associated trim.
 - 3. Proposed controls schematic and wiring diagram. A symbols list defining all abbreviated components shall be included. The diagram shall delineate between power and control wiring and shall indicate all sensors, contactors, relays, and other components of the system.
 - 4. Manufacturer's installation instructions and operation and maintenance data.

PART 2: PRODUCTS

2.01 GENERATOR FUEL STORAGE TANK SYSTEMS

- A. TANK SIZING: The required tank capacity should be calculated based on published engine consumption data and a specified minimum run time. GEFA has found that a maximum fuel supply of up to 72 hours of run time is reasonable for most facilities. Greater capacities may be merited in certain circumstances based on generator service, geographical consideration, historical outages and extended fuel delivery times.

- B. TANK TYPE: Unless otherwise approved by GEFA FT Group, all generator tanks 1,000 gallon and less shall be subbase-type aboveground storage tanks (ASTs). Generator fuel storage systems with capacities greater than 1,000 gallons shall utilize underground storage tanks (USTs).
 - C. SPILL PLANS: Federal EPA rules (Title 40 of the Code of Federal Regulations, Part 112) require preparation of a Spill Prevention, Control and Countermeasure (SPCC) plan for single aboveground tanks with a capacity greater than 1,320 gallons or multiple tanks with an aggregate capacity greater than this limit.
- 2.02 SUBBASE TANKS: Subbase tanks shall be rectangular double-wall design (secondary containment), consisting of a single-wall inner steel tank constructed inside a steel secondary tank. Subbase tanks are designed for installation below the generator set between the foundation pad and are generally confined within the frame supports. Larger capacity tanks may extend beyond the footprint of the generator. Outdoor generators with subbase tanks should be equipped with a weatherproof enclosure to minimize entry of rainwater and debris on the tank top. Single-wall subbase tanks without diking are not allowed. Subbase AST tanks shall include the following minimum features:
- A. Tank construction shall be heavy-gauge welded steel, 10 Gauge (minimum) on primary inner tank, secondary outer tank walls & bottom. An air gap (2" minimum) shall be provided below the bottom of the tank and the concrete support pad.
 - B. Tank shall carry an Underwriters Laboratories Inc. UL 142 label. Fire-rated UL 2085 tanks may be substituted in special circumstances.
 - C. Subbase tanks shall be provided with the following top-mounted tank openings as a minimum:
 - 1. PRIMARY TANK
 - a. Fuel supply and fuel return openings (1"NPT minimum each)
 - b. *Normal (primary) tank vent opening on primary tank (2"NPT minimum)
 - c. *Emergency pressure-relief (secondary) vent opening sized per NFPA 30.
 - d. Opening for Low-level and high level fuel alarm switches (2"NPT minimum)
 - e. Mechanical fuel gauge opening (1-1/2"NPT minimum)
 - f. Stick port opening (1-1/2"NPT minimum)
 - g. Tank fill bung (2"NPT minimum)
 - 2. SECONDARY TANK
 - a. Monitoring port on interstice of secondary tank (2"NPT minimum)
 - b. *Emergency pressure-relief (secondary) vent opening sized per NFPA 30.
- *Note: Primary secondary tank vents shall be extended outside of the generator enclosure and terminated at a minimum height of twelve (12) feet above grade.
- D. The top of the subbase tank shall include provisions for containment of minor leakage of engine fluids. A liquid-tight containment lip shall be formed with 1" or larger welded steel angle. The containment area should encompass as a minimum the subbase tank top below the engine and within the weather-proof enclosure.

2.03 FILL ASSEMBLY:

- A. The tank fill connection shall be a cam-lock style tight-fill used in conjunction with an overfill prevention valve set to stop the flow of fuel when the tank reaches 95% of tank capacity. The fill shall be located such that the delivery operator has direct access to the tank gauge. The fill shall also include a spill containment bucket that is accessible from outside the generator enclosure.
- B. The overfill prevention valve shall be Morrison Bros. Co. Fig. 909JS, EBW "Auto Limiter II" or approved alternate.

2.04 TANK GAUGING: A mechanical, direct reading, type of fuel level gauge indicator shall be provided in addition to any electronic monitoring system. The fuel level indicator shall be one of the following: Series 6500 Senior Gauge, Manufactured by Rochester Gauges Inc., a "Scully" gauge, a Hersey Direct Reading Mechanical or Magnetic gauge, or equivalent.

2.05 LEAK AND OVERFILL ALARMS:

- A. A liquid sensor shall be mounted inside the secondary tank and wired to the major engine alarm. Sensor shall be INCON TSP-ULS or equal.
- B. A remote overfill alarm horn with an independent alarm silence switch shall be provided. The alarm shall be wired to sound at 90% of tank capacity.

2.06 SIGNAGE: Tanks shall be labeled with fuel type and capacity. Labels shall be 2" white letters on black background and attached to the tank with adhesive.

2.07 ACCESSORIES:

- A. Emergency vent shall be OPW 202 or equal sized by tank manufacturer per NFPA 30.
- B. Dielectric couplings and/or flanged kits shall be provided at all copper to steel connections and as required to isolate the piping from the tank.

2.08 SPILL KITS:

- A. Spill kits shall be the Charles Singleton Company (813-623-5858) "First Responder" kit, part number FR-911-125 or equal.
- B. Spill "Booms" or "Portable Diking" shall be 8 inches in diameter (minimum), no less than ten (10) feet long each. The outer covering or "sock" shall be a close woven material that will not allow the inner absorbent material to easily escape. Booms shall be "Pig" brand (1-800-468-4647) model #BOM 304 or equal.

PART 3: EXECUTION

3.01 TANK INSTALLATION:

- A. Protect the tank finish from damage during installation or modification. Any damaged finish areas of the tank shall be repaired to match factory finish.
- B. Install tank accessories in accordance with manufacturers' instructions and drawing details.
- C. Extend primary and emergency vents outside of the generator enclosure and terminated at a minimum height of twelve (12) feet above grade.

- D. Contractor shall commission tank overfill alarm and prevention valve settings with Owner representative.
- E. Provide Owner with manufacturer tank chart with inches to gallon conversions. Mount a laminated copy of the chart inside the generator module for use by the fuel delivery operator.

3.02 PRESSURE TESTING/CERTIFICATION:

- A. The fuel tank shall be subjected to a field pressure tested after tank installation and before being placed in service. Primary tank shall be pressurized to 5 psig with air or nitrogen for 2 hours with no readable pressure drop, in accordance with manufacturer's instructions/ recommendations. The secondary tank shall pass a 3 psig pressure test, or 5.3 in Hg vacuum test, or in accordance with the tank's listing or manufacturer's instructions for the same duration. Primary and secondary pressure tests shall not be conducted simultaneously.
- B. The Contractor shall provide written certification, signed by the Owner's representative, that the tank passed the pressure or vacuum test. This certification shall be included with the Contractor's final documentation provided to the Owner.
- C. The Contractor shall provide written certification that the appropriate Authority Having Jurisdiction has witnessed the tightness tests required by the prevailing Code.
- D. The fuel tank and associated piping systems shall meet all requirements of the most current Environmental Protection Agency Publications and local and State requirements. The fuel tank shall be installed in accordance with the manufacturer's recommendations and NFPA 30, NFPA 30A, NFPA 37, and local requirements.
- E. The Contractor shall comply with the provisions of all Federal and State regulations pertaining to the removal or modification of existing systems or installation of the new systems.
- F. The Contractor shall notify the State of the work to be performed (including removal and modification of existing systems and installation of new systems) within the times required.
- G. The Contractor shall obtain all permits and pay all fees required by the State and local jurisdictions.

END OF SECTION