



Program Letter  
 Bureau of Storage Tank Regulation  
 R/July 2004

## Fuel Tanks Supplying Stationary Combustion Engines Used For Auxiliary Power and Emergency Generators

Emergency generators or auxiliary power units are combustion engines used to drive generators, alternators, or fire pumps and other essential equipment for emergency or backup purposes. Emergency generators are frequently referred to as backup generators, however, a backup generator may not be considered an emergency generator. This guidance letter applies to tanks supplying fuel to emergency generators and auxiliary power units. Specific and more detailed requirements relating to the location and isolation of emergency generators are contained in Chapter 3, NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 1998 edition.

		<b>NFPA 37 reference</b>
<b>Gasoline Fuel Tank Inside A Building</b>		
Capacity	Maximum 25 gallon capacity (integral tank).	5-2
Tank Listing	Not required.	5-1
Containment	Not required	
<b>Diesel and Fuel Oil Tank Inside Building</b>		
Capacity	660 gallon maximum/1,320 aggregate. Supply tank greater than 1,320 aggregate must be isolated in room with 3 hour fire rating.	5-3.2 6-3.6.1
Tank Listing	Integral tanks – No (Tank with maximum capacity of 25 gallon mounted on the engine with supply by gravity feed.) Day tanks - Yes (COMM 10.355) Supply tanks - Yes (COMM 10.355)	5-1
Containment	Tanks located above the lowest story and not isolated shall have 100% containment.	5-3.5.3
Vent Piping	In accordance with tank listing and NFPA 30	5-7
Setbacks	Tanks located in rooms shall have minimum 15 inch clearance around the tank for inspection.	5-3.5.1 5.3.6.1
Leak detection	No	
Plan review	Yes - tanks greater than 60 gallon capacity.	Comm 10.10
Installation	Supervised by Comm 10 AST Installer (Comm 5).	
Permit/Registration	Registration required for tanks greater than 110 gallon capacity. (Comm 10.13)	
Annual inspection	Annual inspection of tanks with capacity larger than 660 gallons, by Commerce authorized inspector.	
<b>Gasoline or Diesel Fuel Supply Tank Outside Aboveground</b>		
	NFPA 37 references NFPA 30	5-3.3
Capacity	No limit.	
Tank Listing	Yes (Comm 10.27 & 10.355)	
Containment	Yes - NFPA 30-2-3.2.3 and Comm 10.345(1)(a) = 125%	
Setbacks	NFPA 30 Table 2-3.2.1.1	
Leak detection	No	
Permit/Registration	Registration required for tanks greater than 110 gallon capacity.	Comm 10.13
Plan review	Yes	Comm 10.10
Installation	Supervised by Comm 10 AST Installer (Comm 5)	
Tanks on roofs	Refer to NFPA 37-5-3.4	
Annual inspection	Annual inspection of tanks with capacity larger than 660 gallons,	

by Commerce authorized inspector.

Generator fuel supply tanks are required to have a UL (single wall UL 142, UL 80, or UL 2080; double-wall UL 2080, or UL 2085) or other recognized testing laboratory listing mark or label; or be constructed in accordance with API 650 or API 620.



Two recent innovations and trends are the “sub-base” tank and the “fire protected or resistant” tank.

A sub-base configuration consists of the generator placed directly on top of the fuel supply tank. This configuration is also referred to as a “pedestal” or “GenSet” tank. In many situations the tank is either secondarily contained (diked) or of double-wall design. Most of the sub-base generator units are secured to the tank at the manufacturing facility and shipped to the customer with the generator and tank as one unit. Tank manufacturers require a pre-operational integrity test of the tank and these tanks frequently carry a sticker with testing instructions.

The fire resistant tank is an aboveground tank that is listed to provide fire-resistive protection from exposures to a high-intensity liquid pool fire. Fire resistive tanks must have the UL 2080 Listing label or SwRI 94-04, which is generally designated as a two-hour fire rating. Secondary containment is optional.

The fire protected tank is a double-wall configuration with the interstitial space filled with an insulation material allowing the tank to withstand exposure to fire and maintain its integrity within the respective fire rating standards. Fire protected tanks must have the UL 2085 Listing label or SwRI 93-01, which is generally designated as a two-hour fire rating.

Many generator manufactures are fabricating the generator units with weather protection housing or enclosure. This is where issues concerning tank piping and venting arise.

The generators with a sub-base tank, pictured to the right, located outside a building have a louvered weather enclosure protecting the generator. It is the department's position that venting to the outside of the protective enclosure is not required because natural ventilation for these units located outside is adequate. See Note #5.

The unit in the top photo to the right has ventilation louvers cut in the side-wall doors, just above the top of the sub-base tank providing gravity flow ventilation.

The unit in the bottom photo to the right has louvers along most of the surface of the side-wall doors, ends and roof providing gravity flow ventilation.

Spill and overfill provisions are required (NFPA 37-5-5 and 5-6, 1998 edition).



The venting for the generator and tank contained within the modular weather enclosure in the photo on the left is required to terminate outside the enclosure housing. Justification for remote termination is a confined space environment, the potential for combustible vapor buildup just above the floor resulting from changing ambient temperature, and lack of visual reference.

Local municipal regulations are the authority for classifying the modular weather enclosure as a building or a structure. The department does not enter into the debate on this issue, however, for discussion purposes we may refer to the weather housing or enclosure as a structure.

Spill, overfill and containment is required.



Spill control for tanks of the two configurations described above can be accomplished by methods similar to the two shown:

The generator tank in the photo on the right has a spill bucket with delivery connect piped from the outside, through the enclosure, to the tank.

The generator tank in the photo on the left is located within a totally contained enclosure and has a spill bucket with delivery tank fill connection placed within a cabinet mounted to the outside of the enclosure. We have also seen this arrangement located just inside the doors of the enclosure.



Spill bucket piped to tank

Supplemental collision protection is required for units adjacent to traffic and parking areas even if the manufacturer has demonstrated that the sub-base unit has been impact tested, e.g., 12,000 lb. vehicle at 10 mph. Emergency generator units located outside are often installed in a location frequented by larger vehicles. It is the department's position that supplemental collision protection adds a necessary margin of safety to a critical component of the facility's life-safety measures. Mandating the requirement for supplemental collision protection involves inspector discretion, logic, vehicle traffic patterns and operation (backing, turning, setbacks, etc.) and degree of risk.



#### Gasoline, Diesel, or Fuel Oil Underground Supply Tank

5-3.3.1

Capacity	No Limit
Tank Listing	Yes - Comm 10.27 NFPA 37, 5-1
Leak detection	Yes - Comm Subchapter VI
Spill & overfill protection.	Yes - Comm Subchapter VI
Corrosion protection	Yes - Comm Subchapter VI
Permit/Registration	Permit and registration required for tanks in excess of 60 gallon capacity. (s. 101.142, Stats. and 10.16)
Plan Review	Yes
Installation	Supervised by Comm 10 Installer (Comm 5)
Annual inspection	Annual inspection of all underground storage tanks by Commerce authorized inspector.

**Note #1:** The installation of emergency generator tanks is required to be under the oversight of a certified tank installer for the concerns of properly installed leak detection, spill protection, overfill prevention and tank registration.

**Note #2:** The Federal EPA groundwater rules exclude underground storage tanks storing heating fuel for consumptive use on the premises. The department recognizes this exclusion for storage tanks that are *exclusively used to store fuel oil for heating purposes*. *Tanks storing fuel oil to power emergency generators are not recognized by the department as meeting the EPA exclusion*. The EPA has deferred the leak detection requirements (40 CFR 280.10(d) deferral of Subpart D) for emergency generators located at remote locations. The reasoning behind the EPA deferral does not apply to the typical emergency generator use and associated emergency generator regulations applied in Wisconsin *because the location of these tanks are typically not remote in terms of access*. USTs supplying emergency generators and the associated underground piping are required to maintain the respective leak detection and use permit requirements.

**Note #3:** A *supply tank* is a fuel tank for supplying fuel directly to the engine or to a separate auxiliary *day tank* that feeds the engine. When the supply tank is remote from the generator system, a day tank is often an operational necessity. A *day tank* is a fuel tank located inside a structure, but connected to a supply tank. This configuration provides enough fuel storage capacity to the engine of the generator for a specified period of time. A day tank can also serve to eliminate the risk of high capacity storage on-board the genset or storage indoors by providing access to a larger volume of fuel stored in a remote supply tank.

#### Fuel Gas Other Than Liquid Phase LPG with Serv. Pres. 125 psig or less

4-1.1.1

Installed in accordance with NFPA 54 and 58.

**Fuel Gas Other Than Liquid Phase LPG in excess of 125 psig Serv. Pres.**

4-1.1.2

Installed in accordance with ANSI/ASME B31.1 and NFPA 58.

**LP Gas in Liquid Phase**

4-1.1.3

Installed in accordance with NFPA 58.

**Note #4:** Chapter 3 of NFPA 37 addresses the requirements for the emergency generator engine that the supply tank is providing fuel for. The most restrictive requirement will apply in rooms that house the engine and the fuel storage tank.

**Note #5:** NFPA 30 should only be referenced when required by NFPA 37. The editor's comments in the hard cover text version of NFPA 30-2-5 states "As used in this section, "tanks" refers only to storage tanks and not to portable tanks, process vessels and certain other tanks related to building services and utilities." *A generator tank is considered a building service application.*

**Note #6:** Allowing the atmospheric and emergency vent to terminate inside the weather housing is a concept difficult for some fire code enforcement personnel to accept. The department's position accepting this configuration is based upon the nature of the ambient environment, mechanics of the emergency generator, configuration and degree of risk. The department believes that there is little if any ignition and fire risk associated with vapors venting within the immediate housing because both fuel and ignition sources are necessary to start a fire. Emergency generator units are required by code to be located or isolated a distance from potential adjacent fire exposure. An electrical system provides start-up power to the engine and power for the gauges when the generator is not in operation. Gravity flow ventilation associated with the outdoor environment, through the weather housing, will dilute and dissipate vapors exiting the atmospheric vent to a safe level. When in operation the generator will provide electrical power to sustain emergency systems, e.g., lights, fire pump, etc. The fuel is supplied to the engine via a vacuum type pump. Therefore, a breach in the fuel system would not likely pose a leak or provide a source of fuel to feed a fire, especially since the tank is located below the engine and pump. The ignition source is limited to the generator's electrical system or friction sparks. Emergency generator engines are not subject to the grease and grime environment of other engines thereby reducing the combustible material that may potentially ignite and burn. Air movement caused by the cooling fan, when the generator is operating will dilute any vapors that may exist to a level that will not allow vapor ignition. In the event that an ignition would occur within the weather housing, it is the department's belief that solid, liquid or vapor fuel would not be adequate to sustain a fire long enough to cause the tank to vent introducing significant vapors to enhance the fire. It is unlikely that any fire in the generator unit will provide sufficient heat to cause the product in the supply tank to vaporize to the point of activating the emergency vent, and if it did it would be contained within a metal housing. If a fire in an adjacent structure has advanced to the point of causing the sub-base tank to vent, the emergency generator and tank are likely not an element contributing to life safety and fire protection, or salvageable at this point.

**This guide is an overview of selected auxiliary power and emergency generator fuel supply tank regulatory requirements. This guide is not intended to be a detailed or a "how-to-install" guide covering all technical requirements.**