

GUIDELINES FOR INSTALLATION OF TEMPORARY AND PERMANENT ABOVEGROUND DIESEL FUEL TANKS FOR EMERGENCY AND STANDBY POWER SYSTEMS LOCATED OUTSIDE OF BUILDINGS

*For Use by Unidocs Member Agencies or where approved by your Local Jurisdiction
Authority cited: California Fire Code, Hazardous Materials Storage Ordinance*

I. General Information

These guidelines are applicable to the installation of aboveground tanks using combustible liquids as fuel for emergency and standby generators. They apply to both temporary and permanent tank installations. These guidelines are a supplement to other requirements and/or guidelines, and are not all-inclusive.

II. Permits and Plans

- An installation permit is required from your local Planning and/or Building Department to install an emergency or standby generator tank, piping, and associated equipment;
- A new or modified Hazardous Materials Business Plan (HMBP) is required before placing the tank(s) in service;
- Notification of the electric utility is required;
- Permits may also be required from the Bay Area Air Quality Management District.

III. Definitions

The following definitions apply with regard to requirements specified in this document:

Temporary Tank - A tank which is on-site no longer than one (1) year.

IV. Quantity Limits

- Unprotected Tank: 660 gallons maximum;
- Protected Tank: 4,000 gallons maximum (16,000 gallons aggregate maximum)
Contact the local jurisdiction regarding installing tanks exceeding these limits

A. Tanks

- 1. Listing:** Each tank shall be designed and constructed in accordance with nationally recognized standards (UL 142/2244 or equivalent. UL 2085 is the listing for protected tanks). If it is not UL listed, provide documentation showing that it has been designed and constructed to that standard.
(CFC §7902.1.8.1.1 & 7902.1.8.2.1)
- 2. Separation Distances:** Each tank shall be separated from property lines, important buildings, public ways, and other tanks in accordance with CFC Table 7902.2-F, below:

TABLE 7902.2-F (as amended by local ordinance)
Reference Table for Use In CFC Table 7902.2-A

Tank Capacity (gallons)	Minimum distance from property line of property which is or can be built upon, including the opposite side of a public way (feet)	Minimum distance from nearest side of any public way or from nearest important building on the same property (feet)
660 or less	10	10
661-4,000	15	10

- These distances can be reduced if the tank is protected by an unpierced two (2) hour fire-resistive wall extending not less than thirty (30) inches above and to the sides of the storage area.

3. Seismic Protection: Seismic protection for tanks shall be provided in accordance with the Uniform Building Code. (CFC §7902.1.12)

(Exception: For temporary tanks, wheels may be chocked in lieu of providing seismic protection.)

4. Vehicle Impact Protection: Guard posts or other approved means shall be provided to protect tanks subject to vehicular damage. When installed, posts shall be: (CFC §7902.1.9.7 and §7902.2.9)

- Constructed of steel not less than 4 inches in diameter and concrete filled;
- Spaced not more than 4 feet between posts on center;
- Set not less than 3 feet deep in a concrete footing of not less than 15 inches in diameter;
- Set with the top of the posts not less than 3 feet aboveground;
- Located not less than 5 feet from the tank.

(Note: For temporary tanks, K-rails or other substantial protection may be installed in lieu of guard posts.)

5. Secondary Containment: Tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. It shall be capable of containing 110% of the volume of the primary tank if a single tank is used, or in the case of multiple tanks, 150% of the largest tank or 10% of the aggregate, whichever is larger. If secondary containment is open to rainfall or sprinkler flow, contact the local jurisdiction for appropriate calculations. (Local Ordinance)

6. Spill Protection: For unprotected tanks (\leq 660 gallons capacity), spill containers shall be provided on top-filling and/or top-withdrawal connections. Spill containers shall be non-combustible and shall be fixed to the tank. (Local Ordinance).

For protected tanks (between 661 to 4,000 gallon capacity), spill containers of not less than 5 gallons shall be provided for each fill connection. For tanks with a remote fill connection, a portable spill container shall be provided. (CFC §7902.1.9.10)

7. Overfill Protection: Tanks shall be provided with equipment to prevent overfilling as per the following table.

For Non-Protected Tanks (<660 gallon capacity)”

Physical Situation	Approved Overfill Methods	Reference
Level of liquid in tank IS within sight of the operator and filling device IS within immediate control of operator	Visual observation	HMSO
Level of liquid in tank is NOT within sight of the operator and/or filling device is NOT within immediate control of operator	High level (90%) alarm (with posted sign explaining alarm condition) Or Other liquid level limit control*	HMSO

* A liquid level limit control is a mechanical or electronic device which physically limits the level of liquid in the tank (e.g. ball float or flapper valve in the fill line, dispenser nozzle shutoff, etc.).

For Protected Tanks (661-4,000 gallon capacity):

Physical Situation	Approved Overfill Methods	Reference
At 85% of Tank Capacity	Audible or visual signal to notify tank filler; Or Tank level gauge marked at 85%; Or Other approved means.	CFC 7902.1.9.8
	AND	
At 90% of Tank Capacity	Mechanical Shutoff Device	CFC 7902.1.9.8

* A permanent sign shall be provided at the fill point documenting the filling procedure and tank calibration chart. The filling procedure shall require the person filling the tank to determine the gallonage required to fill it to 90% of capacity before commencing the fill operation. (CFC §7902.1.9.8)

8. Projectile Protection: When a projectile test is required by the chief (for protected tanks between 661 and 4,000 gallons), the protected tank shall comply with the requirements for bullet resistance (see CFC 7701.3.4.3). (CFC §7902.1.9.5)

B. Piping Systems

1. Support: Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion or contraction, or exposure to fire. (CFC §7901.11.6)

2. Seismic Protection: Seismic protection for piping, tank supports and connections shall be provided in accordance with the Uniform Building Code. (CFC §8001.4.3.2)

(Exception: Not normally required for temporary tanks.)

3. **Low Melting Point Materials:** For primary piping, low melting point materials such as aluminum, copper, and brass; materials which soften on fire exposure such as non-metallic materials; or non-ductile materials such as cast iron, shall be within their pressure and temperature limitations. When such materials are used, they shall be either: (CFC §7901.11.1.2)
 - a. Suitably protected against fire exposure; or
 - b. Located such that leakage resulting from failure would not unduly expose persons, buildings, or structures; or
 - c. Located where leakage can readily be controlled by operation of accessible remotely-located valves.

4. **Vehicle Impact Protection:** Guard posts or other approved means shall be provided to protect piping, valves or fittings subject to vehicular damage. When installed, posts shall be: (CFC §7901.11.2)
 - a. Constructed of steel not less than 4 inches in diameter and concrete filled;
 - b. Spaced not more than 4 feet between posts on center;
 - c. Set not less than 3 feet deep in a concrete footing of not less than 15 inches in diameter;
 - d. Set with the top of the posts not less than 3 feet aboveground;
 - e. Located not less than 5 feet from the tank.

(Note: For temporary tanks, K-rails or other substantial protection may be installed in lieu of guard posts.)

5. **Secondary Containment:** Supply and return piping shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the fuel stored, and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. (Local Ordinance)

Potentially acceptable methods of containment include:

- Double-contained piping;
- Metal pan;
- Concrete berm;
- “Portable” berm (made of diesel-compatible materials);
- Containment enclosure.

6. **Connections:** Connections to a tank located below normal liquid level shall be provided with internal or external control valves located as close as practical to the shell of the tank. When external, such valves, and their connections to the tank, shall be of steel. (CFC §7901.11.5)

7. **Fill Pipe Length:** For tanks with a top-fill connection, metallic fill pipes shall terminate within 6 inches of the tank bottom to minimize static electricity. (CFC §7902.2.7.2)

8. **Filling/Withdrawal Connections:** Filling and withdrawal connections which are made and broken shall be located outside of buildings and not less than 5 feet from building openings. (CFC §7902.2.7.2)

9. **Normal Venting:** Normal venting shall be provided for the primary tank as follows:

- a. The diameter of the normal vent opening shall be equal to the size of the fill/withdrawal opening, or at a minimum, 1-1/4 inch, whichever is greater. (CFC §7902.1.13.8.1)
- b. Vapors shall be directed to discharge upward or horizontally away from closely adjacent walls, and the top of the vent shall be a minimum of 12 feet above adjacent ground level. The vent opening shall be at least 5 feet from any building opening and/or property line. (CFC §7902.1.13.4)

10. Normal Vent Piping: Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be installed such that they are not subject to physical damage or vibration. (CFC §7902.1.13.5)

11. Emergency Venting: Emergency venting shall be supplied as follows:

- a. Tanks shall be equipped with adequate additional venting that will relieve excessive internal pressure caused by exposure to fires. (CFC §7902.2.6.1)
- b. The pressure relief device shall not discharge inside a building. (CFC §7902.2.6.5.1)

(Note: for the purposes of emergency venting requirements, enclosures which can be occupied are considered buildings whereas enclosures which cannot be occupied are not considered buildings).

12. Flame Arrestors: For protected tanks (i.e. between 661 and 4,000 gallon capacity), approved flame arrestors or pressure-vacuum breather valves shall be installed in normal vents. (CFC §7902.1.9.4)

13. Anti-Siphon Devices: Approved anti-siphon devices shall be installed in each external pipe connected to the tank when the pipe extends below the level of the top of the tank. (CFC §7902.1.9.12)

C. Additional Requirements

1. **Security:** Storage, dispensing, use, and handling areas shall be secured against unauthorized entry and safeguarded with such protective facilities as public safety requires. (CFC §8001.11.2)
2. **Electrical:** Electrical wiring and equipment shall be installed in accordance with the Electrical Code. (CFC §8001.11.4)
3. **Monitoring:** Tank and piping secondary containment systems shall be monitored either visually or electronically. Monitoring shall occur at the low point of each secondary containment system. If electronic monitoring is used, it shall be connected to attention-getting visual and audible alarms. Contact your local agency for approved monitoring methods. (Local Ordinance)

(Note: If response to monitoring alarms is hampered due to absence of site response personnel or there is a history of problems with alarm response at the site, the local agency may require shutdown of the generator during alarm activation.)

4. **Testing*:** Prior to being placed in service, tanks and associated piping shall be field tested in accordance with the following: (CFC §7901.11.10 & 7902.1.8.2.5)

	Field Test	Duration
Primary Tank Test	5 p.s.i.g.	30 minutes
Secondary Tank Test	3 p.s.i.g.	30 minutes
Primary Piping Test	Hydrostatically at 150% of anticipated pressure Or Pneumatically at 110% of anticipated pressure	30 minutes
Secondary Piping Test	5 p.s.i.g.	30 minutes

* If the manufacturer’s specifications do not support the above testing procedures, follow the manufacturer’s recommended procedure.

5. **Hazardous Materials Signage and Labeling:** Warning and identification signs shall be posted to clearly identify hazards. All piping shall be labeled. The design of signs and labeling of piping shall be in accordance with the “Marking Requirements and Guidelines for Hazardous Materials and Hazardous Wastes” (available on the Internet at www.unidocs.org), and other applicable codes and standards (e.g. ANSI A13.1 Scheme for the Identification of Piping Systems, etc.). (CFC §7901.9 & 7902.1.3.2)
6. **Additional Signage:** A sign shall be placed at the main electrical shut-off box identifying type and location of all normal and emergency power sources connected at that location. (CEC §702-8a)
7. **Fire Protection:** At least one 40:BC portable fire extinguisher shall be provided near and within sight of the equipment. (CFC §7901.5.3)
8. **Access:** The required width of a fire apparatus access road (20’) shall not be obstructed in any manner, including the siting of generator/tank assemblies. (CFC §902.2.4.)
9. **Spill Prevention Control and Countermeasure (SPCC) Plan:** The owner or operator of any facility that stores more than 1,320 gallons of petroleum aboveground, or stores petroleum in any aboveground tank larger than 660 gallons in capacity, must prepare an SPCC Plan in accordance with guidelines contained in Part 112 of Title 40 of the Code of Federal Regulations. Information regarding SPCC Plan preparation and submittal requirements is available on the Internet at www.swrcb.ca.gov/~cwphome/agt/index.htm. [HSC §2527005(c)]

(Exception: Tank facilities located on a farm, nursery, logging site, or construction site are not required to prepare an SPCC Plan if no tank exceeds 20,000 gallons and cumulative storage capacity does not exceed 100,000 gallons.)