



Houston Fire Department Life Safety Bureau (LSB)



LSB Standard No. 13, Rev. 07

Outside Protected Aboveground Tanks for Generators and Fire Pumps

Supersedes: LSB Standard No. 13, Rev. 06, 11/02/2021

Effective Date: 01/01/2024



LSB Standards are established in accordance with provisions of the City of Houston *Fire Code*. They are subject to the administrative sections covering alternative materials and methods, modifications, and the Board of Appeals.

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Outside Protected Aboveground Tanks for Generators and Fire Pumps

Section 13.1 – General

13.1.1 Scope.

This standard applies to the installation of protected aboveground tanks, located on the outside of a building or structure, that supply fuel to engine-driven emergency and standby power generators or fire pumps, which shall be in accordance with this standard and the City of Houston *Fire Code*. This standard shall apply within the limits of the City of Houston, including the Districts of Limitations.

13.1.2 Purpose.

The purpose of this standard is to provide guidance and instruction for the installation of protected aboveground tanks that are located outside of buildings or structures and that supply fuel to engine-driven power generators and fire pumps.

This standard is subject to periodic review and updates to accommodate changes in local need or requirements, changes in nationally recognized standards in related technology, or where required by state or federal regulations.

Section 13.2 – Definitions

13.2.1 Protected Aboveground Tank.

A listed UL 2085 or equivalent tank system consisting of a primary tank provided with protection from physical damage and fire-resistive protection from a high-intensity liquid pool fire exposure. The tank system may provide these protection elements as a unit or as an assembly of components, or a combination thereof.

Section 13.3 – General Requirements

13.3.1 Permits and Plans Required.

A permit and plan approval are required to install, use, repair, or modify protected aboveground tanks that are located on the outside of buildings or structures and used to supply fuels to engine-driven power generators and fire pumps.

Permit Office contact information is as follows:

The Houston Permitting Center

1002 Washington Avenue

Houston, Texas 77002

Hours of operation: 8:00am to 3:30pm (CST)

Monday through Friday

Office phone: (832) 394-8811

To E-mail Customer Service Questions: hfd.permitoffice@houstontx.gov

Link to City Wide Fee Schedule: www.houstoncityfees.org

13.3.2 Installation and Site Plans.

Installation and site plans shall be submitted with permit applications. The plans shall include the design, details, and specifications of the following:

- a. Type of protected aboveground tanks and their supports to be used.
- b. Quantities and types of fuel to be stored.
- c. Distances from tanks to property lines and buildings (see Table 13 below).
- d. Distances between adjacent tanks (see Table 13 below).
- e. Provisions for overfill prevention, spill containment, vents, leak monitoring, and other equipment and accessories.
- f. Venting.
- g. Piping and valves.
- h. Electrical systems.
- i. Emergency controls.
- j. Fire department access.
- k. Location of fire appliances.
- l. Vehicle impact protection.
- m. Site security measures.
- n. Other information as required by the Fire Code Official.

13.3.3 Site Inspection.

All outside aboveground fuel tank installations shall be visited and physically inspected by personnel from the Fire Code Official's Office prior to approval of permits.

13.3.4 Prohibited Locations.

Installation of outside aboveground fuel tanks on top of buildings is prohibited.

Exception: Approved Day Tanks of 60 gallons or less capacity.

13.3.5 Locations Subject to Flooding.

Uplift protection shall be provided when a tank is located in an area that is subject to flooding.

Section 13.4 – Tank Design

13.4.1 General.

Protected aboveground tanks shall be listed and labeled to meet the requirements specified for UL 2085 or tanks and systems meeting equivalent design and safety standards acceptable to the Fire Code Official.

13.4.2 Primary Tanks.

The design, fabrication, and construction of primary tanks shall be in accordance with recognized good engineering practice and nationally recognized standards. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design, fabrication, and construction.

13.4.3 Size.

Primary tanks shall not exceed a capacity of 12,000-gallon individual, or 48,000-gallon aggregate.

13.4.4 Vents.

13.4.4.1 Normal and Emergency Venting.

Normal and emergency venting for aboveground tanks shall be installed in accordance with the *Fire Code*.

13.4.4.2 Capacity.

The vent capacity reduction factors shall be in accordance with the *Fire Code*.

13.4.4.3 Flame-Arresters.

Approved flame-arresters shall be installed in normal vents.

13.4.5 Projectile Protection.

When a projectile test is required by the Fire Code Official, the protected tank shall be tested in accordance with the requirements for bullet resistance as specified in the *Fire Code*.

Exception: Listed protected aboveground tanks that have projectile protection incorporated into their design and construction.

Section 13.5 – Installation of Tanks

The installation of protected aboveground tanks shall be in accordance with the following:

13.5.1 Separation Distances.

A protected aboveground tank shall be separated from property lines, important buildings, public ways, and other tanks in accordance with the *Fire Code*. (See Table 13 below.)

13.5.1.1 Aggregate Capacity.

Protected aboveground tank installations having the maximum allowable aggregate capacity shall be separated from other installations of protected aboveground tanks by not less than 100 feet.

13.5.2 Secondary Containment.

Protected aboveground tanks shall be provided with drainage control or diking or with secondary containment that is a component of the listed protected aboveground tank.

There shall be a method of monitoring the secondary containment . Enclosed secondary containment shall be provided with emergency venting.

13.5.3 Vehicle Impact Protection.

Where aboveground tanks may be subject to vehicular impact, and when required by the Fire Code Official, guard posts or other approved means shall be provided to protect aboveground tanks and connecting piping, valves, and fittings.

Where guard posts are installed, the posts shall be:

1. Constructed of a strength equivalent to that of 4-inch diameter Schedule 40 steel pipe and filled with concrete;
2. Spaced not more than 4 feet between posts on center;
3. Set not less than 3 feet deep in a concrete footing of not less than 15-inch diameter;
4. Set with the top of the posts not less than 3 feet above ground; and
5. Located not less than 5 feet from the tank.

Exception: Guard posts are not required for listed, protected aboveground tanks that have vehicle impact protection incorporated into their design and construction.

13.5.4 Overfill Protection.

Protected aboveground tanks shall not be filled in excess of *90 percent* of their capacity. An overfill prevention system shall be provided for each tank. During tank filling operations, the system shall:

1. Provide an independent means of notifying the person filling the tank that the fluid level has reached *85 percent* of tank capacity by providing an audible or visual signal, providing a tank level gauge marked at *85 percent* of tank capacity or other approved means; and
2. Automatically shut off the flow of fuel to the tank when the quantity of liquid in the tank reaches *90 percent* of tank capacity.

For rigid hose fuel-delivery systems, an approved means shall be provided to empty the contents of the filler hose into the tank after the automatic shutoff device is activated.

A permanent sign shall be provided at the fill point for the tank to document the filling procedure and the tank calibration chart.

The filling procedure shall require the person filling the tank to determine the gallonage required to fill it to *90 percent* of capacity before commencing the filling operation.

13.5.5 Fill Pipe Connections.

The fill pipe shall be provided with a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. When any portion of the fill pipe exterior to the tank extends below the top of the tank, a check valve shall be installed in the pipe not more than 12 inches from the fill hose connection.

13.5.6 Spill Containers.

A spill container having a capacity of not less than 5 gallons shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain into the primary tank. For tanks with a remote fill connection, a portable spill container shall be provided.

13.5.7 Warning Signs.

Warning signs and NFPA 704 hazard identification signs shall be installed to clearly identify hazards. Warning signs shall have RED colored lettering on a white background stating **NO SMOKING, WELDING, OR OPEN FLAMES WITHIN 25 FEET** and shall be posted on the sides of tanks or on security fencing, facing in the direction of fire department approach. Warning signs and NFPA 704 hazard signs shall have lettering at least 3 inches in height and be constructed of weather-resistive materials.

13.5.8 Security.

When required by the Fire Code Official, the storage, dispensing, use, and handling areas shall be secured against unauthorized entry and safeguarded with such protective facilities as public safety requires. When security fences are installed, the fences shall:

1. Be substantially built of iron, steel, or concrete, fabricated and installed in accordance with the *Building Code*.
2. Extend not less than 7 feet above the surrounding or adjacent floor or ground surface.
3. Be topped by 3 rows of barbed wire, 4 inches apart.
4. Have necessary openings are designed and fabricated to provide security equivalent to the fence.
5. Be locked at all times except when in use by authorized personnel.
6. Be located not less than 5 feet from the tank, valves, or piping.

13.5.9 Electrical Installations.

All electrical equipment and wiring shall be in accordance with City of Houston Electrical Code and listed for intended service.

Section 13.6 – Parking of Tank Vehicles

13.6.1 Tank Vehicles.

Tank vehicles shall not be parked within 25 feet of a protected aboveground tank.

Exception: When the tank is being filled from the tank vehicle.

Section 13.7 – Maintenance

13.7.1 Maintain Tank and Piping.

Protected aboveground tanks and associated piping systems located outside shall be maintained in a safe operating condition. Protected aboveground tanks and components shall be maintained in accordance with their listings. Tanks, valves, and piping should be visually inspected monthly for rust, deterioration, or leakage.

Damage to listed protected aboveground tanks shall be repaired using materials and methods having equal or greater strength and fire resistance than the tanks had prior to the damage, and repairs shall be made in accordance with the manufacturer's guidelines or recommendations and the tank's listing.

The areas surrounding tanks and their associated piping shall be kept clear of storage, combustible materials, weeds, trash, and waste.

Table 13 – Minimum Separation Requirements for Aboveground Tanks

INDIVIDUAL TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)	MINIMUM DISTANCE FROM NEAREST FUEL DISPENSER (feet)	MINIMUM DISTANCE FROM LOT LINE THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM THE NEAREST SIDE OF ANY PUBLIC WAY PROPERTY (feet)	MINIMUM DISTANCE BETWEEN TANKS (feet)
Less than or equal to 6,000	5	25 ^{a,b}	15	5	3
Greater than 6,000	15	25 ^{a,b}	25	15	3

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L

a At fleet vehicle motor fuel-dispensing facilities, a minimum separation distance is not required.

b For Class IIIB liquids in protected above-ground tanks, a minimum separation distance is not required.

References

1. City of Houston *Fire Code*. City of Houston *Building Code*
2. City of Houston *Electrical Code*
3. National Fire Protection Association (NFPA) Standard 704, "Identification of Hazardous Materials"

All reference materials used under this Life Safety Bureau standard shall be in accordance with the most current adopted City of Houston *Construction Code*.