



# HOUSTON FIRE DEPARTMENT LIFE SAFETY BUREAU (LSB)



LSB STANDARD 13, REV 03

## OUTSIDE PROTECTED ABOVEGROUND TANKS FOR GENERATORS AND FIRE PUMPS

**SUPERCEDES:** LSB Standard 13, Rev. 02 (5/23/03)

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LIFE SAFETY BUREAU (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 BOARD OF APPEALS.

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**LSB STANDARD 13, Rev. 03**  
**OUTSIDE PROTECTED ABOVEGROUND TANKS FOR**  
**GENERATORS AND FIRE PUMPS**

**SECTION 13.1 --- GENERAL**

**13.1.1 Scope.**

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, shall be in accordance with this standard and the *Fire Code*.

**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 shall apply to all installations of protected aboveground tanks within the limits of the City of Houston, including the Districts of Limitations.

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 is allowed to provide these protection elements as a unit or is allowed to be 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. Permits shall be obtained at the City of Houston Permit Office, 3300 Main Street, 77002, telephone: 713-535-7897.

**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. 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 Code Official (Code Official).

### **13.3.3 Site Inspection.**

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

### **13.3.4 Annual inspections.**

Permitted sites shall be inspected annually to assure compliance with the requirements of this standard and the *Fire Code*.

### **13.3.5 Prohibited locations.**

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

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

### **13.3.6 Locations subject to flooding.**

Where a tank is located in an area that is subject to flooding, uplift protection shall be provided.

## **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 equivalent tanks or systems.

### **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 12,000-gallon individual or 48,000-gallon aggregate capacity.

#### **13.4.4 Vents.**

##### **13.4.4.1 Normal and Emergency Venting.**

Venting for 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 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.

A method of monitoring the secondary containment shall be provided. 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 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 less 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 post 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**, shall be provided on the sides of tanks, or on security fencing, in the direction of fire department approach. Warning signs and NFPA 704 hazard signs, shall have lettering at least 3 inches in height and of weather-resistive materials.

### **13.5.8 Security.**

When required by the 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 be as follows:

1. Substantially built of iron, steel or concrete, fabricated and installed in accordance with the *Building Code*,
2. Not less than 7 feet above the surrounding floor or ground surface, no portion of which shall be less than 6 feet above the surrounding floor or ground surface,
3. Topped by 3 rows of barbed wire, 4 inches apart,
4. Such necessary openings are designed and fabricated to provide security equivalent to the fence,
5. Locked at all times except when in use by authorized personnel,
6. 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, and shall be in accordance with the manufacture'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.

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**TABLE 13**  
**Minimum Separation Requirements for Protected Above Ground Tanks**

<b>INDIVIDUAL TANK CAPACITY</b>	<b>MINIMUM DISTANCE FROM PROPERTY LINE WHICH IS OR CAN BE BUILT UPON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY</b>	<b>MINIMUM DISTANCE FROM THE NEAREST SIDE OF ANY PUBLIC WAY OR FROM THE NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY</b>	<b>MINIMUM DISTANCE BETWEEN TANKS</b>
<b>Gallons</b>	<b>Feet</b>	<b>Feet</b>	<b>Feet</b>
<b>Less than or equal to 6,000</b>	<b>15</b>	<b>5</b>	<b>3</b>
<b>Greater than 6,000</b>	<b>25</b>	<b>15</b>	<b>3</b>

## REFERENCES

1. City of Houston *Fire Code*, International Fire Code, 2000 edition, as amended.
2. City of Houston *Building Code*.
3. City of Houston *Electrical Code* (NFPA Standard No. 70, “National Electrical Code”).
4. National Fire Protection Association (NFPA) Standard No 704, “Identification of Hazards of Materials”.

Conversion factors: 1 inch = 25mm; 1 foot = 305 mm  
1 gallon (US) = 3.8 Liters