PURPOSE

This standard outlines the general requirements for the installation of a Liquefied Petroleum Gas (LPG) tank. Information contained herein applies to typical instances and may not address all circumstances.

CODE REFERENCES

2013 California Fire Code (CFC) Chapter 61

2003 NFPA 58

PERMIT(S) REQUIRED

A Fire Department Permit LP Gas Installation Permit is required for the installation of a single stationary container in excess of 125 gallons water capacity or for the installation of any LP Gas system.

Categories and fee amounts are found at:
See City Fee Schedule

ATTACHMENTS

1) Plan Review Checklist – Fire Department LPG Tank Installation

2) Inspection Checklist – Fire Department LPG Tank Installation

REQUIRED INSPECTIONS

1) Fire Department Final – Above Ground Storage Tank Installation for LPG

Inspections shall be scheduled a minimum of 48 hours in advance.

GENERAL INFORMATION

This guideline shall apply to liquefied petroleum gas. For the purposes of clarity, the terms “liquefied petroleum gas(es)”, “LP-Gas”, and “LPG” are synonymous and shall mean any material having a vapor pressure not exceeding that allowed for commercial propane composed predominantly of the following hydrocarbons, either by themselves or as mixtures: propane, propylene, butane (normal butane or isobutane), and butylene (including isomers). LPG is generally stored at normal room temperature and atmospheric pressure. LPG liquefies under moderate pressure, and vaporizes upon release of this pressure. It is this property that facilitates transporting and storage of LPG in a concentrated liquid form, and use in a vapor form (gas). LPG vapors are heavier than air.
PLANS

Applicant shall submit three (3) sets of plans, containing the following information, to the fire department for review and approval.

a. A site plan showing the number, location and capacities of container(s) in relation to property lines, buildings, and access roadways.

b. The number of dispensing units or appliances.

d. The type of LPG stored in each container.

e. The manufacturer and serial number of the container(s).

f. Emergency control information.

g. A copy of training and safe handling information.

h. Method of security and protection from vehicles.

LOCATION OF CONTAINERS (CFC) 6104

Storage of LPG in storage facilities and equipment having a storage capacity of two thousand gallons of water or less, shall be permitted in any zone of the City if approved by the Fire Chief, and when a permit for the location has been issued by the Fire Prevention Division. The storage and transportation of LPG and installation and maintenance of pertinent equipment shall be in accordance with CFC Chapter 61, NFPA 58, and subject to approval by the Chief.

Locations of containers with respect to property lines, buildings and public ways, shall meet the requirements of CFC 6104 and CFC Table 6104.3. Containers awaiting use or resale shall meet the requirements of CFC 6109 and CFC Table 6109.12. Multiple container installations with a total storage water capacity of more than 180,000 gallons (150,000 LP-gas capacity), shall be subdivided into groups containing not more than 180,000 gallons and separated by a distance of not less than 50 feet, unless the tanks are protected with one of the following:

- Mounded in an approved manner,
- Protected with approved insulation on areas that are subject to impingement of ignited gas from pipelines or other leakage,
- Protected by firewalls of approved construction,
- Protected by an approved system for application of water as specified in NFPA 58, Table 6.4.2,
- Protected by other approved means.

When one of these forms of protection is provided, the separation shall not be less than 25 feet between container groups.

Multiple container installations shall meet the requirements of CFC Section 6104.4 and NFPA 58, with respect to special hazards such as aboveground flammable/combustible liquid tanks, oxygen or gaseous hydrogen containers, flooding, electrical power lines, or combustible materials.
DISPENSING (CFC) 3806
Dispensing of LP-gases shall be performed by a qualified attendant.

FIRE SAFETY PRECAUTIONS (CFC) 3807 & 3808

NO SMOKING signs shall be posted. Smoking within 25’ of a point of transfer, while filling operations are in progress, is prohibited, per CFC 6107.2. Placarding of tanks in accordance with NFPA 704 is required. Safety devices on LP-gas equipment shall be provided and not be tampered with or made ineffective.

Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10’ from tanks or containers. LP-gas containers shall be protected from vehicular damage by crash posts in accordance with CFC Section 312. Crash posts are to be 6’ in length; 4” in diameter and shall be installed with 3’ in the ground, encased in concrete. Posts are to be filled with concrete and set a maximum of 48” on center, 3’ from the tank shell. Where used for filling forklifts, crash posts may be required to be set closer together, or have curb protection provided. When forklifts are used, posts and/or curbs shall be 4’ from the shell of the tank.

Fire Extinguishers complying with CFC Section 906 shall be provided as specified in NFPA 58.

TABLE 3809.12 SEPARATION FROM EXPOSURES OF CONTAINERS AWAITING USE, RESALE OR EXCHANGE STORED OUTSIDE OF BUILDINGS FROM EXPOSURES

<table>
<thead>
<tr>
<th>Quantity of LP-Gas stored (pounds)</th>
<th>Nearest important building or group of buildings or line of adjoining property that may be built upon</th>
<th>Line of adjoining property occupied by schools, places of worship, hospitals, athletic fields, or other places of public gathering; busy roads or sidewalks</th>
<th>LP-gas dispensing station</th>
<th>Doorway or opening to a building with two or more means of egress</th>
<th>Doorway or opening to a building with one means of egress</th>
<th>Combustible materials</th>
<th>Motor vehicle fuel dispensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>720 or less</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>721 – 2,500</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2,501 – 6,000</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>6,001 – 10,000</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Over 10,000</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

FIRE DEPARTMENT
## TABLE 3804.3 LOCATION OF CONTAINERS

<table>
<thead>
<tr>
<th>Container Capacity (water gallons)</th>
<th>Minimum separation between containers and buildings, public ways, or lines of adjoining property that can be built upon</th>
<th>Minimum separation between containers 2,3 (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 125 (^{2,4})</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>125 to 250</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>251 to 500</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>501 to 2,000</td>
<td>10</td>
<td>25(^{5,6})</td>
</tr>
<tr>
<td>2,001 to 30,000</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>30,001 to 70,000</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>70,001 to 90,000</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>90,001 to 120,000</td>
<td>50</td>
<td>125</td>
</tr>
</tbody>
</table>

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1. Minimum distance for underground containers shall be measured from the pressure-relief device and the filling or liquid level gauge vent connection at the container, except that all parts of an underground container shall be 10 feet or more from a building or line of adjoining property which can be built upon.

2. For other than installations in which the overhang structure is 50 feet or more above the relief-valve discharge outlet: In applying the distance between buildings and ASME containers with a water capacity of 125 gallons or more, a minimum of 50 percent of this horizontal distance shall apply to all portions of the building which project more than 5 feet from the building wall and which are higher than the relief discharge valve outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level upon which the container is installed. Distances to the building wall shall not be less than those prescribed in this table.

3. When underground multicarrier installations are comprised of individual containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

4. At a consumer site, if the aggregate water capacity of a multicarrier installation, comprised of individual containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of Table 3804.3, applying the aggregate capacity per container. If more than one such installation is made, each installation shall be separated by at least 25\(^{5}\). Minimum distances between containers need not be applied. The following shall apply to aboveground containers installed alongside buildings:

1. Containers of less than a 125-gallon water capacity are allowed next to the building they serve when in compliance with items 2, 3, and 4.

2. Department of Transportation specification containers shall be located and installed so that the discharge from the container pressure relief valve is at least 5\(^{6}\) horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from container pressure relief devices shall be located not less than 5\(^{6}\) from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

3. ASME containers of less than 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located at least 5\(^{6}\) horizontally from building openings below the level of such discharge and not less than 4\(^6\) from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

4. The filling connection and the vent from liquid level gauges on either DOT or ASME containers filled at the point of installation shall not be less than 10\(^{6}\) from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

5. This distance is allowed to be reduced to not less than 10\(^{6}\) for a single container of 1,200-gallon water capacity or less, provided such container is at least 25\(^{6}\) from other LP-gas containers of more than 125-gallon water capacity.
LPG CHECKLIST

LOCATION AND INSTALLATION

☐ CFC 6104 – Locations of containers with respect to property lines, buildings, and public ways meet the requirements of CFC Table 6104.3.

☐ CFC 6104.4 – Multiple container installations or systems are subdivided into groups containing not more than 180,000 gallons and are separated by at least 50 feet unless tanks are protected by an approved manner. If protected, the distance can be reduced to 25 feet between groups.

☐ CFC 6104.2 – Aggregate capacity can be limited to 2000 gallons water capacity in heavily populated areas as determined by the chief.

☐ NFPA 58 – 6.5.3.2 – Containers shall not be stacked one above the other.

☐ NFPA 58 – 6.5.3.3 – Loose or piled combustible material and weeds and long dry grass shall be separated from containers by a minimum of 10 ft (3 m).

☐ NFPA 58 – 6.5.3.8 – No horizontal separation shall be required between aboveground LP-Gas containers and underground tanks containing flammable or combustible liquids installed in accordance with NFPA 30, Flammable and Combustible Liquids Code.

☐ NFPA 58 – 6.5.3.12 – An aboveground LP-Gas container and any of its parts shall not be located within 6 ft (1.8 m) of a vertical plane beneath overhead electric power lines that are over 600 volts, nominal.

PROHIBITED USE

☐ CFC 6105.1 – Equipment and devices powered by LP gas shall be approved for use with LP Gas.

SAFETY PRECAUTIONS

☐ NFPA 58 – 4.3.2.1 & 4.3.2.2 – Temporary Installations. The authority having jurisdiction shall be notified of temporary (not to exceed 12 months) installations of the container sizes covered in 4.3.1 before the installation is started.

☐ NFPA 58 – 5.2.4.3 – Vertical ASME containers of over 125 gal (0.5 m³) water capacity for use in permanent installations in stationary service shall be designed with steel supports that allow the container to be mounted on and fastened to concrete foundations or supports.

☐ Steel supports shall be designed to make the container self-supporting without guy wires and to withstand the wind and seismic (earthquake) forces anticipated at the site.

☐ Steel supports shall be protected against fire exposure with a material having a fire resistance rating of least 2 hours.

☐ Continuous steel skirts having only one opening of 18 in. (460 mm) or less in diameter shall have 2-hour fire protection applied to the outside of the skirt.
NFPA 58 – 6.8.3.1 – Horizontal ASME containers designed for permanent installation in stationary service above ground shall be placed on masonry or other noncombustible structural supports located on concrete or masonry foundations with the container supports.

Where saddles are used to support the container, they shall allow for expansion and contraction and prevent an excessive concentration of stresses.

Where structural steel supports are used, they shall comply with 6.8.3.3. (NFPA 58)

Containers of more than 4000 gal (15.2 m³) water capacity shall be provided with concrete or masonry foundations formed to fit the container contour or, if furnished with saddles in compliance with Table 6.8.3.3 (A), shall be placed on flat-topped foundations. (NFPA 58)

Containers of 4000 gal (15.2 m³) water capacity or less shall be installed on either concrete or masonry foundations formed to fit the container contour, or in accordance with 6.8.3.1. (NFPA 58)

Containers of 4000 gal (15.2 m³) water capacity or less and equipped with attached supports complying with Table 6.8.3.3 (A) shall be installed on a fire-resistive foundation if the bottoms of the horizontal members of the container saddles, runners, or skids are more than 12 in. (300 mm) above grade. (NFPA 58)

NFPA 58 – 6.8.3.4 Where a single ASME container complying with Table 6.8.3.3 (A) is installed in isolated locations with non-fireproofed steel supports resting on concrete pads or footings and the outside bottom of the container shell is not more than 5 feet (105 m) above the ground level, the approval of the authority having jurisdiction shall be obtained.

Containers of 4000 gal (15.2) water capacity or less and container-pump assemblies mounted on a common base complying with Table 6.8.3.3 (A) shall be placed either on paved surfaces or on concrete pads at ground level within 4 in. (102 mm) of ground level. (NFPA 58).

NFPA 58 – 6.8.3.2 – ASME containers that have liquid interconnections shall be installed so that the maximum permitted filling level of each container is at the same elevation.

NFPA 58 – 6.8.3.3 – Horizontal ASME containers with attached supports and designed for permanent installation in stationary service shall be installed in accordance with Table 6.8.3.3 (A). Horizontal ASME containers ≤4000 gal on foundations in their installed condition, shall do the following:

A. Structurally support the containers when subject to deteriorating environmental effects including, but not limited to, ambient temperature of -40°F to 150°F (-40°C to 66°C) or local conditions if outside this range, ultraviolet rays, radiant heat from fires, and moisture.

B. Be of either noncombustible or self-extinguishing material (per the definition in NFPA 99, Standard for Health Care Facilities 3.3.149).

NFPA 58 – 6.8.3.4 – Where a single ASME container complying with Table 6.8.3.3 (A) is installed in isolated locations with non-fireproofed steel supports resting on concrete pads or footings and the outside bottom of the container shell is not more than 5 ft (1.5 m) above the ground level, the approval of the authority having jurisdiction shall be obtained.

NFPA 58 – 6.8.3.5 – The part of an ASME container in contact with saddles or foundations or masonry shall be coated or protected to minimize corrosion.
NFPA 58 – 5.9.4.1 – Containers of 4000 gal (15.2 m³) water capacity or less shall be fitted with valves and other appurtenances in accordance with Table 5.9.4.1. Shutoff, filler, check, and excess-flow valves shall comply with ANSI/UL 125.

NFPA 58 – 5.9.5.1 – Liquid level gauging devices shall be installed on all containers filled by volume.

NFPA 58 – 5.9.8.1 – All container openings except those used for pressure relief devices, liquid level gauging devices, pressure gauges, double check filler valves, combination backflow check and excess-flow vapor return valves, actuated liquid withdrawal excess-flow valves, and plugged openings shall be equipped with internal valves or with positive shutoff valves and either excess-flow or backflow check valves.

NFPA 58 – 5.11.3.1 – Pipe shall be wrought iron or steel (black or galvanized), brass, copper, polyamide, or polyethylene (Polyamide and polyethylene allowed outdoors underground only).

NFPA 58 – 5.11.3.2 – Tubing shall be steel, stainless steel, brass, copper, polyamide, or polyethylene (Polyamide and polyethylene allowed outdoors underground only).

NFPA 58 – 5.11.6.4 – Hose, hose connections, and flexible connectors (see 3.3.28, Flexible Connector) shall be fabricated of materials that are resistant to the action of LP-Gas both as liquid and vapor and meet manufactures specifications.

NFPA 58 – 6.9.2.1 – Pressure relief devices shall be installed so that the relief device is in direct communication with the vapor space of the container.

NFPA 58 – 6.9.2.7 – The pressure relief valve discharge on each aboveground container of more than 2000 gal (7.6 m³) water capacity shall be piped vertically upward and unobstructed to the open air.

NFPA 58 – 6.9.2.10 – Shutoff valves shall not be installed between pressure relief devices and the container unless a listed pressure relief valve manifold meeting requirements.

NFPA 58 – 6.10 – First-stage or high-pressure regulators shall be directly attached, or attached by flexible metallic connectors, to the vapor service valve used on stationary (permanent) container installations, and to interconnecting piping of manifolded stationary (permanent) container installations, or to a vaporizer outlet.

NFPA 58 – 6.11.2.1 – LP-Gas vapor piping systems downstream of the first-stage pressure regulator shall be sized so that all appliances operate within their manufacturer's specifications.

NFPA 58 – 6.11.2.2 – LP-Gas vapor piping systems shall be sized and installed to provide a supply of gas to meet the maximum demand of all gas utilization equipment using Table 16.1(a) through Table 16.1(q) or engineering methods.

NFPA 58 – 6.14.1 – On new installations and on existing installations, stationary container storage systems with an aggregate water capacity of more than 4000 gal (15.1 m³) utilizing a liquid transfer line that is 1½ in. (39 mm) or larger and a pressure equalizing vapor line that is 1¾ in. (32 mm) or larger shall be equipped with emergency shutoff valves.

NFPA 58 – 6.16.1.1 – After assembly, piping systems (including hose) shall be tested and proven free of leaks at not less than the normal operating pressure.

CFC 3807.4, 5704.2.9.7.4 and Section 312 – per NFPA 58 – Posts are to be filled with concrete and set a maximum of 48“ on center, 3’ from the tank shell. Where used for filling forklifts, crash posts may be required
to be set closer together, or have curb protection provided. When forklifts are used, posts and/or curbs shall be 4’ from the shell of the tank.

TEMPORARY INSTALLATIONS

- **NFPA 58 – 6.6.3.1** – Single containers constructed as portable storage containers for temporary stationary service in accordance with 5.6.1.2(A) shall be placed on concrete pads, paved surfaces, or firm earth for such temporary service (not more than 12 months at a given location).

- **NFPA 58 – 6.6.3.2** – The surface on which the containers are placed shall be level and if not paved shall be clear of dry grass and weeds and other combustible material within 10 ft (3 m) of the container.

- **NFPA 58 – 6.6.3.4** – Flexibility shall be provided in the connecting piping in accordance with 6.11.6.

- **NFPA 58 – 6.6.3.5** – Where portable storage containers are installed at isolated locations with the bottoms of the skids or runners above the ground, either fire-resistive supports shall be provided or non-fire-resistant supports shall be permitted when all the following conditions are met:
  
  A. The height of the outside bottom of the container does not exceed 5 ft (1.5 m) above the ground.
  
  B. The approval of the authority having jurisdiction is obtained

FIRE PROTECTION

- **NFPA 58 – 6.29.3.1** – Fire protection shall be provided for installations with an aggregate water capacity of more than 4000 gal (15.1 m³) and for ASME containers on roofs.

- **NFPA 58 – 6.29.4.1** – Roadways or other means of access for emergency equipment, such as fire department apparatus, shall be provided.

- **NFPA 58 – 6.29.4.2** – Each industrial plant, bulk plant, and distributing point shall be provided with at least one approved portable fire extinguisher having a minimum capacity of 18 lb (8.2 kg) of dry chemical with a B:C rating. Where fire extinguishers have more than one letter classification, they can be considered to satisfy the requirements of each letter class.

- **NFPA 58 – 8.5.2** – Storage locations, where the aggregate quantity of propane stored is in excess of 720 lb (327 kg), shall be provided with at least one approved portable fire extinguisher having a minimum capacity of 18 lb (9.2 kg) dry chemical with a B:C rating.

- **NFPA 58 – 8.5.3** – The required fire extinguisher shall be located no more than 50 ft. (15m) from the storage location. Where fire extinguishers have more than one letter classification, they can be considered to satisfy the requirements of each letter class.

- **CFC 6107.2** - Smoking and other sources of ignition - No smoking signs shall be posted. Smoking within 15 feet of point of transfer, while filling operations are in progress shall be prohibited.
Approved by:

[Signature]

Ray Iverson
Deputy Fire Chief