

## CHAPTER 38

# LIQUEFIED PETROLEUM GASES

### SECTION 3801 GENERAL

**3801.1 Scope.** Storage, handling and transportation of LP-gas and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter, NFPA 54, National Fuel Gas Code and NFPA 58, Liquefied Petroleum Gas Code as amended.

**Exception:** LP-gas used with oxygen for hot work operations shall be in accordance with Chapter 26.

Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58 as amended.

**3801.2 Permits.** Permits shall be required as set forth in Sections 105.6 and 105.7.

Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the fire code official.

**3801.3 Construction documents.** Where a single container is more than ~~2,000~~ 500 gallons (~~7570~~ 1892.5 L) in water capacity or the aggregate capacity of containers is more than ~~4,000~~ 1,000 gallons (~~15140~~ 3785 L) in water capacity and for all mounded or underground LP-gas containers, the installer shall submit construction documents to the fire code official for approval of ~~for~~ such installation prior to beginning the installation. [NFPA 58 1.4.1].

### SECTION 3802 DEFINITIONS

**3802.1 Definition.** The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

**LIQUEFIED PETROLEUM GAS (LP-gas).** A material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

### SECTION 3803 INSTALLATION OF EQUIPMENT

**3803.1 General.** Liquefied petroleum gas equipment shall be installed in accordance with ~~the International NFPA 54, National Fuel Gas Code~~ and NFPA 58 as amended, except as otherwise provided in this chapter.

### SECTION 3803.2 USE OF LP-GAS INSIDE BUILDINGS

**3803.2 Use of LP-gas containers in buildings.** LP-gas containers shall not be used inside of buildings.

**Exception:** The use of LP-gas containers in buildings shall be in accordance with Sections 3803.2.1 and 3803.2.2.

**3803.2.1 Portable containers.** Portable LP-gas containers, as defined in NFPA 58 as amended, shall not be used in buildings except as specified in ~~NFPA 58 and~~ Sections 3803.2.1.1 through 3803.2.1.7. [NFPA 58 3.4.1.1]

**3803.2.1.1 Use in basement, pit or similar location.** LP-gas containers shall not be used in a basement, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be used in an above-grade underfloor space or basement unless such location is provided with an approved means of ventilation.

**Exception:** Use with self-contained torch assemblies in accordance with Section 3803.2.1.6.

**3803.2.1.2 Construction, renovation and temporary heating.** Portable containers are allowed to be used in buildings or areas of buildings undergoing construction, or renovation, or for temporary heating as set forth in this section and Sections 3.4.3, 3.4.4, and 3.4.7 of NFPA 58 as amended. [NFPA 58 3.4.3, 3.4.4, 3.4.7]

Individual LP-gas container capacities and aggregate quantities of LP-gas allowed within buildings undergoing construction or renovation shall be in accordance with Table 3803.2.1.2-A.

**TABLE 3803.2.1.2-A  
USE OF LP-GAS INSIDE BUILDINGS UNDERGOING CONSTRUCTION OR RENOVATION<sup>1</sup>**

LOCATION	MAXIMUM INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE QUANTITY PER FLOOR	MAXIMUM AGGREGATE QUANTITY INSIDE THE BUILDING
Within Occupied A Occupancies	Limits established by permit issued by Special Events Section		
Within Occupied Buildings other than A Occupancies	50 lbs water capacity (nominal 20 lbs LP-gas capacity)	Number of cylinders shall not exceed the number of workers assigned to use the LP-gas.	Number of cylinders shall not exceed the number of workers assigned to use the LP-gas.
Unoccupied Buildings	239 lbs water capacity (nominal 100 lbs LP-gas capacity)	735 lbs water capacity (nominal 300 lbs LP-gas capacity)	4410 lbs water capacity (nominal 1,800 lbs LP-gas capacity)

For SI: 1 pound = .454 kg.

1. Weight of LP-gas per gallon = 4.20 lbs. See Point of Information.

**TABLE 3803.2.1.2-B  
USE OF LP-GAS INSIDE BUILDINGS FOR TEMPORARY HEATING<sup>1,2</sup>**

LOCATION	MAXIMUM INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE QUANTITY INSIDE THE BUILDING
Group F Occupancies	239 lbs water capacity (nominal 100 lbs LP-gas capacity)	735 lbs water capacity (nominal 300 lbs LP-gas capacity)
All Occupancies <sup>3</sup> except Group F Occupancies	Established by temporary permit	Established by temporary permit

For SI: 1 pound = .454 kg.

1. Temporary heating refers to seasonal space heating that may supplement the buildings primary heat source.

2. Weight of LP-gas per gallon = 4.20 lbs.

3. Allowed in these occupancies only for emergency heating to prevent damage to the building or contents when the permanent heating system is temporarily out of service.

Individual LP-gas container capacities and aggregate quantities of LP-gas allowed within buildings for temporary heating shall be in accordance with Table 3803.2.1.2-B.

**3803.2.1.3 Group F occupancies.** In Group F occupancies, portable LP-gas containers are allowed to be used to supply quantities necessary for processing, research or experimentation. ~~Where manifolded, the aggregate water capacity of such containers shall not exceed 735 pounds (334 kg) per manifold.~~

Temporary heating using LP-gas is also allowed inside Group F occupancies in accordance with Section 3803.2.1.2.

Individual LP-gas container capacities and aggregate quantities of LP-gas allowed within Group F occupancies shall be limited in accordance with Table 3803.2.1.3.

**TABLE 3803.2.1.3  
USE OF LP-GAS INSIDE GROUP F OCCUPANCIES<sup>1</sup>**

LOCATION	MAXIMUM INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE CONTAINER CAPACITY PER MANIFOLD <sup>2</sup>
Fire District	100 lbs water capacity (nominal 40 lbs LP-gas)	287 lbs water capacity (nominal 120 lbs LP-gas capacity)
Elsewhere	239 lbs water capacity (nominal 100 lbs LP-gas capacity)	735 lbs water capacity (nominal 300 lbs LP-gas capacity)

For SI: 1 pound = .454 kg.

1. Weight of LP-gas per gallon = 4.20 lbs.

2. Where multiple manifolds of such containers are present in the same room, each manifold shall be separated from other manifolds by a distance of not less than 20 feet (6096 mm). [NFPA 58 3.4.5]

**3803.2.1.4 Group B, E and I occupancies.** In Group B, E and I laboratory occupancies, portable LP-gas containers are allowed to be used for research and experimentation. Such containers shall not be used in classrooms. Such containers shall not exceed a 50-pound (23 kg) water capacity in occupancies used for educational or research purposes and shall not exceed a 12-pound (5 kg) water capacity in occupancies used for institutional purposes. Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm). [NFPA 58 3.4.6]

**3803.2.1.5 Demonstration uses.** Portable LP-gas containers are allowed to be used temporarily for demonstrations

and public exhibitions. Such containers shall not exceed a water capacity of 12 pounds (5 kg). Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm). [NFPA 58 3.4.8]

**3803.2.1.6 Use with self-contained torch assemblies.** Portable LP-gas containers are allowed to be used to supply approved self-contained torch assemblies or similar appliances. Such containers shall not exceed a water capacity of 2.57 pounds (1.2 kg). [NFPA 58 3.4.8.3]

**3803.2.1.7 Use for food preparation.** Where approved, listed LP-gas commercial food service appliances are allowed to be used for food-preparation within restaurants and in attended commercial food-catering operations in accordance with the *International NFPA 54, National Fuel Gas Code*, the *International Mechanical Code* and NFPA 58 as amended. [NFPA 58 3.4.8.4]

**3803.2.2 Industrial vehicles and floor maintenance machines.** Containers on industrial vehicles and floor maintenance machines shall comply with NFPA 58, Sections 8.3 and 8.4 of NFPA 58 as amended. [NFPA 58 8.3, 8.4]

**3803.3 Location of equipment and piping.** Equipment and piping shall not be installed in locations where such equipment and piping is prohibited by the *International Fuel Gas Code*.

**3803.3 Use of LP-gas containers on roofs or exterior balconies.** LP-gas containers on roofs or exterior balconies shall be in accordance with Sections 3803.3.1 through 3803.3.2.

**3803.3.1 LP-gas containers on roofs of buildings.** LP-gas containers are prohibited on the roofs of buildings and parking garages. [NFPA 58 3.2.10.1, 3.4.1.1, 3.4.9]

**Exceptions:**

1. Temporary installations at construction sites in accordance with Section 3803.4.
2. A single LP-gas container having an individual water capacity not exceeding 48 pounds (22 kg) [nominal 20 pounds (9 kg) LP-gas] connected to a LP-gas grill.

**3803.3.2 Containers on exterior balconies.** LP-gas containers with a water capacity greater than 2.7 pounds (1.2 kg) shall not be located on balconies above the first floor that are attached to a Group R-1, R-2, R-4 or LC occupancy.

**Exception:** A single LP-gas container having an individual water capacity not exceeding 48 pounds (22 kg)

[nominal 20 pounds (9 kg) LP-gas] connected to a LP-gas grill on other than Group R-4 and LC occupancies, provided a portable fire extinguisher having a minimum rating of 20-B is located within 30 feet (9144 mm) of the grill.

**3803.4 Special uses of LP-gas outside of buildings.** Individual container capacities and maximum aggregate quantities of LP-gas used for outdoor cooking, fueling equipment at construction sites, fueling tar kettles, fueling hot tar tank trucks and used in conjunction with torch-applied roofing operations shall be limited in accordance with Table 3803.4.

LP-gas-fired heating appliances located outdoors at permanent Group A drinking and dining establishments are allowed in accordance with Section 603.4.2.

**SECTION 3804  
LOCATION OF CONTAINERS**

**3804.1 General.** The storage and handling of LP-gas and the installation and maintenance of related equipment shall comply with this chapter, NFPA 58 as amended and be subject to the approval of the fire code official, except as provided in this chapter.

**3804.2 Maximum capacity within established limits.** Within the limits established by law restricting the storage of liquefied petroleum gas for the protection of heavily populated or congested areas, the aggregate capacity of any one installation

shall not exceed a water capacity of 2,000 gallons (7570 L) (see Section 3 of the Sample Ordinance for Adoption of the *International Fire Code* on page v).

**Exception:** In particular installations, this the location and capacity limit of LP-gas installations shall may be determined by the fire code official, after consideration of special features such as topographical conditions, nature of occupancy, and proximity to buildings, capacity of proposed containers, degree of fire protection to be provided, proximity to residential, educational and institutional occupancies and other high-risk areas and capabilities of the local fire department.

**3804.3 Container location.** Containers shall be located with respect to buildings, public ways, and lot lines of adjoining property that can be built upon, in accordance with Table 3804.3. [NFPA 58 3.2.2.2]

**3804.3.1 Special hazards.** Containers shall also be located with respect to special hazards such as above-ground flammable or combustible liquid tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in NFPA 58, Section 3.2.2.6 of NFPA 58 as amended. [NFPA 58 3.2.2.6]

**3804.4 Multiple container installation.** Multiple container installations with a total water storage capacity of more than 180,000 gallons (681 300 L) [150,000-gallon (567 750 L) LP-gas capacity] shall be subdivided into groups containing

**TABLE 3803.4  
SPECIAL USES OF LP-GAS OUTSIDE OF BUILDINGS**

USE/ACTIVITY	LOCATION	MAXIMUM INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE QUANTITY
Outdoor Cooking (except R-2 and R-3 where allowed)	Fire District	50 lbs water capacity <sup>1</sup> (nominal 20 lbs LP-gas capacity)	100 lbs water capacity (nominal 40 lbs LP-gas capacity)
	Elsewhere	50 lbs water capacity (nominal 20 lbs LP-gas capacity)	357 lbs water capacity (nominal 150 lbs LP-gas capacity)
Fueling Temporary Heating Equipment at Construction Sites	Fire District	Prohibited	Prohibited
	Elsewhere	500 gallons	500 gallons
Fueling Tar Kettles	Fire District	200 lbs water capacity (nominal 84 lbs LP-gas capacity)	400 lbs water capacity (nominal 168 lbs LP-gas capacity)
	Elsewhere	3,024 lbs water capacity (nominal 1,260 lbs LP-gas capacity)	3,024 lbs water capacity (nominal 1,260 lbs LP-gas capacity)
	On Roofs of Buildings	200 lbs water capacity (nominal 84 lbs LP-gas capacity)	400 lbs water capacity (nominal 168 lbs LP-gas capacity)
Fueling Hot Tar Tank Trucks	Fire District	200 lbs water capacity (nominal 84 lbs LP-gas capacity)	400 lbs water capacity (nominal 168 lbs LP-gas capacity)
	Elsewhere	500 gallons	500 gallons
Fueling Roofing Torches	Occupied Buildings	95 lbs water capacity (nominal 40 lbs LP-gas capacity)	300 lbs water capacity (nominal 126 lbs LP-gas capacity)
	Unoccupied Buildings	95 lbs water capacity (nominal 40 lbs LP-gas capacity)	605 lbs water capacity (nominal 252 lbs LP-gas capacity)

For SI: 1 pound = .454 kg.

1. When the LP-gas is separated from the public by minimum of 30 feet, or by a noncombustible partition, the maximum allowable individual container size may be increased to 239 pounds water capacity (nominal 100 pounds LP-gas capacity) and the maximum allowable aggregate quantity may be increased to 1,000 pounds water capacity (nominal 420 pounds LP-gas capacity).

**TABLE 3804.3  
LOCATION OF LP-GAS CONTAINERS**

CONTAINER CAPACITY (water gallons)	MINIMUM SEPARATION BETWEEN CONTAINERS AND BUILDINGS, PUBLIC WAYS OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT UPON		MINIMUM SEPARATION BETWEEN CONTAINERS <sup>b, c</sup> (feet)
	Mounded or underground containers <sup>a</sup> (feet)	Above-ground containers <sup>b</sup> (feet)	
Less than 125 <sup>c, d</sup>	10	5 <sup>e</sup>	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25 <sup>e, f</sup>	3
2,001 to 30,000	50	50	5
30,001 to 70,000	50	75	(0.25 of sum of diameters of adjacent containers)
70,001 to 90,000	50	100	
90,001 to 120,000	50	125	

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

- a. 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 lot line of adjoining property which can be built upon.
- b. For other than installations in which the overhanging 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 also apply to all portions of the building which project more than 5 feet from the building wall and which are higher than the relief valve discharge 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.
- c. When underground multicontainer 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.
- d. At a consumer site, if the aggregate water capacity of a multicontainer 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 rather than the capacity per container. If more than one such installation is made, each installation shall be separated from other installations by at least 25 feet. Minimum distances between containers need not be applied.
- e. The following shall apply to above-ground 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 (DOTn) specification containers shall be located and installed so that the discharge from the container pressure relief device is at least 3 feet 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 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.
  3. ASME containers of less than a 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 feet horizontally from building openings below the level of such discharge and not less than 5 feet 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 DOTn or ASME containers filled at the point of installation shall not be less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.
- f. This distance is allowed to be reduced to not less than 10 feet for a single container of 1,200-gallon water capacity or less, provided such container is at least 25 feet from other LP-gas containers of more than 125-gallon water capacity.

not more than 180,000 gallons (681 300 L) in each group. Such groups shall be separated by a distance of not less than 50 feet (15 240 mm), unless the containers are protected in accordance with one of the following:

1. Mounded in an approved manner.
2. Protected with approved insulation on areas that are subject to impingement of ignited gas from pipelines or other leakage.
3. Protected by firewalls of approved construction.
4. Protected by an approved system for application of water as specified in NFPA 58, Table 3.2.2.4.
5. Protected by other approved means.

Where one of these forms of protection is provided, the separation shall not be less than 25 feet (7620 mm) between container groups.

## SECTION 3805 PROHIBITED STORAGE AND USE OF LP-GAS

**3805.1 Nonapproved equipment.** Liquefied petroleum gas shall not be used for the purpose of operating devices or equipment unless such device or equipment is approved for use with LP-gas.

**3805.2 Release to the atmosphere.** Liquefied petroleum gas shall not be released to the atmosphere, except through an approved liquid-level gauge or other approved device.

**3805.3 Fire district restrictions.** Storage and use of LP-gas containers having an individual capacity in excess of 239 pounds (108 kg) water capacity [nominal 100 pounds (45 kg) LP-gas] and all stationary installations are prohibited in the fire district.

**Exception:** Containers and stationary installations up to 500 gallons (1893 L) LP-gas capacity west of Alaskan Way.

**3805.4 Rooftop installations.** LP-gas containers are prohibited on the roofs of buildings and parking garages. [NFPA 58 3.2.10.1, 3.4.1.1, 3.4.9].

**Exceptions:**

1. Temporary installations at construction sites in accordance with Section 3803.4.
2. A single LP-gas container having an individual water capacity not exceeding 48 pounds (22 kg) [nominal 20 pounds (9 kg) LP-gas] connected to a LP-gas grill on other than Group R-4 and LC occupancies, provided a portable fire extinguisher having a minimum rating of 20-B is located within 30 feet (9144 mm) of the grill.

**3805.5 Stationary installations inside buildings.** Stationary installations of LP-gas containers inside buildings are prohibited. [NFPA 58 3.2.2.1]

### SECTION 3806 DISPENSING AND OVERFILLING

**3806.1 Attendants.** Dispensing of LP-gas shall be performed by a qualified attendant.

**3806.2 Overfilling.** Liquefied petroleum gas containers shall not be filled or maintained with LP-gas in excess of either the volume determined using the fixed liquid-level gauge installed by the manufacturer, or the weight determined by the required percentage of the water capacity marked on the container.

**3806.3 Dispensing locations.** The point of transfer of LP-gas from one container to another shall be separated from exposures as specified in NFPA 58 as amended. [NFPA 58 3.2.3]

### SECTION 3807 SAFETY PRECAUTIONS AND DEVICES

**3807.1 Safety devices.** Safety devices on LP-gas containers, equipment and systems shall not be tampered with or made ineffective. [NFPA 58 3.3.6]

**3807.2 Smoking and other sources of ignition.** “No Smoking” signs complying with Section 310 shall be posted when required by the fire code official. Smoking within 25 feet (7620 mm) of a point of transfer, while filling operations are in progress at containers or vehicles, shall be prohibited.

Control of other sources of ignition shall comply with Chapter 3 and NFPA-58; Section 3.7 of NFPA 58 as amended. [NFPA 58 3.7]

**3807.3 Clearance to combustibles.** Weeds, grass, brush, trash and other combustible materials shall be kept a minimum of 10 feet (3048 mm) from LP-gas tanks or containers [NFPA 58 3.2.8.2]

**3807.4 Protecting containers from vehicles.** Where exposed to vehicular damage due to proximity to alleys, driveways or parking areas, LP-gas containers, regulators and piping shall be protected in accordance with Section 312.

### SECTION 3808 FIRE PROTECTION

**3808.1 General.** Fire protection shall be provided for installations having storage containers with a water capacity of more than 4,000 gallons (15 140 L), as required by Section 3-10 of NFPA 58 as amended. [NFPA 58 3.10]

**3808.2 Fire extinguishers.** Fire extinguishers complying with Section 906 shall be provided as specified in NFPA 58 as amended. [NFPA 58 5.5]

### SECTION 3809 STORAGE OF PORTABLE LP-GAS CONTAINERS AWAITING USE OR RESALE

**3809.1 General.** Storage of portable containers of 1,000 pounds (454 kg) or less, whether filled, partially filled or empty, at consumer sites or distributing points, and for resale by dealers or resellers shall comply with Sections 3809.2 through 3809.15.

**Exceptions:**

1. Containers that have not previously been in LP-gas service.
2. Containers at distributing plants.
3. Containers at consumer sites or distributing points, which are connected for use. [NFPA 58 5.1.1]

**3809.2 Exposure hazards.** Containers in storage shall be located in a manner which minimizes exposure to excessive temperature rise, physical damage or tampering. [NFPA 58 5.2.1.1]

**3809.3 Position.** Containers in storage having individual water capacity greater than 2.57 pounds (1.2 kg) [nominal 1-pound (0.454 kg) LP-gas capacity] shall be positioned with the pressure relief valve in direct communication with the vapor space of the container. [NFPA 58 3.2.4.1, 5.2.1.2]

**3809.4 Separation from means of egress.** Containers stored in buildings in accordance with Sections 3809.9 and 3809.11 shall not be located near exit access doors, exits, stairways, or in areas normally used, or intended to be used, as a means of egress. [NFPA 58 5.2.1.3]

**3809.5 Quantity.** Empty containers that have been in LP-gas service shall be considered as full containers for the purpose of determining the maximum quantities of LP-gas allowed in Sections 3809.9 and 3809.11. [NFPA 58 5.2.1.4]

**3809.6 Storage on roofs.** Containers which are not connected for use shall not be stored on roofs. [NFPA 58 5.2.1.5]

**3809.7 Storage in basement, pit or similar location.** Liquefied petroleum gas containers shall not be stored in a basement, pit or similar location where heavier-than-air gas might collect. Liquefied petroleum gas containers shall not be stored in above-grade underfloor spaces or basements unless such location is provided with an approved means of ventilation.

**Exception:** Department of Transportation (DOTn) specification cylinders with a maximum water capacity of 2.57 pounds (1.2 kg) for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds (9 kg).

**3809.8 Protection of valves on containers in storage.** Container valves shall be protected by screw-on-type caps or collars which shall be securely in place on all containers stored regardless of whether they are full, partially full or empty. Container outlet valves shall be closed or plugged. [NFPA 58 5.2.2]

**3809.9 Storage within buildings accessible to the public and in residential occupancies.** Storage of LP-gas within buildings accessible to the public and in residential occupancies shall be in accordance with this section.

**3809.9.1 Storage within buildings accessible to the public.** Department of Transportation (DOTn) specification cylinders with maximum water capacity of 2.57 pounds (1.2 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building accessible to the public. The quantity of LP-gas shall not exceed 200 25 pounds (11 kg) in the fire district and 100 pounds (45 kg) outside the fire district pounds (91 kg) except as provided in Section 3809.11.

**Exception:** Storage in restaurants and at food service locations of 10-oz (238 g) butane nonrefillable containers shall be limited to no more than 24 containers, and an additional 24 10-oz (238 g) butane nonrefillable containers stored in another location within the building, where constructed with at least a 2-hour fire wall construction. [NFPA 58 5.3.1.2]

**3809.9.2 Storage within residential occupancies.** Storage of containers within residential occupancies, including the basement or any storage area in a common basement storage area in multiple-family occupancies and attached garages, shall be limited to containers having a maximum individual water capacity of 2.7 pounds (1.2 kg) and shall not exceed 5.4 pounds (2.4 kg) aggregate water capacity per living space unit. Each container shall meet DOT specifications. [NFPA 58 5.3.4]

**3809.10 Storage within buildings not accessible to the public.** The maximum quantity allowed in one storage location in buildings not accessible to the public, such as industrial buildings, shall not exceed a water capacity of 735 pounds (334 kg) [nominal 300 pounds (136 kg) of LP-gas]. Where additional storage locations are required on the same floor within the same building, they shall be separated by a minimum of 300 feet (91 440 mm). Storage beyond these limitations shall comply with Section 3809.11. [NFPA 58 5.3.2.]

Individual LP-gas container capacities and aggregate quantities of LP-gas allowed to be stored within buildings not accessible to the public shall be limited in accordance with Table 3809.10.

**TABLE 3809.10  
STORAGE WITHIN BUILDINGS NOT ACCESSIBLE TO THE PUBLIC<sup>1</sup>**

LOCATION	MAX INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE QUANTITY
Fire District	72 lbs water capacity (nominal 30 lbs LP-gas capacity)	144 lbs water capacity (nominal 60 lbs LP-gas)
Elsewhere	72 lbs water capacity (nominal 30 lbs LP-gas capacity)	735 lbs water capacity (nominal 300 lbs LP-gas capacity)

For SI: 1 pound = .454 kg.  
1. Weight of LP-gas per gallon = 4.20 lbs.

**3809.10.1 Quantities on equipment and vehicles.** Containers carried as part of service equipment on highway mobile vehicles need not be considered in the total storage capacity in Section 3809.10, provided such vehicles are stored in private garages and do not carry more than three LP-gas containers with a total aggregate LP-gas capacity not exceeding 100 pounds (45.4 kg) per vehicle. Container valves shall be closed. [NFPA 58 5.3.2.2]

**3809.11 Storage within rooms used for gas manufacturing.** Storage within buildings or rooms used for gas manufacturing, gas storage, gas-air mixing and vaporization, and compressors not associated with liquid transfer shall comply with Sections 3809.11.1 and 3809.11.2. [NFPA 58 5.3.3]

**3809.11.1 Quantity limits.** The maximum quantity of LP-gas shall be 10,000 pounds (4540 kg).

**3809.11.2 Construction.** The construction of such buildings and rooms shall comply with requirements for Group H occupancies in the *International Building Code*; NFPA 58 as amended, Chapter 7; and both of the following:

1. Adequate vents shall be provided to the outside at both top and bottom, located at least 5 feet (1524 mm) from building openings.
2. The entire area shall be classified for the purposes of ignition source control in accordance with NFPA 58 as amended, Section 3.7.

**3809.12 Location of storage outside of buildings.** Storage outside of buildings, for containers awaiting use, resale or part of a cylinder exchange program shall be located not less than 20 10 feet (6096 mm) from openings into buildings, 20 feet (6096 mm) from any motor vehicle fuel dispenser and 10 feet (3048 mm) from any combustible material and in accordance with Table 3809.12-A. [NFPA 58 5.4]

**TABLE 3809.12-A  
LOCATION OF CONTAINERS AWAITING USE OR  
RESALE STORED OUTSIDE OF BUILDINGS**

QUANTITY OF LP-GAS STORED	DISTANCES TO A BUILDING OR GROUP OF BUILDINGS, PUBLIC WAY OR LOT LINE OF PROPERTY THAT CAN BE BUILT UPON (feet)
500 pounds or less	0
501 to 2,500 pounds	10 <sup>a</sup>
2,501 to 6,000 pounds	15
6,001 to 10,000 pounds	20
Over 10,000 pounds	25

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.  
a. Containers are allowed to be located a lesser distance.

Maximum aggregate quantities located outside of buildings accessible to the public shall be in accordance with Table 3809.12-B.

**TABLE 3809.12-B  
STORAGE OUTSIDE OF BUILDINGS ACCESSIBLE TO THE  
PUBLIC<sup>1</sup>**

LOCATION	MAX INDIVIDUAL CONTAINER CAPACITY	MAXIMUM AGGREGATE QUANTITY
Fire District	72 lbs water capacity (nominal 30 lbs LP-gas)	357 lbs Water capacity (nominal 150 lbs LP-gas)
Elsewhere	72 lbs water capacity (nominal 30 lbs LP-gas)	2592 lbs water capacity (nominal 1,080 lbs LP-gas) <sup>2</sup>

For SI: 1 pound = 0.454 kg.

1. Weight of LP-gas per gallon = 4.20 lbs.

2. Actual maximum quantity shall be determined on a case-by-case basis but shall not exceed the maximum quantity set forth here.

**3809.13 Protection of containers.** Containers shall be stored within a suitable enclosure or otherwise protected against tampering. Vehicular protection shall be provided in accordance with Section 312 as when required by the fire code official. [NFPA 58 3.2.4.2]

**3809.14 Separation from means of egress for containers located outside of buildings.** Containers located outside of buildings shall not be located within 10 feet (3048 mm) of any exit access doors, exits, stairways or in areas normally used, or intended to be used, as a means of egress.

**3809.15 Alternative location and protection of storage.** Where the provisions of Sections 3809.12 and 3809.13 are impractical at construction sites, or at buildings or structures undergoing major renovation or repairs, the storage of containers shall be as required by the fire code official.

## SECTION 3810 CONTAINERS NOT IN SERVICE

**3810.1 Temporarily out of service.** Containers whose use has been temporarily discontinued shall comply with all of the following:

1. Be disconnected from appliance piping.
2. Have container outlets, except relief valves, closed or plugged.
3. Be positioned with the relief valve in direct communication with container vapor space.

**3810.2 Permanently out of service.** Containers to be placed permanently out of service shall be removed from the site.

## SECTION 3811 PARKING AND GARAGING

**3811.1 General.** Parking of LP-gas tank vehicles shall comply with Sections 3811.2 and 3811.3.

**Exception:** In cases of accident, breakdown or other emergencies, tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

**3811.2 Unattended parking.** The unattended parking of LP-gas tank vehicle shall be in accordance with Sections 3811.2.1 and 3811.2.2.

**3811.2.1 Near residential, educational and institutional occupancies and other high-risk areas.** Liquefied petroleum gas tank vehicles shall not be left unattended at any

time on residential streets or within 500 feet (152 m) of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Tank vehicles shall not be left unattended at any other place that would, in the opinion of the fire code official, pose an extreme life hazard.

**3811.2.2 Durations exceeding 1 hour.** Liquefied petroleum gas tank vehicles parked at any one point for longer than 1 hour shall be located as follows:

1. Off public streets, highways, public avenues or public alleys.
2. Inside of a bulk plant.
3. At other approved locations not less than 50 feet (15 240 mm) from buildings other than those approved for the storage or servicing of such vehicles.

**3811.3 Garaging.** Garaging of LP-gas tank vehicles shall be as specified in NFPA 58 as amended. Vehicles with LP-gas fuel systems are allowed to be stored or serviced in garages as specified in NFPA 58 as amended, Section 8.6.

### Point of Information

The following tables may be used to approximate container capacity conversions.

#### FOR PORTABLE DOT/ICC/CTC CYLINDER APPLICATIONS:

PROPANE CAPACITY (lb)	WATER CAPACITY	
	(gal)	(lb)
5	1.2	12
10	2.4	23.8
14	3.3	34
20	4.7	48
25	5.9	59.5
30	7.1	72
40	9.5	95
60	14	144
100	24	239
150	35	357
200	47	477
300	71	715
420	99	1,000

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

#### FOR STATIONARY ASTM CONTAINER APPLICATIONS:

WATER CAPACITY (gallons)	LP-GAS CAPACITY (gallons)*	LP-GAS CAPACITY (pounds)
100	80	338
125	100	423
150	120	508
250	200	848
325	260	—
500	400	—
1,000	800	—

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

Based on propane specific gravity of .508 at 60°F (16°C).

