CHAPTER 38
LIQUEFIED PETROLEUM GASES

SECTION 3801
GENERAL

3801.1 Scope. Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter and NFPA 58. Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.

3801.2 Permits. Permits shall be required as set forth in Section 107.2.

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,* except when the container is for temporary use on construction sites.

3801.3 Construction documents. Where a single LP-gas container is more than 2,000 gallons (7570 L) in water capacity or the aggregate water capacity of LP-gas containers is more than 4,000 gallons (15 140 L), the installer shall submit *construction documents* for such installation.

SECTION 3802
DEFINITIONS

3802.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings 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.

LP-GAS CONTAINER. Any vessel, including cylinders, tanks, portable tanks and cargo tanks, used for transporting or storing LP-gases.

SECTION 3803
INSTALLATION OF EQUIPMENT

3803.1 General. LP-gas equipment shall be installed in accordance with the *International Fuel Gas Code* and NFPA 58, except as otherwise provided in this chapter.

3803.2 Use of LP-gas containers in buildings. 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, shall not be used in buildings except as specified in NFPA 58 and Sections 3803.2.1.1 through 3803.2.1.7.

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 and temporary heating. Portable LP-gas containers are allowed to be used in buildings or areas of buildings undergoing construction or for temporary heating as set forth in Sections 6.19.4, 6.19.5 and 6.19.8 of NFPA 58.

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. 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).

3803.2.1.4 Group E and I occupancies. In Group E and I 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 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).

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).

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 $2^1/_2$ pounds (1 kg).

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 Fuel Gas Code,* the *International Mechanical Code* and NFPA 58.

3803.2.2 Industrial vehicles and floor maintenance machines. LP-gas containers on industrial vehicles and floor maintenance machines shall comply with Sections 11.12 and 11.13 of NFPA 58.

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*.

SECTION 3804
LOCATION OF LP-GAS CONTAINERS

3804.1 General. The storage and handling of LP-gas and the installation and maintenance of related equipment shall comply with NFPA 58 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 xiii).

Exception: In particular installations, this capacity limit shall 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 LP-gas containers, degree of fire protection to be provided and capabilities of the local fire department.

3804.3 Container location. LP-gas 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.

3804.3.1 Special hazards. LP-gas containers shall also be located with respect to special hazards including, but not limited to, above-ground flammable or *combustible liquid* tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in Section 6.4.5 of NFPA 58.

TABLE 3804.3
LOCATION OF LP-GAS CONTAINERS

LP-GAS CONTAINER CAPACITY (water gallons)	MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT UPON		MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS[b, c] (feet)
	Mounded or underground LP-gas containers[a] (feet)	Above-ground LP-gas containers[b] (feet)	
Less than 125[c, d]	10	5[e]	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25[e, f]	3
2,001 to 30,000	50	50	5
30,001 to 70,000	50	75	(0.25 of sum of diameters of adjacent LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:
   1. LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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 LP-gas 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.

3804.4 Multiple LP-gas container installations. Multiple LP-gas 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 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 Table 6.4.2 of NFPA 58.
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 LP-gas container groups.

SECTION 3805
PROHIBITED USE OF LP-GAS

3805.1 Nonapproved equipment. LP-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. LP-gas shall not be released to the atmosphere, except through an *approved* liquid-level gauge or other *approved* device.

SECTION 3806
DISPENSING AND OVERFILLING

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

3806.2 Overfilling. LP-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. Portable LP-gas containers shall not be refilled unless equipped with an overfilling prevention device (OPD) where required by Section 5.7.3 of NFPA 58.

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

3806.4 DOT cylinders filled on site. DOT cylinders in stationary service that are filled onsite and, therefore, are not under the jurisdiction of DOT either shall be requalified in accordance with DOT requirements or shall be visually inspected within 12 years of the date of manufacture or within five years from March 15, 2008, whichever is later, and within every five years thereafter, in accordance with the following:

1. Any cylinder that fails one or more of the criteria in Item 3 shall not be refilled or continued in service until the condition is corrected.
2. Personnel shall be trained and qualified to perform inspections.
3. Visual inspection shall be performed in accordance with the following:
   - 3.1. The cylinder is checked for exposure to fire, dents, cuts, digs, gouges, and corrosion according to CGA C-6, Standards for Visual Inspection of Steel Compressed Gas Cylinders, except that paragraph 4.2.1(1) of that standard (which requires tare weight certification), shall not be part of the required inspection criteria.
   - 3.2. The cylinder protective collar (where utilized) and the foot ring are intact and are firmly attached.
   - 3.3. The cylinder is painted or coated to retard corrosion.
   - 3.4. The cylinder pressure relief valve indicates no visible damage, corrosion of operating components, or obstructions.
   - 3.5. There is no leakage from the cylinder or its appurtenances that is detectable without the use of instruments.
   - 3.6. The cylinder is installed on a firm foundation and is not in contact with the soil.
   - 3.7. A cylinder that passed the visual inspection shall be marked with the month and year of the examination followed by the letter "E" (example: 10-01E, indicating requalification in October 2001 by the external inspection method).
   - 3.8. The results of the visual inspection shall be documented, and a record of the inspection shall be retained for a five-year period.

Exception: Any inspection procedure outlined in Items 3.1 through 3.8 that would require a cylinder be moved in such a manner that disconnection from the piping system would be necessary shall be omitted, provided the other inspection results do not indicate further inspection is warranted.

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.

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 LP-gas containers or vehicles, shall be prohibited.

Control of other sources of ignition shall comply with Chapter 3 of this code and Section 6.22 of NFPA 58.

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.

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 LP-gas storage containers with a water capacity of more than 4,000 gallons (15 140 L), as required by Section 6.25 of NFPA 58.

3808.2 Portable fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided as specified in NFPA 58.

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

3809.1 General. Storage of portable LP-gas containers of 1,000 pounds (454 kg) or less, whether filled, partially filled or empty, at consumer sites or distribution points, and for resale by dealers or resellers shall comply with Sections 3809.2 through 3809.14.

Exceptions:

1. LP-gas containers that have not previously been in LP-gas service.
2. LP-gas containers at distribution plants.
3. LP-gas containers at consumer sites or distribution points, which are connected for use.

3809.2 Exposure hazards. LP-gas containers in storage shall be located in a manner that minimizes exposure to excessive temperature rise, physical damage or tampering.

3809.3 Position. LP-gas containers in storage having individual water capacity greater than $2^1/_2$ pounds (1 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.

3809.4 Separation from means of egress. LP-gas 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*.

3809.5 Quantity. Empty LP-gas 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.

3809.6 Storage on roofs. LP-gas containers that are not connected for use shall not be stored on roofs.

3809.7 Storage in basement, pit or similar location. LP-gas containers shall not be stored in a basement, pit or similar location where heavier-than-air gas might collect. LP-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 $2^1/_2$ pounds (1 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 LP-gas containers in storage. LP-gas 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.

3809.9 Storage within buildings accessible to the public. Department of Transportation (DOTn) specification cylinders with maximum water capacity of $2^1/_2$ pounds (1 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 pounds (91 kg) except as provided in Section 3809.11.

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.

3809.10.1 Quantities on equipment and vehicles. LP-gas 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. LP-gas container valves shall be closed.

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.

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*, Chapter 10 of NFPA 58 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 Section 6.22 of NFPA 58.

3809.12 Location of storage outside of buildings. Storage outside of buildings of LP-gas containers awaiting use, resale or part of a cylinder exchange program shall be located in accordance with Table 3809.12.

3809.13 Protection of containers. LP-gas containers shall be stored within a suitable enclosure or otherwise protected against tampering. Vehicular protection shall be provided as required by the *fire code official*.

3809.14 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*.

3809.15 LP-gas cylinder exchange for resale. In addition to other applicable requirements of this chapter, facilities operating cylinder exchange stations for LP-gas that are accessible to the public shall comply with the following requirements.

1. Cylinders shall be secured in a lockable, ventilated metal cabinet or other approved enclosure.
2. Cylinders shall be accessible only by authorized personnel or by use of an automated exchange system in accordance with Section 3809.15.1.
3. A sign shall be posted on the entry door of the business operating the cylinder exchange stating "DO NOT BRING LP-GAS CYLINDERS INTO THE BUILDING" or similar approved wording.
4. An emergency contact information sign shall be posted within 10 feet (30 480 mm) of the cylinder storage cabinet. The content, lettering, size, color and location of the required sign shall be as required by the fire code official.

3809.15.1 Automated cylinder exchange stations. Cylinder exchange stations that include an automated vending system for exchanging cylinders shall comply with the following additional requirements:

1. The vending system shall only permit access to a single cylinder per individual transaction.
2. Cabinets storing cylinders shall be designed such that cylinders can only be placed inside when they are oriented in the upright position.
3. Devices operating door releases for access to stored cylinders shall be permitted to be pneumatic, mechanical or electrically powered.
4. Electrical equipment inside of or within 5 feet (1524 mm) of a cabinet storing cylinders, including but not limited to electronics associated with vending operations, shall comply with the requirements for Class 1, Division 2 equipment in accordance with NFPA 70.
5. A manual override control shall be permitted for use by authorized personnel. On newly installed cylinder exchange stations, the vending system shall not be capable of returning to automatic operation after a manual override until the system has been inspected and reset by authorized personnel.
6. Inspections shall be conducted by authorized personnel to verify that all cylinders are secured, access doors are closed and the station has no visible damage or obvious defects, which necessitate placing the station out of service. The frequency of inspections shall be as specified by the fire code official.

SECTION 3810
LP-GAS CONTAINERS NOT IN SERVICE

3810.1 Temporarily out of service. LP-gas containers whose use has been temporarily discontinued shall comply with all of the following:

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

3810.2 Permanently out of service. LP-gas containers to be placed permanently out of service shall be removed from the site.

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

QUANTITY OF LP-GAS STORED (pounds)	MINIMUM SEPARATION DISTANCE FROM STORED LP-GAS CYLINDERS TO (feet):						
	Nearest important building or group of buildings or line of adjoining property that may be built upon	Line of adjoining property occupied by schools, places of religious worship, hospitals, athletic fields or other points of public gathering; busy thoroughfares; or sidewalks	LP-gas dispensing station	Doorway or opening to a building with two or more means of egress	Doorway or opening to a building with one means of egress	Combustible materials	Motor vehicle fuel dispenser
720 or less	0	0	5	5	10	10	20
721 - 2,500	0	10	10	5	10	10	20
2,501 - 6,000	10	10	10	10	10	10	20
6,001 - 10,000	20	20	20	20	20	10	20
Over 10,000	25	25	25	25	25	10	20

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

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.

Exception: The unattended outdoor parking of LP-gas tank vehicles may also be in accordance with Section 9.7.2 of NFPA 58.

3811.2.1 Near residential, educational and institutional occupancies and other high-risk areas. LP-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. LP-gas tank vehicles parked at any one point for longer than1 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. Vehicles with LP-gas fuel systems are allowed to be stored or serviced in garages as specified in Section 11.15 of NFPA 58.