

Minnesota Department of Public Safety State Fire Marshal Division

Liquefied Petroleum Gas

Hazards of liquefied petroleum (LP) gas

LP gas is heavier than air so it tends to seek lower levels. Ignition sources that are at or lower than the tank are a concern in addition to vents and openings into buildings that allow the gas to enter and accumulate. LP gas is also frequently known as propane.

LP gas is stored in containers as a liquid and expands to a gaseous state when released from the container. When released, a gallon of liquid expands to about 270 gallons of gas. Due to expansion, the release of even a small quantity of LP gas in a room can quickly reach explosive levels.

Types of containers

LP gas containers come in two forms:

- DOT cylinders: These are meant to be movable and transportable (especially when empty) and generally have a nominal maximum capacity of 100 gallons of water. Even though the maximum capacity is measured in gallons of water capacity, DOT cylinders are often referred to by their LP gas weight (i.e. 20 pound or 100 pound).
- Tanks: These are meant to be stationary and generally have a water capacity (WC) exceeding 100 gallons.

LP gas containers can be aboveground (most common), underground (buried completely underground), or mounded (partially out of the ground and covered with earth, sand, or other material).

Container separation distances — buildings and property lines

One of the critical safety features for LP gas is to have distance separations from buildings, roads, and property lines. Separation distances are based on the size of the container, orientation of the container (aboveground, underground, or mounded), and fire protection features that may be present. The larger the container, the farther it has to be located from buildings and property lines. The following table summarizes the separation distances for aboveground LP gas tanks.

Container Type	Container Size (in water gallons)	Minimum Distance to Buildings	Minimum Distance to Property Lines	NFPA 58 (2017) Section
Aboveground	0-124	0	0	Table 6.4.1.1
Aboveground	125-500	10 ft.	10 ft.	Table 6.4.1.1
Aboveground (single tank – no other LP Gas tanks within 25 ft.)	501-1,200	10 ft.	10 ft.	Section 6.4.1.3
Aboveground	501-2,000	25 ft.	25 ft.	Table 6.4.1.1
Aboveground	2,001-30,000	50 ft.	50 ft.	Table 6.4.1.1
Aboveground	30,001-70,000	75 ft.	75 ft.	Table 6.4.1.1
Aboveground	70,001-90,000	100 ft.	100 ft.	Table 6.4.1.1



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Container Type	Container Size (in water gallons)	Minimum Distance to Buildings	Minimum Distance to Property Lines	NFPA 58 (2017) Section
Aboveground	Above 90,000	See NFPA 58	See NFPA 58	Table 6.4.1.1
Underground or Mounded	0-2,000	10 ft.	10 ft.	Table 6.4.1.1
Underground or Mounded	Above 2,000	50 ft.	50 ft.	Table 6.4.1.1
Underground or Mounded with Fail-safe Protection Features	2,001-30,000	10 ft.	10 ft.	Sections 6.4.2.1 & 6.30.2.1
Aboveground Multiple Containers – aggregate capacity over 500 gallons	0-125 (individual container size)	Table 6.4.1.1 for aggregate capacity	Table 6.4.1.1 for aggregate capacity	Section 6.4.3.2

Container requirements for tents and membrane structures

There are some additional concerns when LP gas is used in conjunction with tents and membrane structures (see Minnesota State Fire Code 3107.13.2 and NFPA 58 Table 6.4.1.1).

- LP gas containers must be located outside of tents and membrane structures.
- LP gas safety release valves must be pointed away from tents and membrane structures.
- Minimum distances between LP gas containers and tents or membrane structures are as follows:
 - 500 gallons or less: 10 feet from tents or membrane structures.
 - 501 to 2,000: 25 feet from tents and membrane structures.
 - Over 2,000: See NFPA 58 Table 6.4.1.1

Container separation distances — other containers

Containers also need to be separated from other containers so that potential fire sizes are limited. The following table lays out the separation distances between other containers.

Container Type	Container Size (in water gallons)	Minimum Distance Between Containers	NFPA 58 (2017) Section
Aboveground, Underground, or Mounded	0-250	0	Table 6.4.1.1
Aboveground, Underground, or Mounded	251-2,000	3 ft.	Table 6.4.1.1
Aboveground (single tank allowed to be closer to buildings – no other LP Gas tanks within 25 ft.)	501-1,200	25 ft.	Section 6.4.1.3
Aboveground, Underground, or Mounded	2,001-30,000	5 ft.	Table 6.4.1.1
Aboveground, Underground, or Mounded	Above 30,000	See NFPA 58	Table 6.4.1.1
Aboveground Multiple Containers – aggregate capacity over 500 gallons	0-125 (individual container size)	0 ft. between containers 25 ft. from other installations	Section 6.4.3.2



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Container separation distances — point of transfer

Other spacing considerations are from the “point of transfer” — this is where the LP gas container is filled by the transport truck, bulk truck, or rail car or where smaller containers are filled from the larger tank.

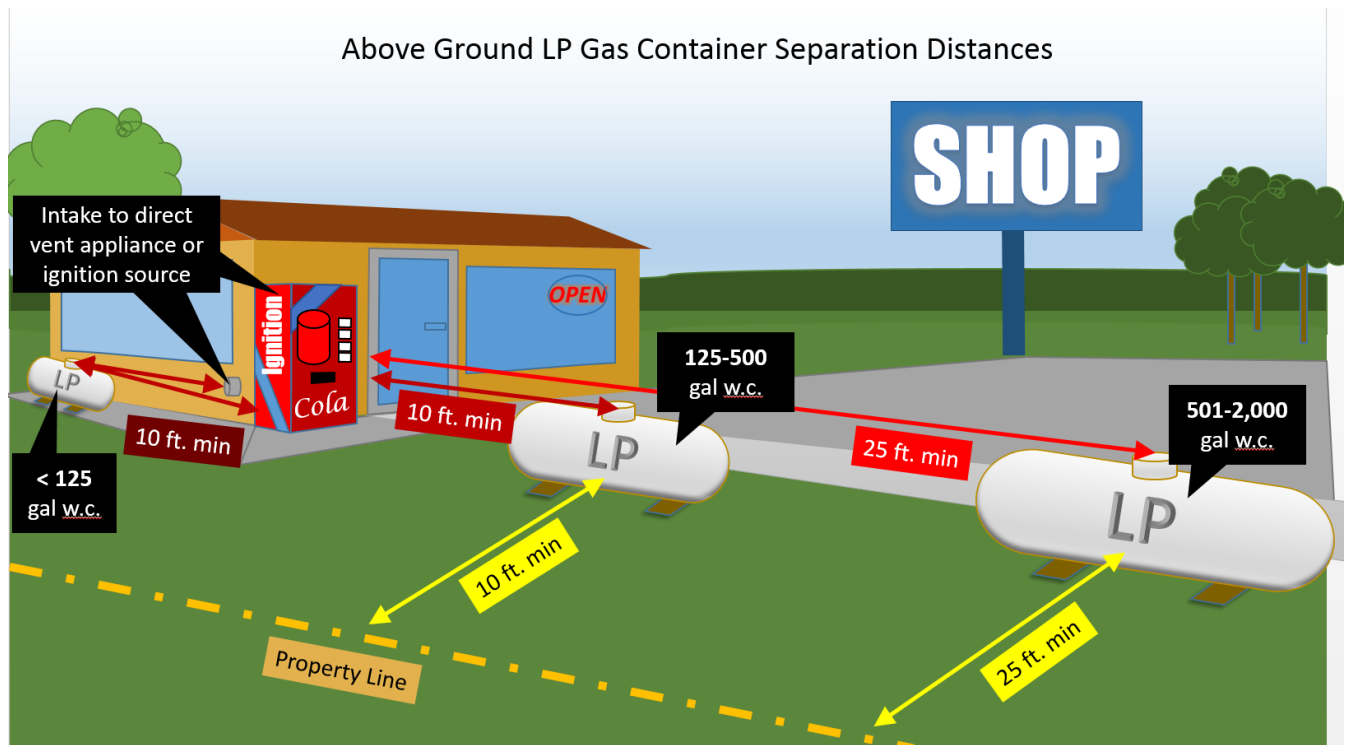
Description	Minimum Distance	Minimum Distance Using Low Emission Transfer	NFPA 58 (2017) Section
Buildings with minimum 1-hour fire-rated walls	10 ft.	10 ft.	Table 6.7.2.1
Buildings with fire-rated walls less than 1 hour (including tents)	25 ft.	12.5 ft.	Table 6.7.2.1
Building wall openings or pits at or below the level of the point of transfer	25 ft.	12.5 ft.	Table 6.7.2.1
Line of adjoining property that can be built upon	25 ft.	12.5 ft.	Table 6.7.2.1
Outdoor places of public assembly (such as schoolyards, athletic fields, & playgrounds)	50 ft.	25 ft.	Table 6.7.2.1
Public ways (including streets, highways, & sidewalks) and other points of transfer	25 ft.	12.5 ft.	Table 6.7.2.1
Public ways (including streets, highways, & sidewalks) and vehicle L.P. Gas fuel dispensers	10 ft.	10 ft.	Table 6.7.2.1
Gasoline or diesel fuel dispensing	10 ft.	5 ft.	Table 6.7.2.1
Other L.P. Gas containers	10 ft.	10 ft.	Table 6.7.2.1

With larger tanks or where the quantity of LP gas consumed is high, there may be other spacing requirements to consider (such as distance from vaporizers).



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Above Ground LP Gas Container Separation Distances



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