

SANTA ROSA FIRE DEPARTMENT

FIRE PREVENTION BUREAU

PLAN REVIEW CHECKLIST

July 1, 2010



LIQUEFIED PETROLEUM GAS (LPG) TANK INSTALLATION

Address:		Permit #:
Inspector:	Date:	Status:
Inspector:	Date:	Status:
A-Approved; AC-Approved w/comments; I-Incomplete; D-Denied		

This Checklist outlines general requirements. Information contained herein applies to typical instances and may not address all circumstances.

CODE REFERENCES

2007 California Fire Code (CFC) Chapter 38
2004 National Fire Protection Association (NFPA) Standard 58

REQUIRED INSPECTIONS

- Fire Department Final – Above Ground Storage Tank for LPG

FILE REVIEW

- | | Y | N | |
|-----|--------------------------|--------------------------|--|
| 1. | <input type="checkbox"/> | <input type="checkbox"/> | Is there an alternate method application approved? |
| 2. | <input type="checkbox"/> | <input type="checkbox"/> | Are there any special requirements or AM&M proposals? |
| 3. | <input type="checkbox"/> | <input type="checkbox"/> | Permit fees entered in Permits Plus. |
| 4. | <input type="checkbox"/> | <input type="checkbox"/> | Contractor shall provide, or have on file, a current Contractor's License. |
| 5. | <input type="checkbox"/> | <input type="checkbox"/> | Name and address of project |
| 6. | <input type="checkbox"/> | <input type="checkbox"/> | Contractor's name, address, and telephone number. |
| 7. | <input type="checkbox"/> | <input type="checkbox"/> | Three (3) sets of scaled plans and specifications |
| 8. | <input type="checkbox"/> | <input type="checkbox"/> | A site plan showing the number, location, and capacities of containers. |
| 9. | <input type="checkbox"/> | <input type="checkbox"/> | Buildings and access roadways |
| 10. | <input type="checkbox"/> | <input type="checkbox"/> | The number of dispensing units or appliances and specifications for each |
| 11. | <input type="checkbox"/> | <input type="checkbox"/> | The type of LPG stored in each container |
| 12. | <input type="checkbox"/> | <input type="checkbox"/> | The manufacture and serial number of container(s) |

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- | | Y | N | |
|-----|--------------------------|--------------------------|--|
| 13. | <input type="checkbox"/> | <input type="checkbox"/> | Location of portable fire extinguishers |
| 14. | <input type="checkbox"/> | <input type="checkbox"/> | Emergency control information |
| 15. | <input type="checkbox"/> | <input type="checkbox"/> | A copy of training and safe handling information |
| 16. | <input type="checkbox"/> | <input type="checkbox"/> | Method of security and protection from vehicles |
| | <input type="checkbox"/> | <input type="checkbox"/> | Contractor's name, address and telephone number. |

LOCATION AND INSTALLATION

17. CFC 3804 – Locations of containers with respect to property lines, buildings, and public ways meet the requirements of CFC Table 3804.3.
18. CFC 3808.4 – 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.
19. CFC 3804.2 – Aggregate capacity can be limited to 2000 gallons water capacity in heavily populated areas as determined by the chief.
20. NFPA 58 – 6.4.5.1 – Containers shall not be stacked one above the other.
21. NFPA 58 – 6.4.5.2 – Loose or piled combustible material and weeds and long dry grass shall be separated from containers by a minimum of 10 ft (3 m).
22. NFPA 58 – 6.4.5.7 – 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*.
23. NFPA 58 – 6.4.5.12 – 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

24. CFC 3805.1 – Equipment and devices powered by LP gas shall be approved for use with LP Gas.

SAFETY PRECAUTIONS

25. NFPA 58 – 4.3.2 – 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.
26. NFPA 58 – 5.2.7.1 – 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.
27. 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.
28. Steel supports shall be protected against fire exposure with a material having a fire resistance rating of at least 2 hours.

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| 29. | <input type="checkbox"/> | <input type="checkbox"/> | 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. |
| 30. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.3.1 – 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. |
| 31. | <input type="checkbox"/> | <input type="checkbox"/> | Where saddles are used to support the container, they shall allow for expansion and contraction and prevent an excessive concentration of stresses. |
| 32. | <input type="checkbox"/> | <input type="checkbox"/> | Where structural steel supports are used, they shall comply with 6.6.3.3. |
| 33. | <input type="checkbox"/> | <input type="checkbox"/> | Containers of more than 2000 gal (7.6 m ³) 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 6.6.3.3, shall be placed on flat-topped foundations. |
| 34. | <input type="checkbox"/> | <input type="checkbox"/> | Containers of 2000 gal (7.6 m ³) water capacity or less shall be installed on either concrete or masonry foundations formed to fit the container contour, or in accordance with 6.6.3.1(E). |
| 35. | <input type="checkbox"/> | <input type="checkbox"/> | Containers of 2000 gal (7.6 m ³) water capacity or less and equipped with attached supports complying with Table 6.6.3.3 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. |
| 36. | <input type="checkbox"/> | <input type="checkbox"/> | Containers of 2000 gal (7.6 m ³) water capacity or less shall not be mounted with the outside bottom of the container shell more than 5 ft (1.5 m) above the surface of the ground. |
| 37. | <input type="checkbox"/> | <input type="checkbox"/> | Containers of 2000 gal (7.6 m ³) water capacity or less and container-pump assemblies mounted on a common base complying with Table 6.6.3.3 shall be placed either on paved surfaces or on concrete pads at ground level within 4 in. (102 mm) of ground level. |
| 38. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.3.2 – ASME containers that have liquid interconnections shall be installed so that the maximum permitted filling level of each container is at the same elevation. |
| 39. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.3.3 – Horizontal ASME containers with attached supports and designed for permanent installation in stationary service shall be installed in accordance with Table 6.6.3.3. Horizontal ASME containers ≤2000 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, <i>Standard for Health Care Facilities</i> 3.3.165). |
| 40. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.3.4 – Where a single ASME container complying with Table 6.6.3.3 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. |
| 41. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.3.5 – The part of an ASME container in contact with saddles or foundations or masonry shall be coated or protected to minimize corrosion. |

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|-----|--------------------------|--------------------------|--|
| 42. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.7.4.1 – Containers of 2000 gal (7.6 m ³) water capacity or less shall be fitted with valves and other appurtenances in accordance with Table 5.7.4.1. Shutoff, filler, check, and excess-flow valves shall comply with ANSI/UL 125. |
| 43. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.7.5 – Liquid level gauging devices shall be installed on all containers filled by volume. |
| 44. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.7.8.1 – 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. |
| 45. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.9.3.1 – Pipe shall be wrought iron or steel (black or galvanized), brass, copper, polyamide, or polyethylene (Polymide and polyethylene allowed outdoors underground only). |
| 46. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.9.3.2 – Tubing shall be steel, stainless steel, brass, copper, polyamide, or polyethylene (Polymide and polyethylene allowed outdoors underground only). |
| 47. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 5.9.6.1 – Hose, hose connections, and flexible connectors (see 3.3.25, 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. |
| 48. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.7.2.1 – Pressure relief devices shall be installed so that the relief device is in direct communication with the vapor space of the container. |
| 49. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.7.2.7 – The pressure relief valve discharge on each aboveground container of more than 2000 gal (7.6 m ³) water capacity shall be piped vertically upward to a point at least 7 ft (2.1 m) above the top of the container, and the discharge opening shall be unobstructed to the open air. |
| 50. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.7.2.8 – Shutoff valves shall not be installed between pressure relief devices and the container unless a listed pressure relief valve manifold meeting the requirements of 6.7.2.9 is used. |
| 51. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.8.1.1 – 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. |
| 52. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.9.2.1 – 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. |

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| 53. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.9.2.2 – 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 15.1(a) through Table 15.1(q) or engineering methods. |
| 54. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.12.1 – On new installations and on existing installations, stationary container storage systems with an aggregate water capacity of more than 4000 gal (15.1 m ³) utilizing a liquid transfer line that is 1½ in. (39 mm) or larger and a pressure equalizing vapor line that is 1¼ in. (32 mm) or larger shall be equipped with emergency shutoff valves. |
| 55. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.14.1 – After assembly, piping systems (including hose) shall be tested and proven free of leaks at not less than the normal operating pressure. |
| 56. | <input type="checkbox"/> | <input type="checkbox"/> | CFC 3807.4 – 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

- | | | | |
|-----|--------------------------|--------------------------|---|
| 57. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.5.1 – Single containers constructed as portable storage containers for temporary stationary service in accordance with 5.2.7.2(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). |
| 58. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.5.2 – 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. |
| 59. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.5.3 – Flexibility shall be provided in the connecting piping in accordance with 6.9.6. |
| 60. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.6.5.4 – 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-resistive 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

- | | | | |
|-----|--------------------------|--------------------------|--|
| 61. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.25.3.1 – Fire protection shall be provided for installations with an aggregate water capacity of more than 4000 gal (15.1 m ³) and for ASME containers on roofs. |
|-----|--------------------------|--------------------------|--|

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| 62. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.25.4.1 – Roadways or other means of access for emergency equipment, such as fire department apparatus, shall be provided. |
| 63. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 6.23.4.2 – 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. |
| 64. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 8.5.1 – 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. |
| 65. | <input type="checkbox"/> | <input type="checkbox"/> | NFPA 58 – 8.5.2 – 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. |
| 66. | <input type="checkbox"/> | <input type="checkbox"/> | CFC 3807.2 - 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. |

Table 5.7.4.1 Container Connection and Appurtenance Requirements for Containers Used in Other Than Bulk Plants and Industrial Plants				
		1	2	3
Part	Appurtenance	Cylinders 2 Through 420 lb Propane Capacity	Stationary ASME Containers \leq4000 gal Water Capacity³	DOT and ASME Engine Fuel and Mobile Containers
A	Vapor shutoff valve ¹	R (CGA 555 outlet prohibited)	R	R with internal excess-flow valve
B	Liquid shutoff valve ¹	R with CGA 555 outlet and internal excess flow shutoff	R with internal excess flow shutoff	R with internal excess-flow valve
D	Pressure relief valve	R (see 5.7.2.2)	R ² [see 5.7.4.1(A)]	R (full internal or flush-type full internal pressure relief valve)
E	Fixed maximum liquid level gauge	R (filled by volume) R (filled by weight, \leq 40 lb and > 100 lb) [see 5.7.4.1(H)]	R	R
F	Overfilling prevention device	R (4 thru 40 lb) (see 5.7.3)	NR	R (ASME only) (see 5.7.4.1(E))
G	Actuated liquid withdrawal excess flow valve	NR	R (\geq 125 gal) [see 5.7.4.1(B) through 5.7.4.1(D)]	NR
H	Float gauge	NR	R (> 124 gal only)	NR
I	Double backflow check filler valve	R (\geq 100 lb filled on site)	R	R (ASME only)
<p>R: Required. NR: Not required. ¹Where installed. ²Aboveground ASME containers, internal spring-type pressure relief valves only. ³All ASME container capacities are water capacity.</p>				

TABLE 3804.3 LOCATION OF CONTAINERS

Container Capacity (water gallons)	Minimum separation between containers and buildings, public ways, or lines of adjoining property that can be built upon		Minimum separation between containers ^{2,3} (feet)
	Mounded or Underground containers ¹ (feet)	Aboveground containers ²	
Less than 125 ^{3,4}	10	5 ⁵	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25 ^{5, 6}	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	

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 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 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 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.

⁴ 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 per container. If more than one such installation is made, each installation shall be separated by at least 25'. Minimum distances between containers need not be applied.

⁵The 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 3' 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' 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' horizontally from building openings below the level of such discharge and not less than 5' 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' from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

⁶ This distance is allowed to be reduced to not less than 10' for a single container of 1,200-gallon water capacity or less, provided such container is at least 25' from other LP-gas containers of more than 125-gallon water capacity.

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

Quantity of LP-Gas stored (pounds)	MINIMUM SEPARATION DISTANCE FROM STORED 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 worship, hospitals, athletic fields, or other places of public gathering; busy roads 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 dispensing
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

Table 6.6.3.3 Installation of Permanently Installed Horizontal ASME Containers with Attached Supports

Container Size		Attached Support	Height of Bottom of the Container
gal	m ³		
>2000	≥7.6	Non-fireproofed steel on flat-topped concrete foundations	6 in. (150 mm) maximum above concrete foundations
≤2000	≤7.6	Non-fireproofed steel on masonry or concrete foundations more than 12 in. (300 mm) above the ground	2 in.-12 in. (51 mm-305 mm) above concrete foundation
≤2000	≤7.6	Non-fireproofed steel on paved surfaces or concrete pads within 4 in. (100 mm) of the ground	24 in. (610 mm) maximum above paved surface or top of concrete pads
≤2000	≤7.6	Foundations or supports for horizontal LP-Gas containers per 6.6.3.3(B)	24 in. (610 mm) maximum above paved surface