

# **TEXAS LP-GAS EXAMINATION STUDY GUIDE**

**Category A, A1, A2**

ASME/DOT Container Manufacturer, ASME Container  
Manufacturer, DOT Container Manufacturer

**Management Level**



**RAILROAD COMMISSION OF TEXAS**

Rev 1.0

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**LP-GAS Management-Level Examination Citations Study Guide List**

<b>Certification Category</b>	<b>LPG Safety Rule Book</b>	<b>NFPA 58 (2017)</b>	<b>49 CFR</b>
<b>A - ASME/DOT CONTAINER MANUFACTURER</b>	Subchapter A, B: 9.126 & 9.129, Subchapter E: 9.403	3.3.34.5, 3.3.55, 3.3.85. 8.2, 3.3.90, 5.2, 5.6, 5.9, 6.9 ,2.2, 6.11.3.5, 9.4, 11.3, 11.14	173.315, 117.337
<b>A-1 ASME CONTAINER MANUFACTURER</b>	Subchapter A, B: 9.126 & 9.12	A.5.2.5.3, 3.3.90, 3.3.34.5, 5.2, 5.6, 5.9, 6.11, 11.3, 11.4, 12.5	178.337
<b>A-2 DOT CONTAINER MANUFACTURER</b>	Subchapter A, B: 9.126	3.3.34.5, 3.3.85 .8.2, 3.3.90, 5.11.6.4, 5.2.1.2, 5.2.8.3, 7.2.3.2, 9.4 1.3 - 9.4.4.5	78.61, 178.51, 178.68

# LP-GAS EXAMINATION STUDY GUIDE

## Management-LEVEL

### Category A, A-1, A-2

#### Who should use this guide?

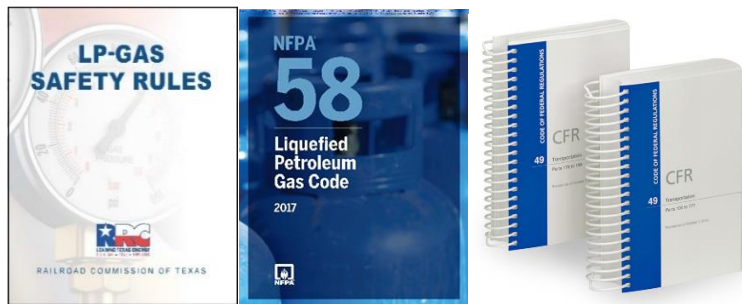
You should use this guide to prepare for the Railroad Commission's management-level qualifying examination to apply for any of the following:

The Category A examination qualifies an individual to assemble, repair, install, subframe, test, and sell both ASME and DOT containers and cylinders, including motor or mobile fuel containers and systems, and to repair and install transport and transfer systems.

The Category A-1 examination qualifies an individual to assemble, repair, install, test, and sell ASME containers, including motor or mobile fuel containers and systems, and to repair and install transport and transfer systems.

The Category A-2 examination qualifies an individual to assemble, repair, install, subframe, test, and sell DOT cylinders.

#### What books do I need?



This examination tests your knowledge of the laws and standards that apply to Container Manufacturer for ASME/DOT, ASME, or DOT operations in Texas. These laws and standards are found in three books:

*LP-Gas Safety Rules* (Texas Railroad Commission)

*NFPA 58 Liquefied Petroleum Gas Code* (National Fire Protection Association, 2017)

Title 49, Code of Federal Regulations (CFR) Supplement

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## Where do I get these books?

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PDF Version of LP-Gas Safety Rules: <https://www.rrc.texas.gov/media/nibc4gtu/lpg-rules.pdf>

NFPA 58: [Liquefied Petroleum Gas Code](#), (RRC adopted 2017 Edition on September 1, 2020)

NOTE: To [view online \(read-only\) documents NFPA requires users to REGISTER](#). Read-only access allows users to view all editions.

The full current text of 49 CFR can also be viewed online. Go to <http://ecfr.gov> and select “Title 49—Transportation.”

To purchase a hard copy of a publication, contact the Railroad Commission of Texas’ Central Records section at [ims@rrc.texas.gov](mailto:ims@rrc.texas.gov) or 512-463-6882

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## License Categories, Container Manufacturer Registration, and Fees

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The license categories and fees are as follows.

(1) A Category **A** license for container assembly and repair authorizes the assembly, repair, installation, subframing, testing, and sale of **ASME or DOT** LP-gas containers, including LP-gas motor or mobile fuel containers and systems, and the repair and installation of transport and transfer systems. A Category A license includes all activities covered by a Category A1 and Category A2 license. The original license fee is \$1,000; the renewal fee is \$600.

(2) A Category **A1** license for ASME container assembly and repair authorizes the assembly, repair, installation, testing, and sale of **ASME** containers, including LP-gas motor or mobile fuel containers and systems, and the repair and installation of transport and transfer systems. The original license fee is \$1,000; the renewal fee is \$600.

(3) A Category **A2** license for U.S. Department of Transportation (DOT) container assembly and repair authorizes the assembly, repair, installation, subframing, testing, and sale of LP-gas **DOT** containers, including LP-gas motor or mobile fuel containers and systems, and the repair and installation of transport and transfer systems. The original license fee is \$1,000; the renewal fee is \$600.

*LP-Gas Safety Rules, §9.6 (b)(1)*

### Sample Question 1

No person may engage in any LP-gas activity until that person has obtained a license from the Commission authorizing the LP-gas activities.

- A. True
- B. False

*Answers on the last page*

## Sections and Topics

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Before you take this examination, you should know the definitions found in this study guide and the contents of the sections of the codes and standards listed below. The actual examination questions may not cover all of the listed sections and topics.

## Terms and Definitions

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NOTE: The list below is not exhaustive. You are responsible for knowing all the terms and definitions that apply to the LP-gas activities you will perform, as well as the rules and standards highlighted in this guide.

NOTE: Informal terms that are sometimes used in the propane industry instead of formal technical terms are given in brackets.

### Railroad Commission *LP-Gas Safety Rules*

***Alternative Fuel Safety (AFS).*** The RRC department responsible for LP-Gas training and inspection.  
***LP-Gas Safety Rules, §9.2(1)***

***Company Representative.*** The individual designated to the Commission by a license applicant or a licensee as the principal individual in authority.  
***LP-Gas Safety Rules, §9.2(12)***

***LP Gas Safety Rules.*** The rules adopted by the Railroad Commission in the Texas Administrative Code, Title 16, Part 1, Chapter 9, including any NFPA or other documents adopted by reference. The official text of the Commission's rules is that which is on file with the Secretary of State's office and available at [www.sos.state.tx.us](http://www.sos.state.tx.us) or through the Commission's web site  
***LP-Gas Safety Rules, §9.2(22)***

***Operations Supervisor.*** The individual who is certified by the Commission to actively supervise a licensee's LP-gas operations and is authorized by the licensee to implement operational changes.

***Outlet.*** A site operated by an LP-gas licensee from which any regulated LP-gas activity is performed.  
***LP-Gas Safety Rules, §9.2(32)***

***Rules examination.*** The Commission's written examination that measures an examinee's working knowledge of Chapter 113 of the Texas Natural Resources Code and/or the current LP-Gas Safety Rules.  
***LP-Gas Safety Rules, §9.2(41)***

**NFPA 58 (2017)**

**Cylinder.** A portable container with a marked water capacity of 1000 lb. or less that is designed to transport and store LP-Gas.

*NFPA 58, §3.3.17*

**Rotary Gauge.** A type of variable liquid level gauge that indicates the liquid level on a dial gauge installed on an ASME container by manually rotating an open ended tube inside the container, which is connected to a positive shutoff vent valve.

*NFPA 58, §3.3.34.5*

**Overfilling Prevention Device (OPD).** A device that is designed to provide an automatic means to prevent the filling of a container beyond a predetermined level

*NFPA 58, §3.3.55*

**Water Capacity.** The amount of water at 60°F (16°C) required to fill a container.

*NFPA 58, §33.90*

**Flush-Type Full Internal Pressure Relief Valve.** An internal pressure relief valve in which the wrenching section is also within the container connection, not including a small portion due to pipe thread tolerances on makeup.

*NFPA 58, §3.3.85.8.2*

**Sample Question 2**

The \_\_\_\_\_ is the individual designated to the Commission by a license applicant or a licensee as the principal individual in authority.

- A. License Owner
- B. Company Manager
- C. Company Representative
- D. Certified Individual

*Answers on last page*

## Key Topics

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NOTE: The list below is not exhaustive. You are responsible for knowing all the facts, rules, standards and procedures that apply to the LP-gas activities you will perform, as well as the rules and standards highlighted in this guide.

As you study the applicable codes and standards, pay special attention to the facts, rules and procedures related to the following key topics. When you take the examination, read each question very carefully.

## ADMINISTRATIVE RULES - GENERAL REQUIREMENTS

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### Company License

No person may engage in any LP-gas activity until that person has obtained a license from the Commission authorizing the LP-gas activities.

*LP-Gas Safety Rules, §9.7(a)*

Licensees, registered manufacturers, company representatives, and operations supervisors at each outlet shall have copies of all current licenses and/or manufacturer registrations and certificates for employees at that location available for inspection during regular business hours.

*LP-Gas Safety Rules, §9.7(c)*

Licenses and manufacturer registrations issued under this chapter expire one year after issuance at midnight on the last day of the month prior to the month in which they are issued.

*LP-Gas Safety Rules, §9.7(d)*

A properly completed LPG Form 1 listing all names under which LP-gas related activities requiring licensing are to be conducted and the applicant's properly qualified company representative and the following forms or documents as applicable:

- (A) LPG Form 1A for outlets
- (B) LPG Form 7 for delivery units
- (C) LPG Form 19 for transferring ownership

*LP-Gas Safety Rules, §9.7(f)*

### Hearings for Denial, Suspension, or Revocation of Licenses, Manufacturer Registrations, or Certificates

The Commission may deny, suspend, or revoke a license, registration, or certificate for any person who fails to comply with the rules in this chapter.

*LP-Gas Safety Rules, §9.16 (a)*

### Application for a New Certificate

An applicant for a new certificate shall:

- (1) file with AFS a properly completed LPG Form 16 and the applicable nonrefundable rules examination fee specified in §9.10 of this title (relating to Rules Examination); pass the applicable rules examination with a score of at least 75%

- (2) pass the applicable rules examination with a score of at least 75%; and
- (3) complete any required training and/or AFT in §9.51 and §9.52 of this title.

***LP-Gas Safety Rules, §9.8(c)***

### **Certificate Renewal**

Certificate holders shall remit the nonrefundable \$35 annual certificate renewal fee to AFS on or before May 31 of each year. Individuals who hold more than one certificate shall pay only one annual renewal fee.

(1) Failure to pay the nonrefundable annual renewal fee by the deadline shall result in a lapsed certificate

(A) To renew a lapsed certification, the individual must pay the nonrefundable \$35 annual renewal fee plus a nonrefundable \$20 late-filing fee.

(B) If an individual's certificate lapses or expires, that individual shall immediately cease performance of any LP-gas activities authorized by the certificate.

(C) If an individual's certificate has been expired for more than two years from May 31 of the year in which the certificate lapsed, that individual shall comply with the requirements in §9.8 of this title (relating to Requirements and Application for a New Certificate) or §9.13 of this title.

***LP-Gas Safety Rules, §9.9(c)***

### **Rules Examination**

Failure of any exam shall immediately disqualify the individual from performing any LP-gas related activities covered by the exam which is failed, except for activities covered by a separate exam which the individual has passed.

***LP-Gas Safety Rules, §9.10(f)***

Individuals who pass an employee level rules examination between March 1 and May 31 of any year shall have until May 31 of the next year to complete any required training. Individuals who pass an employee level rules examination at other times shall have until the next May 31 to complete any required training.

***LP-Gas Safety Rules, §9.52(a)(3)***

### **Trainees**

A licensee or ultimate consumer may employ an individual as a trainee for a period not to exceed 45 calendar days without that individual having successfully completed the rules examination

The trainee shall be directly and individually supervised at all times by an individual who has successfully completed the Commission's rules examination for the areas of work being performed by the trainee.

***LP-Gas Safety Rules, §9.12***

No person shall perform work, directly supervise LP-gas activities, or be employed in any capacity requiring contact with LP-gas unless:

(1) that individual is a certificate holder

(2) that individual is a trainee

***LP-Gas Safety Rules, §9.8(a)***



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## **TRANSFER LOCATION RULES - GENERAL REQUIREMENTS**

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### **Designation and Responsibilities of Company Representatives and Operations Supervisors**

Each licensee shall have at least one company representative for the license and at least one operations supervisor for each outlet.

***LP-Gas Safety Rules, §9.17***

A licensee maintaining one or more outlets shall file LPG Form 1 with AFS listing the physical location of the first outlet and designating the company representative for the license and LPG Form 1A designating the physical location and operations supervisor for each additional outlet.

***LP-Gas Safety Rules, §9.17(a)(1)***

A licensee may have more than one company representative.

***LP-Gas Safety Rules, §9.17(a)(2)***

An individual may be operations supervisor at more than one outlet provided that:

- (A) each outlet has a designated LP-gas certified employee responsible for the LP-gas activities at that outlet;
- (B) the certified employee's and/or operations supervisor's telephone number is posted at the outlet on a sign with lettering at least 3/4-inch high, visible and legible during regular business hours; and
- (C) the certified employee and/or the operations supervisor monitors the telephone number and responds to calls during normal business hours.

***LP-Gas Safety Rules, §9.17(a)(3)***

The company representative may also serve as operations supervisor for one of the licensee's outlets provided that the individual meets both the company representative and the operations supervisor requirements in this section.

***LP-Gas Safety Rules, §9.17(a)(4)***

A licensee shall immediately notify AFS in writing upon conclusion of employment, for whatever reason, of its company representative or any operations supervisor and shall at the same time designate a replacement.

***LP-Gas Safety Rules, §9.17(a)(5)***

A licensee shall cease all LP-gas activities if it no longer employs a qualified company representative who complies with the Commission's requirements. A licensee shall not resume LP-gas activities until such time as it has a properly qualified company representative.

***LP-Gas Safety Rules, §9.17(a)(6)***

A licensee shall cease LP-gas activities at an outlet if it no longer employs a qualified operations supervisor at that outlet who complies with the Commission's requirements. A licensee shall not resume LP-gas activities at that outlet until such time as it has a properly qualified operations supervisor.

***LP-Gas Safety Rules, §9.17(a)(7)***

**Report of LP-Gas Incident/Accident**

At the earliest practical moment or within two hours following discovery, a licensee owning, operating, or servicing equipment or an installation shall notify AFS by telephone of any event involving LP-gas which.

- (1) caused a death or any personal injury requiring hospitalization;
- (2) required taking an operating facility out of service;
- (3) resulted in unintentional gas ignition requiring an emergency response;
- (4) involved the LP-gas installation on any vehicle propelled by or transporting LP-gas;
- (5) caused an estimated damage to the property of the operator, others, or both totaling \$5,000 or more, including gas loss;
- (6) could reasonably be judged as significant because of rerouting of traffic, evacuation of buildings, or media interest even though it does not meet paragraphs (1) - (5) of this subsection; or
- (7) is required to be reported to any other state or federal agency (such as the Texas Department of Public Safety or the United States Department of Transportation).

*LP-Gas Safety Rules, §9.36(a)*

**Sample Question 3**

A licensee may employ a trainee for a period not to exceed \_\_\_\_\_ calendar days without that individual's having passed the required examination for the LP-gas activities to be performed.

- A. 30
- B. 45
- C. 60
- D. 90

*Answer on last page*

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## **Code of Federal Regulations – Title 49**

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### **Pressure relief devices, piping, valves, hoses, and fittings**

(b) *Piping, valves, hose, and fittings.*

(1) The burst pressure of all piping, pipe fittings, hose and other pressure parts, except for pump seals and pressure relief devices, must be at least 4 times the design pressure of the cargo tank. Additionally, the burst pressure may not be less than 4 times any higher pressure to which each pipe, pipe fitting, hose or other pressure part may be subjected to in service. For chlorine service, see [paragraph \(b\)\(7\)](#) of this section.

(2) Pipe joints must be threaded, welded, or flanged. If threaded pipe is used, the pipe and fittings must be Schedule 80 weight or heavier, except for sacrificial devices. Malleable metal, stainless steel, or ductile iron must be used in the construction of primary valve body parts and fittings used in liquid filling or vapor equalization. Stainless steel may be used for internal components such as shutoff discs and springs except where incompatible with the lading to be transported. Where copper tubing is permitted, joints must be brazed or be of equally strong metal union type. The melting point of the brazing material may not be lower than 538 °C (1,000 °F). The method of joining tubing may not reduce the strength of the tubing.

**Title 49, Code of Federal Regulations §178.337-9 (b) (2)**

### **Compressed gases in cargo tanks and portable tanks.**

**173.315 (i)** Each tank must be provided with one or more pressure relief devices which, unless otherwise specified in this part, must be of the spring-loaded type. Each valve must be arranged to discharge upward and unobstructed to the outside of the protective housing to prevent any impingement of escaping gas upon the tank. For each chlorine tank the protective housing must be in compliance with the requirements set forth in the applicable specification

**Title 49, Code of Federal Regulations §173.315 (i)**

### **Specification 4BW welded steel cylinders with electric-arc welded seam.**

#### ***Manufacture.***

(3) Longitudinal electric-arc welded seams (in shells) must be of the butt welded type. Welds must be made by a machine process including automatic feed and welding guidance mechanisms. Longitudinal seams must have complete joint penetration, and must be free from undercuts, overlaps or abrupt ridges or valleys. Misalignment of mating butt edges may not exceed 1/6 inch of nominal sheet thickness or 1/32 inch whichever is less. All joints with nominal sheet thickness up to and including 1/8 inch must be tightly butted. When nominal sheet thickness is greater than 1/8 inch, the joint must be gapped with maximum distance equal to one-half the nominal sheet thickness or 1/32 inch whichever is less. Joint design, preparation, and fit-up must be such that requirements of this [paragraph \(d\)](#) are satisfied.

**Title 49, Code of Federal Regulations §178.61(d)(3)**

### **Specification 4E welded aluminum cylinders.**

**Type, size and service pressure.** A DOT 4E cylinder is a welded aluminum cylinder with a water capacity (nominal) of not over 1,000 pounds and a service pressure of at least 225 to not over 500 psig. The cylinder must be constructed of not more than two seamless drawn shells with no more than one circumferential weld. The circumferential weld may not be closer to the point of tangency of the cylindrical portion with the shoulder than 20 times the cylinder wall thickness. Cylinders or shells closed in by spinning process and cylinders with longitudinal seams are not authorized.

**Title 49, Code of Federal Regulations §178.68 (a)**

**Specification 4BA welded or brazed steel cylinders.**

Minimum thickness of heads and bottoms must be not less than 90 percent of the required thickness of the side wall.

**Title 49, Code of Federal Regulations §178.51(d)(1)(i)**

**General requirements**

**Design pressure.** The design pressure of a cargo tank authorized under this specification shall be not less than the vapor pressure of the commodity contained therein at 115 °F. or as prescribed for a particular commodity in [§ 173.315\(a\) of this subchapter](#), except that in no case shall the design pressure of any cargo tank be less than 100 p.s.i.g. nor more than 500 p.s.i.g.

**Title 49, Code of Federal Regulations §178.337-1 (b)**

**Emergency discharge control** means the ability to stop a cargo tank unloading operation in the event of an unintentional release.

Emergency discharge control can utilize passive or off-truck remote means to stop the unloading operation. A passive means of emergency discharge control automatically shuts off the flow of product without the need for human intervention within 20 seconds of an unintentional release caused by a complete separation of the liquid delivery hose. An off-truck remote means of emergency discharge control permits a qualified person attending the unloading operation to close the cargo tank's internal self-closing stop valve and shut off all motive and auxiliary power equipment at a distance from the cargo tank motor vehicle.

**Title 49, Code of Federal Regulations §178.337-1 (g)**

**Structural Integrity**

(b) *Static design and construction.*

(1) The static design and construction of each cargo tank must be in accordance with Section VIII of the ASME Code. The cargo tank design must include calculation of stresses generated by design pressure, the weight of lading, the weight of structure supported by the cargo tank wall, and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be used in calculation of thermal stresses.

**Title 49, Code of Federal Regulations §178.337-3 (b) (1)**

**4 Joints**

All longitudinal shell welds shall be located in the upper half of the cargo tank.

**Title 49, Code of Federal Regulations §178.337-4 (c)**

**Closure for manhole**

(a) Each cargo tank marked or certified after April 21, 1994, must be provided with a manhole conforming to paragraph UG-46(g)(1) and other applicable requirements in Section VIII of the ASME Code (IBR, see [§ 171.7 of this subchapter](#)), except that a cargo tank constructed of NQT steel having a capacity of 3,500 water gallons or less may be provided with an inspection opening conforming to paragraph UG-46 and other applicable requirements of the ASME Code instead of a manhole.

(b) The manhole assembly of cargo tanks constructed after June 30, 1979, may not be located on the front head of the cargo tank.

**Title 49, Code of Federal Regulations §178.337-6 (a) -178.337-6 (b)**

**Pressure relief devices, piping, valves, hoses, and fittings**

(b) *Piping, valves, hose, and fittings.*

(1) The burst pressure of all piping, pipe fittings, hose and other pressure parts, except for pump seals and pressure relief devices, must be at least 4 times the design pressure of the cargo tank. Additionally, the burst pressure may not be less than 4 times any higher pressure to which each pipe, pipe fitting, hose or other pressure part may be subjected to in service.

(2) Pipe joints must be threaded, welded, or flanged. If threaded pipe is used, the pipe and fittings must be Schedule 80 weight or heavier, except for sacrificial devices. Malleable metal, stainless steel, or ductile iron must be used in the construction of primary valve body parts and fittings used in liquid filling or vapor equalization. Stainless steel may be used for internal components such as shutoff discs and springs except where incompatible with the lading to be transported. Where copper tubing is permitted, joints must be brazed or be of equally strong metal union type. The melting point of the brazing material may not be lower than 538 °C (1,000 °F). The method of joining tubing may not reduce the strength of the tubing.

**Title 49, Code of Federal Regulations §178.337-9 (b) (1) (2)**

**Marking inlets and outlets.** Except for gauging devices, thermometer wells, and pressure relief valves, each cargo tank inlet and outlet must be marked “liquid” or “vapor” to designate whether it communicates with liquid or vapor when the cargo tank is filled to the maximum permitted filling density. A filling line that communicates with vapor may be marked “spray-fill” instead of “vapor.”

**Title 49, Code of Federal Regulations §178.337-9 (c)**

**Accident damage protection**

(a) All valves, fittings, pressure relief devices, and other accessories to the tank proper shall be protected in accordance with [paragraph \(b\)](#) of this section against such damage as could be caused by collision with other vehicles or objects, jack-knifing and overturning. In addition, pressure relief valves shall be so protected that in the event of overturn of the vehicle onto a hard surface, their opening will not be prevented and their discharge will not be restricted.

(b) The protective devices or housing must be designed to withstand static loading in any direction equal to twice the weight of the tank and attachments when filled with the lading, using a safety factor of not less than four, based on the ultimate strength of the material to be used, without damage to the fittings protected, and must be made of metal at least 3/16-inch thick.

**Title 49, Code of Federal Regulations §178.337-10 (a) - 178.337-10 (a) (b)**

**Marking.**

**General.** Each cargo tank certified after October 1, 2004 must have a corrosion-resistant metal name plate (ASME Plate); and each cargo tank motor vehicle certified after October 1, 2004 must have a specification plate, permanently attached to the cargo tank by brazing, welding, or other suitable means on the left side near the front, in a place accessible for inspection. If the specification plate is attached directly to the cargo tank wall by welding, it must be welded to the tank before the cargo tank is postweld heat treated.

**Title 49, Code of Federal Regulations §178.337–17(a)**

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## **LPG Safety Rules**

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### **Appurtenances and Equipment**

(a) All appurtenances and equipment placed into LP-gas service shall be listed by a nationally recognized testing laboratory such as Underwriters Laboratory (UL), Factory Mutual (FM), or American Gas Association (AGA) unless: (1) it is specifically prohibited for use by another section of the rules in this chapter; (2) there is no test specification or procedure developed by the testing laboratory for the appurtenance or equipment; or (3) it is used and in compliance with any NFPA standard adopted by the Commission

**LP-Gas Safety Rules, §9.126 (a)(1)(2)(3)**

### **Manufacturer's Nameplate and Markings on ASME Containers**

(d) Nameplates on stationary ASME containers built prior to September 1, 1984, shall include at least the following legible information:

- (1) the name of container manufacturer;
- (2) the manufacturer's serial number;
- (3) the container's working pressure;
- (4) the container's water capacity; and
- (5) the ASME Code symbol

(e) Nameplates on stationary ASME containers built on or after September 1, 1984, shall be stainless steel and permanently attached to the container by continuous fusion welding around the perimeter of the nameplate, and shall be stamped or etched with the information required by NFPA 58, §5.2.8.3(C) and §11.3.4(B) in characters at least 5/32 inch high.

(f) Any replacement nameplate issued by an original container manufacturer for containers constructed prior to September 1, 1984, shall be stainless steel and shall be affixed in accordance with ASME Code. The owner or operator of the container shall ensure that a copy of LPG Form 8 is filed with AFS when a replacement nameplate is affixed.

(g) Nameplates on LP-gas motor or mobile fuel tanks shall be permanently attached in a manner which will minimize corrosion of the nameplate or its fastening means and not contribute to corrosion of the container. If the nameplate is not continuously welded to the container, then it shall be raised at least 1/4 inch but no more than 1/2 inch from the container's surface.

(h) In addition to a container nameplate, underground containers shall have a system nameplate permanently attached to the system in a location that will be readily accessible for inspection when the containers are buried. Where the container is buried, mounded, insulated, or otherwise covered so the nameplate is obscured, a duplicate nameplate shall be installed in a clearly visible and accessible location.

**LP-Gas Safety Rules, §9.129 (d) (e) (g) (h)**

### **Applicability**

(3) 49 CFR §180.405(n) states: "Thermal activation. No later than the date of its first scheduled leakage test after July 1, 1999, each specification MC 330 or MC 331 cargo tank motor vehicle and each non-specification cargo tank motor vehicle conforming to §173.315(k) of this subchapter, marked and certified before July 1, 1999, that is used to transport a liquefied compressed gas, other than carbon dioxide and chlorine, that has a water capacity of 13,247.5 liters (3,500 gallons) or less must be equipped with a means of thermal activation for the internal self-closing stop valve as specified in §178.337- 8 (a)(4) of this subchapter."

**LP-Gas Safety Rules, §9.201 (c) (3)**

**NFPA 58 (2017)**

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**General**

Containers shall be designed, fabricated, tested, and marked (or stamped) in accordance with the regulations of the U.S. Department of Transportation (DOT 49 CFR); Federal Aviation Administration (FAA 14 CFR); the ASME Code, Section VIII, “Rules for the Construction of Unfired Pressure Vessels” ; or the API-ASME *Code for Unfired Pressure Vessels for Petroleum Liquids and Gases*, except for UG-125 through UG-136.

**NFPA 58, §5.2.1.1\***

Containers that have been involved in a fire and show no distortion shall be requalified for continued service before being used or reinstalled.

(A) Cylinders shall be requalified by a manufacturer of that type of cylinder or by a repair facility approved by DOT.

(B) ASME or API-ASME containers shall be retested using the hydrostatic test procedure applicable at the time of the original fabrication.

(C) All container appurtenances shall be replaced.

(D) DOT 4E specification (aluminum) cylinders and composite cylinders involved in a fire shall be permanently removed from service.

**NFPA 58, §5.2.1.2 (A) (B) (C)**

Repairs or alteration of a container shall comply with the regulations, rules, or code under which the container was fabricated. Repairs or alteration to ASME containers shall be in accordance with the NB23, National Board Inspection Code.

**NFPA 58, §5.2.1.6**

Containers for general use shall not have individual water capacities greater than 120,000 gal (454 m<sup>3</sup>).

**NFPA 58, §5.2.1.8,**

### Container Service Pressure

The service pressure of cylinders shall be in accordance with the regulations published under 49 CFR, "Transportation."

#### **NFPA 58, §5.2.4.1**

In addition to the applicable provisions for horizontal ASME containers, vertical ASME containers over 125 gal. water capacity shall comply with 5.2.4.3(A) through 5.2.4.3(E).

(A) Containers shall be designed to be self-supporting without the use of guy wires and shall be designed to withstand the wind, seismic (earthquake) forces, and hydrostatic test loads anticipated at the site.

(B) The MAWP (*see Table 5.2.4.2*) shall be the pressure at the top head, with allowance made for increased pressure on lower shell sections and bottom head due to the static pressure of the product.

(C) Wind loading on containers shall be based on wind pressures on the projected area at various height zones above ground in accordance with ASCE 7, *Minimum Design Loads for Buildings and Other Structures*. Wind speeds shall be based on a mean occurrence interval of 100 years.

(D) Seismic loading on containers shall be in accordance with ASCE 7, *Minimum Design Loads for Buildings and Other Structures*.

A seismic analysis of the proposed installation shall be made that meets the approval of the authority having jurisdiction.

(E) Shop-fabricated containers shall be fabricated with lifting lugs or other means to lift the container.

#### **NFPA 58, §5.2.4.3 (A)(B)(C)(E)**

### ASME Container Openings

The openings required by 5.2.5.1 shall be located either in the shell, in the heads, or in a manhole cover.

#### **NFPA 58, §5.2.5.2**

ASME containers of more than 30 gal through 2000 gal water capacity that are designed to be filled volumetrically shall be equipped for filling into the vapor space.

#### **NFPA 58, §5.2.5.3**

ASME containers of 126 gal through 4000 gal water capacity in other than bulk plant and industrial occupancies shall be provided with an opening for an actuated liquid withdrawal excess-flow valve with a connection not smaller than 3/4 in. national pipe thread (NPT).

#### **NFPA 58, §5.2.5.4**

ASME containers of more than 4000 gal water capacity shall have an opening for a pressure gauge.

#### **NFPA 58, §5.2.5.5**

ASME containers in storage or use shall have pressure relief valve connections that have direct communication with the vapor space of the container.

(A) If the pressure relief valve is located within a well inside the ASME container with piping to the vapor space, the design of the well and piping shall have a flow capacity equal to or greater than that of the pressure relief valve.

(B) An enclosure that protects a pressure relief valve shall be painted, coated, or made from corrosion-resistant materials.

(C) The design of an enclosure that protects a pressure relief valve shall permit inspection of the pressure relief valve.



**(D)** If the pressure relief valve is located in any position other than the uppermost point of the ASME container, the connection shall be internally piped to the uppermost point practical in the vapor space of the container.

**NFPA 58, §5.2.5.6**

ASME containers to be filled on a volumetric basis shall be fabricated so that they can be equipped with a fixed maximum liquid level gauge(s) that is capable of indicating the maximum permitted filling level(s) in accordance with 7.4.2.3

**NFPA 58, §5.2.5.7**

### **Portable Container Appurtenance Physical Damage Protection.**

Cylinders shall incorporate protection against physical damage to cylinder appurtenances and immediate connections to such appurtenances when not in use by any of the following means:

- (1) A ventilated cap
- (2) A ventilated collar
- (3) A cylinder valve providing inherent protection as defined by DOT in 49 CFR 173.301(h)(3)

**NFPA 58, §5.2.6.1 (1) (2)**

**5.2.6.2** Protection of appurtenances of portable containers, skid tanks, and tanks for use as cargo tanks of more than 1000 lb (454 kg) water capacity [nominal 420 lb.

**A)** Appurtenance protection from physical damage shall be provided by recessing, by protective housing, or by location on the vehicle.

**NFPA 58, §5.2.6.2 (A)**

### **Portable Storage Containers**

The legs or supports, or the lugs for the attachment of legs or supports, shall be secured to the container in accordance with the ASME code under which the container was designed and built.

**NFPA 58, §5.2.7.1**

**5.2.7.2** The attachment of a container to either a trailer or semitrailer running gear, or the attachments to the container to make it a vehicle, so that the unit can be moved by a conventional over-the-road tractor, shall comply with the DOT requirements for cargo tank service.

**NFPA 58, §5.2.7.2**

Portable tank design and construction of a full framework, skids, or lugs for the attachment of skids, and protection of fittings shall be in accordance with DOT portable tank specifications. The bottom of the skids shall be not less than 2 in. or more than 12 in. (300 mm) below the outside bottom of the tank shell.

**NFPA 58, §5.2.7.3**

Cylinders shall be marked as provided in the regulations, rules, or code under which they are fabricated.  
**NFPA 58, §5.2.8.1**

Cylinders shall be marked with the following information:

- (1) Water capacity of the cylinder in pounds
- (2) Tare weight of the cylinder in pounds, fitted for service

**NFPA 58, §5.2.8.2 (1)(2)**

### **Container Marking**

**5.2.8.4** Warning labels shall meet the following requirements:

- (1) Warning labels shall be applied to all cylinders of 100 lb propane capacity or less that are not filled onsite.
- (2) Warning labels shall include information on the potential hazards of LP-Gas.

**NFPA 58, §5.2.8.4 (1) & 5.2.8.4(2)**

### **Containers with Attached Supports**

**Vertical ASME Containers.** Vertical ASME containers of over 125 gal water capacity for use in permanent installations in stationary service shall be designed with steel supports that allow the container to be mounted on and fastened to concrete foundations or supports.

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

**NFPA58 §5.6.1 - 5.6.1.1**

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

**NFPA58 §5.6.1.2**

### **Pressure Relief Devices**

ASME containers shall be equipped with one or more pressure relief valves that are designed to relieve vapor.

**NFPA58 §5.9.2.1**

Cylinders shall be equipped with pressure relief valves as required by DOT regulations.

**NFPA58 §5.9.2.2**

The flow capacity of pressure relief valves installed on underground or mounded containers shall be a minimum of 30 percent of the flow specified in Table 5.9.2.6.

**NFPA58 §5.9.2.8**

### **Overfilling Prevention Devices**

Cylinders with 4 lb. through 40 lb. propane capacity for vapor service shall be equipped or fitted with a listed overfilling prevention device that complies with UL 2227, *Standard for Overfilling Prevention Devices*, and a fixed maximum liquid level gauge. These devices shall be either separate components or combined in the container valve assembly.

**NFPA58 §5.9.3.1**

Cylinders required to have an overfilling prevention device installed shall be equipped with either a CGA connection number 791 or a CGA connection number 810 as described in CGA V-1, *Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections*.

**NFPA58 § 5.9.3.4 -**

**Container Valves and Other Appurtenances**

(C) Containers 2 lb through 4000 gal water capacity shall be fitted with valves and other appurtenances in accordance with 5.9.8.1, Table 5.9.4.1(B) and the following:

(1) Shutoff, filler, check, and excess-flow valves for ASME containers shall comply with UL 125, *Standard for Flow Control Valves for Anhydrous Ammonia & LP-Gas (Other than Safety Relief)*.

(2) Shutoff valves used on cylinders shall comply with UL 1769, *Standard for Cylinder Valves*.

**NFPA58 §5.9.4.1 (C)(2)**

Cylinders greater than 40 lb through 100 lb propane capacity filled by volume shall have a fixed maximum liquid level gauge.

**NFPA58 §5.9.4.1(C)(10)**

**Liquid Level Gauging Devices**

Cylinders shall have the letters DT stamped on them followed by the vertical distance (to the nearest tenth of an inch), measured from the top of the boss or coupling into which the gauge, or the cylinder valve of which it is a part, is installed to the end of the dip tube.

**NFPA58 §5.9.5.5**

Cylinders equipped with a fixed maximum liquid level gauge where the dip tube is not welded to the inside of the cylinder shall be permanently marked on the cylinder collar as follows:

(1) The marking shall be the letters “DT” followed by the dip tube length to the nearest tenth of an inch.

**NFPA58 §5.9.5.6 (1)**

Gauging devices that vent product to the atmosphere when used shall be designed so that the vent valve maximum opening to the atmosphere is not larger than a No. 54 drill size.

**NFPA58 §5.9.5.10-**

**Pressure Gauges**

Pressure gauges shall be attached directly to the container opening or to a valve or fitting that is directly attached to the container opening.

**NFPA58 §5.9.6.1-**

All container openings except those used for pressure relief devices, liquid level gauging devices, pressure gauges, 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.

**NFPA58 §5.9.8.1-**

If an excess-flow valve is required for cylinders other than for mobile or engine fuel service, it shall be permitted to be located at the outlet of the cylinder shutoff valve.

**NFPA58 §5.9.8.1 (D)**

Container inlet and outlet connections on ASME containers of more than 2000 gal (7.6 m<sup>3</sup>) water capacity shall be labeled either on the container service valve or on the container to designate whether they communicate

**NFPA58 §5.9.8.5**

**Installation of Pressure Relief Devices**

Pressure relief devices on cylinders shall be installed to minimize the possibility of relief device discharge impingement on the cylinder

**NFPA58 §6.9.2.2**

**Installation of Metallic Pipe, Tubing, and Fittings**

Gaskets shall be made of metal or material confined in metal having a melting point over 1500°F (816°C) or shall be protected against fire exposure.

**NFPA58 §6.11.3.5 (F)**

**Transportation in Cargo Tank Vehicles**

Transfer shall be made by a pump or compressor mounted on the vehicle or by a transfer means at the delivery point.

**NFPA58 §9.4.1.2**

**Cargo Tanks Mounted on, or a Part of, Cargo Tank Vehicles**

Cargo tanks mounted on, or comprising in whole or in part, the stress member used in lieu of a frame for cargo tank vehicles shall comply with DOT cargo tank vehicle specifications for LP-Gas service

**NFPA58 §9.4.2.1**

Liquid hose of 1 1/2 in. (38 mm) (nominal size) and larger and vapor hose of 1 1/4 in. (32 mm) (nominal size) and larger shall be protected with an internal valve that is fitted for remote closure and automatic shutoff using thermal (fire) actuation.

**NFPA58 §9.4.2.3**

**Piping (Including Hose), Fittings, and Valves**

The following shall also apply to pipe, tubing, pipe and tubing fittings, valves, hose, and flexible connectors:

- (1) Pipe shall be wrought iron, steel, brass, or copper in accordance with 5.11.3.1.
- (2) Tubing shall be steel, brass, or copper in accordance with 5.11.3.2.
- (3) Pipe and tubing fittings shall be steel, brass, copper, malleable iron, or ductile (nodular) iron suitable for use with the pipe or tubing used as specified in 9.4.3.2(1) or (2).
- (4) Pipe joints shall be threaded, flanged, welded, or brazed, and fittings, where used, shall comply with 9.4.3.2(3).
- (5) Where joints are threaded, or threaded & back welded, pipe & nipples shall be Schedule 80 or heavier.

**NFPA58 §9.4.3.2**

Flexible connectors used in the piping system to compensate for stresses and vibration shall be limited to 3 ft in overall length and, when replaced, shall comply with 5.11.6.

**NFPA58 §9.4.3.6**

All threaded primary valves and fittings used in liquid filling or vapor equalization directly on the cargo tank of transportation equipment shall be of steel, malleable iron, or ductile iron construction.

**NFPA58 §9.4.3.8**

**Containers. General.**

Containers shall be designed, fabricated, tested, and marked (or stamped) in accordance with the regulations of the U.S. Department of Transportation (DOT); the ASME *Boiler and Pressure Vessel Code*, Section VIII, “Rules for the Construction of Unfired Pressure Vessels”; or the API-ASME *Code for Unfired Pressure Vessels for Petroleum Liquids and Gases*, except for UG-125 through UG-136.

**NFPA58 §11.3.1.1**

Containers that have been involved in a fire and show no distortion shall be requalified in accordance with CGA C-6, *Standard for the Visual Inspection of Steel Compressed Gas Cylinders*, or CGA C-6.3, *Guidelines for Visual Inspection and Requalification of Low Pressure Aluminum Compressed Gas Cylinders*, for continued service before being used or reinstalled.

(A) Cylinders shall be requalified by a manufacturer

**NFPA58 §11.3.1.4 (A)**

Cylinders shall be designed and constructed for at least a 240 psig service pressure

**NFPA58 §11.3.1.6**

11.3.2.1 ASME engine fuel containers shall have an MAWP of 312 psig

**NFPA58 § 11.3.2.1**

**Container Corrosion Protection**

Container Corrosion Protection.

(A) Engine fuel containers constructed of steel shall be painted or powder coated to minimize corrosion.

(B) Stainless steel cylinders shall not be required to be painted or powder coated.

**NFPA58 §11.3.7 (A)**

Container appurtenances subject to pressures in excess of 125 psig shall be rated for a pressure of at least 250 psig.

**NFPA58 §11.4.1.2**

### **General Requirements for Appurtenances**

Permanently mounted ASME containers shall be equipped with a valve or combination of valves in the liquid outlet connection that has manual shutoff, excess-flow, and automatic closure features.

**NFPA58 §11.4.1.8**

Cylinders used in engine fuel service for industrial trucks shall be equipped with full internal or flush-type full internal pressure relief valves.

**NFPA58 §11.4.1.10**

ASME containers fabricated after January 1, 1984, for use as engine fuel containers on vehicles shall be equipped or fitted with an overfilling prevention device

**NFPA58 §11.4.1.15**

### **Industrial Truck Cylinders**

The pressure relief valves shall be in direct communication with the vapor space of the cylinder in either position.

**NFPA58 §11.13.2.4**

The cylinder vapor or liquid withdrawal valves shall function in either position.

**NFPA58 §11.13.2.5,**

The discharge opening shall be provided with a protective cover to minimize the possibility of the entry of water or any extraneous matter.

**NFPA58 §11.13.2.7**

### **Structural Requirements for Mounting ASME Containers**

ASME container mounting brackets shall be provided by or recommended by the ASME container manufacturer and shall be provided with a resilient material to be installed between the supports or clamping bands and the ASME container such that there is no direct metal-to-metal contact.

**NFPA58 §12.5.4 (5)**

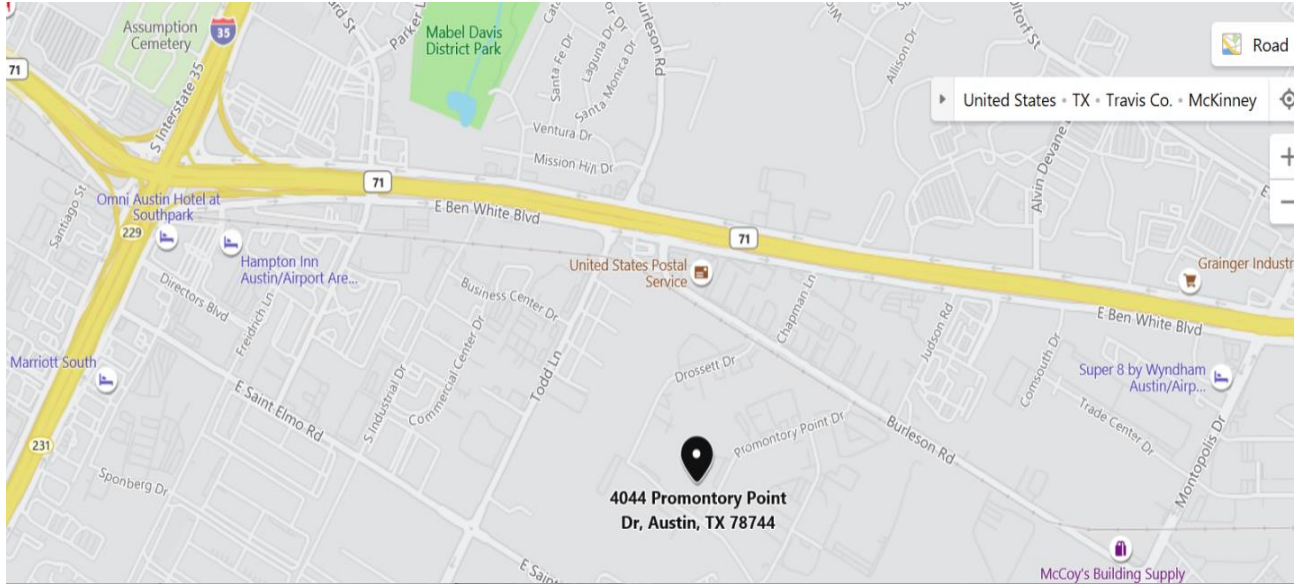
### **ANNEX A**

Prior to December 1, 1963, ASME containers of greater than 30 gal (0.1 m<sup>3</sup>) water capacity, up to and including 2000 gal (7.6 m<sup>3</sup>) water capacity, were not required to be equipped for filling into the vapor space of the container.

**NFPA58 §A.5.2.5.3**

# ALTERNATIVE FUELS TRAINING CENTER

## 4044 Promontory Point Austin Texas 78744



Sample Questions Answers	
1.	A
2.	B
3.	B