

# Safe Dispensing of Propane

PROPANE DISPENSING UNIT OPERATOR TRAINING MANUAL



FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES  
NICOLE "NIKKI" FRIED, COMMISSIONER

[www.800helpfla.com](http://www.800helpfla.com) 1-800-HELP-FLA (435-7352) ■ 850-410-3800

## **INTRODUCTION**

This course is designed to introduce (or reacquaint) you, the dispensing unit operator, to the procedures, regulations, and practical aspects of propane dispensing. It covers Florida laws concerning safe handling, storage, and transportation of liquefied petroleum gas as well as the characteristics and properties of propane. The purpose of this material is to set forth general safety practices and is not meant to be an exhaustive treatment of the subject. Additionally, other procedures which could enhance safe dispensing unit operation are not meant to be precluded by this material. This material will deal primarily with propane since it is the most commonly dispensed LP gas product in the State of Florida.

The Florida Department of Agriculture and Consumer Service recommends each dispensing unit operator have a copy of the current Chapter 527, Florida Statutes; Chapter 5J-20, Florida Administrative Code and National Fire Protection Association (NFPA) Pamphlet #58 on your premises at all times, as these publications will be beneficial references when dispensing propane.

The State of Florida requires that all persons involved with the dispensing of LP gas must be adequately trained in the proper procedures and safe handling of this product. Your safety, as well as that of your customers and your fellow employees, depends on your knowledge of Florida's code requirements and your commitment to ensuring safe operations.

It is very important that you meet your responsibilities under Florida law. Operators who do not comply may be subject to administrative penalties which can include fines and the possibility of suspension or revocation of your license.

Note: Many terms used in this training manual are words and phrases commonly used among LP gas industry personnel. A glossary of these terms can be found at the end of this training manual.

## **CONTENTS**

|                                                                  |                |
|------------------------------------------------------------------|----------------|
| <b>SECTION 1. FLORIDA'S LP GAS LICENSING LAWS</b>                | <b>Page 03</b> |
| <b>SECTION 2. PROPANE PROPERTIES AND CHARACTERISTICS</b>         | <b>Page 07</b> |
| <b>SECTION 3. PROPANE CONTAINERS</b>                             | <b>Page 13</b> |
| <b>SECTION 4. VALVES and FITTINGS</b>                            | <b>Page 21</b> |
| <b>SECTION 5. FILLING PROPANE CONTAINERS</b>                     | <b>Page 25</b> |
| <b>SECTION 6. TRANSPORTATION OF PROPANE CONTAINERS</b>           | <b>Page 32</b> |
| <b>SECTION 7. CARE &amp; MAINTENANCE OF YOUR DISPENSING UNIT</b> | <b>Page 34</b> |
| <b>SECTION 8. SAFETY PRECAUTIONS &amp; HANDLING EMERGENCIES</b>  | <b>Page 38</b> |
| <b>SECTION 9. GLOSSARY OF TERMS</b>                              | <b>Page 41</b> |

# ***SECTION 1***

---

## **FLORIDA DIVISION OF CONSUMER SERVICES**

The Florida Division of Consumer Services is a part of the Florida Department of Agriculture & Consumer Services. The Division oversees the regulation of storage, handling, sale, and use of LP gases through:

- Inspections
- Regulation and Enforcement
- Accident Investigations
- Training
- Consumer Assistance

Propane, the most widely used liquefied petroleum gas, is an energy source for hotels, restaurants, schools, hospitals, nursing homes, universities, private homes, recreational vehicles, agricultural and industrial facilities, and is used as an alternative fuel for vehicles. Directly or indirectly, propane touches the lives of almost every Floridian.

The Florida Department of Agriculture and Consumer Service enforces all applicable LP gas laws and regulations in this state, which include the following: **Chapter 527, Florida Statutes; Chapter 5J-20, Florida Administrative Code; National Fire Protection Association Pamphlet 58; National Fire and Protection Association Pamphlet 54.** Pursuant to Chapter 527, Florida Statutes, the Department has the following duties and responsibilities: inspection of liquefied petroleum gas facilities in Florida (including bulk plants, dispensing units, bulk storage sites, cylinder cages, trucks, etc.); the investigation of accidents, fires or explosions where reason exists to believe liquefied petroleum gas is involved; licensure of persons engaged in LP gas activities in this state; and training and examination of industry personnel. These licensing, inspection, investigation and training activities enable the Department to ensure that those persons engaged in LP gas business activities in this state are trained and that compliance with acceptable safety codes and standards is achieved statewide.

Enforcement of LP gas safety laws and regulations is the Departments primary concern; however, everyone involved with the handling of liquefied petroleum gas shares a role in maintaining safe practices. Through our training and education programs, both industry and public members can be kept well-informed of the various aspects of LP gas safety. Accident prevention and safety are responsibilities that need a commitment from everyone. Working together and sharing these responsibilities will help us all achieve our safety goals.

***SAFETY IS GOOD BUSINESS....MAKE IT YOURS!***

## **THE DISPENSING UNIT OPERATOR'S (DISPENSER'S) LICENSE**

January 2019

The Department of Agriculture and Consumer Service licenses and inspects over 1,000 dispensing units in this state annually. The license category for dispensing units is known as Category II Liquefied Petroleum Gas Dispenser. A dispensing unit that requires a license in this state is one where LP gas is dispensed **to the consumer**. A dispensing unit that would not require licensure would be a unit installed strictly for the owner's use.

When you apply for a dispensing unit license in Florida, the following procedures must be followed prior to the license being issued.

- ***License fees and application must be submitted to the Department, along with proof of insurance. FS 527.02***-- Currently, Florida law requires each dispensing unit to pay a license fee of \$400. In addition to the application and fee, proof of insurance must be provided and will be verified by the Department. A **minimum of \$1 million bodily injury and property damage liability insurance is required.**
- ***Qualifying examination. FS 527.0201***-- Each dispensing unit operator must employ one "qualifier". A qualifier is an individual who has successfully completed an examination administered by the Department. The qualifier registration received as a result of passing the exam is **NOT** a license.

Once the license requirements are met, the Department will issue your license to operate.

**Your qualifier registration will expire 3 years after the date of issuance.** You may renew your qualification upon application to the department, payment of a \$20 renewal fee and documentation of completion of a minimum of 16 hours of approved continuing education courses, as defined by department rule, during the previous 3-year period. Application for renewal must be made 30 calendar days before expiration.

Your qualifier registration automatically expires if you terminate active employment in the area of examination for a period exceeding 24 months. If the qualifier registration expires, you must apply for and successfully complete an examination by the department in order to reestablish qualifier status.

As a qualifier you **CANNOT** serve as the qualifier at more than one licensed location at the same time.

Once the dispensing unit is installed and all construction is complete, the installer (or the operator) must contact the Bureau of Standards Field Office at [Standards-LP@freshfromflorida.com](mailto:Standards-LP@freshfromflorida.com) or call 850-921-1545 to request an inspection of the unit.

**Pursuant to Chapter 527.0605, Florida Statute--No dispenser may be put into service without department approval.**

The department will inspect the installation to insure it has been installed in accordance with the currently adopted codes as applicable to the dispenser. The inspector will check for proper clearances in

respect to the container and the point of transfer clearances to property lines, buildings, openings into buildings, sources of ignition, pits or underground sewer systems, playgrounds or other places of public assembly. The Inspector will verify the dispenser is adequately protected from vehicular traffic where the container is within 10 feet of a public thoroughfare or parking area. Adequate vehicular protections as defined in NFPA 58 consist of 4-inch steel post spaced not more than 4 feet between post on center; set not less than, 3 feet deep in a concrete footing of not less than 15 inches in diameter; set with the top of the post not less than 3 feet above ground and located not less than 3 feet from the protected installation. Equivalent protection in lieu of guard posts shall be a minimum of 3 feet in height and shall resist a force of 6,000 pounds applied 3 feet above that adjacent ground surface. The inspector will check all equipment including the electrical components, hoses, scales and meters to insure compliance.

Upon completion of the inspection, the inspector will provide written notification documenting the inspection results. Any deficiencies noted during the inspection will be required to be corrected and a follow up inspection will be conducted by the department. At the time the inspection is complete with no deficiencies noted, the inspector will provide written notification documenting the authorization to place the unit into operation.

Once you become a licensed dispenser operator in Florida, you assume many responsibilities. These responsibilities include:

- Proper operation of the dispensing unit;
- Maintenance of the dispensing unit (housekeeping);
- Response to all correspondence from the Department concerning your license or dispensing unit
- Reporting of accidents;
- Reporting vacancy in Qualifiers
- Training and supervision of your dispensing unit personnel and documentation of training.
- Compliance with all regulations governing your dispensing operation

Failure to comply with any of Florida's laws governing LP gas can result in administrative action, including fines of up to \$3,000 per violation, and/or license suspension or revocation.

Be advised that the LP license issued to your company by the State of Florida does **NOT** allow you to perform any type of service or repair work to the dispensing unit. Service and repair to the unit may be performed only by a properly licensed LP gas company or individual. If your dispensing unit is the property of the gas supplier who installed the unit, you will need to contact them to conduct the needed service or repairs.

One of your responsibilities as an operator is that of reporting to the Department any accidents that may occur involving your dispenser or your customers. Accidents that meet the reporting criteria as

specified in Chapter 527, Florida Statutes (reflected below) must be immediately reported. The 24 hour Accident Reporting Line toll free number is (866) 296-5082.

**"527.065 Notification of accidents; leak calls.--**

**(1) Immediately upon discovery, all liquefied petroleum gas licensees shall notify the department of any liquefied petroleum gas related accident involving a liquefied petroleum gas company or customer account which:**

- (a) Caused a death or personal injury requiring professional medical treatment;**
- (b) Resulted in the uncontrolled ignition of liquefied petroleum gas; or**
- (c) Caused estimated damage to property exceeding \$3,000**

By reporting accidents to the Department, you are helping to prevent future occurrences.

Another responsibility held by operators is that of **TRAINING**. ALL employees who dispense propane must be trained in the safe operation of the dispensing unit. If your personnel are not trained, contact your propane supplier or the Bureau of Compliance @ 850-921-1600 for assistance. **YOUR SAFETY - AS WELL AS THE SAFETY OF YOUR EMPLOYEES AND CUSTOMERS - DEPENDS ON YOU.**

## ***SECTION 1 REVIEWS***

---

1. When must a dispensing unit have a license to operate in the State of Florida?
2. What are the insurance requirements for dispensing units in Florida?
3. What kind of LP Gas accidents must be reported to the Florida Department of Agriculture?
4. When must accidents be reported?
5. Who regulates the sale of LP gas in Florida?
6. What is a qualifier?
7. Who is allowed to dispense LP gas in Florida?
8. Who is responsible for the safe operation of your dispensing unit?
9. Who is allowed, by law, to repair leaks and replace parts on your dispensing unit?
10. What penalties may be levied by the Florida Department of Agriculture and Consumer Service for violations of Florida's LP gas laws?

### PROPANE PROPERTIES AND CHARACTERISTICS

**WHAT IS PROPANE?** -- Propane, LP gas, bottled gas, butane, and propylene are some of the names used to identify liquefied petroleum gas. LP gases are in the family of **hydrocarbons**, but not all hydrocarbons are LP gases.

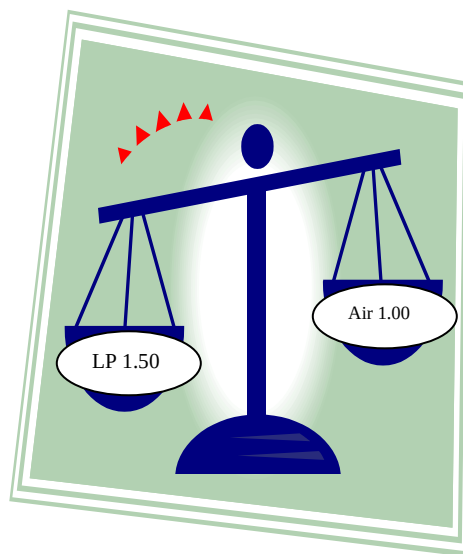
Propane is normally stored in a pressure vessel as both a vapor and a liquid under moderate pressure. In its natural state it is **colorless, tasteless, odorless, and non-toxic**. It is produced through the oil refining process or is stripped out of natural gas. In most cases an odorant is added to serve as a warning agent of a possible gas leak. The odorant most commonly used is **Ethyl Mercaptan**.

**PROPANE EXPANDS** -- Propane liquid will expand **270 times** as it changes from a liquid state to vapor state. For example, 1 gallon of liquid stored under pressure in a container will expand to approximately 270 gallons of vapor if released to the atmosphere. Consequently, a small amount of liquid propane has the potential to create a serious hazard. This rapid expansion ratio of 270:1 makes propane an effective refrigerant.

**PROPANE TEMPERATURE** -- Propane boils at **44 degrees below zero (-44°)**. Through this refrigeration process, heat is rapidly absorbed. If your skin should come in contact with propane liquid, a severe freeze burn, or frostbite may occur. First aid treatment for frostbite is the application of lukewarm water to the affected area. As with any serious burn, immediate medical treatment should be sought.

**PROPANE SPECIFIC GRAVITY** -- **Specific Gravity** is the weight of a product compared to the weight of water or air. The specific gravity of propane *vapor* is 1.50; air is 1. This means that **propane vapor weighs one and one-half times more than air**. The specific gravity of propane *liquid* is 0.504; water is 1.

Therefore, we know that **propane liquid is lighter than water**. Since propane is heavier than air, it will normally seek out low areas. This behavior, however, can easily be affected by air currents.



The fact that propane is heavier than air also creates the hazard of a simple asphyxiant. Oxygen needed to sustain life can be displaced by propane. If a large accumulation of liquid or vapor is present, always remain upwind. Never enter a concentrated area of propane vapor. Inhaling vapor can cause dizziness, unconsciousness, and respiratory arrest.

# The Effects of Oxygen Deficiency are Life Threatening

## POTENTIAL EFFECTS OF OXYGEN-DEFICIENT ATMOSPHERES

| <u>% By Volume<br/>At Atmospheric<br/>Pressure</u> | <u>Effects</u>                                                                                                                                             |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19.05%                                             | Minimum permissible oxygen level.                                                                                                                          |
| 15-19%                                             | Decreased ability to work strenuously. May impair coordination and may induce early symptoms in persons with coronary, pulmonary, or circulatory problems. |
| 12-14%                                             | Respiration increases in exertion, pulse up, impaired coordination, perception, judgment.                                                                  |
| 10-12%                                             | Respiration further increases in rate and depth, poor judgment, lips blue.                                                                                 |
| 08-10%                                             | Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea, and vomiting.                                                             |
| 06-08%                                             | 8 minutes, 100% fatal; 6 minutes, 50% fatal; 4-5 minutes, recovery with treatment.                                                                         |
| 04-06%                                             | Coma in 40 seconds, convulsions, respiration ceases, death.                                                                                                |

These values are approximate and vary as to the individual's state of health and his physical activities.

**Exposure to atmospheres containing 12% or less oxygen can bring about unconsciousness without warning, and affects the body so quickly that the individual cannot help or protect himself.**

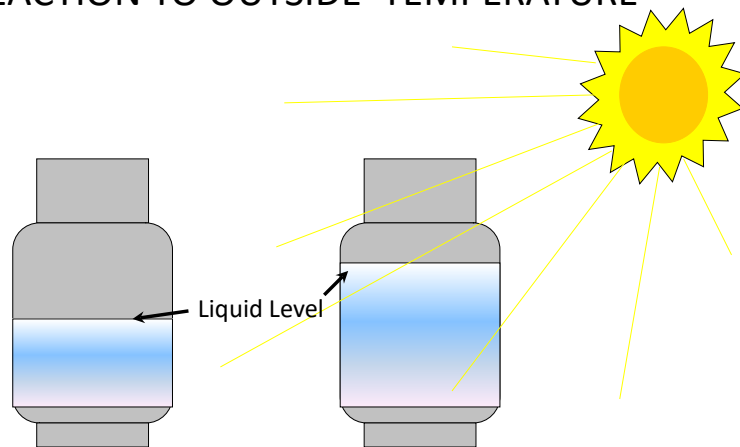
**APPROXIMATE PROPERTIES OF LP GASES**  
**(Commercial Propane)**  
**Properties of Propane from NFPA 58 Annex B**

|                                                                        |                                           |
|------------------------------------------------------------------------|-------------------------------------------|
| Vapor Pressure in PSIG at:                                             |                                           |
| 70 <sup>0</sup> F                                                      | 127 PSIG                                  |
| 100 <sup>0</sup> F                                                     | 195 PSIG                                  |
| 104 <sup>0</sup> F                                                     | 210 PSIG                                  |
| 130 <sup>0</sup> F                                                     | 287 PSIG                                  |
| Specific Gravity of Liquid at 60 <sup>0</sup> F                        | 0.504                                     |
| Initial Boiling Point at 14.7 PSI                                      | -44 <sup>0</sup> F                        |
| Weight per Gallon of Liquid at 60 <sup>0</sup> F                       | 4.20                                      |
| Specific Heat of Liquid, Bulb at 60 <sup>0</sup> F                     | 0.630                                     |
| Cubic Ft. of Vapor per Gallon at 60 <sup>0</sup> F                     | 36.38                                     |
| Cubic Ft. of Vapor per Pound at 60 <sup>0</sup> F                      | 8.66                                      |
| Specific Gravity of Vapor at 60 <sup>0</sup> F (air = 1)               | 1.50                                      |
| Ignition of Temperature in Air (range)                                 | 920 <sup>0</sup> F to 1120 <sup>0</sup> F |
| Maximum Flame Temperature in Air                                       | 3,595 <sup>0</sup> F                      |
| Limits of Flammability in Air, Percent of Vapor<br>in Air/Gas Mixture: |                                           |
| a) Lower                                                               | 2.15%                                     |
| b) Upper                                                               | 9.60 %                                    |
| Latent Heat of Vaporization at Boiling Point                           |                                           |
| a) BTU Per Pound                                                       | 184                                       |
| b) BTU Per Gallon                                                      | 773                                       |
| Total Heating Values after Vaporization:                               |                                           |
| a) BTU Per Cubic Foot                                                  | 2,488                                     |
| b) BTU Per Pound                                                       | 21,548                                    |
| c) BTU Per Gallon                                                      | 91,502                                    |

**PROPANE WEIGHT** -- One gallon of propane weighs 4.2 pounds.

**HOW OUTSIDE TEMPERATURE AFFECTS PROPANE** -- **Temperature** has a direct relationship to propane pressure. A pot of water placed on a stove at a high temperature will eventually boil over. In the same way, an **increase in outside temperatures will cause an increase in the pressure** within an LP gas container. As the pressure increases, the volume of the liquid will also expand in the container. For example, water expands 2.2%. At a temperature rise from 160<sup>0</sup> F to 600<sup>0</sup> F, liquid propane would expand 25% and steel would expand only 0.19%. The fact that propane reacts more quickly to outside temperature changes and expands more rapidly emphasizes the importance of NEVER overfilling an LP gas container. **No LP gas container should ever be filled more than 80% full.**

### REACTION TO OUTSIDE TEMPERATURE



**Containers should not be filled beyond 80% of the water Capacity**

**PROPANE FLAMMABILITY – Range of flammability** is a term used to describe that certain mixture of air and LP gas which will readily burn. Any mix outside this range will not burn easily. Propane has a relatively narrow range of flammability when compared to other petroleum products. It has a flammable range of 2.15 to 9.60, meaning that if propane is released to the atmosphere, a propane/air mixture containing less than 2.15% gas is too lean to burn, and a mixture containing more than 9.6% gas, is too rich to burn.

This range of flammability is important to remember when LP gas is being transferred or discharged. If the propane/air mixture is within the flammability range, sources of ignition could include fans, electrical switches, auto ignitions, static electricity, or cigarettes.

**Section 1.****MATERIAL SAFETY DATA SHEET\***

Suppliers Name \_\_\_\_\_ Emergency Phone No. \_\_\_\_\_  
Address \_\_\_\_\_  
Chemical Name Liquefied Petroleum Gas or Propane CAS Registry No. 74-98-6  
Chemical Family Hydrocarbon Formula C<sub>3</sub>H<sub>8</sub>

**Section 2.****HAZARDOUS INGREDIENTS**

Hazardous Mixtures Air with 2.15 to 9.60 percent propane

**Section 3.****PHYSICAL DATA**

Boiling Point -44° F Specific Gravity (H<sub>2</sub>O=1) 0.51 Vapor Pressure (mm HG) at 100°F 9825 Percent, Volatile by Volume (%) 100  
Vapor Density (Air=1) 1.52 Evaporative Rate None Solubility in Water Slightly Appearance and Odor Clear - unpleasant odor caused by odorant

**Section 4.****FIRE AND EXPLOSION HAZARD DATA**

\_\_\_\_\_ Flammable Limits

Flash Point N/A Classification Flammable Gas UN 1075 LEL 2.15 UEL 9.60  
Extinguishing Media Water Spray: Class A-B-C or BC Fire Extinguishers  
Special Fire Fighting Procedures Stop flow of gas. Use water to keep fire-exposed containers cool. Use water spray to disperse unignited gas or vapor. If ignition has occurred and no water available, tank metal may weaken from overheating. Evacuate area. If gas has not ignited, LP-gas liquid or vapor may be dispersed by water spray or flooding.

**Section 5.****HEALTH HAZARD**

Threshold Limit Value 1,000 PPM Permissible Exposure Limit 1,000 PPM Effects of Overexposure Inhalation -- concentration can lead to symptoms ranging from dizziness to anesthesia and respiratory arrest. Eyes -- moderate irritation. Emergency and First Aid Procedures Inhalation -- remove to fresh air. Guard against self-injury. Apply artificial respiration if breathing has stopped.

**Section 6.****REACTIVITY DATA**

Stable X Unstable \_\_\_\_\_ Hazardous Decomposition Products \_\_\_\_\_ None  
Incompatibility (materials to avoid) Mixing with oxygen or air, except at burner  
Hazardous Polymerization: May Occur \_\_\_\_\_ Will Not Occur X

**Section 7.****SPILL OR LEAK PROCEDURES**

Steps to be taken in case material is released: Keep public away. Shut off supply of gas. Eliminate sources of ignition. Ventilate the area. Disperse with water spray. Contact between skin and these gases in liquid form can cause freezing of tissue causing injury similar to thermal burn. Waste Disposal Method Controlled burning. Contact supplier.

**Section 8.****SPECIAL PROTECTION INFORMATION**

Respiratory Protection Stay out of gas or vapor (because of fire hazard)  
Ventilation Explosion-proof motors and keep sources of ignition at safe distances.  
Personal Protective Equipment and Apparel Heavy duty gloves, goggles for protection against accidental release of pressurized products.

**Section 9.****SPECIAL PRECAUTIONS**

Precautions to be taken when handling and storing Keep containers away from heat sources and store in upright position. Containers should not be dropped. Keep container valve closed when not in use.  
Other precautions Install protective caps when not connected for use.

**Section 10.****TOXICOLOGICAL INFORMATION**

OSHA Carcinogen Classification (29 CFR 1910) Not listed/applicable X

**Section 11.****DOT LABELING INFORMATION (49 CFR 100-199)**

Proper Shipping Name Liquefied Petroleum Gas Hazardous Classification Flammable Gas Identification No. UN 1075  
Label(s) Required Flammable, Class 2

\* This is a sample Material Safety Data Sheet that should be provided by your propane supplier in compliance with the federal Community Right-To-Know Act, and is not meant to act as a substitute for this form or to be used in compliance with this Act. This is not to be used for purposes other than this training class.

## ***SECTION 2 REVIEWS***

---

1. Name three characteristics of propane.
2. What is the initial boiling point of propane?
3. What does one gallon of liquid propane weigh in pounds?
4. How heavy is propane vapor compared to air? Propane liquid to water?
5. What is the Limit of Flammability in air, percent of vapor in air/gas mixture?
6. What is the most commonly used odorant in LP gases and why is it added?
7. When liquid propane is released to the atmosphere, what is its expansion ratio?
8. Is propane non-toxic?
9. Name several potential sources of ignition.
10. When the outside temperature increases, what happens to propane inside a container?

### PROPANE CONTAINERS

As a dispensing unit operator, you may encounter three types of LP gas containers - **ASME** tanks, **DOT** cylinders and **FAA** cylinders.

**ASME TANKS** are manufactured according to specifications of the **American Society of Mechanical Engineers**. This type of propane container will most frequently be encountered in mobile installations such as recreational vehicles, and as motor fuel containers on vehicles. ASME tanks are more commonly used in residential, industrial, and commercial applications to store propane for use in various heating and cooking applications. ASME containers used in these applications are fixed in place and are considered stationary tanks.

**DOT CYLINDERS** are portable and are manufactured according to **U.S. Department of Transportation** specifications. Prior to 1967, specifications for these cylinders came under the authority of the **Interstate Commerce Commission (ICC)**, therefore, many times DOT cylinders are also referred to as DOT(ICC) cylinders. These cylinders are the type you will most commonly encounter, as they are extremely portable and are used to store propane for gas grills, fork lift motor fuel, and various other heating and cooking activities.

**FAA CONTAINERS** are portable and are manufactured according to The Federal Aviation Administration, a subdivision of the DOT. The FAA regulates the use of propane cylinders used in Hot air balloons used in flight or in-flight preparation. These containers are required to be marked to demonstrate compliance with FAA regulations and may **NOT** be used for any other purpose.

#### FAA Container Marking



Regardless of their construction specifications, both ASME and DOT tanks have basic parts that

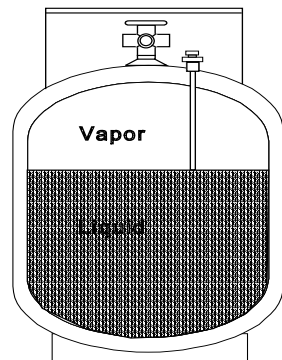
share common functions as shown in the table below:

### BASIC CONTAINER COMPONENTS

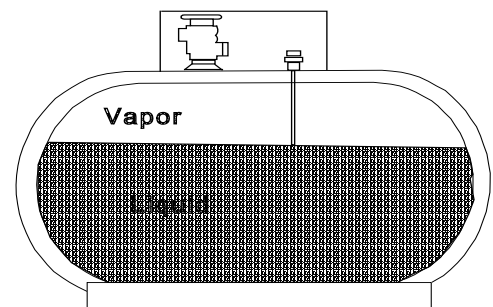
| ASME CONTAINER     | DOT(ICC) CONTAINER       | FUNCTION                                      |
|--------------------|--------------------------|-----------------------------------------------|
| Valve Protection   | Neck Ring/Protective Cap | Protection of Container Fittings and Openings |
| Data Plate         | Container Markings       | Container Information (design/use/capacity)   |
| Container Openings | Container Openings       | Filling connections/valves                    |
| Container Body     | Cylinder Body            | Product Storage Area                          |
| Mounting Hardware  | Foot Ring                | Mounting or Placement of Container            |

Propane containers are constructed for the safe storage of this product under pressure. Containers are marked with a **maximum allowable working pressure** which tells you the highest pressure a container is designed to hold safely.

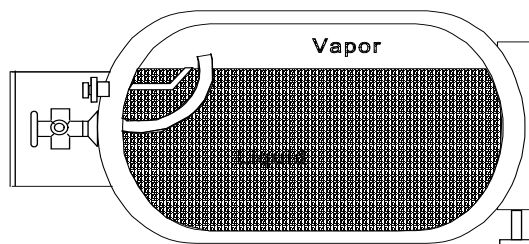
As you know, propane under pressure is stored as a liquid; however, **no container may be filled to more than 80% of its water capacity**. This means that a container filled to the legal limit will have propane stored inside as **both a vapor and a liquid**, allowing for expansion within the container.



STANDARD VERTICAL (DOT/ICC)



ASME - STANDARD HORIZONTAL



DOT/ICC HORIZONTAL

January 2019

## STORAGE OF PROPANE IN CONTAINERS

### ASME CONTAINERS

Here are some things to remember about ASME containers:

- All ASME containers are made of steel
- All ASME containers are required to have a legible, metal data plate attached that gives you valuable information about the container
- ASME containers used in mobile service **MUST ALWAYS** be securely fastened - **NEVER** fill a container that is unsecured
- All ASME container capacities are expressed in the **maximum** amount of water gallons the tank can hold

### ASME TANK DATA PLATES

One of the most important parts of any propane container is the container markings. On an ASME container, this information is on a **data plate**. The data plate carries information vital to the identification and safe use of the container and should be securely attached to the container. If a customer should request that you fill an ASME tank with a missing or illegible data plate and cannot produce a data sheet for the tank, you must refuse to fill it-- for their protection and yours.

Container data plates are required to give you the following information about the propane container:

NAME AND ADDRESS OF MANUFACTURER  
TYPE OF SERVICE OR INTENDED USE  
MAXIMUM ALLOWABLE WORKING PRESSURE  
WATER CAPACITY IN GALLONS  
OUTSIDE SURFACE AREA OF TANK (IN SQUARE FT.)

Also, the data plate must contain the wording: "THIS CONTAINER SHALL NOT CONTAIN A PRODUCT HAVING A VAPOR PRESSURE IN EXCESS OF \_\_\_ PSIG AT 100<sup>0</sup> F."

Other information, such as the year of manufacture, head and shell thickness, length of the tank, serial number, material of construction, dip tube length, etc, may also be found on the container data plate

# SAMPLE DATE PLATE - ASME CONTAINER

|                                                                                                      |                     |                 |                        |
|------------------------------------------------------------------------------------------------------|---------------------|-----------------|------------------------|
| 12345                                                                                                |                     | UL              |                        |
| MODEL                                                                                                |                     |                 |                        |
| MANUFACTURER, INC.                                                                                   |                     |                 |                        |
| DALLAS, TEXAS                                                                                        |                     |                 |                        |
| ASME LABEL                                                                                           | 250 P.S.I. @ 125° F |                 | WELDING & TESTING INFO |
| MAX. ALLOWABLE WORKING PRESSURE                                                                      |                     |                 |                        |
| R T 3                                                                                                |                     | ABC 12345678    |                        |
| O.S. SURFACE AREA                                                                                    |                     | MFG. SERIAL NO. |                        |
| 174 SF                                                                                               |                     | D.R. HEMI       |                        |
| WATER GALS.                                                                                          |                     | WATER LBS.      |                        |
| 1000                                                                                                 |                     | 8333            |                        |
| 86                                                                                                   | .2894               | 2306            | 193.5                  |
| O.S. DIA.                                                                                            | SHELL THK.          | HEAD THK.       | LENGTH                 |
| THIS CONTAINER SHALL NOT CONTAIN A PRODUCT HAVING A VAPOR PRESSURE IN EXCESS OF 216 #/ IN AT 100 °F. |                     |                 |                        |
| U G                                                                                                  | 1978                | 27.8            | R                      |
| TYPE                                                                                                 | YR. BUILT           | D.T.            | MFG. AT                |

## DOT CONTAINERS

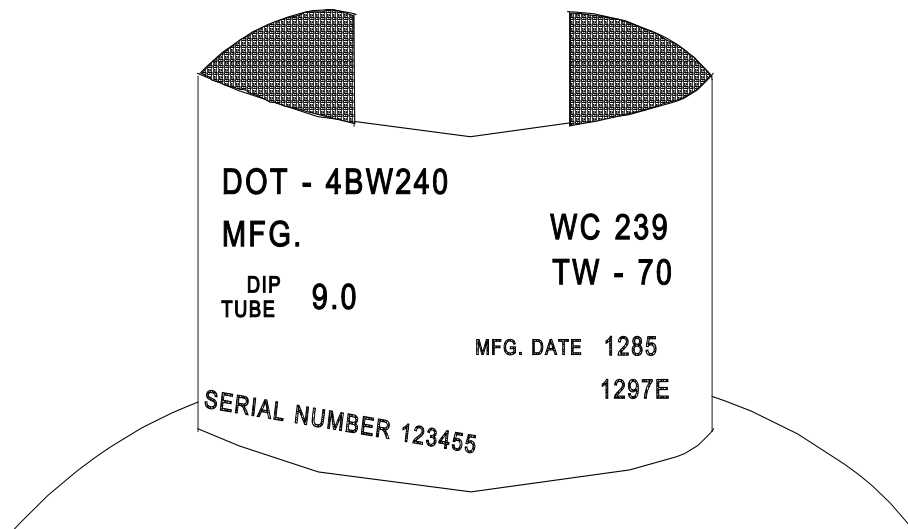
DOT (ICC) containers:

- Have all container data stamped into the body or collar (neck ring) of the container
- Are made of steel, aluminum, or composite.
- Must be retested for use according to DOT specifications
- DOT (ICC) container capacities are expressed in the amount of propane in pounds they can contain

The container markings on a DOT cylinder can be found permanently stamped into the container collar, neck ring or on the cylinder body. Occasionally a metal plate will carry this information, much like the ASME tank data plate, and will be attached to the body of the DOT cylinder. Information required for DOT (ICC) cylinders is:

DESIGN OR MANUFACTURE CODE  
WATER CAPACITY  
TARE WEIGHT  
RETEST DATE

As is the case with missing or illegible ASME data plates, DOT cylinders without all required markings or with illegible markings should never be filled.



SAMPLE DOT CYLINDER MARKINGS

The **tare weight** of a container is what the container weighs when it is empty. This weight includes the weight of the valves, and is **important** to know when filling containers by weight. The **water capacity** of a container is the weight of water needed to completely fill the container. DO NOT CONFUSE WATER CAPACITY OF A CONTAINER WITH ITS PROPANE CAPACITY. To determine the propane capacity of a container, simply multiply its water capacity by 42% (.42).

**DOT containers are required to be certified for safe continued use at specific intervals.**

## **STEEL AND ALUMINUM CYLINDERS**

The first test is required 12 years after the manufacture date. After the 12-year test, the container must be tested every 5, 7 or 12 years, depending on the type of examination. There are three methods of retesting and requalification of DOT cylinders:

### **1. External Visual Inspection Method**

The external visual inspection can be used provided the cylinder has been used exclusively for LP-Gas commercially free of corroding components. Inspection to be made by a competent person, using CGA C-6 for steel cylinders or C-6.3 for aluminum cylinders and recording the inspection results as required by DOT regulations. Cylinders that pass the examination are marked with the with the RIN (retester identification number), the retest date and year followed by the letter E. In certain situations, DOT has issued a VRIN (visual requalifier identification number). Those issued this number must place the VRIN in a straight line followed by the month and year and letter E.

**This type of requalification is valid for a period of five (5) years.**

### **2. Proof Pressure Method—Simple Hydrostatic Test**

Commonly referred to as the “Simple Hydrostatic Test”, A pressure of twice the marked service is applied, but no provision is made for measuring total and permanent expansion during the test. The cylinder is carefully observed while under the test pressure for leaks, undue swelling or bulging indicating weaknesses. Cylinders that pass the test and the required visual inspection are marked with the RIN and retest date. The RIN is set in a square pattern between the month and the year of the test date followed by the letter "S" the type of test conducted. **This type of test is generally valid for a 7-year period.**

### **3. Volumetric Expansion Method**

Commonly referred to as a “Water Jacket Hydrostatic Test”. A pressure of twice the marked service pressure is applied, using a water jacket (or the equivalent) so that the total expansion of the cylinder during the application of the test pressure can be observed and recorded for comparison with the permanent expansion of the cylinder after depressurization. Cylinders that pass the retest and required visual examination are marked with the RIN and retest date. The RIN is set in a square pattern between the month and the year of the test date. **This type of test is valid for a 12-year period**

## **COMPOSITE CYLINDERS**

The Composite Cylinder (depending on the manufacturer) must be visually inspected 5 years after the manufacture date and every 5 years thereafter. The maximum usage period for a composite cylinder is 15 years from the manufacture date, at which time the cylinder must be disposed of.

Composite Cylinder manufacturers are required to pressure test their cylinders every 5 or 10 years based on their DOT certifications.

These periodic testing procedures are designed to detect leaks or damage to cylinders which could pose a safety hazard if the cylinder is allowed to remain in service.

**ONLY THOSE PERSONS/COMPANIES LICENSED BY THE FLORIDA DEPARTMENT OF CONSUMER SERVICES AS A 'REQUALIFIER OF CYLINDERS' OR A CATEGORY I LP GAS DEALER MAY RETEST OR RECERTIFY CYLINDERS.**

**EFFECTIVE OCTOBER 1, 2002, ALL PERSONS REQUALIFYING CYLINDERS WERE REQUIRED TO BE REGISTERED WITH THE U.S. DEPARTMENT OF TRANSPORTATION, RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, AND TO OBTAIN A REGISTRATION IDENTIFICATION NUMBER (RIN) FROM THAT AGENCY - THIS INCLUDES VISUAL REQUALIFICATION!**

**COMPANIES PERFORMING EITHER THE SIMPLE OR WATER JACKET HYDROSTATIC TEST MUST ALSO HOLD A U.S. DEPARTMENT OF TRANSPORTATION LICENSE FOR THIS WORK.**

|                                       |  |      |
|---------------------------------------|--|------|
| A1                                    |  |      |
| 11                                    |  | 03 E |
| 32                                    |  |      |
| 11 is the month of requalification    |  |      |
| A123 is the RIN                       |  |      |
| 03 is the year of the requalification |  |      |
| E is the symbol for requalification   |  |      |

|                                               |  |
|-----------------------------------------------|--|
| V0000037                                      |  |
| 1103E                                         |  |
| The top number is the RIN                     |  |
| 1103 is the month and year of requalification |  |
| E is the symbol for requalification           |  |

The DOT **cylinder** markings will play an important part in the length of time any of these three methods is valid. This code tells the design code of the tank and its service pressure. Note the table

below:

| <b>INSPECTION &amp; TEST PERIODS FOR STEEL AND ALUMINUM DOT/ICC<br/>PROPANE CYLINDERS ONLY</b> |                    |                                           |                                     |                             |
|------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|-------------------------------------|-----------------------------|
| CYLINDER<br>TYPE                                                                               | FIRST TEST<br>DATE | NEXT REQUIRED TEST DATE & TEST LETTER     |                                     |                             |
|                                                                                                |                    | WATER JACKET<br>HYDROSTATIC-<br>NO LETTER | SIMPLE<br>HYDROSTATIC<br>TEST - "S" | VISUAL<br>INSPECTION<br>"E" |
| 4B                                                                                             | 12 YEARS           | 12 YEARS                                  | 7 YEARS                             | 5 YEARS                     |
| 4BA                                                                                            | 12YEARS            | 12 YEARS                                  | 7 YEARS                             | 5 YEARS                     |
| 4BW                                                                                            | 12 YEARS           | 12 YEARS                                  | 7 YEARS                             | 5 YEARS                     |
| 4E                                                                                             | 12 YEARS           | 12 YEARS                                  | 7 YEARS                             | 5 YEARS                     |

**TEST DATE REQUIREMENT SHOULD BE BASED ON MOST RECENT DATE STAMPED ON  
CONTAINER**

Although ASME containers are not required to be tested in the same manner as DOT cylinders, ASME containers should be visually inspected prior to filling to determine their suitability for continued use.

## ***SECTION 3 REVIEWS***

---

1. Name THREE types of specifications which propane containers are manufactured under.
2. What does DOT stand for? ASME? FAA?
3. How long after manufacture may a DOT Steel or Aluminum cylinder be used before recertification is required? How many re-certifications are allowed?
4. How long after manufacture may an ASME propane container be used before recertification is required?
5. How long after manufacture may a DOT Composite cylinder be used before recertification is required?
6. Where is the identification information found on a DOT cylinder? On an ASME tank?
7. If an ASME container does not have a data plate, but appears to be in good condition, can it be filled?
8. Can a licensed dispensing unit operator re-qualify DOT cylinders for continued use?
9. Name 3 types of requalification that can determine if a DOT cylinder is acceptable for safe continued use.
10. The cylinder marking 4BW-240 tells you what?

## SECTION 4

### VALVES AND FITTINGS

As a dispensing unit operator, you should be able to identify the different valves and fittings on propane containers and know their purposes. Your instructor will show you examples of these valves and fittings and discuss the purpose of each.

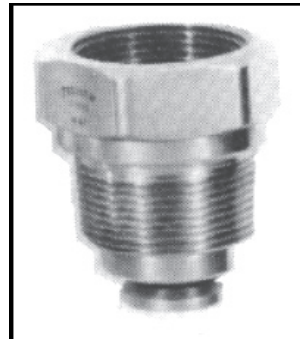
#### ***FILL VALVE OR BACK FLOW CHECK VALVE***

This type valve will always remain closed except when fuel flow from outside forces it open (as happens during the filling process).



#### ***EXCESS FLOW CHECK VALVE***

This valve permits flow of gas in either direction, but closes automatically when the outward gas flow exceeds a safe rate.



#### ***PRESSURE RELIEF VALVE - external***

Type and Internal Types.

These valves are held closed by a spring unless the tanks internal pressure becomes higher than the maximum working pressure.



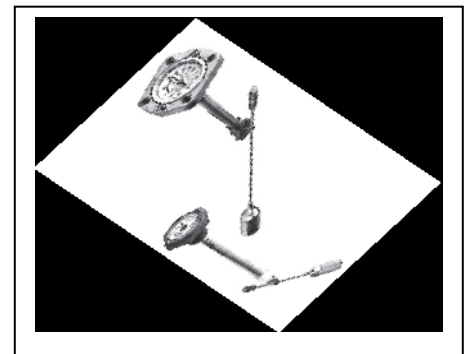
**LIQUID SERVICE VALVE**-with integral excess flow check valve. Used primarily in motor fuel applications such as fork lift trucks.



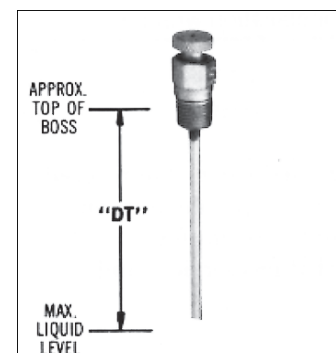
**POL VALVE** - Service valve with built-in pressure relief for vapor withdrawal from cylinders. This valve should be plugged or capped whenever the container is disconnected from use. Always check the pressure relief valve for damage before filling.



**MAGNETIC FLOAT GAUGE** Gauges are devices which indicate the percentage of gas in a container based on an internal float located at and moving with the liquid inside the tank. **NOT** to be used as a guide for filling containers.



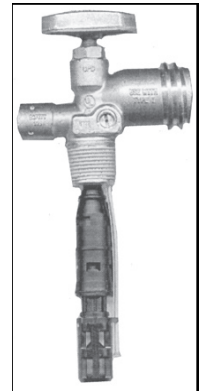
**FIXED LIQUID LEVEL GAUGE**-The gauge is used during the filling process to determine when the container is filled to 80% full. A tube attached to the valve is in communication with the vapor space of the container. When the container is at 80%, liquid will go through the tube and bleed through the gauge when open. This gauge is to remain closed except when filling a container.



# OPD

## OVERFILL PREVENTION DEVICES

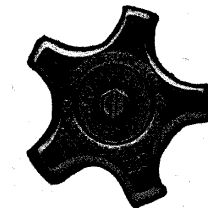
The valve found on all DOT cylinders between 4 and 40 lbs, manufactured after September 30, 1998, is called an Overfill Prevention Device, commonly known as the OPD. The OPD is designed to detect the liquid level of product inside a DOT container and **help** prevent overfilling of the container. **No cylinder (4 lbs to 40 lbs) may be filled unless it is equipped with a listed OPD** (except those cylinders used in industrial truck applications, including forklifts, cylinders for industrial welding or cutting gases, and floor maintenance machines, or similar applications as noted by exemption in the code).



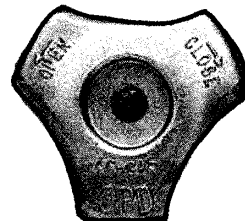
**OPD's are NOT an approved method of filling a container.**

**IDENTIFYING OPD'S** – Cylinders equipped with the OPD are identifiable by the different hand wheel configuration. Diagram #1 below represents the common round handwheel configuration for older cylinders; Diagram #2 is representative of the OPD triangular-shaped handwheel configuration. **IMPORTANT: The old-style handwheel may be different from manufacturer to manufacturer. The new OPD handwheel will be uniform and will bear the OPD stamp.**

Typical old-style handwheel



New OPD handwheel



## ***SECTION 4 REVIEWS***

---

1. How does a back flow check valve work?
2. What is the purpose of a pressure relief valve?
3. What information does a fixed liquid level gauge give you?
4. What should a vapor service valve (POL) be equipped with when disconnected?
5. What does the excess flow in a liquid service valve do?
6. What is an OPD and what is its purpose?
7. Can you rely on an OPD valve for accurate filling of a D.O.T cylinder?
8. Is the float gauge alone a suitable method for filling?

### **FILLING PROPANE CONTAINERS**

**Only fully trained and qualified persons should be authorized to transfer propane gas.  
No persons under the age of 18 years shall be permitted to dispense propane.**

#### **Training**

By law, all dispensing unit personnel must be adequately trained in proper LP gas transfer procedures. Make sure all new employees receive the training they need and that proof of this training is available on-site.

Your liquefied petroleum gas supplier will give you hands-on training on the filling of propane containers for portable cylinders, recreational vehicles, motor fuel tanks, forklifts, etc. Filling procedures may differ slightly since tanks and cylinders vary. Adapters may be needed in order to connect some types of containers. This section will give you valuable safety information concerning these procedures.

It is the responsibility of the licensed operator to have only qualified persons filling containers. A qualified person is one who understands the types of containers and the conditions under which they may be filled. That person must be well trained in the use of dispensing equipment and in the actual transfer of liquid propane gas. Emergency training is also a vital part of these activities.

### **NOTICE FAA CONTAINERS**

Pursuant to Chapter 7.2.1.4, NFPA 58, an FAA-certified balloon pilot or a trained crew member shall be present and ensure the proper filling of FAA containers. The trained pilot or crew member carries a card documenting the required training.

Per NFPA 58 Chapter 7.2.2.10 and 7.2.2.11, the requirement to remove the cylinder sleeve to facilitate the visual inspection of a cylinder prior to filling DOES NOT apply to the FAA containers that are included in the flight log of the hot air balloon. In addition, the hot air balloon containers are not required to be removed from the aircraft for filling.

***BEFORE YOU CONNECT - INSPECT!***

January 2019

## REFILLING CONTAINERS

Each container's specifications and condition must be visually inspected every time it is filled to determine if it is suitable for propane service. If the container is wrapped with a sleeve of any type of material, it must be removed.

Always visually inspect the container for excessive corrosion, dents, gouges, leaks, exposure to fire, damaged pressure relief valves, and damaged collars/foot rings. The bottom, foot rings, and legs are the most susceptible areas for corrosion and rust. Make certain that all identifying marks are complete and legible.

By Florida law, propane containers **MAY NOT** be filled if:

01. You do not have the owner's permission.
02. Identifying marks are missing or not legible.
03. A DOT cylinder has not been requalified as periodically required by the requalification method.
04. The container has excessive pitting, dents, gouges, or other damage
05. The container has a visible bulge(s).
06. The container has been exposed to fire.
07. The container is not approved for propane gas.
08. The container or fitting possesses leaks.
09. The container is damaged or has obstructed pressure relief valves.
10. There is no collar (or the collar is damaged) or cap to protect the valves in transit.
11. There is no foot ring or the foot ring is damaged. If it is a motor fuel tank, it must be securely fastened in place.

## **NEW CONTAINERS - PURGING BEFORE FILLING**

Purging of new containers is required for efficient and safe use with propane.

A new container may possess water, air, or other contaminants. These must be removed before filling.

The purging process must be done in compliance with Section 7.3.2.3, NFPA 58, which reads as follows:

Venting of containers outdoors shall be performed under conditions that result in rapid dispersion of the product being released.

For the dispensing unit operator, container venting must always be performed out-of-doors. Make sure all sources of ignition are eliminated. Smoking should not be allowed within 25 feet of the purging operation.

1. If the container is pressurized, this pressure must be vented and reduced to zero pound pressure.

2. Pressurize the tank with propane **vapor**; approximately 15 to 25 p.s.i. Vent the air/gas mixture through a vent stack. Repeat 3 or 4 times for total purging.
3. If water appears to be present, methanol must be used to remove it. Contact your propane supplier for assistance.

Failure to purge a container may create other hazards. A higher than normal pressure could cause the pressure relief valve to operate, releasing a gas/air mixture. Failure to purge could also result in appliance malfunction, burner outage or internal corrosion of the cylinder.

On the job training and a demonstration of the actual purging procedure should be provided by your propane supplier.

## **CONTAINER FILL PROCEDURE**

These fill procedures are a general guideline for the safe filling of propane containers. These procedures are not meant to preclude other safety procedures.

### **BEFORE YOU FILL:**

1. If your dispenser is located inside a fenced area, make sure both gates are open.
2. **NO SMOKING**, open flame, portable electrical tools, and extension lights capable of igniting LP Gas within 25 feet.
3. Internal combustion engines within 15 ft. of the point of transfer shut down during the transfer operation.
4. Use protective gloves while filling cylinders.
5. Check the cylinder valves to determine their suitability for LP gas service.
6. Remove any wrapping
7. Visually inspect the condition of each container for the following:
  - a. Excessive corrosion on the top, sides and bottom
  - b. Deep Dents or Gouges
  - c. Leaks of any kind  
NOTE: if the tank is empty put a little gas into it first to check for leaks.
  - d. Evidence of exposure to fire

### **MOTOR FUEL CONTAINERS:**

1. Make sure the vehicle ignition is OFF
2. The brakes should be set (or chock blocks in place).
3. All passengers should be out of the vehicle BEFORE you begin.

### **RECREATIONAL VEHICLES:**

1. Vehicle motors are turned off.
2. All Pilots and burners are turned off.
3. All electrical circuits are turned off.
4. All other ignition sources have been eliminated.
5. All passengers are out of the vehicle.
6. Check for leaks

### **DOT CYLINDERS**

1. Check container dates to verify it has been requalified in accordance with U.S. Department of Transportation regulations (see Section 3 for requalification information).
2. Check the tare weight of the cylinder (empty) and water capacity of the cylinder - these will be found stamped on the cylinder body or collar.
3. Set the Scales
  - a. Determine propane capacity by multiplying water capacity (WC) by 0.42. For example, if the WC of a container is 48 pounds, the propane capacity will be 20 pounds, and so forth.
  - b. Add the tare weight (TW) and propane capacity together to determine the total filled weight of the cylinder.
  - c. Determine the weight of the hose end.
  - d. Set scales to indicate the combined weight of the filled container and hose end.
4. Stop filling when the scale balances.
5. **ALWAYS** check the weight of the filled cylinder after the filling connector has been disconnected to insure the container has not been overfilled.
6. **ALWAYS** check for leaks after filling any container before giving it back to the consumer.
7. Apply the required decals to the container.

**NEVER LEAVE A FILLING PROCESS UNATTENDED**

January 2019

**NEVER GIVE AND OVERFILLED OR LEAKING CYLINDER BACK TO A CONSUMER**

**AFTER CONTAINER FILLING OPERATION IS COMPLETED OR ANY TIME STATION IS UNATTENDED**

1. Shut off pump.
2. Close valves at storage tank.
3. Coil hose on rack inside fence or protected area.
4. Lock fence protected area to secure installation against tampering.

**THINGS TO REMEMBER**

1. Fill only approved containers.
2. Fill DOT cylinders that are within the proper requalification time limits.
3. You (the attendant) must remain at the transfer area during the filling operation.
4. Wear protective clothing, eye protection, gloves, and footwear.
5. Double check tank for overfilling.
6. Check all valves and fittings with leak detector solution for leaks.
7. Be sure containers are transported in the proper position.
8. Be sure that the container has transportation/warning labels and POL plug or cap, if required.
9. Be sure valves are protected by collar or cap.
10. Follow proper filling and safety procedures all the time.

## ***SECTION 5 REVIEWS***

---

1. What must be done before a new DOT container may be filled?
2. Before filling a motor home, what steps should you take?
3. What is the maximum amount of propane you may dispense into a container?
4. What must be done before any propane container may be refilled?
5. Personnel dispensing propane gas must have what?
6. Sources of ignition, including cigarettes, should be eliminated within how many feet of the filling procedure?
7. How do you determine the gas capacity of a DOT cylinder? Of an ASME container?
8. How do you determine if a DOT cylinder is overfilled? What may happen if a container is overfilled?
9. How often is refresher training required?
10. How do you determine the set scale weight when filling a DOT cylinder?

### TRANSPORTATION OF CONTAINERS

Cylinders under 45 lbs. propane capacity may be transported in enclosed vehicles. The cylinder and its valves must be protected and determined to be leak free and securely fastened, with consumer warning and shipping labels attached.

If your customer is transporting a propane container in an enclosed vehicle, you should recommend that the vehicle be kept cool and ventilated and that the cylinder be removed as soon as possible. If a hissing noise or odor of propane is noticed, the cylinder must be removed at once, taking special precautions to avoid all possible sources of ignition.

By law, the largest amount (total pounds) of propane that may be transported at one time in an enclosed vehicle is 90 pounds' aggregate; however, no single container can exceed 45 lbs. propane capacity.

Cylinders must be transported in a position where the pressure relief valve is in direct contact with the vapor space. With most cylinders, this is an upright (vertical) position, standing on the container foot ring. Some cylinders, however, are designed to "lie down" or be positioned horizontally (see Section 3).

If the pressure relief valve comes in contact with the liquid stored in the cylinder, a rise in tank pressure would cause the escape of propane liquid. The expansion of this liquid released to the atmosphere (270 times) could create an immediate safety hazard due to the large amount of propane present and the possibility of ignition.

#### **REMEMBER:**

1. Containers shall not be transported inside vehicles where ignition sources (pilot lights, burners, etc.) are present.
2. Smoking should be prohibited when containers are transported in the space opened to the passenger area.
3. Containers shall be secured and transported only with the pressure relief valve in contact with the vapor space of the container; usually this in an upright position.
4. A leaking container should never be placed inside a vehicle.
5. POL valve outlets should be plugged to avoid accidental release of propane.
6. Cylinders shall not be transported without valve protection by use of cap, collar or other acceptable method.

## ***SECTION 6 REVIEWS***

---

1. What is the largest amount of propane that can be transported in an enclosed vehicle at one time?
2. What is the largest size propane container that can be transported in an enclosed vehicle?
3. In what position should a container be transported?
4. After filling a propane container and placing it in an enclosed vehicle, you observe a white vapor and hear a slight hissing sound. What should you do?
5. It's a hot July day, and you just finished loading a filled container into the trunk of a car. Your customer tells you that he is headed to a nearby mall to shop for several hours before heading home. What should you do?

### **CARE AND MAINTENANCE OF YOUR DISPENSING UNIT**

Proper care and maintenance of your dispensing unit will ensure the safe continual use of the unit. If you are a licensed LP gas dispensing unit operator, your unit will be routinely inspected a department inspector. Additionally, your gas supplier may inspect the unit prior to each filling operation. As the unit operator, however, you should routinely inspect your unit for any leaks or potential problems.

#### **Housekeeping**

Simple good housekeeping around your dispensing area is a good common sense approach to safety. Do not allow Combustible materials to accumulate or be stored within 10feet of the container.

#### **Leaks**

No leaks of any size or type should be permitted at a container filling area. Leaks at your dispensing unit may be indicated by:

- An oily residue observed around fittings;
- A hissing sound; or
- A smell of propane when cabinet is first opened.

Any leak should be reported to your gas supplier immediately. By law, leak calls must be responded to within 24 hours of the first report. Never attempt to repair your dispensing unit -this should be left to a properly licensed company or individual. A major leak at your dispenser is an immediate hazard - the area should be evacuated, and emergency responders contacted as well as your gas supplier.

THE DEPARTMENT RECOMMENDS CHECKING YOUR DISPENSER FOR LEAKS AT LEAST MONTHLY WITH A LEAK DETECTOR SOLUTION. Check with your gas supplier for a recommended solution - never use a solution that contains ammonia, as it may damage your equipment.

#### **Fire Extinguishers**

Make sure your fire extinguisher(s) is a minimum 18 lb. dry chemical with an A-B-C rating. Extinguishers must be fully charged located within 50 ft. of the dispensing unit and easily accessible. The extinguisher must be inspected, recertified, and tagged by a licensed technician, annually.

## **Posting of Signs**

Dispensing units are required to be marked for safety. Filling procedures must be posted at each dispenser. "No Smoking," signage must be prominently posted on visible or approachable sides and ends of the container. "Propane" or "Flammable Gas" signs must be prominently posted on visible or approachable sides of the container. Smoking or other open flames are not permitted within 25 ft. of the unit.

## **Dispensing Unit Equipment**

### **NFPA 58 requires:**

#### **6.27.3.9—Emergency Shut Off Valve**

An identified and accessible remote emergency shutoff device for either the internal valve or the emergency shutoff valve as required by 6.27.3.8 (1) or (2) shall be installed not less than 3 ft or more than 100 ft from the liquid transfer point.

#### **6.27.3.17—Emergency Electrical Shut Off Switch**

An identified and accessible switch or circuit breaker shall be installed at a location not less than 20 feet or more than 100 feet from the dispensing device(s) to shut off the power in the event of a fire, accident or other emergency.

Routinely check remote and emergency shut off valves and switches to affirm that they are operational and accessible. Your propane supplier will advise you on the proper operation of this equipment

Insure crash protection from potential vehicular traffic meets code requirements.

Make sure all gates are open during transfer operations and closed when not in operation.

### **DISPENSING UNIT OPERATOR CHECKLIST**

Use this list as a safety reminder and inspect your unit regularly.

- ☒ The area around the dispensing unit is free of flammable materials.
- ☒ The area around the dispensing unit is free of weeds and tall grass.
- ☒ The dispensing unit has been checked for leaks.
- ☒ Any leaks found have been reported to gas supplier for repair.
- ☒ Fire extinguisher is readily accessible and fully charged.
- ☒ Filling procedures are properly posted in a prominent position.
- ☒ Required signs are properly posted and visible from all approachable sides.
- ☒ Dispensing unit hoses and fittings are in good shape with no visible signs of wear.
- ☒ Check to insure you have adequate supplies: leak solution, labels, plugs and caps.
- ☒ Remote and emergency shutoff valves are accessible and operational.
- ☒ All employees who dispense product have received proper training in filling procedures, safety practices and emergency procedures.
- ☒ Emergency phone numbers are clearly posted.

## ***SECTION 7 REVIEWS***

---

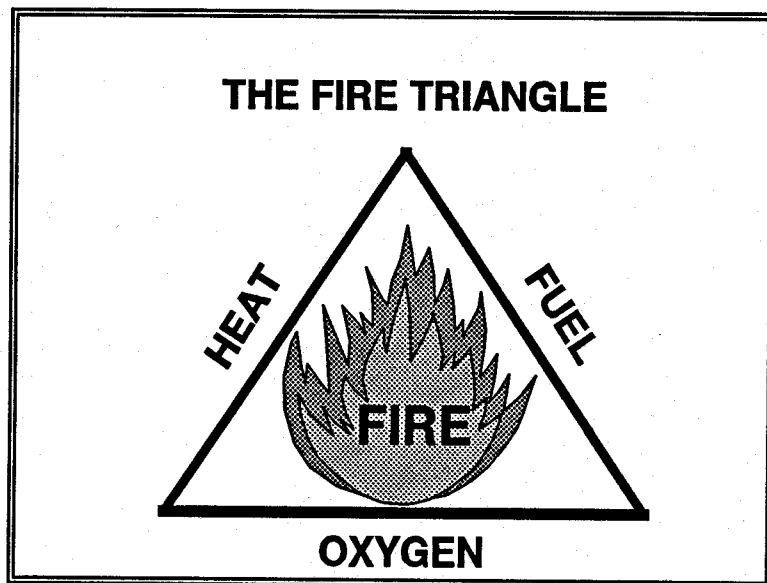
1. How many feet around the dispensing unit must be kept free of debris, trash and other combustible materials?
2. What type of repairs are dispensing unit operators allowed to make to their unit?
3. If you suspect a leak, what signs should you look for?
4. How would you check for a leak around a fitting?
5. Where must your fire extinguisher be located?
6. If you detect a leak, who would you call?
7. When must a reported leak be investigated by your gas supplier?
8. How often must the fire extinguisher be inspected and re-certified by a licensed technician?

### SAFETY PRECAUTIONS AND HANDLING OF EMERGENCY SITUATIONS

#### SAFETY PRECAUTIONS WHEN FILLING

Liquid propane will expand 270 times as it converts from liquid to vapor. This rapid conversion of liquid to vapor causes intense chilling and literally freezes whatever it comes in contact with. For this reason, precautions should be taken to **protect eyes and skin from the liquid since freeze burn or frostbite is possible.**

Proper clothing and eye protection should be available at any transfer operation. Gloves approved for use with LP Gas should be used. Safety glasses, goggles, or a face shield should be used. Foot protection is useful as a protection against injury should a tank, cylinder, or hose end be dropped.

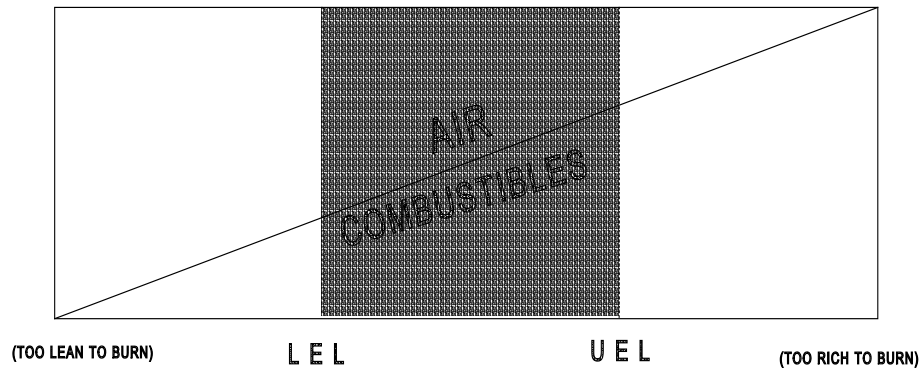


#### PROPANE FLAMMABILITY

For any fire to occur, three ingredients are needed -- fuel, heat and oxygen. LP gas vapor makes an excellent fuel, and heat can exist in the form of an open flame, a lighted cigar or cigarette, an arc formed by an electrical switch, ignition arc on an auto, or static electricity. In the right combination with oxygen, these three ingredients make up the necessary components of the "fire triangle."

While propane vapor is readily ignitable, it has a very narrow flammability range when compared to other petroleum products. In order to ignite, the propane/oxygen mix must contain from 2.15 to 9.60 percent propane vapor. This means that a propane/air mixture containing **less than** 2.15 percent gas is too lean to burn. If the mixture contains **more than** 9.6 percent gas, it is too rich to burn.

LOWER EXPLOSIVE LIMIT (L E L) VS. UPPER EXPLOSIVE LIMIT (U E L)



The **range of flammability** is important to remember when LP gas is transferred or discharged. If the propane/air mixture is within the flammability range, sources of ignition could include fans, electrical switches, auto ignition, static electricity or cigarettes. The ignition temperature of propane is approximately 920<sup>0</sup> F to 1120<sup>0</sup> F. By comparison, a cigarette will burn at approximately 600<sup>0</sup> F to 1350<sup>0</sup> F, and a light switch will arc at 2000<sup>0</sup> F.

Propane is **non-toxic** and is not harmful to breathe in small concentrations. However, breathing large concentrations may result in suffocation. Inhaling propane vapor may produce dizziness, loss of coordination, unconsciousness, or death. This depends upon the level of concentration and the time of exposure. **Never enter an area if a vapor cloud is present, or if the area is suspected of having a high vapor concentration.**

Should a propane leak occur, **eliminate all possible sources of ignition immediately**. Try to stop the flow by shutting off all valves. Remember to approach with the wind at your back.

If propane reaches a source of ignition, a flash, fire, or explosion may result. The fire should **never** be extinguished until the flow of gas has been turned off. Should the fire be extinguished and the supply of fuel is not turned off, a greater fire hazard may exist or an explosion may occur. If the fire is small, you may be able to control it with a BC fire extinguisher. When using an extinguisher, always approach the fire from upwind. After use, make sure your extinguisher is recharged immediately.

Florida law requires that an 18 lb. ABC fire extinguisher be readily available for use at LP gas dispensing units. **Large** quantities of water or water spray are also acceptable control methods. Water helps cool the container and disperse the vapor. If the fire is not controlled, immediately notify the fire department and evacuate all personnel to a safe area.

## ***SECTION 8 REVIEWS***

---

1. If you observe a propane vapor cloud around the dispensing unit or area, what should you not do?
2. If a leak occurs, what is the first thing you should do?
3. What 3 things are needed for a fire to occur?
4. If a propane fire occurs, what should you attempt to do first?
5. When fighting a small propane fire with a fire extinguisher; from which direction should you approach the fire?
6. Why should gloves, eye protection and protective clothing be worn during filling procedures?
7. Other than an 18 lb. BC rated fire extinguisher, what other method of control is acceptable for handling propane emergencies?

### GLOSSARY OF COMMONLY USED TERMS

|                              |                                                                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ASME</b>                  | American Society of Mechanical Engineers                                                                                                                                                         |
| <b>ABC FIRE EXTINGUISHER</b> | A fire extinguisher rated for extinguishing trash, wood, paper, liquid and electrical equipment fires.                                                                                           |
| <b>DATA PLATE</b>            | Plate attached to ASME containers with all pertinent information for the container.                                                                                                              |
| <b>DOT</b>                   | United States Department of Transportation                                                                                                                                                       |
| <b>ETHYL MERCAPTAN</b>       | An odorant used in liquefied petroleum gases to aid in detecting leaks.                                                                                                                          |
| <b>FLOAT GAUGE</b>           | Device which indicates the percentage of gas in a container based on an internal float located at and moving with the liquid inside the tank.                                                    |
| <b>ICC</b>                   | Interstate Commerce Commission which formerly set forth specifications for the manufacture of portable cylinders. This responsibility now lies with the U.S. Department of Transportation (DOT). |
| <b>LPG</b>                   | (Liquefied petroleum gases) - Gases belonging to the hydrocarbon family. Commonly referred to as propane, LP gas, bottled gas, butane, propylene, etc.                                           |
| <b>NFPA</b>                  | Abbreviation for "National Fire Protection Association," who promulgates and publishes fire safety standards                                                                                     |
| <b>NPGA</b>                  | Abbreviation for "National Propane Gas Association," formerly the National Liquefied Petroleum Gas Association (NLPGA).                                                                          |
| <b>OPD</b>                   | Overfill Prevention Device. A device which causes the service valve to close when the container becomes filled.                                                                                  |
| <b>POL</b>                   | This abbreviation (commonly referred to as 'put on left') is used to describe different types of fittings, service valves, plugs, filler couplings, adapters, etc., all with a left-hand thread. |
| <b>POL PLUG</b>              | A metal or plastic plug for the service valve required to be used during the transportation of propane containers.                                                                               |
| <b>POL VALVE</b>             | A vapor service valve with built-in pressure relief for vapor withdrawal from cylinders.                                                                                                         |
| <b>PSIG</b>                  | Pounds per square inch gauge - measurement of pressure inside a container                                                                                                                        |
| <b>QUALIFIER</b>             | A supervisor, manager or employee who has passed the required state LP Gas examination                                                                                                           |

|                              |                                                                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>RANGE OF FLAMMABILITY</b> | A term used to describe that certain mixture of air and propane required to achieve combustion.                                |
| <b>RELIEF VALVE</b>          | A fitting designed to release vapor pressure to atmosphere to maintain a predetermined level of pressure inside the container. |
| <b>REQUALIFICATION</b>       | The testing, certifying, retesting or recertifying ICC/DOT cylinders to determine suitability for continued safe use           |
| <b>SERVICE VALVE</b>         | The container valve that turns the gas on or off.                                                                              |
| <b>SPECIFIC GRAVITY</b>      | Product weight compared to air (vapor) or water (liquid).                                                                      |
| <b>TARE WEIGHT (TW)</b>      | Weight of an empty container, including its valve                                                                              |
| <b>TRANSFER OPERATION</b>    | Act of transferring liquid product from one container (dispensing device) to another                                           |
| <b>WC</b>                    | Water capacity. The amount of <u>water</u> in gallons that an LP gas container can hold when full                              |