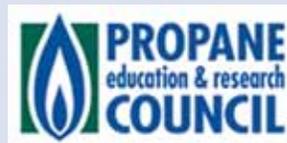


DISPENSING PROPANE SAFELY



Propane Education & Research Council
1140 Connecticut Avenue N.W.
Washington, DC 20036
(202) 452-8975

Copyright 2005 Propane Education & Research Council

About The Program

Dispensing Propane Safely is a program of training material organized into modules that allow you to select what material is covered based on your job responsibilities. The following training tools are available:

- 1) A DVD
- 2) A companion instruction manual (either on CD or in paper format), including optional quizzes and answer keys

The first three modules in the program apply to anyone dispensing propane and cover

- 1) Dispenser Training Requirements,
- 2) Propane Properties, Characteristics and Safety Measures, and
- 3) Dispensing Equipment.

Additional modules that can be selected based on job requirements include

- 4) DOT Cylinders;
- 5) Inspecting, Filling & Labeling Small Cylinders;
- 6) Refueling, Maintaining & Troubleshooting Forklift Cylinders;
- 7) Refueling ASME Motor Fuel & RV Tanks; and
- 8) Retail Exchange Cylinder Operations

(Employers: There is also an optional quiz for each module and a sheet allowing you to document the training completed for each employee.)

Acknowledgements

The Propane Education & Research Council (PERC) and National Propane Gas Association gratefully acknowledge the generosity and cooperation of the following individuals and organizations for providing personnel, equipment and technical assistance. Without their help, this program could not have been produced.

Bone Roofing, Chicago, IL

Bruce Montroy, Bergquist, Inc., Toledo, OH

Country Gas Co./Inergy LP, Crystal Lake and Wasco, IL

Capitol Propane, Columbus, OH

Sam's Gas, Orlando, FL

Manchester Tank & Equipment Co., Franklin, TN

We also gratefully acknowledge the technical inputs and guidance of the task force members involved in the project, who served as Subject Matter Experts (SMEs) and reviewers.

Mike Walters, task force chairman (Amerigas Propane)

George Distasi (Manchester Tank & Equipment)

David Hyslop (Heritage Propane)

Jay Johnston (Jay Johnston & Associates)

Ray Kazakewich (RegO Products/ECII)

Eric Kuster (Tri-Gas & Oil)

Mike Merrill (Suburban Energy)

Ed Miller (Titan Propane)

Valeria Schall (Alliance Energy)

Cliff Slisz (Ferrellgas)

The material and other information included in this presentation is intended to provide general guidance only on the subject matter addressed by the presentation. It is not intended to be a substitute for the personal instruction, guidance and advice of a professional with training and experience in the safe and proper use of propane.

Table of Contents

1.0	INTRODUCTION TO DISPENSING PROPANE SAFELY	1
2.0	PROPERTIES, CHARACTERISTICS AND SAFETY MEASURES	5
3.0	DISPENSING EQUIPMENT	11
4.0	DOT CYLINDERS	17
5.0	INSPECTING, FILLING AND LABELING SMALL CYLINDERS	23
6.0	REFUELING, MAINTAINING AND TROUBLESHOOTING FORKLIFT CYLINDERS	31
7.0	REFUELING ASME MOTOR FUEL AND RV TANKS	43
8.0	RETAIL EXCHANGE CYLINDER OPERATIONS	49
	QUIZZES	53
	QUIZ ANSWER KEYS	73
	CERTIFICATE OF INSTRUCTION	87

1.0 INTRODUCTION TO DISPENSING PROPANE SAFELY



INTRODUCTION

Dispensing stations can be found on bulk plant cylinder docks, industrial locations, hardware stores, campgrounds, rental equipment companies or gasoline stations. They offer a convenient fueling source for residential, recreational and business users of propane. Propane dispenser operators play a critical role in safely and efficiently providing propane to these customers.

Propane Dispensers

Propane dispenser operators' responsibilities include:

- Understanding the operation of the **dispensing equipment**, the **regulations** pertaining to it, and the routine **inspections** which should be performed before each use.
- **Inspecting** customer containers to ensure that they are safe for filling.
- **Filling** containers to their proper levels and ensuring that containers are not overfilled;
- **Communicating** to customers product information and warnings such as the proper securing of containers when transporting them;
- Maintaining the **security** of the propane dispenser and transfer area to control ignition sources and to prevent tampering or release of propane;
- Knowing how to **shut down** and **secure** the dispenser in the event of an emergency.

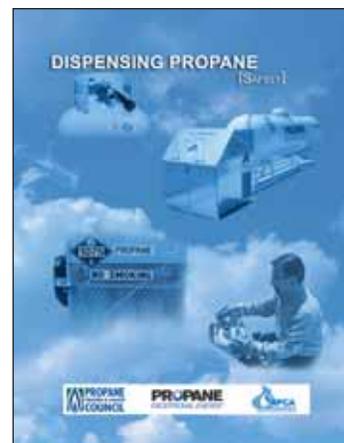


Program Elements

This program offers a training **manual** and **DVD** or **VHS**, organized into a modular format that allows you to select material based on your job responsibilities. There is also an optional **quiz** for each module and **documentation** material for your employer.

The first three training sections apply to all dispenser operators and cover:

- (1) Training Requirements
- (2) Propane Properties, Characteristics and Safety Measures
- (3) Dispensing Equipment



Sections that can be selected based on job requirements include:

- Inspecting, filling and labeling small cylinders
- Refueling, maintaining and troubleshooting forklift cylinders
- Refueling ASME Motor Fuel and RV tanks
- Retail exchange cylinder operations

Dispenser Training Requirements

There are specific training and inspection requirements published in national codes (such as NFPA 58, the LP Gas Code) and by government agencies such as the United States Department of Transportation (DOT), the Department of Labor (DOL) and the Occupational Safety & Health Administration (OSHA).

NFPA 58, the LP-Gas Code, is a national standard that addresses:

- Dispensing station equipment requirements
- Cylinder storage and refueling
- Cylinder appurtenances (such as overfilling protection devices)
- Dispenser operator training



States and jurisdictions have differing policies relative to the adoption of various editions of NFPA 58; some may add or delete provisions to the code. Check with your supervisor to determine which edition of NFPA 58 your jurisdiction has adopted and whether any provisions have been modified.

Some of the DOT requirements cover:

- Visual inspection prior to filling cylinders
- Pressure relief device leak checking and replacement
- Periodic cylinder requalification
- Cylinder markings and labeling
- Cylinder weight verification
- Filling methods used (weight or volume)
- Hazardous material training and documentation

OSHA rules include:

- The use of and training in personal protective equipment (PPE)
- Written Hazard Communication Plans and Material Safety Data Sheets (MSDS)
- Emergency Action Plans

Knowing your responsibilities, being properly trained, following proper procedures and understanding the applicable regulations and local laws will provide you, your employer, your customers, and the general public a safe, efficient energy source.

2.0 PROPERTIES, CHARACTERISTICS AND SAFETY MEASURES



PROPANE PROPERTIES, CHARACTERISTICS AND SAFETY MEASURES

Safe dispensing of propane involves knowing its properties and characteristics, plus being aware of safety procedures.

Product Information

A **Material Safety Data Sheet**, an MSDS, is available from propane suppliers or distributors, and by law must be available and accessible to all employees at the workplace.

This program will discuss information from the MSDS that relates to your job of safely dispensing propane.

Propane can be either a **liquid** or a **gas** depending on the amount of pressure it is stored under. To store propane as a liquid above its normal boiling point (-44 °F), it must be stored and transported in pressure-tight containers. Propane liquid stored in containers at ambient temperatures will begin to boil off and pressurize the vapor space of the container. This vapor is what is used in customer appliances and equipment.

MATERIAL SAFETY DATA SHEET FOR ODORIZED PROPANE			
1. Chemical Product and Company Information			
Product Name: Odorized Commercial Propane			
Chemical Name: Propane			
Chemical Family: Paraffin Hydrocarbon			
Formula: C ₃ H ₈			
Synonyms: Dimethylmethane, LP-Gas, Liquefied Petroleum Gas (LPG), Propane, Propyl Hydro			
Name & Address	Transportation Emergency Number	Emergency Number: For Routine Info, Call:	
2. Composition/Information on Ingredients			
INGREDIENT NAME	PERCENTAGE	OSHA PEL	ACGIH TLV
Propane (C ₃ H ₈)	87.1-100		Simple asphyxiant
Dimethyl Sulfide	0.5-0	1,000 ppm	Simple asphyxiant
Propyl Mercaptan	0.2-0		Simple asphyxiant
Ethyl Mercaptan	10-20 ppm	0.7 ppm	0.1 ppm
3. Hazards Identification			
EMERGENCY OVERVIEW			
<p>HAZARD: Flammable liquid/gas under pressure. Keep away from heat, sparks, flames, and all other ignition sources. Vapor/liquid mixture available for breathing and may cause asphyxiation in confined spaces. Use only with adequate ventilation. Cold may not prevent adequate warning of potentially hazardous concentrations. Tight in warmer than air. Liquid can cause freeze burn similar to frostbite. Do not get liquid in eyes, on skin, or on clothing. Avoid breathing of vapor. Keep container under relief.</p>			
HEALTH HAZARD		PHYSICAL HAZARD	
ENVIRONMENTAL HAZARD		REACTIVITY	



Dispensing Information

In its natural state, propane is **colorless** and **odorless**. To increase the likelihood that a propane leak will be detected, an odorant (usually sulfur-based) is added to the gas at the time of production or shipping. Learn to recognize the odor of propane and always be sensitive to the slightest gas smell.

Under certain conditions, the chemical **odorant** can fade or diminish in intensity. Some persons may have difficulty detecting this odorant. Colds, allergies, sinus congestion, cooking odors, certain medications, age, prolonged exposure to the odor of propane, damp or musty smells and the use of tobacco, alcohol or drugs may diminish the ability of you or your customers to detect the odorant.

If for any reason you or the customer cannot smell odorized propane, notify your supervisor immediately. Both you and your customer's safety may depend on your ability to smell propane in the event of a leak.

Liquid propane, like water, will **expand** when heat is added to it. Propane liquid, however, will increase in volume nearly **17 times** greater than water over the same

temperature increase. To allow for this expansion, propane containers are typically filled to only **80%** of their capacity.

If propane liquid is released into the air, the lack of pressure quickly vaporizes it, expanding it to **270 times** its original volume. Therefore, liquid propane leaks can be more hazardous than vapor leaks.



It also causes a refrigerating effect that makes everything it touches extremely cold. This means if it comes in contact with your skin, it can cause third degree or deep **freeze burns** to the skin.

For this reason, gloves or other personal protective equipment resistant to propane should be worn when filling containers. Your employer may require other Personal Protective Equipment (or PPE), depending on your responsibilities.



Propane is **non-toxic**, but if released in a confined space, will displace air. Therefore, avoid inhaling propane. Propane vapor is **1-1/2 times heavier** than air. If released into still air, it may initially settle in low-lying areas. However, if there is sufficient air movement, especially outside, the vapor will quickly dissipate in the air.

Every release or leak creates the potential for a hazardous situation. Keep in mind that the proper mixture of **propane vapor, air** and a **source of ignition** causes propane to burn.

To minimize the likelihood of sources of ignition or propane release, customers should be restricted from the immediate area around the liquid propane transfer operation.

To safely dispense propane, you should know the following.

- The location of and how to operate **emergency shutdown** and pump controls
- The location and condition of the **fire extinguisher**



- Plant fire prevention and emergency **evacuation plans**
- That ignition sources are not permitted within **25 feet** of the point of transfer, and combustible materials within **10 feet**
- **Valve protection** is required, except for the time that cylinders are on the scales and being filled
- Proper cylinder **handling** techniques

Fire Extinguishers

NFPA 58, the National Liquefied Petroleum Gas Code, requires at least one **fire extinguisher** easily available at the filling site.

It should be at least an **18 lb. dry chemical** extinguisher with a **B:C rating**, and each employee must be trained in the proper use and operation of it. OSHA requires employees to be trained on fire extinguisher use upon initial hiring and annually thereafter.



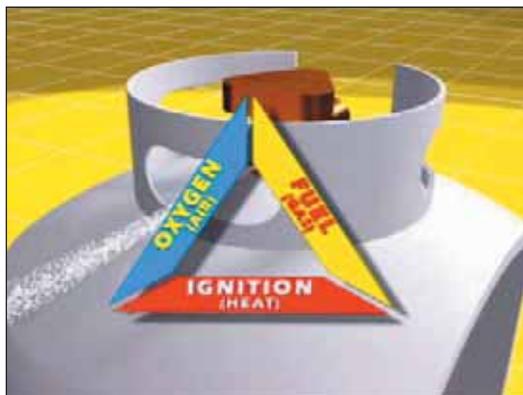
Fire extinguishers are not intended to put out propane fires and have a limited application area. They are only effective for small fires, such as those involving combustible materials. They are also valuable in providing an escape route for personnel.

NFPA 10 requires a **monthly visual inspection** of all fire extinguishers. This includes checking the extinguisher to be sure it is fully charged and has a tag showing the last annual inspection. If the extinguisher is due for inspection, low on charge, damaged, or even missing an inspection tag, filling operations should be stopped. Notify your supervisor immediately.

Leaks and Fires

In the event of an uncontrolled leak or fire, remain calm and do the following, if it is safe to do so.

- If there is an emergency shutdown device, **activate it**.
- Immediately **eliminate sources of ignition**.
- **Evacuate the immediate area**



- Contact the **fire department** and do not re-enter until it has been determined to be safe.
- Move and stay **upwind** of a propane leak, fire, or vapor cloud.
- Shut off the **electrical power** at the main power supply
- Contact your **propane supplier** from a safe location.

It is important to remember that in any propane emergency where there is fire, flames should not be extinguished unless by doing so the fuel supply can be **turned off**, as an explosion hazard much greater than the fire hazard may be created.

After a fire, do not operate a dispenser that has been exposed to fire until it has been thoroughly **inspected** and **repaired** by a qualified technician approved by your propane supplier.

Your company may have specific instructions for you to follow in both routine and emergency situations. Consult your supervisor for more information.

Knowing the properties and characteristics of propane, plus being aware of safety and emergency procedures, will protect you, the customer, and your company.

3.0 DISPENSING EQUIPMENT



DISPENSING EQUIPMENT

Dispenser Components

In order to safely dispense propane, you must know the equipment you are working with and how to use it. There are two main types of packaged propane dispenser installations; **vertical** tank dispensers and **horizontal** tank dispensers.

Dispensing equipment may vary with the location. Your system may or may not have the following components.

- An **ASME storage tank** that supplies propane to the dispensing equipment
- **Valves** to control the flow of propane through the piping system
- Extra heavy **piping** and forged steel pipe fittings
- A propane **pump**, driven by an explosion-proof electric motor
- A platform **scale** for weighing cylinders during and after filling
- Automatic pump **by-pass valve(s)**, to protect the pump, piping and hoses against excessively high pressures when the hose end valves are closed and the pump is running.
- Electrical **wiring, fixtures** and **switches** to control the propane pump motor and provide for emergency shutdown.
- A **metering system** for measuring liquid propane transferred into appropriate containers.
- Propane transfer **hose assemblies** for cylinder filling and ASME tank filling.
- **Hose end adapters** to accommodate the different valves used on DOT cylinders and ASME tanks.
- An **emergency break-away device** for vehicle mounted containers designed to provide protection in case of a pull-away. These are usually on the ASME tank



transfer hose assembly to stop the flow of gas if the customer drives away with the hose attached.

- A **fenced enclosure or lockable cabinet** to secure the dispenser when not in use. Depending on the site and enclosure, traffic barricades may also be required.

Manual shutdown dispensers rely on the operator to determine when the maximum permitted filling limit for a cylinder is reached, and to stop the flow of liquid into cylinders by manually closing one or more valves.

Automatic shutdown systems are used primarily where several cylinders are being filled simultaneously, such as the cylinder dock at a propane plant. They reduce the possibility of overfilling cylinders and normally consist of a sensor or trip lever mounted on the balance beam of the scale and a master control valve that restricts the flow of liquid propane to the dispensing hose.



The dispenser tank may be equipped with either an **internal excess flow valve** in combination with a positive shutoff valve or an **internal valve** which incorporates excess flow protection and may include thermal and remote shutoff capability.



Remote shutdown stations may also be located away from the pump and transfer location providing a greater level of emergency shutdown capability.

Ball valves control the flow of propane from the supply tank through the piping and may be used as a hose end valve. A ball valve is open when the valve handle is pointed in the same direction as the piping; in the closed position, the handle is across the piping.



Globe valves are similar to a water faucet and are operated by turning the hand-wheel counter-clockwise to open and clockwise to close. They must be either fully open or fully closed.



Hose end valves stop the flow of propane as part of the container filling operation. As another safeguard against overfilling containers hose end valves must be quick-closing, or snap acting types. Many designs also incorporate a safety latch to prevent accidental opening when the valve is not connected for filling.

Platform balance beam **scales** determine when the proper filling weight for cylinders is reached and when to stop the flow of liquid propane into the cylinder.

In many states and jurisdictions, scales must bear **certification decals** from weights and measures officials, and be periodically inspected and calibrated for accuracy.

Platform scales can be either **single beam** or **double beam**. Both require periodic maintenance and should be checked daily for proper registration at zero and with a known weight.

They must also be **leveled** and **protected** from weather, especially accumulation of water, debris, snow or ice.



Preparing the Dispenser

The first step in preparing the dispenser for operation is to **unlock** and **open** any or all entry gate or gates. If the dispenser is equipped with a cabinet, unlock the cabinet and verify that the hose end valves are closed.



With the exception of the hose end valves, **SLOWLY** open the **liquid outlet valve** and the first downstream manual valve.

- If valves are opened too quickly, the excess flow valve may close, and you'll hear a snapping noise.
- Shut off the manual valve and the internal valve.
- When the pressure equalizes, slowly open the operating valves including the vapor valve connected to the vapor return line from the meter.



Inspect all valves, piping, transfer hose and fittings for proper operation.

Inspect the threads of all connection adapters, especially brass for excess wear and to assure that the gaskets are in place and in suitable working condition.

Verify there are no propane leaks.



Dispenser Shutdown

When the dispenser is not in use or at any time that a qualified dispenser operator is not in attendance, the dispenser should be **shut down** and **secured**. The shut down procedure is basically the reverse of preparing the dispenser for operation.

- **Close all valves** at the storage tank.
- **Place a dust cap or plug** in the hose end valve or filling adapter
- **Store** the filler hose in the proper location.
- **Close and lock** the cabinet and/or fence gates.



Becoming familiar with the dispensing equipment and how it works will enable you to safely fill cylinders and protect your customers, your workplace, and yourself.

4.0 DOT CYLINDERS



DOT CYLINDERS

Most cylinders in propane service today are manufactured according to DOT specifications and therefore, are commonly referred to as “DOT cylinders”.

Small, portable cylinders are used with hand torches, plumber’s pots, gas lanterns, camp stoves, barbecue grills, and on many recreational vehicles and are filled at various locations.

Larger cylinders are typically filled at the plant and delivered to industrial, commercial or residential customers.

Common Elements

Cylinder bodies are made from either **aluminum** or some type of **alloy steel**, and are either two or three piece.



Every cylinder has a **foot ring**, a wide metal band that is welded or brazed to the bottom or non-service end of the cylinder. It is used to protect the bottom of the cylinder body from corrosion or other damage and also functions as a supporting stand or base.

Openings for **valves** and fittings are located in the service end of the cylinder, with threaded fittings welded to the opening. The number of openings depends on how the cylinder will be used.



Portable and exchange cylinders rarely have more than one fitting which is threaded to a 3/4" female National Pipe Thread, an NPT fitting, and raised above the surface. As a result, the fitting is often called the **neck** of the cylinder. A combination **service valve** and **pressure relief valve** is installed in the fitting.



Vertical cylinders with 4 pound through 40 pound propane capacity used in vapor service must be fitted with an **overfilling prevention device**, an OPD, when they are requalified for continued service.

OPD cylinder valves are distinctively marked and are equipped with a unique **handwheel**, a modified triangle, to make identification easier. The "OPD" marking is molded into the handwheel and the valve body.

OPDs are not the primary means of preventing overfilling. The dispenser operator's responsibility is to close the hose end valve when the proper filling level has been reached.

Cylinders used in **industrial truck service**, cylinders manufactured prior to 1998 and designed for use in the **horizontal** position for which an OPD is not available, and cylinders used for **industrial welding and cutting gases** are exceptions to the OPD requirements.

To protect the cylinder valves, portable cylinders use a **collar**, which is a wide metal band that is welded to and partially surrounds the neck in the service end of the cylinder.

It often incorporates a handle for lifting and moving, since cylinder valves must never be used for these purposes.



Cylinder Markings

Markings are required by DOT and are the ID card for the cylinder.

The markings include **information** for selecting cylinder valves, the **specification design code**, **cylinder tare weight**, **water capacity** in pounds and the **manufacturer name** and **test or requalification date**.

The information must be clearly and permanently stamped on the collar or cylinder body itself, and be easy to read.

Cylinder size is marked by the amount of water it can hold in pounds. Propane capacity is **42% of water capacity**. Portable cylinders usually range from 1 pound to 100 pounds propane capacity.

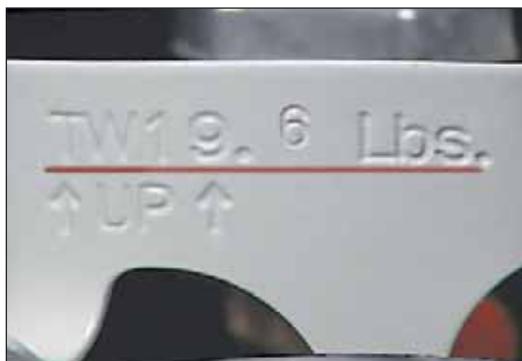
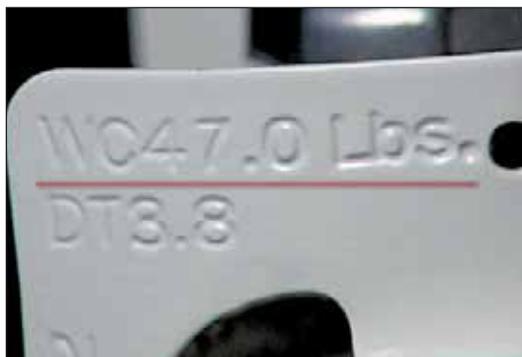
Cylinder **specification markings** consist of two basic parts: the design code and the service pressure. DOT-4BA240 is one of several specifications for cylinders.

The term “4B” indicates that the cylinder is a welded (series 4) alloy steel (series BA) cylinder. The numbers 240 indicate the service pressure is 240 pounds per square inch gauge (psig).

The **tare weight**, TW is the weight of the cylinder when empty and includes the weight of the cylinder valves, but not the weight of the filling hose & nozzle.

Cylinders with the same water capacity can have different tare weights.

DOT CODE	TYPICAL CYLINDER MATERIAL	CYLINDER CONSTRUCTION	SERVICE PRESSURE (PSIG)
4B240	STEEL	2 OR 3 PC., WELDED OR BRAZED	240
4BA240	ALLOY STEEL (PRESCRIBED)	2 OR 3 PC., WELDED OR BRAZED	240
4BA300	ALLOY STEEL (PRESCRIBED)	2 OR 3 PC., WELDED OR BRAZED	300
4BW240	STEEL (PRESCRIBED)	3 PC. WELDED	240
4BW300	STEEL (PRESCRIBED)	3 PC. WELDED	300
4E240	ALUMINUM	2 PC. WELDED	240
4E300	ALUMINUM	2 PC. WELDED	300



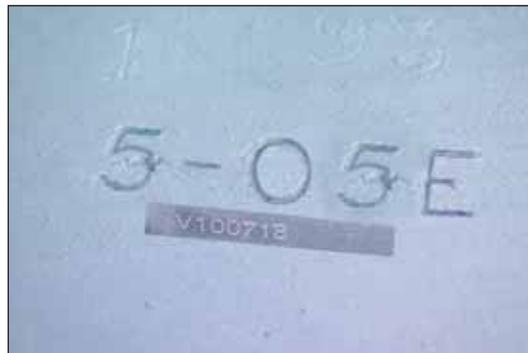
Requalification

All refillable cylinders must be requalified at regular intervals. Requalification is performed only by qualified individuals whose facility is registered with the DOT and is normally not handled at dispenser locations.

- A date without a letter indicates the next requalification must be within **12 years**.
- The letter “S” following the date indicates the cylinder must be requalified within **seven years** of the marked date.
- The letter “E” following the date indicates that requalification is required again within **five years** of the marked date.

The most recent requalification date is stamped on the cylinder. Cylinders that are out of qualification must NOT be refilled.

Knowing about cylinder construction, appurtenances, and markings will assist you in safely refilling your customer’s cylinders.



5.0 INSPECTING, FILLING AND LABELING SMALL CYLINDERS



INSPECTING, FILLING AND LABELING SMALL CYLINDERS

Pre-fill Visual Check

Safely inspecting and filling small portable cylinders is an important job that requires following specific procedures.

Customers are often not aware of cylinder inspection, requalification, purging and filling requirements and you may have to refuse to fill their cylinder. However, the safety of yourself, your customer, or the public should not be compromised. You have no idea what happened to the container prior to its arrival for refilling, and you have no control over the container after it leaves your location. What you must do is use reasonable care in your handling of the cylinder while it's in your control.

Before a small cylinder can be filled or refilled DOT regulations require a **visual check** to verify that it is fit for continued service. If any of the following are found, the cylinder must not be refilled.

- Leaks
- Cracks
- Bulging
- Serious denting or gouging
- Defective valves
- Defective or leaking pressure relief device
- Evidence of physical abuse, fire or heat damage, or excessive rusting or corrosion
- Damage to the cylinder valve, valve protection and cylinder foot rings
- Out-of-date requalification



If any of these conditions are found, identify the cylinder and set it aside in a designated safe area.

Steel cylinders subjected to fire must be requalified, reconditioned or repaired prior to being put back into service. **Aluminum cylinders** subjected to fire must be permanently removed from service.

Cylinders with a series of **XXXs** over the DOT specification number and marked



service pressure or stamped with “CONDEMNED” on the shoulder, head, or collar are condemned cylinders which must not be refilled or continued in service.

Valves and accessories should be inspected prior to filling. Many cylinder valves are made with nonmetallic or soft parts such as Nylon, rubber, and Teflon®.

When these materials wear out or are damaged, propane liquid or vapor can leak out of the valve and create a potentially hazardous situation. They should be checked regularly for signs of aging and wear.



Valve **accessories** may become broken or even lost, allowing dirt or moisture to enter the valve. Inspect and replace faulty or missing dust caps.

Many states and jurisdictions require that cylinders be equipped with an **OPD**, an overfilling prevention device. Check your company’s policies for refilling and handling cylinders that do not have an OPD.

Valves may also be damaged through **improper cylinder maintenance**. For example service personnel may fail to use proper brushes or applicators around cylinder openings when painting them. As a result, gauge faces, “weep” holes in filler valves, and discharge openings of relief valves may be covered with paint.



A blue-green stain on the brass portion of the cylinder valve is evidence that it has been in contact with **anhydrous ammonia**, which is often used to manufacture illegal drugs. If you suspect or find a cylinder that contains or has contained anhydrous ammonia. Place the cylinder in an area where hazards from ejection of the valve and product loss would be minimized, and contact your supervisor.



Requalification

All refillable cylinders must be **requalified** at regular intervals.

Requalification is performed only by qualified individuals whose facility is registered with the DOT and is normally not handled at dispenser locations.

The most recent requalification date is stamped on the cylinder.



- A date without a letter indicates the next requalification must be within **12 years**.
- The letter “S” following the date indicates the cylinder must be requalified within **seven years** of the marked date.
- The letter “E” following the date indicates that requalification is required again within **five years** of the marked date.

Cylinders that are out of qualification must NOT be refilled.

Purging

In order for equipment to operate safely, both new cylinders that have not been vacuum purged by the manufacturer and those that have been opened to the atmosphere must be purged of air or moisture before they are filled.

If air or moisture enter a propane cylinder, they can slow down the filling operation, create unusually high service pressures, may cause regulator freeze-up, and may cause fading of the odorant in the cylinder.

Purging should be done in an approved area as outlined in NFPA 58, usually at a propane plant, and is never done with propane liquid.

Filling Cylinders By Weight

Cylinders less than 200 pounds water capacity and subject to DOT jurisdiction must be filled by weight. Check with your supervisor for any exceptions.

During the filling procedure, the operator must be in **attendance** the entire time.

To fill a cylinder by weight:

- Set the scale to the proper total weight of the filled cylinder: **tare weight** plus **42% of water capacity** plus the weight of the **hose** and **nozzle**. (Filling charts with common cylinder capacities are also available.)

- Open the **liquid outlet valve** on the storage/supply tank and any valves in the by-pass return line, if this has not already been done.
- Connect the **dispensing hose** to the service valve.
- Open the **service valve** on the cylinder.
- Start the **pump** and slowly open the **hose end valve**.
- Close the **hose end valve** as soon as the scale beam or indicator tips.
- Close the **cylinder valve**.
- Shut off the **pump**.
- Disconnect the **dispensing hose**. Check the weight of the filled cylinder.
- If it has been overfilled, contact your supervisor. **DO NOT GIVE THE CUSTOMER AN OVERFILLED CYLINDER**, since the relief valve may release propane and create a flammable mixture.
- Close the **liquid outlet valve** on the storage tank.
- Check the **cylinder valves**, especially the relief valve, for leaks.



Service valve outlets on cylinders of 45 lbs. propane capacity or less must be either plugged or equipped with a **quick closing** or **quick connect coupling**. No plug is required for OPD service valves; however, a protective cap or cover may be installed to keep out dust and debris.

After the cylinder filling operation is completed or at any time the dispensing station is unattended, shut off the pump, close valves at the storage tank and disconnect and store the hose. At locations that are not weather protected, install a dust cap or plug in hose filling adapter. Secure the installation against tampering.

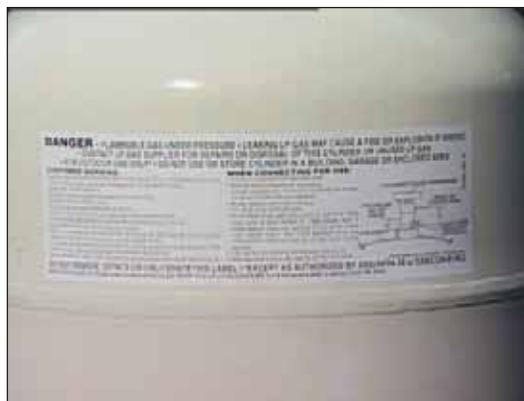
Cylinder Labeling

NFPA 58, DOT and OSHA require specific **labeling** for all cylinders.

DOT cylinders used to transport propane must be clearly and durably marked with the proper **shipping name** and **hazard class**.



In addition, a **consumer information/warning label** must be on all portable refillable cylinders of 100 lb. propane capacity or less not filled on site. The label must include information on the potential hazards of propane.



Cylinders used in industrial applications must have additional warning information.

Apply a new warning label if the original manufacturer's label is not present or legible. If you have any question regarding the legibility or completeness of the warning label that is on the cylinder, place a new warning label on the cylinder.

Cylinder Loading and Transporting

Prior to releasing the cylinder to the customer, be sure that it is **protected** against damage to the cylinder valves and fittings while being transported. Cylinders of 2-1/2 pound water capacity (1 pound propane capacity) or more must be positioned so that each cylinder's pressure relief valve is in direct communication with the vapor space at all times. Cylinders must also be **fastened** securely in a position to minimize the possibility of movement, tipping, or physical damage related to each other or to the supporting structure, while in transit.



It is important to recognize the difference between **horizontal** and **vertical cylinders**. They are typically marked to indicate which position they are to be used in. Failure to properly position cylinders may result in a very serious situation should the relief valve need to vent while having liquid in the valve.

NFPA 58 limits closed bodied vehicles such as passenger cars and vans to a maximum of **90# LP-Gas capacity with no single container having a capacity of more than 45#**. Verify your state and local codes, as they might be different.

It may be your company's practice to distribute **safety information** to customers when cylinders are filled. Check with your supervisor to determine if there is literature that should be distributed to customers when cylinders are filled.

Properly inspecting, filling and marking cylinders enables you to safely serve both your customers and your company. At the same time, customers are provided with a safe source of fuel for their cylinder needs.



6.0 REFUELING, MAINTAINING AND TROUBLESHOOTING FORKLIFT CYLINDERS



REFUELING, MAINTAINING AND TROUBLESHOOTING FORKLIFT CYLINDERS

Propane-fueled forklifts offer numerous advantages over other types of industrial trucks including greater safety through the use of a closed fuel system, healthier working conditions through fewer emissions, and less wear and tear on carburetors and other engine components.

Forklift Cylinders

Forklift cylinders are refueled either by refilling **on site** from a dispensing tank or by **exchanging** an empty cylinder for a full one.

To safely refuel cylinders, you should understand their construction, and how they work.

Forklift cylinders are manufactured to U.S. **DOT specifications** and can be made from either aluminum or some type of alloy steel. They typically hold **33 pounds** of propane, but other sizes may be used.

A **footring** is a part of every DOT cylinder. The footring is a wide metal band that protects the bottom of the cylinder from corrosion or other damage and also functions as the cylinder's supporting stand or base.



If these materials are worn out, propane liquid or vapor can leak out of the valve and create a potentially hazardous situation.

For that reason, valves should be examined at each filling or exchange of the cylinder.



Openings for **valves** and **fittings** are located in the service end of the cylinder. Many valves are made with nonmetallic or soft parts. Nylon, rubber, and Teflon® are three materials used in o-rings, packing seals, valve discs, and gaskets to ensure that valves provide a gastight seal.





A **pressure relief valve** provides over-pressure protection to the cylinder. It should be kept clean, unrestricted and set in the 12 o'clock position when the cylinder is mounted horizontally.

The relief valve should be directed upward at a 45-degree angle.

Relief valves on forklift cylinders must be replaced within **12 years** of the cylinder's manufacture date, and every **10 years**

thereafter. A rain cap or dust cap must also be in place.

Filler valves have an internal check valve to limit fuel loss in the event of an accident. This valve should be covered with a plastic cap.

The **fixed maximum liquid level gauge**, an integral part of the filling operation, is opened during filling.



DOT cylinders may have a **fuel gauge** using a magnetic liquid level float dial inside of the cylinder.



The **liquid service valve** is equipped with the male portion of a forklift connector.

The **liquid hose** that is part of the carburetion system is equipped with the female portion of the connector. Both halves are

equipped with 100% shutoffs, and as they are coupled together, they open and allow gas to flow.



The male portion of the connector acts as an added check valve. If the liquid service valve is turned on without being connected to the female portion, no gas can escape because the coupler has two seals an “O” ring and a flat washer.

The “O” ring prevents leakage from the shaft on the other coupling and the flat washer bottoms out and seals when the coupler is fully connected.

Both the washer and the “O” ring should be replaced if they show signs of wear, abuse or leakage.

The **service valve** can be turned off for service or emergencies and is equipped with an internal excess flow check valve designed to close automatically if a line is severed. When the propane cylinder is in use, the valve must be completely open.



Forklift cylinders have a protective **collar** which is a wide metal band welded to and partially surrounding the valves in the service end of the cylinder. It also often incorporates a hand-hold for lifting and moving the cylinder.

Cylinder Markings

Cylinder **markings** are required by DOT and include information such as the specification design code, cylinder tare weight, water capacity in pounds and the manufacturer name and test date. The information must be clearly and permanently stamped on the cylinder collar or body and must be legible.



DOT CODE	TYPICAL CYLINDER MATERIAL	CYLINDER CONSTRUCTION	SERVICE PRESSURE (PSI)
4B240	STEEL	2 OR 3 PC., WELDED OR BRAZED	240
4BA240	ALLOY STEEL (PRESCRIBED)	2 OR 3 PC., WELDED OR BRAZED	240
4BA300	ALLOY STEEL (PRESCRIBED)	2 OR 3 PC., WELDED OR BRAZED	300
4BW240	STEEL (PRESCRIBED)	3 PC. WELDED	240
4BW300	STEEL (PRESCRIBED)	3 PC. WELDED	300
4E240	ALUMINUM	1 PC. WELDED	240
4E300	ALUMINUM	2 PC. WELDED	300



Markings include the design code, shown by a number and one or more letters, and the service pressure in pounds per square inch gauge-psig. DOT-4BA240 is one DOT specification for cylinders. In this example, the term “4BA” indicates that the cylinder is a welded (series 4) alloy steel (series BA) cylinder. The number 240 indicates the service pressure is 240 psig.

The **tare weight**, TW, is the weight of the cylinder when empty and includes the weight of the cylinder valves. The tare weight is used when a cylinder is filled by weight and should always be checked before a cylinder is filled. Cylinders with the same water capacity can easily have different tare weights.

Cylinders with a series of XXXs over the DOT specification number and marked service pressure, or stamped with “CONDEMNED” on the shoulder, top head, or collar are condemned cylinders which must not be refilled or continued in service.

Requalification

All refillable cylinders must be requalified at regular intervals.

Requalification is performed only by qualified individuals whose facility is registered with the DOT and is not normally handled at forklift customer locations.

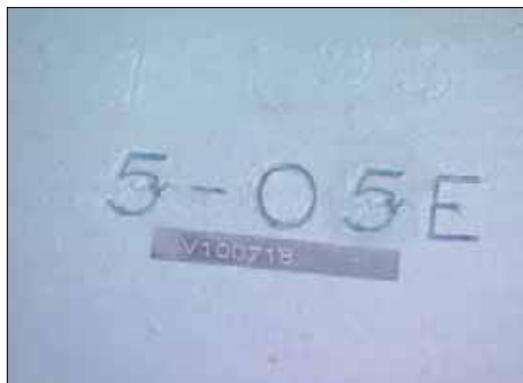
The most recent requalification date is stamped on the cylinder.

- A date without a letter indicates the next requalification must be within **12 years**.
- The letter “S” following the date indicates the cylinder must be requalified within **7 years** of the marked date.



- The letter “E” following the date indicates that requalification is required again within **5 years** of the marked date.

Cylinders that are out of qualification must **NOT** be refilled.



Purging

In order for equipment to operate safely, both new cylinders that have not been vacuum purged by the manufacturer and those that have been opened to the atmosphere must be **purged** of air or moisture before they are filled.

If air or moisture enter a propane cylinder, they can slow down the filling operation, create unusually high service pressures, may cause regulator freeze-up, create improper truck operation and may cause fading of the odorant in the cylinder.

If you come in contact with a cylinder that has been opened to the atmosphere, do not refill it or remount it on the forklift; place it in an area for return to your propane supplier.

Pre-fill Inspection

Conduct a pre-fill inspection before refilling or exchanging any forklift cylinder.

If any of the following defects are found, the cylinder must not be refilled. Identify it and return it to a designated safe area.

- Leaks
- Cracks
- Bulging
- Serious denting or gouging
- Defective valve
- Defective or leaking pressure relief device
- Evidence of physical abuse, fire or heat damage
- Excessive rusting or corrosion
- Damage to the cylinder valve, valve protection and cylinder footings.



Steel cylinders subjected to fire must be requalified, reconditioned or repaired in order to be put back into service. Aluminum cylinders subjected to fire must be permanently removed from service.

Check all valves, springs, **valve seats**, and **gaskets**. If they are aging or worn, they need to be repaired or replaced.

Valve accessories such as **relief valve adapters** and **protective caps** may become broken or even lost. As a result, dirt, trash, moisture, and other impurities can enter the valve. Frequent inspections and replacements can extend the life of propane valves.

Valves may also be damaged through **improper cylinder maintenance**. For example, service personnel may fail to use proper brushes or applicators around cylinder openings when painting them. As a result, gauge faces, "weep" holes in filler valves, and discharge openings of relief valves may be covered with paint.



A blue-green stain on the brass portion of the cylinder valve is evidence that it has been in contact with **anhydrous ammonia**, which is often used to manufacture illegal drugs. If you suspect or find a cylinder that contains or has contained anhydrous ammonia, place the cylinder in an area where hazards from ejection of the valve and product loss would be minimized, and contact your supervisor.

(In addition to inspecting the cylinder prior to filling or exchanging, it should be checked again after connecting, since leaks or equipment malfunctions may not be readily apparent on empty containers that are not pressurized.)

Whether refilling or exchanging forklift cylinders, be sure you are wearing the appropriate **personal protective equipment (PPE)** and proper clothing.

Cylinder Exchange

To begin the cylinder changing operation, **park the truck** in a designated safe area and stop the engine.

Close the **cylinder valve** and remove the **quick disconnect coupling** from the cylinder.

Remove the empty cylinder from the cradle holding device.



Store the empty cylinder in a designated safe area. Select a filled cylinder and check it and its fittings for damage or leaks. Be sure the cylinder valve is closed prior to connecting.

Observe the fuel lines and forklift connector couplings, particularly the washers and o-rings for damage or abnormal wear.

Carefully **install the filled cylinder** in the cradle on the truck so the cylinder locator pin enters the locating hole in the cylinder collar.

Reconnect the fuel line to the cylinder liquid service valve and open the valve slowly.

Securely **mount** the cylinder in its brackets and within the outline of the vehicle.

A common problem is that often these locating pins that are broken off, allowing the cylinder to be mounted in any position. This creates two problems.

1. The liquid withdrawal tube is exposed to the vapor space, which may give a false indication that the cylinder is empty.
2. The pressure relief valve may be immersed in liquid fuel, which would cause the cylinder to vent liquid in the event that it was activated.

In the event that the locating pins for a cylinder are broken, you should take the forklift out of service. Do not use a forklift with broken locating pins.

Check for leaks using a non-corrosive leak detector solution. If a leak is found, close the valve immediately and notify your supervisor or manager. If no leaks are found, start the engine and proceed with your work.

Filling Forklift Cylinders

Removable DOT cylinders may be filled either by **weight** using an accurate and approved scale or by **volume**, using the **fixed maximum liquid level gauge**.



Cylinders must not be filled solely by using the magnetic float gauge.

They must also be filled outdoors or in an approved filling area. The lift truck ignition should be off and the hand brake set.

While most are not filled on the truck, filling on the truck is permitted. In this case, pull-away protection is required.



During the filling procedure, the operator must be in attendance the entire time. To fill cylinders, you must be trained in operating the dispensing equipment.

Filling By Weight

Filling the cylinder by weight can be accomplished by the following procedures.

- Set the scale to the proper total weight of the filled cylinder: **tare weight plus 42% of water capacity plus the weight of the hose and nozzle.**
- Open the liquid outlet valve on the storage/supply tank and any valves in the by-pass return line.
- **Connect** the dispensing hose to the service valve.
- **Open** the service valve on the cylinder.
- Start the **pump** and slowly open the hose end valve.
- Close the **hose end valve** as soon as the scale beam or indicator tips.
- Close the **cylinder valve**.
- Shut off the **pump**.
- Disconnect the **dispensing hose**.
- Close the **liquid outlet valve** on the storage tank.
- Check the **cylinder valves**, especially the relief valve, for leaks
- Verify that the cylinder is not overfilled.



Filling By Volume

Filling by volume follows a similar procedure, with a few changes.

- With the **fixed maximum liquid level gauge** open, if a steady white mist or fog continues to appear, stop and do not continue the filling operation—the cylinder is already filled. If no liquid appears, or immediately disappears after initial venting, continue the filling operation.
- Connect the dispensing hose to the cylinder filling valve.
- Slowly open the service valve on the cylinder.
- Start the pump and slowly open the hose end valve.
- When a steady white stream is first emitted from the fixed maximum liquid level gauge, this indicates the maximum permissible fill level has been reached. Immediately close the hose end valve, close the fixed maximum liquid level gauge and shut off the pump.
- Close the cylinder service valve, if applicable.
- Disconnect the filling adapter and dispensing hose.
- Check the cylinder and its valves for leaks with a non-corrosive leak detector solution.



Reconnect the fuel line and check the cylinder and its valves for leaks with a non-corrosive leak detector solution, inspecting the gaskets and O-rings in the filler valve, and/or service valve connector.

Defective gaskets or O-rings can cause leaks and must be replaced.



Position the cylinder securely, using the locating pin on the truck and the hole in the cylinder collar. Secure the hold down straps properly.

After the cylinder is filled, or at any time the dispensing station is unattended, shut off the pump, close valves at the storage tank and disconnect and store the hose. Secure the dispenser against tampering.



Labeling

NFPA 58, DOT and OSHA require specific labeling for all cylinders.

DOT cylinders used to transport propane must be clearly and durably marked with the proper **shipping name** and its **hazard class**.

Apply a new **warning label** if the original manufacturer's label is not present or legible. If you have any question regarding the legibility or completeness of the warning label that is already on the cylinder, place a new warning label on the cylinder.



Whether filling forklift cylinders on site or exchanging empty ones for full ones, it is important to understand and follow these procedures, for your own safety as well as that of your fellow employees and customers.

7.0 REFUELING ASME MOTOR FUEL AND RV TANKS



REFUELING ASME MOTOR FUEL & RV TANKS

Propane dispensers are used to refuel automobiles, fleet vehicles and RV tanks.

In order to safely fill ASME motor fuel tanks and mobile fuel tanks on RVs, they must be inspected to be sure they have all the correct markings and appurtenances, are in good condition, and safe for filling.



Markings and Appurtenances

A **data plate** lists the working pressure and other information about the tank. If the data plate is missing or illegible or shows a working pressure other than 250 or 312 psi, the tank must not be filled.

A **fixed maximum liquid level gauge** is installed in the ASME tank at the maximum liquid filling line.



Motor fuel tank **float gauges** are used to confirm the liquid level before and after filling and to alert the driver to the approximate liquid fuel level. They are not used for filling. Float gauges are protected by a separate heavy metal guard or ring.

Once the motor fuel tank has been inspected, it can be safely refilled.

Filling Motor Fuel Tanks

First, be sure no one is inside the vehicle and that the ignition is turned off. Customers are restricted from the immediate area around the liquid propane transfer operation and all ignition sources must be at least 25 feet from the dispenser. Proceed as follows.

- Set the propane **meter** to zero.
- Connect the motor fuel **hose** to the tank fill valve.



- Open the vent valve on the **fixed maximum liquid level gauge**.
- Start the **pump** and slowly open the **valve** on the end of the hose.
- When a steady white mist or fog is first emitted from the fixed maximum liquid level gauge, immediately close the **hose end valve**.
- Close the **fixed maximum liquid level gauge**.
- Shut off the **pump**.
- Slowly loosen the **filler adapter** to vent liquid propane trapped between the filler adapter and the motor fuel tank filler valve. Wait until propane stops venting before completely disconnecting the adapter.
- Check the valve for **leaks** and replace the dust cap.



Filling Mobile Fuel Tanks (RVs)

Filling procedures for mobile fuel tanks used on RVs, catering trucks, or in roofing applications are similar to those for motor fuel tanks with one important addition.

Mobile fuel and RV tanks are used to supply propane appliances that are possible ignition sources.



Therefore, it is critically important that **appliance pilots** and **electronic ignition systems** must be turned off.

Notify the vehicle operator that you are turning the propane fuel supply off at the service valve. Be sure that pilots and ignition systems are off.

- Set the propane **meter** to zero.
- Connect the motor fuel **hose** to the **tank fill valve**.
- Open the **vent valve** on the **fixed maximum liquid level gauge**.
- Start the **pump** and slowly open the **hose end valve**.



- When a steady white mist or fog is first emitted from the fixed maximum liquid level gauge, immediately close the **hose end valve**.
- Close the **fixed maximum liquid level gauge**.
- Shut off the **pump**.
- Slowly loosen the **filler adapter** to vent liquid propane trapped between the filler adapter and the motor fuel tank filler valve. Wait until propane stops venting before completely disconnecting the filler adapter.
- When venting has stopped, disconnect and stow the **hose assembly**.
- Replace the **filler valve cap**.



If it is not your company's policy to light customer **pilot lights**, you should advise the customer to have a professional service company or gas distributor light the pilot lights, and that if the customer does this without professional help, the appliance manufacturer's instructions must be carefully followed.

A propane **decal** is required on vehicles equipped with motor and/or mobile fuel tanks.

This decal alerts emergency response personnel that propane containers are present.

Location requirements for the decal are either the **lower right rear** of the vehicle near the bumper for motor fuel tanks or near the **access panel door** or **fender skirt** for mobile fuel tanks.



When the dispenser is not in use, or at any time that a qualified dispenser operator is not in attendance, it should be shut down and secured in keeping with company operating procedures.



The **shutdown** procedure should ensure that

- Dispenser operating valves are closed.
- Transfer hoses are secured in storage cabinets or their designated locations,
- The dispenser cabinet or fence gates are closed and locked.

Becoming familiar with both the motor fuel system and safe filling procedures will assure your safety as well as that of your customers.

8.0 RETAIL EXCHANGE CYLINDER OPERATIONS



RETAIL EXCHANGE CYLINDER OPERATIONS

Retail **exchange cabinets** are used to store small cylinders awaiting resale or exchange and can be found at home improvement, convenience, hardware and equipment rental stores, as well as at gas stations, campgrounds and truck stops.



Exchange cabinets can be used to store either full or empty cylinders that have been returned by customers; for the purposes of this training material, empty cylinders should be handled in the same manner as full cylinders.

Cylinder exchange facilities must conform to the requirements of NFPA 58, the *LP-Gas Code* and local or state exceptions. Check with your supervisor if you are not sure of other applicable installation procedures or requirements.

Cylinders stored at a location open to the public must be protected by a **fenced enclosure** or a **lockable ventilated metal locker** or rack that prevents tampering with valves and pilferage of the cylinder.



If more than **720 pounds** of propane (36 or more 20-pound grill cylinders) are stored in one location, the area must be provided with at least one approved portable **fire extinguisher** having a minimum capacity of 18 pounds dry chemical with a B:C rating.

(Note that the primary purpose of fire extinguishers is to put out small fires (such as combustibles) or to provide a means of egress from an area of fire. They should not be used to try to extinguish a propane fire. In that situation, emergency responders should be contacted immediately.)

The required fire extinguisher must be located no more than **50 feet** from the storage location.

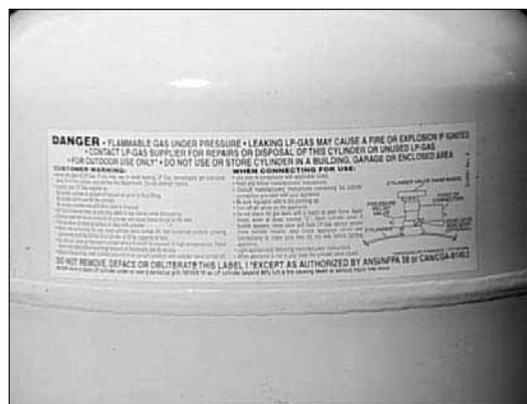
Buildings open to the public, such as convenience stores or home improvement centers, typically require protection from **vehicular damage**.



Cabinets are required to have various markings affixed to them, and may include **“Flammable Gas,” No Smoking, OSHA warning, NFPA 704** (Hazardous Materials Identification), and **product identification** labels (“Propane”). Check with your supervisor or manager for other requirements.

Cylinders must be stored with the relief valve in the vapor space of the container. For exchange grill cylinders, this is in the vertical position. The valve outlet must be plugged or must be of the quick-closing type and have a protective cap or collar. Cylinders must be labeled according to DOT regulations to indicate contents.

NFPA 58 also requires that a **warning label** be applied to all portable refillable cylinders of 100 pounds propane capacity or less not filled on-site. The label must include information on the potential hazards of propane. Apply a new warning label if the original manufacturer’s label is not present or legible. If you have any question regarding the legibility or completeness of the warning label that is already on the cylinder, place a new warning label on the cylinder.



Cylinder cabinets should be set on a **firm, non-combustible base** and should be locked when not attended. They should also be free of combustibles and flammable materials and be well-ventilated.

Cylinder storage must be located in compliance with NFPA 58 requirements for **separation distances**. Stored cylinders must be at least 20 feet away from any gas station fuel dispenser.



The cabinet must be placed at least 5 feet from any **doorway** or **opening** in a public building and at least 5 feet from **sources of ignition**, including soft drink and ice machines, exhaust fans, air conditioners and some telephones. For buildings with **only one exit**, cylinder racks must be located 10 feet from that exit.

Cylinders, either empty or full, must not be permitted indoors. Consumers and employees should be warned of this.

An **overfilling prevention device** (an OPD) is a special cylinder service valve which stops the flow of gas liquid into the cylinder when the cylinder is about 80% filled. These are found on all vertical 4-lbs. through 40-pound cylinders that are used in vapor service. Your facility may have a policy on “upgrading” consumer cylinders that don’t have an OPD. Check with your supervisor or manager.



Finally, a cylinder that is out of date (requires requalification), does not have an OPD (if required), or is missing proper warning labels should not be released to the customer.

Exchange cylinder cabinets provide a convenient way for recreational and grill cylinder customers to obtain fuel safely. Following proper procedures will assure that this is accomplished safely.

DISPENSING PROPANE SAFELY QUIZZES

SECTIONS 1-3 QUIZ

1. NFPA 58 is also known as the:
 - a. Fuel Gas Code
 - b. LP-Gas Code
 - c. Propane Safety Code
 - d. Fire Prevention Code

2. Which of the following subjects is covered in DOT regulations?
 - a. Cylinder storage and refueling
 - b. Cylinder appurtenances
 - c. Cylinder markings and labeling
 - d. Hazard Communication Plans

3. An important subject covered in OSHA regulations is:
 - a. Overfilling Prevention Devices (OPDs)
 - b. Hazmat training and documentation
 - c. Pressure relief devices
 - d. Personal Protective Equipment (PPE)

4. What is an MSDS?
 - a. a detailed procedure for inspecting propane containers
 - b. a detailed procedure for filling propane cylinders
 - c. a information bulletin that alerts you to properties and health hazards of propane
 - d. a Consumer safety information packet

5. _____ is added to propane to increase the likelihood that a leak will be detected.
 - a. Moisture
 - b. An identifying color
 - c. Additional vapor
 - d. Odorant

6. Liquid propane will _____ when heat is added to it.
 - a. Expand
 - b. Contract
 - c. Vaporize
 - d. Dissipate

7. In order to allow for liquid expansion, propane containers are typically filled to _____ % of their capacity.
 - a. 25%
 - b. 40%
 - c. 65%
 - d. 80%

8. Propane liquid released into the air will expand to _____ times its original volume.
 - a. 2.15
 - b. 9.6
 - c. 270
 - d. 350

9. Gloves and other PPE are required when filling containers because of the _____ of liquid propane
 - a. refrigerating effect
 - b. vaporization rate
 - c. expansion properties
 - d. toxicity

10. The proper mixture of propane vapor, air and _____ is needed for propane to burn.
 - a. nitrogen
 - b. humidity
 - c. odorant
 - d. an ignition source

11. OSHA requires employees to be trained on fire extinguisher use immediately upon hiring and _____ thereafter.
 - a. daily
 - b. weekly
 - c. monthly
 - d. annually

12. In any emergency where there is a propane fire, flames should not be extinguished unless the fuel supply can be _____.
 - a. Turned on
 - b. Turned off
 - c. Replenished
 - d. Recharged

13. Most propane dispensers include a(n) _____ that supplies propane to the dispensing equipment.
 - a. Metering system
 - b. Platform scale
 - c. Scale
 - d. ASME storage tank

14. When filling a cylinder by volume using the fixed maximum liquid level gauge, the filling process relies on the _____ to determine when the maximum permitted filling limit for a cylinder is reached.
 - a. Sensor
 - b. Trip lever
 - c. Operator
 - d. Control valve

15. Which of the following is used to provide an additional level of emergency shut-down capability?
 - a. Ball valves
 - b. Remote shutdown stations
 - c. Globe valves
 - d. Hose end valves

16. Platform balance beam scales must bear _____.
 - a. Certification decals
 - b. Single beams
 - c. Proper registration
 - d. Double beams

17. When the operator is not in attendance, the dispenser should be _____.
 - a. Maintained and lubricated.
 - b. Shut down and secured.
 - c. Calibrated and cleaned.
 - d. Opened to the public.

18. When filling mobile propane containers that are permanently mounted on vehicles or RV's, dispensing equipment must be equipped with
 - a. the appropriate adapters
 - b. a break-away device
 - c. a vapor meter
 - d. an electronic shutoff device

19. Because of the inherent dangers when filling propane containers, customers should be asked to
 - a. help secure the cylinder when filling
 - b. sit in the vehicle
 - c. remain away from the immediate filling area
 - d. hold the fire extinguisher

SECTION 4 QUIZ: DOT CYLINDERS

1. The _____ is a wide metal band welded or brazed to the bottom of the cylinder used to protect the cylinder body from corrosion or damage.
 - a. Valve opening
 - b. OPD
 - c. Pressure relief valve
 - d. Footring

2. An OPD serves as a _____.
 - a. primary means of preventing overfilling of cylinders
 - b. secondary means of preventing overfilling of cylinders
 - c. means of protection for the cylinder valves
 - d. handle for lifting the cylinder

3. To protect the valves, portable cylinders use a _____.
 - a. Collar
 - b. NTP fitting
 - c. Footring
 - d. OPD

4. Which of the following indicates the weight of the cylinder when empty?
 - a. Water capacity
 - b. Requalification date
 - c. Design code
 - d. Tare weight

5. Container water capacity is multiplied by _____ percent when determining propane capacity.
 - a. 24
 - b. 36
 - c. 42
 - d. 58

6. Cylinder specification markings consist of the design code and the _____ of the cylinder.
 - a. Tare weight
 - b. Manufacturer name
 - c. Service pressure
 - d. Water capacity

7. The marking "4B240" tells you that the cylinder is made of _____.
 - a. Steel
 - b. Aluminum
 - c. Carbon
 - d. Composite

8. Which of the following is typically not the responsibility of a propane dispenser operator?
 - a. Pre-fill visual check
 - b. Scale calibration
 - c. Cylinder requalification
 - d. Customer education

9. A cylinder with the letter "E" following its requalification date indicates that the next inspection should be conducted within _____ year(s).
 - a. 1
 - b. 2
 - c. 5
 - d. 12

10. Cylinders may not be filled if they are past their _____ date.
 - a. Annual inspection
 - b. Requalification
 - c. Maintenance test
 - d. DOT fitness

SECTION 5 QUIZ: INSPECTING, FILLING AND LABELING SMALL CYLINDERS

1. Before a cylinder can be filled or refilled, DOT regulations require a(n) _____ to verify it is fit for continued service.
 - a. Visual check
 - b. Requalification
 - c. AHJ approval
 - d. Purging

2. _____ cylinders subjected to fire must be permanently removed from service.
 - a. Steel
 - b. Aluminum
 - c. Cast Iron
 - d. Any

3. Many states require cylinders to be equipped with a(n) _____.
 - a. Weather cap
 - b. Weep hole
 - c. Discharge opening
 - d. Overfilling Prevention Device

4. A blue-green stain on the brass portion of the cylinder valve is evidence that it has been in contact with _____.
 - a. Methanol
 - b. Anhydrous ammonia
 - c. Ethyl mercaptan
 - d. Polyethylene

5. The letter "E" following the date on the cylinder indicates that requalification is required again within _____ years of the marked date.
 - a. 5
 - b. 7
 - c. 12
 - d. 18

6. Which of the following problems can be caused by cylinders not properly purged of air or moisture?
 - a. Fading of the odorant in the cylinder
 - b. Unusually low service pressures
 - c. Regulator overheating
 - d. Inaccurate weight when filling

7. The proper total weight of the filled cylinder is equal to tare weight plus:
 - a. 52% of water capacity plus valve weight
 - b. 52% of water capacity minus valve weight
 - c. 42% of water capacity plus hose & nozzle weight
 - d. 42% of water capacity minus hose & nozzle weight

8. A cylinder that is accidentally overfilled should be:
 - a. Released to the customer
 - b. Flared off
 - c. Set aside in a safe place and the supervisor contacted
 - d. Set aside and used to fill other, smaller cylinders

9. DOT requires that cylinders be clearly labeled with:
 - a. Consumer and warning information
 - b. Valve size and propane capacity
 - c. NFPA 704 information and storage tips
 - d. Shipping name and hazard class

10. Consumer information/warning labels must be on all portable refillable cylinders of _____ pounds propane capacity or less not filled on site.
 - a. 20
 - b. 33
 - c. 45
 - d. 100

11. NFPA 58 limits closed-bodied vehicles such as passenger cars and vans to a maximum of _____ pounds propane capacity, with no single container having a capacity of more than _____ pounds.
 - a. 80/30
 - b. 90/45
 - c. 100/50
 - d. 150/75

12. If a cylinder warning label is not legible, _____ before releasing the cylinder to the customer.
 - a. place a new one on it
 - b. have the customer sign a waiver
 - c. orally deliver safety information
 - d. contact the supervisor

13. Cylinders should be positioned in customer vehicles so that the _____ is in communication with the vapor space.
 - a. Fixed maximum liquid level gauge
 - b. Pressure relief valve
 - c. Float gauge
 - d. Dust cap

14. New cylinders that have not been vacuum purged by the manufacturer and cylinders that have been opened to the atmosphere must be _____, usually at a propane plant, prior to filling.
 - a. Reconditioned
 - b. Repainted
 - c. Purged of air or moisture
 - d. Requalified

SECTION 6 QUIZ: REFUELING, MAINTAINING AND TROUBLESHOOTING FORKLIFT CYLINDERS

1. Forklift cylinders typically hold _____ pounds of propane.
 - a. 20
 - b. 33
 - c. 45
 - d. 100

2. A _____ functions as the cylinder's supporting stand or base.
 - a. Handhold
 - b. Footring
 - c. Collar
 - d. Neckring

3. The purpose of the O-ring inside the forklift connector is to provide _____.
 - a. weather protection
 - b. a gas-tight seal
 - c. protection from debris
 - d. refueling safety

4. Pressure relief valves should be directed upward at a _____ degree angle on forklift cylinders.
 - a. 30
 - b. 45
 - c. 60
 - d. 90

5. Relief valves on forklift cylinders must be replaced within _____ years of the cylinder's manufacture date and every ten years thereafter.
 - a. 5
 - b. 7
 - c. 12
 - d. 18

6. The fixed maximum liquid level gauge is _____ when filling a forklift cylinder by volume.
 - a. Opened
 - b. Closed
 - c. Tightened
 - d. Loosened

7. For a DOT-4BA240 specification cylinder, the number "240" indicates the cylinder _____.
 - a. water capacity
 - b. service pressure
 - c. tare weight
 - d. series

8. If there is no letter following the date stamped on the cylinder, it indicates requalification is required within _____ years.
 - a. 5
 - b. 7
 - c. 12
 - d. 18

9. Leaks, cracks or bulging are often discovered during a cylinder _____ inspection.
 - a. pre-fill
 - b. tare weight
 - c. operational
 - d. post-fill

10. When a steady white stream is emitted from the fixed maximum liquid level gauge, the next step is to immediately:
 - a. Shut off the pump
 - b. Close the cylinder service valve
 - c. Check the valve for leaks
 - d. Close the hose end valve

11. A _____ is used to properly position the cylinder on the forklift.
 - a. Cylinder collar
 - b. Gasket
 - c. Locating pin
 - d. Filling adapter

12. When filling forklift cylinders by weight, it is important to:
 - a. Close the fixed maximum liquid level gauge.
 - b. Weigh the cylinder halfway through the filling process.
 - c. Verify that the cylinder is not overfilled at the conclusion of the filling process.
 - d. Position the cylinder with the relief valve in the liquid space of the cylinder.

13. Tare weight is required when calculating cylinder filling by _____.
 - a. volume
 - b. weight
 - c. outage gauge
 - d. OPD

14. When changing out a forklift cylinder, the cylinder service valve should be _____ prior to making the hose connection to the cylinder.
 - a. Lubricated
 - b. Closed
 - c. Opened
 - d. Replaced

15. The locating pin on the forklift is used to _____.
 - a. Determine whether the cylinder is full
 - b. Determine the age of the cylinder
 - c. Properly position the cylinder on the forklift
 - d. Maintain the pressure in the cylinder

16. When filling cylinders by weight, the _____ is used to determine that the cylinder has reached its maximum permitted filling level.
 - a. Float gauge
 - b. Scale
 - c. Locating pin
 - d. OPD

17. When filling forklift cylinders by volume, once a white mist is emitted from the fixed maximum liquid level gauge, the _____ must be immediately shut off.
 - a. Pump
 - b. Gauge
 - c. Hose End Valve
 - d. Dispenser

SECTION 7 QUIZ: REFUELING, ASME MOTOR FUEL AND RV TANKS

1. Permanently mounted mobile motor fuel and RV tanks are built to _____ specifications.
 - a. DOT
 - b. ASME
 - c. NFPA
 - d. NPGA

2. Working pressure for motor fuel tanks is usually _____ pounds per square inch (psi).
 - a. 100/125
 - b. 190/250
 - c. 212/312
 - d. 250/312

3. All ignition sources must be at least _____ feet from the motor fuel dispenser.
 - a. 10
 - b. 25
 - c. 40
 - d. 55

4. RV tanks are used to supply propane appliances; therefore, appliance pilots and electronic ignition systems must be _____ before beginning the filling operation.
 - a. inspected
 - b. turned off
 - c. turned on
 - d. leak checked

5. When relighting pilot lights, carefully follow _____ .
 - a. NFPA 54
 - b. UL listings
 - c. Appliance manufacturer's instructions
 - d. Tank manufacturer's instructions

6. A propane decal is typically located near the _____ of the vehicle near the bumper for motor fuel tanks.
 - a. Upper left front
 - b. Upper right rear
 - c. Lower left front
 - d. Lower right rear

7. When filling RV's, the service valve on the tank and _____ should be shut off to eliminate all ignition sources
 - a. Filler valves and float gauges
 - b. Float gauges
 - c. Fixed maximum liquid level gauges
 - d. Appliance pilots and ignition systems

8. When filling mobile motor fuel or RV's tanks, when the white mist appears from the fixed maximum liquid level gauge, immediately shut off the _____.
 - a. fixed maximum liquid level gauge
 - b. service valve
 - c. hose end valve
 - d. pump

9. The _____ is used to determine when the tank has been adequately filled.
 - a. Float gauge
 - b. Fixed maximum liquid level gauge
 - c. Rotary gauge
 - d. Relief valve

10. Which of the following should be completed immediately after the filling process?
 - a. Check for leaks with a non-corrosive leak detector solution
 - b. Relight the customer's pilot lights
 - c. Verify that appliance pilots have been extinguished
 - d. Inspect the tank data plate

SECTION 8 QUIZ: RETAIL EXCHANGE CYLINDER OPERATIONS

1. Cylinder exchange facilities must conform to the requirements of:
 - a. NFPA 54
 - b. NFPA 58
 - c. UL 1040
 - d. 49 CFR

2. Areas where more than _____ pounds of propane are stored in one location must be provided with an approved portable fire extinguisher.
 - a. 500
 - b. 670
 - c. 720
 - d. 840

3. Fire extinguishers are used primarily on _____ fires.
 - a. Electrical
 - b. Oil
 - c. Propane
 - d. Combustible

4. Cylinders awaiting resale must be stored in a(n) _____ position.
 - a. Upright
 - b. Horizontal
 - c. Secured
 - d. Upside-down

5. Cylinders must be stored with the relief valve in the _____ space of the container.
 - a. liquid
 - b. odorized
 - c. vapor
 - d. vertical

6. Stored cylinders must be at least _____ feet away from gas station fuel dispensers.
 - a. 5
 - b. 10
 - c. 15
 - d. 20

7. Cabinets must be placed at least _____ feet from sources of ignition.
 - a. 5
 - b. 10
 - c. 15
 - d. 20

8. Empty exchange cylinders should be handled in the same fashion as _____ cylinders.
 - a. Defective
 - b. Operating
 - c. Open
 - d. Full

DISPENSING PROPANE SAFELY QUIZ ANSWER KEYS

SECTIONS 1-3 ANSWER KEY

1. NFPA 58 is also known as the:
 - a. Fuel Gas Code
 - b. LP-Gas Code**
 - c. Propane Safety Code
 - d. Fire Prevention Code

2. Which of the following subjects is covered in DOT regulations?
 - a. Cylinder storage and refueling
 - b. Cylinder appurtenances
 - c. Cylinder markings and labeling**
 - d. Hazard Communication Plans

3. An important subject covered in OSHA regulations is:
 - a. Overfilling Prevention Devices (OPDs)
 - b. Hazmat training and documentation
 - c. Pressure relief devices
 - d. Personal Protective Equipment (PPE)**

4. What is an MSDS?
 - a. a detailed procedure for inspecting propane containers
 - b. a detailed procedure for filling propane cylinders
 - c. an information bulletin that alerts you to properties and health hazards of propane**
 - d. a Consumer safety information packet

5. _____ is added to propane to increase the likelihood that a leak will be detected.
 - a. Moisture
 - b. An identifying color
 - c. Additional vapor
 - d. Odorant**

6. Liquid propane will _____ when heat is added to it.
 - a. Expand**
 - b. Contract
 - c. Vaporize
 - d. Dissipate

7. In order to allow for liquid expansion, propane containers are typically filled to _____ % of their capacity.
- 25%
 - 40%
 - 65%
 - 80%**
8. Propane liquid released into the air will expand to _____ times its original volume.
- 2.15
 - 9.6
 - 270**
 - 350
9. Gloves and other PPE are required when filling containers because of the _____ of liquid propane
- refrigerating effect**
 - vaporization rate
 - expansion properties
 - toxicity
10. The proper mixture of propane vapor, air and _____ is needed for propane to burn.
- nitrogen
 - humidity
 - odorant
 - an ignition source**
11. OSHA requires employees to be trained on fire extinguisher use immediately upon hiring and _____ thereafter.
- daily
 - weekly
 - monthly
 - annually**
12. In any emergency where there is a propane fire, flames should not be extinguished unless the fuel supply can be _____.
- Turned on
 - Turned off**
 - Replenished
 - Recharged

13. Most propane dispensers include a(n) _____ that supplies propane to the dispensing equipment.
- Metering system
 - Platform scale
 - Scale
 - ASME storage tank**
14. When filling a cylinder by volume using the fixed maximum liquid level gauge, the filling process relies on the _____ to determine when the maximum permitted filling limit for a cylinder is reached.
- Sensor
 - Trip lever
 - Operator**
 - Control valve
15. Which of the following is used to provide an additional level of emergency shut-down capability?
- Ball valves
 - Remote shutdown stations**
 - Globe valves
 - Hose end valves
16. Platform balance beam scales must bear _____.
- Certification decals**
 - Single beams
 - Proper registration
 - Double beams
17. When the operator is not in attendance, the dispenser should be _____.
- Maintained and lubricated.
 - Shut down and secured.**
 - Calibrated and cleaned.
 - Opened to the public.
18. When filling mobile propane containers that are permanently mounted on vehicles or RV's, dispensing equipment must be equipped with
- the appropriate adapters
 - a break-away device**
 - a vapor meter
 - an electronic shutoff device

19. Because of the inherent dangers when filling propane containers, customers should be asked to
- help secure the cylinder when filling
 - sit in the vehicle
 - remain away from the immediate filling area**
 - hold the fire extinguisher

SECTION 4 QUIZ: DOT CYLINDERS ANSWER KEY

- The _____ is a wide metal band welded or brazed to the bottom of the cylinder used to protect the cylinder body from corrosion or damage.
 - Valve opening
 - OPD
 - Pressure relief valve
 - Footring**
- An OPD serves as a _____.
 - primary means of preventing overfilling of cylinders
 - secondary means of preventing overfilling of cylinders**
 - means of protection for the cylinder valves
 - handle for lifting the cylinder
- To protect the valves, portable cylinders use a _____.
 - Collar**
 - NTP fitting
 - Footring
 - OPD
- Which of the following indicates the weight of the cylinder when empty?
 - Water capacity
 - Requalification date
 - Design code
 - Tare weight**
- Container water capacity is multiplied by _____ percent when determining propane capacity.
 - 24
 - 36
 - 42**
 - 58

6. Cylinder specification markings consist of the design code and the _____ of the cylinder.
 - a. Tare weight
 - b. Manufacturer name
 - c. **Service pressure**
 - d. Water capacity

7. The marking "4B240" tells you that the cylinder is made of _____.
 - a. **Steel**
 - b. Aluminum
 - c. Carbon
 - d. Composite

8. Which of the following is typically not the responsibility of a propane dispenser operator?
 - a. Pre-fill visual check
 - b. Scale calibration
 - c. **Cylinder requalification**
 - d. Customer education

9. A cylinder with the letter "E" following its requalification date indicates that the next inspection should be conducted within _____ year(s).
 - a. 1
 - b. 2
 - c. **5**
 - d. 12

10. Cylinders may not be filled if they are past their _____ date.
 - a. Annual inspection
 - b. **Requalification**
 - c. Maintenance test
 - d. DOT fitness

SECTION 5 QUIZ: INSPECTING, FILLING AND LABELING SMALL CYLINDERS ANSWER KEY

1. Before a cylinder can be filled or refilled, DOT regulations require a(n) _____ to verify it is fit for continued service.
 - a. **Visual check**
 - b. Requalification
 - c. AHJ approval
 - d. Purging

2. _____ cylinders subjected to fire must be permanently removed from service.
 - a. Steel
 - b. Aluminum**
 - c. Cast Iron
 - d. Any

3. Many states require cylinders to be equipped with a(n) _____.
 - a. Weather cap
 - b. Weep hole
 - c. Discharge opening
 - d. Overfilling Prevention Device**

4. A blue-green stain on the brass portion of the cylinder valve is evidence that it has been in contact with _____.
 - a. Methanol
 - b. Anhydrous ammonia**
 - c. Ethyl mercaptan
 - d. Polyethylene

5. The letter "E" following the date on the cylinder indicates that requalification is required again within _____ years of the marked date.
 - a. 5**
 - b. 7
 - c. 12
 - d. 18

6. Which of the following problems can be caused by cylinders not properly purged of air or moisture?
 - a. Fading of the odorant in the cylinder**
 - b. Unusually low service pressures
 - c. Regulator overheating
 - d. Inaccurate weight when filling

7. The proper total weight of the filled cylinder is equal to tare weight plus:
 - a. 52% of water capacity plus valve weight
 - b. 52% of water capacity minus valve weight
 - c. 42% of water capacity plus hose & nozzle weight**
 - d. 42% of water capacity minus hose & nozzle weight

8. A cylinder that is accidentally overfilled should be:
 - a. Released to the customer
 - b. Flared off
 - c. Set aside in a safe place and the supervisor contacted**
 - d. Set aside and used to fill other, smaller cylinders

9. DOT requires that cylinders be clearly labeled with:
 - a. Consumer and warning information
 - b. Valve size and propane capacity
 - c. NFPA 704 information and storage tips
 - d. **Shipping name and hazard class**

10. Consumer information/warning labels must be on all portable refillable cylinders of _____ pounds propane capacity or less not filled on site.
 - a. 20
 - b. 33
 - c. 45
 - d. **100**

11. NFPA 58 limits closed-bodied vehicles such as passenger cars and vans to a maximum of _____ pounds propane capacity, with no single container having a capacity of more than _____ pounds.
 - a. 80/30
 - b. **90/45**
 - c. 100/50
 - d. 150/75

12. If a cylinder warning label is not legible, _____ before releasing the cylinder to the customer.
 - a. **place a new one on it**
 - b. have the customer sign a waiver
 - c. orally deliver safety information
 - d. contact the supervisor

13. Cylinders should be positioned in customer vehicles so that the _____ is in communication with the vapor space.
 - a. Fixed maximum liquid level gauge
 - b. **Pressure relief valve**
 - c. Float gauge
 - d. Dust cap

14. New cylinders that have not been vacuum purged by the manufacturer and cylinders that have been opened to the atmosphere must be _____, usually at a propane plant, prior to filling.
 - a. Reconditioned
 - b. Repainted
 - c. **Purged of air or moisture**
 - d. Requalified

**SECTION 6 QUIZ: REFUELING, MAINTAINING AND TROUBLESHOOTING
FORKLIFT CYLINDERS ANSWER KEY**

1. Forklift cylinders typically hold _____ pounds of propane.
 - a. 20
 - b. 33**
 - c. 45
 - d. 100

2. A _____ functions as the cylinder's supporting stand or base.
 - a. Handhold
 - b. Footring**
 - c. Collar
 - d. Neckring

3. The purpose of the O-ring inside the forklift connector is to provide _____.
 - a. weather protection
 - b. a gas-tight seal**
 - c. protection from debris
 - d. refueling safety

4. Pressure relief valves should be directed upward at a _____ degree angle on forklift cylinders.
 - a. 30
 - b. 45**
 - c. 60
 - d. 90

5. Relief valves on forklift cylinders must be replaced within _____ years of the cylinder's manufacture date and every ten years thereafter.
 - a. 5
 - b. 7
 - c. 12**
 - d. 18

6. The fixed maximum liquid level gauge is _____ when filling a forklift cylinder by volume.
 - a. Opened**
 - b. Closed
 - c. Tightened
 - d. Loosened

7. For a DOT-4BA240 specification cylinder, the number "240" indicates the cylinder _____.
 - a. water capacity
 - b. service pressure**
 - c. tare weight
 - d. series

8. If there is no letter following the date stamped on the cylinder, it indicates requalification is required within _____ years.
 - a. 5
 - b. 7
 - c. 12**
 - d. 18

9. Leaks, cracks or bulging are often discovered during a cylinder _____ inspection.
 - a. pre-fill**
 - b. tare weight
 - c. operational
 - d. post-fill

10. When a steady white stream is emitted from the fixed maximum liquid level gauge, the next step is to immediately:
 - a. Shut off the pump
 - b. Close the cylinder service valve
 - c. Check the valve for leaks
 - d. Close the hose end valve**

11. A _____ is used to properly position the cylinder on the forklift.
 - a. Cylinder collar
 - b. Gasket
 - c. Locating pin**
 - d. Filling adapter

12. When filling forklift cylinders by weight, it is important to:
 - a. Close the fixed maximum liquid level gauge.
 - b. Weigh the cylinder halfway through the filling process.
 - c. Verify that the cylinder is not overfilled at the conclusion of the filling process.**
 - d. Position the cylinder with the relief valve in the liquid space of the cylinder.

13. Tare weight is required when calculating cylinder filling by _____.
 - a. volume
 - b. weight**
 - c. outage gauge
 - d. OPD

14. When changing out a forklift cylinder, the cylinder service valve should be _____ prior to making the hose connection to the cylinder.
- Lubricated
 - Closed**
 - Opened
 - Replaced
15. The locating pin on the forklift is used to _____.
- Determine whether the cylinder is full
 - Determine the age of the cylinder
 - Properly position the cylinder on the forklift**
 - Maintain the pressure in the cylinder
16. When filling cylinders by weight, the _____ is used to determine that the cylinder has reached its maximum permitted filling level.
- Float gauge
 - Scale**
 - Locating pin
 - OPD
17. When filling forklift cylinders by volume, once a white mist is emitted from the fixed maximum liquid level gauge, the _____ must be immediately shut off.
- Pump
 - Gauge
 - Hose End Valve**
 - Dispenser

SECTION 7 QUIZ: REFUELING, ASME MOTOR FUEL AND RV TANKS ANSWER KEY

1. Permanently mounted mobile motor fuel and RV tanks are built to _____ specifications.
- DOT
 - ASME**
 - NFPA
 - NPGA
2. Working pressure for motor fuel tanks is usually _____ pounds per square inch (psi).
- 100/125
 - 190/250
 - 212/312
 - 250/312**

3. All ignition sources must be at least _____ feet from the motor fuel dispenser.
 - a. 10
 - b. 25**
 - c. 40
 - d. 55

4. RV tanks are used to supply propane appliances; therefore, appliance pilots and electronic ignition systems must be _____ before beginning the filling operation.
 - a. inspected
 - b. turned off**
 - c. turned on
 - d. leak checked

5. When relighting pilot lights, carefully follow _____ .
 - a. NFPA 54
 - b. UL listings
 - c. Appliance manufacturer's instructions**
 - d. Tank manufacturer's instructions

6. A propane decal is typically located near the _____ of the vehicle near the bumper for motor fuel tanks.
 - a. Upper left front
 - b. Upper right rear
 - c. Lower left front
 - d. Lower right rear**

7. When filling RV's, the service valve on the tank and _____ should be shut off to eliminate all ignition sources
 - a. Filler valves and float gauges
 - b. Float gauges
 - c. Fixed maximum liquid level gauges
 - d. Appliance pilots and ignition systems**

8. When filling mobile motor fuel or RV's tanks, when the white mist appears from the fixed maximum liquid level gauge, immediately shut off the _____ .
 - a. fixed maximum liquid level gauge
 - b. service valve
 - c. hose end valve**
 - d. pump

9. The _____ is used to determine when the tank has been adequately filled.
- Float gauge
 - Fixed maximum liquid level gauge**
 - Rotary gauge
 - Relief valve
10. Which of the following should be completed immediately after the filling process?
- Check for leaks with a non-corrosive leak detector solution**
 - Relight the customer's pilot lights
 - Verify that appliance pilots have been extinguished
 - Inspect the tank data plate

SECTION 8 QUIZ: RETAIL EXCHANGE CYLINDER OPERATIONS

ANSWER KEY

- Cylinder exchange facilities must conform to the requirements of:
 - NFPA 54
 - NFPA 58**
 - UL 1040
 - 49 CFR
- Areas where more than _____ pounds of propane are stored in one location must be provided with an approved portable fire extinguisher.
 - 500
 - 670
 - 720**
 - 840
- Fire extinguishers are used primarily on _____ fires.
 - Electrical
 - Oil
 - Propane
 - Combustible**
- Cylinders awaiting resale must be stored in a(n) _____ position.
 - Upright**
 - Horizontal
 - Secured
 - Upside-down

5. Cylinders must be stored with the relief valve in the _____ space of the container.
 - a. liquid
 - b. odorized
 - c. vapor**
 - d. vertical

6. Stored cylinders must be at least _____ feet away from gas station fuel dispensers.
 - a. 5
 - b. 10
 - c. 15
 - d. 20**

7. Cabinets must be placed at least _____ feet from sources of ignition.
 - a. 5**
 - b. 10
 - c. 15
 - d. 20

8. Empty exchange cylinders should be handled in the same fashion as _____ cylinders.
 - a. Defective
 - b. Operating
 - c. Open
 - d. Full**

CERTIFICATE OF INSTRUCTION DISPENSING LP-GAS

UTILIZATION: (Check one of the following)

LP-Gas Dispensing Station Operator _____

Company Employee _____

Keylock System Operator (Consumer) _____

Cardlock System Operator (Consumer) _____

Code lock System Operator (Consumer) _____

Other (State Use) _____

COMPANY PROVIDING TRAINING: _____
COMPANY NAME

COMPANY RECEIVING TRAINING: _____
COMPANY NAME

This is to certify that _____
FULL NAME OF PERSON RECEIVING TRAINING
has been provided with written instructions for the LP-Gas transfer operation and has satisfactorily
performed this transfer operation at least 3 full cycles under the supervision of

FULL NAME OF PERSON ADMINISTERING TRAINING

The Training was conducted at: _____
NAME

ADDRESS CITY STATE

ON _____
MONTH DAY YEAR