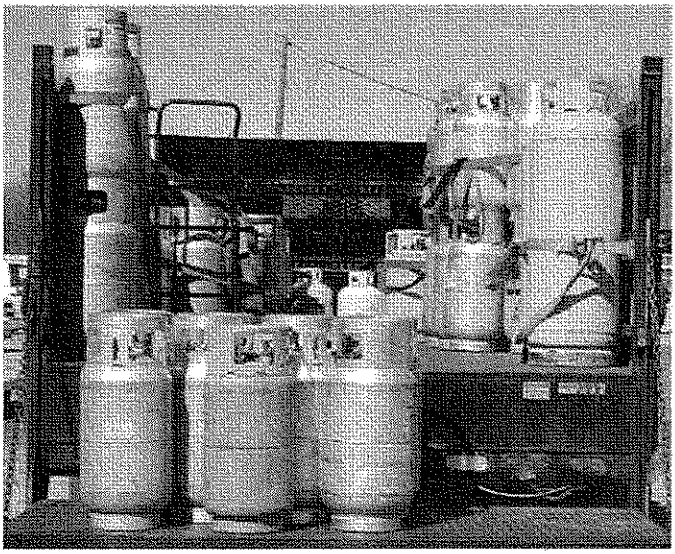
LP Gas Dispenser Operator

Study Guide



Oklahoma LP Gas Administration

3815 N. Santa Fe, Suite 117

Oklahoma City, Oklahoma 73118

405.521.2458

lpgasinfo@lpgas.state.ok.us

This study guide may be utilized by the following Permit holders;

Class III DOT Cylinder Transporter

Class IV-DO Installer/Dispenser Operator

Class IV-D Driver/Installer

Class VI DOT Cylinder &/or LP Gas Motor Fuel Station Operator

Class VI-A LP Gas Dispensing

This study guide for LP Gas Dispenser Operators is not intended to conflict with any Federal, State, of Local laws or regulations; nor is it intended to be the sole reference book for dispenser operators.

It may be used for quick reference and as a study aid for new and current dispenser operators. It shall be the responsibility of the Permit holder to comply fully with all laws and regulations.

The LP Gas Administration shall not be held liable for any misinformation contained herein.

The State regulations for cylinder filling are found in NFPA 58, Oklahoma State Statute, Title 52, Chapter 420 and the Oklahoma Administrative Code, Title 420

The Federal regulations for cylinder filling are found in 49 CFR.

Dispenser operators are required to be trained by OSHA, NFPA and State regulations.

My Safety Code Enforcement Officer is

_____

Cell Number

_____

Table of Contents

Table of Contents Con't

General Information

What Permits are required before I begin? At least one Class VI is required for each dispenser location. Additional personnel may have a Class VIA Permit or Class IV RV Permit with DO endorsement.

How do I get a Permit? A Class VI or VI-A test can be administered by an Oklahoma LP Gas Class X permit holder. You can also call the Oklahoma LP Gas Administration 405-521-2458 and a Code Enforcement Officer will contact you to set up the testing at your location.

When do Permits expire? Permits will expire August 31 of each year unless the renewal application and proper fees are received by the Oklahoma LP Gas Administration. The permit holder must also attend an annual Safety Class before the permit will be renewed. Safety classes are held in several locations around the state in April and May.

What do I do if there is a leak or an accident? EVACUATE THE AREA! Eliminate sources of ignition, call the Fire Department and then contact the Oklahoma LP Gas Administration 405-521-2458. If it is a night or weekend, there will be additional contact information on the answering machine. You should also contact your propane supplier, they are familiar with your dispenser and may know of a quick fix.

What is Propane? Propane is a hydrocarbon (C3H8) and is sometimes referred to as liquefied petroleum gas, LP-gas, or LPG. Propane is produced from both natural gas processing and crude oil refining, in

roughly equal amounts from each source. Nearly 97 percent of propane consumed in the United States is produced in North America.

Is propane dangerous to the environment? No. Propane is an approved, clean fuel listed in the 1990 Clean Air Act and the Energy Policy Act of 1992 and is one of the cleanest burning of all fossil fuels. Tests conducted by the U.S. Environmental Protection Agency show that propane-fueled vehicles produce 30 percent to 90 percent less carbon monoxide and about 50 percent fewer toxins and other smog-producing emissions than gasoline engines. Propane also is nontoxic, so it's not harmful to soil or water.

Definitions

ASME Container—May include any of the following: permanently mounted motor fuel tanks, house tanks, bulk storage tanks, portable tanks (420#), and cargo tanks, used to transport or store LP-gases.

Container Appurtenances—["valves and fittings"]. Devices installed in container openings for safety, control, or operating purposes. [Examples include pressure-relief devices; shutoff valves, backflow check valves, excess-flow valves and internal valves; liquid level gauges; pressure gauges; and plugs].

C-Tag—Cylinder Identification Label

Cylinder—A container designed, constructed, tested and marked according to U.S. Department of Transportation specifications (Title 49, *Code of Federal Regulations*).

Dispensing Station—Fixed equipment in which LP-gas is stored and dispensed into approved ASME containers or cylinders.

DOT—U.S. Department of Transportation.

Fixed Maximum Liquid Level Gauge—["outage gauge," "spitter valve," "spew gauge"]. A fixed liquid level gauge that indicates when the liquid level in a container has reached its maximum permitted filling limit.

Liquefied Petroleum Gas—LP Gas or Propane

NFPA—National Fire Protection Association.

Overfilling Prevention Device—["OPD," "stop valve"]. A safety device that is designed to automatically prevent a container from being filled beyond its maximum permitted filling limit.

Point of Transfer—The location where connections and disconnections are made or where LP-gas is vented to the atmosphere during transfer operations.

Portable Container—A container designed to be moved readily, as opposed to a container designed for stationary installations.

Pressure Relief Valve—["popoff valve"]. A type of pressure relief device designed to both open and close to relieve excess internal pressure.

Sources of Ignition—Devices or equipment that are capable of igniting flammable LP-gas vapor-air mixtures and that will permit propagation of flame away from them.

Universal Cylinder—A cylinder that can be connected for service in either the vertical or the horizontal position, so that the fixed maximum liquid level gauge, pressure relief device, and withdrawal appurtenances function properly in either position.

Water Capacity—The amount of water at 60°F required to fill a container.

Tare Weight—The weight of an empty container.

Physical Characteristics

Propane is nontoxic, colorless, and virtually odorless. As with natural gas, an identifying odor is added so the gas can be readily detected.

Propane will vaporize at any temperature above -44 F.

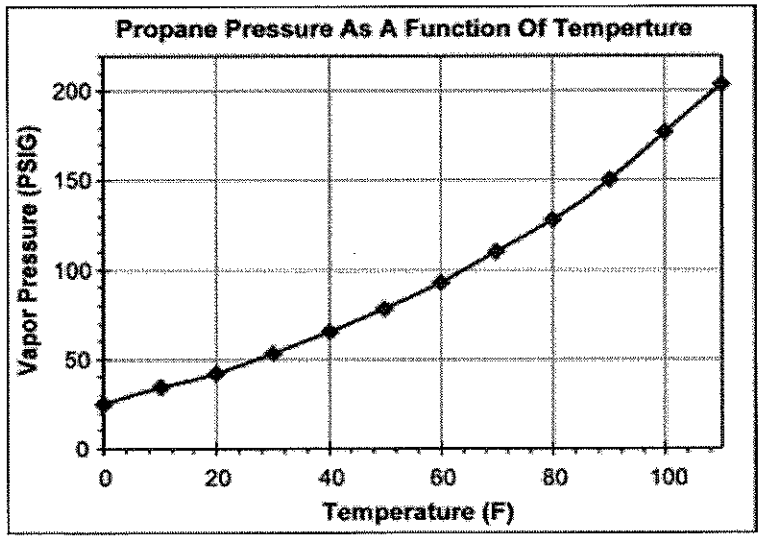
When liquid propane is released into the atmosphere it vaporizes and rapidly expands to 270 times its original volume. Extremely cold temperatures are produced at the point of release and can produce frostbite very quickly on exposed skin.

Liquid Propane weighs 4.2 lb per gallon, about half the weight of water.

Propane vapor is 1.5 times heavier than air, therefore when it is released, it will settle in low areas.

Propane liquid will expand approximately 1% for every 6 degree rise in temperature. This is why propane containers are filled to only 80% of their capacity, providing space for liquid to safely expand.

Vapor Pressure of Commercial Propane



The relief valve on DOT cylinders is set to relieve at 375 psi

The relief valve on ASME containers is the same as the working pressure, which would be 250 psi or 312 psi.

OSHA Fire Extinguisher Training, 29 CFR Section 1910.157(g)(1)

Where the employer has provided portable fire extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting.

1910.157(g)(2) The employer shall provide the education required in paragraph (g)(1) of this section upon initial employment and at least annually thereafter.

Here is a link to some online training from OSU.

http://ehs.okstate.edu/MODULES/exting/index.htm

NFPA requires a minimum 18 lb BC or ABC, Fire extinguisher to be readily available at each dispenser. Fire extinguishers shall be inspected by a competent person at least annually.

Personal Protective Equipment (PPE)

OSHA 29 CFR 1910.132 requires that when hazards can-not be eliminated through engineering and/or administrative controls, PPE must be used to protect the eyes, face, head, feet, hands, arms, body, ears, and lungs.

Persons filling tanks and cylinders should wear gloves and protective eye wear during the inspection, purging and filling operation.

Required Knowledge

Each person at the dispenser location should be familiar with the procedures and locations to turn off the electricity and close valves to stop the flow of propane, in case of an accident. (note: propane that is in the lines may continue to escape for several minutes after the valves are closed)

An identified and accessible switch or circuit breaker must 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.

An identified and accessible emergency shutoff that will stop the flow of propane shall be more than 3 ft and less than 100 ft from the point of transfer. (note, this may not be on older dispensers that have been in continuous service)

An LP-gas fire must not be extinguished until the source of the burning gas is shut off or can be shut off.

At least one qualified person must remain in attendance at a transfer operation from the time connections are made until the transfer is completed, shutoff valves are closed, and lines are disconnected.

Sources of ignition must be turned off during transfer operations, while connections or disconnections are made, or while LP -gas is being vented to the atmosphere.

Smoking, open flame, portable electrical tools, and extension lights capable of igniting LP-gas must not be permitted within 25 ft. of a point of transfer while filling operations are in progress.

Loose or piled combustible material and weeds and long dry grass must be separated from containers by a minimum of 10 feet.

Cylinders in storage must be located to minimize exposure to excessive temperature rises, physical damage, or tampering

LP Gas cylinders and/or ASME tanks shall not be mounted in front of the vehicle, behind the rear bumper, or on the roof.

Cylinders are filled by weight, therefore the scales must be kept clean, level, and in good operating condition. They should be checked regularly to ensure proper calibration.

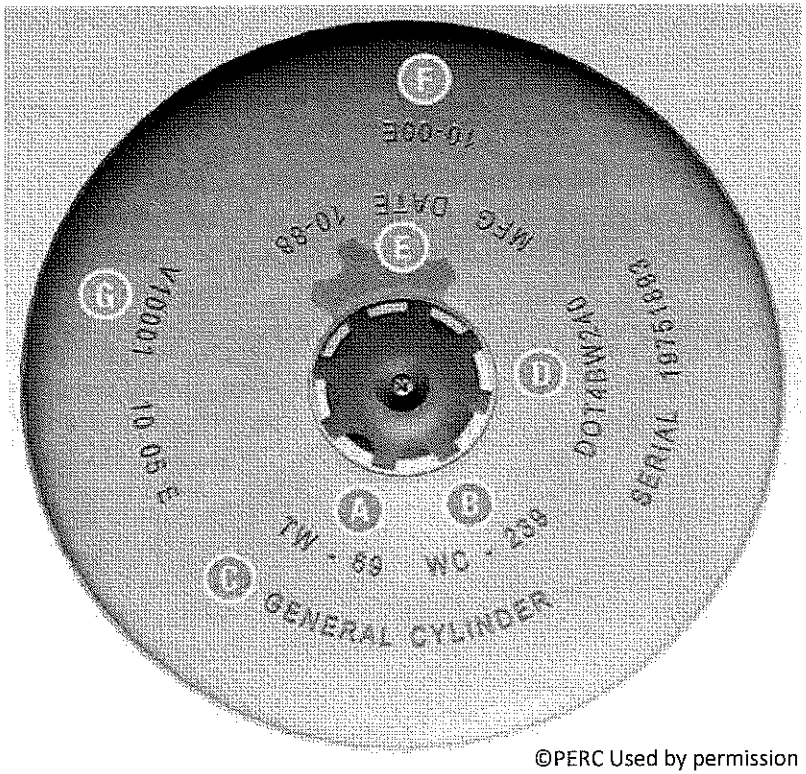
Understanding the Information on a Cylinder

Become familiar with the information that is required on a cylinder

Consumer Warning Labels are required.

Understanding the Information on a Cylinder

A. Tare Weight (the weight of the cylinder when it is new and empty)
B. Water Capacity (the number of pounds, of water, the cylinder will hold when completely full
C. Manufacturers Name or Symbol
D. Specification Design Code
E. Date of Manufacture (the date the cylinder was constructed)
F. Requalification Date(s)
G. Recertification Information (the RIN and date the cylinder was recertified) Note some cylinders may have several Recertification dates on them.



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:

1. 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.)
2. 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.
3. Connect the **dispensing hose** to the service valve.
4. Open the **service valve** on the cylinder.
5. Start the **pump** and slowly open the **hose end valve.**
6. Close the **hose end valve** as soon as the scale beam or indicator tips.
7. Close the **cylinder valve.**
8. Shut off the **pump.**
9. Disconnect the **dispensing hose.** Check the weight of the filled cylinder.
10. 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.
11. Close the **liquid outlet valve** on the storage tank.
12. Check the **cylinder valves**, especially the relief valve, for leaks.

Note: Never fill a cylinder by the gallons it can hold, as it may already be partially filled. Never stand in front of or look into a relief valve when filling a cylinder.

CAPACITY IN POUNDS	
WATER CAPACITY	PROPANE CAPACITY
12	5
15	6
24	10
26	11
48	20
60	25
67	28
69	29
72	30
80	33.5
96	40
104	43.5
120	50
144	60
239	100

Point of Transfer on a Dispenser

Shall be 25 ft from buildings or property lines.

Distance may be reduced to 12-1/2 ft if the dispenser meets all the requirements of a low emission location

Distance may be further reduced to 10 ft if the building has a 1hr fire rated walls.

Shall be 50 ft from outdoor places of public assembly, including schoolyards, athletic fields and playground

Electrical equipment shall be designed for hazardous location and meet the National Electric Code, NFPA 70, within a 15 ft radius of the tank, pump and point of transfer.

Hose, Hose Connections and Flexible Connectors

Hose, hose connections, and flexible connectors must be fabricated of materials that are resistant to the action of LP-gas both as liquid and vapor.

Hose must be designed for a working pressure of 350 psig with a safety factor of 5 to 1 and must be continuously marked with LP-GAS, PROPANE, 350 PSI WORKING PRESSURE, and with the manufacturer's name or trademark.

Hose assemblies must be observed for leakage or for damage that could impair their integrity before each use.

Cylinder Inspection

Prior to filling any cylinder, an in-depth inspection must be performed . At first glance, it may appear that it would take several minutes of inspection for each cylinder, however this is not the case. The majority of cylinders can be inspected in a very short time. (Note, this inspection does not constitute a requalification. Requalification procedures are a DOT requirement and must be done to DOT specifications.)

Visual inspections must be performed in accordance with the following:

1. The cylinder is checked for exposure to fire, dents, cuts, digs, gouges, and corrosion.
2. Any sleeve on the cylinder that hampers an inspection, shall be removed.
    a. Any dent in a weld shall not be deeper that ¼ inch
    b. Any dent that does not include a weld shall not be deeper than 10% of the average dent diameter. Any dents that include a cut or gouge shall cause the cylinder to fail the inspection.
3. New, unused cylinders must have an Oklahoma C-Tag on it. A C-Tag is a small (approximately 1" x 3"), white adhesive label

with a unique identification number. C-Tags must be attached by the seller of the cylinder.

4. Cylinders made to ICC specifications prior to 1967, are the equivalent of DOT specification cylinders and may be continued in service, providing it passes an inspection and has been properly requalified.
5. DOT aluminum and composite cylinders that have been involved in a fire shall be permanently removed from service.
6. DOT cylinders other than aluminum and composite that have been involved in a fire, shall be requalified before being place back into service.
7. The cylinder protective collar (where utilized) and the foot ring must be intact and firmly attached.
8. Welding on any pressure containing portion of a cylinder is prohibited unless performed by a facility authorized by DOT.
9. The cylinder shall be painted or coated to minimize corrosion.
10. Cylinders classified as disposable, non-refillable, or single trip shall not be refilled.
11. The cylinder pressure relief valve shall indicate no visible damage, corrosion of operating components, or obstructions.
12. There shall be no leakage from the cylinder or its appurtenances that is detectable without the use of instruments.
13. If the cylinder is equipped with an O-ring or rubber seal inside the POL connection, it should be checked to ensure it is not cracked or deformed.
14. Cylinder date of manufacture and requalification dates must be checked. A cylinder that is past the requalification date, shall not be refilled.
    a. Cylinders must be requalified 12 years from the date of manufacture. A cylinder that is out of date, must be requalified by methods prescribed in DOT regulations.
    b. Cylinders that have passed an external visual requalification may be continued in service for 5 years.
15. All cylinders used in industrial truck service (including forklift truck cylinders) must have the cylinder's pressure relief valve replaced by a new or unused valve within 12 years of the date of manufacture of the cylinders and every 10 years thereafter.
16. Cylinders with 4.2 lb. through 40 lb. propane capacity for vapor service must be equipped or fitted with a listed overfilling prevention device (OPD) that complies with UL 2227, Overfilling Prevention Devices, and a fixed maximum liquid level gauge. These devices must be permitted to be a part of the container valve assembly.
17. The following types of cylinders are exempt from the requirements of installing a listed overfilling prevention device:
    a. Cylinders used in industrial truck service (fork lift) and cylinders that are marked and used for industrial welding and cutting gases
    b. Cylinders manufactured prior to October 1, 1998, and designed for use in the horizontal position and where an OPD is not available. These cylinders shall be marked with a label to indicate they are not equipped with an OPD.

Any cylinder that fails one or more of the criteria of the visual inspection requirements must not be refilled or continued in service until the condition is corrected.

Purging

If a cylinder is new and never contained propane or if the cylinder valve was open when it was brought in to the dispensing station, it must be purged of air before being filled. Failure to do so could result in excessive tank pressure, possibly causing the relief valve to open. It could also create fuel/air mix problems with any appliance the cylinder is connected to and could also contribute to odorant fade.

Most new cylinders are now vacuum purged and only need to be pressurized with propane vapor before being filled. (Note, the propane vapor is not blown down on vacuum purged cylinders)

Propane dispensers should be equipped with a cylinder purging manifold which is equipped with a discharge stack that discharges the vapors to a safe elevated location, at least 25 feet from any building.

Cylinders should be pressurized to 15 psi with propane vapor. The propane/air mixture should then be released through the vent stack. Repeating the procedure at least 5 times will remove approximately 97% of the air.

Propane liquid should never be used to purge an LP Gas container only propane vapor. Using propane liquid will freeze any water vapor in the LP tank and cause regulator freeze up problems later on.

What to Do If a Cylinder or Tank is Overfilled or Leaking

Never release an overfilled or leaking container to the customer!!!

If your dispenser is equipped with purging equipment, you should hook up the purging equipment and vent the container until it reaches the proper level.

If there is no purging equipment and the container can be safely moved, it should be moved to a safe location, as far as possible from any source of ignition, and the manager notified.

Transporting Cylinders

Closed-bodied vehicles such as passenger cars, vans, and station wagons must not be used for transporting cylinders of more than 45 lb. propane capacity per cylinder. The aggregate propane capacity being transported in closed-bodied vehicles shall not exceed 90 lb. propane capacity.

Cylinders and their appurtenances must be determined to be leak-free before being loaded into vehicles.

Cylinders must be secured, in position, to minimize the possibility of movement, tipping, and physical damage.

A cylinder, being transported, must have the relief valve in communicate with the vapor space of the cylinder (in the upright position).

Customers transporting cylinders inside a closed bodied vehicle shall be advised to remove the cylinder as soon as possible to minimize the possibility of the relief valve discharge, especially in warm weather.

Vehicles transporting more than 1000 lb. of propane (propane and container weight) shall be required to meet DOT Hazardous Material Transportation Regulations.

Filling Vehicle Mounted ASME Tanks

ASME tanks do not require periodic requalification, however they shall be inspected to ensure there is a legible data plate, no rust, corrosion, dents, gouges or other condition that could make the tank unsafe.

ASME tanks that are mounted in an enclosed space (such as a pickup camper), shall remote filling, remote 80% outage gauge, and the relief valve piped out.

Never stand in front of or look into the relief valve when filling an ASME tank.

All persons must exit the vehicle before LP Gas tanks on the vehicle are filled.

All sources of ignition on the vehicle shall be turned off during the filling procedure.

Older ASME tanks made to U-68 or U-69 specification and a 200 lb working pressure may be continued in service.

ASME tanks make to U-W specification and a 250 lb working pressure may also be continued in service. Newer ASME tanks are made to U-W specification will have a 312 working pressure.

Dispensers that are used to fill tanks on vehicles shall be equipped with an emergency breakaway device. The device shall be designed to retain the propane liquid on each side of the device in case of a pull-a-way.

Hoses on dispensers shall not exceed 18 ft in length unless approved by the LP Gas Administrator

Dispensers that fill any LP Gas container, other than by weight, shall be equipped with an approved meter that reads to the nearest 1/10 gallon. Meters are required to have the calibration proved annually.

Prohibited

Tanks of more than 125 gallon water capacity shall not be transported with more than 5% of propane, unless specifically designed and approved by DOT. (a trailer mounted house tank with roll bars is not approved or allowed)

Filling cylinders that are due for requalification shall not be allowed.

ASME tanks without a legible data plate or missing the data plate shall not be filled.

Filling tanks to more than the maximum allowable limits shall not be allowed.

Filling Fork lift cylinders that have an out of date relief valve is prohibited.

Unattended Dispensers

Shall have liquid withdrawal valves closed

Shall be locked or in a secured area

Dispenser Labels

1. Labels shall be readily visible from any direction the public approaches.
2. Each dispense shall be marked with "No Smoking", minimum 6 inch letters
3. Propane, LP Gas, or Flammable Gas, minimum 6 inch letters
4. The name of the dispenser operator and their phone number in minimum 2 inch letters
5. The name of the dispenser owner, if different than the operator
6. It is also good practice to display an emergency phone number if the operators phone number is not an "after hour" number.

Crash Protection

Dispensers shall be protected from vehicle impact in accordance with good engineering practices.

Failure to Comply With Laws and Regulations

Failure to comply with state laws, rules and regulations can result in suspension, or revocation of permits and/or a fine of not more than $500.00 per violations.

Failure to comply with Federal Laws can result in fines of $5000.00 per violation

Safety Code Enforcement Officers are certified State Police Officers and have the authority to arrest, write citations, or put the dispenser location out of service.

How to Obtain a Requalifiers Identification Number RIN

http://www.npga.org/files/public/RIN%20Commonly%20asked%20questions_June_08.pdf

http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/visual_rin_application.pdf

Notes

SUMMARY PROCEDURES FOR FILLING LP-GAS CONTAINERS*

WARNING: THIS DISPENSER IS TO BE OPERATED ONLY BY A CERTIFIED, TRAINED ATTENDANT.
THE ATTENDANT MUST BE TRAINED BY THE OWNER / MANAGER IN ACCORDANCE WITH THE AMERIGAS DISPENSING STATION TRAINING MANUAL.

GENERAL

1. Dispenser must be installed and maintained in compliance with local, state and federal regulations and company policy.
2. Remove all combustible litter including dry grass and leaves from within 25' of installation.
3. Container filling must not be done within 25' of buildings and line of adjoining property that may be built upon and 25' of sources of ignition.

PRIOR TO FILLING

1. Inspect dispenser for operational and safety integrity.
2. Vehicles with permanently mounted propane tanks must be at least 10 feet from propane storage tanks of over 2000 GWC while propane containers are being filled. Vehicle motor must be turned off and all possible sources of ignition such as pilot lights, burners, etc. turned off during filling operation.
3. NO SMOKING IS PERMITTED WITHIN 25' OF FILLING OPERATION.
4. Use protective gloves and safety glasses while filling cylinders.
5. The following DOT (ICC) specification cylinders may be filled with propane: 3B-240, 4B-240, 4BA-240, 4BW-240, 4E-240, 26-240.
6. Before filling, visually examine each container to make sure that it is not damaged by deep dents or excessive corrosion. DO NOT fill any container that is damaged or if leaks are observed at any fittings or valves. DO NOT fill container if pressure relief device is damaged, corroded or contains foreign material. DO NOT fill DOT (ICC) containers that have not been requalified in accordance with currently effective regulations of the Department of Transportation. Current regulations require requalification after 12 years when a letter does not follow the latest test date on the cylinder i.e. 12-94, seven years after the last test date when it is followed by the letter ISI , i.e. 12-94S, and after 5 years when the latest test date is followed by the letter IET i.e. 12-94E.

FILLING PROCEDURES CYLINDERS - WEIGHT METHOD

1. Before filling check tare weight (T.W.) of empty cylinder and water capacity of cylinder (W.C.), both of which are stamped on cylinder or collar.
2. Determine propane capacity from table below. For other container sizes, multiply water capacity (W.C.) by 0.42.

TABLE OF TANK CAPACITY

Water Capacity In Pounds	Propane Capacity In Pounds
12	5
15	6
24	10
26	11
48	20
60	25
67	28
69	29
72	30
80	33.5
96	40
104	43.5
120	50
144	60
239	100

3. Add tare weight and propane capacity together to determine total filled weight of cylinder.
4. Set scales to indicate proper total filled weight of container, plus hose and connector.
5. Open required valves on storage tank.
6. Connect hose to cylinder fill valve.
7. Start pump.
8. Open valve on cylinder.
9. Open valve on end of hose.
10. Close hose valve as soon as scale beam or indicator tips.
11. Close cylinder valve.
12. Shut off pump.
13. Disconnect hose.
14. Check weight of filled cylinder after filling connector has been disconnected. If overfilled, bleed off excess propane at safe location.
15. Operator shall be in attendance during the entire filling procedure.
16. Check container valves for leaks.

CYLINDERS - VOLUME METHOD

NOTE: Cylinder must be equipped with a fixed liquid level gauge

1. Open required valves on storage tank.
2. Connect hose to cylinder fill valve.
3. Start pump.
4. Open fixed liquid level gauge valve.
5. Open valve on cylinder.
6. Open valve on end of hose.
7. Close hose valve as soon as white fog escapes from fixed liquid level gauge.
8. Close fixed liquid level gauge valve.
9. Close cylinder valve.
10. Shut off pump.
11. Disconnect hose.
12. Check container valves for leaks.
13. Check cylinder for possible overfill. Open fixed liquid level gauge. If a steady liquid stream

ASME TANKS

1. Only ASME containers having a minimum design pressure of 250 PSI or 200 PSI under U-68 or U-69 (see ASME data plate on tank) may be filled.
2. Before starting filling procedure check to determine that container is not already full to proper loading point by observing the discharge from the vent valve of the fixed liquid level gauge (cloud of visible vapor indicates a filled container).
3. Open required valves on storage tank.
4. Connect hose to container fill valve.
5. Start pump.
6. Open vent valve of fixed liquid level gauge.
7. Open valve on end of hose.
8. If container fill valve is hand operated, open valve (most open automatically when connected or filling starts).
9. Fill until vapor coming from vent valve is visible, then immediately turn off hose end valve and close vent valve.
10. Shut off pump.
11. Turn off container valve if hand operated.
12. Disconnect hose.
13. Check container valves for leaks.

AFTER FILLING

(OR AT ANY TIME DISPENSER IS UNATTENDED)

1. Shut off pump.
2. Close valves at storage tank.
3. Coil hose on rack inside fence protected area and install dust cap or plug in hose filling adaptor.
4. Lock fence of facility to secure installation against tampering.