

# DEALER OUTLET OPERATION

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APRIL 16, 2026



# TOPICS

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A. LPG PRODUCT KNOWLEDGE



B. LPG CYLINDER



C. ANCILLARY EQUIPMENT



D. LPG INSTALLATION



E. MEASURING DEVICES



F. FACILITY LAYOUT



## A. LPG PRODUCT KNOWLEDGE

## SOME LPG MISCONCEPTION

4/16/26

LPG is the  
Most  
Dangerous  
Fuel

- Builds Unnecessary Fear and Apprehension.
- Leads to Accidents and Injury.

LPG is not a  
Dangerous  
Fuel

- Causes Complacency and disregard of safety
- Leads to Accidents and Injury.

# LPG PRODUCT KNOWLEDGE

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- **WHAT IS LPG?**

- ❖ LPG is Liquefied Petroleum Gas (Generic Name)
- ❖ LPG is predominantly composed of 60% butane and 40% propane
- ❖ Adopted names are Rufrance LPG, CRMC, Poderoso, PEPC, and etc.

# LPG PRODUCT KNOWLEDGE

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- **WHAT IS LPG?**

• **LIQUEFIED** : LPG is stored and transported in a state of fluidity. In its natural state, under atmospheric condition, the product is in vapor form. However, when put under moderate pressure it gets fluid (liquid) with a change of volume down to 1/270 of the original gas volume



270 of 1 kg filled (vapor state)

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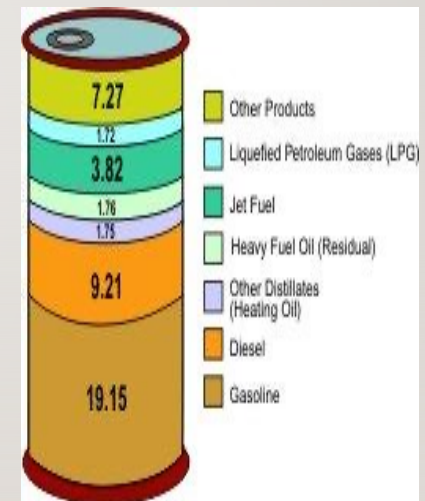


1 kg (liquid state)

# LPG PRODUCT KNOWLEDGE

- **WHAT IS LPG?**

- **PETROLEUM** : LPG is a petroleum product which is manufactured mainly through crude oil refining (distillation of the crude oil), being the last and most precious product in the distillation process.

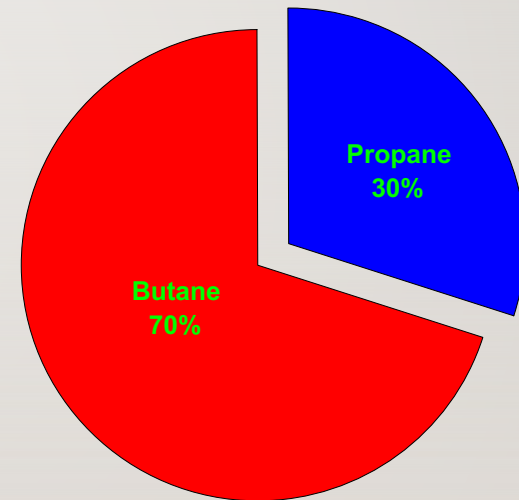


# LPG PRODUCT KNOWLEDGE

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- **WHAT IS LPG?**

• **GAS** : Once the pressure has been reduced, the product will change from liquid into gas form. LPG is a mixture of hydrocarbon gases, mainly propane ( $C_3H_8$ ), butane ( $C_4H_{10}$ ) {normal & iso-butane}, propylene and butylene. Commercial LPG is predominantly composed of 70 % butane and 30% propane by VOLUME.



LPG Composition by Volume

# LPG PRODUCT KNOWLEDGE

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## WHERE DOES LPG COME FROM?

### I. LPG is derived from a Crude Oil refinery plant

- ❖ About 60% of the world's LPG supply comes from natural gas processing.
- ❖ When raw natural gas is extracted from underground reservoirs, it contains a mix of hydrocarbons.
- ❖ LPG components—propane and butane—are separated from methane (the main component of natural gas) during processing.
- ❖ LPG is extracted from oil fields (under the Earth) and/or processed in a natural gas processing plant.



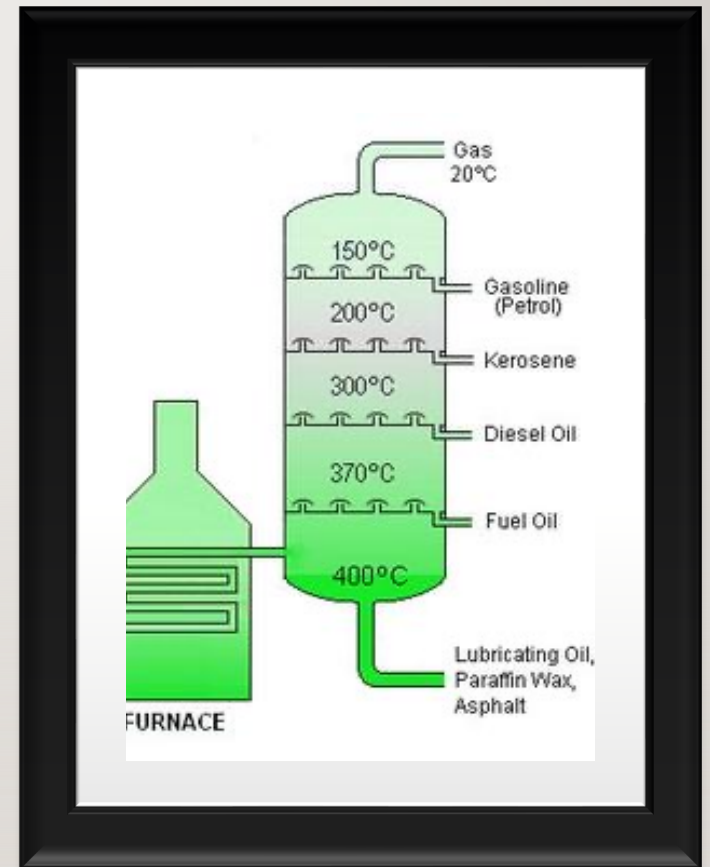
# LPG PRODUCT KNOWLEDGE

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- **WHERE DOES LPG COME FROM?**

- 2. **Natural Gas Processing**

- ❖ Around 40% of LPG is produced during crude oil refining.
    - ❖ LPG is recovered during the distillation and catalytic cracking processes used to produce gasoline, diesel, and other fuels.
    - ❖ It is the first product formed in the process of producing heavier fuels such as diesel, jet fuel, fuel oil, and gasoline.
    - ❖ The refining process separates the lighter hydrocarbons like propane and butane from heavier ones.



## LP Gas Usage



Household Use



Commercial use at  
Hotel & Restaurant



Bulk Sale at Ship  
Breaking Industry



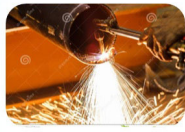
Autogas



Textile  
Industry



Glass &  
Ceramic



Iron & Steel



Aerosol

# LPG PRODUCT KNOWLEDGE

## • LPG COMMON APPLICATIONS

1. Household
2. Commercial
3. Industrial
4. Agricultural (poultry)
5. Automotive
6. Marine

# LPG PRODUCT KNOWLEDGE

- **LPG PROPERTIES**

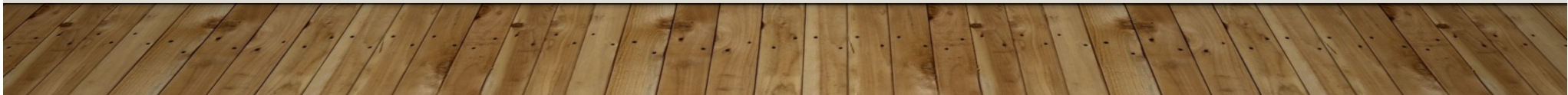
Property	Description
State at Room Temperature	Gas
Storage State	Liquid under pressure
Boiling Point	-42°C for Propane, -0.5°C for Butane
Color	Colorless
Odor	Odorless (Ethyl Mercaptan is added as an odorant for leak detection)
Density	Heavier than air (vapor can settle in low areas) Lighter than water (floats above the water)
Flammability Range	2% to 9.5% in air
Ignition Temperature	Approximately 470°C
LPG heating value	46, 800 BTU/kg
LPG boils	10°F

# LPG PRODUCT KNOWLEDGE

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- **LPG BEHAVIORS**

1. LPG is liquid inside the container, but immediately transforms to gas when released
2. Like any other fuels, LPG is also flammable
3. Like any other liquids, LPG also expands and contracts with the changes in temperature
4. LPG is colorless and cannot be seen
5. LPG is slightly heavier than air, hence if there is a leak, it flows to low lying areas
6. LPG is half as light as water, hence it floats initially before it vaporizes
7. LPG is non-toxic but can cause asphyxiation in very high concentrations in air

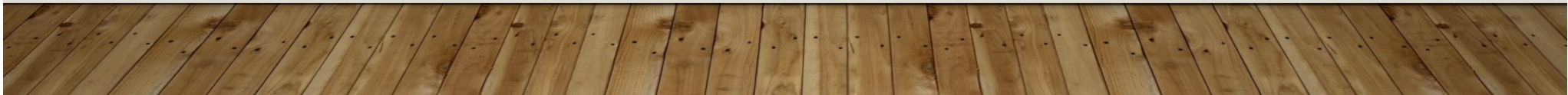


# LPG PRODUCT KNOWLEDGE

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- **LPG BEHAVIORS**

- **LPG is liquid inside the container but immediately transforms to the gaseous state when released.**
- It is liquefied so that it can be stored economically and transported easily. A gallon of liquid LPG in a bottle will need a truck **270 times bigger** if stored in vapor form.
- **Like any other liquid, LPG expands and contracts with changes in temperature.**
- A gallon of LPG expands at 60°F. These **LPG containers are never filled to their full capacity** – to give allowance for expansion of liquid.
- **LPG is non-toxic or non-poisonous.**
- However, because **it is heavier than air in vapor form**, it pushes out air inside the room causing a shortage of oxygen and this might suffocate any person in that room.

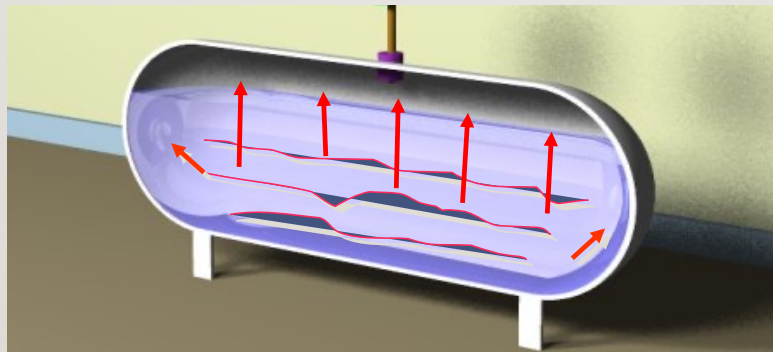


# LPG PRODUCT KNOWLEDGE

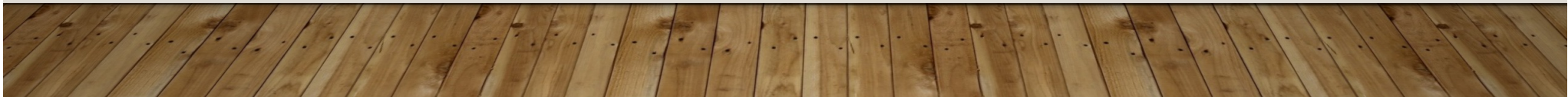
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- LPG BEHAVIORS

## Liquid Expansion



LPG in the liquid phase expands due to any increase in temperature. The liquid inside the tank tries to evaporate, but, since it is trapped inside the confines of the tank, pressure builds up.



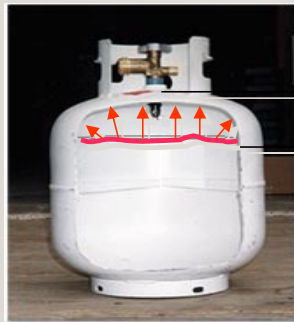
# LPG PRODUCT KNOWLEDGE

- LPG BEHAVIORS

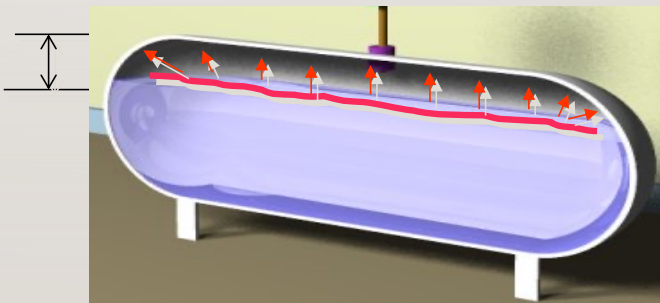
## Liquid Expansion

Because of liquid expansion, we never fill the tank to its maximum capacity. Filling is done only up to **85% capacity**.

The **15% “free space”** is called **ULLAGE**. Overfilling the tank may result to dangerous hydraulic pressures which may cause the discharge of liquid out of the pressure relief valve, or may even rupture the tank.



**ULLAGE**  
**15%**  
**Free**  
**space**



# ADVANTAGES OF LPG

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LPG equipment controls are simple and easy to handle.

LPG can be used in many other ways.

LPG equipment provide max. eff. At min. operational cost.

LPG is dependable, no power interruption, ready supply.

Installation and operation of LPG equipment can be easily understood by the user.

LPG is safer than other sources of fuel.

LPG heats fast and instantly, thus reduce time

# LPG PRODUCT KNOWLEDGE

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- **LPG STORAGE IN CYLINDERS**

- ❖ LPG cylinder storage is an effective and reliable method when standards and safety practices are followed. Training LPG personnel and end-users in proper handling and inspection is essential to prevent accidents and ensure safe use.
- ❖ LPG is generally stored in pressurized steel cylinders to keep it in liquid form. When the cylinder valve is opened, the pressure drops, and the liquid LPG vaporizes, making it ready for use in stoves, heaters, and other appliances



**B. LPG CYLINDER and PNS on  
its manufacturing,  
requalification, repair and  
disposal**

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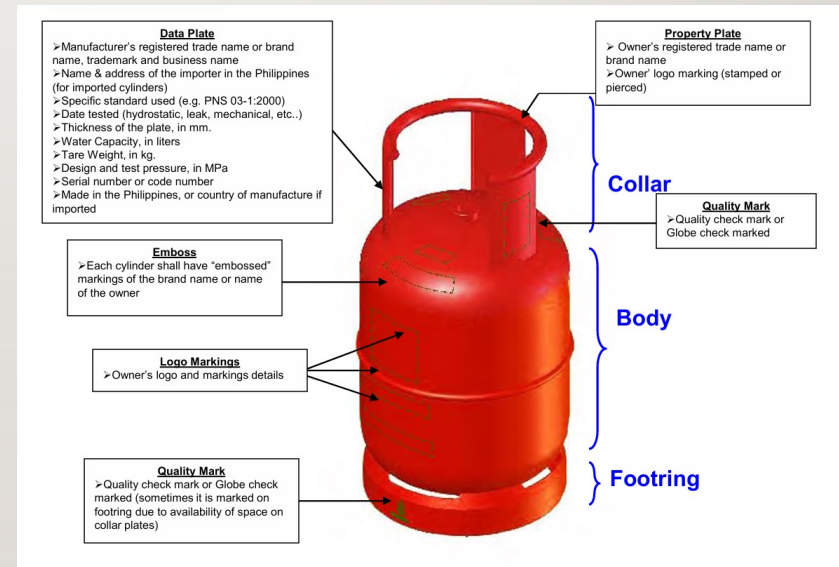
- **LPG CONTAINERS (CYLINDERS):**

- LPG is placed in metal containers for easier and safer transportation and storage. Design, construction and installation of LPG containers considered as “Unfired Pressure Vessels” are governed by standards and codes promulgated by the American Society of Mechanical Engineers, the National Fire Protection Association and the Products Standards Agency of the Department of Trade and Industry.

- **LPG cylinders must be in accordance with the provisions of PNS 03-1:2020, Transportable and Refillable Cylinders for Liquefied Petroleum Gas (LPG).**



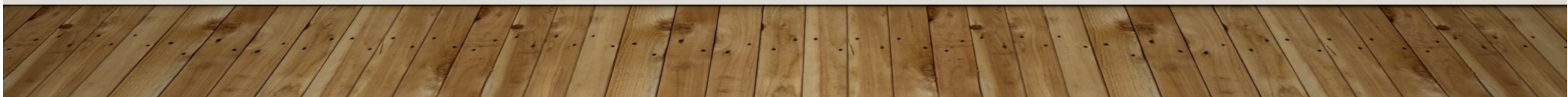
- PARTS OF THE CYLINDERS AND ITS MARKINGS



# LPG CONSUMER TIPS

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IN PURCHASING LPG, BE SURE  
THAT THE LPG CYLINDER IS IN  
GOOD VISUAL CONDITION



# PROPER MARKINGS

- Purchase LPG cylinders only with appropriate or proper markings (e.g., brand name, product safety and tare weight)

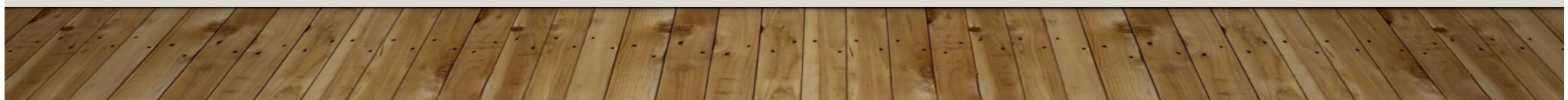


### VERY GOOD CYLINDER



### REJECT CYLINDER

**CORRODED  
CYLINDER**



# PERMANENT MARKINGS OF A CYLINDER DURING ITS LIFESPAN

1.) Embossed in the shoulder of the cylinder - Trademark or tradename;

2.) Etched or Stamped on the collars or foot ring or if not possible, on the plate of the cylinder:

a.) *Manufacturer's registered Trademark or tradename (if domestically manufactured):*

b.) *Name of importer (if imported);*

c.) *Specific standards used and the year of its edition:*

d.) *Date tested;*

e.) *Thickness of the plate, in millimeters;*

f.) *Cylinder capacity - water capacity in liters and tare weight in kilograms;*

g.) *Design and test pressure, in megapascals;*

h.) *Serial number or code number;*

i.) *Country of manufacture;*

j.) *Type of neck ring used ( NGT, SGT, NGS or DIN); and*

k.) *DTI PS or ICC mark.*

# PERMANENT MARKINGS OF A CYLINDER DURING ITS LIFESPAN

3.) Durable markings printed in silk-screen. or other equivalent technology on the body

of the cylinder:

a.) Trademark or tradename;

b.) Net content in kilogram;

c.) Tare weight in kilogram;

d.) Date of next requalification ( MM/YYYY); and

e.) For cylinders fitted with direct burner attachment (e.g. camping-type), regardless of size and capacity, shall have the additional marking: "FOR OUTDOOR USE ONLY" with the recommended font size at the minimum of four (4) millimeters.

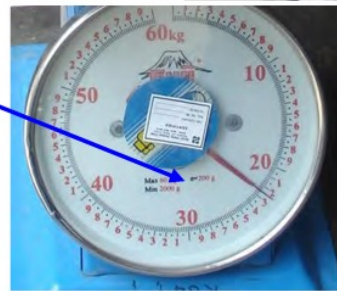
## How to Determine Under-filling of LPG

Net weight + 11.0 kg.

Gross Weight 23.0 kg.

22.4 kg.

-0.6 kg.



# TARE WEIGHT

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Determine the gross weight of LPG in filled cylinders by adding the Tare Weight (T.W.) and the required net weight of 11.0 kg of LPG.



$$\begin{array}{r} 12.3 \\ + 11.0 \\ \hline \end{array}$$

Gross weight = 23.3



- Check if the security seal is intact and firmly affixed to the Pressure Relief Valve (PRV).

*The brand name/logo in the cylinder and the seal must be the same*

## CYLINDER VALVE

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# REQUALIFICATION, REPAIR AND DISPOSAL

Activity	Standard / Law	Key Processes
<b>Requalification</b>	PNS 03-2:2020, DAO 22-11	Cylinders 1–150 L; must undergo visual inspections, hydraulic tests, valve checks. (PNS 03-2:2020 – Methods of Requalification)
<b>Repair</b>	RA 11592 (“cylinder improvement”)	BPS-accredited repair; only approved parts; must meet (PNS 03-03:2020 – Requirements for Repair)
<b>Disposal</b>	RA 11592 + DOE/DTI guidelines + PNS	Scrapping/disposal via crushing/cutting; irreversible and documented.

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# C. LPG CYLINDER ANCILLARY EQUIPMENT

## LPG HOSE

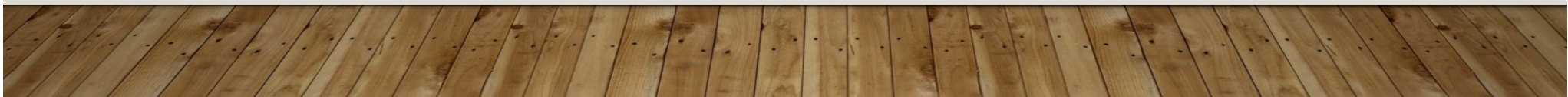
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- a. Shall be made of LPG resistant materials; and
  
- b. Shall have DTI PS or ICC Mark and properly marked with the name of the manufacturer or importer as the case may be.





**PIGTAIL HOSE ASSEMBLY**



# VALVES AND REGULATORS

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a. Shall be made of LPG resistant materials;

b. Shall have DTI PS or ICC Mark and properly marked with the name of the manufacturer or importer, as the case may be; and

c. Shall be properly marked with "on-off" gas flow direction.

# TYPE OF VALVES

Pol valve

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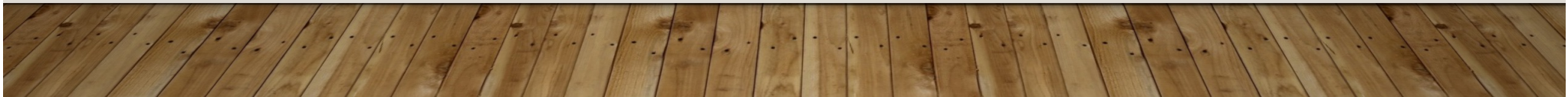
POL-Valve

## TYPE OF VALVES

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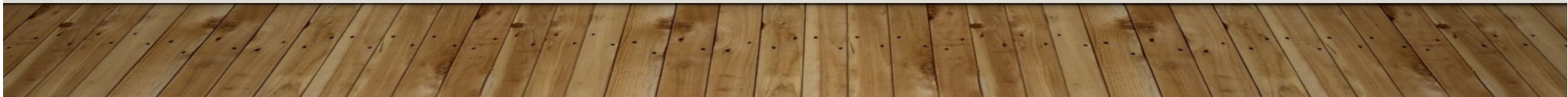
Snap-On Valve



# TYPE OF VALVES

Compact Valve

Bayonet Valve

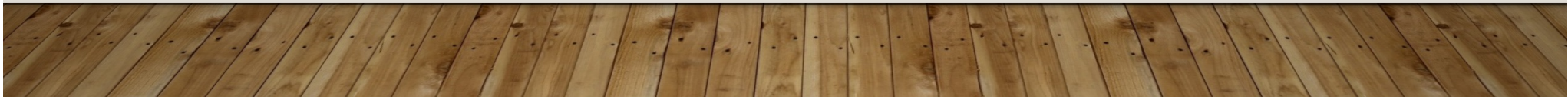


# TYPE OF VALVES

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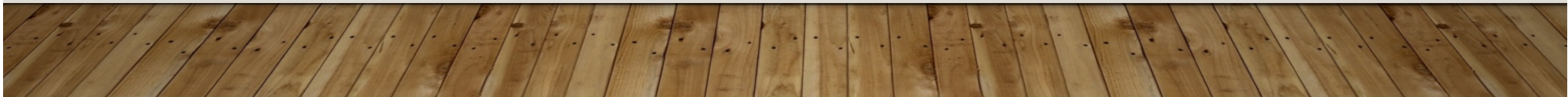


Camping Valve



# REGULATORS

- **LOW PRESSURE**
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## REGULATORS

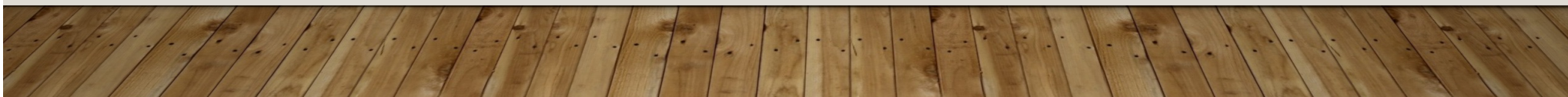
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**LV 4403 V4**



**L - 102**



# REGULATORS

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## HIGH PRESSURE



# REGULATORS

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# LPG SEAL

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a. Shall have distinctive design, symbol, emblem, or mark, identifying the LPG cylinder owner;

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b. Shall be made of LPG resistant material; and

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c. Shall be broken or destroyed before LPG product can flow out of the cylinder. (**Shall be broken and destroyed to prevent the reuse of such seals.**)



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## D. LPG INSTALLATIONS



# LPG INSTALLATIONS

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## **INSTALLATION INTRODUCTION**

A typical LPG installation for domestic purposes usually consist of single 11kg or 50kg cylinder. The said capacities are to meet the low consumption required by ordinary cooking appliance. However, for large consumers with high gas requirements such as restaurants and hotels, a bank of manifold 50kg cylinders should be installed. A typical installation of this would consist of cylinders in service and an equivalent numbers in reserve. A correct sized common regulator should be fitted with adequate isolation valves provided for safe connection and disconnection.

# LPG INSTALLATIONS

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## **OBJECTIVE OF THE TYPICAL LPG INSTALLATION**

The primary objective of a typical Liquefied Petroleum Gas (LPG) installation is to **safely store, transport, and regulate the pressure of propane or butane gas** to deliver it from a container (cylinder or bulk tank) to consumption points (appliances) at a consistent, usable pressure

# LPG INSTALLATIONS

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## KEY OBJECTIVE INCLUDES:

1. **Safety & Risk Mitigation:** To prevent leaks, fire, or explosions by using secure tanks with pressure relief valves, proper spacing from buildings, and appropriate, well-maintained piping.
2. **Consistent Energy Delivery:** To convert high-pressure liquid in a tank into a controlled, low-pressure gas via a regulator for reliable use in cooking, heating, or industrial processes.
3. **Uninterrupted Supply:** To ensure continuous operation for commercial/residential users for immediate change-over of the supply.
4. **Compliance:** To meet local, national, and international safety regulations (e.g., NFPA 58) regarding installation, distance from structures, and ventilation.
5. **Convenience:** To provide a portable or compact stationary energy source that is easy to manage, inspect, and refill.

# LPG INSTALLATIONS

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## THINGS TO CONSIDER FOR LPG INSTALLATIONS:

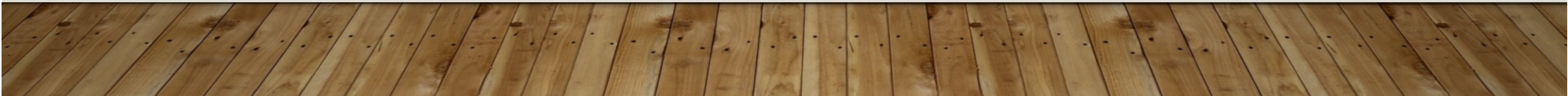
- 1. Calculating the total load:** In order to properly determine the size of the storage container, regulator to be used, the pipe size & etc., the total BTU load must be first calculated. The total load is the sum of all the gas usage in the installation.
  - **Evaporative Capacity of the Cylinder**
    - 11 kg cylinder – 47,000 BTU/Hr – 1 kg/hr
    - 50 kg cylinder – 137,000 BTU/Hr – 2.915 kg/hr
- 2. Location of Installation:** Cylinders in general, should be located outdoor and in well ventilated area. Proper safety distance should be observed and in compliance to the NFPA 58 or of the authority having jurisdiction.

# LPG INSTALLATIONS

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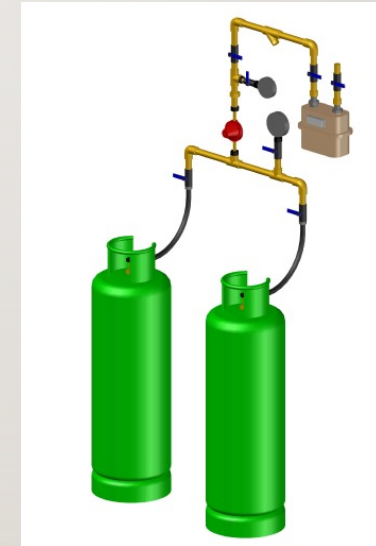
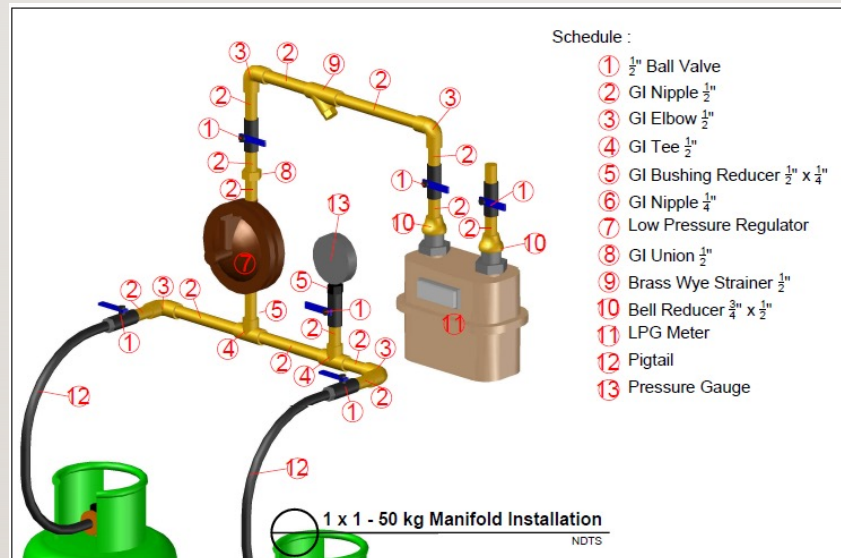
## THINGS TO CONSIDER FOR LPG INSTALLATIONS:

- 3. Leak Testing:** Once installation is completed and before the piping system will be put in service, it must be carefully tested to ensure that it is a gas tight. The pressure to be used for checking gas tightness are:
  - Piping installation subject to full cylinder pressure: test pressure of 1.5 times the normal working pressure or 10 bars (150 psi), whichever is greater.
  - Piping installation after the 1<sup>st</sup> stage regulator with pressure settings of 500 mm inches wc: test pressure of 2.5 times the maximum expected operating pressure 3.5 bars (50 psi), whichever is greater.
- 4. Commissioning and Hand-over:** The piping shall be purged of air up to the appliance with LPG vapor and further tested for leaks. Care must be taken to prevent accumulation of gas-air mixture released during purging inside premise.



# LPG INSTALLATIONS

## TYPICAL LPG INSTALLATION:



# LPG INSTALLATIONS

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**TYPICAL LPG INSTALLATION:**

6x6-50kg Manifold



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## E. MEASURING DEVICES



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## WEIGHING SCALES

### Purpose:

- To verify net weight of filled cylinders matches declared content.
- Ensures underfilling or overfilling is avoided for safety and compliance.

### DOE Standards

- I.) Test weight and weighing scale shall have an annual calibration certificate from DOST or manufacturer of such measuring devices for accuracy.



Look for a **DOE-required** weighing scale.





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- **CYLINDER  
WEIGHING SCALE**

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## F. FACILITY LAYOUT and DESIGN

## WHAT IS A SHOWROOM?

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- -an area or floor space dedicated to display or show the LPG cylinders for sale, and/or other LPG-Related devices; the showroom can also include the floor space for the conduct of sales and other business-related transactions
- Such construction and safety distance requirements shall be in accordance with the provisions of PNS/DOE 04:2023, LPG Dealer's Showroom, Warehouse, and Safety Practices – General Requirements.

# GENERAL REQUIREMENTS

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1. An LPG facility or building should not be located within or be part of a theater, school, hotel, supermarket, or place of worship.
2. Storage areas must be well-ventilated, especially at the floor level (since LPG is heavier than air).
3. The storage area should be protected by an adequate security fence to prevent trespassing and vandalism by unauthorized persons. A recommended minimum height of 1.8 meters is advised.



# GENERAL REQUIREMENTS

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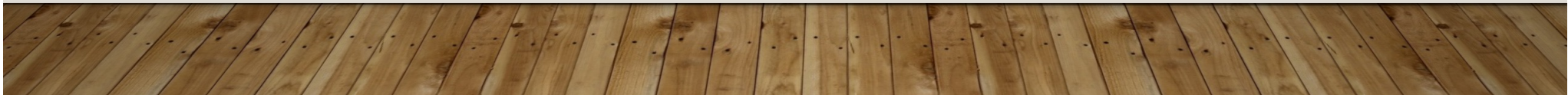
4. In cases where the storage area cannot comply with the required separation distances, a firewall may be considered to reduce the required distances.
5. Posts, walls, roofing, and trusses shall be made of non-combustible materials like steel/concrete.
6. The electrical outlet shall be properly protected from spark or possible source of ignition. Electrical outlets may also be weather/waterproof.



# GENERAL REQUIREMENTS

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7. No electrical switches, outlets, or appliances should be present within the storage area.
8. Each individual stockpile of cylinders shall have adequate gangways to facilitate easy retrieval or inspection in case of leaks.
9. No smoking, open flames, or ignition sources within the LPG cylinder storage area.
10. Cylinders must be stored upright, secured to prevent tipping.
11. Only approved and inspected cylinders (in good condition) may be stored



# GENERAL REQUIREMENTS

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12. Must be located outdoors, or in a room/building that meets special construction requirements (e.g., explosion-proof equipment and proper ventilation must be provided).
13. Floor must be non-combustible and level.
14. No pits or basements—to avoid LPG accumulation.
15. A flammable gas leak detector shall be installed on a wall or mounted on a metal stand (or any non-combustible material), no more than 0.30 meters (1 foot) from the floor, or as specified by the flammable gas leak detector supplier.



# SHOWROOM LAYOUT DESIGN AND SPECIFICATIONS

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## STRUCTURAL REQUIREMENTS (Open Air Storage or Buildings, as applicable)

- 1.) Building shall be made up of predominantly non-combustible material (Concrete/Steel);
- 2.) Building should not be part of a Theatre, School, Hotel, Supermarket or a place of worship;
- 3.) LPG cylinders should preferably be stored in a well-ventilated or open air and ground level location;
- 4.) The storage area should be protected by an adequate security fence to prevent trespassing and vandalism or unauthorized person. Recommended minimum height of 1.8 meters;

## SHOWROOM LAYOUT DESIGN AND SPECIFICATIONS

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5.) In cases storage cannot comply for separation distances, a firewall may be considered to reduce separation distances;

6.) Fire walls must be imperforate and substantially constructed from brick, reinforced concrete, or such other materials so that they have a standard of fire resistance of not less than 30 minutes. They shall be at least as high as the height of the highest stack of cylinders stored, but should be not more than 2.5 meters high. They shall be of such a length that the distance from any cylinder to boundary or fixed ignition source measured around the end of the wall is not less than the separation distances specified in Table 9 of PNS/DOE FS 2:2018;

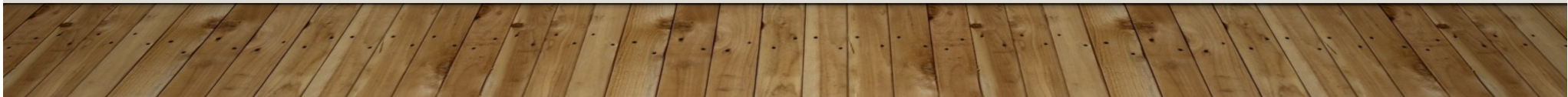
# SHOWROOM LAYOUT DESIGN AND SPECIFICATIONS

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- 7.) The floor of the storage area should be level, free from depressions and compacted or paved with a suitable materials and design to carry the expected load;
- 8.) The position chosen for storage shall be at ground level and never below it in cellars or basement and be readily accessible;
- 9.) The fire wall may be a wall of a building, in which case the following additional requirements must be met:

*a. There must be no openings in the wall above the cylinders stored or within 2 meters horizontally;*

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# SHOWROOM LAYOUT DESIGN AND SPECIFICATIONS

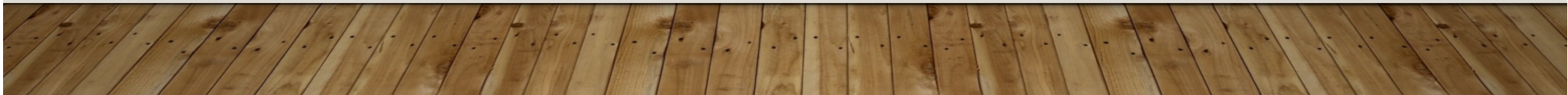
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*b. There must be no overhanging eaves or similar projections constructed from combustible materials above any stored cylinder; and*

*c. No external stairway or fire escape shall be positioned above cylinders or allowed to terminate in the storage area.*

10.) Any loading platform, and any roof provided over a storage place, shall be predominantly constructed from non-combustible materials;

11. The gas leak detector must be mounted at the lower portion of the wall; and

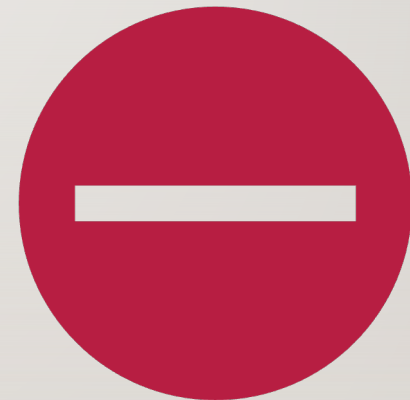


# SHOWROOM LAYOUT DESIGN AND SPECIFICATIONS

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12. All LPG storage facilities shall be clearly marked with notices on each externally visible side and presence at entrances to storage area indicating the presence of LPG. These notices shall indicate:

- (1) A warning notice – “Highly Flammable LPG”;
- (2) The warning symbol - For Flammable Gas;
- (3) The prohibition sign – No smoking or naked flames, no cellphones and cameras; and
- (4) Emergency contact numbers in case of gas leaks or fire: BFP, nearest hospital, LGU (Disaster Risk Reduction and Management Office).



# LPG INFORMATIONAL SIGNS

**GAS CYLINDER STORAGE**



- DANGER**  
Compressed gas
- Keep well ventilated
- No smoking or naked flames
- No entry to unauthorised personnel

**GAS CYLINDER PPE**



- Eye Protection MUST be worn
- Lab Coat MUST be worn
- Hard Toed Shoes MUST be worn
- Safety Gloves MUST be worn

**NOTICE**

**EMPTY CYLINDERS**



**GAS CYLINDER STORAGE**



- Danger**  
Compressed gas
- Keep well ventilated
- No Smoking or naked lights
- No entry to unauthorised personnel

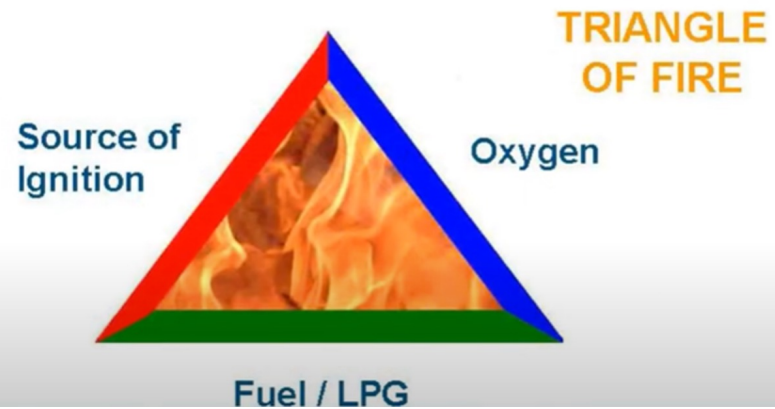
69

# FIRE TRIANGLE

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## FLAMMABILITY

LPG will burn either in the liquid or vapor phase. Combustion will require the three elements represented by each side.



4/16/26

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*HOW TO USE FIRE EXTINGUISHER*

4/16/26

## Parts of a Fire Extinguisher

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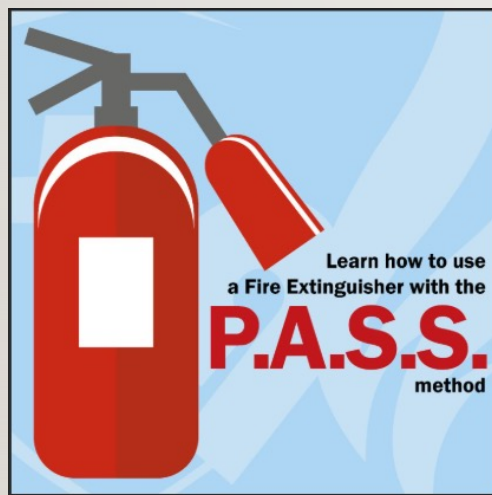
## Parts of a Fire Extinguisher

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P A S S



It is easy to remember how to use a fire extinguisher if you can Remember the Acronym *P A S S*, which stands for **Pull, Aim, Squeeze and Sweep**.

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**P A S S**

**PULL** the pin that unlocks the lever.  
(some models may have another  
lever-release mechanism.)

75

**P A S S**

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**Aim at the base of the fire.**

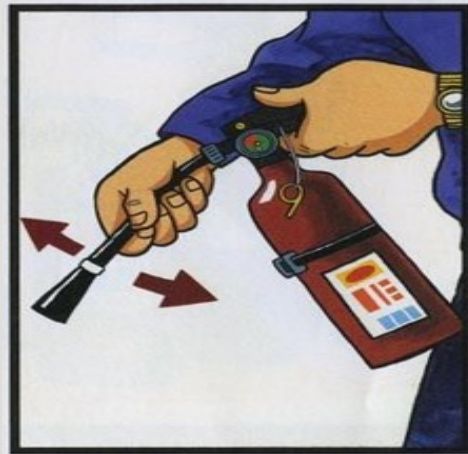
If you aim at the flames (which is frequently the temptation), the extinguishing agent will fly right through and do no good. You want to hit the fuel.

76

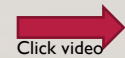
**P A S S**

**Squeeze the top handle or lever.**  
Squeeze the handle to discharge the pressurized extinguishing agent in the extinguisher.

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**P A S S****Sweep from side to side.**

Sweep the nozzle back and forth at the base of the fire. Once the fire is out, keep an eye on the area in case it re-ignites.



## FAQ's

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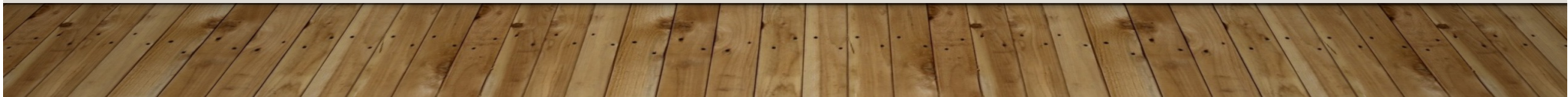
1. LPG means \_\_\_\_\_  
**Liquefied Petroleum Gas**

2. What is the color of LPG?  
**Colorless**

3. What is the name of the odorizing agent introduced in LPG so that leak can easily be detected?  
**Ethyl Mercaptan**

4. LPG is poisonous (True or False).  
**False**

5. LPG is being used in automotive (True or False)  
**True**



## FAQ's

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6. *LPG heat is not a fast instant heat (True or False)*

**False**

7. *We should replace our hoses and clips every 2 years and \_\_\_\_\_years for regulators*

**5 years**

8. *We should not panic during an emergency (True or False)*

**True**

9. *In the fire triangle, we have the Oxygen, Fuel and \_\_\_\_\_*

**Heat**

10. *We should buy our LPG and accessories from **AUTHORIZED \_\_\_\_\_ LPG Dealers or***

**Rufrance LPG**

**Rufrance LPG**



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- “Ang kaalaman ay pundasyon ng kaligtasan. Habang lalo nating nauunawaan ang LPG, mas nagiging ligtas ang ating komunidad.”- ILDP Training school

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**Maraming Salamat!**