

Loss Prevention Standards

Storage and Use of Liquefied Petroleum Gas (LPG) Refillable Cylinders

Introduction

Liquefied Petroleum Gas (LPG) is the generic term used to describe Propane, Butane, or mixtures of the two gases. It is heavier than air and will therefore collect at the lowest possible levels such as cellars, pits, drains or basements.

LPG cylinders are fabricated from sheet steel. Propane containers are either red, or grey with a red shoulder and Butane containers are normally painted blue.

Hazards

LPG is extremely flammable and readily forms explosive air-vapour mixtures.

Containers of LPG are liable to explode if they are involved in a fire, and this could result in fragments being projected over considerable distances.

Inhalation may cause irritation to the nose and throat, headache, nausea, vomiting, dizziness, euphoria and drowsiness. In poorly ventilated or confined spaces, unconsciousness and asphyxiation may result. Eye or skin contact with liquid product or gas under pressure can cause frost bite (cold burns).

Legislation

Relevant legislation for the safe use of LPG includes:

- Health and Safety at Work etc. Act 1974
- Management of Health and Safety at Work Regulations 1999
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Manual Handling Operations Regulations 1992 (as amended)
- Personal Protective Equipment at Work Regulations 1992 (as amended)
- Pressure Systems Safety Regulations 2000
- Dangerous Substances and Explosive Atmospheres Regulations 2002

Use of LPG in Cylinders

Managers and employees who have responsibility for the use and storage of LPG must understand the characteristics and hazards of the product they are using. They should also understand the fundamentals of fire fighting and control of leakages and know the procedures for dealing with emergencies. The following checklists should not be regarded as exhaustive:

- Appliances/equipment using LPG should be installed, commissioned and regularly maintained by trained personnel in accordance with the manufacturers'/suppliers' instructions
- Many appliances can be used with either Butane or Propane but because of the different operating pressure it is important to use the correct regulator. It is not possible to change from one gas to the other without also changing the regulator
- Empty cylinders should be treated in the same manner as full ones but should be kept separate, and the valves closed
- Regular inspections for leaks should be carried out. Naked lights must not be used for this purpose
- Cylinders in use should preferably be located in the open air, but where this is not possible, they should be positioned so that there is adequate ventilation at low level to the open air
- Cylinders, except special ones for fork lift trucks, should be used with the valves in the upright position
- Ensure that cylinders are not dropped, used as rollers, or struck by other solid objects
- Flexible hoses must be checked regularly for deterioration and must comply with BS 3212: *Specification for flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations.* LPG attacks natural rubber. Hoses should be kept as short as possible
- Combustible materials must be kept clear of equipment which uses LPG and cylinders must not be subjected to heat as the pressure within could build-up to dangerous levels

Storage of LPG in Cylinders

- Quantities of LPG should be kept to the minimum needed for effective operations, and excessive numbers of cylinders must not be allowed to accumulate
- Preferably, storage should be in the open air, on a concrete or paving slab base surrounded by a secure fence (e.g. chain link) and kept free of weeds and vegetation. There should be sufficient shelter to protect the cylinders from extremes of weather such as hot sun
- The minimum separation distance from other buildings or ignition sources is 3m for up to 1 tonne of LPG and 7.5m for 1 to 4 tonnes; more details can be found on the Health and Safety Executive (HSE) website at: [Separation distances](#)
- For further guidance on location and spacing for vessels, and requirements concerning fire wall provision, reference should be made to the [UKLPG](#) website which also contains various Codes of Practice
- Other highly flammable, combustible or oxidising materials must not be stored in the same compound, e.g. oxygen cylinders
- Cylinders should be stored with their valves uppermost and stacking should be avoided
- Warning signs must be displayed indicating the presence of LPG and prohibiting smoking and the use of naked flames
- Where only one or two cylinders are stored, they should be kept in a secure metal bin

Fire Protection

- It is inadvisable for untrained employees to attempt to extinguish a fire involving LPG and the fire brigade should be called immediately
- An adequate supply of water should be made available for the fire brigade together with suitable access to the storage area
- Approved fire extinguishers suitable for extinguishing fires in nearby materials should be provided in the vicinity of the storage area
- Consideration should be given to water spray or automatic sprinkler protection in situations where significant quantities of LPG are stored

Key Action Steps

- **Usage:** ensure that Butane and Propane cylinders are not interchanged
- **Maintenance:** set up maintenance programmes to include regular checks by competent persons
- **Training:** ensure that employees are trained in the correct and safe use of LPG
- **Storage:** set up adequate storage facilities for LPG cylinders
- **Warning:** display appropriate warning signs

Additional Information

- [Dangerous Substances and Explosive Atmospheres Regulations 2002: Approved Code of Practice and Guidance – L138](#) - HSE
- [Storage of Flammable Liquids in Containers: HSG51](#) – HSE
- [Inspecting and Maintaining or Replacing Buried Metallic Pipework Carrying LPG Vapour: Advice for Commercial and Industrial Users of LPG: INDG428](#) – HSE
- [UKLPG: Trade Association for the LPG Industry in the UK](#)
- BS 3212: 1991 - Specification for flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations

Further risk management information can be obtained from [Aviva Risk Management Solutions](#)

Please Note

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