

# FIRE SAFETY GUIDE FOR THE SAFE USE AND STORAGE OF LPG CYLINDERS



This document is designed to assist NFU Mutual customers in managing fire risks associated with LPG Cylinders



**NFU Mutual**  
RISK MANAGEMENT SERVICES

## INTRODUCTION

The two most common types of Liquefied Petroleum Gas (LPG) found in commercial environments are propane and butane. Fires involving LPG cylinders can be devastating with cylinders capable of being propelled significant distances if ruptured by heat, it is therefore important to ensure the potential for serious fire involving LPG cylinders is reduced as far as possible by minimizing inception hazards and ensuring they are stored correctly.

The following guide is aimed at providing information on fire safety for storage and use of propane and butane LPG cylinders in small quantities, rather than high level bulk storage where other guidance is available.

## WHAT ARE THE FIRE RISKS ASSOCIATED WITH THE USE AND STORAGE OF LPG CYLINDERS?

LPG is a hydrocarbon gas that exists in a liquified form. LPG boils at a very low temperature and to avoid the gas evaporating it is stored in pressurized steel vessels, the orange or blue cylinders that we are all familiar with.

LPG is colourless, odourless and heavier than air, therefore if a cylinder is defective and leaking, it could cause a volatile explosive atmosphere and life safety hazards without us being aware. It is therefore of utmost importance that persons working with LPG cylinders are trained in their safe use and know how to store correctly.

Generally, propane is found in commercial environments as it works in much lower temperatures than butane, but butane is still found in internal heaters and single use burners.

As with other flammable liquids, the main hazard will arise from ignition of leaking vapour. A fire involving LPG has the potential to be devastating, given the pressurized nature of the cylinder. The gas itself rarely causes the fire, but if the cylinders are heated sufficiently, they may rupture causing flying debris and releasing an additional fuel to the fire making it much harder to control.

## FIRE RISK ASSESSMENT

A fire risk assessment to be undertaken to identify and evaluate the potential for a serious fire at your premises. Responsibility for the fire risk assessment rests with occupiers and owners of business premises and should include the construction of the premises, working practices within, fire inception hazards, likely fire spread potential and the suitability and standard of fire protections including your fire alarm, fire doors, emergency lighting, escape signage and fire extinguishing appliances. The risk assessment to be carried out by a suitably competent person and any necessary control measures carried out to reduce the risk and effects of fire.

We recommend the local Fire & Rescue Service are invited to visit the location to assess water sources and familiarise themselves with the layout and the location of the premises.

Site plans to be available for the emergency services. These to show the locations of the storage areas, the type, quantity and location of gas cylinders in each area and the location of installations using the cylinders.

## GENERAL STORAGE & USE

Only LPG cylinders that are properly labelled and colour coded in accordance with **BS EN 1089-3 (Transportable Gas Cylinders – Gas Cylinder Identification)**, to be used so they are easily identifiable. The gases to be assessed in relation to the Control of Substances Hazards to Health (COSHH) Regulations and appropriate data sheets retained.

All staff to be provided with appropriate Personal Protective Equipment (PPE) and adequately trained in using and understanding LPG properties, specific training concerning what action is required in the event of an emergency is essential.

Cylinders to be stored upright, with their valves uppermost, in a well-ventilated area, away from other gases, ignition sources, oils/greases and combustibles.

To prevent cylinders in use from falling over a suitable trolley is to be used, or the cylinder to be chained/strapped to a fixed structure.

## STORAGE IN THE OPEN AIR

Cylinders in the open air to be stored upright and protected by placing within a lockable cage, or compound at least 1.8 meters in height, the floor is to be level, loadbearing and unlikely to flood. Protection to be provided from direct sunlight by a light, open sided weather covering of non-combustible construction (tarpaulins not to be used).

This to be located away from all property boundaries, public access routes, fire escapes, buildings, drains and motor vehicle movement. Where practical this distance should be at least 5 metres.

The cage/compound and adjacent areas to be kept clear of combustible materials, such as pallets and vegetation. If weed killers are utilised in the vicinity, only those of a non-chlorate type to be used.

Flammable materials, naked flames and smoking to be prohibited within the storage area and for at least 3 metres surrounding, with appropriate signage displayed.

## STORAGE WITHIN BUILDINGS

1. LPG cylinders to be stored in well ventilated areas, preferably in the open air. Where this is not possible, cylinders to be stored within a dedicated detached building constructed of non-combustible materials and located as far away as possible from other buildings.
2. Preferably only cylinders required for immediate and ongoing use are to be stored within the working area and the following guidance adhered to.
3. The number of cylinders to be kept to a minimum, with good ventilation both at high and low level.
4. Storage to never be below ground and away from underground pits, cellars, basements or drains, sources of ignition, oils/grease, corrosive and oxidizing agents and oxygen cylinders.
5. The building must display warning signs identifying the gases being stored and smoking and naked flames to be prohibited in the area. The storage area to be secured to prevent access by unauthorised persons.
6. Where cylinders have to be stored within a building used for other purposes, ensure they are located at ground level, near a door leading directly to open air.
7. The storage area to be separated from the remainder of the building by walls and floors built to the fire compartment standards as specified in the LPC Design Guide for the Fire Protection of Buildings.
8. For cylinders stored internally a Dangerous Substances and Explosive Atmosphere Regulations (DSEAR) assessment to be undertaken by a competent person and any corrective actions arising are implemented immediately. Ventilation is required to ensure that any small leakage of gas is adequately dispersed and will prevent a hazardous atmosphere being created.
9. The provision of a leak detection system with remote monitoring to be considered particularly where large numbers of gas cylinders are stored.

## STORAGE OF OTHER GASES

LPG cylinders to be stored separately away from oils, paints or other corrosive or flammable liquids. Propane or butane cylinders to be stored a minimum of 3 metres away from all other gas cylinders.

In areas where cylinders of different classes of gas are stored, consideration to be given to the provision of radiation barriers. Such barriers to have a fire resistance of at least 30 minutes and have a height not less than that of the tallest cylinder.

## STORAGE IN STACKS

Storage of larger quantities of LPG cylinders to be separated into stacks to reduce the potential for large scale explosion. Where more than 1,000kg of LPG is stored, separate stacks are required and further site-specific advice to be obtained - see further guidance below.

### PORTABLE FIRE EXTINGUISHER PROVISION

Whilst suitable and sufficient extinguishers for extinguishing fires in nearby materials, to be provided in the vicinity of all areas in which gases are used or stored. Fires involving LPG cylinders are not to be tackled with a fire extinguisher. Procedures to be put in place to contact the Fire and Rescue Service without delay and to ensure the area is evacuated immediately.

## SAFE USE OF CYLINDERS

1. Cylinders in use to be kept clear of all heat sources, especially oxy-fuel gas torches and electrical welding tools other than that in operation.
2. Equipment to be inspected prior to use, with records of the inspection retained, and any defects identified rectified prior to use. Cylinder valves only to be opened with a proper key and if the valve is damaged no attempt to be made to open it. The valve to be kept closed when not in use. Only regulators designed for the gas to be used and flashback arrestors to be fitted downstream of the pressure regulators for welding and similar applications.
3. Hoses to be purpose made and comply with current **BS3212: Specification for flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations**, to be used. Hoses to be secured by clips that are approved by the equipment manufacturer (Worm-drive clips are not suitable for this purpose) and hoses not to be coiled around cylinders or their regulators as this can cause damage.
4. Appropriate ventilation to be provided whenever cylinders are in use and cylinders to be maintained in clean condition. Grease or oil never to be allowed to come into contact with the cylinders.

## FURTHER GUIDANCE

Further guidance is available from RISC Authority document RC8 – Recommendations for the storage and use of common Industrial gases in cylinders including LPG available at [www.riscauthority.co.uk](http://www.riscauthority.co.uk) and Liquid Gas UK's **Code of Practice 7: Storage of Full and Empty LPG Cylinders and Cartridges** [www.uklpg.org](http://www.uklpg.org)

The Health & Safety Executive also issue guidance. Refer **HS(G)51 Storage of flammable liquids in containers**.

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