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Safe Use of Propane and Butane Cylinders and Cartridges

This Consumer Guidance Sheet gives general guidance for all users in domestic, small commercial and industrial applications who use LPG (Liquefied Petroleum Gas) cylinders and cartridges as a fuel supply to gas fired appliances. This guidance applies to vapor use only. The Health and Safety Executive was consulted in the production of this publication and endorses the advice set out in this guidance.

In this document cylinders are portable pressure containers up to 150 L capacity and cartridges are small containers of less than 1.4 L capacity [see 4].

The reference to Propane and Butane also covers mixtures of these two gases.

The guidance is limited to appliances only operating with pre-set pressures and does not cover Bitumen Boilers, and is limited to the storage and use of up to four cylinders or cartridges. Where a greater number of cylinders are required we recommend that consideration is given to a bulk storage tank.

For further information on the use and storage of cylinders refer to:

Liquid Gas UK Code of Practice 7; Storage of Full and Empty LPG Cylinders and Cartridges

Liquid Gas UK Code of Practice 24 series; The Use of Cylinders Part 1-6 depending upon your application.

The guidance will support and inform the risk assessment required under Health and Safety law at places of work [see 8].

Important: The guidance solely relates to LPG filled cylinders and cartridges commercially supplied by an authorised distributor or dealer. When empty NO attempt should be made to re-fill such cylinders and cartridges. Refillable cylinders are the property of the gas supplier and UNDER NO CIRCUMSTANCES can be refilled or disposed of but MUST be returned to the distributor or dealer. Cartridges must be safely disposed of when empty [see 5].

LPG cylinders must only be filled by competent personnel who have the correct training, experience and equipment.

The filling of cylinders that are supplied as being suitable for customer refilling from Autogas dispensing installations is covered in Liquid Gas UK Consumer Guidance Sheet 026.



- Properties and potential hazards
- Butane and Propane are Liquefied Petroleum Gases i.e. gases that are stored as a liquid in cylinders under pressure. At 15 degrees C the pressures are about 1.5 bar for butane and 7 bar for propane.
- The gas is heavier than air, so it tends to sink towards the ground and can accumulate in low areas, drains, basements and cellars.
- Escapes of small quantities of gas can mix with air to create large volumes of a flammable gas mixture which could ignite.
- An odour is added to the LPG so small releases of gas can be smelt.
- Never search for a suspected leak with a naked light.
- LPG is highly flammable and the liquid can cause a cold burn when in direct contact with skin.

1. Using LPG Cylinders Cartridges

- The majority of LPG cylinders in the UK are the property of the gas company who own, fill, maintain and inspect the cylinders in accordance with UKLPG Code of Practice 12.
- Always read the operating instructions and the emergency actions available from the gas supplier and/or manufacturer. If you have any doubts or questions, put safety first and contact your gas supplier.
- Keep any documentation relating to the installation for reference;
- Remember cylinders are heavier than the weight marked on the outside, lift carefully or use a trolley. A full cylinder will weigh about twice the gas contents weight shown on it.
- When a cylinder or cartridge is not connected always keep the valve closed and replace the cap/plug in its outlet connection (even when empty).
- Do transport, store and use cylinders and cartridges with their valve uppermost.
- Do treat cylinders and cartridges with care to ensure they don't get damaged
- Do use cylinders and cartridges in accordance with the supplier's instructions.
- Do keep all cylinders and cartridges in a safe, well-ventilated place, away from escape routes and stairs; cylinders preferably in the open air, cartridges in a dry location away from sources of potential ignition and excessive heat.
- Do make sure the cylinders are properly secured and are kept upright in use (except where cylinders are designed to be used on their side).
- Do keep cylinders and cartridges separate from other flammable and combustible materials. The area where cylinders are located outdoors should be kept free from rubbish and excessive build-up of vegetation; e.g. trees, bushes, undergrowth and weeds in the vicinity prevented.

- Do report any equipment failure or damage to your supplier without delay, and ask them for advice about what you should do.
- Do return cylinders when empty or no longer required to your supplier or nearest stockist.

1.1 Restrictions on Use of Cylinders

- Don't use propane cylinders indoors except when necessary for work processes and/or for short periods when propane cylinders may be used inside by trades people (e.g. plumbers).
- Don't subject cylinders to excessive heat or position them e.g. near a boiler flue or radiator.
- Don't use butane cylinders indoors unless the appliance is specifically designed to house the cylinder (e.g. a "cabinet heater") or a specific cylinder housing is provided.
- Don't use butane cylinders, even in cabinet heaters where gas is prohibited in a building or location.
- Don't use barbeques indoors, even if supplied from butane cylinders.
- Don't use cabinet heaters with propane cylinders.
- Don't store or use cylinders in cellars or below the ground level.
- Don't store or use cylinders adjacent to or over any opening into a cellar.
- Don't obstruct access to cylinders.
- Don't position cylinders adjacent to doors or in passageways.
- Don't smoke or use a mobile phone when changing cylinders;
- Don't allow electrical equipment, vehicles, bonfires, or other potential sources of ignition near the cylinders.
- Don't use cylinders other than for supplying gas, they are the property of the gas company and should be returned when no longer required.
- Don't try and remove the valve or cut the cylinder, it will still contain a flammable gas which can explode if in contact with an ignition source, such as a spark.
- Don't cut a cylinder or cartridge, even when empty as it will still contain flammable gas.
- Don't try and refill a cartridge. Where cylinders are concerned please see UKLPG User Information Sheet 026.
- Don't throw cylinders away, if you do not know what to do with a cylinder consult the UKLPG website or speak to your nearest stockist.

1.2 Cylinder Deliveries

If you have cylinders delivered, make sure you order the right number and correct type of replacements. Don't order more than you need. On a delivery day, make sure the parking area is clear for the delivery vehicle. Keep away from the vehicle while the cylinders are being handled.

Authorised cylinder distributors or dealers that supply and connect cylinders to domestic households and commercial & industrial premises shall ensure that suitable and sufficient training is provided to their employees for carrying out work as required under the Health and Safety at Work Act 1974.

2. Regulators and Hoses

Most appliances need regulators and hoses to connect them to cylinders.

2.1 Regulators Introduction

Regulators are necessary to reduce the pressure of LPG in the cylinder or cartridge to the much lower pressure that is used by the appliance. Each country has their own settings, typically in the UK, butane regulators are pre-set at nominally 28-30mbar and a propane regulator is pre-set to 37mbar. Regulators come in two basic patterns, screwed connectors and quick connect types. They are specific to the type of cylinder they can be attached to. Most screwed connections (except for special cylinders e.g. Camping Gaz, Calor 340 or Primus) are 'Left Handed' and tighten in the opposite direction to a normal screw. Some connections require the use of a non-metallic sealing washer.

The regulator service life is specified by the manufacturer, if this is not known then the precautionary period should be taken as 10 years. When selecting a regulator it is recommended that a model with a means of protecting the downstream pipework and appliance from overpressure in the event of regulator malfunction is used.

Such devices are: A regulator incorporating an Over Pressure Shut Off (OPSO) A two stage regulator where the 1st stage restricts the pressure lower than 150mbar. A regulator with an integral relief valve set lower than 150mbar. This type of regulator cannot be used indoors.

- Do make sure that the outlet pressure of the regulator is the same as the inlet pressure requirement of the appliance(s) and ensure it is the correct size for the cylinder valve – never force onto one of the wrong size
- Do connect regulators to cylinders in accordance with the manufacturer's instructions.
- Do always use the correct sized spanner to tighten any connection: Don't over tighten.
- Do use regulators clearly marked BS3016, BS EN16129, BS EN12864 or; (Regulators to BS EN13875 or BS EN13876 may be needed by some equipment for professional use or for some installations).
- When connecting to a cylinder ensure that both cylinder and regulator connection faces are clean with no apparent damage, and those requiring washers for sealing are present and in correct alignment.
- Do make sure regulators, not fitted directly to the cylinder outlet, and any changeover valve is secured at a position higher than the cylinder outlet.



- Do make sure the vent on a regulator does not point upwards or is installed in a position allowing the ingress of water.
- Do make sure the vent is not blocked by other contaminants; e.g. mortar from building works.
- Do replace a regulator if it shows signs of wear, leakage or damage

Regulator Restrictions

- Don't force a regulator or its mechanism if it does not fit easily.
- Don't tamper with or try to adjust regulators, they are pre-set by the manufacturer to control the gas supply at the correct pressure.

2.2 Hoses

- Do use rubber hoses clearly marked BSEN 1763 or Stainless Steel convoluted hoses marked EN10380
- Do use hoses clearly marked as 'High Pressure LPG' for direct connection to cylinders or if the outlet pressure of the regulator exceeds 50 mbar.
- Do keep hose lengths as short as practical but long enough that they are not pulled tight.
- Do replace any hose which shows signs of stiffness, wear, cracking, soft spots, blisters, rupture, or damage. Replacement of hoses should be considered after 5 years of service life unless they are made of stainless steel and marked EN10380.
- Do ensure hoses to changeover and wall mounted regulators are always routed so that the inlet of a changeover regulator is higher than the cylinder valve.
- Do tighten the connection from the hose end to the cylinder using a correctly sized spanner.
- Do ensure the connection is not over tightened, if it leaks then undo and check.
- Do make sure that the pipework or flexible hose from the cylinders to the point of use is protected against accidental damage, and is properly supported.
- Do ensure hose end connections are secured with hose clips. Preferably hoses should be factory assembled and tested with crimped connections.
- Do ensure hoses terminate before entering a property. Transition fittings to solid pipework shall be classed as hoses and must not pass through walls. (Note, in compliance with the Gas Safety (Installation and Use) Regulations 1998 GSIUR, solid pipework must be sleeved where it passes through walls).
- Do keep hoses clear of hot surfaces.
- Do keep hoses clear of boiler flues

3. Appliances

- Do have your appliances installed and regularly serviced by an appropriately qualified person. For fixed installations in domestic and commercial premises, this should be a GasSafe® Registered installer.
- Do use appliances in accordance with the manufacturer's instructions; keep the instructions available for future use.
- Do make sure that your appliances are never used if damaged.
- Do ensure there is an adequate supply of fresh air in the room where the appliance is being used. Do not block or restrict air vents.



Appliance Restrictions

- Don't connect a propane or butane supply to a natural gas appliance.
- Don't improvise or modify your gas appliance

4. LPG Cartridges

There are two types of cartridge. These can contain butane or butane/propane mix. It is essential that the instructions from the manufacturer/supplier are read before use. Make sure you are familiar with the way the cartridge fits on the appliance or regulator and always change the cartridge in the open air, never in a tent or building.

Pierceable Cartridges

This design of cartridge is only to be used with special appliances. The cartridge must not be removed from the appliance until it is empty, (in some conditions the cartridge may appear to be empty, but may contain some gas in a semi-refrigerated state).

Re-sealable Cartridges

This design of cartridge is fitted with a self-sealing valve that can be easily disconnected and reconnected from the appliance even when not empty. Re-sealable cartridges have a right hand thread.

5. Disposal of Cylinders and Cartridges

ALWAYS return cylinders to your supplier or their nearest stockist. LPG cylinders remain the property of the gas company who supplied them. Dispose of empty gas cartridges with care. Cylinders and cartridges should be always treated as FULL, the gas residue that they contain could lead to danger. Under no circumstances should cartridges be thrown onto fires. Small numbers of empty cartridges can be disposed of by recycling or including them in normal refuse but significant quantities should be disposed of by arrangement with the Local Authority or by a specialist waste contractor.

6.0 Emergency Information

In the event of a leak, take the following action:

- If it is safe to do so, turn off all the LPG appliances.
- If you think you have an LPG leak at a cylinder or the associated pipework, call the LPG supplier so they can come and make safe.
- If you have a leaking cylinder indoors and it is safe to move the cylinder outdoors, move the cylinder to a well-ventilated location where the leaking gas cannot find its way into a building, basements, cellar or drain.
- If you smell gas, suspect a leak or get headaches when an appliance is used, if it is safe to do so, switch off the appliance and turn off the gas supply at the cylinder(s). Contact somebody who is suitably qualified to check over the installation. For appliances and fixed installations in domestic and commercial premises, this should be a GasSafe® Registered technician.
- If the leak is indoors, open all the doors and windows. Do not switch any lights or electrical equipment on or off, as this may cause a spark. Do not smoke.



In the event of a fire, take the following action:

- Don't try to put out a fire involving LPG - leave it to the fire brigade. It is safer to evacuate everyone from the area. An overheated cylinder or cartridge may explode.
- Dial 999 to call the fire brigade.
- Tell them LPG cylinders or cartridges are on the premises.
- Tell everybody to leave the premises and go to a safe place well away from the installation/cylinders/cartridges.
- If you have a fire alarm, activate it.
- A fire involving grass, rubbish, etc, can be tackled with a fire extinguisher or hose reel if it is safe to do so. Always call the fire brigade first. If the fire is near the cylinders or pipework, or if you can't put it out quickly - leave it.

7.0 Carbon Monoxide



Carbon Monoxide (CO) is a poisonous gas which can be formed by burning any carbon based fuel if the appliance is not properly installed or maintained. Carbon monoxide detectors are widely available. It is strongly recommended that every property has one. Such alarms should comply with BS EN 50291 and carry the appropriate conformity marking. CO alarms should be installed, checked and serviced in accordance with manufacturer's instructions. If you suffer from any of following symptoms when appliances are in use such as headaches; nausea and dizziness, you should turn the appliance(s) off immediately, and have them checked by a qualified person. This should be a GasSafe® Registered technician for appliances and fixed installations in domestic and commercial premises. If you have any safety concerns or questions, please contact your gas supplier.

8.0 Legislation

The storage and use of LPG cylinders and cartridges at places of work is subject to the Health and Safety at Work Act (HASWA). The guidance in this leaflet is intended to assist employers in complying with their responsibilities under HASWA and the specific requirements under the Management of Health and Safety at Work Regulations, Dangerous Substances and Explosive Atmospheres Regulations and Provision and Use of Work Equipment Regulations.

Appliances and fixed pipework installations in domestic and commercial premises are also subject to the requirements of Gas Safety (Installation and Use) Regulations 1998 (SI 1998 No 2451) (GSIUR). These Regulations and the HSW Act place responsibilities on a wide range of people, including those installing, servicing, maintaining or repairing gas appliances and other gas fittings; as well as suppliers and users of gas, including certain landlords

For further information see:

www.hse.gov.uk

<http://www.hse.gov.uk/fireandexplosion/index.htm>

<http://www.hse.gov.uk/gas/domestic/index.htm>

This guidance is also intended to assist individuals who have duties as “responsible persons” under the Regulatory Reform (Fire Safety) Order in England and Wales and Fire (Scotland) Act to meet these [For further information for England and Wales see:

<https://www.gov.uk/government/organisations/department-for-communities-and-localgovernment/series/fire-safety-law-and-guidancedocuments-for-business>

and for Scotland see:

<http://www.scotland.gov.uk/Topics/Justice/publicsafety/Fire-Rescue/FireLaw/FireLaw/GeneralGuidance>



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