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Guidance on Storage, Marking, Transportation and Disposal of LPG and Propylene Non-Refillable Cylinders

Introduction

This Guidance is aimed at Local Authorities (Trading Standards), manufacturers, wholesale or retail suppliers, dealers and stockists of non-refillable cylinders. The guidance is applicable to the UK market only.

This guidance sheet relates to the storage, marking, transportation and disposal of non-refillable cylinders and cartridges for LPG and propylene.

These cylinders have been on the market for several years and are generally sold to professionals and private people via builders and plumbers' merchants and other DIY retailers. Cylinders are connected to a variety of branded blow torches with a CGA 600 connection for soldering, brazing, and general plumbing requirements. These are normally used by trade professionals such as plumbing, heating, gas installers and chefs. Cylinders contain a low pressure liquefied gas; Butane, Propylene, Propane or a mixture of these gases, combined with oxygen to give a flame temperature of up to 3000°C.

The guidance aims to reduce confusion in the marking and transportation of the products between a trade professional cylinder and the canisters/cartridges that are used in portable cooking appliances.

LPG and Propylene Properties

LPG and propylene are stored as a liquid in cylinders under pressure and have properties that make them a potential hazard for you. Any leakage can result in an extremely flammable/explosive atmosphere. One litre of liquefied gas released into the atmosphere will expand to 270 times that volume, which when mixed with air will give up to 13.5 cubic metres of flammable vapour.

Safe Operation

Safe operation of LPG/propylene cylinders and their associated appliances is achieved by ensuring they are installed correctly, and do not have any obvious defects which could result in leakage of the LPG/propylene or lead to the production of Carbon Monoxide. Cylinders should always be checked for leakage at the time of receipt. For cylinders in commercial use, appropriate fire precautions and emergency procedures must be in place.

Responsibilities

Where cylinders are supplied from wholesale or retail suppliers, dealers and stockiest etc. the point of supply shall make available basic safety information regarding the use of the cylinders and the gas it contains. Everyone responsible for retailing cylinders, equipment and/or appliances that operate on LPG or propylene, including the exchange or replacement at customer premises, shall be competent to ensure that they understand:

- the properties and hazards of LPG/propylene,
- the correct selection of equipment (including regulators and hoses),
- appropriate fire and other safety precautions.

Definition of Non-Refillable Cylinders and Canister/Cartridges

Welded or brazed non-refillable cylinders for use with LPG or Propylene shall be constructed in accordance with ISO11118 and for the purpose of shipping must be marked **UN 1077 or UN 1978** as appropriate to the actual contents. ISO 11118 is the standard for non-refillable cylinders of welded, brazed, or seamless construction used for high pressure compressed, liquefied, or dissolved gases. For this application these cylinders contain predominately propylene or propane.

Market	Commercial	All Applications
Type	non-refillable Cylinders	Canisters/Cartridges
Product	Propylene or Propane	Butane, Propane or their Mixtures
Connector	CGA-600	Euroconnector and/or Pierceable
Material	Steel	Aluminium or Steel
Non-refillable Sealing Device	YES	NO
Refillable	NO	NO
Construction Standard	ISO 11118	EN 417
UN Number Assignment	UN 1077, UN 1978	UN 1950 or UN 2037



*Pictures supplied courtesy of Camping Gaz and BernzOmatic.

Storage

LPG and propylene cylinders may be stored indoors in the following, subject to the quantity limitations given in the table below:

- a specially designed single storey building.
- a specially designed storage place within a building.
- a cabinet or cupboard.

Minimum Separation Distances for Total LPG (and/or propylene) Storage: Refer to (Table 1 in Liquid Gas UK Code of Practice 33: Use of LPG Cylinders)

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>
<i>Total Quantity of LPG (and/or propylene) Storage in 'Cylinder'</i>	<i>Minimum separation distance to boundary, building or fixed ignition source FROM NEAREST CYLINDER (where no fire wall is provided)</i>	<i>Minimum separation distance to boundary, building or fixed ignition source FROM FIRE WALL where provided</i>
Kilograms	Metres	Metres
From 15 To 400	1	Nil
Above 400 To 1 000	3	1
Above 1 000 To 4 000	4	1

Note:

Further information on the storage of cylinders is contained in Liquid Gas UK Code of Practice 7: Storage of LPG Cylinders and Cartridges.

Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)

Dangerous substances can put people's safety at risk from fire, explosion and corrosion of metal. DSEAR puts duties on employers and the self-employed to protect people from these risks to their safety in the workplace, and to members of the public who may be put at risk.

For further information on DSEAR refer to Energy Institute: Part 15 'Area classification for installations handling flammable fluids. The document provides guidance on the classification of areas around equipment handling or storing flammable liquids and provides a basis for both the selection of fixed electrical and mechanical equipment and the location of other sources of ignition in those areas.

Transportation



UN 1077 PROPYLENE
UN 1978 PROPANE
Class 2 (Classification code:2F)
Label 2.1

Cylinder Packing instruction: P200 of ADR

Mixed packaging (ie put in same box as other products)

MP9 May be packed together in an outer packaging for combination packaging in accordance with 6.1.4.21:

- with other goods of Class 2; - with goods of other classes, when the mixed packing is also permitted for these; or
- with goods which are not subject to the requirements of ADR, provided they do not react dangerously with one another.

Note: since limited quantities are not allowed, the packaging MUST be a UN (United Nations) certified type, which has been tested and approved for the specific cylinders to be carried. In practice this will almost exclusively require a package with a '4GV' or '4DV' marking.

Transport category 2: The load limit (of flammable content gas) below which the full provisions of ADR 1.1.3.6 do not apply is ≤ 333 kg (assuming no other dangerous goods are carried) > 333 kg means ADR rules apply in full. Tunnel restriction code: B/D (only applies when above the 333 kg limit).

Driver training: if > 333 kg is carried on the vehicle the driver must hold an ADR driver training certificate covering Class 2 in packages. If ≤ 333 kg then they must have received relevant ADR awareness training.

Vehicle markings: if >333 kg is carried then a plain orange plate must be fixed to the front and rear of the vehicle, no placards are required. If ≤333 kg carried, then no orange plates or placards are required.

Additional transport provisions when > 333 kg is carried:

CV9 Packages shall not be thrown or subject to impact & receptacles shall be so stowed in the vehicle or cylinder that they cannot overturn or fall.

CV10 Cylinder as defined in the ADR 1.2.1, shall be laid parallel to or at right angles to the longitudinal axis of the vehicle or cylinder; however, those situated near the forward transverse wall shall be laid at right angles to the said axis.

Short cylinders of large diameter (about 30 cm and over) may be stowed longitudinally with their valve-protecting devices directed towards the middle of the vehicle or cylinder.

Cylinders which are sufficiently stable or are carried in suitable devices effectively preventing them from overturning may be placed upright.

Cylinders which are laid flat shall be securely and appropriately wedged, attached, or secured so that they cannot shift.

CV36 Packages shall preferably be loaded in open or ventilated vehicles or open or ventilated cylinders. If this is not feasible and packages are carried in other closed vehicles or cylinders, the cargo doors of the vehicles shall be marked with the following in letters not less than 25 mm high: "WARNING NO VENTILATION OPEN WITH CAUTION"
This shall be in a language considered appropriate by the consignor.

S2 **Additional requirements concerning the carriage of flammable liquids or gases**

(1) Portable lighting apparatus The load compartment of closed vehicles carrying liquids having a flash-point of not more than 60 °C or flammable substances or articles of Class 2, shall not be entered by persons carrying portable lighting apparatus other than those so designed and constructed that they cannot ignite any flammable vapours or gases which may have penetrated into the interior of the vehicle.

S20 The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass or volume of these substances in the vehicle exceeds 10 000 kg as packaged goods.

H.I.N 23 Extremely Flammable Gas

- Transport, store and use cylinder and cartridges with their valve uppermost.
- Do make sure the cylinders are properly secured and are kept upright in use.

Department for Transport Road Derogation 4: Retail Distribution by Road

Road Derogation 4 states:

1. This derogation does not apply to the carriage of Class 1, 4.2, 6.2 or 7 goods.
2. Subject to paragraph 1, the requirement for packaging to be a combination package as specified in ADR 3.4.2 or 4.1 and for markings to be affixed for the final stages of the carriage operation in ADR 5.2 and 6.1.3 do not need to be complied with if:
 - a. the goods for carriage by road were originally packed in limited quantities in accordance with ADR 3.4 or combination packaging's in accordance with ADR 4.1; and
 - b. the quantity carried on the transport unit does not exceed 30 kilograms or litres per type, colour, strength or inner package size of a substance or an article, and a total of 333 kilograms or litres per transport unit; and
 - c. the goods have been removed from their outer packaging for the final stages of the carriage operation between a distribution centre and a retailer or end-user, or a retailer and end-user, or between an end-user and retailer or distribution centre.

Road Derogation 4 (retail distribution by road) provides for the carriage of "naked" receptacles (inner packaging's) that have been taken from fully regulated combination packages during the final stages of the distribution chain, and any consequential initial returns that are sent back up the distribution chain.

This derogation is vital, for instance, to enable supermarkets (merchants and retail) to engage in home deliveries of customer orders, for many products in the final stages of their distribution. It permits the carriage of inner packaging's without the outer packaging and relies on the supply labelling to warn those involved of the hazards.

It thus permits a supermarket (merchants and retail) to deliver a single unpackaged aerosol, cylinder/cartridge as part of an online ordered home delivery. The derogation is only from certain aspects — and does not derogate from ADR's requirement for prior, appropriate and documented training by all involved.

Disposal

Cylinders should be emptied of all remaining gas as per the manufacturer's instructions and then recycled at your local authority amenities site. Further information can be found at Liquid Gas UK website: www.liquidgasuk.org for guidance on how to safely dispose of your cylinder at the end of its life.

Appendix

Regulations

This list is not exhaustive, and other legislation may apply in particular cases.

Agreement Concerning the International Transport of Dangerous Goods by Road (ADR)

The international agreement on the carriage of dangerous goods, "Accord européen relatif au transport international des marchandises dangereuses par route" (ADR).

Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009

"The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG Regs) directly reference ADR for the main duties, though there are some GB derogations. Subsequent amending regulations have been made, mainly to reflect changes to the EU Transportable Pressure Equipment Directive and the introduction of the UK Rho mark". Further guidance can be found at:

<http://www.hse.gov.uk/cdg>

<https://www.vehicle-certification-agency.gov.uk>

Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation)

Regulation on classification, labelling and packaging of substances and mixtures came into force on 20 January 2009 in all EU Member States, including the UK. It is known by its abbreviated form, 'the CLP Regulation' or just 'CLP'.

From the 1st of June 2015, the CLP Regulations were fully applied in the UK.

Dangerous Substances and Explosive Atmospheres Regulations 2002

These Regulations impose requirements for the purpose of eliminating or reducing risks to safety from fire, explosion or other events arising from the hazardous properties of a "dangerous substance" in connection with work.

Pressure Equipment (Safety) Regulations 2016

These regulations apply to all pressurised equipment including pipework assemblies operating at pressures greater than 0,5 bar produced after May 2002. In most cases new equipment needs to be CE marked or UKCA marked.

Health & Safety Executive Publications

HSG 51 The storage of flammable liquids in 'Cylinders'

HSE L138 Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and Guidance.

HSE (INDG370) Controlling fire and explosion risks in the workplace

Normative Standards

ISO EN 11118 specifies minimum requirements for the material, design, inspections, construction and workmanship, manufacturing processes, and tests at manufacture of non-refillable metallic gas cylinder of welded, brazed, or seamless construction for compressed and liquefied gases including the requirements for their non-refillable sealing devices and their methods of testing.

EN 417 non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances. Construction, inspection, testing and marking.

Liquid Gas UK Code of Practice 7: Storage of Full and Empty LPG Cylinder and Cartridges

Liquid Gas UK Code of Practice 33: Use of LPG Cylinders

Liquid Gas UK Code of Practice 27: The Carriage of LPG Cylinder by Road & Hazard Information Labelling Requirements

Energy Institute: Part 15 Area classification for installations handling flammable fluids

Liquid Gas UK Guidance Sheets

Consumer Guidance Sheet 28: Safe Use of Propane and Butane Cylinder and Cartridge.

Liquid Gas UK

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