

Title: Consumer Guidance Sheet (CGS) 05 – LPG Hoses and Tubing for Use with Vapour Offtake Cylinders

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Note: This version of Technical Bulletin (TB) 146 replaces the version originally published 30 March 2020 which is now withdrawn. This version has been reviewed and where appropriate revised to ensure that it remains both current and relevant.

This Technical Bulletin informs Gas Safe registered businesses/engineers of the publication by Liquid Gas UK of a Consumer Guidance Sheet (CGS) on LPG Hoses and Tubing for Use with Vapour Offtake Cylinders. The purpose of this is to ensure that correct LPG hoses are used for the relevant applications.

Introduction

Liquid Gas UK has issued a Consumer Guidance Sheet (CGS). A copy of the CGS is attached to this TB as [Appendix 1](#). The guidance contained in this CGS gives important information relating to the two published Standards, BS 3212⁽¹⁾ and BS EN 16436⁽²⁾ and to inform industry about important information that is contained within the UK National Foreword to BS EN16436 Part 1. This CGS is stated as having the same status as a Code of Practice and therefore its contents are expected to be conformed with.

Issue

With the publication of a new European standard for LPG hose and tubing - BS EN 16436-1: 2014⁽²⁾ 'Rubber and plastics hoses, tubing and assemblies for use with propane and butane and their mixture in the vapour phase. Part 1: Hoses and Tubing', this standard now defines one class of tubing and two classes of hose. However, the Liquid Gas UK CGS also makes it clear that hose and tubing assemblies should be assembled in accordance with British Standard BS 3212⁽¹⁾ which is still current.

Guidance

The CGS provides definitions for both 'hoses' and 'tubing' and details the suitability of use for both. It provides guidance on service life for hoses and tubing and provides information on manufacturing marking. It also provides guidance on recommended regular inspection and a replacement scheme. It advises on information contained in a statement in the National Forward to BS EN 16436-1: 2014⁽²⁾ regarding the permeability of hoses and provides a recommendation that all hose sold in the UK be subjected to a permeability test with propane in accordance with BS 3212⁽¹⁾.

It also provides guidance to dealers and retailers on establishing the use of the hose or tubing before it is supplied.

High Pressure Systems

The CGS clarifies that BS EN 16436⁽²⁾ Class 2 hose is only suitable for use downstream of a pressure regulating device and hence when operating at full vapour pressure, including the use of 'pigtailed', the hose must be BS 3212 Class 2 or BS EN 16436 Class 3.

BS EN 16436 Class 2 is unsuited to high-pressure applications on propane systems, because of its potential to burst when the LPG cylinder is subject to extreme summer

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Developed by Liquid Gas UK & Boat Safety Scheme

temperatures, such as the conditions created when e.g. a boat is covered up. Accordingly, for propane or butane systems on the high-pressure (cylinder) side, where hose marked is marked to BS EN 16436, only Class 3 can be accepted where the cylinder and hose may be subjected to elevated temperatures during summer months.

Boat Safety Scheme

The need for correct hose types to be used is important and therefore the Boat Safety Scheme now requires that boats subject to periodic examinations are assessed to ensure Class 3 hose is used in the high-pressure application.

Note 1: For details of current gas safety legislation, building legislation and industry standards for the geographical areas covered by Gas Safe Register, see the [Legislative, Normative & Informative Document List \(LNIDL\)](#)⁽³⁾ at: <https://www.gassaferegister.co.uk/sign-in/> - login and visit the Technical Information area.

Note 2: For general information about the process behind the development of Gas Safe Register Technical Bulletins and the expectations for all Stakeholders, see [TB 1000](#)⁽⁴⁾.

Bibliography

- (1) BS 3212:1991 - Specification for flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations
- (2) BS EN 16436-1:2014 Rubber and plastics hoses, tubing and assemblies for use with propane and butane and their mixture in the vapour phase. Hoses and tubing
- (3) LNIDL – Gas Safe Register Legislative, Normative & Informative Document List
- (4) TB 1000 – An introduction to Gas Safe Register Technical Bulletins

Note: Gas Safe Register Technical Bulletins and the Legislative, Normative & Informative Document List can be viewed at: <https://www.gassaferegister.co.uk/sign-in/> - login and visit the Technical Information area.

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LPG HOSE AND TUBING FOR USE WITH VAPOUR OFFTAKE CYLINDERS

1. Introduction

Liquid Gas UK (formerly UKLPG) has been made aware of a number of incidents involving the inappropriate use of hose and tubing. The standards define hose as being suitable for LPG vapour at all pressures, whilst tubing is only suitable for pressures not exceeding 200 mbar.

2. Hose

Suitable hose can be of rubber or stainless steel construction. Rubber hose is of two-ply construction and designed for use with medium and high-pressure gas. Requirements for medium and high pressure rubber hoses are given in sections 2.1 and 2.2 respectively. Requirements for stainless steel hoses are given in section 2.3.

2.1. Hose for medium pressure applications (maximum pressure 10 bar)

It is used for applications downstream of a regulator and is capable to connect some appliances that require medium pressure (up to 10 bar) such as plumber and roofing blow torches and some models of fan draft space heater used in heating commercial and agricultural premises. Hose length should be kept as short as practicable.

It shall comply with BS EN 16436-1 Class 2 and be marked with the following: Manufacturer Name – BS EN 16436-1:2014 – class 2 – Xmm – 10 bar – Propane/Butane. Where X indicates the internal diameter. Class 2 hose shall only be used downstream of a pressure regulating device. Class 2 hose may be coloured orange, black or white.

2.2. Hose for high pressure applications

It shall comply with BS EN 16436_1 Class 3 and be marked with the following: Manufacturer Name – BS EN 16436-1:2014 – class 3 – Xmm – 30 bar – Propane/Butane. The above hoses are available in a number of sizes, but where used to connect gas cylinders to regulators or cylinders to cylinders this shall not be more than 8mm in diameter and no longer than 1m in length (or 0.5m for touring caravans in accordance with BS EN 1949).

(BS EN 1949 – for touring caravans, has a maximum hose length of 0.5 metres).

Class 3 hose is also used as a high integrity hose and is suitable for various applications, such as for outdoor appliances.

Class 3 hose may be coloured orange or black with an orange stripe.

2.3. Flexible Stainless Steel Hoses

Flexible or convoluted stainless steel hoses, which are normally PVC covered, can be used as an alternative to rubber hoses. Typically, they are suitable for use at a working pressure up to 2 bar pressure. For working pressures over 2 bar, the hose also requires an outer wire braid. Suitable stainless steel hoses shall conform to BS EN ISO10380 and shall be marked with the following: Manufacturer Name, the year of manufacture, BS EN ISO 10380 product type (Type 1-50, 1-10, 2-10 or 3; annular or helical), material type, nominal diameter (DN), Pressure rating (PS or PN) and operating temperature (if applicable).

3. Tubing (Maximum pressure 200 mbar)

Tubing is normally of single ply construction and designed for use downstream of a low-pressure regulating device. It shall comply with BS EN 16436-1 Class 1 and be marked with the following: Manufacturer Name – BS EN 16436-1:2014 – class 1 – Xmm – 0.2 bar – Propane/Butane – EXP DATE.

It is usually only available in 8 mm internal diameter (X = 8). Tubing is only suitable for use at pressures not exceeding 200 mbar. Class 1 hose may be coloured black or white and is marked with an expiry date. The hose is normally used integral of a gas appliance.

Where a flexible connection is used it shall be of one continuous length and be as short as practicable to provide the flexibility for which they are to be utilised.

The length of the flexible connection shall be sufficient to prevent excessive strain on it or its end connections and to allow smooth swept bends without kinking or twisting when assembled.



Hoses where used after a regulator shall be sized correctly to ensure that the appliances work correctly within the operational limits as prescribed by the manufacturer.

Longer hose lengths may cause excessive pressure drop which will affect the correct operation of the appliance.

4. General Safety Advice Guidance

4.1. Service Life of Hose and Tubing

Whilst there is no specific service life or exchange interval for LPG hose, it is recommended that rubber hoses are replaced after 10 years. However, rubber hoses fitted to cabinet heaters should be replaced after 5-year service.

It is essential that LPG hose/tubing and end connections are regularly inspected and replaced if showing signs of:

- Physical damage such as - cuts or abrasion, rodent attack***, cracking, stretching, flattening, kinking and, where fitted, missing/worn sealing washers, damaged cylinder connections;
- Environmental deterioration such as - stiffening, cracking, de-lamination of outer covering, chemical degradation i.e. softening of outer coating by contact with oil;
- Hose service failure such as - blistering, soft spots, rupture and, for pre-assembled end fittings, corrosion or loosening of swaged fittings attaching hose.

If any of these defects are observed the hose or tube shall be IMMEDIATELY replaced.

For LPG tubing there is an expiry date of 5 years. This will be marked on the hose as "EXP DATE" followed by the year corresponding to 5 years after the manufacturing date (see Note below). Notwithstanding LPG tubing's expiry date, as with hoses, it should also be regularly visually inspected for cuts, abrasion, discoloration, deterioration, swelling and damage. If any of these defects are observed the hose or tube shall be IMMEDIATELY replaced.

Note: For tubing manufactured from the 1st of September of year YYYY, the marking of the expiry date (EXP DATE) may be the year YYYY+6.

4.2. Gas Safety (Installation and Use) Regulations (GSIUR)

GSIUR requires hoses or tubing to be connected to rigid pipework before passing through walls, floors, ceilings or other partitions. Any gas installation within the scope of GSIUR must meet this requirement. LGUK recommends that this requirement is also followed for premises outside the scope of GSIUR.



4.3. Installations within the Scope of BS 6891

Only Class 2 or 3 hose should be used in the installation or commercial activity covered by the GSIUR and or installations within the scope of British Standard BS 6891.

4.4. Rodent Attack

For residential park home and caravan holiday home connections within the scope of BS 6891 or for any other installations where there is a history of the hoses being attacked by rodents, if rubber hoses are used they shall be protected against rodent attack. In this instance it is normal to incorporate wire braided protection known as armoured hose. In this instance it is normal to incorporate wire braided protection known as armoured hose. Stainless steel hoses provide sufficient rodent protection by their inherent design.

4.5. Hose and Tubing End Fittings

It is very important that the ends of tubing and hose are securely attached to the end fittings. For more detail see Liquid Gas UK Consumer Guidance Sheet CGS 17 - Use of clips to secure vapour phase LPG hose and tubing.

4.6. Avoidance of Re-liquefaction (See note)

Serious and in some cases fatal accidents have occurred in the past with long hose lengths due to re-liquefaction. To avoid re-liquefaction, the hose shall be as short as practical and shall slope down from the regulator inlet to the cylinder valve without any dips where any re-liquefied gas could accumulate.

5. Action by Dealers and Retailers

When supplying hose or tubing dealers and retailers should ask the following questions to ensure the correct specification of hose/tube is supplied, i.e:

- Whether the customer needs medium or high-pressure hose, or low pressure tubing;
- Whether the hose or tubing is to be used outside;
- What the customer needs the hose or tubing for;
- Make provisions for the above questions on your website for online sales.



Note:

Re-liquefaction is when the ambient temperature of the gas drops below the temperature that the gas vaporises at it then turns back into liquid LPG. This can occur in hoses that are connected directly to a cylinder where the pressure regulator is not installed on the cylinder valve. If the formed liquid gas can drain back into the cylinder it should not cause a problem. However, if it cannot drain back, when the appliance draws gas, a slug of liquid can pass through the regulator. Once it is past the regulator it will rapidly vaporise, and the pressure will rise to a higher level than the regulator control pressure. This can result in damage and/or leakage to the pipework and/or the appliance, in addition the appliance flame can increase significantly in size resulting in bad combustion and in extreme cases, the appliance catching fire.

Status of Liquid Gas UK Consumer Guidance Sheets (CGS)

The Consumer Guidance sheets serve as guidance prepared and issued under the authority of Liquid Gas UK; the contents have the same status as a Code of Practice so members of Liquid Gas UK are expected to conform to the information provided. Liquid Gas UK guidance is sometimes written in collaboration with UK policy makers, therefore regulatory inspectors may choose to use the guidance to establish good practice and compliance.

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