

Domestic butane- and propane-gas-burning installations —

Part 1: Specification for installations at permanent dwellings

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Committees responsible for this British Standard

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- British Fire Services Association
- British Marine Industries Federation
- British Waterways Board
- Caravan Club
- Consumer Policy Committee of BSI
- Consumers' Association
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Department of Transport (Marine Directorate)
- Health and Safety Executive
- Home Office
- Institution of Fire Engineers
- LP Gas Association
- Loss Prevention Council
- National Association of Plumbing, Heating and Mechanical Services Contractors
- National Caravan Council Limited
- Society of British Gas Industries
- The Council for Registered Gas Installers
- Institute of Wastes Management
- Coopted members

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National foreword

This Part of BS 5482 has been prepared under the direction of the Gas Standards Engineering Policy Committee. It supersedes BS 5482-1:1979 which is withdrawn.

NOTE This standard has been written in the form of a practice specification (see clause 6 of PD 6501-1:1982). To comply with this specification, users have to comply with all of its requirements. Users may depart from recommendations, but this should be on their own responsibility and they would be expected to have good reasons for doing so.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to the following statutory regulations:

- a) The Gas Safety (Installation and Use) Regulations 1994 (SI 1886) (as amended) [1];
- b) The Gas Safety (Installation and Use) (Amendment) Regulations 1996 (SI 1996 No. 550);
- c) The Building Regulations 1991 (SI 2768) (as amended) [2];
- d) The Building Standards (Scotland) Regulations 1990 (SI 2179) (as amended) [3];
- e) Building Regulations (Northern Ireland) 1990 (SR 159) (as amended) [4];
- f) The Gas Appliances (Safety) Regulations 1995 (SI 1629).

Summary of pages

This document comprises a front cover, an inside front cover, pages 1 to 26, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This Part of BS 5482 specifies requirements for the installation at permanent dwellings of domestic systems using liquefied petroleum gases (LPG), whether from cylinders or bulk supply, at a pressure of 28 mbar¹⁾ for commercial butane and of 37 mbar for commercial propane. It makes recommendations on the selection of materials, components and appliances, on design considerations, on installation requirements, on inspection and testing and on consumer instruction.

This standard applies to the installation of liquefied petroleum gas appliances which conform to recognized national standards.

This standard does not cover the installation requirements for bulk tank supplies of liquefied petroleum gas, for which guidance is given in Health and Safety Executive Guidance Note HS(G)34 [5].

Appliances incorporating their own gas supply are not considered to be part of the installation and are thus outside the scope of this standard.

NOTE It is recognized that this standard may be referred to for LPG installations other than those concerned with domestic systems at permanent dwellings. In these instances it has to be borne in mind that other codes of practice, standards and regulations may apply.

Annexes A, B and C give test procedures for low pressure and high pressure stages of installation. Annex D gives an example of an emergency action notice or leaflet for users of liquefied petroleum gas.

1.2 References

1.2.1 Normative references

This Part of BS 5482 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on page 25. Subsequent amendments to, or revisions of, any of these publications apply to this Part of BS 5482 only when incorporated in it by updating or revision.

1.2.2 Informative references

This Part of BS 5482 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on page 26, but reference should be made to the latest editions.

1.3 Definitions

For the purposes of this Part of BS 5482, the definitions given in BS 1179:1967, BS 1179-6:1980, BS 6760:1990 and BS 5440-1:1990 and BS 5440-2:1989 apply together with the following.

1.3.1

permanent dwelling

structure of a permanent nature, to which appropriate building regulations apply and which is used primarily for domestic purposes

1.3.2

liquefied petroleum gas (LPG)

commercial butane and commercial propane

NOTE See BS 4250-1:1987.

1.3.3

high pressure stage

that part of the installation between the valve of the cylinder/tank and the inlet of the high pressure (1st stage) regulator

1.3.4

intermediate pressure stage

that part of the installation between a first stage regulator sited at the tank or cylinder position and a second stage regulator

1.3.5

low pressure stage

that part of the installation between the outlet of the single stage pressure regulator (or second stage regulator when an intermediate stage is used) and the inlet of the appliance

1.3.6

cylinder

portable and refillable vessel of approved design containing LPG under pressure

1.3.7

bulk tank

permanently installed vessel of approved design for the storage of LPG under pressure which is filled in situ

1.3.8

low pressure regulator

apparatus for automatically maintaining a constant gas outlet pressure at the level recommended for the appliances in use

¹⁾ 1 mbar = 10² N/m² = 100 Pa.

1.3.9**gas meter**

apparatus for measuring the volume of LPG in vapour form at low pressure; meters may either be of a “credit” or of a “prepayment” type. The latter incorporates means by which a pre-set volume of gas is delivered on insertion of a coin or token

1.3.10**manual reset low pressure cut-off valve**

device which automatically shuts off the gas supply in the event of the supply pressure falling below the predetermined value and requiring a manual operation to re-establish the supply

1.3.11**atmosphere sensitive cut-off valve**

item of equipment designed to shut off the main gas supply to an appliance when the CO₂ content of the surrounding atmosphere exceeds a given level

1.3.12**safety valve**

automatic valve incorporated to protect a cylinder or system against excessive pressure. It will vent to atmosphere when a predetermined maximum pressure is attained

1.3.13**diffusive catalytic space heater**

appliance in which neat gas diffuses through a catalytic bed and is flamelessly oxidized by oxygen which has diffused into the bed from the surrounding atmosphere at a temperature below that at which combustion would occur in the absence of the catalyst

NOTE This definition does not include catalytic heaters in which complete premixing of gas and air is effected before the catalytic bed is reached, nor does it include appliances employing after-burners in which products of incomplete combustion from normal flames are further oxidized over a catalyst.

1.3.14**low bed-temperature cut-off device**

device which cuts off the gas supply to an appliance when the catalytic bed ceases to operate satisfactorily

1.3.15**room-sealed appliance**

Appliance which, when in operation, has the combustion system, including the air inlet and the products outlet, isolated from the room or space in which the appliance is installed

Section 2. Materials, components and appliances

2.1 Materials

2.1.1 Pipework materials The following materials shall be used for installation pipework:

- a) solid drawn copper tube used with copper or copper alloy fittings;
- b) steel tube used with wrought iron, low-carbon steel or malleable cast iron fittings, or steel compression couplings and protected against corrosion, e.g. by galvanizing and painting;
- c) stainless steel tube and appropriate compression or screwed fittings.

COMMENTARY AND RECOMMENDATIONS ON 2.1.1

- 1) *Brass tubes conforming to BS 2871-2 (designation CA 126 or CZ 110) which have been given a final drawing operation after annealing are considered suitable.*
- 2) *Plastics pipes and fittings should not be used inside a dwelling.*
- 3) *Malleable cast iron fittings are only suitable for intermediate and low pressure stage installations.*
- 4) *The following materials are not recommended for general use for installation pipework for the reasons shown in parenthesis:*
 - i) *aluminium (subject to corrosion);*
 - ii) *composition and lead (subject to creep);*
 - iii) *brass tubing (subject to seasonal cracking);*
 - iv) *tubing of the type fabricated from sheet steel, coated internally and externally and wrapped, should not be used externally because it is subject to atmospheric corrosion.*

2.1.2 Selection of materials

All materials used in the installation shall conform to the requirements of the relevant British Standards, e.g. BS 21, BS 143 & BS 1256, BS 864-2, BS 1387, BS 1494-1, BS 1740-1, BS 2871-1 and BS 2871-2, BS 3212, BS 3601, BS 3605, BS 4368-1 and BS 4368-3 and BS 5292.

COMMENTARY AND RECOMMENDATIONS ON 2.1.2

Where no British Standard exists, materials should be of suitable quality and workmanship to fulfil their intended purpose.

2.2 Components

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 2.2.1

Where no British Standard exists, components should be of types recommended by manufacturers or wholesale gas distributors.

2.2.1 General

All components used in the installation shall conform to the requirements of the relevant British Standards, e.g. BS 1522, BS 3016 and BS 5045-2.

COMMENTARY AND RECOMMENDATIONS ON 2.2.1

Where no British Standard exists, components should be of suitable quality and workmanship to fulfil their intended purpose.

2.2.2 Cocks and valves

A tapered plug cock shall be spring loaded and fitted with an operating handle designed to indicate clearly whether the cock is in the open or closed position. Valves should be marked with direction of rotation to open or close.

A cock at floor level shall be of either the drop fan or the loose key type or so positioned to prevent inadvertent operation.

Valves shall be of ball or diaphragm type, and they shall be suitable for use with LPG.

Needle valves and gate valves shall not be used as isolating valves.

Gas cock lubricants shall be of a type suitable for use with LPG, e.g. lubricants having a 25 % molybdenum disulfide base.

2.3 Selection of appliances

2.3.1 General

Only appliances which conform to the relevant British Standards and/or carry an appropriate CE mark shall be installed.

2.3.2 Domestic appliances

Domestic appliances shall conform to the relevant British Standards and/or carry an appropriate CE mark.

2.3.3 Cooking appliances

Cooking appliances shall conform to BS 5386-3:1980, BS 5386-4:1991 and BS 5386-6:1991, as appropriate.

2.3.4 Fixed space heaters

In selecting fixed space heaters the following shall be taken into consideration.

- a) Space heaters shall conform to BS 5258-5:1989, BS 5258-8:1980, BS 5258-10:1980, BS 5258-11:1980, BS 5258-12:1990, BS 5258-13:1986 or BS 5258-16:1991 as appropriate.
- b) The type, physical size of the appliance, mode of heat dissipation and mode of dispersal of combustion products shall be suited to the application and siting.

2.3.5 Water heaters

In selecting water heaters, the following shall be taken into consideration.

- a) Water heaters shall conform to BS 5258-7:1977, BS 5386-1:1976 or BS 5386-2:1981, as appropriate.
- b) Preference shall be given to the use of room-sealed appliances.
- c) A water heater shall be selected only if it is fitted with a flame-failure device, arranged to shut off the mains and pilot (where fitted) gas supplies in the event of flame failure. (See BS 5386-1.)
- d) A water heater shall be connected to a flue in accordance with BS 5440-1:1990, unless it serves only a sink or wash basin in which case it may not require a flue. However, an instantaneous sink water heater shall have a flue if fitted in a confined space. (See BS 5440-1.)

2.3.6 Central heating systems

2.3.6.1 General

A central heating system, conforming to either 2.3.6.2 or 2.3.6.3 shall be selected.

2.3.6.2 Water filled systems

If fitted, wet type central heating and/or hot water systems shall conform to BS 5258-1:1986 or BS 6798:1987, as appropriate.

COMMENTARY AND RECOMMENDATIONS ON 2.3.6.2.

Consideration may be given to the installation of wet type central heating and/or hot water systems as an alternative to individual appliances providing separate heating and hot water services.

2.3.6.3 Ducted warm air systems

Ducted warm air systems shall conform to BS 5258-4:1987 and shall be installed in accordance with BS 5864:1989.

2.3.7 Refrigerators

Refrigerators shall conform to BS 5258-6:1988.

COMMENTARY AND RECOMMENDATIONS ON 2.3.7.

The following three main types of refrigerator are available:

- a) *free-standing;*
- b) *wall-mounting;*
- c) *built-in.*

Refrigerators of type c) may have either integral inlet and outlet ventilating louvres, or inlet and outlet louvres positioned remote from the refrigerator, provided there is adequate provision for air circulation (see 4.4.4).

2.3.8 Tumble dryers

Tumble dryers shall conform to BS 5258-17:1992.

Section 3. Installation design

3.1 Layout of supply system

Layout shall be such that the length of pipe from the inlet of the gas supply to the highest rated appliances is as short as possible and all pipe runs, particularly at intermediate pressure stage, shall be as short as practicable.

COMMENTARY AND RECOMMENDATIONS ON 3.1

Further information is given in the codes of practice of the Liquefied Petroleum Gas Association [6, 7].

3.2 Cylinder supply

Consideration shall be given to the guidance provided in Table 1 and Table 2, as appropriate to the appliance.

COMMENTARY AND RECOMMENDATIONS ON 3.2

Guidance given in Table 1 on the number of cylinders that should be provided in parallel to supply the installation is based on the evaporative capacity of the cylinders specified and on gas rates for different appliances. To ensure continuity of gas supply it is also advisable to stock an equivalent number of replacement cylinders.

Table 1 — Appliance heat input and gas rate^a

Appliance	Heat input kw	Gas rate	
		Butane kg/h	Propane kg/h
Cooker (large domestic)	11.0	1.74	1.74
Cooker (normal domestic)	6.6	1.04	1.05
Hotplate (2 burner)	2.3	0.35	0.37
Hotplate (3 burner)	3.0	0.49	0.47
Hotplate (2 burner and grill)	3.3	0.56	0.53
Space heater, large	3.3	0.56	0.53
Boilers and air heater	8.5	1.41	1.35
Space heater, small	1.0	0.14	0.16
Lighting appliance	0.3	0.049	0.047
Sink storage water heater	1.3	0.21	0.21
Sink instantaneous water heater	5.7	0.90	0.90
Multipoint instantaneous water heater	14.0	2.23	2.22
Refrigerator	1.3	0.021	0.021

^a This table is based upon the maximum gas rate and 70 % of the maximum gas rate for cookers.

The number of cylinders necessary may be calculated by totalling the gas rate for each appliance in kilograms per hour and dividing this total by the recommended offtake for the size of cylinder chosen (see Table 2).

Table 2 — Recommended offtakes for temperate climates

Butane		Propane	
Cylinder size kg	Offtake kg/h	Cylinder size kg	Offtake kg/h
15	0.696	13	1.054
		19	1.319
		47	2.373

3.3 Installation design of cylinders and tanks

3.3.1 General

The cylinder position shall afford ease of access to facilitate changing and quick removal in case of necessity. Cylinders shall be installed in the upright position with valves uppermost so that only vapour is withdrawn in use.

COMMENTARY AND RECOMMENDATIONS ON 3.3.1

It is recommended that LPG cylinders are stored outside buildings. (See Health and Safety Executive Guidance Note CS 4 [8].)

3.3.2 Cylinder location (propane)

Cylinders shall be located outside buildings in the open air and situated on firm level ground in a well ventilated location (see Figure 1).

Cylinders shall be located:

- where they remain readily accessible at all times;
- where they do not obstruct any means of access to or from the premises;
- where they are reasonably protected from accidental damage.

NOTE Where necessary, suitable protection should be provided against possible damage or interference by persons, animals or vehicles.

Cylinders shall not be located:

- in a cellar, basement or sunken area;
- less than 1 m, measured in the horizontal plane from the nearest cylinder valve, or less than 0.3 m, measured vertically above the cylinder valve(s), from fixed sources of ignition, unprotected electrical equipment, excessive heat sources, readily ignitable materials etc., or apertures in the property, e.g. doors, openable windows, ventilation ducts, air bricks, flue terminals.