

Specification for

Kerosine (paraffin) unflued space heaters, cooking and boiling appliances for domestic use

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Co-operating organizations

The Petroleum Equipment Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government department and industrial and other organizations:

- British Gas Corporation
- British Mechanical Engineering Confederation
- British Rubber Manufacturers' Association Limited
- British Steel Industry*
- Council of British Manufacturers of Petroleum Equipment*
- Department of Trade and Industry
- Oil Companies Materials Association*
- Process Plant Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Committee entrusted with the preparation of this British Standard:

- British Hardware Federation
- Chief Fire Officers' Association
- Consumer Standards Advisory Committee of BSI
- Department of Education and Science
- Department of the Environment, Joint Fire Research Organization of the
Department of Environment and Fire Officers' Committee
- Fire Protection Association
- Home Office
- Institution of Fire Engineers
- National Physical Laboratory
- Oil Appliance Manufacturers' Association

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Foreword

This revised British Standard has been prepared under the authority of the Petroleum Equipment Industry Standards Committee.

The 1960 edition of the standard consisted of a revision of BS 2049-1, issued in 1953, and embodied many advances in safety requirements as compared with the original standard.

The standard was again revised in 1963 when the main changes were as follows.

A further strengthening of the safety requirements of the spillage test for barometric feed space heaters, and the extension of these requirements to wick-fed space heaters.

A further strengthening of the safety requirements for operation under out-of-level conditions.

The standard was later amended to require that appliances shall extinguish themselves on being overturned when lit.

The purpose of this revision is to metricate the standard and to take account of the new requirements for fireguards set out in BS 1945:1971 "*Fireguards for heating appliances (gas, electric and oil burning)*".

Users of this specification may wish to note that all unflued domestic oil heaters offered for sale in Great Britain are required to comply with the Oil Heaters Regulations 1962 (as amended in 1966) made by the Home Secretary under the Consumer Protection Act 1961. Those Regulations are based on British Standard 3300 and, in the main, are in accord with it. The Home Office is kept informed of any technological advances in the British Standard so that they may be taken into account whenever the amendment of Regulations is contemplated.

Certification. It is strongly recommended that in view of the nature of this specification, manufacturers and purchasers should make use of the certification facilities described on the inside back cover of this standard.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, 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 Scope

This British Standard specifies construction operation and safety requirements and tests for unflued kerosine appliances intended by the manufacturer for domestic use.

NOTE The titles of the British Standards referred to in this standard are listed on the inside back cover of this standard.

2 Definitions

For the purposes of this British Standard the following definitions apply:

2.1

unflued appliance

one designed to emit combustion products into the room (space) occupied by the appliance

2.2 Burner types

2.2.1 Long drum

Burners having a flue or chimney to induce air for combustion.

2.2.1.1

blue flame

the air for combustion is introduced in such a way as to maintain a blue flame

2.2.1.2

white flame

the air for combustion is introduced in such a way as to produce a luminous flame

2.2.2

short drum

these burners consist essentially of one or more pairs of perforated sleeves or plates mounted above a fuel feeding device. Kerosine vapour is burned mostly in the space between the sleeves and partly above them, producing a non-luminous blue flame. The long drum that forms an essential feature of the previous class is not required

2.2.3

pressure (Vapour jet)

these burners usually consist of a burner head with a cavity in which the kerosine is vaporized by the heat of the flame or by a separate heat supply. The vapour emerges from a nipple or injector in such a manner that the kinetic energy is utilized to entrain and mix the primary combustion air with the vapour. The pressure is usually generated by a hand-operated air pump but some automatic method or a gravity head may be used

2.3

wick fed burner

one in which a wick is used to lift the fuel from the fuel container to the burner

2.4

kindler type burner

one in which the fuel feeding device consists of a trough in which there is a kindler for lighting purposes

2.5

warm-up time

the time measured from applying a light to obtaining full flame

2.6

fuel creep

spreading of fuel over any part of the appliance (including the burner) when operated under normal conditions of burning or when not in use

2.7

flame creep

increase in flame size, while burner is operating, without adjustment being made to the control(s)

2.8

self-extinguishing facility

a mechanism or any other feature incorporated in the design of a space heater or cooker to ensure that the flame will be extinguished should the lighted appliance be overturned

3 Terminology

For the purposes of this British Standard, the following terms apply (see Figure 1 to Figure 7).

Burner joint	Nipple
Burner washer	Outer burner casing
Chimney	Outer cap (perforated)
Cone (part without perforations surrounding burner)	Outer perforated sleeve
Filler cap	Outer wick tube
Filler opening	Pan support
Flame spreader	Pressure release valve
Fuel bowl	Pricker
Fuel container	Pump
Fuel container valve	Pump non-return valve
Fuel feed pipe	Pump washer
Fuel level indicator	Roarer flame ring
Fuel regulating device or shut-off	Safety valve
Gallery (part with perforations surrounding burner)	Spirit cup
Hotplate	Wick
Inner cap	Wick carrier
Inner perforated sleeve	Wick stop
Inner wick tube	Wick winder
Kindler	Winder knob
Kindler trough	

4 Instructions

Instructions for the safe use of the appliance shall be supplied with the appliance. They shall state that the appliance shall be filled with kerosine (paraffin) of the class C1 described in BS 2869 and identified by the device shown in that standard. They shall also state the approximate maximum fuel consumption in litres/hour and pints/hour or hours/litre and hours/gallon. A warning shall be included against the use of fuels other than kerosine (paraffin). Any special precautions necessary for the fixing, safe use and operation of the appliance shall be included.

5 Marking

The following information as appropriate shall be legibly and indelibly marked on the appliance, to last as long as its useful life.

5.1 All appliances shall be marked with:

- Manufacturer's name or trade mark
- Manufacturer's type number
- The number of this British Standard, i.e. BS 3300
- A warning against the use of petrol
- A warning against carrying when alight
- A warning on the need for adequate ventilation
- A warning on protection against draughts

5.2 In addition, appliances shall be marked as applicable with:

- a) For appliances designed with a self-extinguishing facility, a warning of any periodic attention required by the self-extinguishing facility.
- b) For appliances designed with a self-extinguishing facility which requires periodic attention, a warning against placing the appliance where it may be knocked over.
- c) For appliances other than space heaters, a warning not to use them as space heaters and in addition, where such appliances are not designed with a self-extinguishing facility, a warning against placing the appliance where it can be knocked over.
- d) For appliances other than those where the fuel container is intended to be re-filled after removal and isolation from the burner, a warning against filling when alight.

Section 2. Construction

6 General

The construction and the strength of materials shall be such that harmful distortion does not take place under normal conditions of use. Adequate regard shall be paid to safety and durability. Deep drawn brass parts shall be heat treatment to prevent season cracking. The presence of season cracking shall be determined by the method given in BS 885.

Provision shall be made for levelling the heater if this is necessary for its proper operation.

7 Fuel container

All joints below the full fuel level shall be thoroughly sweated with solder or welded or otherwise firmly joined to give an air-tight and fuel-tight joint. Each fuel container shall be tested, using pressure or other tests, by the manufacturer to ensure fuel-tightness. Each fuel container shall be made sufficiently rigid to prevent hazardous discharge of oil or vapour due to distortion.

The container and any internal coating materials shall not be susceptible to thermal or mechanical damage arising from normal use and operation of the appliance.

7.1 Containers used to carry wick-fed burners. If ferrous sheet metal other than stainless steel is used for the bottom of the container it shall be coated internally to render it resistant to corrosion where water droplets could accumulate or be trapped.

7.2 Barometric feed type space heaters. Barometric feed type space heaters shall, in addition, comply with the following requirements:

7.2.1 Resistance to kerosine. Materials used in the structure of the container or present in its internal coating after manufacture shall be insoluble in test kerosine as specified in Appendix A and shall not soften or otherwise deteriorate through prolonged exposure to test kerosine.

NOTE The object of this requirement is to ensure that containers or coatings composed wholly or partly of organic materials are durable, and incidentally to prevent interference with normal burning of the fuel.

7.2.2 Resistance to corrosion. The fuel container shall be resistant to corrosion. When ferrous sheet metal other than stainless steel is used in its construction, the sheet metal shall be not less than 0.7 mm thick; in the fabricated tank it shall in no place be less than 0.5 mm thick, and it shall be adequately coated to render it corrosion-resistant. The coating may be organic or inorganic, metallic or non-metallic, or composed of two or more kinds of material.

NOTE 1 As evidence of the performance of protective coatings in containers is accumulated, a list of approved protective methods may be drawn up. In the meantime, the following remarks are intended for the guidance of manufacturers.

The following coating materials, quoted as examples, appear capable of giving beneficial results.

- a) Electrodeposited zinc, 0.003 mm thick, but preferably 0.008 mm.
- b) Tin orterne alloy, with 7 or 20 % tin, at a coating weight of not less than 250 g/m² of sheet preferably covered with a kerosine-resistant lacquer, and provided that adhesion is good and that fabrication processes and handling do not adversely affect the coating.
- c) Stoved epoxy resin, provided that its application and stoving are correctly carried out.
- d) Kerosine-resistant paint or lacquer, used in some instances in conjunction with non-ferrous or phosphate coatings, provided that adhesion is good.

NOTE 2 Kerosine as such is non-corrosive. Corrosion can occur, however, through the presence of water which may be introduced accidentally or may be condensed from the atmosphere. In such circumstances, the water may be expected to contain the ionizable corrosion-promoting compounds that occur normally in natural waters, or as atmospheric pollution.

The fuel container shall not include any soft solder joints.

8 Fuel supply system

Where the burner is not mounted immediately on top of the fuel container, exposed joints in the fuel supply system shall be fuel-tight and shall be either mechanical, metal-to-metal joints or welded, brazed or soldered, or made of other suitable high-temperature material, as appropriate to the conditions under which the joints will operate in normal use.

9 Stability

The heater, both when full of fuel and when empty, shall be capable of being tilted in any direction to an angle of 15° from the vertical without overturning on being released.

10 Provision for fixing

Space heaters shall have screw-holes, a hook and chain or other means conveniently placed and sufficient for securing them so as to prevent their being overturned.

11 Safety on overturning

This clause applies to all space heaters other than those intended to operate only when permanently fixed to a rigid support. It also applies to those cooking and boiling appliances which have a self-extinguishing facility.

11.1 Self-extinguishing. A self-extinguishing appliance shall have a facility which will extinguish its flame within 15 s if the appliance is overturned when lit. The facility shall be tested in accordance with **K.1.** and **K.2.** During this test, no flame shall appear outside the casing or guard of the heater, nor shall the winceyette on which the heater is overturned catch fire: moreover, once extinguished by the facility, there shall be no tendency for the heater to re-ignite spontaneously. The materials and construction of any parts comprising or associated with the self-extinguishing facility shall be such as to ensure that its operation will not be impaired through corrosion, mechanical wear and tear or other cause during the normal life of the heater. Ideally, extinguishing facilities should be designed to function effectively on a continuing basis without attention from the user, although it is accepted that they may need to be restored to the safety condition after they have operated. Facilities which do not comply with this recommendation shall not normally require maintenance at intervals of less than one month for their proper and continuing operation. If they have operated, however, facilities should invariably be checked to ensure that they are in proper working order before the heater is re-lit. Routine maintenance and checking of this kind shall take no more than a few minutes to complete and shall be of a nature no more complicated than filling the heater itself. Arrangements shall be incorporated to make it apparent if the facility is not in an effective condition and the appliance shall be indelibly marked (in writing or otherwise) with instructions specifying any action or attention that may be required.

11.2 Fuel spillage. If such appliances designed to stand on a floor are overturned, the fuel spillage during the first 15 s shall not exceed 55 ml per burner when tested in accordance with **K.3.** This requirement is intended to ensure that, provided the appliance is righted without delay following accidental overturning, the fuel spilt is unlikely to prove a serious hazard even if it becomes ignited.

12 Inner and outer wick tubes

Inner or outer wick tubes shall be sufficiently strong to avoid harmful distortion under normal use and shall be so mounted that objectionable fuel leakage in service is prevented.

13 Wick stop

Any wick stop shall be designed to prevent the flame from reaching its smoke point.

14 Wick carrier and winder

The wick carrier and winder mechanism shall give an even adjustment of the wick and shall be so mounted that objectionable fuel leakage in service is prevented.

15 Winder knob or other regulating device

The winder knob or other regulating device of the appliance shall be readily accessible and easily adjustable when the appliance is alight.

16 Assembly of removable components

Removable components should preferably be so constructed that they cannot be assembled incorrectly and where this is not possible, they should be marked to show clearly their correct position.

17 Interchangeability

Burners, wicks, kindlers and catalogued parts of the same model and capacity shall be interchangeable without adverse effect upon performance. Spare wicks and kindlers shall be adequately identified.

18 Lighting

Lighting shall be possible with a match without undue inconvenience or difficulty.

19 Guards

Kerosine space heaters having exposed flames or radiants shall be provided with guards complying with the appropriate requirements of BS 1945:1971.

NOTE Statutory requirements for such guards are set out in the Heating Appliance (Fireguards) Regulations 1973 which refer to BS 1945:1971.

20 Corrosion

All corrosive materials used in manufacture shall be removed or otherwise made harmless.

Section 3. Additional construction requirements for pressure burners

21 Fuel container

The construction and the strength of materials shall be such that harmful distortion does not take place under normal conditions of use.

Fuel containers shall be leak-proof when tested at 2.1 bar¹⁾ or, if it is higher, at the pressure reached by the pump fitted to the appliance, after one minute's pumping at 60 strokes per minute with the container filled with fuel through the filler opening with the container standing on a level surface. If a safety valve is fitted as a part of the appliance, the test shall be carried out with the safety valve omitted and blanked off.

During manufacture, sample quantities of the fuel container shall be leak-proof when tested at the lesser of two pressures, P_1 and P_2 , defined below, if greater than the two pressures referred to in the second paragraph of this clause.

$$P_1 \text{ in bars}^{1)} = \frac{1330 \times \text{mechanical advantage}}{\text{internal cross-sectional area of pump in mm}^2}$$

$$P_2 \text{ in bars}^{1)} = 1.03 \times \text{compression ratio of the pump.}$$

NOTE The mechanical advantage is the factor by which the force applied to the pump handle is multiplied between this point and the pump piston.

22 Burner

Burners or vaporizing units shall be leak-proof when tested at 4.2 bar¹⁾ or, if it is higher, at the pressure reached by the pump of the fuel container to which the burner, in normal use, is attached. The pump shall be operated as specified in the second paragraph of Clause 21.

During manufacture, sample quantities of the burner shall be leak-proof when tested at the lesser of two pressures P_1 and P_2 as above, if greater than the two pressures referred to in the first paragraph of this clause.

¹⁾ 1 bar = 10⁵ N/m² = 100 kPa.