



BS 5871 : 1980

UDC [697.245+697.326.3] : 696.2

**Code of practice for the
Installation of gas fires, convectors and
fire/back boilers (2nd family gases)**

(formerly CP 332 : Part 1)

Code de bonne pratique pour l'installation des appareils de chauffage à rayonnement et à convection et des appareils mixtes: appareils de chauffage à rayonnement/chaudière, utilisant les combustibles gazeux (gaz de la 2e famille)

Richtlinien für den Einbau von Gaseinzelheizöfen (Strahlungs- und Konvektionsheizöfen) und von zusammengesetzten Anlagen: Strahlungsheizöfen/Heizkesseln, für gasförmige Brennstoffe (Gase der 2. Familie)

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This code of practice represents a standard of good practice and takes the form of recommendations. Compliance with it does not confer immunity from relevant legal requirements, regulations and bye-laws, including the Gas Safety Regulations and the building regulations of England and Wales, of Scotland and of Inner London.

Foreword

This British Standard code of practice is a revision of CP 332 : Part 1 : 1961 and, in its preparation, the opportunity has been taken to express the values in metric (SI) units in accordance with the British Standards Institution's programme of metrication. Wherever possible

rounded metric values have been chosen. The imperial equivalents given in brackets have been rounded off with sufficient accuracy to ensure that the installation will be satisfactory whether designed in metric or imperial units.

British Standard Code of practice for the

Installation of gas fires, convectors and fire/back boilers (2nd family gases)

Section one. General

1. Scope

This code of practice is concerned with the installation of space heating appliances burning gas*, mainly intended for heating single rooms in domestic and other premises. In addition, it presents information on the installation of gas fires when combined with back boilers.

The space heaters dealt with in this code are available in four basic types, known as radiant gas fires, radiant convector gas fires, gas convectors and fire/back boilers.

Fire/back boilers are available for two purposes. The back boiler may be intended for providing domestic hot water only, or for central heating with or without domestic hot water.

Attention is drawn to the fact that many of the practices recommended in this code are obligatory under the Gas Safety Regulations 1972 and, therefore, persons using the code should be fully conversant with these Regulations.

2. References

The titles of the standards publications referred to in this code are listed on the inside back cover (see also clause 5).

NOTE. The recommendations of the following standards publications also relate to the installation of space heaters covered by this code of practice:

CP 3, chapters II and VIII
CP 331 : Parts 1 and 2.

3. Definitions

For the purposes of this code, the following definitions apply. All the following terms and definitions, with the exception of 'closure panel' and its definition, are given in BS 1179 : Part 6.

3.1 air heater. An appliance for heating air to be used for space heating.

3.2 air vent. A non-adjustable purpose made opening or duct that is designed to allow the passage of air at all times.

3.3 back boiler. A water heating appliance designed to fit into a fireplace opening to provide domestic hot water and/or central heating.

3.4 closure plate. A non-combustible plate for closing off substantially a fireplace opening when installing a gas fire.

3.5 closure panel. A non-combustible panel used to close off a fireplace opening when installing an open-flued convector. The panel has an aperture for the convector flue spigot.

3.6 convector. An air heater that discharges heated air only into the space in which it is installed.

3.7 cooler device. A device fitted at the spigot outlet of a gas fire to prevent localized overheating of a precast flue-block chimney.

3.8 fanned draught flue system. A flue system in which the draught is produced by a fan.

3.9 dressguard. A metal guard fitted to the front and forming part of a gas fire.

3.10 fire surround. A purpose-designed setting for a gas fire, fitted against a wall at the base of a flue and usually incorporating a hearth.

3.11 flue spigot restrictor. A plate designed to be fitted to a flue spigot of a gas fire to reduce the effect of flue pull on the appliance.

3.12 gas fire. A flued appliance for heating one room and incorporating one or more radiants.

3.13 greenhouse heater. A flueless convector specially designed to be able to tolerate an environment vitiated to a 1 % CO₂ level and, when not required to be firmly secured, to be self-extinguishing if knocked over.

3.14 hearth. A floor-level slab of non-combustible material to prevent overheating of the floor beneath a heating appliance.

3.15 infill panel. A non-combustible panel having an opening to accommodate a standard closure plate, used in a fireplace opening which is too large for the closure plate alone.

3.16 internal space. An interior volume, not a room, such as a hall, passageway, etc.

3.17 open-flued appliance. An appliance designed to be connected to an open flue system, its combustion air being drawn from the room or space in which it is installed.

NOTE. The term 'open-flued' replaces the term 'conventionally-flued'.

3.18 open flue system. A flue system that is open to a room or internal space at each appliance position.

3.19 radiant. A component forming part of a gas appliance and designed to become incandescent when heated by a gas flame.

3.20 radiant convector gas fire. A gas fire designed to emit heat by both radiation and convection.

3.21 radiant gas fire. A gas fire designed to emit heat mainly by radiation.

3.22 room-sealed appliance. An 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.

*Gas, according to BS 1179 (in course of revision), is normally supplied to the public by a utility undertaking in accordance with statutory requirements. The provisions of this code apply to installations supplied with 2nd family gases, including mixtures of liquefied petroleum gas (LPG) and air, distributed by a gas undertaking. They do not apply to installations using gases of the 1st and 3rd (neat LPG) families.

3.23 room-sealed flue system. A flue or duct system that is not open to any room or habitable internal space.

3.24 space heating. The heating of one or more rooms or other spaces to produce a desired temperature therein.

4. Exchange of information and time schedule

4.1 Collaboration at the planning stage is essential between those concerned with the design and execution of the work. The gas undertaking should be consulted throughout, with particular reference to facilities for the installation of gas supplies to suitably prepared points.

The extent of the work to be carried out by the gas undertaking and any attendance required by it or by other trades should be clearly defined.

4.2 Consideration should be given, as applicable, to the following at the planning stage:

- (a) type of construction;
- (b) degree of insulation;
- (c) location, orientation and exposure of building;
- (d) size and purpose of room(s);
- (e) size, height and route of flue together with the materials of construction;
- (f) provision of adequate ventilation;
- (g) assessment of heat requirements as described in appendix A;
- (h) dimensions of fireplace opening;
- (i) position of heating appliances in relation to probable position of fixtures and furniture;
- (j) electric wiring;
- (k) water supplies.

4.3 Some appliances require preliminary structural work to be completed at the building carcass stage. Where air ducts or pipes are to be laid in solid floors or walls, the channels in which the ducts or pipes are to be accommodated should be made during the construction of the building, and the pipes or ducts should also be fitted at this stage. Sleeves should be inserted for flue pipes and pipes passing through solid floors or walls. Suitable apertures or openings should be made for connection to a built-in flue, or for terminating a balanced-flued heater. Hearths for fires should be provided where necessary.

5. Materials, components and appliances

5.1 Materials and components. All materials and components used should comply with the requirements of the British Standards listed below, where appropriate. Where no such standard exists, materials used should be agreed with the gas undertaking.

BS 143 & 1256, BS 476, BS 567, BS 715, BS 864, BS 1387, BS 1945, BS 2871 and BS 4127.

5.2 Appliances. The appliance selected, with the exception of greenhouse heaters, should comply, as appropriate, with the requirements of BS 5258 : Parts 5 and 8* and BS 1250 : BS 1250 : Parts 1 and 4, and should be suitable for the gas with which it is to be supplied.

Section two. Selection of appliances

6. General

In general, the appliances described in this code are intended to heat single rooms or spaces. However, a high rated convector can be used in a hall, for example, to provide background heating, and a fire/back-boiler unit can be used to heat several rooms or spaces.

Open-flued fire/back boiler units should not be installed in a bedroom, bed-sitting room or any room or space containing a bath or shower.

Gas fires are available in two types, radiant fires and radiant/convactor fires, which may be open-flued or room-sealed. They are always fitted at low level, either floor-mounted or wall-mounted.

Convectors are available for open-flued, room-sealed and flueless operation. Open-flued and room-sealed convectors are to be preferred to flueless heaters since the latter might give rise to problems of condensation. In no circumstances should a flueless heater be fitted in a bedroom or a room containing a bath and, preferably, not in any other room of volume less than 6 m³ (210 ft³). Where it is permissible to install a flueless convector, the rated heat input is limited to 50 W/m³ (5 Btu/h per ft³) in a room, or 100 W/m³ (10 Btu/h per ft³) in an internal space other than a room, e.g. a hall or passageway. For the installation of greenhouse heaters, see clause 17.

Any appliance described in this code can be used to heat a room or internal space to a desired temperature level, but the type chosen will depend on the user's personal preference; it should be based on a knowledge of the range of appliances available, the use to which the room will be put and the period of usage.

Gas fires, convectors and fire/back boilers are available with rated heat inputs in the following approximate ranges.

Radiant fire	5 kW to 6 kW (17 000 Btu/h to 20 500 Btu/h)
Radiant/convactor fire	4 kW to 8 kW (13 500 Btu/h to 27 500 Btu/h)
Flued convector	2 kW to 15 kW (7 000 Btu/h to 51 000 Btu/h)
Flueless convector (domestic)	up to 3 kW (up to 10 000 Btu/h)
Flueless convector (greenhouse)	1 kW to 4 kW (3 500 Btu/h to 13 500 Btu/h)
Fire/back boilers:	
fire	4 kW to 8 kW (13 500 Btu/h to 27 500 Btu/h)
boiler	4 kW to 22 kW (13 500 Btu/h to 75 000 Btu/h)

In some situations it may be desirable to provide two appliances in the same room or internal space rather than one, in order to obtain an even temperature distribution, e.g. in a long room. A fire/back-boiler unit, together with a radiator supplied by the associated central heating circuit, provides an alternative arrangement for heating such a room or space.

Some appliances incorporate fans in order to improve the circulation of convected heat.

*In course of preparation.

7. Comfort levels

Feelings of comfort in a room or internal space are influenced by many factors, all of them subjective. As far as thermal comfort is concerned, the most important factors are the surface temperatures of solid bodies in the room (the principal contribution in this category being from the walls), and the air temperature. For the appliances described in this code it may be assumed that, if the appliance is sized according to the method described in clause 8, a satisfactory level of comfort will be achieved.

8. Appliance sizing

It should be recognized that the recommendations on the sizing of an appliance for a given situation can only be in the nature of a general and approximate guide.

It should be appreciated that these recommendations are intended primarily for buildings of traditional construction, and may need to be modified for more highly insulated dwellings.

The following are the sizing principles generally adopted.

(a) The steady-state heat requirement, i.e. the heat output required from the appliance to balance the losses from the room or internal space when it is fully heated, is calculated on the assumption that the heating appliance should be able to provide comfortable conditions when the external temperature is at its lowest likely value.

(b) If the steady-state condition is likely to be unusual for the given situation, an increase over the steady-state requirement will be desirable to enable the heater to achieve a rapid warm-up under short-period usage conditions.

The steady-state heat losses from a room or internal space will depend upon the values of the following four basic factors:

- (a) the size of the room or internal space;
- (b) the insulation value of the building fabric;
- (c) the inside/outside temperature difference;
- (d) the ventilation rate.

Factors (a) and (b) are specific properties of the room or internal space under consideration, while (c) and (d) are open to specification by design.

Currently accepted figures for internal temperatures are:

kitchens, halls, passages, etc:	16 °C	(61 °F)
bedrooms:	18 °C	(64 °F)
living rooms, dining rooms, bed-sitting rooms, etc:	21 °C	(70 °F)
bathrooms:	22 °C	(72 °F)

The design external temperature is generally taken to be -1°C (30°F) and the ventilation rate to be two air changes per hour.

If the heater's normal usage is likely to be for short periods only, then the steady-state requirement figure can be increased by about 10 % to allow rapid warm-up.

Appendix A presents a method of sizing which can be used for most situations; in unconventional situations the gas undertaking should be consulted.

It should be appreciated that since the heater will be sized for steady-state conditions in order to cope with an external temperature of -1°C (30°F), under average external temperature conditions it will be oversized.

Section three. Installation

9. Appliance fixing

9.1 Flueless convectors. Except in the case of a greenhouse heater, it is essential that a flueless convector be firmly secured to a wall or floor and fitted to a rigid gas connection.

9.2 Open-flued appliances

9.2.1 General. Before installing any open-flued appliance covered by this code, the correct operation of the flue should be checked by carrying out a test in accordance with BS 5440 : Part 1. A further test in accordance with that code should be carried out after the appliance has been installed.

Any chimney previously used for an appliance burning a fuel other than gas should be thoroughly swept before installing any gas appliance.

In any case, even when replacing a gas-fired appliance it should be ensured that the base of the flue is clear of debris.

Where the appliance is to be fitted to an existing 225 mm x 225 mm (9 in x 9 in) brick chimney, any damper plate in the chimney should be left secured in the fully open position or, preferably, removed altogether. Such a chimney is oversized for the appliances covered by this code and therefore some means is needed to control the total rate of flow through it. The method of control depends upon whether the appliance is a gas fire, a convector or a fire/back boiler and the form of control will be detailed in the manufacturer's instructions (e.g. the use of closure plates and/or spigot restrictors). When installing a fire/back boiler, reference should be made to BS 5440 : Part 1 for advice on the lining of chimneys.

The appliance should be secured to a wall or floor, or stood on the floor, according to the manufacturer's instructions, in such a way that it can be removed, if necessary, for servicing. If it is evident that the appliance is not sufficiently stable when installed and connected to the gas supply, additional fixings should be used to secure it in its correct location.

9.2.2 Gas fires

9.2.2.1 A gas fire should always be fitted using its closure plate, regardless of the type of flue system to which it is connected. However, it may be necessary to modify the closure plate for some installations; manufacturer's instructions will normally give detailed information. (When re-fixing older fires for which no closure plates are available, the gas undertaking should be consulted). In principle, it may be connected to a 225 mm x 225 mm (9 in x 9 in) brick chimney (see figures 1 to 4), to a precast block chimney of area 130 cm² (20 in²) if the aspect ratio is 3:1, or of area 200 cm² (30 in²) if the aspect ratio is 5:1 (see figure 5), or to a 125 mm (5 in) diameter flue pipe (see figure 6). However, the manufacturer's instructions should be consulted regarding suitability for use with precast block chimneys.

9.2.2.2 For connection to a brick chimney, a fire is supplied with a closure plate of standard dimensions 660 mm x 460 mm (26 in x 18 in), incorporating an opening for the insertion of the flue spigot and, where necessary, a ventilation or air relief opening. The latter is located and sized by the manufacturer to allow a total flue flow rate of about 60 m³/h (2100 ft³/h) when the appliance is in operation. The closure plate may be fixed to the

fireplace surround (figures 1, 2, 3 and 4), using single- or double-sided adhesive tape or other suitable means, to eliminate the entry of excess air to the flue other than through the spigot opening and the ventilation opening in the closure plate. It is essential that the flue spigot or spigot extension passes through the closure plate and there should be a minimum clearance of 50 mm (2 in) at the end of the spigot.

Where a fireplace incorporates an overhang in front of which the fire is required to stand, the fire may be brought forward as indicated in figure 2, in which case a flue spigot extension piece should be used. The effective extension should not exceed 150 mm (6 in) or such other length as is specified in the manufacturer's instructions. Where a standard closure plate is inadequate to fill the fireplace opening completely, or where required for the sake of appearance, an infill panel or surround may be used with an opening to which the standard closure plate may be secured.

The fire should be fitted so that the base of the flue forms a void down to floor or hearth level to allow debris from the chimney to collect without blocking the flue spigot. The volume of the void up to the bottom of the spigot should be at least 12 dm³ (735 in³) and the distance between the bottom of the spigot and the floor, hearth or the top of the wall below the spigot of a wall-mounted fire should be at least 250 mm (10 in). Provision should be made to allow this debris to be removed at regular intervals, preferably during routine servicing (see section six).

For a fire (or fire/back boiler) which requires a hearth, the hearth and its supports should be of sufficiently robust construction to carry safely the weight of the appliance. A surround, if provided, should have an opening of dimensions 520 mm (20.5 in) high by 400 mm (16 in) wide, cut on site if necessary, to take the standard gas fire closure plate. The surround should be fitted to the wall and suitably sealed to prevent air leakage into the flue and a consequent reduction in the flue pull at the spigot.

9.2.2.3 When a fire is fitted to a precast block chimney, a cooler device (see figure 5) should be fitted so that products of combustion issuing from the flue spigot are diffused and directed away from the flue wall, thus limiting the temperatures of the walls. The manufacturer's fitting instructions will specify the type of cooler device to be fitted; it is important that this guidance be followed.

9.2.2.4 Where a flue pipe is utilized, the appliance should be fitted into a non-combustible box which is capable of accepting a standard closure plate (figure 6).

9.2.3 Convector. An open-flued convector incorporating its own draught diverter may be connected to a 225 mm x 225 mm (9 in x 9 in) brick chimney*, (see figure 7) to a precast block chimney or to a flue pipe.

9.2.4 Fire/back boilers

9.2.4.1 General. Fire/back boilers were originally designed to be installed in houses having chimneys and fireplaces constructed for solid fuel appliances, but they can be installed in houses without such chimneys where a suitable back boiler enclosure, hearth, flue and terminal are provided.

Explicit information on the installation of a particular fire/back boiler will be found in the manufacturer's installation instructions; these should be complied with.

9.2.4.2 Using a solid fuel appliance chimney and fireplace.

When a solid fuel appliance chimney is used, the builder's opening at the base of the chimney forms the back boiler enclosure.

If the chimney is lined with a 175 mm (7 in) diameter liner (generally the case for chimneys built later than 1965), the fire/back boiler may be installed into the builder's opening without modification of the chimney or opening. A chimney that has previously been used with a solid fuel appliance should be swept. A short length of 125 mm (5 in) diameter flue pipe either flexible or rigid, should be used to connect the appliance to the 175 mm (7 in) diameter liner such that the flue pipe projects about 150 mm (6 in) into the liner. The annular space between the flue pipe and liner should be sealed using a material such as mineral wool. This should be done in such a way that it does not block the flue pipe exit and will not fall out into the back boiler.

If the chimney is not lined, lining should be carried out, e.g. by means of a 125 mm (5 in) diameter stainless steel flexible liner which should be directly connected to the outlet of the draught diverter of the back boiler.

A metal terminal which satisfies the requirements, or if constructed of other suitable materials the performance test requirements, given in BS 715† should be installed at the top of the chimney. The terminal should be of the same nominal size as the liner to which it is connected.

NOTE. It may not be necessary to line the chimney if the back boiler is used only for heating water for domestic purposes. See 12.4(b) of BS 5440 : Part 1 : 1978.

The annular space between the flue liner and the chimney should be sealed at the base and the top of the chimney. At the base, this should be done using a material such as mineral wool in such a way that it will not fall out on to the back boiler. The height of the plug of mineral wool should be about 150 mm (6 in). The flue liner should be supported at the top of the chimney by means of a sealing plate which is secured and weather-proofed by flaunching with a 3:1 sand:cement mix. The terminal should be installed at the top of the chimney by connecting it directly to the top of the flue liner. The liner should protrude no more than about 50 mm (2 in) into the terminal socket.

If an extension to an existing chimney breast is constructed to form a duct for pipework, cables etc., it is essential to seal the builder's opening from the duct. (See 9.2.4.4 and figure 9.)

9.2.4.3 Using a precast flue block chimney or a fluepipe. When there is no solid fuel appliance chimney, a purpose made non-combustible box should be provided to take the place of the builder's opening and provide the back boiler enclosure. The box may be a proprietary item made of precast concrete, insulated metal or asbestos substitute or it may be constructed in situ of suitable material.

Recommended maximum internal dimensions are as follows:

Height 900 mm (36 in)
Width 585 mm (23 in)
Depth 375 mm (15 in)

Reference should be made to the appliance manufacturer's installation instructions to determine minimum dimensions.

The back boiler enclosure should stand on, or should incorporate, a hearth which can support the weight of the enclosure and fire/back boiler.

*Where a convector is fitted to a 225 mm x 225 mm (9 in x 9 in) brick chimney, a void below the spigot of volume not less than 12 dm³ (735 in³) should be available.

†Currently under revision.

The hearth should be of solid, non-combustible material not less than 25 mm (1 in) thick placed upon non-combustible supports of height not less than 25 mm (1 in). It should extend not less than 150 mm (6 in) from the back and sides of the back boiler. If there is a wall within 150 mm (6 in) of the appliance it should extend to that wall. It should also extend to the front of the back boiler.

It is essential to ensure that the height of the back boiler hearth above the finished floor level is appropriate to the type of installation. If the fire associated with the fire/back boiler is to fit on a hearth, then the back boiler hearth should be level with the fire hearth. Such a fire hearth should meet the size recommendations of 10.2.1. If the fire is to be wall mounted, the height of the back boiler hearth should be sufficient to enable the fire to meet the height recommendations of 10.2.1.

The associated precast flue block chimney or fluepipe should be properly connected to the back boiler enclosure box and the joint sealed with, for example, fireclay. A metal terminal which satisfies the requirements, or if constructed of other suitable materials the performance test requirements, given in BS 715* should be installed at the top of the chimney. The terminal should be of the same nominal size as the liner to which it is connected.

The back boiler enclosure box and chimney or fluepipe are usually enclosed in a 'false chimney breast' for aesthetic reasons. It is essential to seal the back boiler enclosure from the space above it. (See 9.2.4.4 and figure 10.)

9.2.4.4 Sealing of adventitious openings to back boiler enclosures. An essential feature for the correct operation of the fire/back boiler is that the back boiler enclosure should have only two openings, an entrance through and round the back of the fire and an exit via the flue. All other openings, e.g. those made for the passage of gas, water and flue pipes and electric cables, should be sealed, with, for example, cement or fireclay.

The reason for sealing these other openings is that they provide a passage for combustion products to reach rooms above and also because upward flow through them can produce a second flue effect which apart from transmitting the combustion products can also cause excessive air movement under the fire leading to flame reversal.

9.3 Balanced-flued appliances. Both fires and convectors are available in balanced-flued form. In all cases, the manufacturer's instructions should be complied with.

10. Fire precautions

10.1 General. A basic requirement for all domestic gas appliances and their flue pipes is that provision should be made for preventing the temperature of adjacent combustible material from being raised to more than 65 °C (150 °F).

10.2 Floor protection

10.2.1 Gas fires. Unless the manufacturer's instructions state otherwise, and provided that the fire is installed so that no part of any flame or incandescent material is less than 225 mm (9 in) above the floor, no hearth is necessary. Wall-mounted fires should preferably be installed so that no part of any flame or incandescent material is less than 300 mm (12 in) above the floor in order to make allowance for floor coverings beneath the fire.

If the fire is installed so that flame and incandescent material is less than 225 mm (9 in) above the floor, then a hearth under the fire is almost certainly required. The manufacturer's instructions in this respect should be complied with.

Where a hearth is provided, it should be of solid non-combustible material. It should extend at least 300 mm (12 in) forward from the back plane of the fire and should extend sideways at least 150 mm (6 in) beyond each edge of the radiant source.

It is emphasized that these dimensions are the minimum required as precautions against fire; it may be necessary or desirable to increase the hearth area, for example in order to ensure that the fire is stable on the hearth.

The hearth material should be at least 12 mm (½ in) thick. Its top surface should be preferably 50 mm (2 in) above floor level in order to discourage the placing of carpets or rugs over it.

10.2.2 Convectors. No precautions are necessary to protect the floor below a convector, whether wall- or floor-mounted, if the appliance complies with the requirements of BS 1250 : Part 4 and is installed in accordance with the manufacturer's instructions.

10.2.3 Fire/back boilers. When a fire/back boiler is installed at the base of a chimney, which usually will be associated with an existing hearth, no precautions are necessary to protect the surrounding floor.

Where a hearth is not available, the recommendations of 10.2.1 should be followed. Consideration should also be given to the structural strength of such protection material (see 9.2.2.2).

10.3 Protection at rear of appliance. Combustible material at the rear of an appliance should be protected against the effects of heat transmission. If it is stated in the appliance installation instructions that it is suitable for mounting on or against combustible material, then the instructions in this respect should be strictly adhered to.

When fitting a fire or a fire/back boiler to a fireplace opening, combustible material should not be fitted directly behind the closure plate area.

10.4 Side-wall protection

10.4.1 Gas fires. A fire should be installed so that no part of a combustible side wall is less than 500 mm (20 in) from the radiant source. If this is not possible, the combustible side wall should be suitably protected.

10.4.2 Convectors. A convector should be installed so that no part of a combustible side wall is less than 150 mm (6 in) from the warm air outlet, unless the manufacturer's instructions specify otherwise.

10.5 Protection of combustible material adjacent to a flue pipe. Recommendations for the protection of combustible material adjacent to flue pipes, balanced-flue appliance duct assemblies and terminals are given in BS 5440 : Part 1.

10.6 Protection of furniture. As a general guide, combustible furniture should not be sited less than 1 m (3.3 ft) from the radiant source of a fire and forward of the radiant surface.

There should be a vertical distance of at least 150 mm (6 in) separating the underneath of a shelf from the top of an appliance sited beneath it, unless the manufacturer's instructions specify otherwise.

*Currently under revision.