BRITISH STANDARD

BS 8303-1: 1994

Installation of domestic heating and cooking appliances burning solid mineral fuels —

Part 1: Specification for the design of installations

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Engineering Sector Board to Technical Committee RHE/28, upon which the following bodies were represented:

Association of British Solid Fuel Appliance Manufacturers
British Ceramic Tile Council
British Coal Corporation
Consumer Policy Committee of BSI
Department of Energy (Energy Efficiency Office)
Department of the Environment
HETAS Ltd.
Incorporated Association of Architects and Surveyors
Low Temperature Coal Distillers of Great Britain Ltd.
METCOM
National Fireplace Manufacturers' Association
National Society for Clean Air
Real Fire Association
Solid Smokeless Fuels Federation
Waterheater Manufacturer's Association
Coopted members

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Contents

Foreword

This Part of BS 8303 has been prepared under the direction of the Engineering Sector Board, and together with BS 8303 Parts 2 and 3 supersedes BS 8303:1986 which is withdrawn.

BS 8303 covers the design and installation of domestic heating and cooking appliances burning solid mineral fuel.

This Part of BS 8303 details the design specification to be followed by the designer, when developing an acceptable appliance installation design for a particular application.

Part 2 of BS 8303 specifies the practices to be followed when installing the appliance in accordance with the design specification. It reflects good site supervision and working practices.

Part 3 of BS 8303 gives guidance and recommendations to the designer and installer on options to be identified and the methods of achieving a safe and satisfactory installation. It also gives important guidance on other matters including maintenance and cleaning.

BS 8303 does not deal with design or installation of hot water heating systems or hot water supply systems. However, where the appliance involves hot water services then attention is drawn to BS 5449:1990.

Attention is drawn to the need to ensure compliance with all local and general regulations as they affect the installation, including the following;

— planning permission;

— Building Regulations [1];

— Clean Air Act [2];

— Gas Safety (Installation and Use) Regulations [3].

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 and ii, pages 1 to 30, 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.

1 Scope

This Part of BS 8303 specifies both general and specific requirements relating to the design and installation of all domestic heating and cooking appliances burning solid fuels in both new and existing buildings. The appliances covered by this standard are categorized as follows (see clause **6**):

a) open fires;

b) roomheaters;

c) freestanding cookers and independent boilers.

Specific installation requirements related to each category of appliance are detailed under separate headings (see clauses **17** to **20**).

In addition to the definitive requirements, this standard also requires the items detailed in clause **4** to be documented. For compliance with this standard, both definitive requirements and the documented items have to be satisfied.

2 Definitions

For the purposes of this Part of BS 8303, the definitions given in BS 1846-1:1994 apply.

3 References

3.1 Normative references

This Part of BS 8303 incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 30. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this Part of BS 8303 only when incorporated in it by amendment or revision. For undated references, the latest edition applies, together with any amendments.

3.2 Informative references

This Part of BS 8303 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 the inside back cover, but reference should be made to the latest editions.

4 Information and requirements to be agreed and documented

NOTE Annex A includes an example of a checklist that may be used to document this information.

4.1 Information to be supplied by purchaser

The information to be supplied by the purchaser shall be fully documented. Both definitive requirements specified throughout the standard and the following documented items shall be satisfied before a claim of compliance with the standard can be made and verified:

— type (open fire, roomheater, independent boiler, cooker) and make/model (where appropriate) of appliance selected and overall heat services required.

NOTE Further information on the selection of appliances is given in Annex B.

— details of building structure including materials of construction;

— location and materials of construction of fireplace recess;

— hearth, including size and material of construction and decorative finish;

— environmental conditions particular to the area, e.g. topography;

— hot water boiler with hot water heating or supply system, if required;

— gas ignition supply point, if required.

— electrical supply, if required;

— type, size and location of fuel storage, if required;

— other accessories, if required, e.g. fireguard.

4.2 Items for agreement

The following items to be agreed between the contracting parties shall be fully documented. Both the definitive requirements specified throughout the standard and the following documented items shall be satisfied before a claim of compliance can be made and verified:

— exact siting of the appliance, including:

a) special dimensional or constructional requirements for the appliance location, the fireplace recess or surround;

b) access for the installation and maintenance of pipework and/or warm air ductwork;

— position, size and type of chimney flue, and access for sweeping;

— position and type of ventilators necessary to ensure adequate provision of air for combustion and ventilation.

4.3 Exchange of information with appliance installer

The design specification shall be made available to the installer prior to commencing work.

5 General requirements

5.1 Mechanical resistance and stability

The designer shall use materials whose mechanical resistance and stability is not adversely affected when subjected to the heat expected during normal use.

Where it is necessary to construct a new fireplace recess, the designer shall ensure adequate foundationing for it and the chimney serving it.

The design of the fireplace recess (see clause **7**) shall be such that the chimney is adequately supported by the fireplace recess where appropriate by the use of load bearing lintels or corbelling of coursed masonry.

Where it is necessary to construct a new chimney, it shall conform to the requirements of BS 6461-1:1984 or BS 7566:1992.

In the case of a chimney not serving a fireplace recess the chimney shall be constructed with adequate foundationing where appropriate, so that no part of the chimney is supported by the appliance.

NOTE Further information is given in clause **4** of BS 8303-3:1994.

The designer shall ensure that the appliance manufacturer's instructions regarding securing the appliance are followed in order to prevent movement during normal use which could cause joint separation and a leakage to occur between the appliance and the flue, such that the ability of the chimney to evacuate products of combustion safety to the outside atmosphere is impaired.

NOTE Further information is given in clause **5** of BS 8303-3:1994.

5.2 Safety in case of fire

The materials used in the installation of an appliance shall be non-combustible in accordance with the requirements of BS 476-4:1970 in order to limit the spread of fire to other rooms.

5.3 Hygiene, health and the environment

The size of air inlets into the room shall be such that sufficient air for combustion and ventilation is provided to avoid the escape of products of combustion from the appliance.

In the case of an open fire an air opening or openings with a total free area of at least 50 % of the throat opening area (see clause **14** and Figure 1, Figure 2 and Figure 3) shall be provided. For other appliances an opening or openings with a total free area of at least 550 mm^2 per kW of rated output above 5 kW shall be provided. Where a flue draught stabilizer is used the total free area shall be increased by 300 mm^2 for each kW of rated output.

Extractor fans shall not be located in the same room or space in which an appliance is installed.

All joints between an appliance and its chimney shall be sealed using non-combustible material in a manner that enables the joint to withstand the expansion and contraction to which it is subject during normal use.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

The designer shall ensure that the chimney outlet conforms to BS 7566:1992.

5.4 Safety in use

The designer shall ensure that the chimney flue size for the appliance to be installed is not less than those shown in Table 1.

NOTE Further information is given in clause **8** of BS 8303-3:1994.

Any fireplace recess shall be constructed of non-combustible material in accordance with clause **7**. The outer surface temperature of the walls of the fireplace recess shall be such that during normal use of the appliance adjacent combustible material is not ignited from the heat transmitted.

An appliance shall be installed on or above a hearth (see clause **8**) so that adjacent combustible materials shall not be ignited from the following causes:

a) direct radiation or conduction of heat from the appliance (see clauses **17** to **20** depending upon the specific appliance to be installed);

b) embers falling from the appliance (see clause **8**);

c) heat transfer from the fluepipe and fittings (see clauses **9**, **10** and **11**).

NOTE Further information is given in clause **9** of BS 8303-3:1994.

Where accidental human contact is possible surfaces shall be either lower in temperature than can cause harm as described in BS 4086:1966 and PD 6504:1988 or where appropriate be protected by the use of a fireguard conforming to BS 6539:1984. Where fireguards are used, provision shall be made for fixings conforming to BS 6539:1984.

NOTE Lowering the surface temperature of some surfaces may be achieved by the use of insulating materials.

It shall be possible to inspect, clean and maintain the chimney without removing the installed appliance. Where the chimney cannot be swept through the appliance a soot door and/or flue pipe access port shall be provided for inspection, cleaning and maintenance (see clause **10**).

Each appliance shall be connected to its own individual flue. A number of individual flues may form part of a single chimney stack.

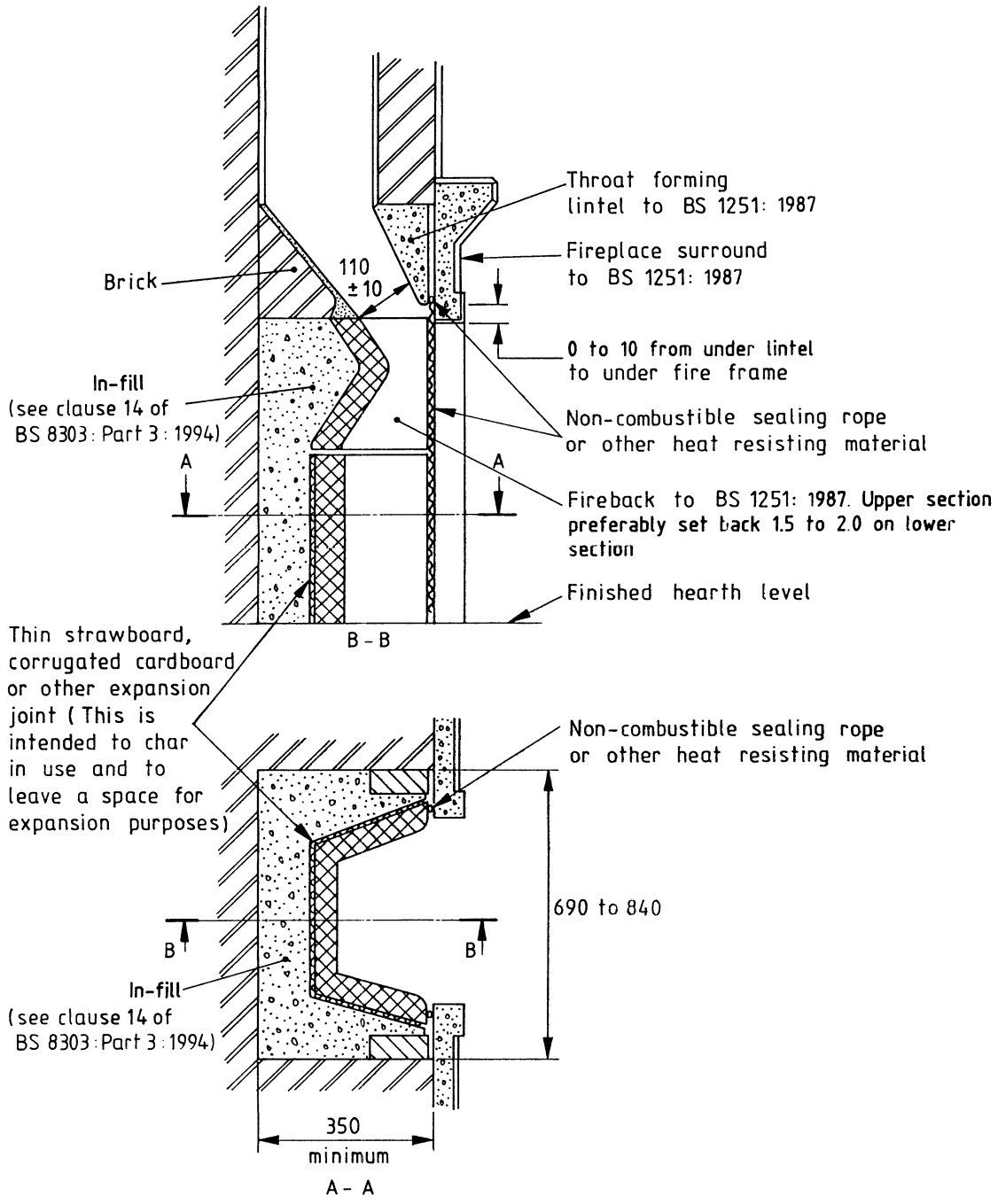
Electrical components shall have an electrical supply fitted with an appropriate fuse. Means of isolating electric components shall be provided in accordance with BS 7671:1992.

NOTE Where gas is to be used for ignition purposes, attention is drawn to the Gas Safety (Installation and Use) Regulations [3].

5.5 Protection against noise

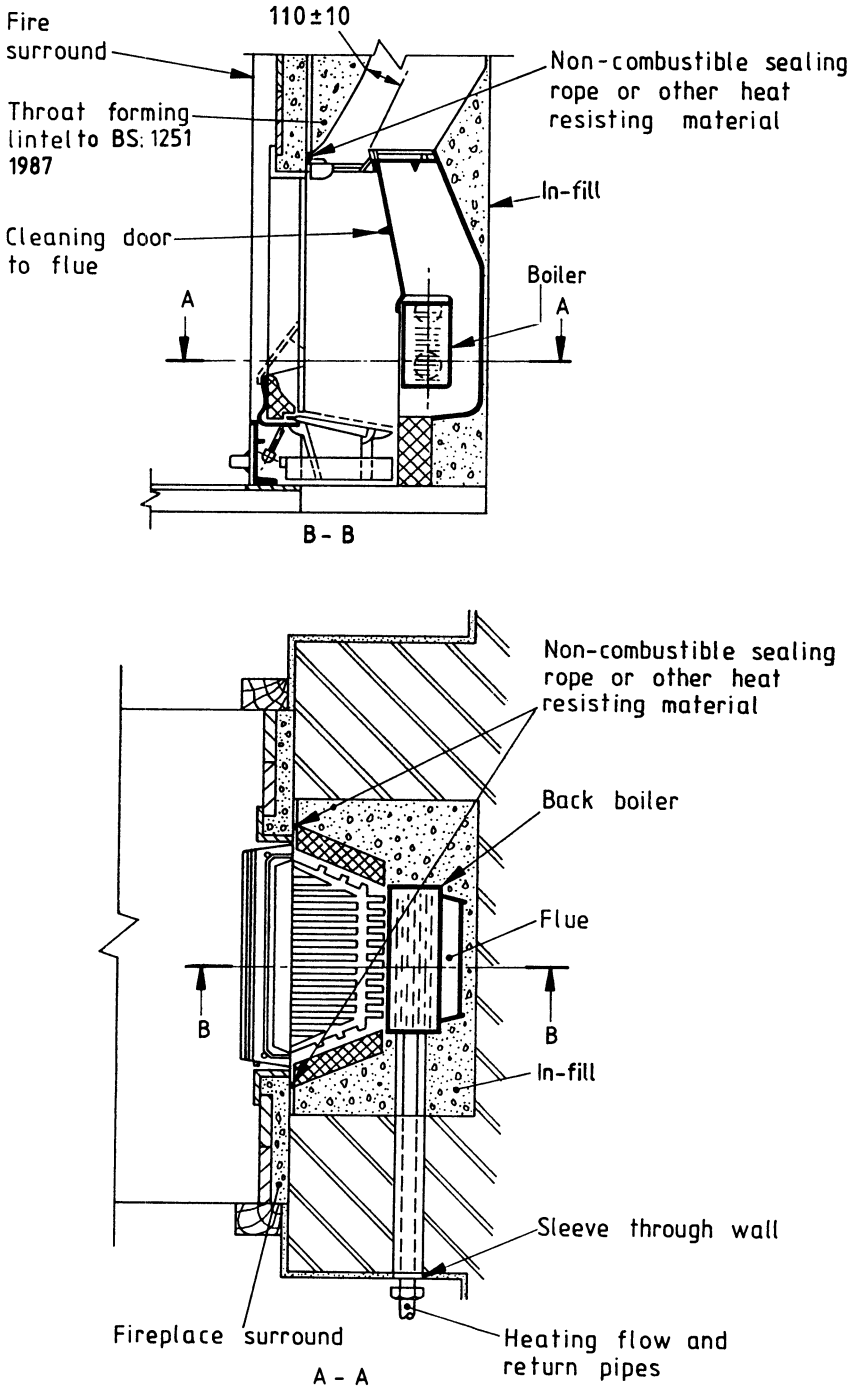
Where noise generated from the operation of an appliance is sufficient to prevent sleep or rest the installation of the appliance shall be such that the noise is not transmitted to adjacent occupancy areas.

NOTE Further information is given in clause **10** of BS 8303-3:1994.



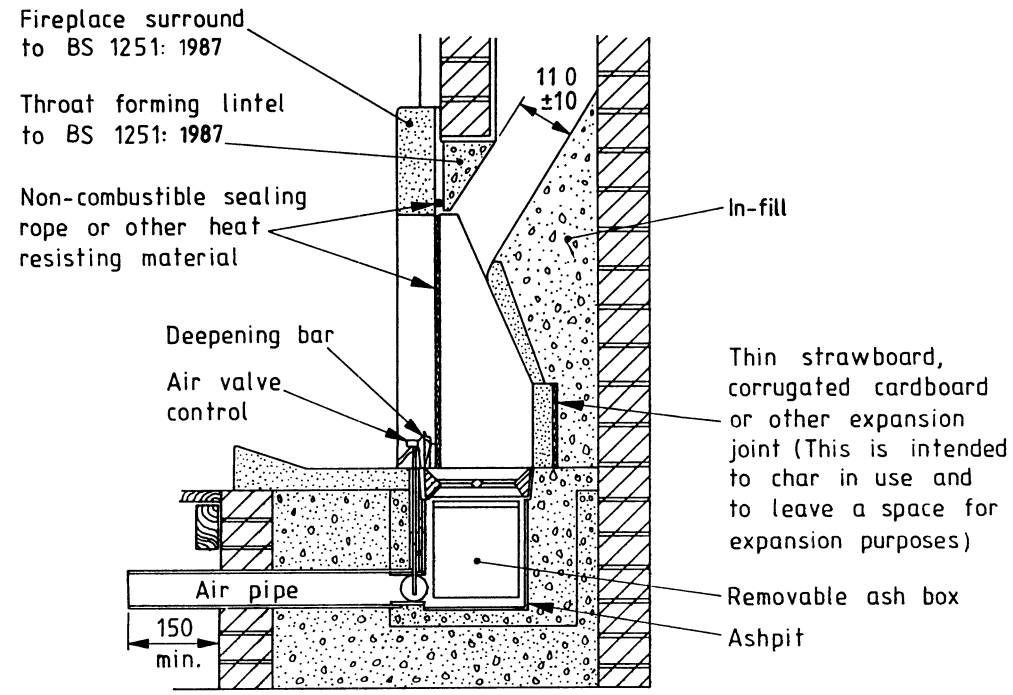
All dimensions in millimetres.

Figure 1 — Typical setting for inset open fire without a boiler unit



All dimensions in millimetres.

Figure 2 — Typical installation of inset open fire with a boiler unit



All dimensions in millimetres.

Figure 3 — Typical installation of a sunken ashpit inset open fire with underfloor air supply

Table 1 — Size of flues

Installation	Minimum flue size
Appliance in a fireplace recess with an opening up to 500 mm × 550 mm.	200 mm diameter or square section of equivalent area.
Closed appliance up to 20 kW rated output.	125 mm diameter or square section of equivalent area.
Closed appliance up to 20 kW rated output burning bituminous coal.	150 mm diameter or square section of equivalent area.
Closed appliance above 20 kW and up to 30 kW rated output.	150 mm diameter or square section of equivalent area.
Closed appliance above 30 kW and up to 45 kW rated output.	175 mm diameter or square section of equivalent area.
NOTE Should an offset be necessary in a flue run then the flue size should be increased by 25 mm on each dimension, diameter or each side of square flue.	

5.6 Energy economy and heat retention

The installation of the appliance shall be such that the amount of energy required in use, is kept to a minimum.

NOTE Further information is given in clause **11** of BS 8303-3:1994.

5.7 Materials and working life

The designer shall use durable materials, supported by relevant British Standards, British Board of Agrement Certificate or products beating a CE mark as defined in the EC Construction Products Regulations [4].

NOTE This includes the requirement for an economically reasonable working life subject to normal maintenance and forseeable operating criteria.

6 Appliance classification

The appliances covered by this standard are categorized[1)] as follows:

a) open fires;

b) roomheaters;

c) freestanding cookers and independent boilers.

Appliances within these three main categories shall be further categorized for installation purposes as follows:

1) freestanding appliance: an appliance designed to operate anywhere within a building where a chimney can be provided;

2) inset appliance: an appliance, usually an open fire or a roomheater, that is designed to be built into and operate within a fireplace recess (see clause **7**).

7 Fireplace recess

7.1 General

An appliance shall be installed in such a manner that its operation in proximity to combustible material does not result in a fire (see **5.4**).

NOTE A fireplace recess is a means of satisfying this requirement.

Account shall be taken of the manufacturer's installation instructions for the appliance as well as the information obtained from the purchaser as detailed in clause **4**.

7.2 Construction

Fireplace recesses shall either be of brick or block work construction or built from non-combustible prefabricated components.

NOTE 1 When the nominal size of the appliance is known the fireplace recess may be constructed to a width to accommodate the appliance and any infill that may be required.

When the size of the appliance is not known the recess shall be constructed to a maximum width of 840 mm (see Figure 4). The depth of a fireplace recess shall be 350 mm minimum excluding any surface finish except for any non-combustible treatment applied directly onto the front of the recess jambs.

Where the construction of the fireplace recess is of traditional brickwork the essential characteristics of Figure 4a shall be applied.

NOTE 2 This applies particularly in the forming of the gather from the top of the fireplace opening to the flue.

Where the top of the fireplace recess terminates in a raft lintel the essential characteristics of Figure 4(b) shall be applied.

The flue opening of the fireplace recess shall be reduced smoothly from the flue outlet of the appliance, or its flue pipe, to the chimney flue and the fireplace recess shall be of adequate height to allow for this. Where the type of appliance to be installed is not known the recess height shall be approximately 1 100 mm.

8 Hearth

8.1 General

A hearth shall be constructed such that the temperature under or adjacent to the hearth does not cause damage to or ignition of combustible material during the normal operation of the appliance.

NOTE Further information is given in clause **9.2** of BS 8308-3:1994.

8.2 Size of hearth

The size of the hearth shall be such that the proximity of the appliance to its edges will prevent damage to or ignition of other parts of the house e.g. carpet, walls or to any combustible material placed upon it.

NOTE Further information is given in clause **9.2** of BS 8303-3:1994.

9 Flue pipes

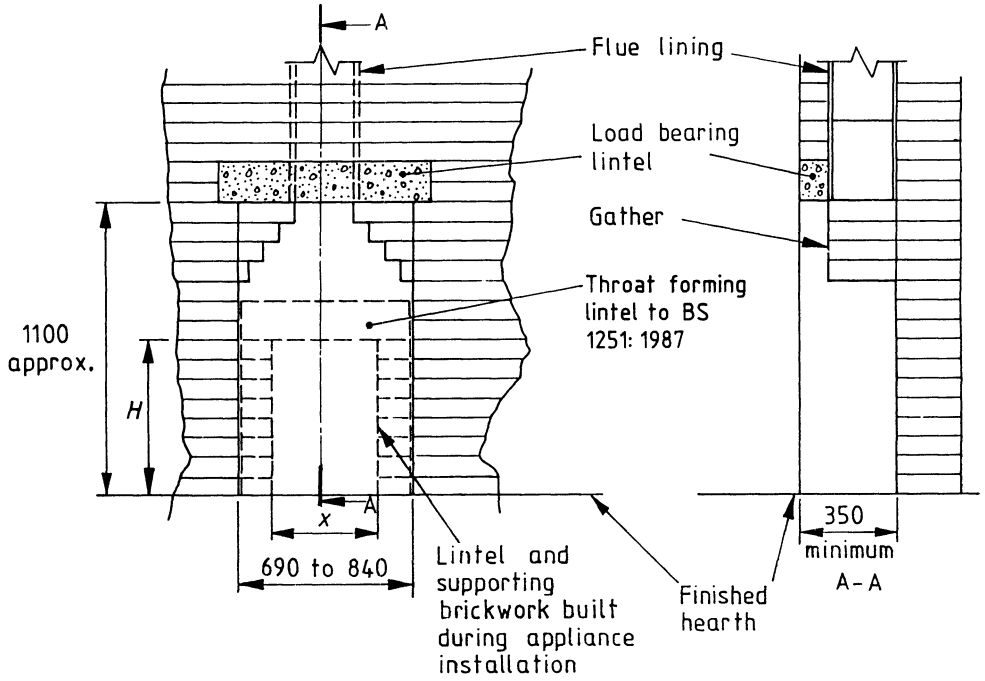
9.1 General

A flue pipe shall be used only to connect the appliance to the chimney. It shall serve only one appliance and not pass through any combustible wall or ceiling.

9.2 Size

The flue pipe internal diameter shall be not less than that of the appliance flue outlet.

[1)] Appliances are categorized under the Heating Equipment Testing and Approval Scheme. Full details are available from HETAS Ltd., P.O. Box 37, Bishop's Cleeve, Gloucestershire, GL52 4TB, Telephone No. 0242 673257.



NOTE. x is the opening to accommodate BS 1251 fireback. H is 0 mm to 10 mm greater than height of surround opening from finished hearth level.

a) Traditional brick construction.

Figure 4 — Construction of a fireplace recess

9.3 Material

A flue pipe shall be manufactured using material conforming to one of the following specifications:

a) cast iron conforming to BS 41:1973; or

b) low carbon steel conforming to a part of BS 6323:1982, with a wall thickness of at least 3 mm;

c) stainless steel conforming to BS 1449-2:1983 for Grade 316 S11, 316 S13, 316 S16, 316 S31, 316 S33 or the equivalent Euronorm 88-71 [5] designation with a wall thickness of at least 1 mm, or equivalent UK gauge; or

d) vitreous enamelled steel of low carbon content, coated internally and externally with acid-resistant enamel conforming to BS 6999:1989; or

e) other materials shown to be no less suitable.

NOTE Further information is given in clause **12** of BS 8303-3:1994.

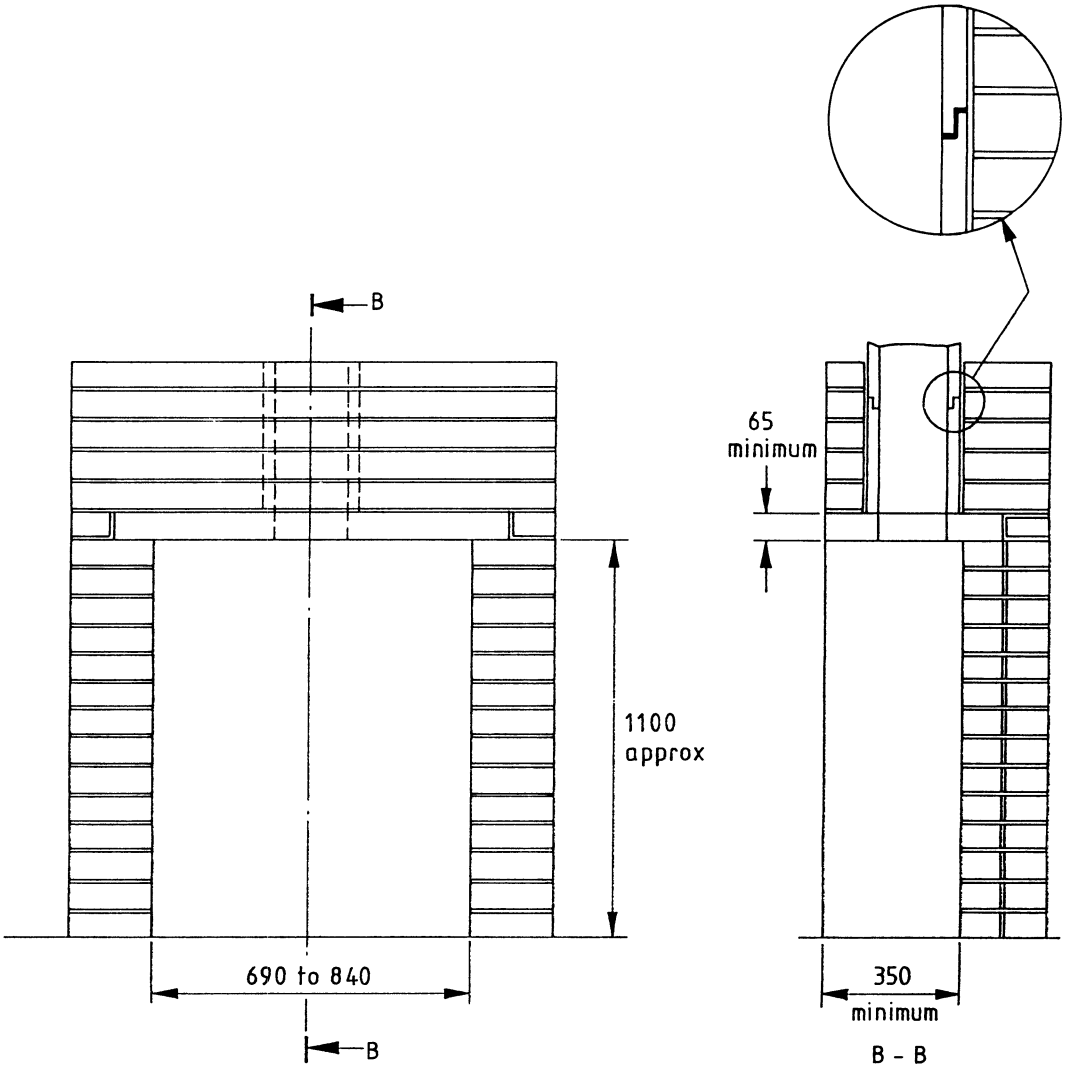
9.4 Bends

A flue pipe shall have no more than two bends each providing a maximum change of direction of 45°, except for a back outlet application using a 90° "T" piece in accordance with the manufacturer's instructions. In this case the horizontal flue run from the back outlet of the appliance shall only be used to connect the appliance to a chimney or flue pipe and shall be not more than 150 mm in length.

There shall not be a change of direction in the flue for at least 600 mm from the outlet of a top-outlet appliance unless the appliance is fan blown.

9.5 Cleaning

Any flue pipe shall be erected in such a way that it can be cleaned through its length without difficulty or causing damage to any part. A sealable cleaning door having a durable fixing shall be fitted if access cannot be achieved through the appliance or via a suitable soot door in the chimney that allows easy access to the flue pipe (see clause **10**).



b) Construction with a raft lintel

All dimensions in millimetres.

Figure 4 — Construction of a fireplace recess (*concluded*)

9.6 Separation from combustible material

Flue pipes shall be separated from combustible material such that damage to or ignition of the combustible material is prevented.

NOTE Further information is given in clause **9.3** of BS 8303-3:1994.

9.7 Joints

Flue pipes with spigot and socket joints shall be fitted with the sockets uppermost.

Joints between the sections of flue pipe, appliance, raft lintel, and register plate shall be sealed. The seal shall be designed to allow for thermal expansion using appropriate sized soft non-combustible heat resisting material held in place by fire cement or a clamping ring.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

10 Chimney and flue pipe cleaning

10.1 General

Access for cleaning the chimney and flue pipe shall be provided by one or more of the following methods:

a) through the appliance;

b) by means of a soot door in the chimney;

c) by means of a flue pipe access port.

It shall be possible to sweep the flue without moving the appliance.

10.2 Soot door

Where access is to be provided through a soot door then it shall be in the face of the chimney above the raft lintel or the register plate as appropriate (see Figure 5 and Figure 6). Where a soot door is installed in an outside wall then it shall be of the double door type.

10.3 Access port

Where sweeping is to be carried out through an access port in a flue pipe it shall be on a bend in the flue pipe for a top outlet appliance, or at the bottom of the flue connecting pipe for a rear flue outlet appliance. In this latter case adequate clearance shall be allowed around the appliance to enable this cleaning operation to be performed (see Figure 7 and Figure 8).

NOTE Reference should be made to the instructions of the manufacturer for any necessary clearance at the back or sides of the appliance for cleaning and maintenance.

10.4 Separation from combustible material

A soot door shall be positioned such that adjacent combustible material is not ignited from the heat transmitted during normal use of the appliance.

NOTE Further information is given in clause **9.4** of BS 8303-3:1994.

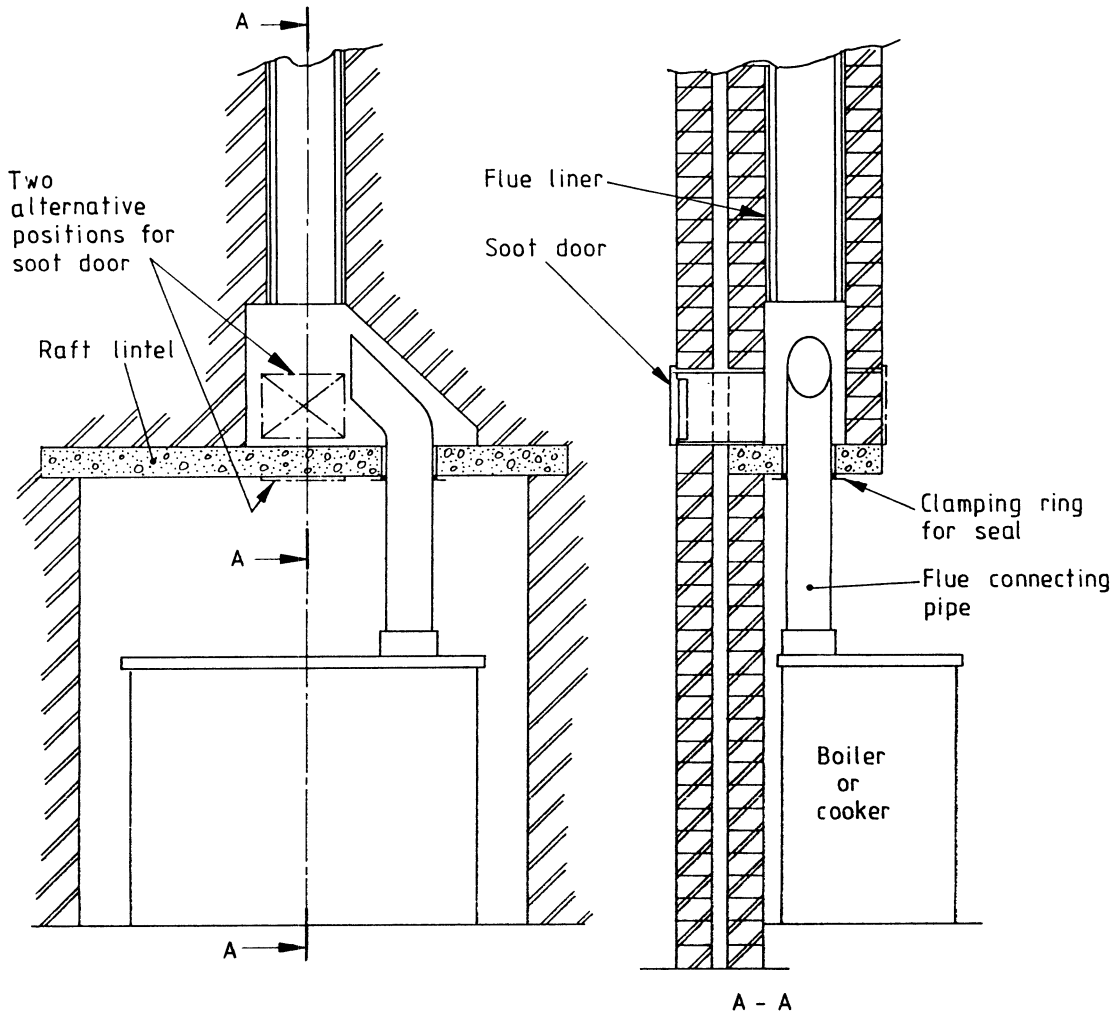


Figure 5 — Typical installation of a freestanding cooker or independent boiler in a recess with a raft lintel

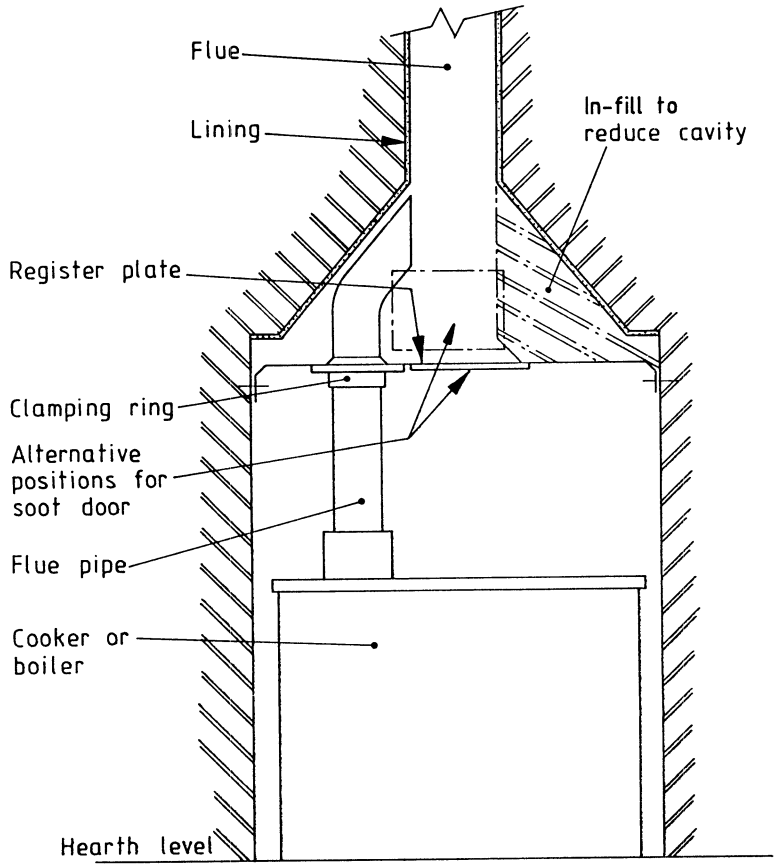


Figure 6 — Typical installation of a freestanding cooker or independent boiler in an existing recess with metal register plate

11 Register plate

11.1 General

Where a freestanding appliance is required to be connected to a fireplace recess then the installation requires the use of a register plate.

The connection is made as follows:

— with a back register plate to close the fireplace opening for rear flue outlet appliances;

— with a top register plate to close the top of the fireplace recess for top flue outlet appliances in which a raft lintel is not used.

11.2 Separation from combustible material

A register plate shall not be secured to combustible material. It shall be positioned such that adjacent combustible material is not ignited from the heat transmitted during normal use of the appliance.

NOTE Further information is given in clause **9.5** of BS 8303-3:1994.

12 Fireback

12.1 General

A fireback shall be installed in a fireplace recess. Sectional firebacks of two-piece, four-piece or five-piece construction conforming to BS 1251:1987 shall be used.

The upper section or sections shall not overhang the lower section and shall be set back from the lower sections by between 1.5 mm to 2 min.

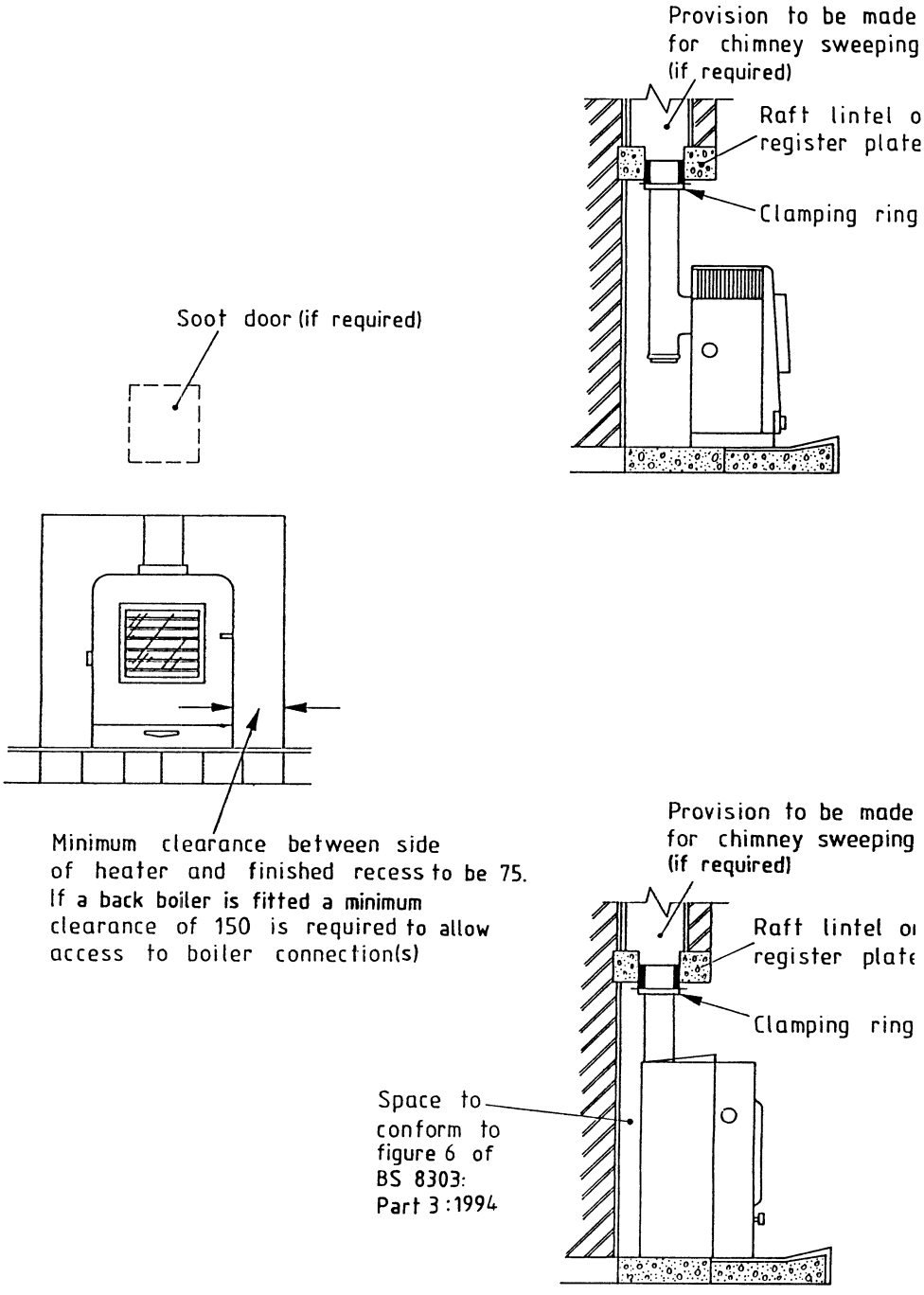
NOTE This is to prevent flames from playing on the edge of the top bricks, which often leads to the early development of cracks.

12.2 Dimensions

The dimensions of the fireback when assembled without jointing shall be as given in Figure 9.

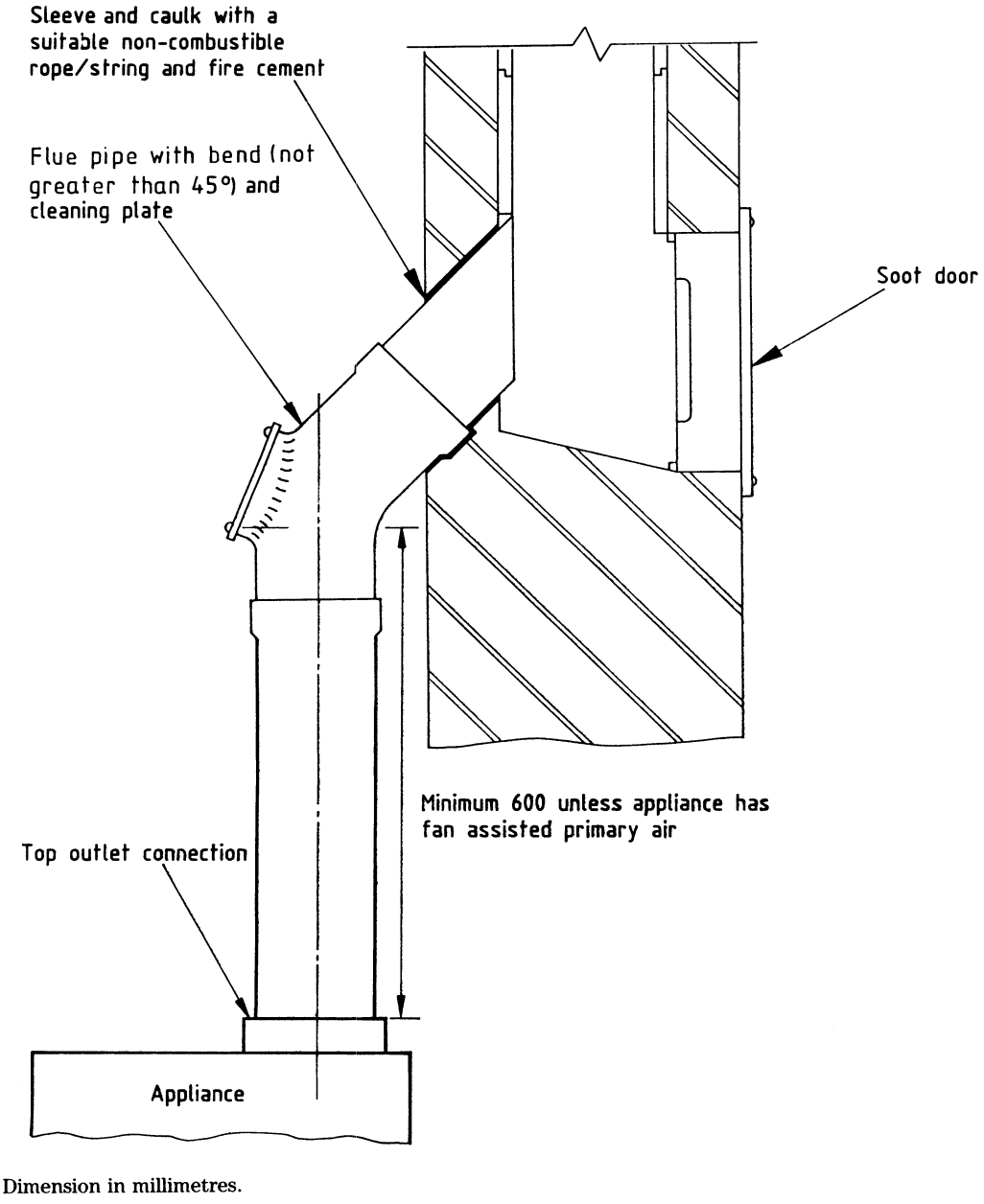
NOTE 1 Two-piece firebacks are usually supplied in one section and should be separated along the horizontal scribing before installation.

NOTE 2 An alternative is to construct the fireback in situ using pup bricks jointed with air setting fire cement.



All dimensions in millimetres

Figure 7 — Typical freestanding roomheater fitted in a recess



Dimension in millimetres.

Figure 8 — Typical connection of a freestanding cooker/independent boiler to a chimney

12.3 Infill

The space around the sides and back of a fireback shall be filled with non-combustible material.

NOTE Further information is given in clause **14** of BS 8303-3:1994.

13 Fireplace surround

A fireplace surround whether constructed in situ from on-site material or assembled using prefabricated components shall conform to the relevant requirements of BS 1251:1987.

14 Throat

The throat construction shall be as described in either of the following.

a) The flue gas passage above an open fire, the throat, shall be formed so that its smallest dimension is 110 mm ± 10 mm from front to back and three quarters of the nominal fireplace opening from side to side. A throat forming lintel conforming to BS 1251:1987 shall be installed at the rear of the fire surround to form the front of the throat as shown in Figure 1. The space to the back and sides of the fireplace recess above the fireback or boiler shall be infilled to eliminate large spaces above the throat and provide a smooth entry for the flue gas into the chimney. At the back the filling shall be angled at about 45° so that there is a smooth transition from the knee of the fireback to the rear of the flue wall.

b) If other forms of throat construction, e.g. precast throat units, are used, the size and shape of the throat shall be similar to that provided by the correct installation of the throat forming lintel specified in BS 1251:1987 and full protection shall be given to the back of the fireplace surround.

When specifying the height of the throat forming lintel or pre-cast throat unit, allowance shall be made for the final height of the hearth taking account of any applied decorative finish (see Figure 4).

NOTE For the purpose of this standard the height of the throat forming lintel or pre-cast throat unit is measured from the level of the top of the finished hearth.

15 Boiler

Where an appliance or the installation incorporates a boiler, access for the pipe connections shall be provided. Where the pipes from the boiler pass through the walls of a fireplace recess they shall be sleeved to allow for movement and easy removal. The space between the pipes and the sleeve shall be sealed.

16 Electrical supply

Where an appliance requires an electrical supply, the electrical installation shall conform to BS 7671:1992.

17 Open fires without convection

17.1 Categories

Open fires without convection are described as inset open fires.

For the purposes of this standard inset open fires without convection are further categorized [2] as follows:

a) without boiler (see **17.3** and Figure 1);

b) with boiler (see **17.4** and Figure 2);

c) with underfloor air supply, with or without boiler (see **17.5** and Figure 3);

d) with fan-assisted air supply, with or without boiler (see **17.6**).

17.2 General requirements

Inset open fires without convection shall conform to the requirements of BS 4834:1990 and shall be installed on a hearth in a fireplace recess (see clause **7**, clause **8** and Figure 1 and Figure 10).

The appliance shall be secured and any joints between the appliance the fire surround and hearth sealed to avoid uncontrolled combustion air entering the appliance under the grate.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

17.3 Inset open fire without boiler

The appliance shall be installed in a fireback (see clause **12**).

17.4 Inset open fire with boiler (see Figure 2)

The appliance shall be a complete unit comprising a boiler and inset fire. The boiler flue shall either be an integral part of the appliance or be fitted with a damper.

NOTE The appliance may be delivered as a unit or in parts to be assembled on site in accordance with the instructions of the appliance manufacturer.

The appliance shall be installed in a fireplace recess utilizing the appropriate parts of a fireback where no boiler wall exists.

NOTE Further information is given in clause **14** of BS 8303-3:1994.

The boiler shall be installed according to the requirements of clause **15**.

17.5 Inset open fire with underfloor air supply (see Figure 3)

17.5.1 *Appliance*

An inset open fire without boiler, with underfloor air supply, shall be installed in a fireback and have a throat (see clause **12** and clause **14**). An inset open fire with boiler, with underfloor air supply, shall be installed according to **17.4**.

NOTE In most cases, fires with an underfloor air supply for combustion have little or no firefront above hearth level. The bottom grate is at, or slightly below, hearth level, and a large capacity ashpan is housed in a deep ashpit below hearth level.

[2] Appliances are categorized under the Heating Equipment Testing and Approval Scheme. Full details are available from HETAS Ltd., P.O. Box 37, Bishop's Cleeve, Gloucestershire, GL52 4TB, Telephone No. 0242 673257.

17.5.2 *Ashpit*

The design of the ashpit shall allow a prefabricated unit to be fixed at the correct depth in relation to the level of the finished hearth; it shall allow the supply of air to the fire for combustion.

NOTE This may involve some excavation of the existing floor.

17.5.3 *Air supply*

To prevent loss of control of the fire no undergrate air shall reach the fire except through the air control valve.

Where the air supply is from under a suspended floor, the designer shall ensure that free ventilation of the space is possible through sleeper walls by the provision of air bricks with at least the air openings given in **5.3**.

Where the floor is of solid construction the air supply shall be provided via ducts from two outside walls preferably at right angles. The ducts, at an angle to each other, shall enter a balancing chamber from which a short duct runs to the air inlet connection.

NOTE This arrangement is to prevent a through-draught of air exerting a suction effect on the fire.

Ducts for the admission of air to an appliance shall be constructed of non-combustible material. The cross-sectional area of each duct, and the free area of the inlet grilles, shall be not less than 7 500 mm^2. The ducts shall be effectively sealed against the entry of vermin.

17.5.4 *Fireplace surround and hearth*

To reduce the risk of the fire smoking into a room from a hearth level fire with no firefront, a surround with an opening height of not more than 500 mm shall be used in place of the standard height of 560 mm.

NOTE The hearth may require modification to suit the appliance by having a cut-out centre. The dimensions of this cut-out should be such that there is ample clearance between the appliance and the vertical edge of the hearth to allow for expansion of the fire parts and for the insertion of mineral wool insulation for packing.

The construction shall meet the requirements of **5.4** in relation to separation from combustible material.

17.6 Inset open fire with fan-assisted air supply

17.6.1 *Appliance*

As fan assisted fires differ from one another, the installation instructions of the appliance manufacturer shall be followed, as they relate to the special requirements for the constructional hearth (see clause **8**), the fireback (see clause **12**), and the fireplace surround (see clause **13**).

17.6.2 *Electricity supply*

A fused electrical supply shall be provided adjacent to the appliance in accordance with BS 7671-1992. In all cases the appliance manufacturer's requirements shall be followed.

18 Open fires with convection

18.1 Categories

For the purposes of this standard, open fires with convection shall be categorized into two main types, each with or without boiler, as follows:

a) freestanding (see **18.2** and **18.3**);

b) inset (see **18.4**).

18.2 General requirements

The appliance shall conform to the requirements of BS 3376:1991. Where an appliance is intended for installation in a fireplace recess, whether freestanding or inset, the recess shall conform to the requirements of clause **7**.

The appliance shall be secured and any joints between the appliance and the flue sealed to avoid uncontrolled air entering the flue. In all cases the manufacturer's instructions shall be followed with respect to the detailed installation requirements for particular appliances.

Where the appliance does not conform to the size of fireplace surround opening of BS 1251:1987, a purpose made surround constructed to the manufacturer's recommended dimensions shall be provided.

NOTE Both freestanding and inset appliances are normally supplied as complete units, together with their own integral convection chamber, ready for installation. Freestanding open fires with convection are normally designed to be installed within a fireplace recess in a similar manner to freestanding roomheaters with top flue outlet described in **19.4**. Inset open fires with convection are designed to be installed so that the appliance body is enclosed within a fireplace recess by mass of a fireplace surround. The body of some types of inset open fires with convection is designed to fit within the confines of a fireback which conforms to clause **12**.

18.3 Freestanding, with or without boiler, standing in a fireplace recess

18.3.1 *Appliance*

NOTE Freestanding open fires with convection that are designed to be installed standing in a fireplace recess, are supplied with a top flue outlet which may be square-shaped or circular. A typical installation is shown in Figure 11.

The appliance manufacturer's recommendations on the size of the recess shall be followed.

18.3.2 *Closure of top of recess*

The top of the recess shall be closed off with a prefabricated or purpose made raft lintel, or register plate having a square shaped or circular hole to take the appliance flue outlet. It shall be supported at each end by the jambs and sealed along its four edges.

NOTE Further information is given in clause **9.5** of BS 8303-3:1994.

18.3.3 *Connection to the flue*

The flue outlet of the appliance shall be connected to the chimney flue with a flue pipe conforming to clause **9** or a purpose designed adaptor manufactured from materials described in **9.3**. Sufficient clearance shall be left between the flue pipe and any combustible material as specified in **9.6**.

NOTE Further information is given in clause **9.3** of BS 8303-3:1994.

18.4 Freestanding, with or without boiler, installed in front of a fireplace recess with back flue outlet

18.4.1 *General*

NOTE 1 Some freestanding open fires with convection may be supplied with a back flue outlet for installation in front of an existing fireplace recess.
NOTE 2 A typical installation is shown in Figure 12.

If the flue outlet of the appliance is circular and is too short to act as the flue pipe, a short length of flue pipe conforming to clause **9** shall be used as the flue adaptor and fitted onto the flue outlet of the appliance. The design shall include reference to any special shape adaptors, e.g. for rectangular flue outlets.

18.4.2 *Connection to flue*

The appliance shall be connected to the flue via a back register plate as specified in clause **11** or via a purpose-made opening in the chimney wall. Any existing fireback shall be removed and suitable access for chimney sweeping provided at the side or back of the chimney.

NOTE Infill of space below the access door is recommended.

18.5 Inset open fire with convection, with or without boiler

18.5.1 *General*

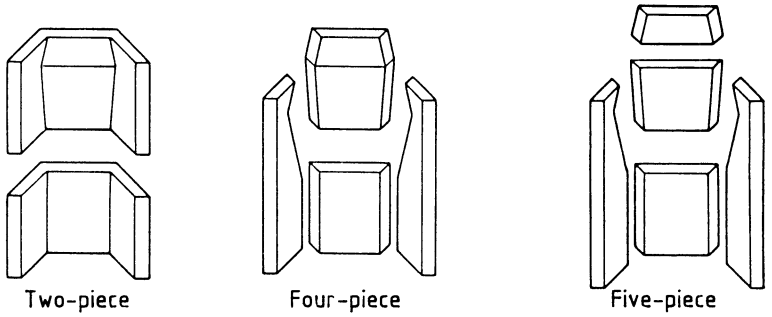
An inset open fire with convection designed so that it can be installed into a new or existing fireplace recess, shall be supplied as a complete unit.

NOTE This unit is enclosed within the fireplace recess by means of a fireplace surround (see Figure 13).

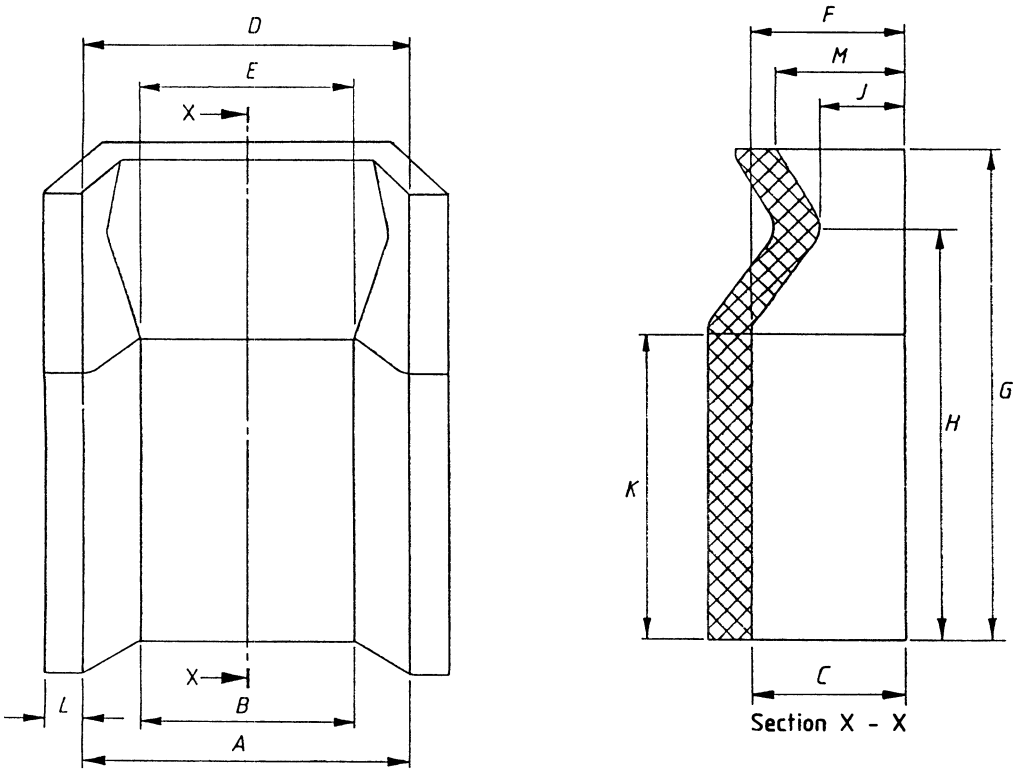
18.5.2 *Connection to the flue*

Where the body of a non-boiler model fits within the confines of a fireback conforming to clause **12**, the throat shall conform to clause **14** (see Figure 13). The flue shall be connected and sealed in accordance with the installation instructions of the manufacturer in order to protect the surround and brickwork from direct impingement of hot gases.

Where the manufacturer's method of installation specifies the use of a flue pipe in conjunction with the flue connector then a flue pipe of the correct size and conforming to clause **9** shall be used.



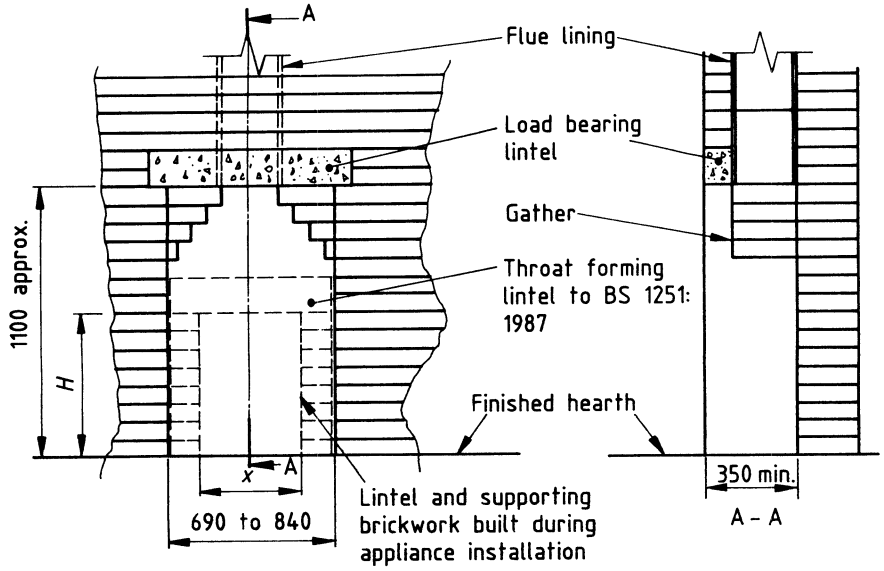
a) Types of sectional firebacks



All dimensions in millimetres												
Nominal size of fire	**Dimension**											
	*A**	*B**	*C**	*D*	*E*	*F*	*G*†	*H*†	*J*‡	*K*§	*L*†	*M*†
350	330	200	170	0 to 3	0 to 3	0 to 3	560	470	100	340	43	150
400	380	250	170	>	>	>	560	470	100	340	43	150
450	430	300	170	*A*	*B*	*C*	560	470	100	340	43	150
500	480	350	170				560	470	100	340	43	150
Tolerances on dimensions: * +15 −0 mm ‡ ±10 mm † + 10 −0 mm § + 0 −10 mm												
NOTE. Dimensions are identical with those given in BS 1251 : 1987.												

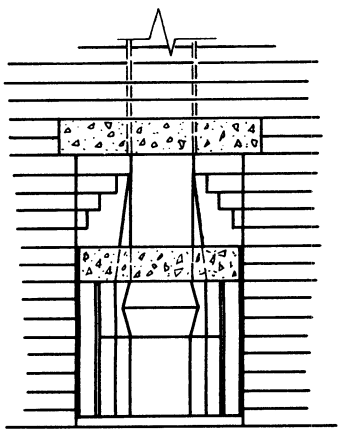
b) Fireback dimensions

Figure 9 — Firebacks

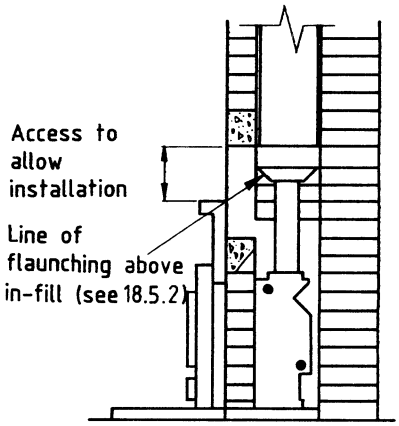


NOTE. x is the opening to accommodate BS 1251 : 1987 fireback. H is 0 mm to 10 mm greater than height of surround opening from finished hearth level.

a) Traditional brick construction.



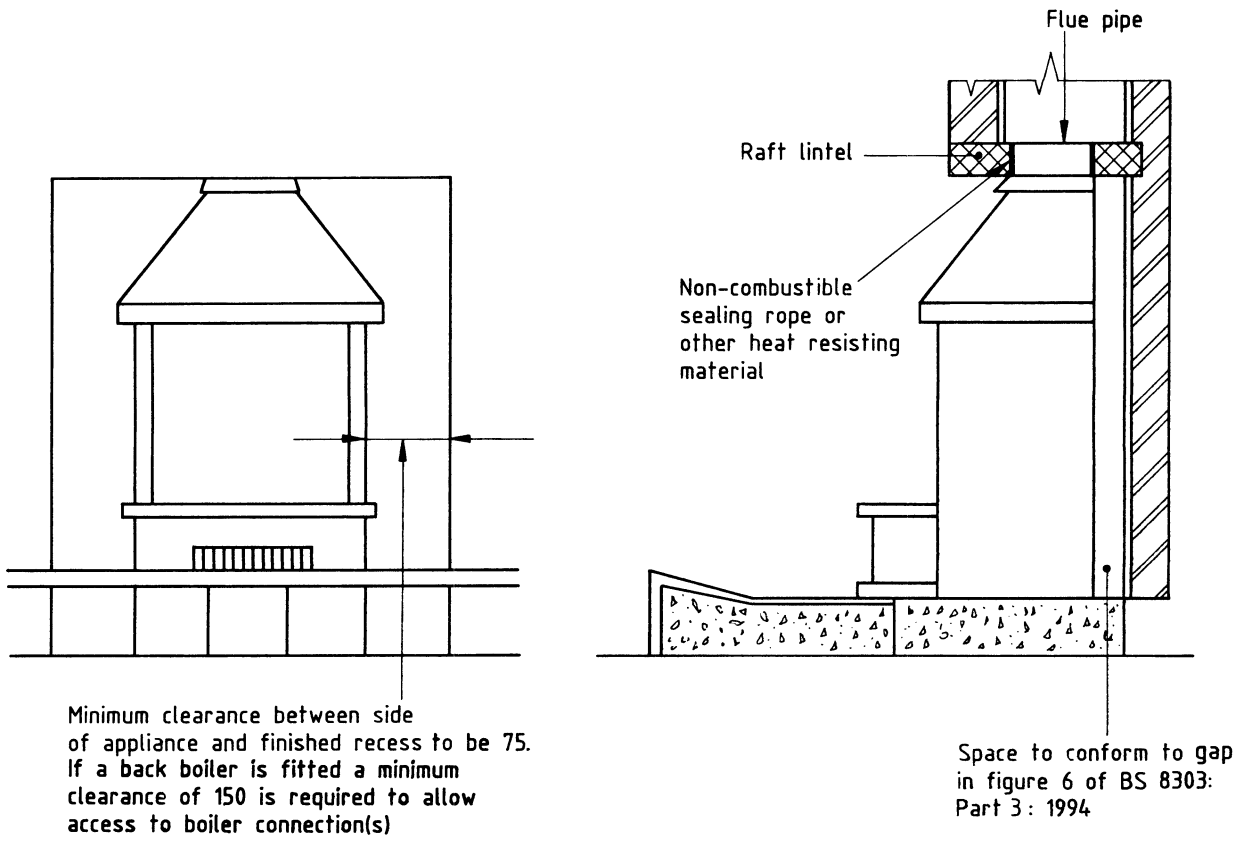
b) Open fire construction (see also figure 4).



c) Section: roomheater installation showing access over surround.

All dimensions in millimetres.

Figure 10 — Construction of a fireplace recess with corbelled gather applicable to a typical installation of inset open fires and roomheaters



All dimensions are in millimetres.

Figure 11 — Typical freestanding open fire with convection fitted in a recess

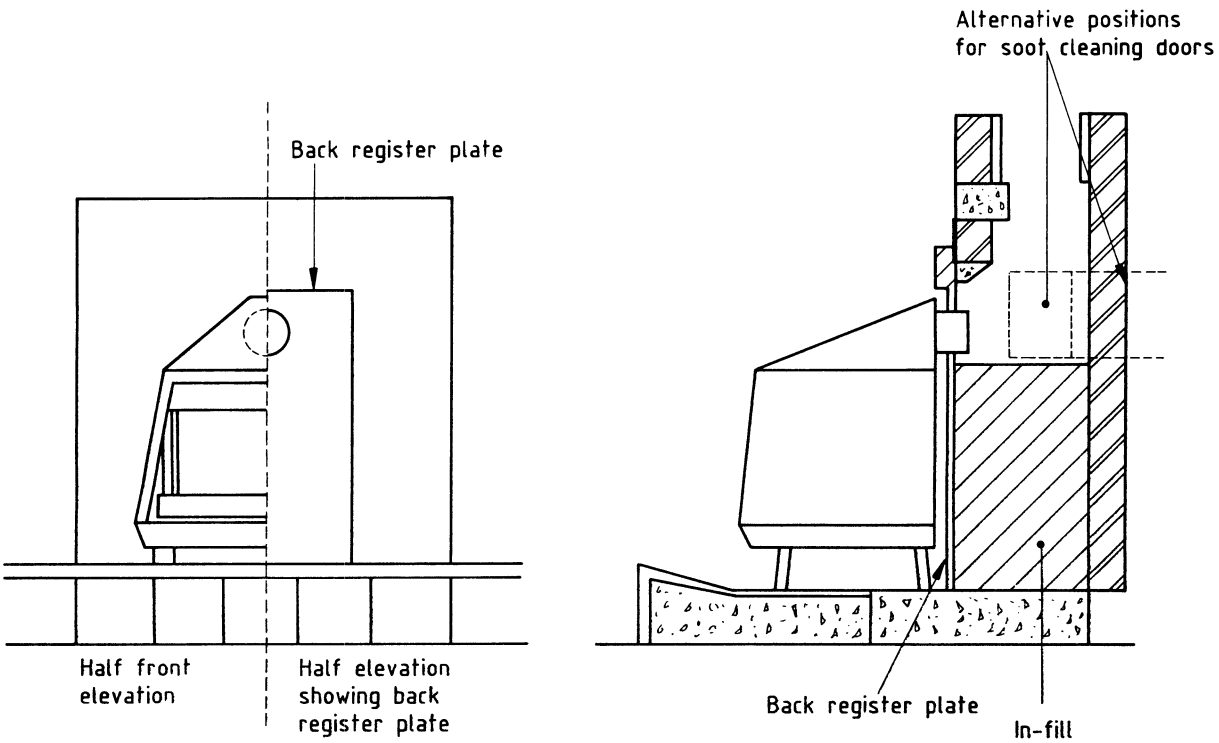


Figure 12 — Typical fitting of an open fire with convection to a back register plate

Where the top of the fireplace recess terminates in a gather (see Figure 4) the appliance shall be connected to the chimney flue by a flue pipe sealed to the flue outlet of the appliance and to the chimney flue. The space around the flue pipe shall be filled with a lightweight aggregate concrete and flaunched to the flue with lime mortar. This shall be achieved via an access hole through the chimney wall above the fluepipe. Where the top of the fireplace recess terminates in a raft lintel or register plate, then the flue pipe shall be sealed to the raft lintel or register plate (see Figure 15 and clause **7** of BS 8303-3:1994).

18.5.3 *Sealing to the surround and hearth*

The manufacturer's recommendations on sealing the appliance to the surround shall be followed. The base of the appliance shall be sealed to the hearth in accordance with the instructions of the manufacturer.

18.5.4 *Insulation*

The space behind and at the sides of the outer convector casing shall be filled with non-combustible insulating material. The body of the appliance shall be insulated from direct contact with the building structure.

19 Roomheaters

19.1 Categories

For the purposes of this standard roomheaters are categorized into two main types, each available with or without boiler, as follows:

a) freestanding (see **19.2**, **19.3**, and **19.4**, and Figure 7 and Figure 14

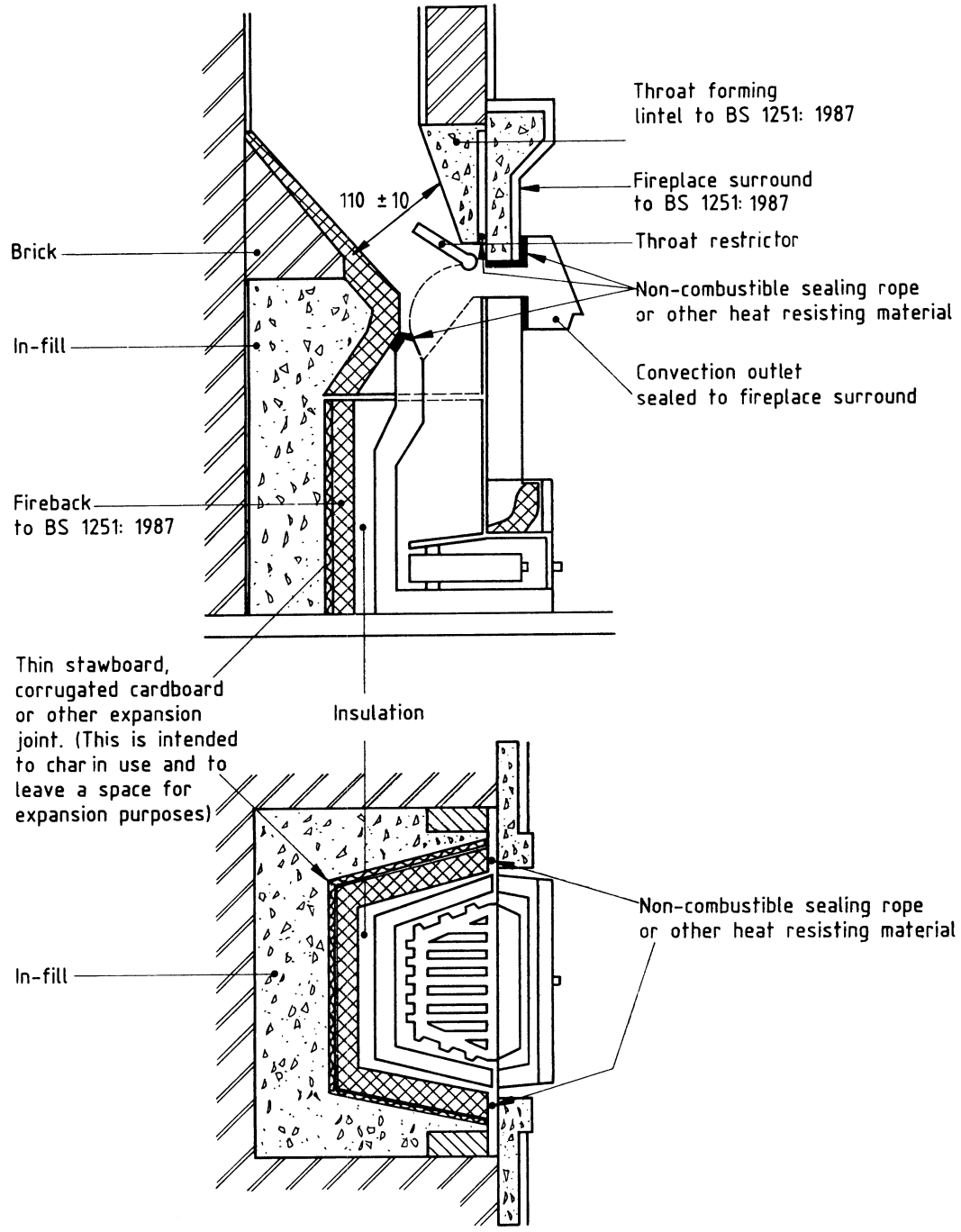
b) inset (see **19.5**, and **19.6**, and Figure 15 and Figure 16

The installation requirements vary for each category.

19.2 General requirements

The appliance shall conform to the requirements of BS 3378:1986. Where an appliance is intended for installation in a fireplace recess, whether freestanding or inset, the recess shall conform to clause **7**.

The appliance shall be secured and any joints between the appliance and the flue sealed to avoid uncontrolled air entering the flue.



All dimensions in millimetres.

Figure 13 — Typical setting for inset open fire with convection, without boiler, installed into a BS 1251:1987 fireback

19.3 Freestanding with or without boiler, with a rear flue outlet standing in front of a fireplace recess

19.3.1 *General*

A freestanding roomheater with back flue outlet standing in front of an existing fireplace recess or similar opening, shall be installed as shown in Figure 14.

19.3.2 *Connection to flue*

The connection of the appliance to the flue shall be made through a back register plate as specified in clause **11**. Any existing fireback shall be removed and suitable access for chimney sweeping provided at the side or back of the chimney breast as indicated in Figure 14.

NOTE Infill of space below the access door is recommended.

If the flue outlet of the roomheater is too short to act as the flue pipe or adaptor, a short length of fluepipe shall be used as the flue adaptor and fitted onto the flue outlet of the roomheater. Such a pipe shall be sealed to the flue outlet with refractory cement (see Figure 14). The end of the pipe shall protrude only a short distance behind the back register plate in order that the flow of gases is not impeded. Any gap around the flue pipe where it fits into the back register plate shall be sealed.

19.4 Freestanding, with or without boiler, and standing in a fireplace recess

19.4.1 *General*

A freestanding roomheater, with or without a boiler, standing in a fireplace recess shall be installed as shown in Figure 7. Sufficient clearance shall be left on each side of the appliance as shown in Figure 7.

19.4.2 *Connection to the flue*

The appliance shall be connected to the flue as shown in Figure 7. The flue pipe shall comply with the requirements of clause **9**. For a back outlet appliance sufficient clearance shall be provided around the appliance to allow for cleaning and maintenance.

19.4.3 *Closure of top of recess*

The top of the recess shall be closed off with either a prefabricated or purpose made concrete raft lintel, supported at each end by the jambs and sealed along its four edges or by a metal register plate constructed and fitted as specified in clause **11** (see Figure 7).

19.5 Inset, with and without boiler

19.5.1 *General*

An inset roomheater that has a top flue outlet shall be installed so that the appliance body behind the front decorative casing is enclosed within the fireplace recess by means of a fireplace surround (see Figure 15).

NOTE These roomheaters normally incorporate an integral convection jacket.

19.5.2 *Connection to flue*

19.5.2.1 *General*

The room heater shall be connected to the flue by:

a) sealing to the chimney; or

b) sealing to surround and hearth; or

c) a combination of a) and b).

NOTE For efficient working of the roomheater it is important to ensure that no air enters the chimney other than through the flue outlet of the appliance.

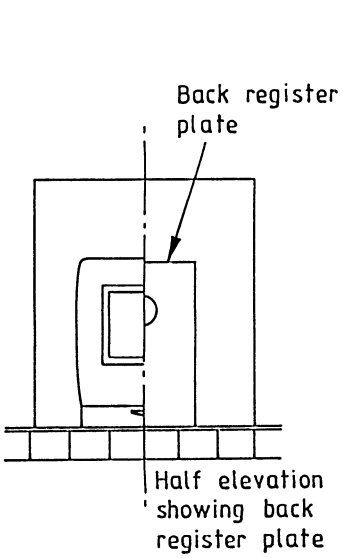
The appliance shall be connected to the flue in accordance with the manufacturer's instructions.

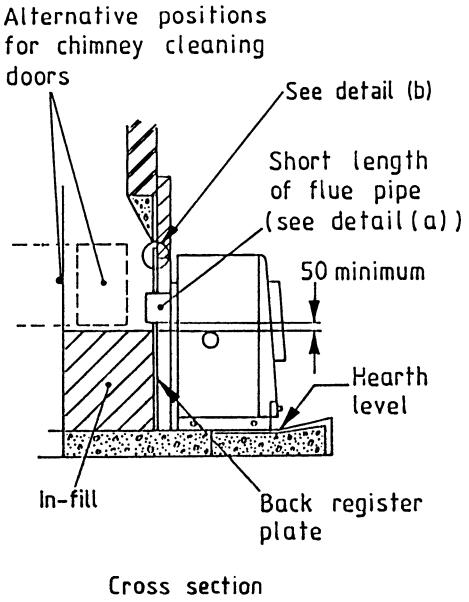
19.5.2.2 *Sealing to the chimney*

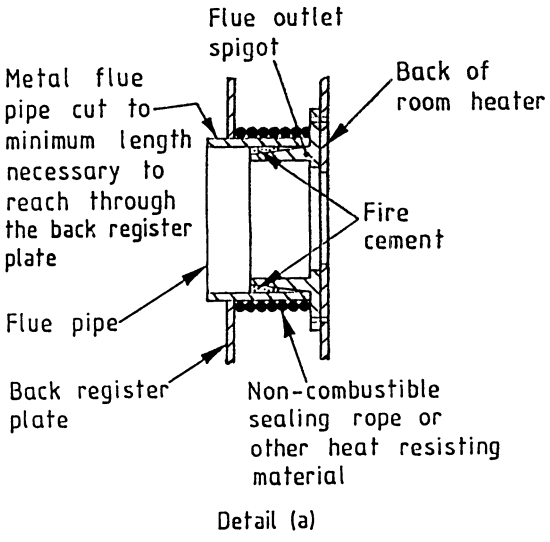
Where the top of the fireplace recess terminates in a gather (see Figure 15) the appliance shall be connected to the chimney flue by a flue pipe. The flue pipe shall be sealed to the flue outlet of the appliance and to the chimney flue. The space around the flue pipe shall be filled with a lightweight aggregate concrete and flaunched to the flue with lime mortar. This shall be achieved via an access hole in the chimney wall above the fluepipe. Where the top of the fireplace recess terminates in a raft lintel or register plate, the flue pipe shall be sealed to the raft lintel or register plate (see Figure 10 and clause **7** of BS 8303-3:1994).

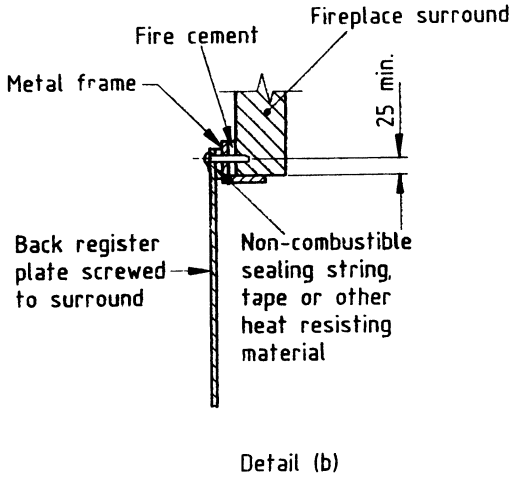
NOTE The body of some types of non-boiler models may fit within the confines of a fireback conforming to clause **12**.

The method of flue connection shall be in accordance with the installation instructions of the manufacturer in order to protect the surround and brickwork from direct impingement of hot gases.









All dimensions in millimetres.

Figure 14 — Typical fitting and sealing of a freestanding roomheater to a back register plate

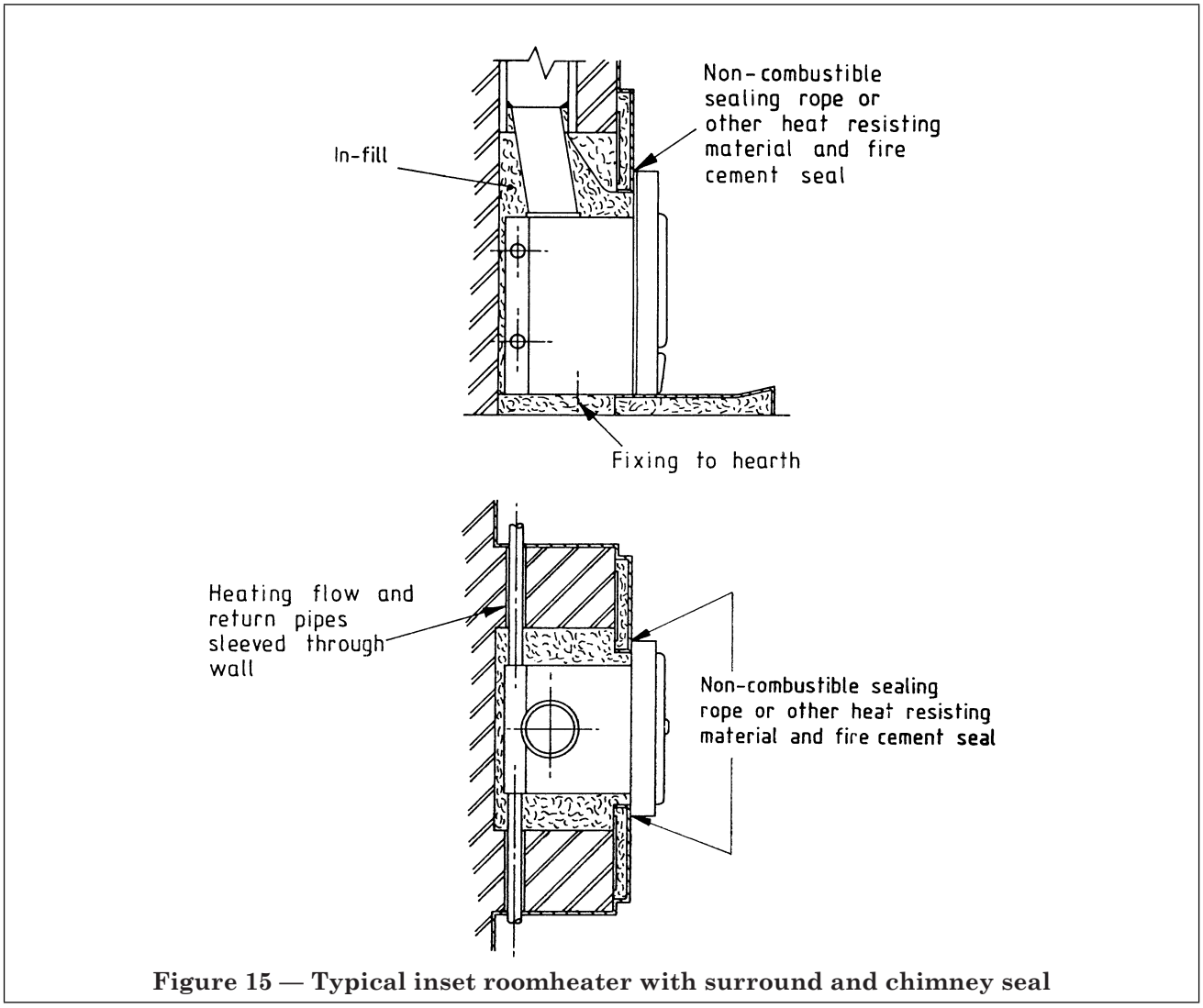


Figure 15 — Typical inset roomheater with surround and chimney seal

19.5.2.3 *Sealing to the surround and hearth*

Where inset roomheaters are supplied with the rear face of the front (at the top and sides) fitted with non-combustible sealing rope or other similar heat resisting material to provide a seal, the roomheater shall be located so that the rear face of the front is vertical and that the top and sides fit closely to the surround. The base of the roomheater shall be sealed to the hearth in accordance with the instructions of the manufacturer.

19.5.3 ***Insulation***

The space behind and at the sides of the outer convector casing shall be filled with non-combustible insulating material (see clause **14** of BS 8303-3:1994). The body of the roomheater shall be insulated from direct contact with the building structure.

19.6 Inset with or without boiler, installed in a free-inset fireplace surround

19.6.1 ***General***

An appliance to be fitted in a free-inset manner shall be installed in a fireplace recess terminating in a raft lintel or a top register plate according to **19.4**. The fireplace surround shall have a removable centre piece. The size of the fireplace opening shall conform to the requirements of BS 1251:1987 with the centre piece in place. When the centre piece is removed it shall allow access to the appliance flue outlet flue pipe and boiler connections during and after installation.

The space around the appliance in the fireplace recess shall not be filled with the non-combustible insulating material. Ventilation slots shall be provided in the removable centre piece. A typical installation is shown in Figure 16.

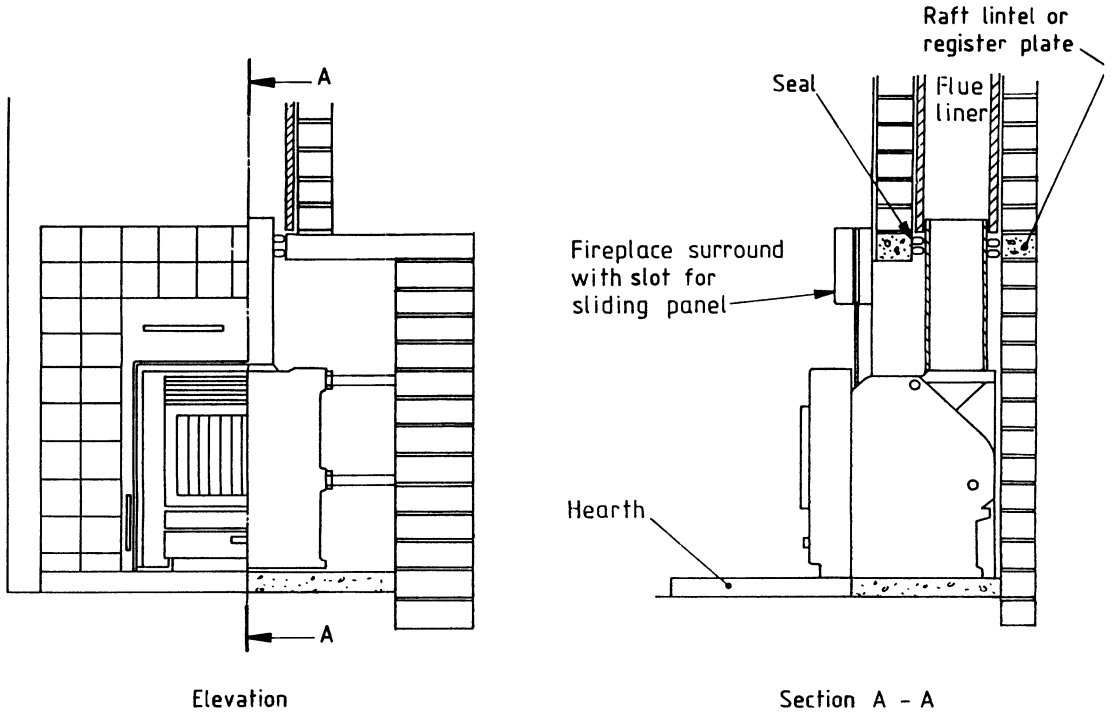


Figure 16 — Typical free inset application of roomheater installation

19.6.2 ***Connection to the flue***

The flue outlet of the appliance shall be connected to the flue using a flue pipe conforming to clause **9**, or special adaptor supplied by the manufacturer. The flue pipe or adaptor shall be sealed to the appliance flue outlet and the raft lintel or top register plate as shown in Figure 16.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

20 Independent boilers and freestanding cookers

20.1 General requirements

Independent boilers shall comply with the requirements of BS 4433-1:1994 or BS 4433-2:1994. Freestanding cookers shall comply with the requirements of BS 1252:1987. Where an appliance is intended for installation in a fireplace recess the recess shall conform to clause **7**.

The appliance shall be secured and any joints between the appliance and the flue sealed to avoid uncontrolled air entering the flue.

Means of access for cleaning shall be provided to the flue-pipe and chimney (see clause **9** and clause **10**). Access for chimney sweeping shall be via a soot door provided in the chimney (see **10.2** and Figure 5, Figure 6 and Figure 8).

A flue damper shall not be installed in a flue system except where it is supplied integral with the appliance. In instances where the appliance may be subjected to high draughts then a draught stabilizer shall be fitted to the flue pipe in the same room as the appliance.

The manufacturer's instruction regarding clearance at the back and sides of the appliance shall be followed.

20.2 Independent boiler or freestanding cooker installed against a wall

A boiler or cooker installed against a wall shall be positioned on a hearth conforming to clause **8**.

A flue pipe conforming to clause **9** shall be used for connecting the appliance to the chimney flue. A typical connection is shown in Figure 8.

To prevent expansion and contraction cracking of the plaster around the point of entry to the brickwork, a sleeve shall be fitted for the flue pipe to pass through.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

The end of the flue pipe shall not project inside the chimney flue. The mouth of the flue pipe shall be above the base of the chimney flue to allow space for the accumulation of fly ash (see Figure 8).

20.3 Independent boiler or freestanding cooker installed in a fireplace recess

20.3.1 *General*

The height of the recess shall be sufficient to accommodate the boiler or cooker and to allow for easy connection of the flue pipe. If the boiler or cooker is fuelled from the top, there shall be sufficient room for convenient refuelling in accordance with the manufacturer's recommended clearances.

For cookers the height shall also be sufficient to allow room for plates, pots etc., and shall allow headroom for comfortable operation.

Some gravity feed boilers require access so that internal rear vertical boiler flueways can be cleaned with a flue brush or scraper. They shall be designed in accordance with the manufacturer's recommended clearance to allow flueway cleaning to be properly performed.

20.3.2 *Connection to the flue*

The flue outlet of the appliance shall be connected to the chimney flue with a flue pipe conforming to clause **9**. The top of the recess shall be closed with a raft lintel or top register plate (see **18.3.2** and **18.3.3**). The flue pipe shall be sealed to the appliance flue outlet and the raft lintel or top register plate as shown in Figure 5 or Figure 6.

NOTE Further information is given in clause **7** of BS 8303-3:1994.

20.3.3 *Installation in a new construction*

If a boiler or cooker is to be installed in a fireplace recess in a new construction then the installation shall be as shown in Figure 5. The top of the fireplace recess shall be closed by a raft lintel (see clause **7** and Figure 1(b) for detail) and the chimney built up from this leaving a small side cavity for the entry of a flue pipe conforming to clause **9**. The flue pipe shall be sealed to the raft lintel and to the flue outlet of the appliance.

NOTE Further information is given in clauses **7** and **9** of BS 8303-3:1994.

The flue pipe shall be extended above the level of the raft lintel as shown in Figure 5 to allow a space for the accumulation of fly ash.

20.3.4 *Installation in an existing recess*

If the boiler or cooker is to be installed in an existing recess then the top of the recess shall either be closed using a raft lintel as for a new construction or by using a metal register plate constructed and fitted as specified in clause **11** (see Figure 6). In either case the flue pipe shall pass through a hole and terminate near the top of the gather.

The void created between raft lintel or metal register plate and the existing gather shall be filled with non-combustible material. The flue pipe shall be sealed to the raft lintel or metal register plate and to the flue outlet of the appliance as detailed in **20.3.2**.

Annex A (informative)
Check list for specifying purchaser's requirements

Appliance type:

☐ ***Open fire:***

Without boiler ☐ With boiler ☐ With convection ☐ Without convection ☐

Inset ☐ Freestanding ☐ Underfloor air supply ☐

Fan-assisted ☐

☐ ***Roomheater:***

Freestanding ☐ Inset ☐ Without boiler ☐ With boiler ☐

☐ ***Independent boiler:***

☐ ***Cooker:***

Without boiler ☐ With boiler ☐

Location:

In existing fireplace recess ☐

In new fireplace recess ☐

Where? Lounge ☐ Kitchen ☐ Boiler room ☐ Other[1)] ☐

1) Please specify _____

Construction

Fireplace recess:

Existing ☐ New ☐ Not required ☐

Dimensions: Height ____ Width _____ Depth _____

Materials: Brick ☐ Block ☐ Stone ☐ Other[1)] ☐

[1)] Please specify _____

Adjacent materials: Combustible ☐ Non-combustible ☐

Wall construction: Brick/block ☐ Timber framed ☐

Floor construction: Solid ☐ Suspended ☐

Chimney:

Existing ☐ New ☐

Material of construction: Masonry ☐ Metal ☐

Dimensions: Diameter _____ Height above appliance outlet _____

Termination: Clear ☐ Overshadowed ☐

Constructional hearth:

Existing ☐ New ☐

Dimensions: Width _____ Depth _____ Thickness _____

Materials/finish: Please specify _____

Fireplace surround:

Existing ☐ New ☐

Dimensions: Width _____ Height _____ Thickness _____

Materials/finish: Please specify _____

Ventilators:

Dimensions: _____

Location: Direct ☐ Indirect[1)] ☐ Underfloor ☐

[1)] If indirect specify route for air _____

Hot water boiler:

Domestic only ☐ Central heating ☐

Partial cement heating ☐ Full central heating ☐

Specify location of pipework _____

Gas ignition supply point:

Existing ☐ New ☐ Not required ☐

Specify location _____

Electrical supply:

Existing ☐ New ☐ Not required ☐

Specify location _____

Fuel storage:

Bunker ☐ Storeroom ☐

Existing ☐ New ☐ Not required ☐

Dimensions: Length _____ Depth _____ Height _____

Specify location _____

Other accessories:

Fireguard ☐ Sparkguard ☐ Fuel hod ☐ Ash tidy ☐

Companion set ☐ Others[1)] ☐

[1)] Others please specify _____

Annex B (informative) Selection of appliances

The appliance should be selected to meet the service requirement(s) specified by the purchaser, e.g. space heating, central heating, water heating. In particular with roomheaters with high output boilers, the balance between space heating and boiler outputs should be taken into full consideration and the particular recommendations of BS 5449:1990 in this respect should be adopted.

Due regard should be paid to the overall heat services necessary for comfort and these should be related to the appliance in terms of refuelling and de-ashing which are likely to be acceptable to the user.

Wherever possible selection of the appliance should be made at an early stage to avoid unnecessary complications in its installation and any associated heating or hot water supply system.

Where an appliance with a high output boiler is to be fitted which provides both space heating and central heating then the provision of a thermostatically controlled radiator in the same room as that in which the appliance is fitted provides the user with greater control and flexibiity and possibly lower running costs.

Appliances should only be selected from the HETAS Ltd. List of Approved Domestic Solid Fuel Appliances. These appliances have been assessed for their conformity to the appropriate British Standard for that appliance.

General and particular information on the selection of solid mineral fuel burning appliances and fireplace components may be obtained from the following organizations:

a) HETAS Limited, PO Box 37, Bishops Cleeve, GL52 4TB Tel. No. 0242 673257;

b) British Coal Corporation, Marketing Department, Hobart House, Grosvenor Place, London SWlX 7AE Tel. No. 071 201 4141;

c) The Association of British Solid Fuel Appliance Manufacturers, Savoy Tower, 77 Renfrew Street, Glasgow G2 3BZ Tel. No. 041 332 0826;

d) National Fireplace Manufacturer's Association, 8th Floor, Bridge House, 121 Smallbrook Street, Queensway, Birmingham B5 4JP Tel. No. 021 643 3377;

e) The Solid Fuel Association, Victoria House, Southampton Row, London WC1B 4DH Tel. No. 071 405 0034.

List of references

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 41:1973, *Specification for cast iron spigot and socket flue or smoke pipes and fittings.*

BS 476, *Fire tests on building materials and structures.*

BS 476-4:1970, *Non-combustibility test for materials.*

BS 1251:1987, *Specification for open fireplace components.*

BS 1252:1991, *Specification for domestic solid mineral fuel-fired, free-standing cookers with or without boilers.*

BS 1449, *Steel plate, sheet and strip.*

BS 1449-2:1983, *Specification for stainless and heat-resisting steel plate, sheet or strip.*

BS 1846, *Glossary of terms relating to solid fuel burning equipment .*

BS 1846-1:1994, *Domestic appliances.*

BS 3376:1991, *Specification for open fires burning solid mineral fuels with convection, with or without boilers.*

BS 3378:1986, *Specification for roomheaters burning solid mineral fuels.*

BS 4086:1966, *Recommendations for maximum surface temperatures of heated domestic equipment.*

BS 4433, *Specification for solid smokeless fuel boilers with rated outputs up to 45 kW.*

BS 4433-1:1994, *Boilers with undergrate ash removal.*

BS 4433-2:1994, *Gravity feed boilers designed to burn small anthracite.*

BS 4834:1990, *Specification for inset open fires without convection with or without boilers, burning solid mineral fuels.*

BS 6323:1982, *Specification for seamless and welded steel tubes for automobile, mechanical and general engineering purposes.*

BS 6461, *Installation of chimneys and flues for domestic appliances burning solid fuel (including wood and peat).*

BS 6461-1:1984, *Code of practice for masonry chimneys and flue pipes.*

BS 6539:1984, *Specification for fireguards for use with solid fuel appliances.*

BS 6999:1989, *Specification for vitreous-enamelled low-carbon steel tube pipes, other components and accessories for solid-fuel-burning appliances with rated output of 45 kW.*

BS 7566, *Installation of factory-made chimneys to BS 4543 for domestic appliances.*

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[3)] Referred to in foreword only.

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