



CP 403 : 1974

UDC [643.332 : 683.9 : 697.243] .005

**Code of Practice for
Installation of domestic
heating and cooking appliances
burning solid fuel**

British Standards Institution

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This Code of Practice has been prepared by a Committee convened by the Codes of Practice Committee for Building. It was published under the authority of the Executive Board on 31 October 1974.

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First published August 1952
First revision October 1974

ISBN: 0 580 08486 8

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The following BSI references relate to the work on this Code of Practice
Committee reference BLCP/34 Draft for comment 72/12155 DC

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Amendments issued since publication

Amd. No.	Date of issue	Text affected

British Standards Institution · 2 Park Street · London W1A 2BS
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This Code of Practice represents a standard of good practice and therefore takes the form of recommendations. Compliance with it does not confer immunity from relevant statutory and legal requirements.

Foreword

This Code of Practice is a revision of CP 403 : 1952 (but it does not also supersede CP 403.101 : 1952) and in its preparation the opportunity has been taken to express the values in metric units. In addition the types of appliance now covered by the Code have been extended and this is reflected in the change of title of the Code.

The construction associated with the installation of domestic heating and cooking appliances is controlled by the following regulations:

- (1) The Building Regulations 1972, applicable in England and Wales except Inner London, or
- (2) The London Building (Constructional) By-laws, 1972, or
- (3) The Building Standards (Scotland) (Consolidation) Regulations 1971.

Where the expression 'comply with the relevant Building Regulations' is used, it means compliance with the above regulations or any revisions currently in force.

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British Standard Code of Practice for Installation of domestic heating and cooking appliances burning solid fuel

1. General

1.1 Scope

This Code of Practice deals with the selection and installation of various types of domestic heating appliance burning solid fuel in both new and existing buildings. The appliances are considered in five main categories:

- (1) open fires,
- (2) room heaters,
- (3) independent boilers,
- (4) fanned warm air heater units, and
- (5) cookers.

Most of the appliances in these categories may incorporate provision for domestic hot water supply or space heating or both. This Code does not deal with the design or installation of hot water heating systems or hot water supply systems. Certain aspects relating to the safety of warm air heating systems are dealt with in this Code (see 3.3 and 7.4).

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

1.2 Definitions

With the exception of specific definitions used within the text, the terms used throughout this Code have the meanings assigned to them in BS 1846 : Part 1.

1.3 Exchange of information

To ensure the best selection and correct installation of domestic heating appliances, exchange of information is necessary between the architect and other interested parties at the initial planning stage. Adequate scale drawings of the building and specifications of heat requirements should be made available. Specialist advice in the selection of appliances should be sought (see Appendix A).

The appliance manufacturer should supply dimensional drawings and performance data of any appliances to be used, together with full installation instructions.

Consultation should take place regarding the position of the heating equipment, etc., and the following matters should be discussed and decided before the general work of the buildings, which may be affected, is commenced:

- (1) Any special dimensional or constructional requirements in a fireplace recess or surround or both.
- (2) Arrangements for the provision of air for combustion and ventilation.
- (3) Access for the installation and maintenance of pipework and warm air ductwork.
- (4) The position, size and type of chimney flue and access for sweeping.

1.4 Work on site

In preparing a programme of work for the installation of an appliance care should be taken that:

- (1) all accessories and materials for construction are available;
- (2) hearths and fireplace recesses are finished to the correct size for the insertion of the appliance; it should be noted that some appliances require a special fireplace surround or hearth or both;
- (3) chases are formed true to size and correctly positioned;
- (4) lintels and flue connecting blocks are built-in in their true relation to the appliance, hearth and chimney;
- (5) the pipework or warm air distribution system is ready for connection to the boiler or air heater as soon as the appliance has been fixed in its proper place;
- (6) if a duct formed in builder's work is required, it has been laid or constructed;
- (7) the fitter's work and finishing tradesmen's work are co-ordinated; where necessary, protection should be provided to vulnerable surface finishes, e.g. hearths, floors, etc.

The appliances, flue adaptors, fireplace surrounds, warm air outlets, etc., should normally be installed and, in general, the final water, flue and gas connections for the appliance should be made when the structural work is completed; freestanding appliances should normally be installed before the internal decorations are commenced, and built-in types before the plastering of walls adjacent to the fireplace recess is finished.

2. Materials, appliances and components

2.1 Related British Standards

All materials, appliances and components used in the installation of the appliances should comply with the requirements of the following British Standards, as far as they apply:

(1) *Materials*

- BS 1334 The use of thermal insulating materials for central heating and hot and cold water supply installations
- BS 1387 Steel tubes and tubulars suitable for screwing to BS 21 pipe threads
- BS 2871 Copper and copper alloys, tubes
Part 1 Copper tubes for water, gas and sanitation
- BS 4127 Light gauge stainless steel tubes

(2) *Appliances*

- BS 1252 Domestic solid fuel cookers with integral boilers
- BS 3376 Open fires with convection, with or without boiler
- BS 3377 Back boilers for use with domestic solid fuel appliances
- BS 3378 Room heaters burning solid fuel
- BS 4433 Independent thermostatically controlled central heating boilers, with rated outputs up to 44 kW
- BS 4834 Inset open fires without convection

(3) *Components*

- BS 41 Cast iron spigot and socket flue or smoke pipes and fittings
- BS 417 Galvanized mild steel cisterns and covers, tanks and cylinders
- BS 493 Airbricks and gratings for wall ventilation
- BS 699 Copper cylinders for domestic purposes
- BS 835 Asbestos-cement flue pipes and fittings, heavy quality
- BS 864 Capillary and compression tube fittings of copper and copper alloy
Part 2 Metric units
- BS 1181 Clay flue linings and flue terminals
- BS 1251 Open fireplace components
- BS 1565 Galvanized mild steel indirect cylinders, annular or saddle-back type
- BS 1566 Copper indirect cylinders for domestic purposes
- BS 2788 Fireguards for solid fuel fires
- BS 3140 Nursery type fireguards suitable for use with solid fuel appliances
- BS 3198 Combination hot water storage units (copper) for domestic purposes
- BS 3248 Sparkguards for solid fuel fires
- BS 3328 Domestic gas pokers and portable underbar ignition burners
- BS 4543 Factory-made insulated metal chimneys

3. Structural and system design considerations

3.1 Structural fire precautions

3.1.1 General. The installation of a heating appliance too near to combustible material forming part of the construction of a building may result in a fire from any of the following causes:

- (1) direct radiation from the appliance;
- (2) conduction of heat from the appliance through non-combustible material;
- (3) embers falling from the appliance;
- (4) heat transfer from flue pipe and fittings.

Combustible material can be protected from radiant heat by the provision of an adequate air space and from conducted heat by a sufficient thickness of non-combustible material of low thermal conductivity placed between it and the appliance. The danger from falling embers, where it exists, is met by providing adequate hearth projection or a curb or both. It is worth noting also that the large heat capacity of materials like brick and concrete is useful in damping the fluctuations of heat output from the appliance and may offset the effect of short periods of intense burning such as might arise in a chimney fire.

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3.1.2 Construction. Fireplace recesses may be of traditional construction or built from prefabricated components. Prefabricated fireplace recesses are usually made for exclusive use with factory-made insulated chimneys and formed in slabs to provide the back, sides and combined top and lintel unit. A hearth slab may also be provided.

The constructional hearth and all forms of construction of walling above the hearth level should comply with the requirements of the relevant Building Regulations.

3.1.3 Flues. For safe and efficient operation each appliance should be connected to a separate flue.

3.2 Hot water heating and hot water supply systems

Recommendations for the design, choice of materials, installation, testing and maintenance of domestic hot water heating and hot water supply systems are contained in CP 310, CP 342 : Part 1 and CP 3006 : Part 1.

The use of indirect systems incorporating domestic hot water cylinders complying with the requirements of either BS 1565 or BS 1566 is recommended for domestic hot water supply irrespective of the type of water or boiler material, and is a necessity with certain designs of boilers, and where radiators are served.

3.3 Warm air heating systems

3.3.1 This Code deals with the installation of appliances and does not contain recommendations for the distribution of heat from such appliances. There are however certain precautions which should be taken in the design, installation and commissioning of warm air heating systems to ensure safe operation, particularly in the avoidance of the leakage of any combustion gases which may be circulated by means of the fan to the living spaces in the building. These are dealt with in 7.4.

3.3.2 It should be noted that a fanned warm air heater unit and its associated air distribution system could assist in spreading fire around a dwelling by distributing flames, combustion products and combustion air through the ductwork. Relief grilles for ventilation or return air could also assist in spreading fire between adjoining areas. It is essential when designing a warm air heating system to ensure that adequate fire precautions are observed and that the design and installation complies with the requirements of the relevant Building Regulations.

3.4 Air for combustion and ventilation

Provision for combustion and ventilation air, sufficient for the type of appliance, should be provided as recommended in Practice Note 1, 'Combustion and ventilation air for boilers and other heat-producing appliances: installations not exceeding 45 kW (150 000 Btu/h)', prepared by the Institution of Heating and Ventilating Engineers.

4. Inset open fires

4.1 Classification and general recommendations for inset open fires

4.1.1 Classification. For the purposes of installation, inset open fires may be classified as follows:

- (1) Without back boiler (see 4.2 and Fig. 1).
- (2) With back boiler (see 4.3 and Fig. 2).
- (3) With underfloor air supply, with or without back boiler (see 4.4 and Fig. 3).
- (4) With fan-assisted air supply, with or without back boiler (see 4.5).

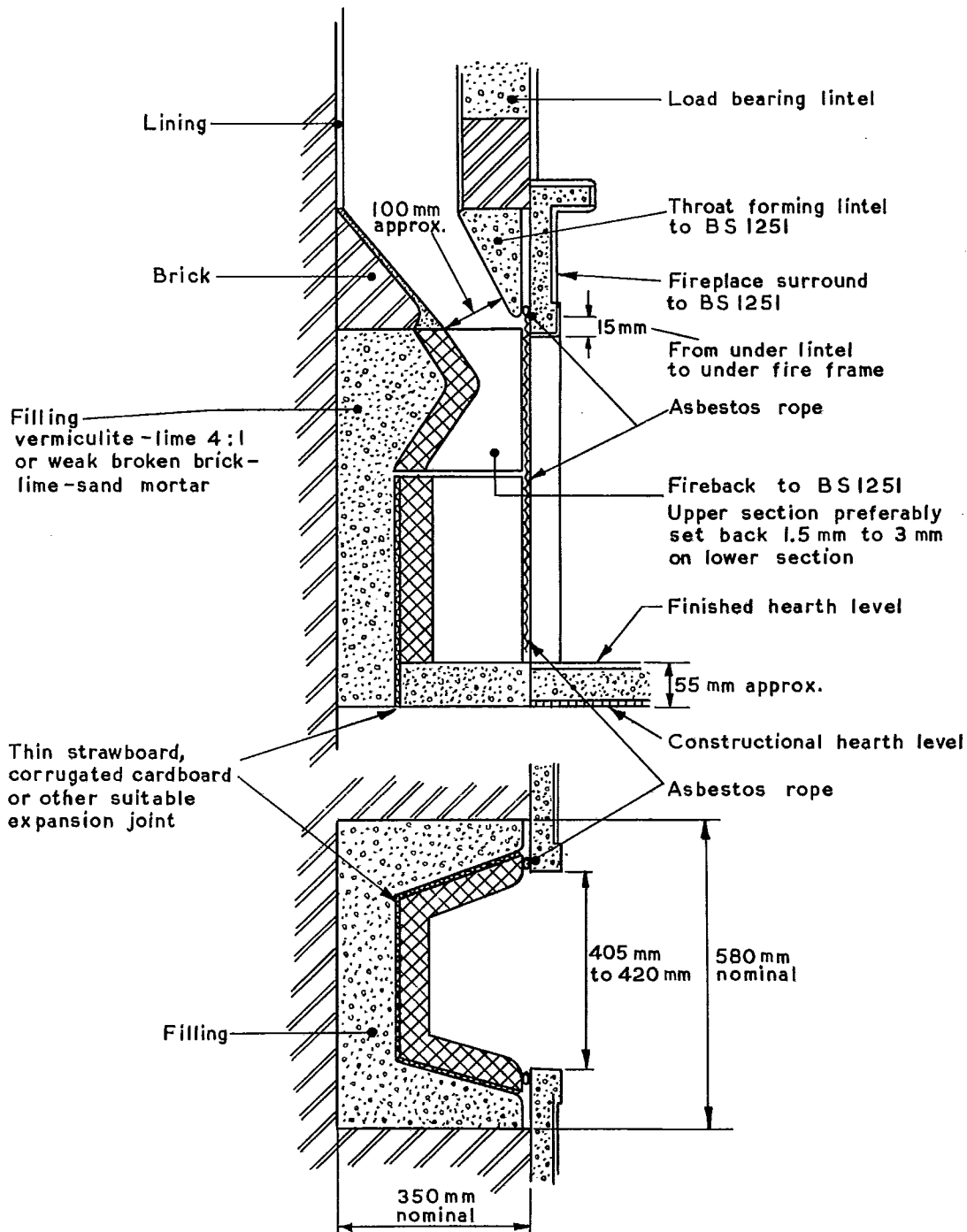


Fig. 1. Setting for 400 mm nominal inset open fire

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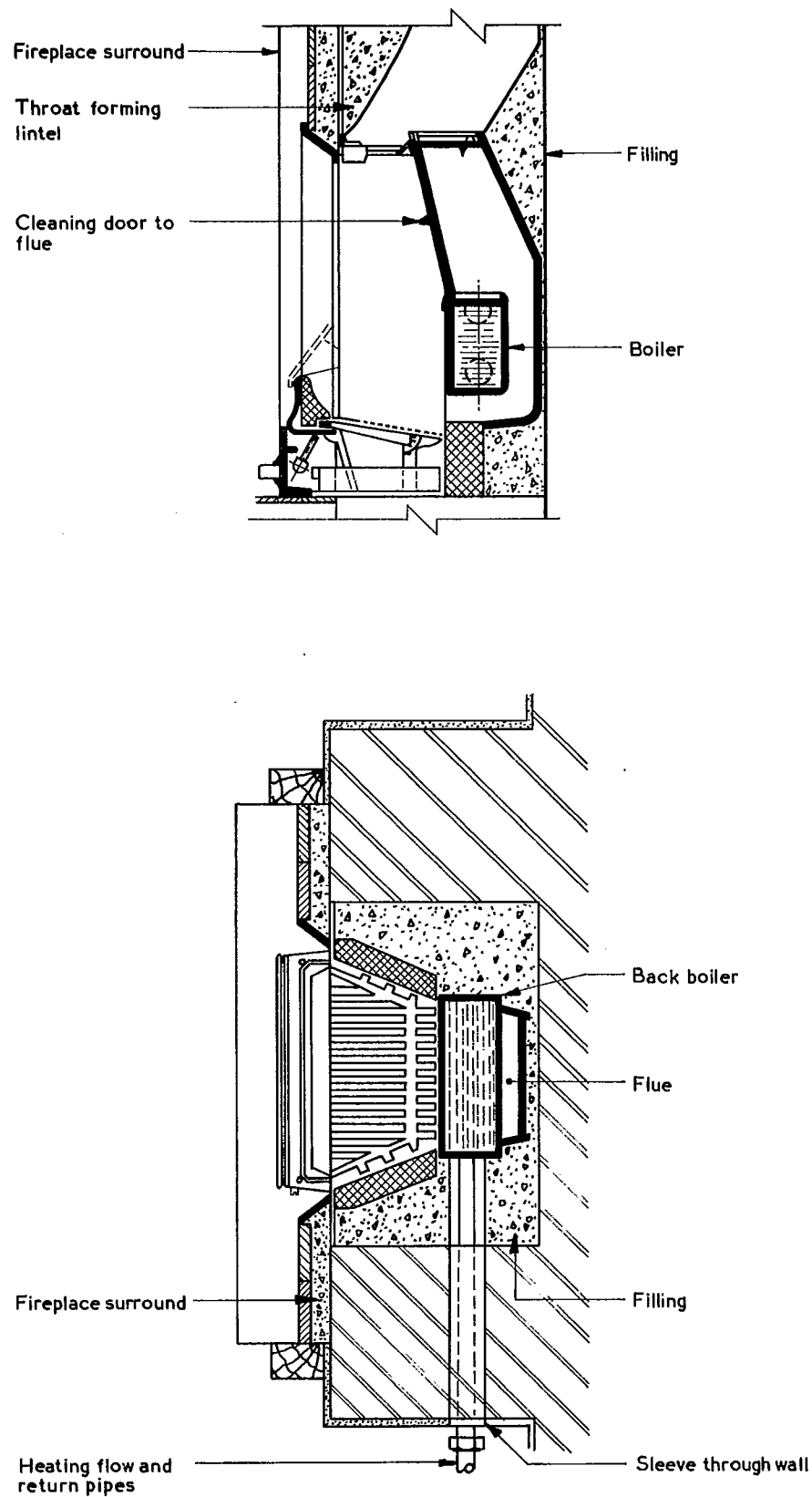


Fig. 2. Installation of 400 mm nominal inset open fire with boiler unit

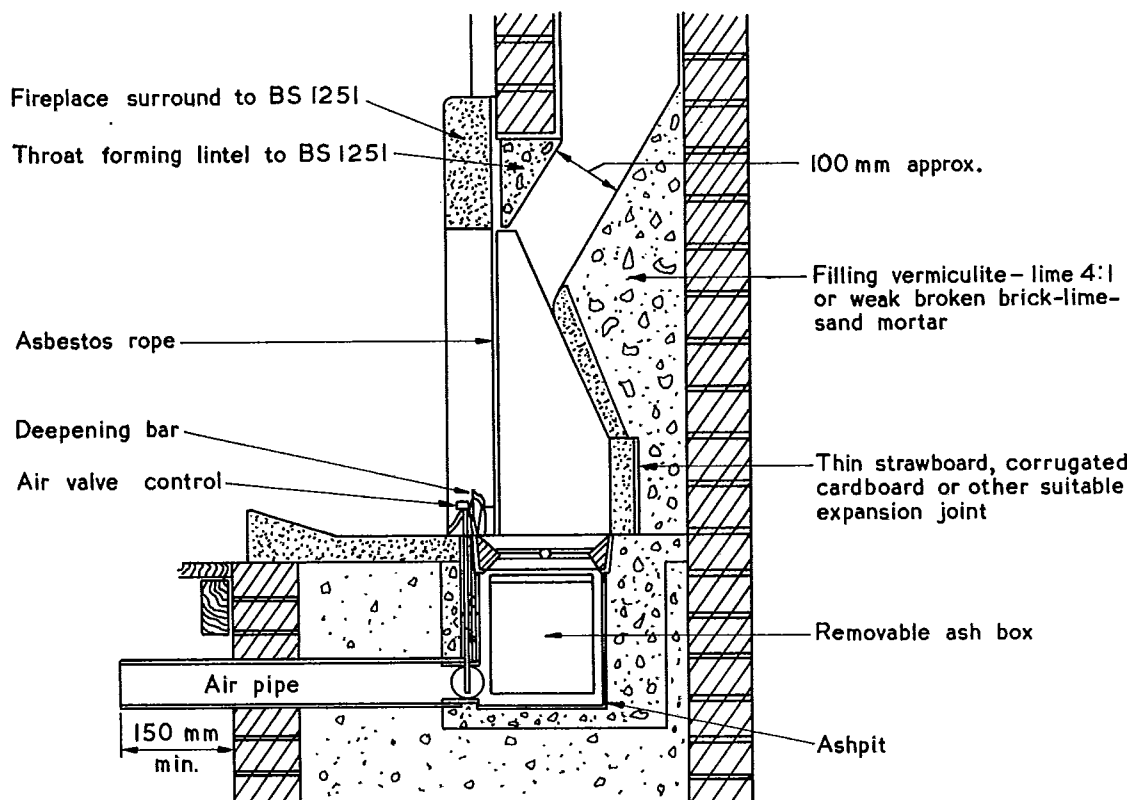


Fig. 3. Installation of 400 mm nominal sunk ashpit inset open fire

4.1.2 Fireplace recesses for open fires. An appreciable amount of heat is given off by chimney walls and therefore in the interests of fuel economy and for reasons of good draught conditions the fireplace recesses should preferably be situated on inside walls. This is also desirable in considering problems of flue arrangement; see CP 131.

In planning an open fire installation, there are three primary factors, viz., the type of open fire (see 4.1.1), the type of fireplace surround and the type of hearth, i.e. raised or flush and whether with overfloor or underfloor air supply. These three factors have to be considered together in designing the chimney breast and fireplace recess. The requisite exchange of information should take place at an early stage (see 1.3), due reference being made to the installation instructions provided by the manufacturer of the appliance.

The width of the fireplace recess depends on the type and nominal size of the open fire concerned.

In the absence of detailed information on the appliance a load bearing lintel should be fixed at a height, to its underside, of 975 mm above the constructional hearth. Where the appliance is known a lower, throat forming, lintel or flue connecting block should be inserted as shown in Fig. 4.

In computing the height of the recess or throat forming lintel, allowance should be made for the height of the finished hearth, which may be higher than the constructional hearth (see Fig. 4). For the purposes of this Code the height of the recess or throat forming lintel is always measured from the level of the top of the finished hearth.

The depth of a fireplace recess is normally 350 mm nominal excluding surface finish. Some appliances require a greater depth.

The arrangement of the fireplace recess will depend upon the type of fire to be installed. For non-convector fires, the sides of the recess, from lintel level, should be tapered to form a smooth gather to the walls of the flue (see Fig. 4).

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4.1.3 Gas for ignition. Open fires, other than those having sunk ashpit, are required by BS 4834 to have provision for gas ignition and are usually supplied with an integral ignition burner. Such a burner may be omitted from open fires of all types installed in dwellings without a gas supply. Provision for gas ignition implies that a suitable ignition burner can be fitted to any open fire after installation, but this is not always possible without removing the fire from its setting. The gas ignition burner of an open fire is designed so that the gas connection may be either right-hand or left-hand, and in many cases a concealed connection may be employed.

For normal fixing the gas supply pipe is run from a gas cock, situated preferably at a distance of not less than 300 mm from the appliance and generally at the side of the fireplace surround (see Fig. 5(a)), across the hearth and close to the surround, to the burner. The union restrictor should be omitted for natural gas burners. For concealed fixing the gas supply pipe is run from the gas cock, beneath the hearth to a convenient point at the side of the ashpit and behind the firefront, where the connection to the burner is completed (see Fig. 5(b)). For concealed gas connections with natural gas the injector/aerator should be fitted as close to the gas burner as possible; it should not however be positioned where ash could be drawn in, so causing blockage of the burner ports.

The gas supply to the gas cock is generally run in pipe of 12 mm nominal bore. The connection to the ignition burner from the gas cock is normally in brass or copper tube suitable for screwing with $\frac{1}{4}$ or $\frac{1}{8}$ nominal taper threads complying with the requirements of BS 2779.

4.2 Inset open fire without convection heating and without back boiler (see also 8.6.1 and 8.6.2)

4.2.1 Appliance. The appliance should comply with the requirements of BS 4834, especially where smokeless fuels are likely to be used.

4.2.2 Fireback. The use of sectional firebacks, two piece, four piece or six piece (see Figs. 6 and 7) to the dimensions and refractoriness specified in BS 1251, is strongly recommended wherever there is a likelihood of solid smokeless fuels being employed, since the temperature gradient at different parts of the fireback is greater with these fuels than with coal. A single-piece fireback is not recommended because it is more liable to crack in use, and is then more difficult to replace. With sectional firebacks, the upper section or sections should not overhang the lower section and should preferably be set back from the lower sections by about 1.5 mm to 3 mm (see Fig. 1). This is to prevent flames from playing on the edge of the top bricks, as this often leads to the early development of cracks.

An alternative is to construct the fireback in situ using pup bricks jointed with air setting fire cement. In this case the fireback should be shaped so as to conform to the dimensions given in Fig. 7.