

Specification for

Inset open fires without convection with or without boilers, burning solid mineral fuels

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Solid Mineral Fuels Standards Policy Committee (SFC/-) to Technical Committee SFC/9, upon which the following bodies were represented:

- Association of British Solid Fuel Appliances Manufacturers
- British Ceramic Tile Council
- British Coal Corporation
- Consumer Policy Committee of BSI
- Department of Energy (Energy Efficiency Office)
- Department of the Environment
- Domestic Solid Fuel Appliances Approval Scheme
- Incorporated Association of Architects and Surveyors
- Institute of Building Control
- Low Temperature Coal Distillers Association of Great Britain Ltd.
- METCOM
- National Fireplace Council Manufacturers' Association
- National Society for Clean Air
- Solid Fuel Advisory Service
- Solid Smokeless Fuels Federation
- Waterheater Manufacturers' Association
- Wood and Solid Fuel Association of Retailers and Manufacturers

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Foreword

This first revision of this British Standard has been prepared under the direction of the Solid Mineral Fuels Standards Policy Committee and supersedes BS 4834:1972 which is withdrawn.

This standard is now the responsibility of Technical Committee RHE/28 which was formerly SFC/9.

The main technical changes from the previous edition are as follows:

- a) restriction to solid mineral fuels;
- b) inclusion of high output boiler appliances with rectangular bottomgrates, and additional requirements for units designated suitable to burn bituminous coal at enhanced efficiency;
- c) extension of nominal widths to 500 mm;
- d) change of test fuel and modification of test procedure for appliances with underfloor air supply;
- e) reduction of the boiler damper opening under the high boiler output (HBO) test condition;
- f) inclusion of requirements for materials for general construction;
- g) change in ashpan requirements;
- h) change of requirements for front firebars;
- i) provision of a gas ignition burner changed from an obligatory to an optional requirement;
- j) introduction of a boiler cleaning procedure between tests when burning coal;
- k) inclusion of requirements for ashpan ash collection;
- l) more stringent requirements for thermal performance.

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 24, an inside back cover and a back cover.

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

Section 1. General

1.1 Scope

This British Standard specifies constructional, dimensional and performance requirements for inset open fires designed to burn solid mineral fuels (i.e. bituminous coal, Welsh dry steam coal, anthracite or manufactured fuels derived from these coals). It does not apply to inset open fires designed to give space heating by convection (see BS 3376).

This standard covers appliances of nominal widths 350 mm, 400 mm, 450 mm and 500 mm, designed for use either with fireplace components complying with BS 1251 and installed in accordance with BS 8303, or with special fireplace components or boilers supplied with the appliance.

The essential components of appliances covered by this standard are the firefront, bottomgrate, ashpit cover, ashpan and means of primary air control.

Specified optional features comprise a deepening bar, deepening plate, front firebars, undergrate gas igniter and boiler.

Appliances are designated as either intermittent or overnight.

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

1.2 Definitions

For the purposes of this British Standard, the definitions given in BS 1846-1, BS 6100-1.5.1 and BS 3323 apply together with the following.

1.2.1

effective grate area

the area, Y , in the plane of the bottomgrate, enclosed by the back and sides of the firebox and by the firefront, when the appliance is installed in accordance with the manufacturer's instructions (see **A.13**)

1.2.2

ash-shedding area

the area, Z , within the frame of the bottomgrate that comprises the projected area of the firebars and the spaces between the firebars

1.2.3

rectangular bottomgrate

a bottomgrate, the sides of which form a rectangle

1.2.4

tapered bottomgrate

a bottomgrate, the sides of which form a trapezium

1.2.5

firefront

the structure that forms the front of the appliance and which may also be decorative

1.2.6

target burning rate

a designated rate of fuel consumption (on a dry basis), depending on the nominal width and category of the appliance, under specified test conditions (see Table 8)

1.2.7

normal output boiler

a boiler designed to give a water heating output level of at least 2.3 kW but less than 3.5 kW at the target burning rate

1.2.8

high output boiler

a boiler designed to give a water heating output level of at least 3.5 kW at the target burning rate

1.3 Classification

For the purposes of this standard appliances are categorized as follows:

a) appliances with tapered bottomgrate [see Figure 1(a)]:

- 1) without a boiler;
- 2) with a boiler designed for normal output;
- 3) with a boiler designed for high output. This category also covers those appliances with rectangular bottomgrate which do not comply with the dimensional requirements given in Table 2 and Table 3.

b) appliances of minimum nominal width 400 mm, with rectangular bottomgrate [see Figure 1(b)] with a boiler designed for high output. This category includes those appliances designated as capable of burning bituminous coal at enhanced efficiency. This category excludes intermittent appliances.

Section 2. Construction

2.1 General

The components of the appliance shall be made from materials indicated in Table 1.

Component parts which require periodic replacement shall be either designed or marked to ensure correct fitting. (see section 5).

NOTE Such parts should be easily replaceable.

2.2 Minimum dimensions for category b) appliances

Category b) appliances shall comply with the minimum dimensional requirements given in Table 2, determined in accordance with A.12 and A.13.

NOTE Those appliances which do not comply with Table 2 are considered to be category a) 3) appliances (see 1.3).

Table 1 — Materials for construction of appliance components

Component	Cast iron	Low carbon steel	Other
Main body	✓	✓	Stainless steel
Ashpit cover	✓	✓	Cast aluminium
Bottomgrate	✓	—	Chrome iron
Front firebars ^a	✓	—	Chrome iron
Ashpan	—	✓	Stainless steel
Deepening bar ^a	✓	✓	Chrome iron
Deepening plate ^a	✓	✓	Chrome iron
Boiler ^a	As specified in BS 3377		
NOTE 1 Decorative parts of the firefront should be made from any material that does not distort or visibly deteriorate during the performance tests described in Appendix A. Such parts should be capable of being easily cleaned.			
^a If fitted.			

Table 2 — Minimum dimensional requirements for category b) appliances

Nominal width, mm	400	450	500
Firebox capacity, dm ³	16	19	22
Effective grate area, Y, dm ²	7.4	8.7	10.2

2.3 Firefront

Means shall be provided for rigidly fixing the firefront either to the back-hearth or to the boiler.

The width of that part of the firefront designed to fit within the tiled surround (dimension *D* in Figure 1) shall be the nominal width of the appliance + 0, – 3 mm.

2.4 Bottomgrate

2.4.1 General

The bottomgrate shall be designed to fit either a fireback complying with BS 1251 or a purpose-made fireback or boiler. It shall be capable of being removed and shall be either designed or marked to ensure correct fitting. The bottomgrate shall consist of a series of firebars and the width of the space between the bars shall be 13 ± 2 mm wide.

NOTE It is recommended that the bottomgrate be supported in such a way as to offer a minimum of obstruction to the removal of ash.

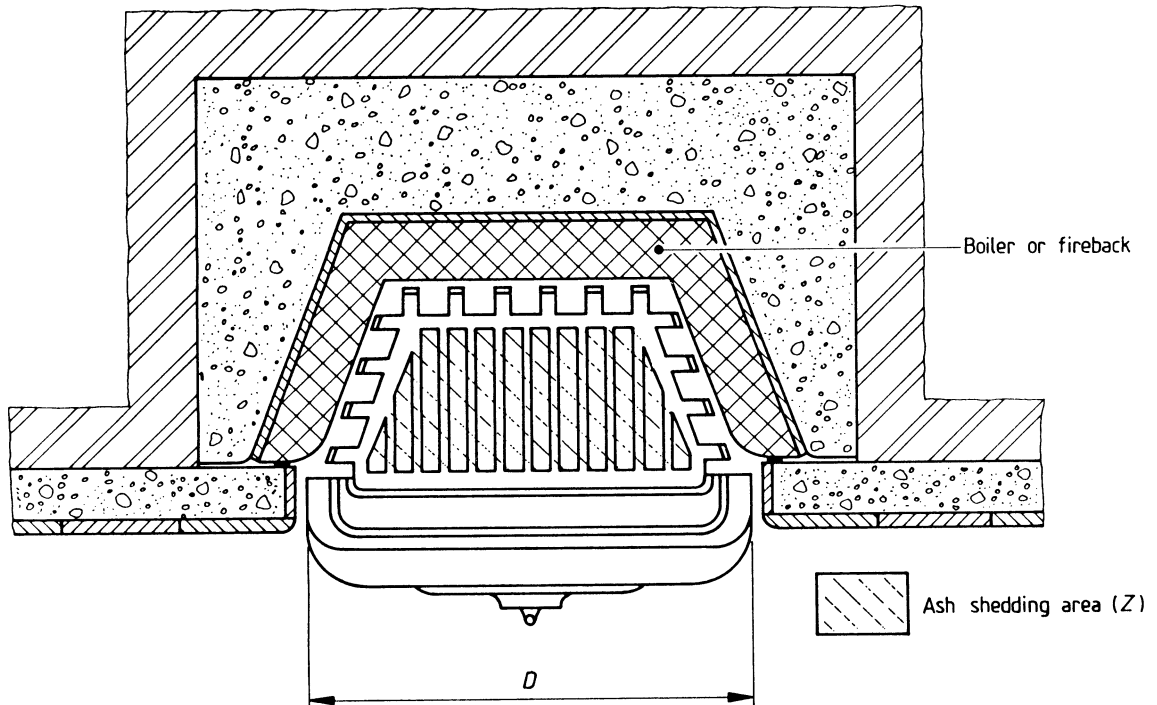
2.4.2 Appliances without underfloor air supply

If the appliance is supplied with its own fireback or boiler, assemble it in accordance with the manufacturer's instructions. Otherwise assemble and install it in a model fireback (e.g. constructed of wood) complying with the mean dimensions specified in BS 1251 ± 1 mm.

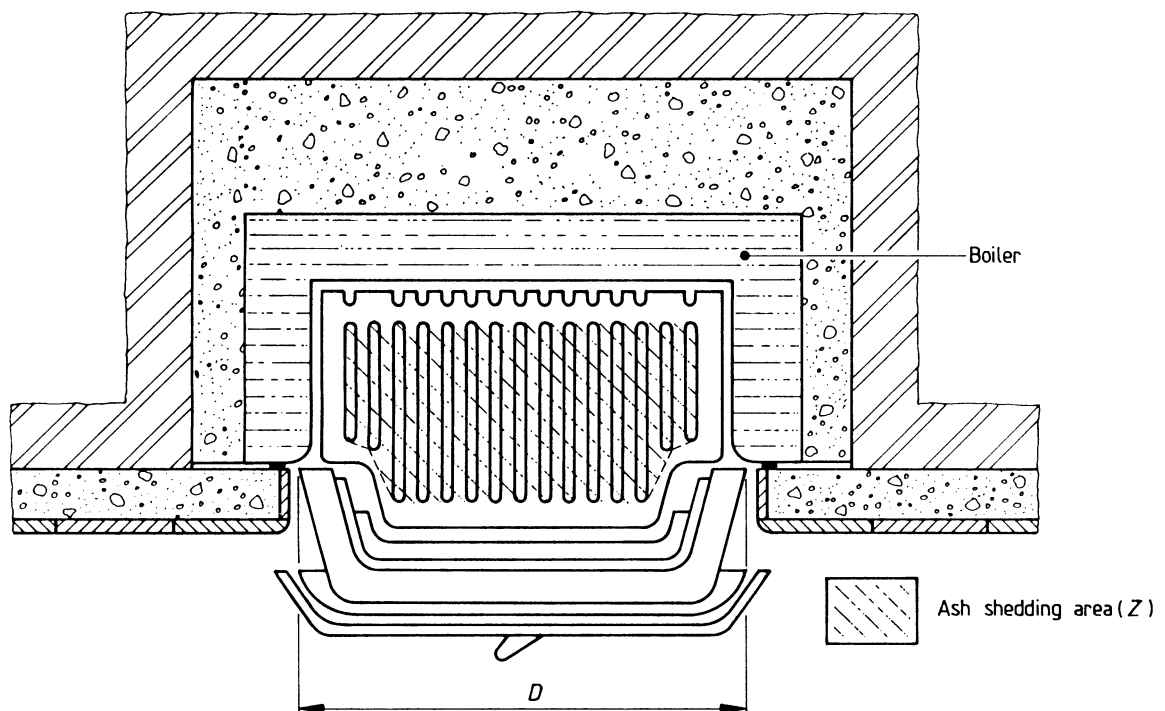
NOTE If adjustable, the bottomgrate may be trimmed to the most appropriate dimensions, in accordance with the manufacturer's instructions.

When assembled, the appliance shall comply with the following.

- The side-to-side movement of the bottomgrate within its support shall not exceed 5 mm.
- It shall not be possible to pass a $20 + 0, - 1$ mm diameter sphere from above the bottomgrate into the ashpit at any point other than a corner.
- It shall not be possible to pass a $30 + 0, - 1$ mm diameter sphere from above the bottomgrate into the ashpit at a corner.
- There shall be a clearance of not less than 6 mm in the plane of the bottomgrate surface at all points between the bottomgrate and adjacent components.



(a) Tapered bottomgrate



(b) Rectangular bottomgrate

Figure 1 — Typical inset open fire

Table 3 — Minimum ashpan capacity

Bottomgrate	Tapered				Rectangular		
Nominal width, mm	350	400	450	500	400	450	500
Minimum capacity, dm ³	1.8	2.1	2.5	2.9	2.5	2.9	3.4

2.4.3 Appliances with underfloor air supply

When assembled as described in 2.4.2, the appliance shall comply with the following.

- a) It shall not be possible to pass a 20 + 0, – 1 mm diameter sphere from above the bottomgrate into the ashpit at any point other than a corner.
- b) It shall not be possible to pass a 30 + 0, – 1 mm diameter sphere from above the bottomgrate into the ashpit at a corner.
- c) There shall be a clearance of not less than 3 mm in the plane of the bottomgrate surface at all points between the bottomgrate and adjacent components.

2.5 Air control

The appliance shall be designed so that, when it is installed according to the manufacturer’s instructions, the primary air shall enter the ashpit only through the designated air inlet(s).

If, for an overnight burning appliance, the hearth forms the base of the ashpit, a means of sealing the firefront to the hearth and either the fireback or boiler shall be provided and be detailed in the manufacturer’s instructions.

The air control shall be capable of maintaining any position in which it is intended to be set. It shall be capable of adjustment to at least three intermediate positions between the fully closed and fully open positions. Two of these positions shall be between the fully closed position and 30 % of the fully open position, measured in terms of the area of the primary air opening.

NOTE 1 It is recommended that a further means of fine air control in the nearly closed position be provided.

NOTE 2 The design of the fire should be such that spillage of fuel or ash should not prevent complete closure of the air control.

2.6 Ashpan

An ashpan shall be provided, constructed of low carbon steel or stainless steel (see Table 1) of minimum thickness 0.91 mm.

The minimum ashpan capacity shall be not less than the value given in Table 3. The capacity shall be determined geometrically. If the ashpan is open at the rear, an angle of repose for the ash of 45° shall be assumed at the rear end.

The ashpan shall be so designed that the ash collection area, *X*, shall be not less than the ash-shedding area, *Z*, when calculated in accordance with A.13.

NOTE The ashpan should be designed and constructed to ensure the following:

- a) that it locates in the ashpit in such a way that it allows the free passage of primary air and does not obstruct any primary air control;
- b) that it can be easily and safely withdrawn, carried and emptied, when hot using the tool(s) provided, without undue spillage of ash;
- c) that it does not distort in normal use to an extent that makes it unsuitable for its purpose.

2.7 Ashpit and ashpit cover

The height from the bottom of the inside of the ashpan to the underside of the bottomgrate bars shall be not less than 75 mm at any point.

NOTE The design of the ashpit cover should be such that:

- a) its closure is not easily prevented by spilled undergrate material;
- b) it is difficult to accidentally dislodge from the set position;
- c) when hot, it can be handled easily and safely with the tool(s) provided.

2.8 Front firebars and fallplate

2.8.1 General

If front firebars are fitted they shall comply with 2.8.3.

If a fallplate is fitted then front firebars shall also be fitted. The upper edge of the fallplate shall not project above the upper edge of the topmost firebar.

2.8.2 Fallplate

The design of the fallplate shall be such that, when in the closed position, it is not capable of being opened without deliberately using the tool provided (see 2.14).

2.8.3 Front firebars

If front firebars are fitted they shall be removable and either horizontal when considered from side to side of the fire, or vertical.

They shall not be capable of being fitted incorrectly.

In the case of horizontal front firebars, the spaces between adjacent bars and between the bottom bar and the firefront shall be such that a 20 + 0, – 1 mm diameter rod cannot be inserted horizontally between them.