

Flue blocks and masonry terminals for gas appliances —

Part 1: Specification for precast concrete flue blocks and terminals

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Cement, Gypsum, Aggregates and Quarry Products Standards Committee (CAB/-) to Technical Committee CAB/11 upon which the following bodies were represented:

- Aggregate Concrete Block Association
- Association of Lightweight Aggregate Manufacturers
- Autoclaved Aerated Concrete Products Association
- British Aggregate Construction Materials Industries
- British Civil Engineering Test Equipment Manufacturers' Association
- British Concrete Masonry Association
- British Precast Concrete Federation Ltd.
- Building Employers' Confederation
- Cement Admixtures Association
- Cement and Concrete Association
- Cement Makers' Federation
- Concrete Brick Manufacturers' Association
- Concrete Society
- Consumer Standards Advisory Committee of BSI
- Department of the Environment (Building Research Establishment)
- Electricity Supply Industry in England and Wales
- Federation of Civil Engineering Contractors
- Institution of Structural Engineers
- Royal Institute of British Architects
- Sand and Gravel Association Limited

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Gas Corporation
- National House-building Council

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Foreword

This Part of BS 1289, prepared under the direction of the Cement, Gypsum, Aggregate and Quarry Products Standards Committee, is a revision of BS 1289:1975, which is withdrawn. BS 1289 will comprise two Parts, this Part and Part 2 “*Specification for clay flue blocks and terminals*”¹⁾, as a complement to BS 715²⁾ which specifies requirements for metal flue components.

This revision was initiated because of constructional difficulties associated with keying flue blocks into masonry walls and operating problems encountered with gas fires which were often due to obstructions in the flueway. Consequently, fundamental changes have been incorporated which restrict the permissible height of bonded flue blocks to co-ordinate with the heights of walling blocks and increase the minimum flueway width. (The increase in building insulation required by the Building (Second Amendment) Regulations 1981 has led to an increase in the thickness of the walling blocks and/or an increase in the cavity width and/or the insertion of cavity insulation. The resulting thicker walls have enabled this British Standard to specify an increased block thickness and thus an increased flueway width.)

Various types of masonry flue components are defined and specified. The performance of a flue is greatly affected by the resistance to flow of the constituent components. A new requirement has been introduced to control the maximum flow resistance of the two most restrictive components, namely the transfer block and the terminal.

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 16, 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⁾ In preparation.

²⁾ Under revision.

1 Scope

This Part of BS 1289 specifies requirements for precast concrete flue blocks intended for use in bonded flues or in non-bonded flues, and precast concrete terminals. The blocks are intended for use with gas appliances that comply with the requirements for flue block systems in the relevant Part of BS 5258.

NOTE 1 The appliance manufacturer's advice should always be sought to ensure that the appliances to be used are suitable for use with flue blocks complying with this standard.

Appendix C gives recommendations for the design and installation of flue block systems. For further information, reference should be made to BS 5440-1.

NOTE 2 The titles of the publications referred to in this Part of BS 1289 are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 1289 the definitions given in BS 6073-1 and BS 5440-1 apply, together with the following.

2.1 flue

passage for conveying combustion products to the outside air

2.2 flue block

block incorporating a preformed section of flue

NOTE Various types of flue block are illustrated in Figure 1.

2.3 Types of flue block

2.3.1

bonded flue block

flue block with bonding extension

2.3.2

non-bonded flue block

flue block without bonding extension

2.3.3

transfer block

flue block designed to facilitate connection to another chimney product

2.4 Flue block systems

2.4.1

bonded flue block system

system in which individual flue blocks are built wholly or partially into a masonry wall [see Figure 2(a)] or panel [see Figure 2(b)] and contribute to its structural integrity

2.4.2

non-bonded flue block system

system in which individual flue blocks may be supported by, but do not contribute to, the structural integrity of an adjacent wall [see Figure 2(c)]

2.5 Terminals

2.5.1

freestanding terminal

terminal designed for fitting directly to the outlet of an open flue system

2.5.2

ridge terminal

terminal designed for fitting at the ridge of a building

2.5.3

ridge terminal adaptor

fitting for connecting a circular cross section pipe to the rectangular section connection of a ridge terminal

2.6 Sizes

2.6.1

co-ordinating height

height of a flue block plus allowances for joints and tolerances

2.6.2

work size

size of a flue block specified for its manufacture, to which its actual size should conform within specified permissible deviations

3 Materials

NOTE The composition of the finished flue blocks should be such that they are non-combustible and capable of resisting flue gas temperatures up to 350 °C.

3.1 Binders and binder constituents

Flue blocks shall be made using one of the following binders complying with the relevant British Standards:

ordinary and rapid-hardening Portland cement BS 12;

Portland-blastfurnace cement BS 146-2;

high alumina cement BS 915-2;

sulphate-resisting Portland cement BS 4027;

Portland pulverized-fuel ash cement BS 6588;

pozzolanic cement with pulverized-fuel ash as pozzolana BS 6610.

Where ordinary or rapid-hardening Portland cement is used, it is permissible to combine it with one of the following binder constituents:

- ground granulated blastfurnace slag complying with BS 6699;
- pulverized-fuel ash complying with BS 3892-1 or BS 3892-2;
- lime complying with BS 890.

3.2 Aggregates

Flue blocks shall be made using one or more of the following aggregates complying with the relevant British Standards:

- | | |
|--------------------------------------|---|
| air-cooled blastfurnace slag | BS 1047; |
| foamed or expanded blastfurnace slag | BS 877-2:1973 (except grading requirements in clause 5); |
| lightweight aggregates | BS 3797-2:1976 (except grading requirements in clause 4); |
| pulverized-fuel ash | BS 3892-1 or BS 3892-2. |

3.3 Admixtures and pigments

Where admixtures and pigments are used, they shall comply with the relevant British Standards:

- | | |
|---|---|
| accelerating, retarding and water-reducing agents | BS 5075-1; |
| air-entraining agents | BS 5075-2; |
| pigments | BS 1014; |
| calcium chloride | BS 3587 (used only as a solution in water). |

3.4 Chloride content

The equivalent anhydrous calcium chloride content shall not exceed 0.2 % by mass of the flue blocks, when measured in accordance with the method given in BS 1881-6, unless it does not exceed 1.5 % by mass of the cement used in their manufacture.

4 Dimensions

4.1 Co-ordinating height

The co-ordinating height (see 2.6.1) for all bonded flue blocks (see 2.3.1) except lintel blocks, starter blocks and transfer blocks shall be 225 mm [see Figure 2 (a) and Figure 2(b)].

The co-ordinating height for bonded lintel blocks, starter blocks and transfer blocks shall be stated by the manufacturer.

NOTE In determining the work size height (see 2.6.2) the manufacturer should allow for the manufacturing tolerance, the construction tolerance and the thickness of the recommended jointing material.

4.2 Wall thickness

The minimum wall thickness of bonded and non-bonded flue blocks shall be 25 mm.

4.3 Flue size

When measured perpendicular to the axis of the flue the minimum dimension of the flue shall be 90 mm and the cross-sectional area shall be not less than 16 500 mm². In transfer blocks the flue shall taper to a diameter of not less than 125 mm.

4.4 Bonding extension

Plain bonded flue blocks shall have a bonding extension of not less than 75 mm [see Figure 1(a)].

4.5 Angles

The angle of offset in lateral offset blocks [see Figure 1(b)] or rear offset blocks [see Figure 1(c)] shall not exceed 30°.

The angle of offset between sections of flue in transfer blocks shall not exceed 45° [see Figure 1(d)].

4.6 Size of opening (starter blocks)

Starter blocks shall incorporate an opening not less than 305 mm wide × 115 mm deep [see Figure 1(f)].

4.7 Terminals

No opening in the terminal shall allow a 16 mm diameter sphere to pass through when subjected to a force of 5 N. Where the terminal is intended to be connected to a flue pipe, it shall be designed to accept flue pipes of sizes specified in BS 567, BS 715 or BS 835.

NOTE 1 Typical terminals are shown in Figure 3.

NOTE 2 All terminals should be designed so that they are unlikely to be blocked by leaves and/or snow and will minimize entry of birds, rain, snow or condensate to the building fabric.

5 Dimensional deviations

When measured in accordance with Appendix A the maximum dimensional deviations from the manufacturer's stated work sizes (see 2.6.2) shall be ± 3 mm.

6 Joints

NOTE Joints should be sealed to prevent the escape of combustion products from the finished flue (see C.3.4).

6.1 Bonded flue blocks

Bonded flue blocks shall be designed so that when jointed together the flues in adjacent blocks are aligned to within 3 mm.

6.2 Non-bonded flue blocks

Non-bonded flue blocks shall be designed so that when jointed together the sides of the flues, including any locating devices, e.g. metal connectors, are aligned to within 3 mm.

7 Compressive strength

NOTE This clause applies only to plain flue blocks since these carry the main load. In practice, other types of flue block are stronger than plain flue blocks.

When sampled in accordance with clause 9 and tested for compressive strength in accordance with B.1 of BS 6073-1:1981, i.e. with the bed face downwards and taking the crushing strength to be the maximum load divided by the gross area, the average crushing strength of 10 plain flue blocks shall be:

- a) not less than 2.8 N/mm^2 ; and
- b) not less than $(0.9 \times 2.8) + 0.62S \text{ N/mm}^2$, where S is the standard deviation for the sample.

8 Flow resistance

8.1 General

Type tests shall be carried out to determine the flow resistance of transfer blocks and terminals. These shall be repeated whenever there is a change in design, type of material or method of manufacture.

8.2 Transfer blocks

When tested for flow resistance as described in B.1, a transfer block shall have a resistance factor, K , not greater than 0.5.

8.3 Terminals

When tested for flow resistance as described in B.2, a flue terminal shall have a resistance factor, K , not greater than 5 for freestanding terminals (see 2.5.1), or not greater than 15 for ridge terminals (see 2.5.2).

9 Sampling

The number of flue blocks taken for dimensional measurement and compressive strength determination, selected at random, shall be as given in Table 1. All samples shall be marked to identify the consignment that they represent. The date and place of sampling and, where known, the date of manufacture shall be recorded.

Samples shall be kept under cover and protected from extremes of temperature, relative humidity and wind exposure until required for test.

NOTE 1 Tests should be carried out as soon as practicable after the samples have been taken.

NOTE 2 Provided that the sampling requirements are satisfied, arrangements for sampling, i.e. before or after delivery, should be agreed between the manufacturer and the purchaser.

NOTE 3 It is recommended that the manufacturer operates a quality control scheme and states in any certificate that the product has been sampled and tested at regular intervals.

10 Marking

The following particulars shall be clearly marked on each flue block or terminal or, where this is not practicable, on the delivery note, invoice or supplier's certificate supplied with a consignment of flue blocks or terminals:

- a) name, trade mark or other means of identification of the manufacturer;
- b) the number and date of this British Standard, i.e. BS 1289-1:1986³⁾.

Instructions for installation consistent with the recommendations in Appendix C shall be included with each consignment.

Table 1 — Number of flue blocks required for testing

Purpose	Appendix reference	Number of flue blocks required per consignment
Dimensional checks	A of this Part of BS 1289	10 (available for subsequent tests)
Compressive strength determination (plain flue blocks only)	B of BS 6073-1:1981	10

³⁾ Marking BS 1289-1:1986 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility.