

Specification for metal flue boxes for gas-fired appliances not exceeding 20 kW

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Committees responsible for this British Standard

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Federation of Master Builders
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Foreword

This British Standard has been prepared by Technical Committee GSE/4. Together with BS EN 1856-1 and BS EN 1856-2, it supersedes BS 715:1993 which is withdrawn.

This edition retains the requirements for metal flue boxes formerly in BS 715:1993, updated to reflect current practice. All requirements and recommendations relating to metal chimneys can now be found in BS EN 1856-1 and BS EN 1856-2.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its 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 12, an inside back cover and a back cover.

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1 Scope

This British Standard specifies the dimensional, material and performance requirements for metal flue boxes to enable gas fire flues to be installed against or within a wall which does not have a fireplace or flue.

The flue boxes are intended to be used with metal flue pipes conforming to BS EN 1856-1 and BS EN 1856-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

BS 1449-1, *Steel plate, sheet and strip — Carbon and carbon-manganese plate, sheet and strip.*

BS 7977-1:2002, *Specification for safety and rational use of energy of domestic gas appliances — Part 1: Radiant/convectors.*

BS EN 509:2000, *Decorative fuel-effect gas appliances.*

BS EN 1559-1, *Founding — Technical conditions of delivery — General.*

BS EN 1559-2, *Founding — Technical conditions of delivery — Additional requirements for steel castings.*

BS EN 1856-1, *Chimneys — Requirements for metal chimneys — Part 1: System chimney products.*

BS EN 1856-2, *Chimneys — Requirements for metal chimneys — Part 2: Metal liners and connecting flue pipes.*

BS EN 10088-1, *Stainless steel — Part 1: List of stainless steels.*

BS EN 10327, *Continuously hot-dip coated strip and sheet of low carbon steels for cold forming — Technical delivery conditions.*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1

flue box

device that provides a substitute open fire place to which a gas fire and flue can be installed

4 General

4.1 Materials

4.1.1 *Construction materials*

Flue box materials shall be selected so that in combination they will not cause corrosion, including bimetallic corrosion, and hence adversely affect the integrity of the flue box.

NOTE This includes any fastenings used in the construction.

4.1.2 *Inner wall*

Except as specified in **9.1** and **10.1**, the inner wall in contact with flue gas (this includes the base sheet where the design of the box permits free circulation of flue gases within the box design) shall be made of aluminium or stainless steel conforming to Table 1 and shall be not less than 0.30 mm thick.

Table 1 — Inner wall material specification

Material	Material type	Material number	Symbol
Aluminium	10	EN AW-4047A	EN AW-Al Si12(A) and Cu <0.1 %, Zn <0.15 % (cast aluminium)
	11	EN AW-1200A	EN AW-Al 99.0(A)
	13	EN AW-6060	EN AW-Al MgSi
Stainless steel	20	1.4301	X5CrNi18-10
	30	1.4307	X2CrNi18-9
	40	1.4401	X5CrNiMo17-12-2
	50	1.4404 ^a	X2CrNiMo17-12-2
	60	1.4432	X2CrNiMo17-12-3
	70	1.4539	X1NiCrMoCu25-20-5
NOTE This information has been taken from BS EN 10088-1 and BS EN 573-3.			
^a Equivalent for material number 1.4404 is 1.4571 (symbol X6CrNiMoTi17-12-2).			

4.1.3 Outer wall

The outer wall shall be of one of the following materials:

- a) aluminium or aluminium alloy conforming to Table 1;
- b) stainless steel conforming to BS EN 10088-1;
- c) aluminium/zinc alloy coated steel of grades DX51D with coating AZ 185 or AZ 150 conforming to BS EN 10327;
- d) hot-dip zinc coated steel sheet of steel grade DX51D with coating type Z600 as specified in BS EN 10327;
- e) hot-dip zinc coated steel sheet of steel grade DX51D or DX52D with coating type Z275 as specified in BS EN 10327;
- f) aluminium coated steel, consisting of steel base conforming to the appropriate section of BS 1449-1, with a hot-dipped coating of alloy conforming to BS EN 1559-1 and BS EN 1559-2 of thickness not less than 13 µm;
- g) roll-bonded aluminium coated steel base conforming to the appropriate section of BS 1449-1 with a minimum coating thickness of 20 µm.

4.1.4 Insulating material

Any insulating material shall be of mineral base, be non-combustible and have substantially uniform density.

4.2 Construction

The flue box shall be either single-walled with insulation or double-walled with or without additional insulation. The flue box shall be generally rectangular in plan, and the front shall be open.

The outlet shall be in the top of the flue box and shall accept a flue pipe conforming to BS EN 1856-1 or BS EN 1856-2 of the diameter specified by the gas fire manufacturer.

Seams shall be sound and mechanically strong when tested in accordance with 5.1. They can be either, folded, riveted, welded, or joined by other mechanical methods, except for vitreous enamelled components which shall have welded seams. Welded seams shall be continuous and shall not form internal or external projections that will detract from the appearance of the finished article, causing difficulty in joining pipes and fittings, or give rise to corrosion.

4.3 Finish

The outside of the flue box shall not contain any sharp edges, projections or other imperfections which could cause injury whilst handling or prevent easy insertion into an existing flue.

4.4 Marking

4.4.1 Information

Each flue box shall be permanently and legibly marked with the following information:

- a) the number and date of this British Standard, i.e. BS 715:2005¹⁾;
- b) the name or distinguishing mark of the manufacturer;
- c) a permanent warning label attached in a prominent position adjacent to the front edge of the base plate²⁾.

4.4.2 Specific wording

The wording on the warning label will depend on the type of fire for which the fire box is intended and is detailed in 6.3, 7.3, 8.3, 9.4 and 10.4 as appropriate.

4.4.3 Print size

The words "WARNING — FIRE RISK" wherever positioned shall be emphasized and in upper case characters at least 8 mm in height; other wording shall be in characters at least 4 mm in height.

4.4.4 Durability²⁾

4.4.4.1 Requirement

The warning label shall be indelibly marked and firmly fixed. This shall be verified through testing in accordance with 4.4.4.2. Upon the completion of the test, the marking shall be clearly legible, there shall be no lifting of the exposed edges of the warning label and the removal of the warning label shall not be easily possible.

4.4.4.2 Method

Fix the warning label in the manner specified by the fire box manufacturer to a piece (200 mm × 200 mm) of the material specified by the fire box manufacturer for the base sheet of the box.

Expose the resulting test piece to 10 cycles of a temperature of 150 °C for 1 h and of 0 °C for 1 h with a 15 min interval at room temperature between each temperature change.

At the end of the 10 cycles, once the test piece is at room temperature, rub the marking on the warning label by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked in petroleum spirit³⁾. Then check:

- a) the marking for legibility;
- b) the exposed edges of the warning label for lifting; and
- c) the fixing of the warning label for ease of removal.

4.5 Installation instructions

The flue box manufacturer shall make available full installation instructions, including the method of securely fixing the flue box in position, the flue size compatible with the flue box outlet and the wording of the warning label specific to the flue box type.

¹⁾ Marking BS 715:2005 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirement of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

²⁾ For the purposes of requirements 4.4.1c) and 4.4.4, a metal foil badge would be regarded as being permanently and legibly marked. Anything else will need to be assessed.

³⁾ The petroleum spirit to be used for the test is aliphatic solvent hexane having a maximum aromatics content of 0.1 % by volume, a kauri-butanol value of 29, an initial boiling point of approximately 65 °C, a dry point of approximately 69 °C and a specific mass of approximately 0.66 kg/l.

5 Performance

5.1 Strength test

5.1.1 Requirement

When tested in accordance with 5.1.2, the flue box in the free-standing position shall withstand an evenly distributed static load of not less than 90 kg without permanent distortion.

5.1.2 Method

Apply an evenly distributed static load of not less than 90 kg to the top surfaces of the flue box (excluding the flue spigot) by means of weighted bags, with the base of the flue box resting on a flat horizontal surface at least equal in size to the base of the flue box.

5.2 Temperature requirement

When tested in accordance with 6.4, 7.4, 8.4, 9.5 or 10.5 as appropriate to the type of flue box:

- a) the maximum temperature rise of the outer walls and top surface of the flue box and any fixing points shall not exceed 65 °C;
- b) the maximum temperature rise recorded on the test floor shall not exceed 50 °C except that, where the manufacturer specifies that the flue box has to be installed on a non-combustible hearth, the maximum temperature rise shall be 60 °C.

At the conclusion of the relevant test no part of the box shall have suffered any breakdown or distortion liable to lead to a reduction in the life of the box or to affect its safety.

6 Flue box for a gas fire which is in accordance with a domestic gas-fired radiant/convector and live fuel effect fire as described in BS 7977-1:2002, 3.1.1 and 3.1.2

6.1 Materials

Materials for the flue box construction shall be in accordance with 4.1.2 and 4.1.3.

6.2 Dimensions

The front faces of the sides, top and bottom shall be on a single plane with a minimum front opening of 380 mm wide and 510 mm high and shall accept a typical closure plate. The flue box internal front-to-back dimensions shall be not less than 165 mm as shown in Figure 1.

6.3 Marking

The permanent warning label (see 4.4) shall state the following:

“WARNING — FIRE RISK

THIS BOX IS ONLY FOR USE WITH DOMESTIC GAS-FIRED RADIANT/CONVECTORS AND LIVE FUEL EFFECT FIRES AS DESCRIBED IN BS 7977-1:2002, 3.1.1 AND 3.1.2.

A SOLID FUEL FIRE MUST NOT BE FITTED IN THIS BOX OR CHIMNEY.”

6.4 Temperature test — Method

6.4.1 Test room

The room shall be adequately ventilated but free from draughts and the ambient temperature shall be kept constant to within ± 2 °C throughout the test.

6.4.2 Procedure

Place the flue box in the test room at least 4 h before commencing the tests to allow it to reach the test room temperature.

Stand the flue box on a test floor in accordance with BS 7977-1:2002, 6.4.4.2, and behind a wooden test wall (1 500 mm wide \times 1 000 mm high \times 25 mm thick) having a cut-out such that the front opening of the flue box is not restricted.

Seal the front of the flue box to the wall, and mount and seal the flue gas generator (see Figure 2) to the front of the wall opening. Seal the gap between the test wall and the front of the flue gas generator with a gasket of suitable insulating material.

Fit a length of flue pipe, as specified by the manufacturer, to give a minimum overall height of 3 m when measured from the floor. The flue pipe shall terminate inside the test room.

Means shall be provided to measure the average flue gas temperature.

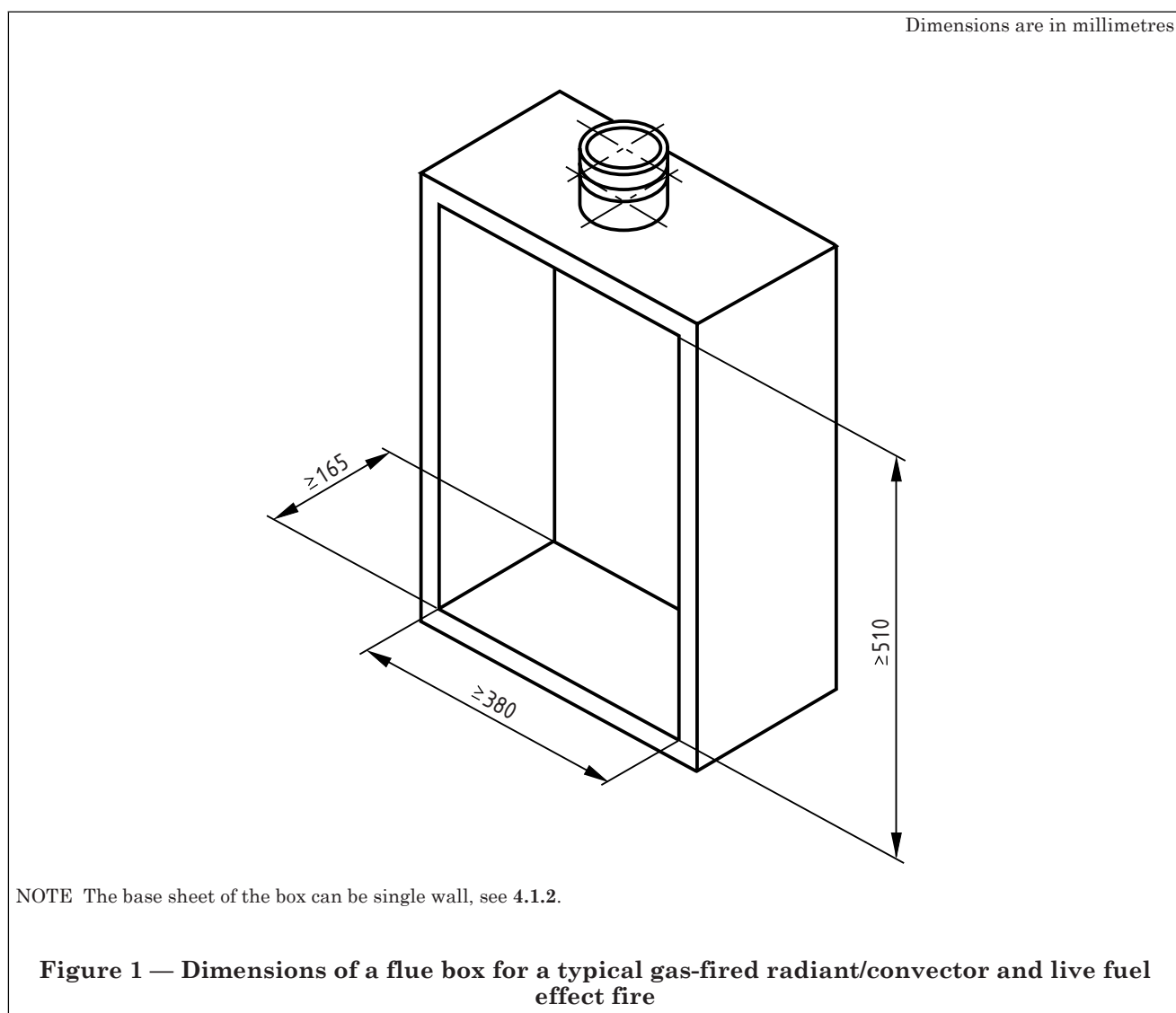
NOTE The combustion probe with the thermocouple described in BS 6332-4 can be used with a recommended sampling rate of between 8 dm³/min and 12 dm³/min.

Fit the temperature probe in the flue at a point 600 mm above the top of the flue box to allow adequate mixing of products.

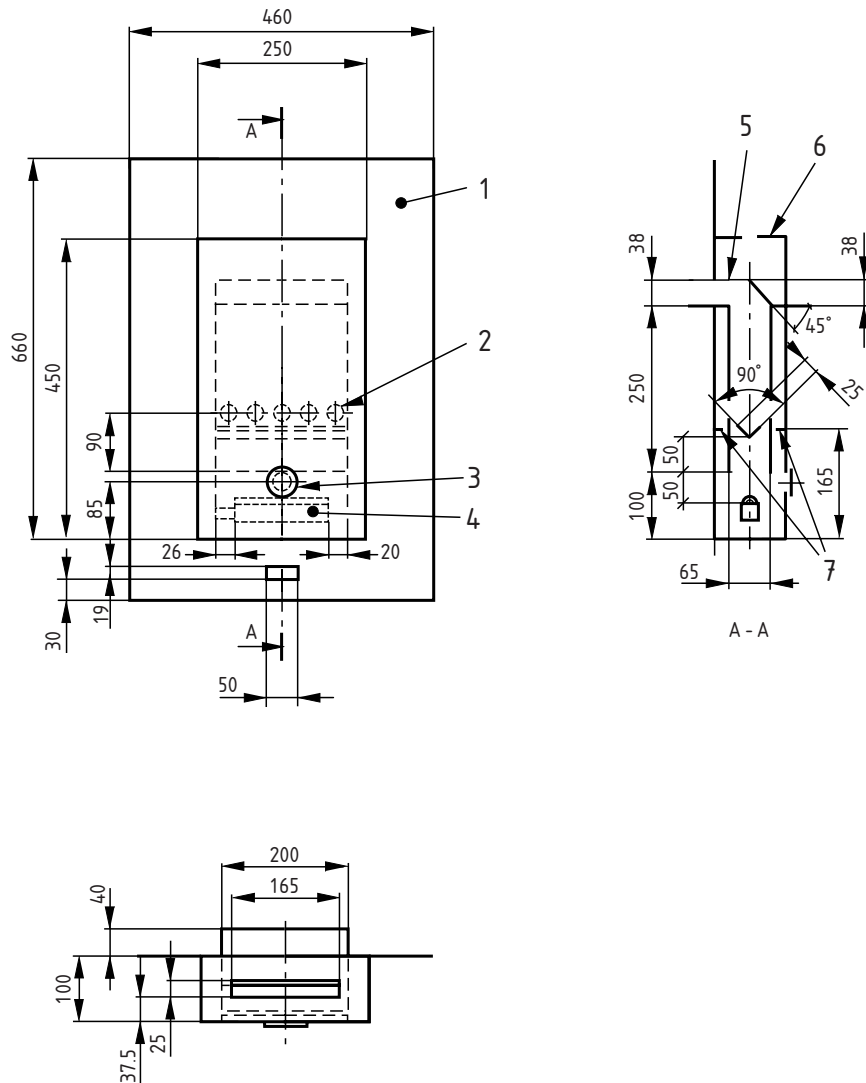
Adjust the flue gas generator to provide a gross heat input of (3 ± 0.06) kW calculated in accordance with BS 7977-1:2002, 6.3.1.3.

Supply flue gases to the flue box and record the temperature rises after 4 h operation using a surface temperature probe for the side and top surface temperatures and record the test floor thermocouple readings for the base temperatures.

Record the flue gas temperature during the test.



Dimensions are in millimetres

**Key**

- | | |
|---|----------------------------------|
| 1 Closure plate | 5 Inner flueway |
| 2 10 holes, $\varnothing 25$ mm \times 40 CRS | 6 Outer cover box |
| 3 Lighting hole, $\varnothing 25$ mm with shutter | 7 Baffles, 200 mm \times 12 mm |
| 4 A typical burner/injector | |

NOTETolerance on all dimensions ± 1 mmTolerance on all angles $\pm 5^\circ$

Material: Inner flueway — Stainless steel
 Closure plate — Bright aluminium 1.2 THK (18 SWG)
 Outer cover box — Bright aluminium 0.9 THK (20 SWG)

The flue gas generator is designed to produce consistent results by reducing direct heat losses to the test laboratory to a minimum. This is achieved by having the inner flueway enclosed in an outer cover box, which has an opening at the top for the combustion air and a closed bottom. Air enters the top of the cover box, passes down over the outside of the flueway thereby picking up the convection heat loss from it. The air then enters the flueway via the burner and through the by-pass holes. It is necessary to by-pass some of the air away from the burner to avoid flame lift due to excessive air velocity past the burner. Radiation losses are reduced by making the outer cover of the box of bright aluminium.

Figure 2 — Flue gas generator

7 Flue box for any inset live fuel effect gas fire not exceeding 7 kW heat input (commonly known as an ILFE) which is in accordance with BS 7977-1

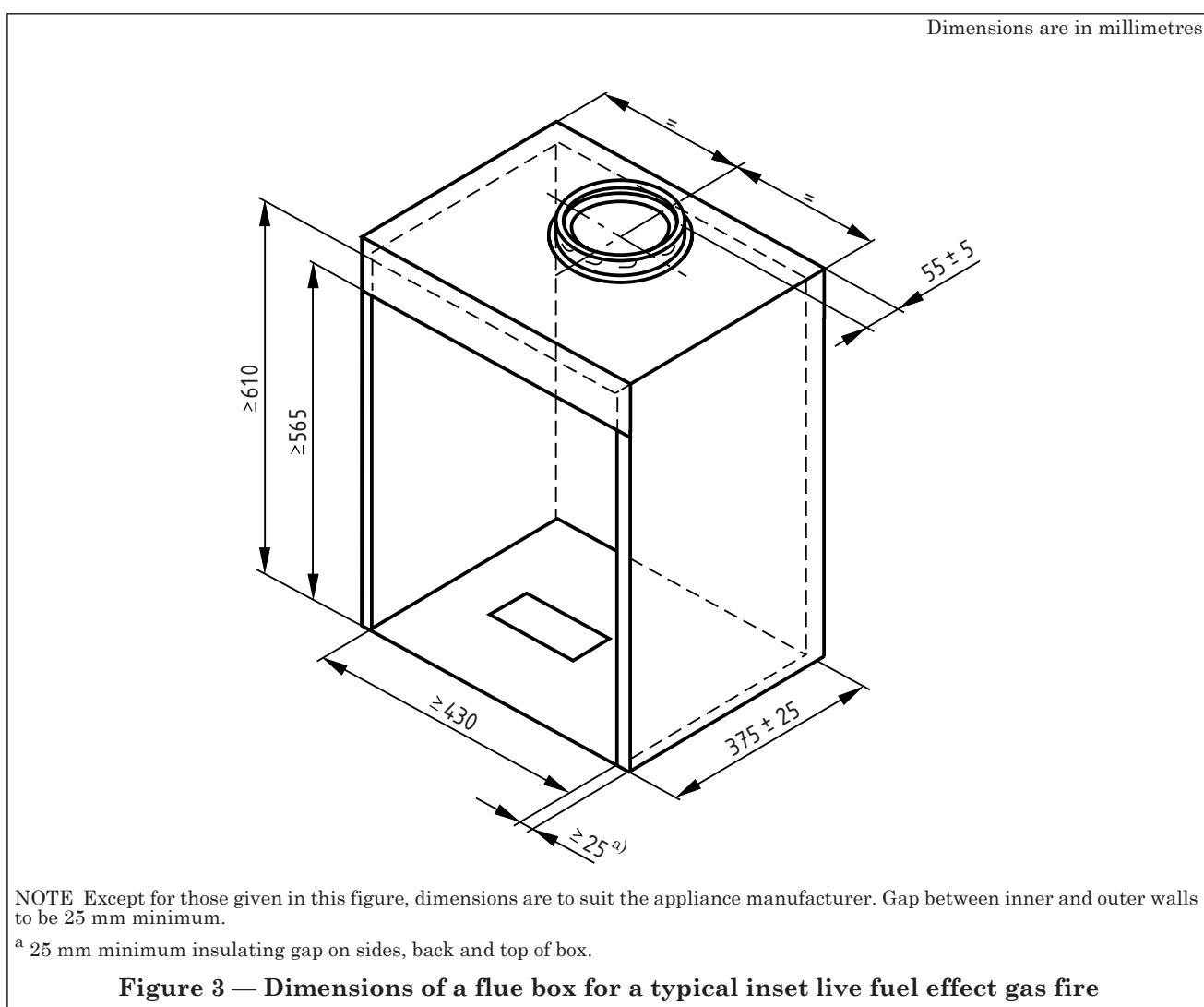
NOTE Fires of this type require either a 125 mm diameter flue or a minimum flue diameter of 175 mm. This will be specified in the gas fire manufacturer's installation instructions. An ILFE with a heat input exceeding 7 kW should be treated as a dedicated arrangement (see 8).

7.1 Materials

Materials for the flue box construction shall be in accordance with 4.1.2 and 4.1.3.

7.2 Dimensions

The front faces of the sides, top and base plate shall be on a single plane with a minimum front opening of 430 mm wide and 565 mm high. The flue box internal dimensions shall be as shown in Figure 3.



7.3 Marking

The permanent warning label (see 4.4) shall state the following:

“WARNING — FIRE RISK

THIS BOX IS PRIMARILY FOR USE WITH INSET LIVE FUEL EFFECT GAS FIRES CONFORMING TO BS 7977-1 AND NOT EXCEEDING 7 kW INPUT BUT A GAS-FIRED RADIANT/CONVECTOR OR LIVE FUEL EFFECT FIRE AS DESCRIBED IN BS 7977-1:2002, 3.1.1 AND 3.1.2 MAY ALSO BE FITTED.

A SOLID FUEL FIRE MUST NOT BE FITTED IN THIS BOX OR CHIMNEY.”

7.4 Temperature test — Method

Carry out the temperature test in accordance with 6.4.

8 Flue box for a specific inset live fuel effect gas fire (commonly known as an ILFE) which is in accordance with BS 7977-1

8.1 Materials

Materials for the flue box construction shall be in accordance with 4.1.2 and 4.1.3.

8.2 Dimensions

As the appliance/flue box is a dedicated combination, all dimensions of the flue box shall be decided by the flue box and/or appliance manufacturer.

8.3 Marking

The permanent warning label (see 4.4) shall state the following:

“WARNING — FIRE RISK

THIS BOX IS PRIMARILY FOR USE WITH [*name of ILFE*]⁴⁾ CONFORMING TO BS 7977-1 BUT A GAS-FIRED RADIANT/CONVECTOR OR LIVE FUEL EFFECT FIRE AS DESCRIBED IN BS 7977-1:2002, 3.1.1 AND 3.1.2 MAY ALSO BE FITTED.

A SOLID FUEL FIRE MUST NOT BE FITTED IN THIS BOX OR CHIMNEY.”

8.4 Temperature test — Method

8.4.1 Test room

The room shall be adequately ventilated but free from draughts and the ambient temperature shall be kept constant to within ± 2 °C.

8.4.2 Procedure

Place the flue box in the test room at least 4 h before commencing the tests to allow it to reach the test room temperature.

Stand the flue box on a test floor in accordance with BS 7977-1:2002, 6.4.4.2, and behind a wooden test wall (1 500 mm wide \times 1 000 mm high \times 25 mm thick) having a cut-out such that the front opening of the flue box is not restricted. Seal the front of the flue box to the wall.

Fit a length of flue pipe, as specified by the manufacturer, to give an overall height of 3 m minimum when measured from the floor. The flue pipe shall terminate inside the test room. Means shall be provided to measure the average flue gas temperature.

NOTE The combustion probe with the thermocouple described in BS 6332-4 can be used with a recommended sampling rate of between 8 dm³/min and 12 dm³/min.

Fit the temperature probe in the flue at a point 600 mm above the top of the flue box to allow adequate mixing of products.

Fit the specific inset live fuel effect gas fire (ILFE) to the flue box in accordance with the manufacturer's installation instructions and adjust the rated heat input calculated in accordance with BS 7977-1:2002, 6.3.1.3.

⁴⁾ The flue box manufacturer is to indicate the identifying name of the ILFE.

Operate the ILFE at rated heat input and record the temperature rises after 4 h operation using a surface temperature probe for the side and top surface temperatures and record the test floor thermocouple readings for the base temperatures.

Record the flue gas temperature during the test.

9 Flue box for any decorative fuel effect gas fire (commonly known as a DGF) as described in BS EN 509, intended for installation in a fire place recess

NOTE A DGF with a heat input exceeding 8 kW or a basket type fire should be treated as a dedicated arrangement (see 10).

9.1 Materials

The materials for the flue box construction shall be in accordance with 4.1.2 and 4.1.3, with the following exceptions.

For the inner wall in contact with the flue gas:

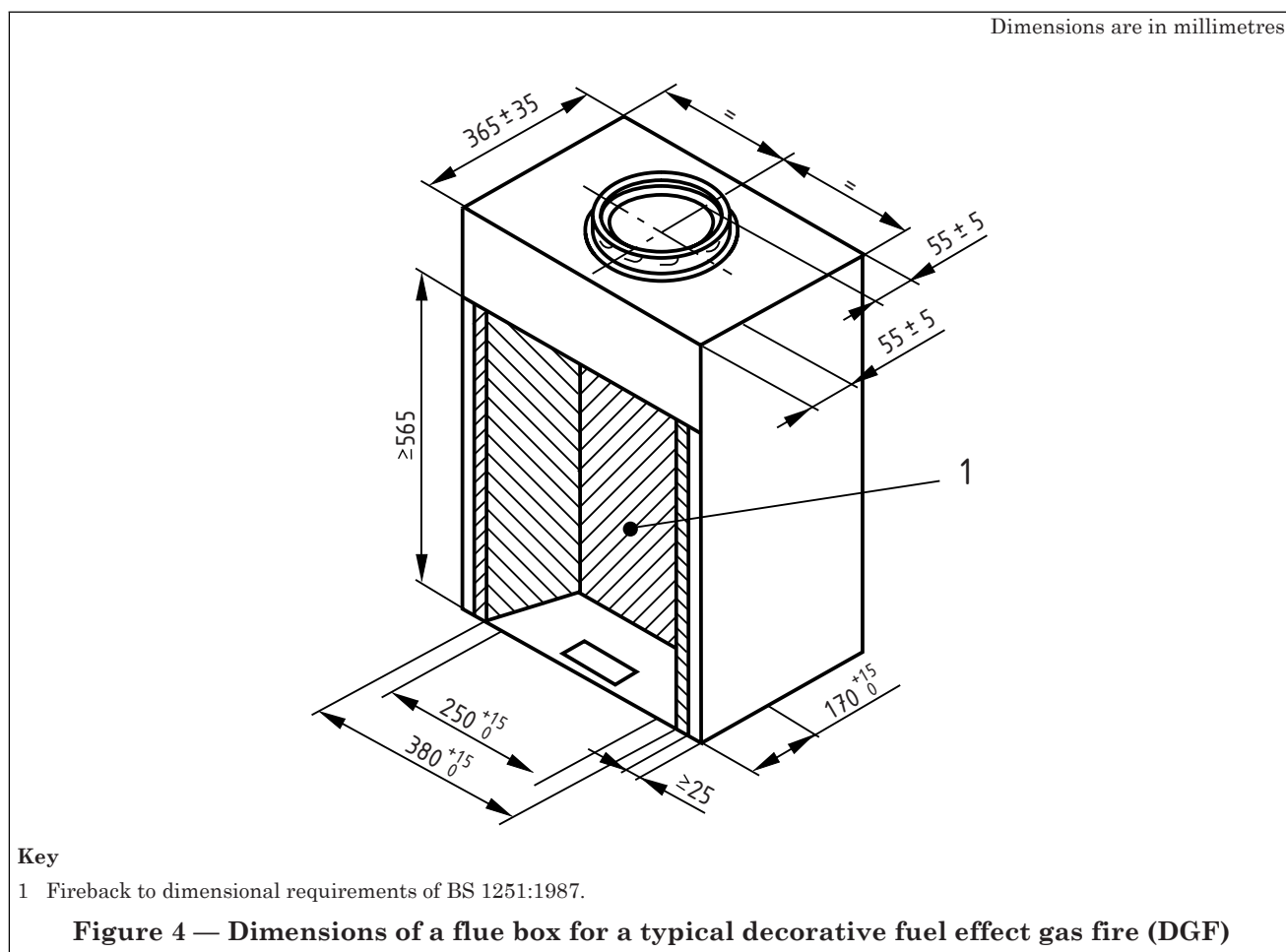
- a) aluminium shall not be used;
- b) a refractory, ceramic or concrete material may be used.

9.2 Construction

In addition to the requirements in 4.2, there shall be a smooth tapered transition into the flue box outlet.

9.3 Dimensions

The flue box dimensions shall be in accordance with Figure 4.



9.4 Marking

The permanent warning label (see 4.4) shall state the following:

“WARNING — FIRE RISK

THIS BOX IS FOR USE WITH DECORATIVE GAS FIRES (DGF) CONFORMING TO BS EN 509 FOR WHICH THE DGF MANUFACTURER’S INSTRUCTIONS CONFIRM IT IS SUITABLE FOR USE WITH [unique product number]⁵⁾.

A SOLID FUEL FIRE MUST NOT BE FITTED IN THIS BOX OR CHIMNEY.”

9.5 Temperature test — Method

9.5.1 Test room

The room shall be adequately ventilated but free from draughts and the ambient temperature shall be kept constant to within ± 2 °C.

9.5.2 Procedure

Place the flue box in the test room at least 4 h before commencing the tests to allow it to reach the test room temperature.

Stand the flue box on a test floor in accordance with BS EN 509:2000, 7.4.4, and behind a wooden test wall (1 500 mm wide \times 1 000 mm high \times 25 mm thick) having a cut-out such that the front opening of the flue box is not restricted. Seal the front of the flue box to the wall.

Fit a length of flue pipe, as specified by the manufacturer, to give an overall height of 3 m minimum when measured from the floor. The flue pipe shall terminate inside the test room. Means shall be provided to measure the average flue gas temperature.

NOTE The combustion probe with the thermocouple described in BS 6332-4 can be used with a recommended sampling rate of between 8 dm³/min and 12 dm³/min.

Fit the temperature probe in the flue at a point 600 mm above the top of the flue box to allow adequate mixing of products.

Fit the specific decorative fuel effect gas fire to the flue box in accordance with the manufacturer’s installation instructions and adjust the rated heat input calculated in accordance with BS EN 509:2000, 7.3.1.

Operate the specific DGF at rated heat input and record the temperature rises after 6 h operation using a surface temperature probe for the side and top surface temperatures and record the test floor thermocouple readings for the base temperatures.

Record the flue gas temperature during the test.

10 Flue box for a specific decorative fuel effect gas fire (commonly known as a DGF) as described in BS EN 509, intended for installation in a fire place recess

10.1 Materials

The materials for the flue box construction shall be in accordance with 4.1.2 and 4.1.3 with the following exceptions.

For the inner wall in contact with the flue gas:

- a) aluminium shall not be used;
- b) a refractory, ceramic or concrete material may be used.

10.2 Construction

In addition to the requirements in 4.2, there shall be a smooth tapered transition into the flue box outlet.

⁵⁾ The flue box manufacturer enters a unique product number here and it is for the DGF manufacturer to declare that the DGF is compatible with that flue box product number.

10.3 Dimensions

As the appliance/flue box is a dedicated combination, all dimensions of the flue box shall be decided by the flue box and/or appliance manufacturer.

10.4 Marking

The permanent warning label (see 4.4) shall state the following:

“WARNING — FIRE RISK

THIS BOX IS PRIMARILY FOR USE WITH [*name of decorative gas fire*]⁶⁾ CONFORMING TO BS EN 509 BUT A GAS-FIRED RADIANT / CONVECTOR OR LIVE FUEL EFFECT FIRE AS DESCRIBED IN BS 7977-1:2002, 3.1.1 AND 3.1.2 MAY ALSO BE FITTED.

A SOLID FUEL FIRE MUST NOT BE FITTED IN THIS BOX OR CHIMNEY.”

10.5 Temperature test — Method

10.5.1 Test room

The room shall be adequately ventilated but free from draughts and the ambient temperature shall be kept constant to within ± 2 °C.

10.5.2 Procedure

Place the flue box in the test room at least 4 h before commencing the tests to allow it to reach the test room temperature.

Stand the flue box on a test floor in accordance with BS EN 509:2000, 7.4.4, and behind a wooden test wall (1 500 mm wide \times 1 000 mm high \times 25 mm thick) having a cut-out such that the front opening of the flue box is not restricted. Seal the front of the flue box to the wall.

Fit a length of flue pipe, as specified by the manufacturer, to give an overall height of 3 m minimum when measured from the floor. The flue pipe shall terminate inside the test room. Means shall be provided to measure the average flue gas temperature.

NOTE The combustion probe with the thermocouple described in BS 6332-4 can be used with a recommended sampling rate of between 8 dm³/min and 12 dm³/min.

Fit the temperature probe in the flue at a point 600 mm above the top of the flue box to allow adequate mixing of products.

Fit the specific decorative fuel effect gas fire to the flue box in accordance with the manufacturer's installation instructions and adjust the rated heat input calculated in accordance with BS EN 509:2000, 7.3.1.

Operate the specific DGF at rated heat input and record the temperature rises after 6 h operation using a surface temperature probe for the side and top surface temperatures and record the test floor thermocouple readings for the base temperatures.

Record the flue gas temperature during the test.

⁶⁾ The flue box manufacturer is to indicate the identifying name of the DGF.

Bibliography

Standards publications

BS 6332-4:1983, *Thermal performance of domestic gas appliances — Specification for thermal performance of independent convector heaters.*

BS EN 573-3, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition.*

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