

Specification for

**Metal flue pipes,
fittings, terminals
and accessories for
gas-fired appliances
with a rated input not
exceeding 60 kW**

Committees responsible for this British Standard

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- British Flue and Chimney Manufacturers Association
- British Gas plc
- Decorative Gas Fire Manufacturers Association
- Federation of Master Builders
- Society of British Gas Industries

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Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
Section 1. General	
1.1 Scope	1
1.2 Definitions	1
Section 2. Single-wall flue system	
2.1 Materials	2
2.2 Construction	2
2.3 Dimensions	2
2.4 Finish	2
2.5 Marking	3
2.6 Instructions	3
2.7 Performance	3
Section 3. Double-wall flue system	
3.1 Materials	4
3.2 Construction	4
3.3 Dimensions	4
3.4 Finish	6
3.5 Marking	6
3.6 Instructions	6
3.7 Performance	6
Section 4. Flexible flue liner	
4.1 Materials	8
4.2 Construction	8
4.3 Dimensions	8
4.4 Finish	8
4.5 Marking	8
4.6 Instructions	8
4.7 Performance	8
Section 5. Flue terminal	
5.1 Materials	11
5.2 Construction	11
5.3 Dimensions	11
5.4 Finish	11
5.5 Marking	11
5.6 Instructions	12
5.7 Performance	12
Section 6. Flue box	
6.1 Flue box for a gas fire which is in accordance with BS 5258-5	16
6.2 Flue box for any decorative fuel effect (DFE), gas appliance (commonly known as a DGF) intended for installation in a fire place recess and in accordance with BS 5258-12	19
6.3 Flue box for a specific decorative fuel effect gas appliance (commonly known as a DGF) in accordance with BS 5258-12	22
6.4 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 5258-16	24
6.5 Flue box for a specific inset live fuel effect gas fire (commonly known as an ILFE) which is in accordance with BS 5258-16	26

	Page
Section 7. Fittings	
7.1 Ridge terminal adaptors	29
7.2 Bends	29
7.3 Adaptors	29
7.4 Flue disconnecting devices	29
Section 8. Accessories	
8.1 Materials	31
Annex A Tests for coatings other than vitreous enamel	33
Figure 1 — Sealing of flue pipe for testing	5
Figure 2 — Typical crushing test apparatus	7
Figure 3 — Typical combined clamp and plate arrangement	10
Figure 4 — A typical ridge terminal adaptor (“R”-type adaptor)	12
Figure 5 — Strength test equipment	13
Figure 6 — Apparatus for testing the performance of free-standing terminals under wind conditions	14
Figure 7 — Apparatus for testing the performance of ridge terminals under wind conditions	15
Figure 8 — Flue gas generator	17
Figure 9 — Dimensions of a flue box for a gas fire to BS 5258-5	18
Figure 10 — Typical views of a flue box for a decorative fuel effect gas fire (DGF)	20
Figure 11 — Typical views of a flue box for a typical basket decorative fuel effect gas fire	25
Figure 12 — Adaptors	30
Figure 13 — A typical wall bracket used to support long pipe runs	31
Figure 14 — A typical combined support assembly and firestop plate	31
Figure 15 — A typical two-piece firestop plate	32
Figure 16 — A typical firestop spacer plate	32
Figure 17 — Paint scratch test apparatus	34
Table 1 — Dimensions of straight pipes, bends and fittings for single-wall flue systems	2
Table 2 — Materials for flue terminals	11
Table 3 — Flue flow rates and values of the constant <i>C</i>	13
Table 4 — Materials for ridge terminal adaptors	29
Table 5 — Dimensions of adaptors	30
Table 6 — Oven temperature	33
List of references	Inside back cover

Foreword

This British Standard has been prepared under the direction of the Gas Standards Policy Committee and supersedes BS 715:1989 which is withdrawn. This edition introduces technical changes to bring the standard up to date but it does not reflect a full review of the standard, which will be undertaken in due course. However, it includes alterations introduced by Amendment No. 1 to BS 715:1989 published in September 1990 and Amendment No. 2 to BS 715:1989 published in July 1991 and further technical changes to section 6 which has been completely revised.

Recommendations on the choice and installation of flues and terminals are contained in BS 5440-1.

BS 1289 is complementary to this standard particularly with respect to the performance requirements of terminals.

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 34, 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 the dimensional, material and performance requirements for metal flue pipes and fittings, and the material requirements for accessories for gas-fired appliances with up to 60 kW rated input and includes the specification for flue boxes to enable gas fire flues to be installed against or within a wall which does not have a fireplace or flue.

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 1179:1967 and BS 1179-6 apply together with the following.

1.2.1

accessory

any component, other than a flue gas carrying component, that is necessary for the installation of a metal flue pipe system, e.g. a bracket

1.2.2

adaptor

a fitting in the form of a socket piece for joining flue pipes and fittings of different materials, e.g. sheet metal pipes to asbestos cement pipes

1.2.3

adjustable bend

a bend that, is made in sealed rotatable segments each of which can be swivelled to provide adjustment for a designated angle

1.2.4

ceiling plate

an accessory used to face a hole in the ceiling and through which a sheet metal flue pipe and adaptor enters. It may be provided with a protecting sleeve

1.2.5

end cap

a component to close the ends of the annuals of a double wall section or bend to retain the air gap. It may also provide the means of coupling double-walled sections together

1.2.6

fitting

any flue gas carrying component other than a straight pipe of uniform bore, e.g. a bend

1.2.7

firestop

a barrier or seal of non-combustible material that is designed to prevent or retard the passage of smoke or flames around a chimney section where it passes through a wall, floor or ceiling

1.2.8

firestop and spacer

a firestop that also locates the chimney where it passes through any part, of the building structure

1.2.9

free-standing terminal

a terminal, other than a ridge terminal, designed for fitting directly to the outlet of an open flue system

1.2.10

flue disconnecting device

a fitting used in a flue system to enable connection and disconnection to be made of either the appliance or part of or all of the flue

1.2.11

flue box

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

1.2.12

joint cover clip

an accessory for covering a joint between pipes, or pipes and fittings, where a connecting piece is used

1.2.13

protecting sleeve

An accessory for providing a gap between the flue pipe and the ceiling, wood work or adjacent combustible materials

1.2.14

ridge terminal

a terminal designed for fitting at the ridge of a building

1.2.15

ridge terminal adaptor ("R"-type adaptor)

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

1.2.16

supporting bracket

an accessory for holding a pipe or fitting at a predetermined distance from a structure

1.2.17

wall plate

an accessory used to face a hole in the wall and through which a sheet metal flue pipe and adaptor enters

1.2.18

size designation

a numerical designation of the size of a unit which is a convenient round number approximately equal to the manufacturing dimension

1.2.19

declared internal diameter

the internal diameter of the inner pipe as declared by the manufacturer

Section 2. Single-wall flue system

2.1 Materials

2.1.1 General

All pipes, fittings and accessories shall be manufactured from materials which in combination will not cause bimetallic corrosion and hence adversely affect the integrity of the flue system.

2.1.2 Sheet metal

2.1.2.1 The sheet metal shall be of steel or aluminium conforming to **2.1.2.2** to **2.1.2.4** and shall be smooth and free from surface or other defects. Prior to the application of any protective coating the sheet metal shall be of a thickness of not less than 0.70 mm for steel and 1.00 mm for aluminium.

2.1.2.2 Steel sheet shall be of one of the grades specified in BS 1449-1.

2.1.2.3 Stainless steel sheet shall be of one of the following grades as specified in BS 1449-2.

304S16	316S11	317S16	320S31
315S16	316S13	317S12	320S33
	316S31		
	316S33		

2.1.2.4 Sheet aluminium shall be aluminium 1 200 of hardness not less than condition H2 in accordance with BS 1470.

2.2 Construction

2.2.1 Seams shall be mechanically strong and sound when tested in accordance with **2.7**. They may be either folded, or riveted, or welded, except for vitreous enamelled components which shall have welded seams.

2.2.2 Continuously welded seams shall not form internal or external projections that will detract from the appearance of the finished article, cause difficulty in joining pipes and fittings, or give rise to corrosion.

2.2.3 Where spot welding is used, the weld spots shall be at not more than 15 mm centres on a curved surface and not more than 20 mm centres on a flat surface.

2.2.4 Folded seams shall be sunk at a spigot end and raised at a socket end.

2.3 Dimensions

The dimensions of straight pipes, bends and fittings shall be as given in Table 1, except that for vitreous enamelled pipes, bends and fittings the tolerances given in Table 1 do not apply.

Bends shall have a minimum angle of 90° and a maximum of 135°. The length of the plain parallel portions of bends shall be not less than that given in column 5 of Table 1.

NOTE Lengths of pipes are not specified in this standard.

2.4 Finish

2.4.1 General

All pipes, fittings and accessories shall be protected against corrosion.

2.4.2 Vitreous enamelled finishes

Vitreous enamelled components shall be completely coated internally and externally. The coating shall be homogeneous and uniform in colour. All edges shall be adequately covered to minimize the possibility of subsequent corrosion. There shall not be an excess of enamel at the ends which might detract from the accuracy of the diameter.

Table 1 — Dimensions of straight pipes, bends and fittings for single-wall flue systems

1	2	3	4	5
Nominal size	Pipes and fittings without sockets and spigots	Pipes and fittings with sockets and spigots		Bends
	Internal diameter (tolerance $\begin{smallmatrix} +1 \\ -0 \end{smallmatrix}$ mm) mm	External diameter at spigot end (tolerance $\begin{smallmatrix} +0 \\ -1 \end{smallmatrix}$ mm) mm	Internal diameter at socket end (tolerance $\begin{smallmatrix} +1 \\ -0 \end{smallmatrix}$ mm) mm	Length of plain parallel portions mm
50	50	51	51	38
75	75	76	76	38
100	101	102	102	50
125	126	127	127	50
150	152	153	153	50
175	177	178	178	50
200	202	204	204	50

The vitreous enamel finish shall conform to BS 3831, where applicable, and shall be such that the internal surface is of minimum standard class A when tested as described in BS 1344-3.

2.4.3 Quality

The ends of all parts shall be smoothly finished, free from burrs, and square to their respective axis.

2.4.4 Coating performance

Coatings, other than vitreous enamel coatings, shall conform to Annex A when tested as described therein.

2.5 Marking

Each pipe, fitting, terminal and accessory shall be permanently and legibly marked with the following information.

- a) The number and date of this British Standard, i.e. BS 715:1993¹⁾.
- b) The name or distinguishing mark of the manufacturer.
- c) The direction of flow (if relevant).

2.6 Instructions

The manufacturer shall make available the following information:

- a) full installation instructions;
- b) a list of all flue pipes, fittings, terminals and accessories necessary for installation of the complete system.

2.7 Performance

2.7.1 Requirement

The measured leakage rate of air from the assembled flue pipe when tested by the method given in 2.7.2 shall not exceed 1.0 m³/h per metre length.

2.7.2 Method

Assemble two or more lengths of flue pipe to provide a nominal length of 3 m and effect an airtight seal at both flue pipe inlet and outlet. The sealing “plugs” should incorporate tapped holes for connection into an air supply.

Connect a means of delivering air at a pressure of 25 N/m² and an air flow meter in series to the sealed flue pipe, and make a separate connection from the sealed flue space to a suitable manometer, making both of these connections directly by airtight hose and fittings.

Deliver into the flue pipe at such a rate that the manometer records a steady internal pressure of 25 N/m².

Obtain the leakage rate of air from the flue pipe by measuring the rate of air flow through the meter necessary to maintain the pressure head.

¹⁾ Marking BS 715:1993 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 requirements 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.

Section 3. Double-wall flue system

3.1 Materials

3.1.1 General

The pipes, both inner and outer, and end caps shall be manufactured from materials which in combination will not cause bimetallic corrosion and hence adversely affect the integrity of the flue system.

3.1.2 Inner pipe

The inner pipe shall be either of aluminium 1 200, condition H14 as specified in BS 1470 or of stainless steel conforming to BS 1449-2, as listed in **2.1.2.3**, and shall be not less than 0.30 mm thick.

3.1.3 Outer pipe

3.1.3.1 For external and internal use the outer pipe shall be of one of the following materials.

- Aluminium 1200 conforming to BS 1470.
- Aluminium alloy 3103 or 5251 conforming to BS 1470.
- Stainless steel conforming to BS 1449-2 as listed in **2.1.2.3**.
- Aluminium/zinc alloy coated steel of grades ZA 1, ZA 2 or ZA 3 with coating GA 185 or GA 150 conforming to BS 6830.

3.1.3.2 For internal use only, the outer pipe shall be of one of the following materials.

- Hot dip zinc coated steel sheet of steel grade FePO2G with coating type Z600 as specified in BS EN 10142.
- Hot dip zinc coated steel sheet of steel grade FePO2G or FePO3G with coating type Z275 as specified in BS EN 10142.
- Aluminium coated steel, consisting of steel base conforming to the appropriate Section of BS 1449-1 with a hot dipped coating of alloy LM6 to BS 1490 of thickness not less than 13 µm.
- Roll bonded aluminium coated steel base conforming to the appropriate Section of BS 1449-1 with a minimum coating thickness of 20 µm.

3.1.4 End caps

3.1.4.1 Where exposed to the external atmosphere or to flue products, the end caps shall either be of aluminium 1200 as specified in BS 1470 or of stainless steel conforming to BS 1449-2 as listed in **2.1.2.3**.

3.1.4.2 Where the design is such that the end caps are not exposed to the external atmosphere or flue products, the end caps shall be of one of the materials listed in **3.1.3**.

3.1.4.3 Where the design is such that end caps are exposed to the external atmosphere but not to the flue products, the end caps shall be one of the materials specified in **3.1.3.1**.

3.2 Construction

3.2.1 Seams and joints for straight pipes

The two pipes shall each have either continuous welded or folded seams which are sound and mechanically strong throughout their length. They shall be welded, spun crimped or riveted together, if necessary through the medium of end caps, to retain the air gap between the two pipes.

The spigot and socket ends and end caps shall have a minimum overlap of 25 mm. Means shall be provided for locking the ends together.

NOTE One method of locking is by a twist lock action.

3.2.2 Adjustable bends and lengths

3.2.2.1 Adjustable lengths

The inner pipe shall conform to **3.2.1**; the outer pipe shall be of an overlapped or riveted construction. A means of clamping or fixing of the adjusted length shall be provided.

3.2.2.2 Adjustable bends

Bends shall be made in segments and the inner of each bend shall, to minimize resistance, consist of a minimum of three such segments and may be of an overlapped or riveted construction.

3.2.2.3 Ease of assembly

Each pipe or fitting shall be so designed that assembly can be made without alteration or the use of cutting tools.

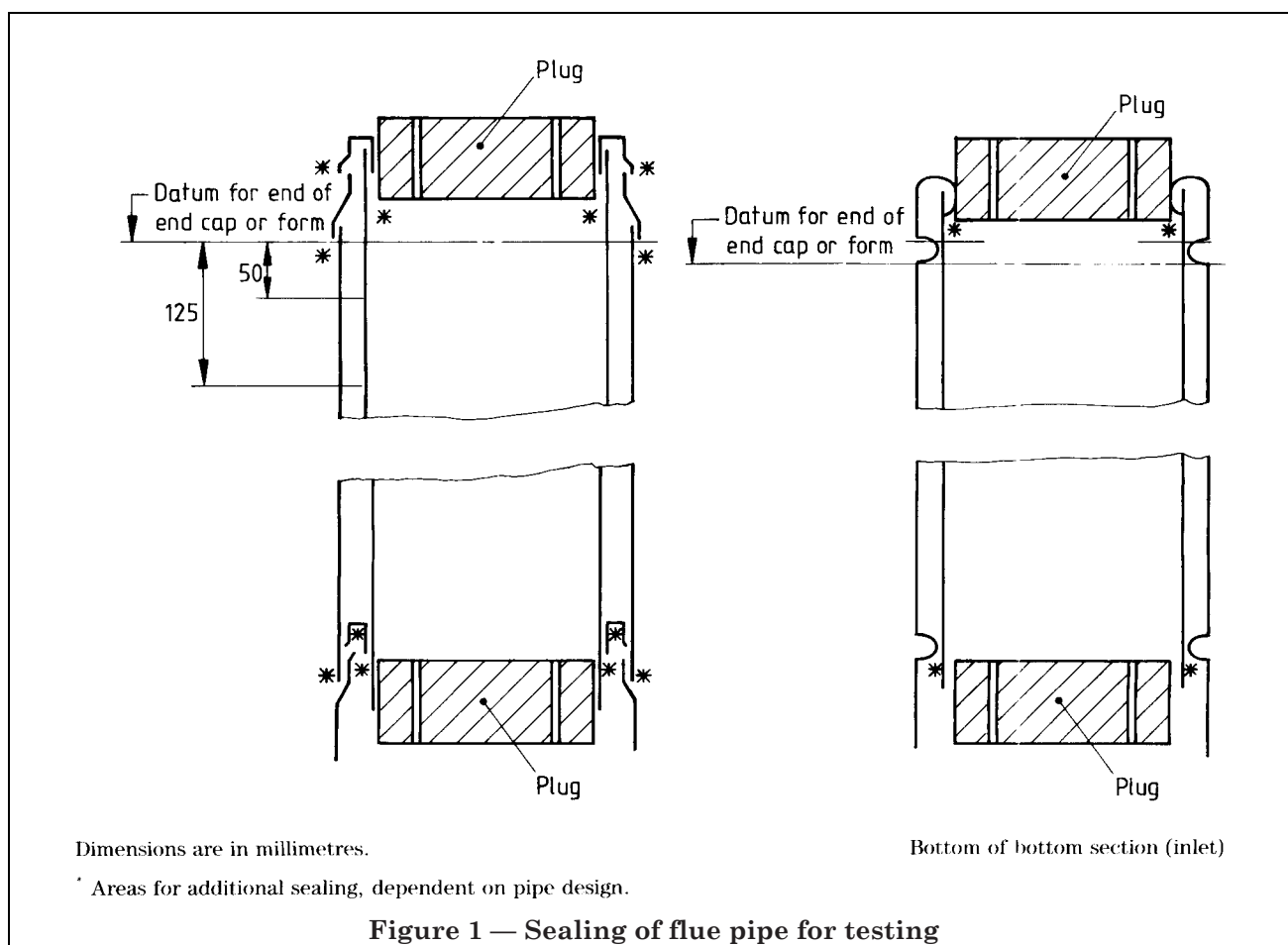
3.3 Dimensions

3.3.1 Circular cross section

3.3.1.1 Requirements

The inner pipe shall have a size designation of 50, 75, 100, 125, 150, 175 or 200 mm. The manufacturer shall declare an internal diameter within the ranges specified in the following.

Size designation	Declared internal diameter range
mm	mm
50	50 to 55
75	75 to 80
100	100 to 105
125	125 to 130
150	150 to 155
175	175 to 180
200	200 to 205



The bore shall be substantially circular to the extent that any measured internal diameter shall be within $\pm 2\%$ of the manufacturer's declared internal diameter, not including localized forming such as crimping or swaging.

The ends of pipes or fittings shall be substantially circular to the extent that there shall be not more than 4% variation in the measured values obtained of any diameter of the connecting ends.

The mean annular airspace between the inner pipe and the outer pipe shall be not less than 6 mm and no one measurement shall be less than 5 mm when tested as described in 3.3.1.2.

The length of contact between the inner and the outer pipes at the spigot and socket ends shall not exceed 25 mm over the pipe circumference.

3.3.1.2 Method

Mark five equidistant vertical lines on the outside of the outer pipe. The pipe seam should be central between two of the lines.

Mark a horizontal line 50 mm beyond the end of the end cap or form, and a second horizontal line 125 mm beyond the end cap or form, at each end of the pipe (see Figure 1).

Take measurements from the outside of the outer pipe to the inside of the inner pipe at the 20 points of intersection of the marked lines. Designate these measurements as A .

Determine the mean thickness of the flue lining B and of the outer casing C .

Calculate the annular airspace as follows.

$$\text{Annular airspace} = A - (B + C)$$

NOTE Long leg calipers with mounted dial gauge calibrated to 0.01 mm and a deep throat micrometer calibrated to 0.01 mm are required.

3.3.2 Non-circular cross section

The inner pipe shall have a cross-sectional area within $\pm 4\%$ of that of a pipe of diameter equal to its size designation.

The mean annular airspace between the inner pipe and the outer pipe shall be not less than 6 mm and no one measurement shall be less than 5 mm.

The aspect ratio of the cross section of the bore of the inner pipe shall be not greater than 3 to 1 and no bore dimension shall be less than 63 mm.

3.4 Finish

The finish of the flue system shall conform to 2.4.

3.5 Marking

Each pipe, fitting, terminal and accessory shall be marked with the information listed in 2.5.

3.6 Instructions

The manufacturer shall make available the following:

- a) full installation instructions;
- b) a list of all flue pipes, fittings, terminals and accessories necessary for installation of the complete system.

3.7 Performance

3.7.1 Leak testing of flue pipe and joints

3.7.1.1 Requirement

The measured leakage rate of air from the assembled flue pipe when tested by the method given in 3.7.1.2 shall not exceed 1.0 m³/h per metre length.

3.7.1.2 Method

Assemble two or more lengths of flue pipe to provide a nominal length of 3 m and effect an airtight seal at both flue pipe inlet and outlet between inner pipe and atmosphere and between inner and outer pipes. Use sealing plugs that incorporate tapped holes for connection to an air supply, and, where necessary, other sealing means (see Figure 1).

Connect a means of delivering air at a pressure of 25 N/m² and an air flow meter in series to the sealed flue pipe, and make a separate connection from the sealed flue space to a suitable manometer. Make both of these connections directly by airtight hose and fittings.

Deliver air into the test flue pipe at such a rate that the manometer records a steady pressure of 25 N/m² inside test flue pipes.

Obtain the leakage rate of air from the flue pipes by measuring the rate of air flow through the meter necessary to maintain the pressure head.

3.7.2 Leak testing of bends

3.7.2.1 Requirement

The measured leakage rate of air from a bend at the maximum angle of adjustment as nominated by the manufacturer, when tested by the method given in 3.7.2.2, shall not exceed 2.0 m³/h.

3.7.2.2 Method

Effect an airtight seal at each end of the bend, introduce air and measure the leak rate as in 3.7.1.2.

3.7.3 Leak testing of adjustable flue pipes

3.7.3.1 Requirement

The measured leakage rate of air from an adjustable flue pipe, in any position of adjustment when tested by the method given in 3.7.3.2, shall not exceed 1.0 m³/h per metre length.

3.7.3.2 Method

Join the adjustable flue pipe to a piece of pipe to obtain a minimum test length of 1 m. Effect an airtight seal at both open ends of the joined pipe, introduce air and measure the leak rate as in 3.7.1.2.

3.7.4 Strength tests

NOTE The tests given in 3.7.4.1 and 3.7.4.2 are intended to evaluate the resistance of the liner to the deformation to which it may be subjected on a building site.

3.7.4.1 Resistance to crushing

3.7.4.1.1 Requirements

When each of two pipes is tested as described in 3.7.4.1.2, the diameter of the inner pipe at the point where the load was applied shall be not less than 75 % of its nominal diameter, it shall be possible to refit both ends of each pipe to each other in the normal way as recommended by the manufacturer and the two pipes assembled together shall conform to 3.7.1.1.

3.7.4.1.2 Method

Subject two flue pipes of 125 mm nominal size and 1 m nominal length individually to a crushing load which increases gradually, from zero to 640 N, over a period of between 15 s to 60 s. Apply the load along a line perpendicular to the pipe axis in turn to each end and at the centre by means of the typical apparatus shown in Figure 2. The applied load shall remain for a period of 5 s to 10 s.

3.7.4.2 Tensile test

On completion of the tests specified in 3.7.4.1, the two pipes while still assembled together shall, on being subjected to a tensile force equivalent to the mass of a 30 m length of 125 mm nominal size pipe, show no evidence of separation and the assembly shall then conform to 3.7.1.1.

