
British Standard

Factory-made chimneys

Part 1. Methods of test

Cheminées fabriquées en usine
Partie 1. Méthodes d'essai

Fertigsschornsteine
Teil 1. Prüfverfahren

Foreword

This Part of BS 4543 has been prepared under the direction of the Building Services Standards Committee, and deals with factory-made chimneys intended for dry construction and for application within a dwelling, with a terminal assembly designed for exposure to the external environment.

This part of BS 4543 describes methods of test for factory-made chimneys to be installed in accordance with BS 6461 : Part 2* and should be read in conjunction with Parts 2 and 3* of this standard. It supersedes BS 4543 : Part 1 : 1976 which is now withdrawn.

In this revision the temperature of the high temperature thermal shock test has been increased from 930 °C to 1100 °C. The thermal test cycle has been considerably modified, to enable the thermal performance of the chimney to be tested, before and after the high temperature thermal shock test. A number of new tests have been added including a check for distortion during testing, an additional high temperature thermal shock test to enable chimneys with bends to be tested, and a moisture test.

The criteria recommended in Part 2 of this standard are developed around factory-made chimneys with stainless steel internal and metal external surfaces, with a flue of circular cross section, intended for use with appliances burning solid fuel with a rated output of up to 45 kW.

Part 3* of this standard specifies requirements for chimney sections intended for use with appliances burning oil.

Factory-made chimneys with non-metallic linings are not covered by this revision and will be considered at a later date.

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

* Revisions of BS 4543 : Part 3 and BS 6461 : Part 2 are in preparation.

Amendment No. 1
published and effective from 15 September 1994
to BS 4543 : Part 1 : 1990

Factory-made chimneys
Part 1. Methods of test

Revised text

Clause 3.1.3

Delete the existing text and substitute the following.

‘3.1.3 The test structure shall be erected within a ventilated space not subject to draughts greater than 0.25 m/s, measured within 150 mm of any boundary of the structure adjacent to zone B or zone C.

NOTE. The boundary is as shown by the dotted lines in figure 1.

The chimney shall exhaust into the same space or into a space freely communicating with that from which the combustion air is taken and the products of combustion removed. Where mechanical ventilation means are used extraction shall be at a rate to remove the total volume of combustion products and shall produce a draught of not more than 0.1, mm water gauge within the chimney at ambient temperature.’

AMD 8379/September 1994

Clause 3.2.3

In the last paragraph, line 3, delete ‘to ensure’ and substitute ‘assess for’.

AMD 8379/September 1994

Table 1. Flue gas generator inputs

Delete the temperature values given in the headings to columns 3 to 6 and substitute the following.

440	530	750	1080
+ 20 °C	+ 20 °C	+ 20 °C	+ 40 °C
0	0	0	0

AMD 8379/September 1994

Clause 9.1 Procedure A

In paragraph 1, line 3, delete ‘column 4’. Also in line 3, delete ‘+ 10 %’ and substitute ‘+ 5 %’.

AMD 8379/September 1994

Clause 9.3 Procedure B

In line 3, delete 'column 5'.

In line 4, delete $\pm 10\%$ and substitute '+ 5 %'.

In line 6, delete '5 min' and substitute '10 min'.

AMD 8379/September 1994

Clause 10.1.1

In paragraph 1, line 4, delete 'column 6'.

In line 5, after '+ 15 %' insert the following:

',' plus a maximum overfire input of the generator of not more than + 50 % of the value given in column 6,'.

In line 7, delete '10 min' and substitute ' 10_{-1}^{+2} min'.

AMD 8379/September 1994

Clause 12.2.2

In paragraph 2, line 2, delete ' 4 ± 0.5 h' and substitute '4 h and not more than 24 h'.

AMD 8379/September 1994

Contents

	Page
Foreword	Inside front cover
Committees responsible	Back cover
Methods	
1 Scope	2
2 Definitions	2
3 Test structure and temperature measurement procedure	2
4 Measurement of internal diameter and length	5
5 Chimney support test	5
6 Leakage test	5
7 Regularity of the internal diameter test	5
8 Draught test	5
9 Thermal performance test	6
10 High temperature thermal shock test	6
11 Strength test (pendulum impact test)	6
12 Moisture test	7
13 Bend test	7
Tables	
1 Flue gas generator inputs	6
2 Length of pendulum	6
Figures	
1 Test structure for straight enclosed chimney showing ambient temperature, flue gas temperature and draught measurement positions	8
2 Section through joist area of test structure showing typical fire-stop and spacers	9
3 Joist assembly and thermocouple locations	10
4 Flue gas generator	11
5 Section through thermocouple, support bracket and flue pipe connector	12
6 Typical test structure for testing bends	13
7 Internal diameter measuring disc and suspension	14
8 Strength test arrangement	15
9 Spray apparatus	16

Methods

1 Scope

This Part of BS 4543 describes methods of test for factory-made chimneys with metal internal and external surfaces, having a flue of circular cross-section, which are supplied in component form needing assembly only and no site fabrication. They are intended for use with appliances burning solid fuel, gas or oil, having a rated output up to 45 kW.

These chimneys are suitable for internal applications with the exception of terminal assembly exposed to external environment (see 3.2.1 of BS 4543 : Part 2 : 1988), and they are intended to provide a vertical chimney (apart from bends producing one offset) for conveying flue gases from a domestic appliance to the open air, when installed in accordance with BS 6461 : Part 2*.

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

2 Definitions

For the purpose of this Part of BS 4543 the following definitions apply.

- 2.1 appliance.** A heat producing unit which requires products of combustion to be vented to the atmosphere.
- 2.2 factory-made chimney.** The complete assembly of all the essential chimney sections, chimney fittings and accessories necessary to form a structurally sound flue to convey the products of combustion to the external atmosphere.
- 2.3 chimney bend.** A flue gas carrying component that provides for a change in direction, constructed to behave in a similar manner to the chimney section to which it is attached, in both gas flow capability and thermal performance.
- 2.4 chimney connector.** An accessory which connects an appliance or flue pipe to the chimney. It may be manufactured as part of the support assembly.
- 2.5 chimney fitting.** Any flue gas carrying component other than a chimney section, e.g. terminal or bend.
- 2.6 chimney section.** A straight flue gas carrying component of uniform bore (except for any swage, socket or spigot) comprising flue lining, insulation section and outer casing.
- 2.7 chimney support.** An accessory designed to support the load of the chimney.
- 2.8 accessories.** Elements other than chimney sections or fittings which do not perform the function of conveying flue gases, e.g. locking bands, brackets.
- 2.9 end-cap.** A component used to close the ends of the annulus of a chimney section which prevents ingress of moisture. The same accessory may be used to couple chimney sections together.
- 2.10 fire-stop.** A barrier of non-combustible material which is designed to prevent or retard the passage of smoke or flame where the chimney section passes through a wall, floor or ceiling.
- 2.11 fire-stop and spacer.** A fire-stop which also locates the chimney where it passes through any part of the building structure.
- NOTE. Both fire-stop and spacer may incorporate a joist shield arrangement and may be so constructed as to prevent access of combustible materials within the recommended clearance from the chimney.
- 2.12 flue.** A passage for conveying the products of combustion to the open air.
- 2.13 flue lining.** The part of the chimney in direct contact with the flue gases.
- 2.14 locking band.** An accessory placed externally over the joint between chimney sections to lock and reinforce the joint.
- 2.15 solid fuel.** Fuel in solid form.
- 2.16 terminal.** A prefabricated chimney fitting which connects to the outlet end of the chimney and is designed to prevent ingress of moisture into the insulating annulus of the chimney section.
- 2.17 declared length.** The length of a chimney section measured when jointed with other chimney sections between identical reference points on adjacent assembled sections, as declared by the manufacturer.
- 2.18 declared internal diameter.** The internal diameter of the flue lining excluding forming, as declared by the manufacturer.
- 2.19 intermediate support assembly.** A fitting designed to support the chimney sections.
- 2.20 terminal assembly.** Those parts of the chimney exposed to the external environment.

3 Test structure and temperature measurement procedure

3.1 Test structure for straight chimney

3.1.1 The test structure for a straight chimney shall be as shown in figure 1 and shall incorporate at least one of the longest and one of the shortest sections in any one manufacturer's range, providing a minimum of three joints within zone B, with one of the longest sections forming the first section of the test assembly. It shall be installed in accordance with the manufacturer's instructions and shall include a terminal assembly. There shall be at least one joint between chimney sections in zone D exposed to the external environment.

* A revision of BS 6461 : Part 2 is in preparation.