

BS 8303:2018



BSI Standards Publication

Installation of domestic heating and cooking appliances burning wood and solid mineral fuels – Specification

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Contents

	Page
Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Information and requirements to be agreed and documented	3
4.1 Information to be obtained by the installer	3
4.2 Checks before commencing work	3
4.3 Items for agreement	4
4.4 Appliance technical specifications and installation instructions	4
5 Appliance classification	4
6 General	5
6.1 Mechanical resistance and stability	5
<i>Figure 1 — Typical flue pipe entry to existing masonry chimney</i>	6
6.2 Safety in case of fire	6
6.3 Air supply and connection to chimney	7
<i>Table 1 — Air supply to solid fuel appliances</i>	7
6.4 Safety in use	10
<i>Table 2 — Minimum flue size</i>	11
6.5 Protection against noise	11
6.6 Energy economy and heat retention	12
7 Checking, handling and site storage of materials and components	12
7.1 Checking	12
7.2 Handling on site	13
7.3 Site storage	13
8 Coordination of work and installation preparation	13
9 Fireplace recess	14
<i>Figure 2 — Dimensions of a masonry-built fireplace recess</i>	15
<i>Figure 3 — Construction of a fireplace recess (traditional brick construction)</i>	16
10 Hearths	16
10.1 General	16
10.2 Constructional hearth	17
<i>Figure 4 — Dimensions of a constructional hearth</i>	17
<i>Figure 5 — Distance of an appliance from combustible material</i>	18
<i>Figure 6 — Clearance between appliance and adjacent walls</i>	19
<i>Table 3 — Clearance between appliance and adjacent walls</i>	19
<i>Figure 7 — Example of parallel installation with shielding of combustible wall</i>	21
<i>Figure 8 — Example of angled installation with shielding of combustible wall (plan view)</i>	22
10.3 Superimposed hearth	22
<i>Figure 9 — Positioning of appliance on a hearth (plan views)</i>	23
10.4 Hearth for appliance placed or built into a raised fireplace recess	24
<i>Figure 10 — Hearth for appliance placed or built into a raised fireplace recess</i>	26
<i>Table 4 — Dimensions for superimposed hearth below appliance on raised hearth</i>	27
11 Connecting flue pipes	27
11.1 General	27
<i>Figure 11 — Pipe or adaptor to flue</i>	27
11.2 Size	27
11.3 Material	28
11.4 Installation	28

<i>Figure 12 — Vertical exit connection</i>	29
<i>Figure 13 — Horizontal exit connection</i>	30
11.5 Cleaning	30
11.6 Separation from combustibile material	30
<i>Figure 14 — Separation from combustibile material</i>	31
11.7 Joints	31
12 Chimney and flue pipe cleaning	31
12.1 General	31
12.2 Soot door	32
<i>Figure 15 — Typical installation of a free-standing cooker or independent boiler in a recess with a raft lintel</i>	32
<i>Figure 16 — Typical installation of a free-standing cooker or independent boiler in an existing recess with metal register plate</i>	33
12.3 Sweeping access in connecting flue pipe	33
12.4 Separation from combustibile material	33
<i>Figure 17 — Typical free-standing rear outlet room heater fitted in a recess</i>	34
<i>Figure 18 — Typical connection of a vertical outlet free-standing cooker or independent boiler to a chimney</i>	35
13 Methods of closure at the top of a fireplace recess	35
13.1 Types and applications	35
13.2 Materials for closures at the top of a fireplace recess	35
<i>Figure 19 — Flue pipe connection to raft lintel</i>	37
13.3 Installation of closures at the top of a fireplace recess	37
<i>Figure 20 — Securing of connecting flue pipe into register plate using clamping ring</i>	39
<i>Figure 21 — Securing of connecting flue pipe into register plate using funnel adaptor</i>	40
14 Fireback	41
14.1 General	41
14.2 Dimensions	41
14.3 Infill	41
<i>Figure 22 — Typical setting for inset open fire without a boiler</i>	42
<i>Figure 23 — Typical installation of inset open fire with a boiler unit</i>	43
<i>Figure 24 — Typical installation of a sunken ash pit inset open fire with underfloor air supply</i>	44
<i>Figure 25 — Typical setting for inset open fire with convection, without boiler, installed into a BS 1251 fireback</i>	45
<i>Table 5 — Composition proportion for in-fill</i>	46
15 Fireplace surround	46
15.1 General	46
15.2 Mechanical fixing arrangements for fireplace surrounds	46
<i>Figure 26 — Typical fixing brackets for cut stone surrounds</i>	46
<i>Figure 27 — Typical fixing locations for cut stone surrounds</i>	48
16 Throat	48
17 Boiler	49
18 Electrical supply	49
19 Open fires without convection	49
19.1 General	49
19.2 Inset open fire without boiler (see Figure 22)	49
19.3 Inset open fire with boiler (see Figure 23)	49
19.4 Inset open fire with underfloor air supply (see Figure 24)	49
<i>Figure 28 — Provision of permanent air vent openings in a solid floor</i>	50
19.5 Inset open fire with fan-assisted air supply	51

20	Open fires with convection	51
20.1	General	51
20.2	Free-standing open fires	51
	<i>Figure 29 — Construction of a fireplace recess (with a raft lintel)</i>	52
	<i>Figure 30 — Construction of a fireplace recess with corbelled gather applicable to a typical installation of inset open fires and room heaters</i>	53
	<i>Figure 31 — Typical open fire with convection fitted in a fireplace recess</i>	54
20.3	Inset open fire with convection, with or without boiler	54
	<i>Figure 32 — Inset convector open fire</i>	55
	<i>Figure 33 — Typical fitting of an open fire with convection to a back register plate</i>	56
	<i>Figure 34 — Typical fitting and sealing of a free-standing room heater to a back register plate</i>	56
21	Room heaters	57
21.1	General	57
21.2	Free-standing appliance in a fireplace recess	57
	<i>Figure 35 — Typical free-standing room heater fitted in a recess</i>	58
21.3	Inset appliance in a fireplace recess	58
	<i>Figure 36 — Typical fitting of a closed inset appliance to a masonry/clay lined chimney</i>	59
	<i>Figure 37 — Typical fitting of a closed inset appliance to a flexible stainless steel relined chimney</i>	60
21.4	Inset (with or without boiler) installed in a free-inset fireplace surround	61
	<i>Figure 38 — Typical free inset application of room heater installation</i>	62
22	Independent boilers and free-standing cookers	62
22.1	General	62
22.2	Appliance installed against a wall	63
22.3	Appliance installed in a fireplace recess	63
23	Making good	63
24	Carbon monoxide alarm	64
25	Commissioning of the installation	64
25.1	Inspection	64
25.2	Testing	65
26	Handover	65
Annex A	(informative) Checklist for specifying purchaser's requirements	66
	<i>Figure A.1 — Checklist for specifying purchaser's requirements</i>	66
Annex B	(informative) Selection of appliances	70
Annex C	(informative) Assessing air permeability	70
Annex D	(normative) Methods of checking flues and installations	71
Annex E	(informative) Specifications of tested external air supply appliances	78
Annex F	(informative) Risk assessment of external air supply appliances	79
Annex G	(informative) Commissioning checklist	81
	<i>Table G.1 — Commissioning checklist: General</i>	81
	<i>Table G.2 — Commissioning checklist: Chimney details</i>	82
	<i>Table G.3 — Commissioning checklist: Hearth details</i>	84
	<i>Table G.4 — Commissioning checklist: Appliance details</i>	84
	<i>Table G.5 — Commissioning checklist: Ventilation details</i>	85
	<i>Table G.6 — Commissioning checklist: Fuel storage details</i>	86
	<i>Table G.7 — Commissioning checklist: Provision for maintenance</i>	86
	<i>Table G.8 — Commissioning checklist: Smoke tests</i>	87
	Bibliography	88

Summary of pages

This document comprises a front cover, and inside front cover, pages i to vi, pages 1 to 88, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 October 2018. It was prepared by Technical Committee RHE/28, *Domestic solid mineral fuel appliances*. A list of organizations represented on this committee can be obtained on request to its secretary.

RHE/28 gratefully acknowledges the personal contributions of the late Christian Pedersen to the drafting of this and previous editions of BS 8303.

Supersession

This British Standard supersedes [BS 8303-1:1994](#), [BS 8303-2:1994](#) and [BS 8303-3:1994](#), which are withdrawn.

Information about this document

BS 8303 does not cover the design or installation of hot water heating systems or hot water supply systems. However, where the appliance involves hot water services, attention is drawn to BS EN 12828, BS EN 12831 and BS EN 14336.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

The drawings in [Figure 1](#) to [Figure 38](#) are not to scale.

Contractual and legal considerations

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 cannot confer immunity from legal obligations.

In particular, attention is drawn to the following legislation and the need to comply with the conditions of any planning permission:

- The Building Regulations 2010 (England and Wales) (as amended) [\[1\]](#);
- The Building (Scotland) Regulations 2004 (as amended) [\[2\]](#);
- The Building Regulations (Northern Ireland) 2012 (as amended) [\[3\]](#);
- The Clean Air Act 1956 [\[4\]](#).

1 Scope

This British Standard specifies requirements for the design and installation of the following types of domestic heating and cooking appliances, rated up to 50 kW, burning wood, woody biomass and solid fuels in both new and existing buildings (see [Clause 6](#)):

- a) open fires;
- b) room heaters;
- c) free-standing cookers; and
- d) independent boilers.

The standard also specifies the procedures to be followed for on-site testing of the installations.

NOTE Where manufacturers' installation instructions are more onerous and give a higher level of safety, these take precedence over the requirements of this British Standard.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions 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.

Standards publications

[BS 1251](#), *Open-fireplace components*

[BS 1252](#), *Specification for domestic solid mineral fuel-fired, free-standing cookers with or without boilers*¹

[BS 3376](#), *Specification for open fires burning solid mineral fuels with convection, with or without boilers*

[BS 4834](#), *Specification for inset open fires without convection with or without boilers, burning solid mineral fuels*

[BS 7671](#), *Requirements for Electrical Installations — IET Wiring Regulations*

[BS 8423](#), *Fireguards for fires and heating appliances for domestic use — Specification*

BS EN 303-5, *Heating boilers — Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW — Terminology, requirements, testing and marking*

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

BS EN 12809, *Residential independent boilers fired by solid fuel — Nominal heat output up to 50 kW — Requirements and test methods*

BS EN 12815, *Residential cookers fired by solid fuel — Requirements and test methods*

BS EN 13229, *Inset appliances including open fires fired by solid fuels — Requirements and test methods*²

BS EN 13240, *Roomheaters fired by solid fuel — Requirements and test methods*

BS EN 15250, *Slow heat release appliances fired by solid fuel — Requirements and test methods*

BS EN 15287-1, *Chimneys — Design, installation and commissioning of chimneys — Part 1: Chimneys for non-roomsealed heating appliances*

¹ Withdrawn

² This document gives an informative reference to BS EN 13229:2001+A2:2004.

BS EN 50291-1, *Electrical apparatus for the detection of carbon monoxide in domestic premises – Part 1: Test methods and performance requirements*³

Other publications

[N1] DEPARTMENT FOR COMMUNITIES AND LOCAL GOVERNMENT. *Domestic Building Services Compliance Guide*. Newcastle Upon Tyne: NBS, RIBA Enterprises Ltd., 2013.

[N2] DEPARTMENT FOR COMMUNITIES AND LOCAL GOVERNMENT. *Building Regulations 2010 Approved Document J, Combustion appliances and fuel storage systems 2010, incorporating 2010 and 2013 amendments*. Newcastle Upon Tyne: NBS, RIBA Enterprises Ltd., 2016.

3 Terms and definitions

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

3.1 competent person

person registered with a competent person scheme operator, who has been assessed by the scheme operator to be technically competent in the installation of solid fuel appliances and is able to self-certify their installations, which are then notified to the local authority via the scheme operator

NOTE The competent person may be registered to carry out only certain types of solid fuel installation work, such as dry stove installations or stoves with boilers. It is necessary to check whether the competent person is registered for the type of work being carried out.

3.2 connecting flue pipe

component(s) that conveys the flue gases from the flue outlet of the appliance to the the start of the flue in the chimney system

3.3 dedicated external air supply (DEAS) appliance

appliance that takes some or all of the combustion air from outside the building via an air supply duct

NOTE Such an appliance either:

- a) takes part of the combustion air from outside and part from within the room; or
- b) takes all of the combustion air through a duct fed from outside the dwelling.

3.4 Plate

3.4.1 closure plate

plate used to close the bottom of a masonry chimney that includes a metal flue liner and prevents debris falling from the void between the flue liner and masonry structure

NOTE A closure plate is used where an appliance is to be installed into an existing recess and the flue is to be modified, such as by installing a flexible or other liner that is connected directly to the appliance connecting flue pipe. This means that the products of combustion, such as flue gases and soot, cannot come into contact with the closure plate.

3.4.2 register plate

corrosion-resistant metal plate used to close the bottom of a masonry chimney and provide connection to the connecting flue pipe

NOTE A register plate is used where an appliance is to be installed in an existing fireplace recess and the flue is to be used in its current state with no additional liner being installed. This means that the products of combustion, such as flue gasses and soot, can come into contact with the register plate.

³ This document gives an informative reference to BS EN 50291-1:2018.

3.5 raft lintel

lintel that supports the structure of the chimney breast above a builder's opening and includes provision for the flue

NOTE A raft lintel is normally used where a new appliance recess is being formed and there is a need to provide some structural strength to support the chimney breast or masonry chimney construction above. A raft lintel might also be present in an old chimney that has not been lined.

4 Information and requirements to be agreed and documented

COMMENTARY ON CLAUSE 4

Annex A includes an example of a checklist (Figure A.1) that can be used to document the information specified in this clause.

4.1 Information to be obtained by the installer

The following information about the appliance to be installed shall be obtained and taken into account by the installer:

- a) type (e.g. open fire, room heater, independent boiler, cooker) and make/model (where appropriate) of the appliance selected and overall heat services required;

COMMENTARY ON 4.1a)

Further information on the selection of appliances is given in Annex B.

In some cases the purchaser can request an appliance with an output greater than required for the room with the intention that the door(s) from the room is left open to allow the heat to spread to other parts of the property. This approach is often favoured as a means to provide supplementary heating from a renewable carbon neutral fuel, such as wood. However, the purchaser and user need to be advised of the implications of this and the need to avoid running the appliance in slumber mode, which could create nuisance smoke and flue blockage, and affect local air quality.

- b) details of building structure, including materials of construction;
- c) location and materials of construction of the fireplace recess or wall where the appliance is to be positioned;
- d) hearth, including size and material of construction and any decorative finish;
- e) environmental conditions particular to the area, e.g. topography;
- f) hot water boiler with hot water heating or supply system, if required;
- g) electrical supply, if required;
- h) fuel type (wood log, wood chip, wood pellet, mineral fuel);
- i) type, size and location of fuel storage, if required; and
- j) other accessories, if required, e.g. fireguard.

4.2 Checks before commencing work

The following shall be checked before commencing work:

- a) the manufacturer's installation and operating instructions are available on site;
- b) the appliance, materials and components are clean, undamaged and dry;
- c) sufficient quantities of all components are available to complete the installation, including those not supplied by the appliance manufacturer; and

- d) the chimney to which the appliance is to be fitted is in good condition and suitable for use with the appliance, and if any remedial work or installation of a flue liner is required, this is done before installation of the appliance.

4.3 Items for agreement

The following items to be agreed between the contracting parties shall be fully documented:

- a) exact siting of the appliance, including:
 - 1) special dimensional or constructional requirements for the appliance location, the fireplace recess, and the fireplace surround or wall where the appliance is to be positioned;
 - 2) access for the installation and maintenance of pipework and/or warm air ductwork and chimney;
 - 3) position, size and type of chimney, and access for inspection, sweeping and testing as necessary;
 - 4) position and type of ventilators necessary to ensure adequate provision of air for combustion and ventilation (see 6.3); and
 - 5) position and type of carbon monoxide alarm;
- b) whether the installation is to be notified to the local authority through:
 - 1) a registered competent installer; or
 - 2) a building control notice;
- c) whether the installation requires planning permission, if it involves the installation of a new or replacement chimney, and who is responsible for checking this and obtaining planning permission if it is required; and
- d) the provisions to be made by the purchaser and/or installer to protect floor coverings, doorways, furnishings and walls that might be affected when carrying out the installation and/or removing an old appliance and associated components from the dwelling.

4.4 Appliance technical specifications and installation instructions

The installer shall obtain and consult the appliance manufacturer's technical specifications and installation instructions before commencing any work.

5 Appliance classification

The appliances covered by this British Standard shall be categorized as follows:

- a) open fires;
- b) room heaters;
- c) free-standing cookers;
- d) independent boilers; and
- e) slow heat release stoves conforming to BS EN 15250.

NOTE These appliances are different from traditional steel or cast iron free-standing appliances as they incorporate the use of dense material that absorbs heat and releases it slowly over a long period of time into the dwelling. Recognizing that they operate and provide heat in a different way to traditional appliances they are covered by and tested to a separate standard than BS EN 15250.

Appliances within these five main categories shall be further categorized for installation purposes as follows:

- 1) free-standing appliance: an appliance designed to operate anywhere within a building where a chimney can be provided; and
- 2) inset appliance: an appliance, usually an open fire or a room heater, that is designed to be built into and operate within a fireplace recess (see [6.4.2](#) and [Clause 9](#)).

6 General

6.1 Mechanical resistance and stability

6.1.1 Materials

6.1.1.1 Only materials whose mechanical resistance and stability are not adversely affected when subjected to the heat expected during normal use shall be used in the installation.

6.1.1.2 The designer shall specify the use of durable materials conforming to relevant British Standards or British Board of Agreement Certificate, or products bearing a CE mark as defined in the EU Construction Products Regulation [5], for the installation.

NOTE This includes the requirement for an economically reasonable working life subject to normal maintenance and foreseeable operating criteria.

6.1.1.3 Delivery tickets and certificates shall be checked against the design specification, and the condition of the appliance, materials and components received shall be examined. If any item is damaged, or is not as specified, advice shall be obtained from the supplier.

6.1.1.4 Where it is necessary to construct a new fireplace recess, the designer shall ensure there is an adequate foundation for it and the chimney serving it before work is carried out.

6.1.1.5 The design of the fireplace recess (see [Clause 9](#)) shall be such that the chimney is adequately supported by the fireplace recess, where appropriate by the use of load-bearing lintels or corbelling of coursed masonry.

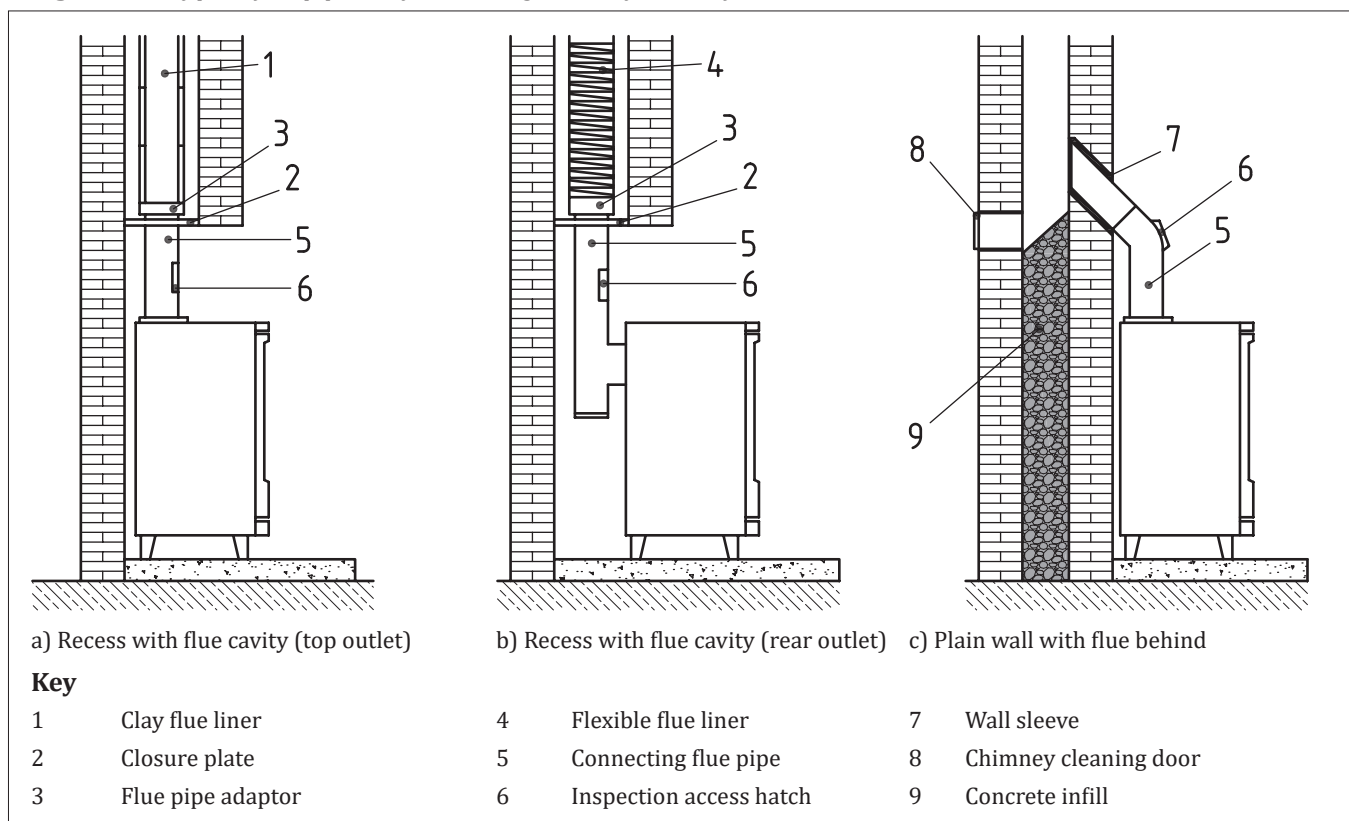
6.1.1.6 Where it is necessary to construct a new chimney, it shall be designed, installed and commissioned in accordance with BS EN 15287-1.

6.1.1.7 A chimney not serving a fireplace recess shall be constructed with an adequate foundation and structural support where appropriate, so that no part of the chimney is supported by the appliance, unless the appliance manufacturer design permits this.

COMMENTARY ON 6.1.1

Where a free-standing appliance is to be installed without the use of a fireplace recess no part of the chimney or flue system should be supported by the appliance. This is necessary so that the appliance can be removed if necessary without major disturbance to the chimney or flue system and to avoid damage being caused by the additional weight of the chimney on the appliance.

Masonry chimneys and chimney block systems can be built up from ground level or by using a fireplace recess or part of the wall structure of the building. A factory-made, insulated metal flue system might provide an alternative method of providing a chimney. The connection between the appliance and the chimney or flue system is achieved via a connecting flue pipe entry, either vertically from underneath, as shown in [Figure 1a](#)) and [Figure 1b](#)), or into an opening in the side of the flue, as shown in [Figure 1c](#)). A factory-made metal flue system is commonly supported on ceiling joists or support brackets according to the system manufacturer's specification. In this case care should be taken that the length of flue system below the lowest support is correctly secured to the section above it and not allowed to rest on the appliance or any connecting flue pipe.

Figure 1 — Typical flue pipe entry to existing masonry chimney

6.1.2 Fixing

The appliance manufacturer's instructions for securing the appliance shall be followed where specified, in order to prevent movement during normal use which could cause joint separation and leakage to occur between the appliance and the flue such as to impair the ability of the chimney to evacuate products of combustion safely to the outside atmosphere.

COMMENTARY ON 6.1.2

The installation instructions indicate how the appliance is secured to prevent movement which could cause joint separation at the flue pipe or chimney connection, and for open fires, at the hearth and fire surround. Joint separation could result in leakage of air into the flue or allow combustion products to escape into the building.

Securing the appliance is particularly important where it relies on a seal between the appliance and the fireplace recess to provide connection to the flue and to prevent any leakage. Movement of the appliance can occur for a variety of reasons such as vigorous operation of the de-ashing mechanism or thermal expansion and contraction.

6.2 Safety in case of fire

The materials used in the installation of the appliance shall be non-combustible in order to limit the spread of fire to other rooms.

NOTE The term "non-combustible" used here and elsewhere means that the materials do not flame or cause temperature rises to adjacent materials or appliances when tested in accordance with [BS 476-4](#).

6.3 Air supply and connection to chimney

6.3.1 Air supply

6.3.1.1 Appliance taking combustion air from the room

6.3.1.1.1 Sufficient air for combustion and ventilation shall be provided into the room in which the appliance is to be installed to ensure the appliance can operate safely and efficiently.

6.3.1.1.2 Any room or space containing an appliance that takes its combustion air directly from the room in which it is installed shall have a permanently open air vent to the outside of the building that provides at least the minimum amount of ventilation shown in [Table 1](#).

Table 1 — Air supply to solid fuel appliances

Type of appliance	Type and minimum amount of ventilation ^{A)}
Open appliance, such as an open fire with no throat, e.g. a fire under a canopy	Permanently open air vent(s) with a total equivalent area of at least 50% of the cross-sectional area of the flue
Open appliance, such as an open fire with a throat as in Figure 22	Permanently open air vent(s) with a total equivalent area of at least 50% of the throat opening area ^{B)}
Other appliance, such as a stove, cooker or boiler, with a flue draught stabilizer	Permanently open vents as follows. If design air permeability >5.0 m ³ /h·m ² at 50 Pa, then: a) 300 mm ² /kW for first 5 kW of appliance rated output; and b) 850 mm ² /kW for balance of appliance rated output. If design air permeability ≤5.0 m ³ /h·m ² at 50 Pa, then 850 mm ² /kW of appliance rated output ^{C)}
Other appliance, such as a stove, cooker or boiler, with no flue draught stabilizer	Permanently open vents as follows. If design air permeability >5.0 m ³ /h·m ² at 50 Pa, then 550 mm ² /kW of appliance rated output above 5 kW. If design air permeability ≤ 5.0 m ³ /h·m ² at 50 Pa, then 550 mm ² /kW of appliance rated output ^{C)}

NOTE The type and amount of ventilation in [Table 1](#) is the minimum required, but if the appliance manufacturer's installation instructions specify additional ventilation requirements these should be followed.

^{A)} Equivalent area of a ventilator is as declared by the manufacturer, having been tested and measured in accordance with BS EN 13141-1. The equivalent area is stated in the ventilator manufacturer's literature or marked on the air vent. When this information is not available, the equivalent area of a simple ventilator with no internal baffles can be taken as the combined total of the cross-sectional area of each opening in the grille measured in the plane where the opening is at a minimum and at right angles to the direction of air flow. For an air brick, louvre or grill with apertures not smaller than 5 mm it is the combined total of the individual apertures that give the equivalent area.

^{B)} For simple, open fires as depicted in [Figure 22](#), the requirement can be met with room ventilation area as follows.

Nominal width of BS 1251 fireback opening (mm)	500	450	400	350
Total equivalent area of permanently open air vents (mm ²)	20 500	18 500	16 500	14 500

^{C)} A dwelling constructed before 2008 is unlikely to have an air permeability less than 5.0 m³/(h·m²) at 50 Pa, unless the building fabric has been substantially upgraded to improve airtightness. See [Annex C](#) for details of what constitutes substantial upgrading.

6.3.1.1.3 Extractor fans shall not be located in the same room or space in which the appliance is installed, unless:

- a) sufficient ventilation is provided to ensure the appliance will operate safely and efficiently; and
- b) the appliance has passed a spillage check in accordance with [Annex D](#); and
- c) this is allowed by the appliance manufacturer's instructions.

COMMENTARY ON 6.3.1.1

An appliance that takes all or some of the combustion air from within the room in which it is installed increases the number of normal ventilation air changes for that room. This has the added benefit of ensuring any smoke or fumes that spill from the appliance are quickly cleared by being drawn back up the chimney and the air within the room is kept fresh with replacement air coming through the permanently open combustion air vents.

Ventilation is usually provided by use of air bricks, factory-made air vent assemblies or direct external air supply (DEAS) as described in 6.3.1.2. A permanently open vent fitted into a window or door might also be used, provided it cannot be closed off and the equivalent area gives the required minimum ventilation to suit the appliance. A closed appliance that can be used with the door open has a permanently open air vent(s) with a total equivalent area of at least 50% of the cross-sectional area of the flue or, if greater, the minimum specified in the appliance manufacturer's instructions.

The size of the combustion air inlets takes into account the fact that rooms are not usually airtight, even when all doors and windows are closed. Consequently, there is no requirement to have an air inlet for closed appliances with an output lower than 5 kW, as enough adventitious air is usually available for satisfactory operation. However, this does not apply to dwellings that have an air permeability of less than $5.0 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ at 50 Pa. Dwellings built after 2008 should be considered as having an air permeability of less than $5.0 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ at 50 Pa.

Open fires and closed appliances that can be used with their door(s) open require more air than closed appliances because of the additional air that enters the appliance above the firebed. The additional air is needed for secondary combustion and to prevent flue gas spillage from the fire/appliance. For standard open fires the throat created by the fireback and throat lintel to [BS 1251](#) is specially shaped to assist the flow into the flue. Open fires tend to create considerable air changes in the room. To minimize this effect, provision should be made for restricting the throat, for example, with an insertable throat restrictor conforming to [BS 3376](#) or other form of adjustable throat provided it allows for flue sweeping.

The ideal position for the air vents is adjacent to the appliance or fire. Where it is not desirable to provide an air vent from outside directly to this location so as to avoid cold draughts, a suitable place of entry into an unoccupied area such as the hallway may be used. In this way there is an element of preheating of the air before it enters the living areas. Apertures of at least the size specified in [Table 1](#) should be provided in partitions between the air vent and the appliance in order to allow an unrestricted route for the air to reach the appliance.

Some appliances are designed for use with underfloor air supplies ducted to the fire. The use of the underfloor system of ducting might also be suitable for other fires. Where ducting cannot readily be provided within or under a floor an alternative technique is to duct air from the roof space. Where this ducting passes through other parts of the dwelling, it should be installed in a manner that provides a rated resistance to the spread of fire (see 6.2) appropriate to the application: in single occupancy dwellings, materials having a 30 min fire rating are usual; in dwelling containing flats (multiple occupancy) 90 min might be required.

6.3.1.2 Appliance taking air directly from outside the building

If the manufacturer provides a printed set of instructions for a DEAS appliance which gives clear guidance on installing the appliance and air kit together (see [Annex E](#)), the installer shall carry out a risk assessment (see [Annex F](#)) and commissioning procedure to ensure the installation is safe.

COMMENTARY ON 6.3.1.2

The DEAS appliances on the market vary significantly in their pressure tightness and their ability to separate the products of combustion from the room air. Also, houses are becoming increasingly airtight, relying solely on the correct operation of the designed ventilation system to maintain indoor air quality. Due to the vast number of permutations between the appliance and dwelling, it has not been possible to create a standardized installation procedure.

The DEAS appliance designs currently on the market range from a traditional appliance with an after-market retrofitted DEAS air box in accordance with the manufacturer's instructions, which allows a duct to be fitted to the primary air feed, through to an appliance that has been designed specifically to be room-sealed (other than when refuelled), taking all the combustion air through a DEAS duct, and has been both pressure and durability tested for its room sealed characteristics.

Older dwellings were constructed without consideration of the permeability of the structure and this provided significant ventilation to the property through the structure even when all-purpose provided ventilators are closed. Modern houses are designed and constructed with a focus on ensuring the structure is airtight; air changes are provided only via the designed ventilation system, so a risk assessment (see [Annex F](#)) should be carried out with particular attention also paid to the appliance minimum air requirements in [Table 1](#), as well as the spillage tests in [Annex D](#).

Further guidance on the industry agreed procedure for assessing air permeability is given in [Annex C](#).

6.3.2 Connection to a chimney

All joints between an appliance, its connecting flue pipe and its chimney shall be sealed using non-combustible material in a manner that enables the joint to withstand the expansion and contraction to which it will be subjected during normal use.

To avoid the accumulation of soot deposits or fly ash, the sleeve and the flue pipe shall not project inside the chimney flue (see [12.3](#), [Figure 17](#) and [Figure 18](#)).

COMMENTARY ON 6.3.2

Joints should be sealed in order to prevent the ingress of unwanted air into the chimney, to reduce the risk of combustion products escaping into living areas and, in the case of an open fire, to ensure that combustion can be controlled.

A common method of providing a seal is the use of a flexible non-combustible rope or tape of thickness suitable for the size of gap to be filled. The rope needs to be well tamped into the gap, but be flexible enough to allow some movement of the joint due to expansion and contraction. The rope can be held in place with a covering of fire cement. This technique is especially recommended for jointing the flue pipe to the appliance, the raft lintel or the register plate. In the latter cases the joint could benefit from the use of a clamping ring which squeezes the rope against the face. Some manufacturers supply a purpose-made flue pipe for this, which has lugs with screws to apply the pressure on the clamping ring and hence the rope.

Special attention should be given to ensuring the presence of a flexible seal around the ash pit area of an open fire. This includes the base where the fire sits on the hearth, as well as the side of the fire where it meets the fireplace surround.

Where a flue pipe enters a chimney through a hole in the chimney wall it is necessary to sleeve the hole and seal the flue pipe into the sleeve. This can be achieved by cementing in a short length of metal pipe

with an inside diameter at least 25 mm larger than the outside diameter of the connecting flue pipe. Both ends of the sleeve should be cut to the angle formed with the chimney. The space between the connecting flue pipe and the sleeve should be well caulked with several turns of soft non-combustible sealing rope or other suitable heat resisting material, and well tamped in (see [12.3](#), [Figure 18](#)).

6.4 Safety in use

6.4.1 Chimney

Each appliance shall be connected to its own flue within a chimney, and the appliance installer shall ensure that the chimney's flue size is not less than shown in [Table 2](#) for each appliance installed.

COMMENTARY ON 6.4.1

The chimney flue size should be not less than the size of the flue outlet of the appliance.

In general, the size of flue is chosen to ensure adequate evacuation of combustion products. The major operating force providing the flue draught to evacuate the products of combustion is the buoyancy of the flue gases, which is mainly dependent upon the temperature of the flue gas itself, but also on the height of the chimney or flue system. An open fire generates a considerably larger volume of flue gas than a closed appliance and therefore needs a larger flue area to suit the size of fireplace opening. In addition, the flue gas temperature from an open fire is considerably less than that for a closed appliance, so the buoyancy (or flue draught) is also less.

Where a chimney is particularly tall, or creates excessive draught, as can occur in taller properties, it might be necessary to fit a flue draught stabilizer. If so, it is essential that this device is fitted close to the appliance and in the same room or space.

The minimum flue sizes for a closed appliance up to 20 kW rated output are subject to the appliance satisfying the conditions in [Table 2](#). However, the appliance manufacturer's installation instructions should be checked as to the minimum flue size permitted for the appliance to be installed. Some appliance manufacturers specify a larger flue size, so the installation instructions should be consulted.

6.4.2 Fireplace recess

6.4.2.1 A fireplace recess shall be constructed in accordance with [Clause 9](#). The outer surface temperature of the walls of the fireplace recess shall be such that, during normal use of the appliance, adjacent combustible material is not ignited from the heat transmitted (see Note to [6.4.2.2](#)).

6.4.2.2 An appliance shall be installed on or above a hearth (see [Clause 10](#)) such that adjacent combustible materials shall not be ignited from the following causes:

- a) direct radiation or conduction of heat from the appliance (see [Clause 10](#) to [Clause 22](#) depending upon the specific appliance to be installed);
- b) embers falling from the appliance (see [Clause 10](#));
- c) heat transfer from the connecting flue pipe and fittings (see [11.6](#)).

NOTE Care should be taken to prevent combustible materials being damaged or ignited when they are subjected to heat from any of the causes in items a) to c). In the case of a fireplace recess, the walls should be of sufficient thickness to prevent the temperature of adjacent combustible material from reaching a temperature in excess of 65 °C above ambient. The thickness depends on the insulating property of the material of construction.

- 6.4.2.3** Where the installation is carried out in a room likely to be occupied by children, older people or people where the burn hazard might not be immediately recognized and accidental human contact is possible, the need for a fireguard conforming to [BS 8423](#) shall be assessed.

Where fireguards are used, provision shall be made for fixings conforming to [BS 8423](#).

NOTE The surface temperature of some surfaces can be lowered by the use of insulating materials and ventilation.

- 6.4.2.4** It shall be possible to inspect, clean and maintain the chimney without removing the installed appliance. Where the chimney cannot be swept through the appliance, a soot door and/or flue pipe access port shall be provided for inspection, cleaning and maintenance (see [Clause 12](#)).

- 6.4.2.5** Electrical components shall have an electrical supply fitted with an appropriate fuse. Means of isolating electric components shall be provided in accordance with [BS 7671](#).

Table 2 — Minimum flue size

Installation	Minimum flue size
Fireplace with an opening up to (500 × 550) mm	200 mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 175 mm
Open fire appliance in an opening in excess of (500 × 550) mm or a fireplace exposed on two or more sides ^{A)}	Conformity can be demonstrated by providing a flue with a cross-sectional area equal to 15% of the total face area of the fireplace opening(s). However, specialist/flue manufacturer's advice should be sought when creating a larger fireplace opening.
Closed appliance ^{B)} up to 20 kW rated output, which: a) burns smokeless or low-volatiles fuel ^{C)} ; or b) conforms to the Clean Air Act [4] when burning an appropriate bituminous coal ^{D)} ; or c) conforms to the Clean Air Act [4] when burning wood ^{D)}	125 mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension of not less than: a) 100 mm for straight flues; or b) 125 mm for flues with bends or offsets.
Pellet burner or pellet boiler conforming to the Clean Air Act [4] ^{D)}	125 mm diameter ^{E)}
Other closed appliance of up to 30 kW rated output burning any fuel	150 mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 125 mm
Closed appliance greater than 30 kW and up to 50 kW rated output burning any fuel	175 mm diameter or rectangular/square flues having the same cross-sectional area and a minimum dimension not less than 150 mm

^{A)} For example, an open fire appliance under a canopy or open on both sides of a central chimney breast.

^{B)} Closed appliances include cookers, stoves, room heaters and boilers.

^{C)} Smokeless fuels are fuels that have been tested to be smokeless and authorized by Defra. Fuels such as bituminous coal, untreated wood, biomass or compressed paper are not smokeless or low-volatiles fuels.

^{D)} These appliances are known as "exempt appliances".

^{E)} This may be reduced to not less than 100 mm where permitted by the appliance manufacturer and supported by calculation in accordance with BS EN 13384-1. The calculation can be applied to an individual installation or manufacturers can provide pre-calculated designs.

6.5 Protection against noise

The appliance shall be installed such that any noise produced is not transmitted to adjacent occupancy areas.

6.6 Energy economy and heat retention

- 6.6.1** The installation of the appliance shall be such that the amount of energy required in use is kept to a minimum (see [6.6.2](#)).
- 6.6.2** The efficiency of the chosen appliance, when tested to the relevant European standard, e.g. BS EN 13240, shall be equal to or better than the minimum appliance efficiencies stated in the *Domestic Building Services Compliance Guide* (DBSCG) [N1].
- 6.6.3** The efficiency of a new appliance shall not be significantly less than the efficiency of any appliance it replaces. If the appliance replacement involves a change of fuel, then the relative carbon emissions associated with the new and existing fuels shall be taken into account when assessing the suitability of the proposed new appliance.

NOTE The DBSCG [N1] contains further detailed guidance on this issue.

COMMENTARY ON 6.6

An installed appliance should contribute as much heat as possible towards satisfying the heat requirements of the dwelling and its occupants.

The most energy-effective installation is one situated in the centre of the dwelling where much of the residual heat in the building structure, e.g. fireplace and chimney, is not lost during operation. As appliance efficiencies improve, less heat is given up to the structure and more is available directly from the appliance. This is beneficial in circumstances where heat from the structure does not contribute effectively to heating the dwelling.

In assessing the type of installation best suited to particular needs, the designer in consultation with the purchaser should bear in mind that masonry structures tend to have a large thermal capacity for storing energy. They take longer to heat up than a factory-made structure, but give up the stored energy over a relatively longer period. This can be an advantage for intermittent occupancy situations where some heat is available even when the appliance is not in use for a short time.

Slow heat release appliances incorporating a high thermal mass can absorb heat and slow-release heat in the same way as the thermal mass of a masonry fireplace and or chimney. Due to their compact construction and distribution of heat they do not necessarily have to be positioned in the centre of the dwelling.

7 Checking, handling and site storage of materials and components

7.1 Checking

7.1.1 Delivery of materials

Delivery tickets and certificates shall be checked against the specification for the proposed installation. The condition of the appliance, materials and components received shall be examined. If any item is damaged, or is not as specified, advice shall be obtained from the supplier.

7.1.2 Before installation

Fireplace recesses and hearths shall be checked to ensure that they are finished to the correct dimensions for the appliance, with special regard to the minimum/maximum sizes specified in [Clause 9](#) and [Clause 10](#).

NOTE Some appliances require a special fireplace surround, hearth or both.

7.2 Handling on site

- 7.2.1** The appliance and components shall be handled in such a manner as to prevent breakage or deterioration. Special care shall be taken before, during and after installation to ensure that equipment is not damaged.

NOTE This is particularly important with equipment or components that are vitreous enamelled, plated or fitted with glass which might be prone to chipping or cracking. Suitable precautions should be taken to prevent floor coverings, doorways and walls being damaged whilst large or heavy items are taken into the property. Statutory health and safety requirements are also applicable.

- 7.2.2** Any components removed during transit or storage shall be handled so that they can be identified and refitted correctly to the original equipment.

NOTE This is especially important where several different appliances are stored together as some parts are individually fitted to each appliance by the manufacturer and are not interchangeable.

7.3 Site storage

Suitable accommodation offering safe, dry and frost-free storage shall be provided for all components, e.g. appliances, pipes, ducting, fireplace surrounds, firebacks and refractory air-setting cement. All components shall be stored on a firm, level base in the original packaging and in accordance with the manufacturer's instructions. Where storage is on a solid floor, components shall be stacked on a sheet of water-proof material, a pallet(s) or timber to prevent damage by rising damp. The appliance instructions and any operating, stoking and cleaning tools shall be kept safely in store until they can be handed directly to the user on completion of the installation.

8 Coordination of work and installation preparation

In preparing for the installation, liaison shall be established with the contractor, builder or householder to ensure that site access is available, cooperation between trades is arranged and sufficient time is allowed for completing each phase of the installation. Care shall be taken to ensure that:

- a) all accessories and materials for construction are available on site;
- b) chases are formed true to size and correctly positioned;
- c) the fireplace recess, chimney, lintels and flue-connecting blocks are installed in accordance with the design specification in their true relation to the appliance and hearth;
- d) where applicable, the pipework is ready for connection to the boiler as soon as the appliance has been fixed in place;
- e) any ducts or vents required to be formed during construction or preparation work have been laid or constructed; and
- f) the fitter's and finishing tradesmen's work is coordinated and vulnerable surface finishes, e.g. hearths and floors, are protected.

COMMENTARY ON CLAUSE 8

The final connections between appliance and flue should be completed when the structural and appliance installation work is finished.

Where the installation of a fireplace recess, hearth or chimney or related construction work are to be carried out by anyone other than the installer of the appliance a written specification should be agreed between the parties in advance of the work being carried out. The specification should include the materials to be used, critical dimensions such as fireplace opening, hearth sizes, position and size of the chimney, start of the flue to connect to the appliance, clearances from combustible materials, type and position of air vent into the room where the appliance is being located, and the date by which all the work is to be completed in preparation for installation of the appliance.

9 Fireplace recess

- 9.1** A fireplace recess shall either be of brick or block work construction, or built from non-combustible material or prefabricated components.

NOTE When the nominal size of the appliance is known, the fireplace recess can be constructed to a width that accommodates the appliance and any infill or clearances that are required.

- 9.2** Where the fireplace recess is to be of traditional brickwork or block work masonry it shall be constructed in accordance with [Figure 2](#) and [Figure 3](#).

NOTE 1 The wall thicknesses shown in [Figure 2](#) are the minimum dimensions for a traditional brick or block-built fireplace recess to provide the necessary protection from the heat created by an appliance or open fire. If the fireplace recess is built on a party wall, the wall's acoustic properties need to be maintained. The dimensions in [Figure 3](#) are for a typical traditional fireplace recess. However, the internal dimensions of the recess vary according to the type of appliance to be installed and the clearance required around the appliance. In some cases a large fireplace recess can be created to give the appearance of a traditional inglenook type fireplace opening into which a free standing appliance is installed.

NOTE 2 [Figure 3](#) shows the formation of a gather using corbelled brickwork. This would be required for use with an open fire, to enable the products of combustion to be gathered in and directed upwards into the chimney flue. The angle of the inner faces of the front, back and sides of the gather should ideally not exceed 45° from the vertical. Factory-made gathers are available with many concrete or clay flue liner systems which are usually easier and more efficient to install. Some open fire appliances are supplied with a pre-made gather. If it is not certain whether an open fire is to be installed, it is good practice to ensure that the height of the fireplace recess is such that it can accommodate installation of a gather. The minimum height is considered to be 1 100 mm from the top of the finished hearth to the underside of the load-bearing lintel. However, a greater height might be required for some appliances.

COMMENTARY ON CLAUSE 9

The thickness may be somewhat less than that specified in [Figure 2](#) when installed in accordance with the manufacturer's instructions. In this instance, the thickness and material need to be as specified by the manufacturer to ensure the temperature does not exceed 65 °C above ambient. This can be achieved by the following.

- a) The appliance being independently certified and the temperature of the surrounding material not exceeding that recommended. For an inset open fire this would be satisfied by conformity to BS EN 13229:2001+A2:2004, 5.2; or if a material has been tested and approved independently, then it can be used according to the material manufacturer's approved results and specification.*
- b) The appliance manufacturer specifying in the installation instructions which materials are suitable by specifying the material thickness to be used and/or the insulating property of the material.*

- c) Where the manufacturer does not specify a material and thickness that has been independently certified, constructing the recess using traditional brick or concrete block construction to the dimensions specified in [Figure 2](#).
- d) Prefabricated, factory-made appliance chambers using components made of insulating concrete, and with the minimum thickness specified by the manufacturer to give equivalent safety to the brickwork thickness detailed in [Figure 2](#). Components should be supplied as sets for assembly and jointing in accordance with manufacturer's instructions.

Figure 2 — Dimensions of a masonry-built fireplace recess

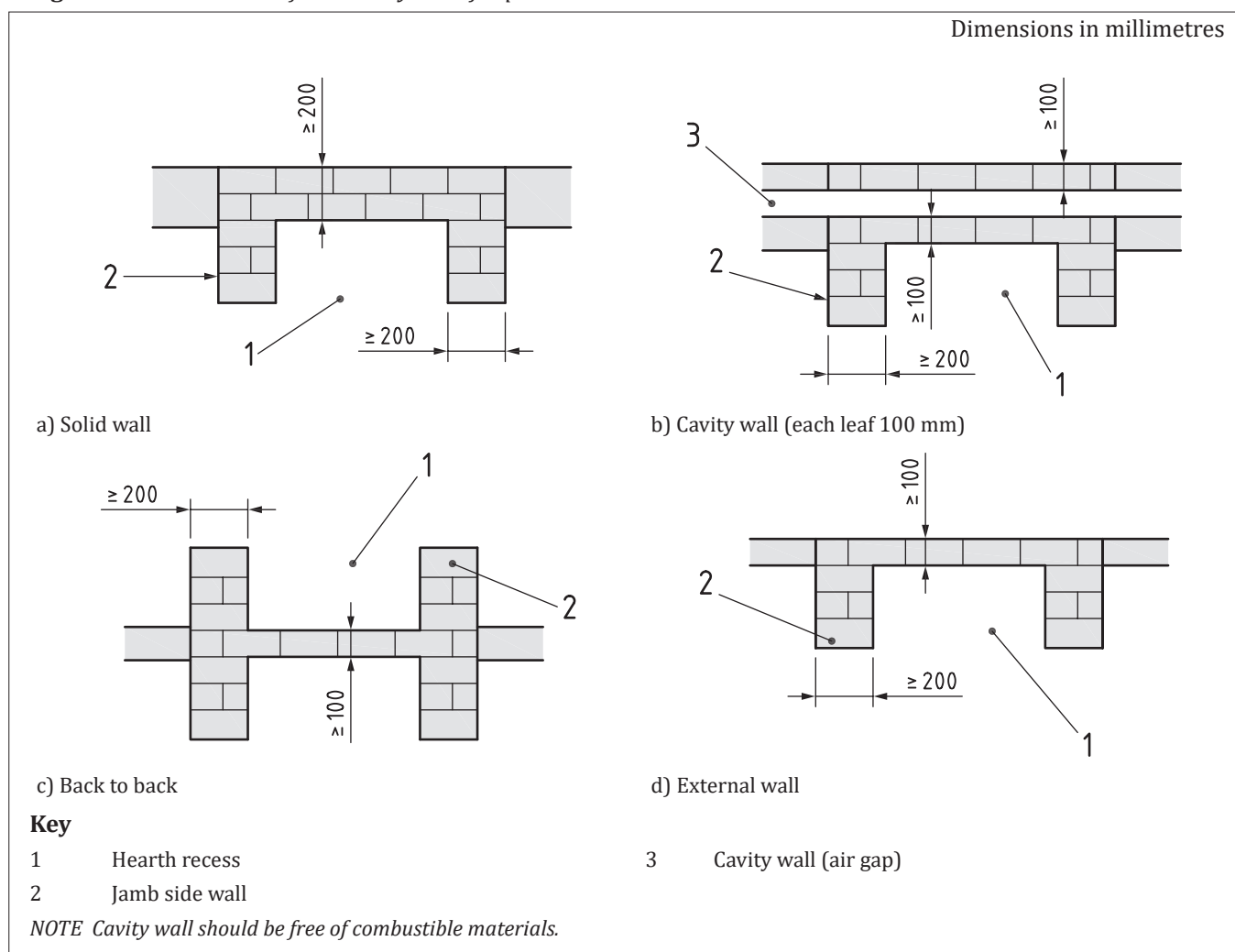
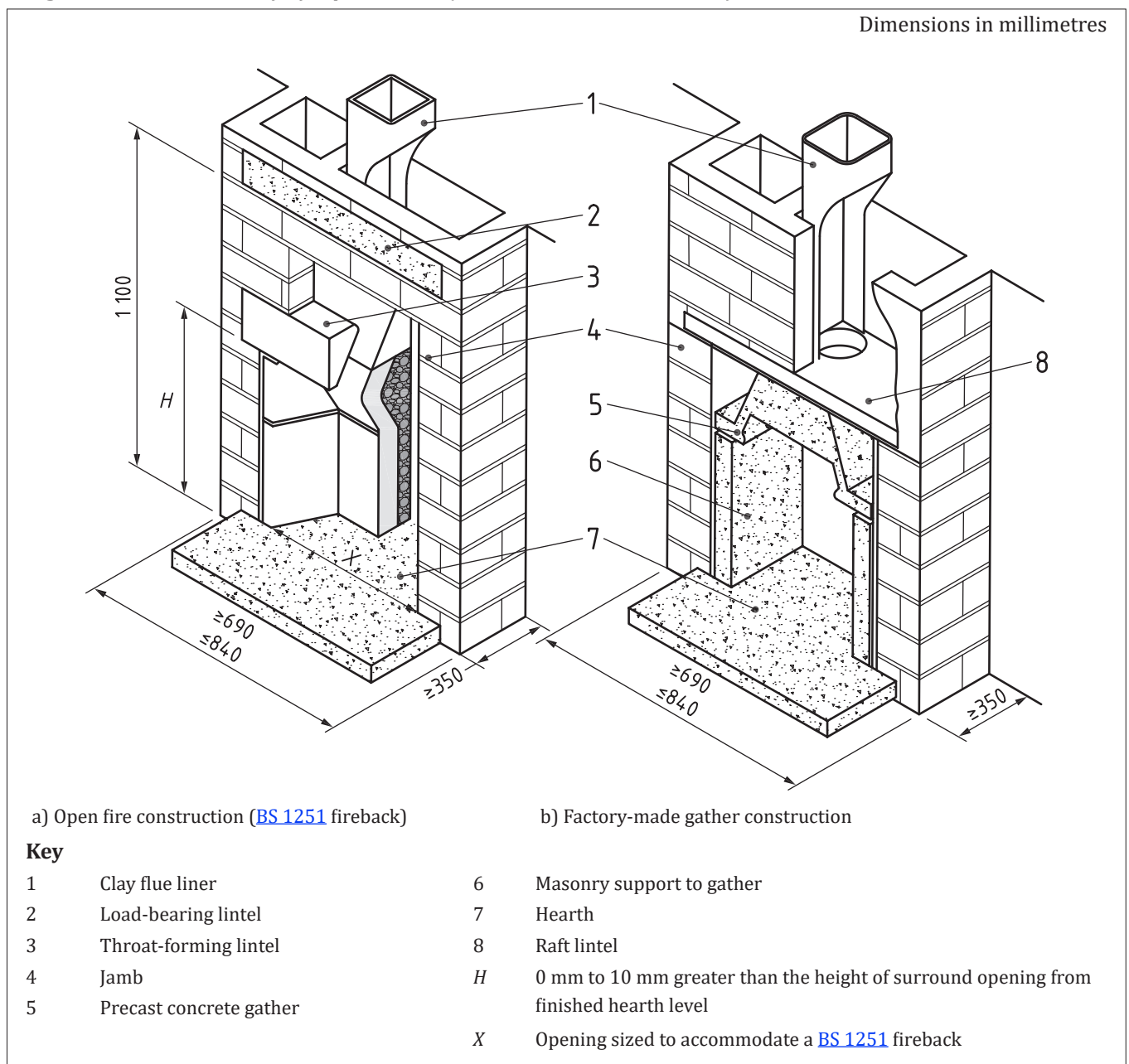


Figure 3 — Construction of a fireplace recess (traditional brick construction)

10 Hearths

10.1 General

A hearth shall be constructed such that the temperature under or adjacent to the hearth does not cause damage to or ignition of combustible material during the normal operation of the appliance.

COMMENTARY ON [10.1](#)

The specification and dimensions for the hearth are dictated by the type of appliance being installed and may be one or a combination of the following:

- a) *a constructional hearth where the surface temperature of the hearth can exceed 65 °C above ambient under test conditions in accordance with the appropriate standard for the appliance type (see [10.2](#));*

b) a superimposed hearth as specified in 10.3, which may be placed:

- 1) on the constructional hearth; or
- 2) if the appliance is tested and certified as not being able to cause a temperature in excess of 65 °C above ambient, below the superimposed hearth, directly on to a non-combustible or combustible floor.

10.2 Constructional hearth

10.2.1 General

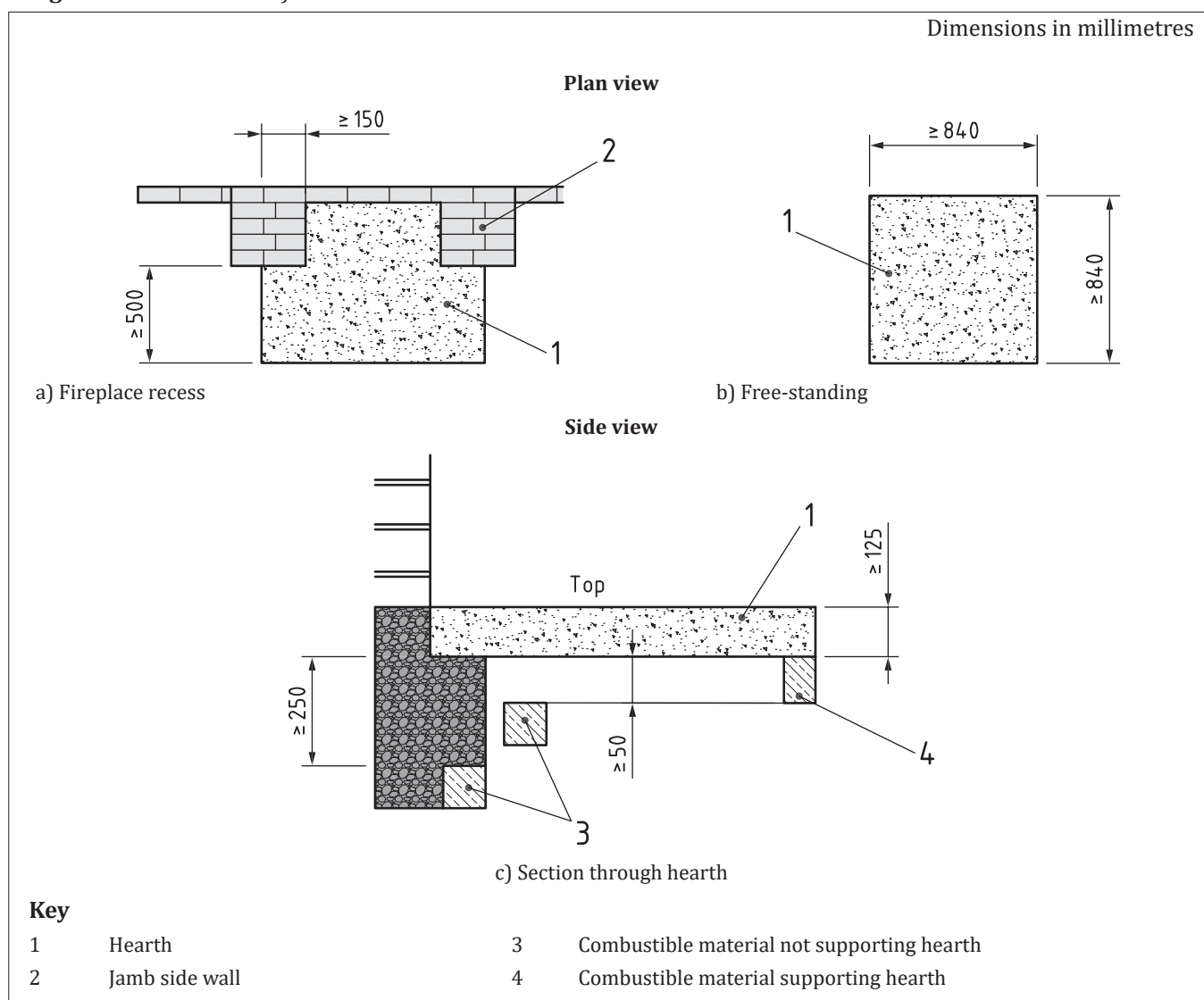
10.2.1.1 Where a constructional hearth is installed it shall be substantial enough to provide a heat sink to ensure the hearth does not have excessive temperatures at its perimeter.

10.2.1.2 A constructional hearth shall be made of solid non-combustible material.

10.2.2 Size of hearth

10.2.2.1 The size of a constructional hearth shall be at least as shown in Figure 4, with a minimum thickness of 125 mm which can include the thickness of any solid non-combustible floor.

Figure 4 — Dimensions of a constructional hearth



- 10.2.2.2** Where a constructional hearth is provided in place of a superimposed hearth (see [10.3](#)), the hearth shall be visually apparent so as to warn the dwelling occupants of the proximity of the hot surfaces and to discourage the placing of combustible material too close to the appliance or within the boundary.

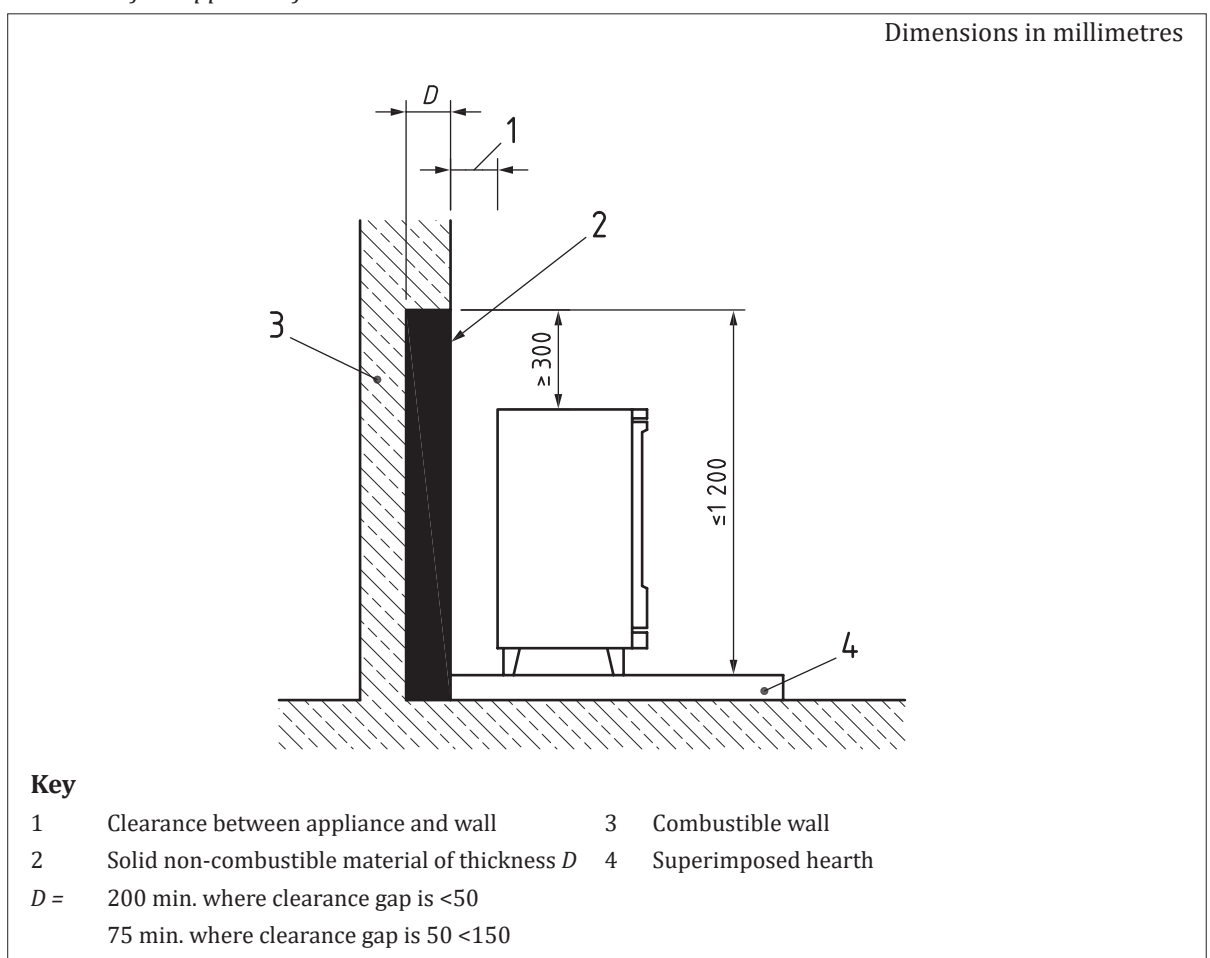
NOTE Where the level of the constructional hearth in a fireplace recess needs to be raised to create a level surface for placing of a superimposed hearth, it might be necessary to form a back hearth of solid non-combustible material. This can be prefabricated or cast in situ, and is normally located in a fireplace recess.

- 10.2.2.3** Combustible underfloor insulation shall not encroach under the area of the constructional hearth.

10.2.3 Proximity to combustible material

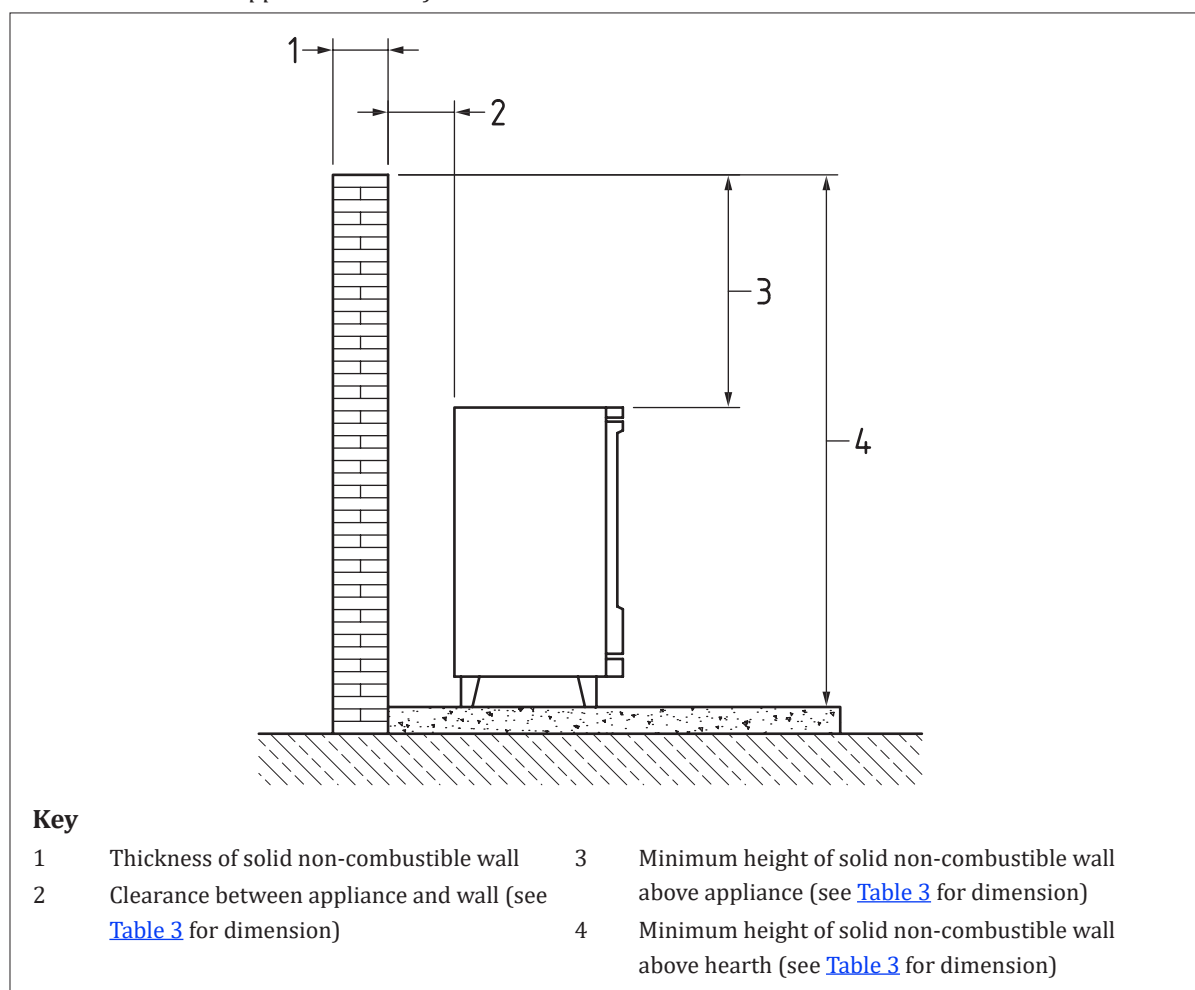
There shall be no combustible material below a constructional hearth, unless it is around its perimeter for support and more than 150 mm away from the appliance, or there is an air gap of at least 50 mm between the underside of the hearth and the combustible material (see [Figure 5](#)).

Figure 5 — Distance of an appliance from combustible material



10.2.4 Abutting or adjacent to walls

- 10.2.4.1** Where a constructional hearth abuts a wall that is not within a fireplace recess, the wall shall be constructed of 200 mm thick solid non-combustible material that extends to a height of 1 200 mm or 300 mm above the appliance, whichever is the greater (see [Figure 5](#)).
- 10.2.4.2** Where the rear wall is less than 200 mm thick solid non-combustible material, the clearance between the appliance and wall shall be as given in [Figure 6](#) and [Table 3](#).
- 10.2.4.3** An appliance shall be installed in accordance with the manufacturer's recommended clearances for service and maintenance.

Figure 6 — Clearance between appliance and adjacent walls**Table 3** — Clearance between appliance and adjacent walls

Clearance between appliance and wall	Minimum thickness of solid non-combustible wall	Minimum height of solid non-combustible wall above appliance	Minimum height of solid non-combustible wall above hearth
mm	mm	mm	mm
0 – 50	200	300	1 200
>50	75	300	1 200

10.2.5 Separation of the appliance from combustible material in surrounding structure

10.2.5.1 General precautions

10.2.5.1.1 Measures shall be taken to prevent combustible materials in the surrounding structure being damaged or ignited when they are subjected to radiated, convected and conducted heat from an appliance. Any combustible material in the vicinity of an appliance, whether exposed or covered, e.g. by tiles, shall be protected to ensure that its surface temperature does not exceed 65 °C above ambient temperature.

10.2.5.1.2 For an appliance (with or without the manufacturer's heat shield) located free-standing within an open part of the room (not within a builder's opening or fireplace recess), the installation arrangements and clearances of combustible materials from the sides and rear of the appliance shall either:

- a) follow the manufacturer's installation instructions; or

- b) if the appliance has a declared distance from combustibles of 700 mm or less to the rear and sides, as determined by the temperature safety tests in BS EN 13240 or BS EN 12815, conform to [10.2.5.2](#) (see [Figure 7](#) and [Figure 8](#)).

10.2.5.1.3 For all other appliances, the safe distances from combustible surfaces for the proposed installation arrangement shall be verified by the temperature safety test procedures in BS EN 13240 or BS EN 12815, as appropriate.

10.2.5.2 Installation with metal shielding

COMMENTARY ON 10.2.5.2

For appliances up to 7 kW output, a metal shield can be utilized to reduce the distance to combustible material to the dimensions specified in this subclause.

10.2.5.2.1 A shield of sheet metal with a thickness of at least 1.5 mm (16 gauge) shall be affixed to the structure, to the sides and rear of the appliance, using non-combustible fixings and with non-combustible spacers to maintain a minimum horizontal air gap of 25 mm between the shield and wall. Where the appliance manufacturer provides the shield, their confirmation of clearances and printed installation instructions shall be consulted and followed.

NOTE It is permissible to use a thinner shield, provided it is adequately supported so that the installed structure retains its original shape and spacing, and does not warp, bend or otherwise lose rigidity when knocked or exposed to high temperatures.

10.2.5.2.2 The shield shall extend to at least the extremities of the hearth horizontally and to at least 300 mm above the top surface of the appliance. There shall be no protrusions from the structure above the shield, such as shelves, to hinder the flow of convection air. There shall be a minimum vertical gap of 25 mm between the surface of the hearth and the base of the shield. Insulation board or other non-combustible material, e.g. metal sheet, shall be affixed to the structure to a height of at least 50 mm and at least 25 mm above the bottom edge of the shield at hearth level, using either an adhesive which does not ignite, emit fumes or lose adhesive qualities at temperatures up to 150 °C, or other non-combustible fixings at the corners of the material. The horizontal gap between the shield and the protective non-combustible material shall be a minimum of 25 mm. The clearances for the connecting flue pipe shall be met.

NOTE Some appliance manufacturers provide a full height shield for use with their appliance so that the necessary clearances for the appliance and connecting flue pipe can be provided. [Figure 7](#) shows an installation where the appliance is installed with its sides and rear substantially parallel to the surrounding structure (and applicable for a rotation of up to 30°).

10.2.5.2.3 The distance from the outer surface of the shield to the rear of the appliance shall be at least 95 mm, and the distance from the outer surface of the shield to the side surface of the appliance shall be at least 90 mm.

NOTE [Figure 8](#) shows an installation where the appliance is at an angle to the surrounding structure and applicable where the smallest angle between the appliance and wall is greater than 30°. The distance from the outer surface of the shield to the corners of the main body of the appliance should be at least 65 mm.

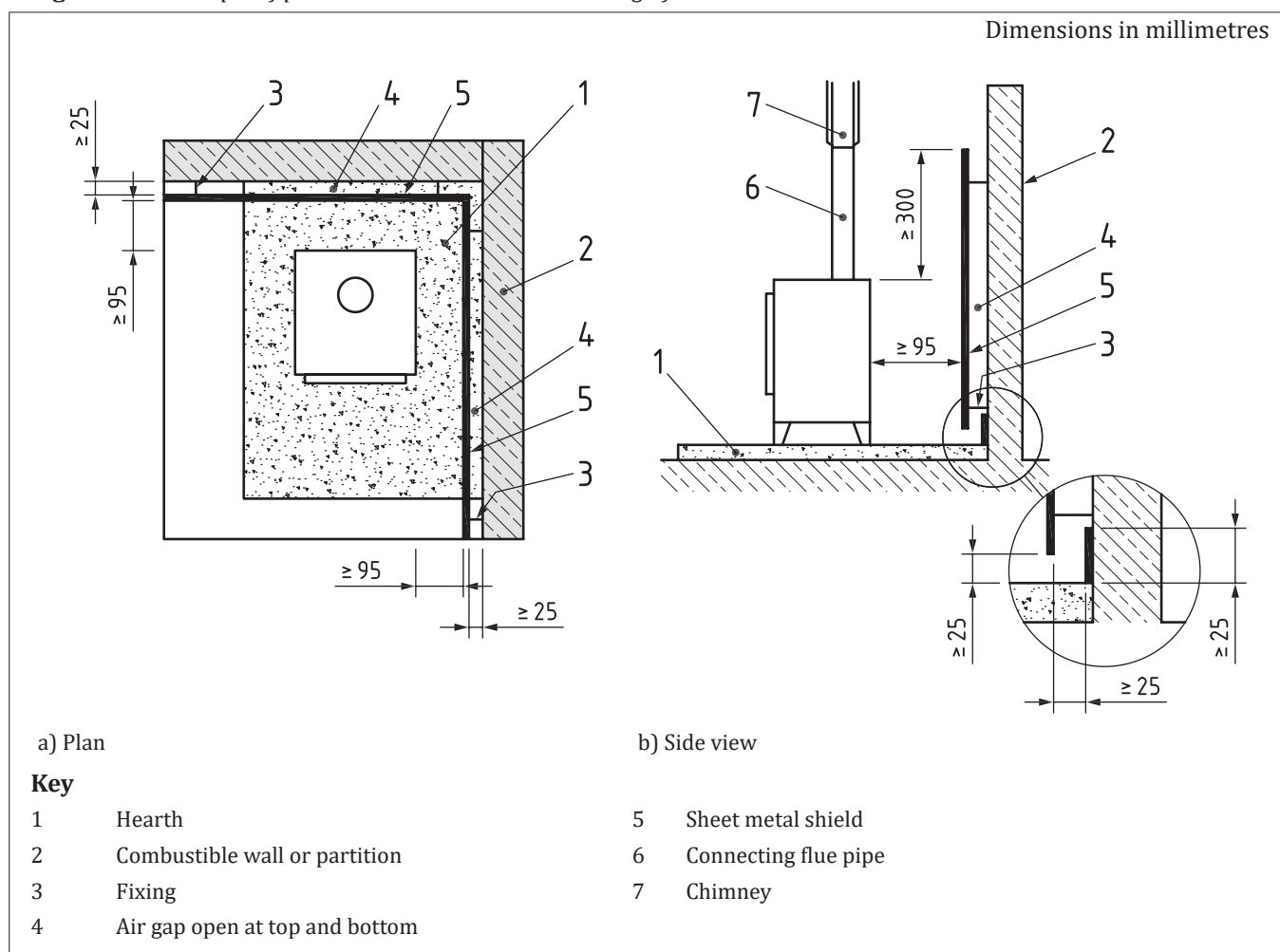
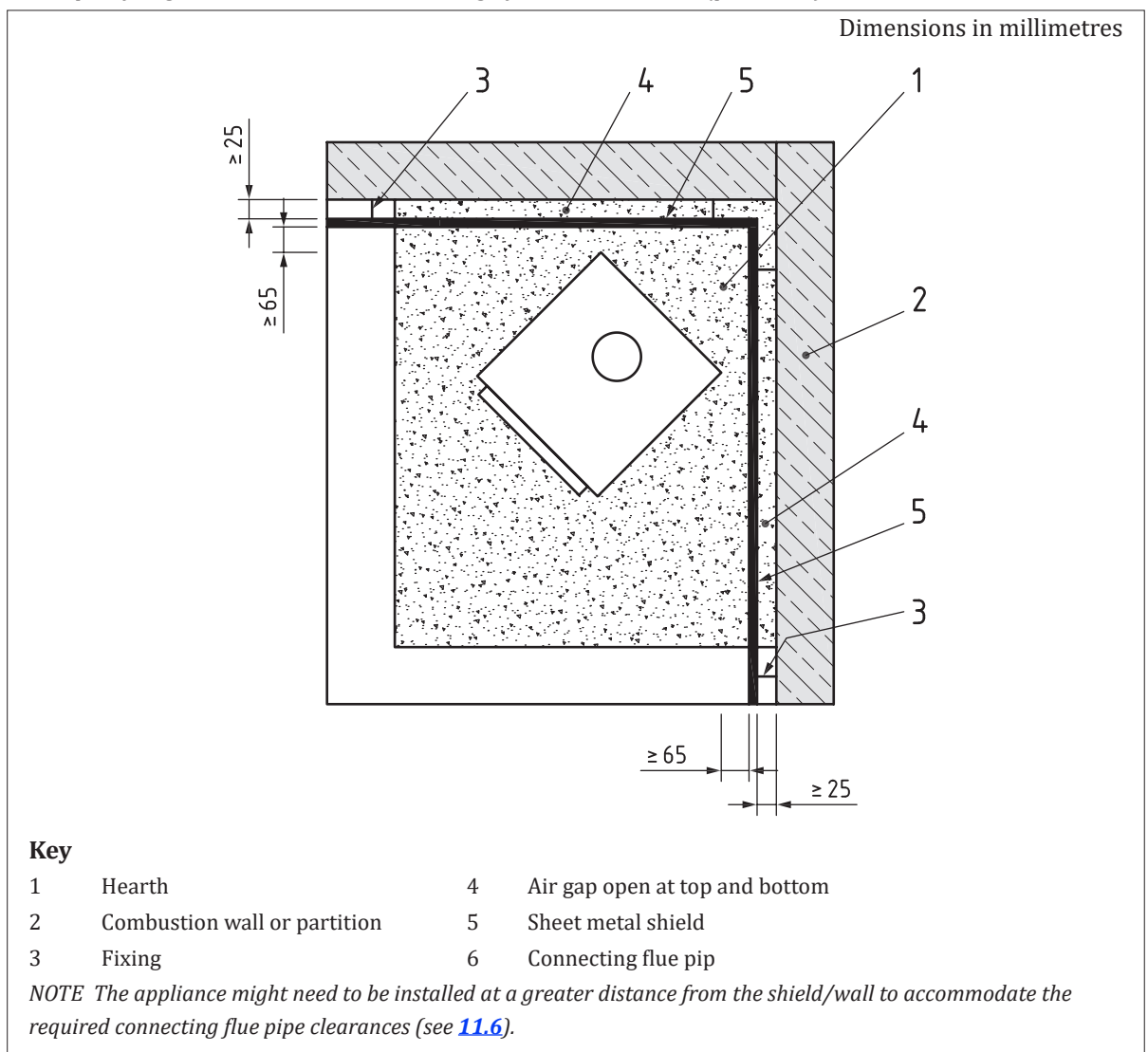
Figure 7 — Example of parallel installation with shielding of combustible wall

Figure 8 — Example of angled installation with shielding of combustible wall (plan view)

10.3 Superimposed hearth

10.3.1 Location

NOTE A superimposed hearth can be placed on a constructional hearth or, if the appliance is tested and verified as not causing a hearth temperature greater than 65 °C above ambient, measured below the superimposed hearth, it can be placed directly on to a non-combustible or combustible floor.

10.3.1.1 The appliance shall be installed on the superimposed (decorative) hearth such that the clearances from the edge of the hearth are as shown in [Figure 9](#).

10.3.1.2 No combustible material shall be placed on a superimposed hearth.

NOTE A superimposed hearth can also be described as a decorative hearth that is subject to the same requirements.

10.3.1.3 The appliance shall not be located directly on a combustible floor.