



BSI Standards Publication

Chimneys, flue pipes and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases)

Part 1: Design, installation, commissioning and maintenance of
chimneys – Specification

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2023

Published by BSI Standards Limited 2023

ISBN 978 0 539 25167 8

ICS 91.060.40

The following BSI references relate to the work on this document:

Committee reference GSE/30

Draft for comment 23/30466570 DC

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

CONTENTS		Page
	Foreword	IV
1	Scope	1
2	Normative references	2
3	Terms and definitions	3
4	Competence	8
5	General	9
5.1	Compatibility of appliances and chimneys	9
5.2	Chimney outlets	11
5.3	Chimneys for use with condensing appliances (open-flued and room-sealed)	12
5.4	Location of appliances	14
5.5	Passive stack ventilation	14
5.6	Exchange of information and planning	14
5.7	Maintenance	15
6	Room-sealed natural draught chimney configurations (balanced flue) for Type C ₁₁ appliances	15
6.1	General	15
6.2	Installation	15
6.3	Post-installation checks	16
6.4	Maintenance	17
7	Room-sealed: fanned draught chimney configurations for balanced flue (Type C ₁₂ , C ₁₃ , C ₃₂ and C ₃₃) and non-balanced flue (Type C ₅₂ , C ₅₃ , C ₆₂ and C ₆₃) appliances	17
7.1	Design options	17
7.2	Installation	18
7.3	Post-installation checks	21
7.4	Maintenance	21
8	Balanced compartment	21
8.1	General	21
	<i>Figure 1 — Balanced compartment installations</i>	22
8.2	Design	22
8.3	Balanced compartment construction	23
8.4	Temperature effects	23
8.5	Terminals	23
8.6	Commissioning	23
8.7	Maintenance	24
9	Room-sealed Type C ₂ for SE-ducts and U-ducts	24
9.1	Selection and installation of a suitable chimney	24
	<i>Table 1 — Normal SE-duct block sizes in existing buildings</i>	24
	<i>Figure 2 — Shared room-sealed systems</i>	25
	<i>Figure 3 — Base of communal flue system – naturally vented</i>	28
	<i>Figure 4 — Base of positive pressure communal flue system</i>	28
9.2	Terminal design and location	29
9.3	Inspection	29
9.4	Selection and installation of compatible appliances	29
9.5	Maintenance	31
10	Individual open-flued natural draught Types B ₁₁ , B ₁₂ , B ₁₃ appliances	31
10.1	Design	31
	<i>Figure 5 — Typical methods of using a flue liner in a masonry chimney installation serving a gas appliance, other than a back boiler</i>	33

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

	<i>prefabricated chimney: enclosure arrangement using a false chimney breast and closure panel</i>	34
	<i>Figure 7 — Installation of a gas fire and combined back boiler using a back boiler enclosure and prefabricated chimney: enclosure arrangement using a proprietary back boiler box</i>	35
	<i>Table 2 — Condensate-free lengths of individual open flue used with a gas fire</i>	38
	<i>Figure 8 — Maximum lengths for condensate-free chimneys for appliances other than gas fires</i>	39
	<i>Table 3 — Minimum void dimensions required below appliance connections</i>	41
	<i>Table 4 — Appliance/chimney combinations which require the chimney to be lined</i>	43
	<i>Figure 9 — Open-flued boiler connections to existing brick chimney</i>	43
10.2	Installation	44
10.3	Commissioning of the chimney	47
10.4	Radon gas systems present	50
10.5	Maintenance	51
11	Individual open-flued fanned draught Types B ₁₄ , B ₂₂ , B ₂₃ appliances and fanned draught chimneys	51
11.1	Design	51
11.2	Installation	52
11.3	Commissioning	53
	<i>Table 5 — Minimum flow rates for fanned flues</i>	53
11.4	Maintenance	53
12	Special categories of chimney	53
12.1	Chimneys for Type C _v (“Vertex”) appliances	53
12.2	Other open-flued fanned draught chimneys	54
13	Maintenance/routine checks on the chimney/flue system	54
13.1	General	54
13.2	Room-sealed fan-assisted positive pressure gas appliances	55
13.3	Balanced compartment	56
13.4	Individual open-flued natural draught Types B ₁₁ , B ₁₂ , B ₁₃ , B ₁₄ , B ₂₂ , B ₂₃ appliances	56
Annex A	(informative) Classifications	57
	<i>Table A.1 — Classification of gas appliances used in the UK according to the method of evacuation of products of combustion (types)</i>	57
	<i>Table A.2 — Default values</i>	60
Annex B	(informative) Calculation method for flue sizing	61
	<i>Table B.1 — Resistance factors for use in calculating equivalent heights (Use specific factors from flue or chimney manufacturer’s instructions where possible)</i>	61
	<i>Table B.2 — Inlet and outlet resistances</i>	62
	<i>Table B.3 — Minimum equivalent heights needed</i>	62
	<i>Figure B.1 — Worked example 1</i>	65
	<i>Figure B.2 — Worked example 2</i>	66
Annex C	(normative) Chimney outlet positions	66
	<i>Figure C.1 — Open-flued, natural draught chimney outlet locations for pitched roofs</i>	68
	<i>Figure C.2 — Open-flued, natural draught chimney outlet locations adjacent to structures</i>	69
	<i>Figure C.3 — Open-flued or room-sealed, natural or fanned draught chimney outlet locations adjacent to openings into a building on pitched roofs</i>	69
	<i>Figure C.4 — Open-flued, natural draught chimney outlet locations on flat roofs</i>	70
	<i>Figure C.5 — Open-flued, natural draught chimney outlet</i>	71
	<i>Figure C.6 — Room-sealed configuration outlet location on pitched roofs</i>	72
	<i>Figure C.7 — Open-flued, fanned draught chimney and room-sealed configuration outlet locations adjacent to structures on pitched roofs</i>	72

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

	<i>for room-sealed chimney configuration outlets)</i>	73
	<i>Table C.1 — Minimum dimensions of chimney outlet positions (refer to Figure C.8)</i>	74
	<i>Figure C.9 — Example of how a natural draught, room-sealed chimney configuration outlet position is measured</i>	77
	<i>Figure C.10 — Example of how a fanned draught room-sealed chimney configuration outlet and a fanned draught open-flued chimney outlet position is measured</i>	78
	<i>Figure C.11 — Proximity of flue duct outlet to a boundary</i>	79
Annex D	(informative) Guidance checklist for positioning of chimney/flue terminations	79
	<i>Table D.1 — Guidance checklist</i>	80
Annex E	(informative) Checking of case seals and the general integrity of room-sealed fan-assisted positive pressure gas appliances	80
	<i>Figure E.1 — Checklist for checking case seals and the general integrity of room-sealed fan-assisted positive pressure gas appliances</i>	81
Annex F	(normative) Design criteria for terminals for shared system chimneys	82
	<i>Figure F.1 — Permitted recirculation of combustion products</i>	82
Annex G	(informative) Guidance on the design and installation of flue block systems in the UK	83
	<i>Figure G.1 — Gas flue blocks</i>	84
	<i>Figure G.2 — Typical flue block systems (general arrangement)</i>	85
	<i>Figure G.3 — Bonded gas flue block system for timber frame construction</i>	86
	<i>Figure G.4 — Typical construction details for gas flue block systems in internal walls</i>	87
	<i>Figure G.5 — Typical construction details for gas flue block systems in external walls</i>	87
	Bibliography	92

Summary of pages

This document comprises a front cover, an inside front cover, pages I to VI, pages 1 to 94, an inside back cover and a back cover.

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

Foreword

Publishing information

This part of [BS 5440](#) is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 December 2023. It was prepared by Technical Committee GSE/30, *Gas installations (1st, 2nd and 3rd family gases)*. A list of organizations represented on this committee can be obtained on request to the committee manager.

Supersession

This part of [BS 5440](#) supersedes [BS 5440-1:2008](#), which is withdrawn.

Relationship with other publications

[BS 5440](#) is published in the following parts:

- *Part 1: Design, installation, commissioning and maintenance of chimneys – Specification;*
- *Part 2: Design, installation, commissioning and maintenance of chimneys – Specification.*

Information about this document

This is a full revision of the document, and introduces the following principal changes:

- a) redefined chimney concepts and adopted common terminology consistent with the range of products used across the whole European Community;
- b) aligned with European Standards, (the general requirements for which are given in [BS EN 1443](#)) where a chimney is treated as a structure containing a flue (the passageway) and might include a liner (inner wall), insulation and an outer wall. The common terminology in UK industry, which has regarded a chimney as a masonry structure generally associated with solid fuel appliances, has been superseded. Attention is drawn to the definitions for chimney ([3.9](#)), connecting flue pipe ([3.16](#)), flue ([3.27](#)) and flue liner ([3.30](#)), air supply duct ([3.1](#)) and room-sealed chimney configuration ([3.48](#));
- c) updated in line with recent changes in building legislation, in particular, Approved Document B [\[1\]](#), Approved Document F [\[2\]](#) and Approved Document J [\[3\]](#);
- d) updated appliance design, flue material and practical experience in the disposal of products of combustion by means of flues;
- e) updated flueing and ventilation installation practices to reduce occurrences of CO related incidents attributable to flueing and ventilation for gas appliances; and
- f) incorporated, where necessary, additional requirements and guidance previously covered within Technical Bulletins.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at [bsigroup.com/standards](#), or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

It has been assumed in the preparation of this part of [BS 5440](#) that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this document 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.

Requirements in this document are drafted in accordance with the *Rules for the structure and drafting of UK standards:2022*, subclause **G.1.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this document.

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient’s own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute 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 specific regulations:

The gas safety regulations for the appropriate legislative region:

- Gas Safety (Installation and Use) Regulations 1998 [\[4\]](#);
- Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [\[5\]](#); and
- Gas Safety (Installation and Use) Regulations 1994, as amended and applied by the Isle of Man Gas Safety (Application) Order 1996 [\[6\]](#).

NOTE 1 These control all aspects of the ways gas-fired systems are installed, maintained and used, mainly in domestic and commercial premises (e.g. offices, shops, hospitals, educational and other public buildings), and the classes of persons who might undertake gas work.

The building regulations for the appropriate legislative region:

- Building Regulations for England and Wales 2000 [\[7\]](#);
- Building Regulations (Northern Ireland) 2000 [\[8\]](#);
- Building Regulations (Scotland) 2004 [\[9\]](#);
- Building Regulations (Isle of Man) Order 2003 [\[10\]](#); and

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

NOTE 2 These control the supply of new gas appliances and specify the conditions required for CE/UKCA/UKNI marking.

This is a preview of BS 5440-1:2023. [Click here to purchase the full version from the ANSI store.](#)

1 Scope

This part of [BS 5440](#) specifies requirements for the installation of gas appliances to chimneys, chimney installation work likely to be undertaken by gas engineers and operatives working under UK gas industry conditions, and requirements for the maintenance of chimneys. It is applicable to open-flued chimneys for Type B gas appliances and room-sealed chimney configurations for Type C gas appliances, each of rated input not exceeding 70 kW net (see Note 2 and Note 3), burning 1st, 2nd or 3rd family gases. It applies to chimneys of the natural draught or fanned draught type and is applicable to room-sealed chimneys and open-flued chimneys supplied with the appliance as well as to those supplied separately.

NOTE 1 Type B and Type C appliances are explained in [Annex A, Table A.1](#).

This part of [BS 5440](#) complements the requirements for the design, installation and commissioning of chimneys as required in [BS EN 15287-1](#) and [BS EN 15287-2](#), and provides extra requirements that are specific to the UK gas industry.

This part of [BS 5440](#) specifies the following:

- a) requirements for the selection of the correct chimney configuration option for gas appliances in the UK;
- b) requirements for the installation of gas appliances to new chimneys, or chimney configurations;
- c) requirements for the installation of gas appliances to existing chimneys or chimney configurations;
- d) requirements for the installation of appliances which carry a CE, UKCA or UKNI mark and for which the manufacturer's instructions are available to the installer; and
- e) requirements for the installation of appliances which do not carry a CE, UKCA or UKNI mark and used/second-hand appliances for which the manufacturer's instructions are available to the installer.

This part of [BS 5440](#) is applicable to:

- 1) complete chimneys and all chimney components from the appliance connection to the discharge point into outside air;
- 2) the installation of gas appliances to existing chimneys that were intended originally for appliances burning other fuels;
- 3) chimneys for residential park homes; and
- 4) chimneys for hybrid systems incorporating gas appliances.

This part of [BS 5440](#) is not applicable to:

- i) gas-fired incinerators (see [BS 5871-3](#) for the installation of decorative fuel effect appliances);
- ii) leisure accommodation vehicles; or
- iii) appliances designed for use on 100% hydrogen.

This part of [BS 5440](#) includes compatibility of appliances installed in the UK with new chimneys designated under [BS EN 1443](#) and with existing chimneys, including non-designated chimneys.

NOTE 2 In the case of an individual appliance connected to a chimney, the 70 kW maximum rated input relates to that appliance. In the case of more than one appliance in the same room connected to a single chimney, the 70 kW maximum rated input relates to the sum of the rated inputs of all the appliances. In the case of appliances in separate dwellings connected to a shared flue in a chimney, e.g. an SE-duct or a U-duct, the 70 kW maximum rated input relates to the rated input of each individual appliance.