



BSI Standards Publication

Installation and maintenance of gas-fired ducted air heaters of rated heat input not exceeding 70 kW net (2nd and 3rd family gases) – Specification

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 28 February 2019. It was prepared by Technical Committee GSE/030, *Gas installations (1st, 2nd and 3rd family gases)*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes [BS 5864:2010](#), which is withdrawn.

Information about this document

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

- [Annex B](#) gives information about the connection options for condensate and combined pressure relief valve/condensate discharge.
- [Annex C](#) gives information on the procedure for inspecting a heat exchanger.
- [Annex D](#) gives information on the procedure for setting up the fan-assisted provision of combustion air.

Use of this document

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.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **J.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 standard.

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 statutory regulations:

The Gas Safety (Installation and Use) Regulations 1998 [\[1\]](#)

The Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [\[2\]](#)

The Gas Appliance (Safety) Regulations 1995 [\[3\]](#)

The Asbestos (Prohibitions) Regulations 2003 [\[4\]](#)

The Building (Amendment) Regulations 2009, as amended [\[5\]](#)

The Building (Scotland) Amendment Regulations 2007, as amended [\[6\]](#)

The Building (Northern Ireland) Amendment Regulations 2009 [\[7\]](#)

The Building Control Act (Isle of Man) 1991 [\[8\]](#)

The Building (Isle of Man) Regulations 2007 [\[9\]](#)

The Gas Safety (Application) (Isle of Man) Order 1996 [\[10\]](#)

The Water Supply (Water Fittings) Regulations 1999, as amended [\[11\]](#)

1 Scope

This British Standard specifies requirements for the selection, installation and maintenance (see Note 1) of flued, gas-fired, ducted-air heaters of rated heat input not exceeding 70 kW, based on net calorific value, burning 2nd or 3rd family gases to heat one or more rooms or internal spaces in either domestic premises (see Note 2) or commercial premises.

It is applicable to warm air heaters that incorporate a fan to circulate the warm air.

It is also applicable to combined air heater/circulator installations and to the servicing and maintenance of heaters that distribute warm air by natural convection (see [Annex A](#)).

It is not applicable to gas installations in towed or motorized leisure accommodation vehicles.

NOTE 1 For the purposes of this British Standard, installation includes design, inspection and commissioning. It is recognized that each of these tasks can be performed by the same person.

NOTE 2 As well as normally constructed dwellings, domestic premises include any permanently sited leisure accommodation vehicles, residential park homes and permanently moored boats.

NOTE 3 For the purposes of this British Standard, heat input is expressed in terms of the net calorific values (CV), unless otherwise stated. The ratio of gross CV (H_g) to net CV (H_n) heat input is approximately 1.11:1 for natural gas, 1.09:1 for propane, and 1.08:1 for butane.

NOTE 4 It is essential that persons carrying out the installation of any gas appliance be competent to do so.

2 Normative references

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

Standards publications

[BS 476-22](#), *Fire tests on building materials and structures — Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction*

[BS 5440-1:2008](#), *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) — Part 1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys*

[BS 5440-2:2009](#), *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) — Part 2: Specification for the installation and maintenance of ventilation provision for gas appliances*

[BS 5482-1](#), *Code of practice for domestic butane- and propane-gas- burning installations — Part 1: Installations at permanent dwellings, residential park homes and commercial premises, with installation pipework sizes not exceeding DN 25 for steel and DN 28 for corrugated stainless steel or copper*

[BS 5482-2](#), *Code of practice for domestic butane- and propane-gas-burning installations — Part 2: Installations in caravans and non-permanent dwellings*

[BS 5546](#), *Specification for installation and maintenance of gas-fired water-heating appliances of rated input not exceeding 70 kW net*

[BS 5871-3](#), *Specification for the installation and maintenance of gas fires, convector heaters, fire/back boilers and decorative fuel effect gas appliances — Part 3: Decorative fuel effect gas appliances of heat input not exceeding 20 kW (2nd and 3rd family gases)*

[BS 6891](#), *Specification for the installation of low pressure gas installation pipework of up to 35 mm (R11/4) on premises*

[BS 7671](#), *Requirements for electrical installations — IEE Wiring Regulations*

BS EN 1949, *Specification for the installation of LPG systems for habitation purposes in leisure accommodation vehicles and accommodation in other vehicles*

BS EN 50379-3, *Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances — Part 3: Performance requirements for apparatus used in non-statutory servicing of gas fired heating appliances*

BS EN ISO 10239, *Small craft — Liquefied petroleum gas (LPG) systems*

PD 5482-3, *Code of practice for domestic butane and propane gas-burning installations — Part 3: Installations in boats, yachts and other vessels*

Other publications

[N1] INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM). *Gas installations in timber framed and light steel framed buildings*, Edition 2. IGM/UP/7. Derbyshire. IGM, 2006.

[N2] INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM). *Installation pipework on industrial and commercial premises*, Edition 2. IGM/UP/2. Derbyshire: IGM, 2008

[N3] INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM). *Tightness testing and direct purging of small Natural Gas installations*, Edition 2. Derbyshire: IGM,

[N4] INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM). *Strength testing, tightness testing and direct purging of industrial and commercial gas installations*. IGM, Derbyshire, Second Edition, 2005

[N5] INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM). *Strength and tightness testing and direct purging of small low pressure industrial and commercial Natural Gas installations*. IGM, Derbyshire, Second Edition, 2005

[N6] The UKLPG User Information Sheet (UIS) 014. *Gas Soundness Testing of LPG Service Pipework, Installation Pipework and Appliances in Holiday Homes, Caravans and Motor Homes*. UKLPG, 2005 (available from <http://www.uklpg.org/>) [Last viewed 28 February 2019].

3 Terms and definitions

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

3.1 air heater

appliance for heating air to be used for space heating

NOTE Hereinafter referred to as “heater”.

3.2 air vent

non-adjustable, purpose-provided unit/assembly designed to allow permanent ventilation

3.3 chimney

structure consisting of a wall or walls enclosing a flue or flues

NOTE This includes chimneys of all materials (e.g. metal, masonry, plastic). It can be either an open flue chimney for use with an open-flued appliance or a room-sealed chimney configuration for use with a room-sealed appliance.

3.4 compartment

enclosure specifically designed or adapted to house one or more gas appliances

NOTE Such an enclosure is a non-habitable space.

3.5 ducted-air heater

air heater using ducting to distribute the heating air

NOTE In domestic premises this term is only used for flued heaters.

3.6 flue

passage for conveying combustion products to outside air within a chimney

3.7 flue pipe

component used for connecting an appliance outlet and the chimney

NOTE For a double-walled flue system or factory-made insulated flue system it is the inner pipe.

3.8 installation instructions

instructions prepared by a gas appliance manufacturer, giving detailed information and requirements on how the appliance should be installed and maintained

NOTE Such instructions should not be confused with other documents supplied by the appliance manufacturer, e.g. sales literature. These instructions are approved by the notified body as part of the CE marking process.

3.9 internal space

interior space which is not a room

NOTE An internal space can be, for example, a hall, passageway, stairway or landing.

3.10 intumescent air vent

assembly for preventing the spread of fire, consisting of a metal louvre or grille with an intumescent block secured behind it, incorporating a latticework of holes to provide continuous ventilation but which expands and closes in the event of extreme heat build up as occurs in a fire

NOTE When fitted to a door, the assembly usually has a Louvre or grille on both sides.

3.11 natural convection air heater

air heater designed for location within a centrally-sited convection chamber

3.12 open-flued (type B) heater

heater designed to be connected to an open-flued system, its combustion air being drawn from the room, space or compartment in which it is installed

3.13 plenum

box connected to a heater outlet that equalizes air pressure to the supply ducts

3.14 protected stairway

stairway, including an exit passageway leading to a final exit, enclosed with a fire-resistant construction, other than any part that is an external wall of a building

3.15 register

fitment equipped with a damper or movable Louvres that permits adjustment or closure of an opening from which air discharges

3.16 room-sealed (type C) heater

heater in which the combustion circuit (air supply, combustion chamber, heat exchanger and evacuation of the products of combustion) is sealed from the room in which the heater is installed

3.17 SE-duct

duct rising vertically through a building, open at its extremities, and serving to bring combustion air to, and to take products to the outside air from, Type C2 room-sealed appliances

3.18 slot-fit heater

heater that is specifically designed and manufactured for installation in a purpose-built recess in such a way that only the front of the heater opens into a room or internal space

NOTE On open-flued heaters, combustion air and air for dilution passes through the front of the heater's panels.

3.19 transfer grille

non-adjustable fitment for location within a wall, door or partition, to effect the transfer of air between adjacent rooms and/or spaces

NOTE These grilles can also provide the route for combustion air, so their size has to be calculated accordingly (see [BS 5440-2](#)).

3.20 U-duct

duct in the form of a vertical "U", the ends being open and adjacent, one limb of which provides combustion air to the bottom of the "U", whilst room-sealed appliances, (Type C2), (both air supply duct and flue duct) are fitted to the other limb

NOTE A continental European arrangement fits the air supply duct of the appliance (Type C4) to one limb and the flue duct to the other.

4 Competence

COMMENTARY ON **CLAUSE 4**

Competence requires sufficient knowledge, practical skill and experience to carry out the job in hand safely, with due regard to good working practice. The installation should also be left in a safe condition for use. Knowledge should be kept up to date with changes in law, technology and safe working practice.

There are three principal aspects to competence for gas fired heaters; these are:

- knowledge of the relevant Building Regulations [[5](#)], [[6](#)], [[7](#)], [[8](#)] for domestic premises;
- ability to ensure that electrical work in dwellings is designed, installed, inspected and tested in accordance with [BS 7671](#);
- for "gas work", registration with an appropriate authority.

It is a statutory requirement in Great Britain, the Isle of Man, Northern Ireland and Guernsey (see [Table 1](#)) that all "gas work" [item c)] be carried out by a business or self-employed person(s) that is a member of a "class of persons" registered with a registration body which has been approved by an approval body (see [Table 1](#)) to operate and maintain such a register.

At the time of publication, the only body with approval to operate and maintain a register of individuals/businesses who are "members of a class of persons" is the Gas Safe Register. Thus, it is essential that all businesses or self-employed gas engineers are registered with the Gas Safe Register.

The qualifications which persons need to have to be deemed competent to carry out gas work are given in [Table 2](#).

Persons carrying out work covered by the scope of this British Standard shall ensure that they have the competence relevant for the task and, in particular, the safe installation, commissioning and operation of gas equipment.

Table 1 — *Approval bodies and statutory regulations by country/territory*

Country/territory	Approval body	Statutory regulations
Great Britain	Health and Safety Executive (HSE)	Gas Safety (Installation and Use) Regulations 1998 [1]
Isle of Man	Health and Safety at Work Inspectorate (HSWI)	Gas Safety (Installation and Use) Regulations 1994, as amended and applied by the Gas Safety (Application) (Isle of Man) Order 1996 [10]
Northern Ireland	Health and Safety Executive Northern Ireland (HSENI)	Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [2]
Guernsey	Health and Safety Executive for the States of Guernsey [HSE (Guernsey)]	Health and Safety (Gas) (Guernsey) Ordinance 2006 [12]

Table 2 — *Competence requirements by country/territory*

Qualifications	Great Britain and Isle of Man	Northern Ireland	Guernsey
Current certificate(s) of competence in the type of gas work to be conducted, issued by an awarding body accredited by the United Kingdom Accreditation Service (UKAS) (ACS certification)	✓	✓	✓
National/Scottish Vocational Qualification (N/SVQ accredited by Ofqual), which is aligned in matters of gas safety	✓	✓	✓
National/Scottish Vocational Qualification (N/SVQ accredited by Ofqual), which is aligned under the HSC ACoP arrangement ^{A)} as approved with the registration body	✓	✓	✗
Any other scheme recognized by the gas registration body for registration purposes	✓	✓	✓

^{A)} Guidance on the individual competence required for gas work is given in *Gas installations in flats and other multi-dwelling buildings* [13].

5 Environmental considerations

The following shall be taken into account as part of the planning process.

- Disposal/recycling of existing appliances and systems materials that are to be removed.
- Disposal/recycling of the new appliance and system components packaging.
- Optimization of energy usage through appliance selection (see 6.2.1) and system design.
- Minimization of harmful emissions discharge (see 6.4.2 and 6.4.3).

6 Selection of equipment and pre-installation

6.1 Exchange of information and planning

COMMENTARY ON [6.1](#)

Consultation between those carrying out the work

Liaison between the persons carrying out the work is essential for a safe and efficient heater installation.

The following matters should be considered when carrying out new or replacement installations:

- a) the number of storeys in the building, which determines the installation requirements (see [7.3.3](#));*
- b) the type of building, its form of construction (e.g. timber framed) and its level of thermal insulation;*

NOTE 1 Information on gas installations in timber framed and light steel framed buildings is given in IGE/UP/7, Edition 2 [N1]. Information on gas installations in flats and other multi-dwelling buildings is given in IGE/G/5, Edition 3 [13].

- c) the location, orientation and exposure of the building;*
- d) the size, layout and purpose of rooms and working areas;*
- e) the total heat requirements;*
- f) the availability of adequate gas supplies;*
- g) the best location of the heater;*

NOTE 2 When the layout and disposition of the various areas to be heated are known, the size, type and location of the heater required should be determined. The path of the chimney system and the ventilation requirements might also affect the choice of the location of the heater. Whenever reasonably practicable, a room-sealed heater should be installed. The design of ductwork and ancillary equipment for the heating system is dealt with in CORGI's Warm Air Heating System Design Guide [14].

- h) the size, height, type, support and route of the chimney and the position of termination, including the possible consequences of any plumbing;*

NOTE 3 Particular notice is drawn to the advice given in [BS 5440-1:2008](#), Clause 12, on the connection to SE-duct, U-duct and shared chimneys. Attention is drawn to the Gas Safety (Installation and Use) Regulations [1] with respect to the need for inspection throughout the length of the chimney system.

- i) the availability of adequate air for combustion and ventilation;*
- j) the electrical supplies available;*
- k) the water supplies available (where applicable);*
- l) the provisions of any local and water bylaws; and*
- m) the external controls of the heating system (see the MHCLG publication, Domestic Building services Compliance Guide [15]).*

Consultation with official bodies

The following official bodies might need to be consulted for the following reasons.

- 1) The local authority, with regard to building regulations and planning application requirements.*
- 2) The fire authority, with regard to relevant fire precautionary requirements; and the fire insurers, for notification of any proposed changes in the means of heating.*

- 3) *The Health and Safety Executive (HSE), with regard to health and safety requirements in commercial premises, particularly with regard to safety requirements which are not fulfilled as an integral part of the installation.*
- 4) *The water authority/company, with regard to the Water Supply (Water Fittings) Regulations (as amended) [11] or relevant bylaws.*

Persons who design the heating system or installation shall have knowledge and understanding of the standards and regulations that apply to ensure that any completed plans produce a safe and satisfactory installation.

Persons concerned with the selection of the heater and the design of the system shall collaborate with the operative during the planning and the execution of the work.

6.2 Selection of heater

6.2.1 General

COMMENTARY ON [6.2.1](#)

The efficiency of the heater should be taken into account during selection. The heater manufacturer's literature might indicate the claimed efficiency when measured in accordance with BS EN 778 for an open-flued heater or BS EN 1319 for a fanned-flued heater.

Attention is drawn to the Building Regulations for England and Wales, Part L and to Approved Documents L1A for new dwellings [16], L1B for existing dwellings [17], L2A for new buildings other than dwellings [18], and L2B for existing buildings other than dwellings [19]. For selection of a heater in England and Wales attention is drawn to:

- a) *the MHCLG publication, Domestic Heating Compliance Guide [15]; and*
- b) *the MHCLG publication, Non-Domestic Building Services Compliance Guide [20].*

Attention is drawn to the HSE Approved Code of Practice and Guidance L56, Safety in the installation and use of gas systems and appliances [21].

For selection of a heater in Scotland attention is drawn to the Scottish Building Standards Agency Domestic Technical Handbook [22] and Non-domestic Technical Handbook [23].

New heaters

Of the heaters covered by this British Standard, new heaters fall within the scope of the European Gas Appliances Regulation [24], implemented in the UK by the Gas Appliances (Safety) Regulations [1], which require new heaters to be CE marked.

The installer should check that the packaging and the heater's data plate are marked with at least the following information.

- a) *The letters "GB".*
- b) *The type of gas and appliance inlet pressure as follows:*
 - 1) *for a heater adjusted for natural gas, "G20 and/or natural gas 20 mbar" plus the designation I2H;*
 - 2) *for a heater adjusted for butane, "G30 and/or butane 29 mbar" plus the designation I3B;*
 - 3) *for a heater adjusted for propane, "G31 and/or propane 37 mbar" plus the designation I3P;*
 - 4) *for a heater that is designed to burn either butane or propane gas at the correct pressure, "G30/G31 and/or butane/propane 29/37 mbar" plus the designation I3+.*

Where a heater's data plate carries the letters CAT I or CAT II followed by the gas type designations, i.e. 2H, 2P, 2B, the heater can be used for different types of gases when adjusted to do so. In such a case, the installer should ensure that the heater is correctly adjusted.

Conversion to another gas, if necessary, should be carried out strictly in accordance with the manufacturer's instructions, using the manufacturer's kit of parts.

If there is any doubt as to the suitability of a heater for a particular gas, the heater manufacturer should be consulted.

Further information on the labelling of gas appliances is given in DD 221, General guidance for the marking of gas appliances.

Previously used heaters

It is recommended that a previously used heater is not installed. However, where such a heater is to be installed and the original packaging is not available, the installer should, by referring to the data plate and/or other means, ensure that the heater is suitable for the pressure and type of gas to be burnt. If there is any doubt, the heater should not be installed. Where the heater manufacturer's instructions are not available, these should be obtained from the manufacturer or his agent before installation of the heater begins.

Where a used heater carries the "CE" mark, its data plate is likely to carry the information on type of gas and appliance inlet pressure. In such a case, the installation should proceed in accordance with the manufacturer's instructions.

Where the heater does not carry a "CE" mark, other criteria could apply, such as surface temperatures, heater stability, ventilation, etc., and these need to be taken into account in deciding the method of installation. The installer should be satisfied that the heater is safe in construction and condition, and can be used without constituting a danger.

The installer shall ensure that a new heater carries a CE mark.

The heater used shall be one that has been marked by the manufacturer as being suitable for the gas with which it is to be supplied.

A previously used heater shall not be installed if the manufacturer's instructions are not available to the installer.

A heater shall only be installed if it has a readable data plate.

6.2.2 Sizing the heater

COMMENTARY ON [6.2.2](#)

Information on the methods for determining heat requirements and fan requirements is given in the Warm Air Heating System Design Guide [14]. Further information, particularly on heat losses and sizing, can also be found in CIBSE Guide B3: Ductwork [25] and IGEM publication, IGEM/UP/17, Shared Chimney and Flue Systems for Domestic Gas Appliances [26].

The heater shall have a rated output sufficient to satisfy the heat requirements of the building as agreed between the installer or designer and the owner/occupier of the premises in which the heater is to be installed, taking into account any losses from the warm air ducting.

6.2.3 Types of heater

COMMENTARY ON [6.2.3](#)

There are three types of heater which are categorized according to the direction of air flow through the heater:

- a) upflow;*

- b) downflow; and
- c) horizontal flow.

Some of these can be combined with an integral water heater. Condensing appliances are also available.

The heater shall be selected to suit the operating characteristics required by the heating system's design.

6.3 Location of heaters

COMMENTARY ON [6.3](#)

The Gas Safety (Installation and Use) Regulations 1998 [1] require that:

- a) *a heater installed in a room or internal space containing or intended to contain a bath or shower has to be room-sealed;*
- b) *a heater of greater than 12.7 kW net (14 kW gross) heat input installed in a room used or intended to be used as sleeping accommodation has to be room-sealed;*
- c) *a heater of not greater than 12.7 kW net (14 kW gross) heat input installed in a room used or intended to be used as sleeping accommodation has to be room-sealed or has to incorporate a safety control designed to shut down the heater before there is a build up of a dangerous quantity of combustion products in the room concerned; and*
- d) *a heater for use with 3rd family gases, which uses automatic-ignition or a pilot light, is not to be installed in a room or internal space below ground level, e.g. a basement.*

The regulations do not preclude the installation of such appliances in rooms or internal spaces which are basements with respect to one side of the building but which are open to ground level on the opposite side.

A previously used, non room-sealed gas heater should not be installed in a room used or intended for use as sleeping accommodation because the device for shutting down the heater in the event of a build up of combustion products might not be present or acceptable. Where there is any doubt as to whether the heater is fitted with an acceptable device it should not be installed in sleeping accommodation.

A room-sealed heater can be installed in any room or space. Installation of a gas heater in a bathroom, shower room or bedroom should be considered only if there is no alternative location and the manufacturer's instructions state that the heater is suitable for installation in a bathroom, shower room or bedroom.

Any type of heater can be installed in a private garage unless the manufacturer's instructions for a particular heater state that it is unsuitable for use in such a location. A heater should not be installed in any premises where concentrations of flammable vapour could accumulate, e.g. commercial garages and workshops. Reference should be made to the IGEM publication, IGEM/UP/18, Gas installations for vehicle repair and body shops [27].

The location of a heater shall be in accordance with the manufacturer's instructions and the chosen location shall be in accordance with [7.1](#) to [7.7](#).

6.4 Condensing heaters

6.4.1 General

COMMENTARY ON [6.4.1](#)

The manufacturer's installation instructions should describe any particular requirements for the condensing heater, e.g. a means for disposal of condensate, the air-gas ratio valve setting and the water temperature operating range.

Heaters designed to be used in the condensing mode shall be installed in accordance with the manufacturer's installation instructions, or, if there are no specific instructions, the requirements in [6.4.2](#), [6.4.3](#), [6.4.4](#), [6.4.5](#) and [6.4.6](#) shall be followed.

6.4.2 Location

6.4.2.1 General

COMMENTARY ON [6.4.2.1](#)

Room sealed heaters can be installed in any room or space. However, it is not recommended that any type of heater be installed in an under stairs cupboard, bathroom or shower room, bedroom or bed sitting room, or within a toilet or cloakroom, but such installations are acceptable subject to the requirements of [7.3.4](#) to [7.3.7](#).

Heaters and their condensate pipes should not be located in such a position that a leak of water or condensate from these components could cause damage to other building services.

Where a heater is located in an exposed position, such as an external location, roof space or an unheated garage, consideration should be given to additional frost protection whilst avoiding an adverse effect on the energy consumption of the installation, e.g. installation of a pipe thermostat on the heater return.

There is no restriction on the type of heater that can be installed in a private garage, except where the manufacturer states otherwise. Great care is required in the location of a heater in any premises where concentrations of flammable vapour could accumulate, e.g. commercial garages and associated workshops.

The following issues shall be considered when determining the suitability of a particular location:

- a) chimney outlet location (see [6.4.3](#));
- b) access to the condensate discharge termination for the condensate drainage pipe (see [6.4.4](#) and [6.4.5](#)) if necessary;
- c) air supply and ambient conditions (see [7.1](#) and [7.3.1](#), respectively);
- d) ventilation (see [7.1](#) and [7.3.2.1](#));
- e) space, both for installation and subsequent service access (see [7.3.1](#));
- f) support for the installed weight of the water-filled appliance and connecting pipework and ancillary controls (see [7.3.3](#)); and
- g) specific requirements for the appliance siting position chosen (see [7.3.2](#) to [7.3.3](#) inclusive).

6.4.2.2 3rd family gases

COMMENTARY ON [6.4.2.2](#)

This does not preclude the installation of such appliances in rooms which are basements with respect to one side of the building but open to ground level on the opposite side.

A heater for use with 3rd family gases shall not be installed in a room or internal space situated below ground level, e.g. a basement or cellar.

6.4.3 Siting of the chimney outlet

COMMENTARY ON [6.4.3](#)

Condensing heaters produce a visible plume of water vapour for a significant proportion of their operating time. At low level, this plume might cause nuisance.

Other aspects to consider when planning the chimney outlet position include the following:

- a) a free passage of air is needed to aid plume dispersal;*
- b) the combustion products of a condensing heater should not be discharged under a carport;*
- c) in cold weather, the plume could cause a safety hazard if it freezes on pathways, or if it results in frost damage to surfaces;*
- d) the plume could trigger infra-red security lighting if sited in the wrong place;*
- e) the plume could affect the performance of external temperature sensors associated with energy management control systems;*
- f) the chimney outlet or plume should not obscure security camera field of vision;*
- g) the chimney outlet guards should be able to resist corrosive properties of the condensate;*
- h) the need for a plume management kit when provided or specified by the appliance manufacturer; and*
- i) for roof space installations, running a chimney system (twin pipe or concentric system) from a room-sealed fan-assisted heater, horizontally through the tiles of an adjacent tiled roof should not be attempted unless specifically permitted by the heater manufacturer's installation instructions.*

NOTE 1 This technique is prone to possible blockage from snow and condensing heaters tend to cause damage to the roof tiles immediately below the chimney outlet, due to condensate leaching the colour out of concrete tiles.

For guidance on how to reduce the possibility of nuisance to neighbouring buildings, refer to the section on flue terminal siting in Guide to the Condensing Heater Installation Assessment Procedure for Dwellings [28].

The chimney outlet shall be sited in accordance with [BS 5440-1](#).

NOTE 2 Information on room sealed (natural/fanned draught) and open flued (fanned draught) appliance flues terminating within covered passageways (ginnells) is given in Technical Bulletin 007, as published by Gas Safe Register [29].

NOTE 3 Chimney outlet was originally referred to as flue terminal in British Standards.

NOTE 4 Information on plume management is provided in [BS 5440-1](#).

Where it is considered that the plume from a chimney outlet installed in accordance with [BS 5440-1](#) might cause a nuisance to the user or their neighbours, reference shall be made to the heater manufacturer's instructions for specialist advice on how to redirect the chimney outlet, for example, by the:

- a) partial rotation of the chimney terminal;
- b) fitting of a deflector elbow; or
- c) use of a kit that provides high level termination.

In particular, the potential for the plume to discharge across the following shall be avoided:

- 1) a public footpath;
- 2) a frequently used access route;
- 3) a frequently used area (such as a patio);
- 4) a neighbouring dwelling; and
- 5) an area used for car parking.

The terminal shall not be directed towards a window or door (see [BS 5440-1](#)), or be sited close to a facing wall, boundary fence or neighbouring property.

NOTE 5 Some appliances are designed to disperse condensate within the combustion products discharge.

Particular care shall be given to siting the terminal to ensure safe disposal of the condensate in accordance with the manufacturer's instructions (see Note 4 of [6.4.8](#)). If such advice is not included in the appliance instructions the manufacturer shall be consulted.

6.4.4 Selection of condensate discharge point

COMMENTARY ON [6.4.4](#)

Winters in the UK can involve prolonged spells of extremely cold weather – down to minus 20 °C in many areas. This can cause freezing of the condensate in the condensate discharge pipe, causing the pipe to become blocked with ice and the heater to shut down. Whilst there can never be a guarantee (under widespread and prolonged very low temperatures) that the condensate discharge will not freeze, parts of the condensate discharge pipe that are located externally are particularly at risk of freezing; hence the recommendation to use an internal foul water discharge point wherever possible.

A slightly longer pipe run, for example, to an internal soil stack, might be preferable to a shorter run connecting into a kitchen waste pipe discharging directly through the wall to an external drain.

The possibility of the condensate drainage pipe freezing downstream of the connection point to the heater during prolonged spells of extremely cold weather shall be taken into account when choosing the siting of the condensate discharge point.

Wherever possible, the condensate drainage pipe shall be terminated at an internal foul water discharge point (see [Annex B, B.1](#)).

Where discharge to an internal foul water discharge is not possible due to impracticality, very long pipe runs being required to reach a suitable internal discharge point, an external discharge point shall be used (see [Annex B, B.2](#)).

Where the pressure relief valve and condensate discharge pipes are combined (see [6.4.5](#) and [6.4.7.2](#)), the combined discharge pipe shall be terminated internally to the property, unless other means of ensuring safe pressure relief valve discharge in the event of freezing have been specified in the appliance instructions.

6.4.5 Combined discharge from pressure relief valve and heater condensate drain

COMMENTARY ON [6.4.5](#)

For some condensing heaters, either:

- a) the heater installation instructions advise that the heater has been designed such that the discharge pipe from the heater pressure relief valve and the heater condensate discharge pipe are combined internally within the heater case to provide a single connection point to which the condensate discharge pipe is to be fitted; or*
- b) the heater installation instructions advise that the pressure relief valve discharge pipe can be combined with the condensate discharge pipe by the installer, outside the heater case.*

Special conditions shall apply where the pressure relief valve discharge pipe and the condensate drainage pipe have been combined (see [6.4.7.2](#)).

The discharge pipe from the pressure relief valve shall conform to [6.4.7.2.6 a](#)).