



BSI Standards Publication

Specification for selection, installation, inspection, commissioning, servicing and maintenance of gas-fired boilers of rated input not exceeding 70 kW net

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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 31 May 2014. It was prepared by Panel GSE/30/-15, *Boilers of rated input not exceeding 70kW and hot water supply*, under the authority of 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 its secretary.

Supersession

This British Standard supersedes BS 6798:2009, which is withdrawn.

Information about this document

The structure of this document follows the approach used in other gas installation standards.

Requirements, with corresponding commentary (e.g. explanation/recommendation as appropriate), cover equipment selection and pre-installation, installation and post-installation, to which maintenance has been added as a specific detail.

In line with BS 5440-1, this revision acknowledges that European work on chimney standards has brought about the need in British Standards to redefine chimney concepts and adopt common terminology consistent with the range of products used across the whole European Community (the general requirements for which are specified 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industry, which has regarded a chimney as a masonry structure generally associated with solid fuel appliances, has been superseded.

All websites referred to in this British Standard were last viewed on 28 May 2014.

Use of this document

The requirements of this specification are supported by recommendations in the form of Commentary. To comply with this specification, it is necessary to comply with all its provisions. The operative may depart from recommendations, but would be expected to have good reasons for doing so.

This standard recognizes that manufacturers' instructions (assessed at the time of CE type testing as resulting in at least an equivalent level of safety) might specify a method of installation, testing, commissioning, servicing or maintenance which differs in points of detail from this standard. It is important that the manufacturer's instructions are followed.

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.

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) (Northern Ireland) Regulations 2004 [2];
- The Gas Safety (Installation and Use) Regulations 1994, as amended and applied by the Gas Safety (Application) (Isle of Man) Order 1996 [3];
- The Health and Safety (Gas) (Guernsey) Ordinance 2006 [4];
- The Gas Appliance (Safety) Regulations 1995 [5];
- The Building Regulations 2010 (England and Wales), as amended [6];
- The Building Regulations (Northern Ireland) 2012 [7];
- The Building (Scotland) Regulations 2004, as amended [8];
- The Building Regulations 2007 (for the Isle of Man) [9];
- The Water Supply (Water Fittings) Regulations 1999, as amended [10];
- The Water Byelaws 2004 (Scotland) [11];
- The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [12].

1 Scope

This British Standard specifies requirements for the selection, installation, inspection, commissioning, servicing and maintenance of gas-fired boilers for central heating and other purposes, which have a total rated heat input not exceeding 70 kW based on net calorific value. This includes cookers with integral boilers used to provide central heating.

It applies to boilers utilizing 1st, 2nd or 3rd family gases designed to operate in the condensing or non-condensing mode for the heating of domestic dwellings or domestic dwellings in commercial premises by the circulation of heated water in open or closed systems.

This standard does not apply to:

- a) boilers with a rated input of over 70 kW; or
- b) groups of boilers with individual ratings of 70 kW or less, but with aggregate inputs of over 70 kW as specified in BS 6644.

NOTE 1 Groups of boilers with individual ratings of less than 70 kW, but with a maximum aggregate input of ≤ 70 kW, may be installed to this standard but specialist advice on the system design, installation and control needs to be sought from the appliance manufacturer.

It is not applicable to the detailed design and installation of the whole heating system, which is specified in BS EN 12828, BS EN 12831:2003 (incorporating corrigendum January 2009) and BS EN 14336:2004 (incorporating corrigendum January 2009).

NOTE 2 With the publication of BS EN 12828, BS EN 12831 and BS EN 14336, BS 5449 has been withdrawn. These Standards are not aligned to UK design and installation practices; they cover commercial as well as domestic heating systems and exclude hot water. Consequently, these standards include UK national annexes covering all the relevant material from BS 5449.

NOTE 3 The installation of boilers with a rated input greater than 70 kW is covered by BS 6644. Additional requirements for the installation of back boiler units are specified in BS 5871-1 and BS 5871-2.

This standard applies to boilers which carry a CE mark and also to previously-used boilers which do not carry the CE mark (see 6.2.1).

NOTE 4 In this standard, heat input is expressed in terms of net calorific values (CV), unless stated otherwise. The ratio of gross to net heat input is approximately 1.11:1 for natural gas, 1.09:1 for propane, and 1.08:1 for butane.

NOTE 5 It is essential that persons carrying out the installation of any gas appliance are competent to do so. Clause 4 gives information on competence.

NOTE 6 Some clauses of this standard might be appropriate for the installation of pool and spa heaters. The manufacturer's instructions might advise which parts are not appropriate. For example, for direct spa and pool heaters, no corrosion inhibitors or chemical cleaning are permitted.

NOTE 7 The general installation requirements for 3rd family installations specified by this standard also apply to gas installations supplied with LPG/air mixtures used in the Channel Islands or the Isle of Man, providing: any gas equipment being installed has been appropriately converted and is suitable for the gas being supplied, and the requirements of the standard do not conflict with local regulations or authorized local custom and practice.

2 Normative references

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

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 1179-6, *Glossary of terms used in the gas industry – Part 6: Combustion and utilization including installation at consumers' premises*

BS 5258-1, *Safety of domestic gas appliances – Part 1: Specification for central heating boilers and circulators*

BS 5258-8, *Specification for safety of domestic gas appliances – Part 8: Combined appliances: gas fire/back boiler*¹⁾

BS 5422:2009, *Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range –40 °C to +700 °C*

BS 5440-1, *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*²⁾

BS 5440-2, *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 5970, *Thermal insulation of pipework, ductwork, associated equipment and other industrial installations in the temperature range of –100 °C to +870 °C – Code of practice*

BS 6644, *Specification for the installation and maintenance of gas-fired hot water boilers of rated inputs between 70 kW (net) and 1.8 MW (net) (2nd and 3rd family gases)*

BS 6891, *Installation of low pressure gas pipework of up to 35 mm (R1¼) in domestic premises (2nd family gas) – Specification*

BS 7671, *Requirements for electrical installations – IET Wiring Regulations – Seventeenth edition*³⁾

BS 7927, *Heating appliances for domestic applications – Portable apparatus designed to detect and measure specific combustion flue gas products – Requirements*

NOTE 1 BS 7927 has been superseded by BS EN 50379-3.

BS 7977-2, *Specification for safety and rational use of energy of domestic gas appliances – Part 2: Combined appliances: Gas fire/back boiler*

¹⁾ Withdrawn. Superseded by BS 7977-2.

²⁾ This standard also gives an informative reference to BS 5440-1:2008.

³⁾ This standard also gives an informative reference to BS 7671:2008.

BS EN 1491, *Building valves – Expansion valves – Tests and requirements*

BS EN 12828, *Heating systems in buildings – Design for water-based heating systems*⁴⁾

BS EN 12831:2003 (incorporating corrigenda January 2009 and September 2013), *Heating systems in buildings – Method of calculation of the design heat load*

BS EN 13831, *Closed expansion vessels with built in diaphragm for installation in water*

BS EN 14336:2004 (incorporating corrigenda January 2009 and September 2013), *Heating systems in buildings – Installation and commissioning of water based heating systems*

BS EN 50291, *Electrical apparatus for the detection of carbon monoxide in domestic premises*

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*

NOTE 2 BS EN 50379-3 has superseded BS 7927.

BS EN ISO 4126-1, *Safety devices for protection against excessive pressure – Part 1: Safety valves*

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

IGEM/G/5, Edition 2: *Gas installations in multi-occupancy buildings*⁵⁾

IGEM/GM/6, Edition 2: *Non-domestic meter installations – Standard designs*⁵⁾

IGEM/UP/2, Edition 2, *Installation pipework on industrial and commercial premises*⁵⁾

IGEM/UP/7, Edition 2, *Gas installations in timber framed and light steel framed buildings*⁵⁾

IGEM/UP/17, *Shared Chimney and Flue Systems for Domestic Gas Appliances*⁵⁾

UKLPG, *Code of Practice 22 – LPG Piping System Design and Installation*⁶⁾

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 1179-6 and the following apply.

3.1 boiler compartment

enclosure specifically designed or adapted to house one or more gas boilers, and which is not a habitable space

3.2 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) for use with either open-flued or room-sealed appliances.

⁴⁾ This standard also gives an informative reference to BS EN 12828:2012.

⁵⁾ Institution of Gas Engineers and Managers, Kegworth.

⁶⁾ UKLPG, Kenilworth.

3.3 combination boiler

boiler designed to provide domestic hot water and hot water for central heating without the need for additional secondary storage

NOTE A combination boiler may include primary or secondary storage.

3.4 condensing boiler

boiler designed to make use of the latent heat in the combustion products by condensing water vapour within the appliance

3.5 domestic dwelling

self-contained unit designed to accommodate a single household

3.6 flue

passage for conveying combustion products to the outside air

3.7 flue duct

duct containing the flue of a chimney configuration

3.8 greywater

water originating from the mains water supply that has been used for bathing or washing, washing dishes or laundering clothes

3.9 hot water storage combination unit

hot-water storage vessel with either:

- a) a cold water feed cistern immediately above it, the two being fabricated together as a compact unit; or
- b) a cold water feed cistern beside it or inside it

3.10 open-flued boiler

boiler designed to be connected to an open-flue chimney

NOTE 1 These appliances are sometimes referred to as "non-room-sealed appliances" in European installation standards.

NOTE 2 These appliances are classified in PD CEN/TR 1749 as Type B appliances.

3.11 open-flued chimney

chimney that evacuates the products of combustion to the outside air, the combustion air being drawn directly from the room, space or enclosure containing the boiler

3.12 open system

heating system which is open to the atmosphere and incorporates a feed and expansion cistern

3.13 operative

person who installs, commissions, services or maintains a gas-fired central heating boiler

NOTE See Clause 4 for the competence requirements of an operative.

3.14 plume

visible cloud formed when products of combustion exit from a chimney and are cooled below the dew point by mixing with external air

3.15 plume management kit

chimney component designed to manage the discharge of the products of combustion such that any plume will not cause a nuisance

3.16 pressure relief valve

pressure-actuated valve which opens automatically at a specified set pressure to discharge fluid

3.17 rated output

useful heat output declared by the manufacturer

3.18 room-sealed boiler

boiler whose combustion system is sealed from the room in which the boiler is located and which obtains air for combustion from a ventilated uninhabited space within the premises, or from the open air outside the premises, and which vents the products of combustion directly to open air outside the premises

NOTE This type of boiler is designated as Type C in PD CEN/TR 1749.

3.19 sealed system

central heating system incorporating a water circuit that is not open to the atmosphere

3.20 terminal

fitting installed at the outlet of a chimney

NOTE Terminals are fitted to assist products of combustion to escape, minimize draught and prevent entry of material which might block the flue.

4 Competence

Persons carrying out work that will have an impact on work covered by the scope of this standard shall ensure that they have the competence relevant for the task such as not to compromise the requirements/recommendations of this standard and, in particular, the safe installation, commissioning and operation of gas equipment.

COMMENTARY ON 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 boilers; these are:

- a) knowledge of the relevant Building Regulations [6, 7, 8, 9] for domestic premises;*
- b) ability to ensure that electrical work in dwellings is designed, installed, inspected and tested to the standard required by BS 7671;*
- c) 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.

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 [3]
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 [4]

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 the Health and Safety Commission's Approved Code of Practice (ACoP) (COP 20) "Standards of training in safe gas installation" [13].⁷⁾

5 Environmental considerations

As part of the planning process, consideration shall be given to the following.

- 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 6.3.2 and 6.3.3).

⁷⁾ COP 20 is to be withdrawn in 2014 and replaced by industry guidance *Standards of training in gas work* which can be found at www.igem.org.uk

6 Selection of equipment and pre-installation

6.1 Exchange of information and planning

Both for a first-time installation in a dwelling and replacement of a boiler in an existing heating system, those concerned with the selection of the boiler and the design of the system shall collaborate with the operative, both at the planning stage and during the execution of the work.

COMMENTARY ON 6.1

Particular matters that should be considered when carrying out new or replacement installations are:

Consultation with official bodies

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

- a) *The local authority, about building regulations and planning application requirements.*
- b) *The fire authority, to establish compliance with relevant fire precautionary requirements, and the fire insurers, for notification of any proposed changes in the means of heating.*
- c) *The Health and Safety Executive (HSE), to establish compliance with health and safety requirements in commercial premises, particularly with regard to safety requirements which are not fulfilled as an integral part of the installation.*
- d) *The water authority/company, about the requirements of the relevant Water Fittings Regulations or relevant by-laws.*

NOTE 1 *The relevant regulations are:*

- *England and Wales – Water Supply (Water Fittings) Regulations 1999 (England and Wales) [10];*
- *Scotland – Water Byelaws 2004 (Scotland) [11];*
- *Northern Ireland – Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [12].*

Liaison between the various trades

Liaison between the various trades carrying out the work is essential for a safe and efficient gas boiler installation.

Particular matters that should be considered when carrying out new or replacement installations are:

- a) *the availability and suitability of gas, electrical and water supplies;*
- b) *the heat requirements (see 6.2.1 and 6.5);*
- c) *the compatibility of heat emitters with current needs;*
- d) *the physical size, design and position of the boiler, and its relationship to structural support and to combustible materials;*

NOTE 2 *Some installations involve preliminary structural work which needs to be completed at the building carcass stage. Suitable bases are required for floor-standing boilers.*

- e) *the type of building, form of construction (e.g. timber framed), and the probable position of fixtures, furniture and curtains;*

NOTE 3 *Information on gas installations in timber-framed and light steel framed buildings is given in IGEMI/UP/7, Edition 2.*

NOTE 4 *Information on gas installations in flats and other multi-dwelling buildings is given in IGEMIG/5, Edition 2.*

- f) *the size, height, type, support and route of the chimney and the position of termination, including the possible consequences of any plume; particular notice is drawn to:*
- *the advice in BS 5440-1:2008, Clause 12, and IGEMI/UP/17 on the connection to SE-duct, U-duct and shared chimneys;*
 - *the fact that, where room-sealed fanned draught boilers are installed with the flue ducts and air-supply ducts concealed within voids, due regard needs to be given to the Gas Safety (Installation and Use) Regulations [1, 2, 3, 4] and Building Standards (e.g. Approved Document J [14] in England) concerning the need for inspection throughout the length of the flue duct prior to initial commissioning of the appliance and during routine servicing or maintenance of the appliance. Detailed information concerning the interpretation of “inspection” is given in Technical Bulletin 008 as published by Gas Safe Register [15]⁸⁾;*
- g) *the provision of adequate air for combustion and ventilation;*
- h) *the position of any drains for condensate or pressure/temperature relief valve discharge (see 6.3.4);*
- i) *the manufacturer's instructions regarding water hardness, unless the manufacturer's instructions say otherwise, where the mains water total hardness (as CaCO₃) exceeds 200 ppm; provisions should be made to treat the feed water to the hot water circuit of combination boilers to reduce the rate of accumulation of limescale (see 8.2.1.3);*
- j) *the compatibility of the boiler with any system controls;*
- k) *the system controls for energy conservation and comfort, in particular to avoid unnecessary cycling of the boiler and to comply with Building Regulations [6, 7, 8, 9];*
- l) *whether the pump is adequate for the new boiler and is located so as to avoid entrainment of air or discharge of water from the system;*
- m) *whether the system pipework is adequately sized; and*
- n) *the need for the central heating system to be thoroughly cleansed and flushed out before installation of a new boiler (see 7.7.4).*

6.2 Selection of boiler

6.2.1 General

A new boiler selected for installation shall carry a CE mark.

A previously-used boiler selected for installation shall either carry a CE mark, or shall conform to BS 5258-1, BS 5258-8 or BS 7977-2.

The boiler shall only be connected to and supplied with the gas for which it is designed.

Conversion to another gas shall only be undertaken when permitted by the boiler manufacturer and shall be carried out strictly in accordance with the manufacturer's instructions, using the manufacturer's specified kit of parts.

The boiler shall only be fitted with external control devices, e.g. flue dampers or economizers, as approved by the boiler manufacturer.

The boiler selected shall be suitable for use with any existing control system to which it is to be fitted.

The boiler rating shall be in accordance with 6.5.

⁸⁾ TB 008 is to be withdrawn when the new edition of BS 5440-1 is published (expected December 2014).

COMMENTARY ON 6.2.1

For selection of a gas-fired boiler in England, Wales and Northern Ireland attention is drawn to the DCLG publication, Domestic Building Services Compliance Guide [16]. In particular, Section 2, gas-fired space heating and hot water systems, requires that gas-fired boilers installed are to be condensing boilers, whether they are replacements or new installations, with a few exceptions. See also the DCLG publication, Guide to the Condensing Boiler Installation Assessment Procedure for Dwellings [17].

For selection of a boiler in Scotland attention is drawn to the Building (Scotland) Regulations 2004 Domestic Technical Handbook, Section 6 (Energy) [18].

Similar requirements might apply in other areas of the UK.

The HSE publication, Safety in the installation and use of gas systems and appliances [19] should also be consulted.

For CE-marked boilers

The operative should ensure that the boiler carries the CE mark on the data plate and that the boiler and the packaging are marked with at least the following information:

- a) *the letters "GB";*
- b) *the type of gas and the pressure of utilization indicated as follows:*
 - 1) *"G20 and/or natural gas 20 mbar" for a boiler adjusted for natural gas;*
 - 2) *"G31 and/or propane 37 mbar" for a boiler adjusted for propane;*
 - 3) *"G30 and/or butane 29 mbar" for a boiler adjusted for butane;*
 - 4) *"G30, G31 and/or butane/propane 29/37 mbar" for a boiler which will burn either butane or propane at the correct pressure.*

The data plate of a CE-marked boiler will carry the designation I2H, I3P, I3B, or I3+ respectively for items 1), 2), 3) or 4). Where a boiler data plate carries the letters "Cat II" or "II", followed by the gas type designations P, B, then the boiler can be used for propane or butane when adjusted and converted to do so.

Installation of previously-used (e.g. second hand) boilers without a CE mark

If a previously-used boiler which does not carry the CE mark is to be installed, the operative should be satisfied that the boiler is safe in construction and can be used without constituting a danger. The boiler should be fitted in accordance with the manufacturer's instructions. If these instructions are not available, the operative should contact the manufacturer and obtain a copy before fitting the boiler.

For all boilers

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

The operative should check the data provided with the boiler to confirm that the boiler is appropriate for the installation, and should confirm the basis on which the heat input rating is quoted, i.e. gross or net.

The ratio of gross to net heat input is approximately 1.11:1 for natural gas, 1.09:1 for propane and 1.08:1 for butane.

Further information on the labelling of gas appliances is given in DD 221:1997.

6.2.2 Boilers for sealed systems

Boilers intended to be used in a sealed system shall be selected from those specifically designated for this purpose by the manufacturer, or shall be modified by means of a kit supplied or specified for this purpose by the manufacturer.

COMMENTARY ON 6.2.2

Boilers used in sealed systems should incorporate appropriate protection devices.

6.3 Condensing boilers

6.3.1 General

Boilers 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, in accordance with 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6, 6.3.7, 6.3.8, 6.3.9 and 6.4.

COMMENTARY ON 6.3.1

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

6.3.2 Location

6.3.2.1 General

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

- a) chimney outlet location (see 6.3.3);
- b) access to the condensate discharge termination for the condensate drainage pipe (see 6.3.4 and 6.3.5) if necessary;
- c) air supply and ambient conditions (see 7.1 and 7.3.11, respectively);
- d) ventilation (see 7.1 and 7.3.2.5);
- 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 7.3.1);
- g) specific requirements for the appliance siting position chosen (see 7.3.2 to 7.3.10 inclusive).

COMMENTARY ON 6.3.2.1

Room-sealed boilers may be installed in any room or space. However, it is not recommended that any type of boiler 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.

Boilers 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 boiler 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 boiler return.

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

6.3.2.2 3rd family gases

A boiler 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.

COMMENTARY ON 6.3.2.2

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.

6.3.3 Siting of the chimney outlet

The chimney outlet shall be sited in accordance with BS 5440-1.

NOTE 1 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 [20].

NOTE 2 Chimney outlet was originally referred to as flue terminal in UK standards.

NOTE 3 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 boiler 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, or be sited close to a facing wall, boundary fence or neighbouring property.

Some appliances are designed to disperse condensate within the combustion products discharge. Particular care is necessary when siting the terminal to ensure safe disposal of the condensate in accordance with the manufacturer's instructions (see Note 4 of 6.3.8). If such advice is not included in the appliance instructions the manufacturer shall be consulted.

COMMENTARY ON 6.3.3

Condensing boilers 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 boiler 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;*