

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)**

ICS 97.100.20

Committees responsible for this British Standard

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Boiler and Radiator Manufacturers Association Ltd.

British Flue and Chimney Manufacturers Association

BSI Consumer Policy Committee

Catering Equipment Suppliers' Association

Centrica plc

Council for Registered Gas Installers

Department of Trade and Industry

Health and Safety Executive

Heating and Ventilating Contractors' Association

ICOM Energy Association

Institute of Domestic Heating and Environmental Engineers

Institution of Gas Engineers and Managers

L P Gas Association

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Co-opted members

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Foreword

This part of BS 5871 has been prepared under the direction of the Engineering Sector Board and is a revision of BS 5871-3:2001, which is withdrawn.

This new edition of BS 5871-3 comes into effect on 11 July 2005.

This revision reflects experience gained in the use of the 2001 edition for the installation of decorative fuel effect gas appliances¹⁾ and also provides additional guidance on the use of fanned draught flueing and flue sizing, and includes requirements for fires installed in raised builders' openings (hole-in-the-wall fireplaces).

— BS 5871-1: *Gas fires, convector heaters, fire/back boilers and heating stoves (2nd and 3rd family gases).*

— BS 5871-2: *Inset live fuel effect gas fires of heat input not exceeding 15 kW and fire/back boilers (2nd and 3rd family gases).*

— BS 5871-3: *Decorative fuel effect gas appliances of heat input not exceeding 20 kW (2nd and 3rd family gases).*

— BS 5871-4: *Independent gas-fired flueless space heaters for nominal heat input not exceeding 6 kW (2nd and 3rd family gases) (in the course of preparation).*

To identify which part of BS 5871 to use when fitting an appliance which simulates a solid fuel fire, reference should be made to Figure 1 which serves to illustrate appliance types and link them to the appropriate part of BS 5871. It should be noted that the only fuel effect appliances covered by this part of BS 5871 are those detailed in b) of the commentary and recommendations on Clause 5 of this standard.

The manufacturer's instructions supplied with fanned draught appliances in which the fan is either integral with the appliance or with the flue system will make reference to the appropriate part of BS 5871.

It should be noted that the only appliances covered by this part of BS 5871 are those that are 'CE' marked. However, BS 5871-3 may also be referred to for the installation of used appliances, where appropriate, providing the manufacturer's instructions are available. In such circumstances, the installer should satisfy himself that the appliance is safe in construction and condition, and can be used without constituting a danger. Attention is drawn to Clause 5 concerning this particular aspect.

Arising from European standards harmonization, some British Standards appliance specifications are now being replaced by European standards. One consequence of this process is that the reference clearance flue flow test, currently included in some of the British Standards covering the safety of appliances dealt with by BS 5871, will not be given in European appliance standards. This test has hitherto been used to determine the flue flow, under laboratory conditions, that an appliance will just clear its combustion products. The test has been used as a key factor in determining whether or not certain appliances of 7 kW²⁾ heat input or less require purpose provided ventilation for their installation.

Although BS 5871 is an appliance installation standard, the drafting committee has decided to include the clearance flue test as an informative annex. It is hoped that this arrangement will provide Notified Test Houses under the Gas Appliance Directive with a continuing means to evaluate appliances for installation within the UK which claim that no purpose provided ventilation is necessary for their installation.

¹⁾ Sometimes referred to as a decorative gas fire or DGF.

²⁾ Due to tolerances, this applies to a heat input of 7 kW on both net and gross calorific value. See Clause 1, Scope, Note 2.

This standard allows manufacturer's instructions to specify a method of installation, testing, commissioning or maintenance which differs in points of detail from this standard. This reference to manufacturer's instructions is allowed only where it will result in at least an equivalent level of safety. In such circumstances, it is important that the manufacturer's instructions are followed.

NOTE In the preparation of this standard the opportunity has been taken to present it in the format of a practice specification as defined in PD 6501-1. This format allows the requirements of the specification to be supported by recommendations. To comply with this specification, the user has to comply with all its requirements. He may depart from recommendations but this would be his own responsibility and he would be expected to have good reasons for doing so.

This publication does not purport to include all necessary provisions of a contract. Users of are responsible for its correct application.

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

In particular, attention is drawn to the following:

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

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

The Gas Appliances (Safety) Regulations 1995 [3]

The Building Regulations 2000, as amended [4]

The Building (Scotland) Regulations 2004 [5]

The Building Regulations (Northern Ireland) Statutory Rules 2000, as amended [6]

The Gas Safety (Application) (Isle of Man) Order 1996 [7]

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 39 and a back cover.

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1 Scope

This part of BS 5871 specifies installation and maintenance requirements for open flued decorative fuel effect gas appliances of heat input not exceeding 20 kW (see Note 2) burning 2nd and 3rd family gases in rooms or internal spaces in domestic (see Note 4) or commercial premises, including public houses and restaurants.

The provisions contained within this standard cover the selection of a suitable appliance, the ventilation and flueing requirements, and other measures necessary to ensure a safe installation.

This standard applies to the installation of decorative fuel effect gas appliances in builder's openings, fireplace recesses, flue boxes or under associated independent canopies. (See Figure 5.) It does not cover the installation of flueless or room-sealed appliances.

This standard is not applicable to mobile and portable appliances in conformity with BS EN 449 or to appliances in touring caravans.

NOTE 1 Attention is drawn to the foreword concerning fuel effect appliances which burn gas for a decorative effect. The only types of such appliance covered by this part of BS 5871 are those detailed in b) of the commentary and recommendations on Clause 5 of this standard. Further guidance in this respect is given in Figure 1.

NOTE 2 Heat inputs in this document are based on net calorific value. Figures based on gross calorific value are given in parenthesis where deemed necessary. [See also Clause 5, commentary and recommendations b).]

NOTE 3 Attention is drawn to the foreword concerning the installation of used appliances.

NOTE 4 As well as normally constructed dwellings, domestic premises include any permanently sited caravan holiday homes, residential park homes and permanently moored boats. See IGE/UP/8 [8].

NOTE 5 Appliances of over 20 kW: although many of the requirements within this standard will equally apply to appliances with a rated heat input in excess of 20 kW, additional or alternative requirements may also be applicable in order to achieve a safe installation. Reference should be made to the Building Regulations and supporting guidance or requirements thereto.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 715, *Specification for metal flue pipes, fittings, terminals and accessories for gas-fired appliances with a rated input not exceeding 60 kW*.

BS 1289-1, *Flue blocks and masonry terminals for gas appliances — Part 1: Specification for precast concrete flue blocks and terminals*.

BS 5440-1, *Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70 kW (1st, 2nd and 3rd family gases) — Part 1: Specification for installation of flues*.

BS 5440-2, *Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70 kW (1st, 2nd and 3rd family gases) — Part 2: Specification for installation and maintenance of ventilation for gas appliances*.

BS 5482-1, *Domestic butane- and propane-gas-burning installations — Part 1: Specification for installations at permanent dwellings*.

BS 5482-2, *Domestic butane- and propane-gas-burning installations — Part 2: Installations in caravans and non-permanent dwellings*.

BS 6891, *Specification for installation of low pressure gas pipework of up to 28 mm (R1) in domestic premises (2nd family gas)*.

BS 7435-2, *Fibre cement flue pipes, fittings and terminals — Part 2: Specification for heavy quality fibre cement flue pipes, fittings and terminals*.

BS 7671, *Requirements for electrical installations — IEE Wiring Regulations (Sixteenth edition)*.

BS 7977-1:2002, *Specification for safety and rational use of energy of domestic gas appliances — Part 1: Radiant/convectors*.

BS EN 1856-1, *Chimneys — Requirements for metal chimneys — Part 1: System chimney products*.

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

3 Terms and definitions

For the purposes of this part of BS 5871, the following terms and definitions apply.

3.1
air vent
non-adjustable purpose provided unit/assembly designed to allow permanent ventilation

3.2
air vent free area
unobstructed cross-sectional area of an air vent, i.e. the sum of the areas of the individual apertures

3.3
associated independent canopy
non-combustible canopy situated at the base of the flue system and which is permanently fixed above the appliance to facilitate the passage of the products of combustion into the flue

3.4
builder's opening
enclosure constructed by the builder to accommodate fireplace components

3.5
chimney breast
projection beyond the thickness of a wall that contains the fireplace and flue

3.6
chimney pot
prefabricated unit fitted at the flue outlet of a chimney

3.7
decorative fuel effect gas appliance
appliance designed to burn gas for a decorative effect

3.8
factory made insulated chimney
complete assembly of all the essential factory made insulated sections, fittings and accessories necessary to convey the products of combustion to the outside air

3.9
fanned flue system
flue system in which the removal of flue products is dependent on a fan

3.10
firebed
part of a decorative fuel effect gas appliance on which the gas burns

3.11
fireplace opening
aperture formed in the face of the builder's opening, fireplace recess, flue box or fire surround, if fitted

3.12
fireplace recess
recess formed by the inclusion of fireplace components in the builder's opening

3.13
flue box
non-combustible enclosure that provides a substitute builder's opening or fireplace recess

3.14**flue pipe**

pipe enclosing a flue; for a double walled flue system or factory made insulated system it is the inner pipe

NOTE European chimney standards refer to a flue pipe as a “chimney”. This is defined in BS EN 1443 as “a structure consisting of a wall or walls enclosing a flue or flues”.

3.15**flue system**

continuous flue, or a complete assembly of flue components, from a builder’s opening, fireplace recess, flue box or associated independent canopy to a chimney pot, terminal or flue outlet

3.16**gather**

smooth transitional reduction in area from above the builder’s opening or fireplace recess into the flue

3.17**hearth**

slab of fire-resisting material to prevent overheating of the surface beneath the appliance

3.18**internal space**

interior space such as a hall, passageway, stairway or landing, which is not a room

3.19**lintel**

loadbearing beam above the builder’s opening or fireplace recess

3.20**open flue system (type B)**

flue system that evacuates the products of combustion to the outside air

NOTE The combustion air is drawn directly from the room or space containing the appliance.

3.21**open-flued appliance (type B)**

appliance designed to be connected to an open flue system, its combustion air being drawn from the room or space in which it is installed

3.22**throat**

contraction located in the flue, immediately above the fireplace recess, that is designed to accelerate the flue gases

3.23**through-room**

room formed by the removal of an interconnecting wall between two rooms or any large room formed by two open plan smaller rooms

NOTE The opening/archway present between two smaller rooms may have sliding or intercommunicating doors.

3.24**ventilation**

process of supplying fresh air to, and/or removing air from a room, internal space, compartment or garage

NOTE The air may be used or intended to be used for purposes of combustion, cooling and/or the operation of the flue.

4 Exchange of information and planning

4.1 General

Persons carrying out the work shall be competent.

The installation work shall be carried out by a business or self employed person, who is a member of a class of persons approved for the time being by the Health and Safety Executive (HSE) as required by the Gas Safety (Installation & Use) Regulations [1].

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

COMMENTARY AND RECOMMENDATIONS ON 4.1

At the time of publication, the body with HSE approval to operate and maintain a register of businesses who are “members of a class of persons” is the Council for Registered Gas Installers (CORGI).

Persons deemed competent to carry out gas work are those who hold a certificate of gas safety competence acceptable to CORGI, which includes (without limitation) the Accredited Certification Scheme (ACS) and the Gas Services S/NVQ that has been aligned with ACS (for electrical work, see C&R to 14.1).

4.2 Design considerations

NOTE Collaboration is essential between those concerned with the design and installation, both at the planning stage and during the execution of the work.

Particular matters that shall be considered are:

- a) availability of gas supplies;
- b) size, height, type and route of flue together with materials of construction;
- c) provision of adequate ventilation;
- d) dimensions of fireplace openings and hearths together with materials of construction;
- e) position of appliance in relation to probable position of fixtures, furniture and curtains;
- f) electrical supplies (where applicable);
- g) the possibility that the user may wish to use the flue system with a solid fuel open fire in the future.

COMMENTARY AND RECOMMENDATIONS ON 4.2

Some appliance installations can require preliminary structural work to be completed at the building carcass stage.

Suitable apertures or openings should be made for connection to a built-in flue. In addition a hearth for the appliance will need to be provided (see Clause 11).

5 Appliances

The appliance, if new, shall carry a ‘CE’ mark, and be suitable for the gas with which it is to be supplied.

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 5

This standard may be used for the installation of used appliances which do not carry a ‘CE’ mark; see foreword.

Consideration should be given to the following.

a) In the case of a new appliance, the installer should ensure that the packaging and the appliance itself is marked with at least the following information:

- The letters 'GB';
- The type of gas and appliance inlet pressure as follows:
 - i) G20 and/or natural gas 20 mbar for an appliance adjusted for natural gas.
 - ii) G30 and/or butane 29 mbar for an appliance adjusted for butane.
 - iii) G31 and/or propane 37 mbar for an appliance adjusted for propane.
 - iv) G30/G31 and/or butane/propane 29/37 mbar for an appliance which will burn either gas at the correct pressure.

The data plate of an appliance will carry the designation Cat. I_{2H}, I_{3B}, I_{3P}, or I₃₊ respectively for cases i), ii), iii) and iv), together with the 'CE' mark.

Where an appliance data plate carries the letters Cat. II followed by gas type designations, (i.e. 2H, 2P, 2B), then the appliance can be used for different types of gases when adjusted to do so.

The installer should ensure that the appliance 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 supplied kit of parts.

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

Further information on the labelling of gas appliances is given in BSI draft for development DD 221:1997 (CR 1472:1997).

The original packaging will generally not be available with used appliances. In this case, the installer should, by referring to the data plate and/or other means ensure that the appliance is suitable for the pressure and type of gas to be burnt. If there is any doubt, the appliance should not be installed.

b) Decorative fuel effect gas appliances are available with rated heat inputs up to 20 kW. The input is quoted on the basis of net calorific value. The traditional UK system of using gross calorific value would give an equivalent rating of 22 kW input for natural gas.

The installer should check the data given with an appliance to establish the basis on which the heat input is quoted.

The ratio of gross:net heat input is approximately 1.11:1, 1.09:1, and 1.08:1 for appliances burning natural gas, propane and butane respectively. [For example, to convert 9 kW input natural gas (gross c.v.) to the equivalent net c.v. heat input:

$$\frac{9}{1.11} = 8.1 \text{ kW heat input}]$$

c) Decorative fuel effect gas appliances covered by this standard are open-flued and may be available with either natural draught or fanned draught flueing.

d) Any appliance described in this standard will be used primarily to provide a decorative solid fuel open fire effect in a room or internal space, but the type chosen will depend on the user's personal preference; it should be based on a knowledge of the range of the appliances available, the use to which the room or internal space will be put and the period of usage.

e) For information purposes, Figure 1 illustrates the types of fuel effect gas appliances covered by BS 5871 with respect to the flue size, location, ventilation and the passage of appliance combustion products to the flue serving the appliance.

6 Materials and components

All materials and components used in the installation shall conform to the requirements of applicable British Standards. Materials containing asbestos shall not be used. Where no British Standard exists, materials and equipment shall be of suitable quality and workmanship to fulfil their intended purpose.

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 6

The Asbestos (Prohibition) Regulations (As Amended) 1999 [9] place further restrictions on the use of asbestos materials, including a total ban of asbestos cement and its products. New (or alterations to existing) flue systems should not be constructed from materials containing asbestos. Existing flue systems may be reused in situ as flue systems provided that they are mechanically sound and conform to the requirements of this British Standard.

7 Location

7.1 The appliance shall not be installed in a room or internal space containing a bath or shower.

7.2 Appliances of greater than 12.7 kW heat input (14 kW gross) shall not be installed in a room used or intended to be used as sleeping accommodation.

7.3 A gas appliance of not greater than 12.7 kW (14 kW gross) heat input installed in a room used or intended to be used as a sleeping accommodation shall incorporate a safety control designed to shut down the appliance before there is a build up of a dangerous quantity of the products of combustion in the room concerned.

COMMENTARY AND RECOMMENDATIONS ON 7.1, 7.2 AND 7.3

Any type of heater may be installed in a private garage unless the manufacturer's instructions for a particular appliance state that it is unsuitable for use in such a location. An appliance 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 British Gas publication, "IMI28: Appliances in commercial garages" [10].

Care should be taken in the selection of appliances for use in sleeping accommodation bearing in mind the following.

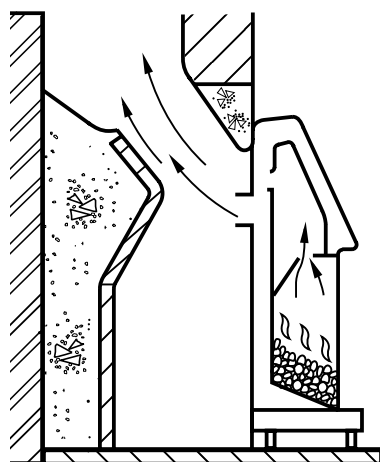
- a) An appliance not bearing a 'CE' mark purchased second hand will not be fitted with an acceptable device.*
- b) Some appliances carrying a 'CE' mark purchased second hand will not be fitted with an acceptable device.*
- c) New appliances will be fitted with an acceptable device. The user instructions should be checked to ensure they contain advice on the action necessary should the device operate.*

Where there is any doubt as to whether the appliance is fitted with an acceptable device, it should not be installed in sleeping accommodation.

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

COMMENTARY AND RECOMMENDATIONS ON 7.4

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



a) Gas fire

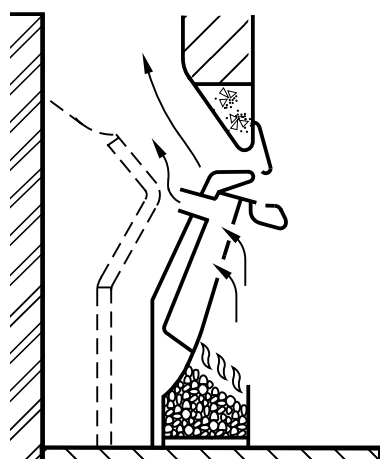
BS 5871-1

Flue size: Minimum of 125 mm across axis of flue normally required.

Location: Normally in front of closure plate which is fitted to fireplace opening.

Ventilation: Purpose provided ventilation not normally required up to 7 kW input.

NOTE For this type of appliance, the radiating surface can be in the form of either a radiant(s) or imitation fuel, the latter giving a live fuel effect.



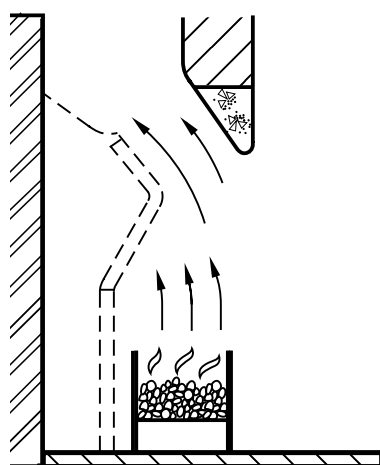
b) Inset live fuel effect gas fire

BS 5871-2

Flue size: Minimum of 125 mm across axis of flue normally required.

Location: Either fully or partially inset into builder's opening or fireplace recess. (For a recess, the chairbrick might have to be removed depending upon appliance design.)

Ventilation: Purpose provided ventilation not normally required up to 7 kW input.



c) Decorative fuel effect gas appliance

BS 5871-3

Flue size: Minimum of 175 mm across axis of flue normally required.

Location: Within builder's opening or fireplace recess or flue box, or under an associated independent canopy. (For recess, the chairback may have to be removed depending upon appliance design.)

Ventilation: Purpose provided ventilation of at least 100 cm² normally required up to 20 kW input.

Figure 1 — Type of fuel effect gas appliances covered by BS 5871

8 Ventilation

8.1 General

The appliance shall have a supply of air for combustion and the safe operation of the flue.

COMMENTARY AND RECOMMENDATIONS ON 8.1

Subclauses 8.2, 8.3, 8.4 and 8.5 specify the ventilation requirements for appliances. It should be noted that whilst BS 5440-2 excludes decorative fuel effect gas appliances from its scope, the references given in 8.3 and 8.5 to BS 5440-2:2000 are applicable in the context in which they are specified.

8.2 Sizing

Unless the manufacturer's instructions specifically state that purpose provided ventilation is not required, such ventilation shall be provided in the room or internal space containing the appliance. Where purpose provided ventilation is required, the air vent free area shall be a minimum of 100 cm², or, where greater, as stated in the manufacturer's instructions.

COMMENTARY AND RECOMMENDATIONS ON 8.2

Normally, appliances covered by this standard will require a minimum of 100 cm² of purpose provided ventilation. However, in the case of an appliance of not greater than 7 kW input which generates a clearance flue flow not greater than 70 m³/h when tested in accordance with Annex A, an air vent may not be necessary. The manufacturer's instructions will provide details in such circumstances. It should be noted that Annex A describes a laboratory test which is not for use by gas installers seeking conformity with this standard.

8.3 Location

An air vent shall not communicate directly with a builder's opening or fireplace recess.

In areas in which radon gas has been identified as a problem, ventilation shall not be taken from below floor level (e.g. using a floor vent) or interfere in any way with remedial measures which may already be in place to prevent radon from entering the habitable part of the dwelling.

COMMENTARY AND RECOMMENDATIONS ON 8.3

Attention is drawn to the following.

- a) Wherever practicable a direct method of ventilation is preferred. BS 5440-2 specifies installation requirements for the ventilation of appliances.*
- b) Areas identified as requiring action for radon gas will be known due to local publicity but in case of doubt further advice can be obtained from a building control officer at the local authority headquarters.*
- c) Where a builder's opening, fireplace recess, or inglenook installation is served by an existing underfloor air supply, the air vent/grille should be sealed to avoid draughts etc., interfering with the correct operation of the flue and the appliance burner. Outside of the hearth area, the use of a floor vent communicating with a ventilated underfloor void is permitted.*

8.4 Multi-appliance installations

8.4.1 Single room or internal space installations

Where the room or internal space contains two or more gas appliances, the air vent free area requirement shall be the total decorative fuel effect gas appliance requirement³⁾ (see 8.2), plus, where appropriate, the greatest of the following:

- a) the total flueless space heating appliance requirement; or
- b) the total open-flued space heating appliance requirement (i.e. 5 cm² per kilowatt total rating); or
- c) the greatest individual requirement of any other type of appliance. For an open-flued non-space heating appliance, the requirement shall be 5 cm² per kW.

³⁾ The air vent free area requirement determined according to 8.2 takes into account the 35 cm² of adventitious ventilation deemed to be available in the room or internal space. Accordingly, when a second decorative fuel effect gas appliance is installed in the same single room or internal space, the adventitious allowance cannot again be taken into account as part of that appliance's overall ventilation requirement. As such, 35 cm² needs to be added to the total air vent free area requirement determined according to 8.4.1 when a second decorative fuel effect gas appliance is installed.