

BS 8446:2020



BSI Standards Publication

**Installation and maintenance of open-flued, non-domestic gas-fired laundry appliances — Specification**

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## Summary of pages

This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 21, an inside back cover and a back cover.

# Foreword

## Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2020. It was prepared by Technical Committee GSE/30, *Gas installations (1st, 2nd and 3rd family gases)*. A list of organizations represented on this committee can be obtained on request to the committee manager.

## Supersession

This British Standard supersedes [BS 8446:2005](#), which is withdrawn.

## Information about this document

This British Standard complements, where applicable, [BS 7624](#).

This British Standard was prepared to address industry concerns about the safety of open-flued, non-domestic gas-fired laundry installations.

Attention is drawn to the hazards that exist in certain locations where the atmosphere or drying load can contain flammable vapours.

This publication can be withdrawn, revised, partially superseded or superseded.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

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

## Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

## Presentational conventions

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

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

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

## 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.

Particular attention is drawn to the following statutory regulations:

- the Health and Safety at Work etc. Act 1974 [[1](#)];
- the Management of Health and Safety at Work Regulations 2006 [[2](#)];

- the Dangerous Substances and Explosive Atmospheres Regulations 2002 [3];
- the Gas Safety (Installation and Use) Regulations 1998, as amended [4];
- the Gas Safety (Installation and Use) (Northern Ireland) Regulations 2004 [5];
- the Gas Safety (Management) Regulations 1996 [6];
- the Electricity at Work Regulations 1989 [7];
- the Control of Substances Hazardous to Health Regulations 2002 [8];
- the Control of Asbestos at Work Regulations 2012 [9];
- the Gas Appliances (Safety) Regulations 1995 [10];
- the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 [11];
- the Provision and Use of Work Equipment Regulations 1998 [12];
- the Confined Spaces Regulations 1997 [13];
- the Construction (Design and Management) Regulations 2015 [14];
- the Construction (Health, Safety and Welfare) Regulations 1996 [15];
- the Pressure Systems Safety Regulations 2000 [16];
- the Building Regulations 2010, as amended [17];
- the Building (Scotland) Regulations 2004 [18];
- the Building Regulations (Northern Ireland) Statutory Rules 2012 [19]; and
- the Gas Safety (Application) Order 1996 (Isle of Man) [20];



## 1 Scope

This British Standard specifies the installation and maintenance of open-flued, non-domestic gas-fired laundry appliances. It is applicable to both fixed and tilting tumble dryers.

*NOTE* 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.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document.<sup>1)</sup> 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 669-2](#), *Flexible hoses, end fittings and sockets for gas burning appliances – Part 2: Specification for corrugated metallic flexible hoses, covers, end fittings, and sockets for catering appliances burning 1st, 2nd and 3rd family gases*

[BS 4800:2011](#), *Schedule of paint colours for building purposes*

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

[BS 7671](#), *Requirements for electrical installations – IET Wiring Regulations*

BS EN 161, *Automatic shut-off valves for gas burners and gas appliances*

### Other publications

[N1] INSTITUTION OF GAS ENGINEERS AND MANAGERS. *Installation pipework on industrial and commercial premises*. IGEM/UP/2. Loughborough: IGEM, 2014.<sup>2)</sup>

[N2] LIQUID GAS UK. *Design, installation and testing of LPG piping systems*. Code of Practice 22. Ringwood: UKLPG, 2012.

[N3] INSTITUTION OF GAS ENGINEERS AND MANAGERS. *Strength testing, tightness testing and direct purging of industrial and commercial gas installations*. IGEM/UP/1. Edition 2. Loughborough: IGEM, 2005.<sup>2)</sup>

[N4] INSTITUTION OF GAS ENGINEERS AND MANAGERS. *Strength testing, tightness testing and direct purging of small low pressure industrial and commercial natural gas installations*. IGEM/UP/1A. Edition 2. Loughborough: IGEM, 2005.<sup>2)</sup>

[N5] INSTITUTION OF GAS ENGINEERS AND MANAGERS. *Tightness testing and direct purging of small liquefied petroleum gas/air, NG and LPG installations*. IGEM/UP/1B. Edition 2. Loughborough: IGEM, 2006.<sup>2)</sup>

<sup>1)</sup> Documents that are referred to solely in an informative manner are listed in the Bibliography.

<sup>2)</sup> Published and available from the Institution of Gas Engineers and Managers, IGEM House, High Street, Kegworth, Derbyshire, DE74 2DA; [www.igem.org.uk](http://www.igem.org.uk).

### 3 Terms and definitions

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

#### 3.1 2nd family gas

natural gases

#### 3.2 3rd family gas

liquefied petroleum gases (LPG), including compressed propane and butane

#### 3.3 appliance flexible connector

pipe with appropriate connector ends, designed to have a high degree of flexibility to facilitate the connection of a gas appliance to an installation pipe and allow the appliance to be moved a short distance without the need for disconnection

#### 3.4 braid

layer(s) of cylindrically woven wires covering the hose

#### 3.5 commissioning

process carried out to place and/or put a gas-fired appliance into operation

*NOTE* Commissioning is done in accordance with the manufacturer's specification.

#### 3.6 dilution

mixture of air, products of combustion and lint

#### 3.7 dry cleaner

appliance in which laundry is processed using solvents

*NOTE* The solvent usually used in dry cleaning is toxic tetrachloroethylene (perchloroethylene), commonly called "perc" or "PERC".

#### 3.8 drying load capacity

maximum weight that a gas-fired laundry appliance is capable of accepting for each load

*NOTE* The drying load capacity is specified by the manufacturer.

#### 3.9 exhaust duct

pipe used to transmit products of combustion and lint, together with the supersaturated warm drying air, to the outside atmosphere

#### 3.10 exhaust products

gaseous mixture of air, water vapour, products of combustion and lint removed as a result of exhaust venting

#### 3.11 exhaust venting

process of removing moist air, including products of combustion and lint, from an appliance in a room or internal space directly to the outside atmosphere

#### 3.12 flexible exhaust connection

final flexible connection for easy fitting and removal of the appliance, suitable for carrying the temperatures of operation and ideally no more than 500 mm

**3.13 lint**

fluff drawn off laundry fabrics being processed in the appliance

**3.14 make-up air**

permanent, non-closable air supply, which replaces that used by a laundry appliance during its operation

*NOTE* The amount of make-up air is specified by the manufacturer.

**3.15 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.

**3.16 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

**3.17 rotary ironer**

appliance in which textile material is ironed by being passed across a rotating roller through which heated air and products of combustion are forced or induced by mechanical means

**3.18 tumble dryer**

appliance in which textile material is dried by tumbling in a rotating drum through which heated air and products of combustion are forced or induced by mechanical means

**3.19 ventilation**

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

**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.*

*It is a statutory requirement in Great Britain, the Isle of Man, Northern Ireland and Guernsey that all "gas work" be carried out by a business or self-employed person(s) who 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 should 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 [4]
Isle of Man	Health and Safety at Work Inspectorate (HSWI)	Gas Safety (Application) (Isle of Man) Order 1996 [20]
Northern Ireland	Health and Safety Executive Northern Ireland (HSENI)	Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [5]
Guernsey	Health and Safety Executive for the States of Guernsey [HSE (Guernsey)]	Health and Safety (Gas) (Guernsey) Ordinance 2006 [21]

**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 <sup>A)</sup> as approved with the registration body	✓	✓	✗
Any other scheme recognized by the gas registration body for registration purposes	✓	✓	✓

<sup>A)</sup> Guidance on the individual competence required for gas work is given in IGEM/IG/1 [22].

Persons carrying out work that has an impact on work covered by the scope of this British Standard shall have the competence relevant for the task such that they do not compromise the requirements of this British Standard and, in particular, the safe installation, commissioning and operation of gas equipment.

## 5 Planning considerations and risk assessment

### 5.1 Design and planning

#### COMMENTARY ON 5.1

*Collaboration is essential between those concerned with the design of laundry appliance installations and those responsible for installing the appliances, both at the planning stage and during the execution of the work.*

The following shall be ascertained before planning of the installation begins:

- a) the availability of gas supplies;
- b) the availability of ventilation sufficient for both combustion and purge requirements;
- c) the proposed location of the laundry appliance in relation to doors, external walls (outside air) and to the probable position of fixtures, furniture and curtains;
- d) the electrical supplies available;

- e) the method of installation recommended in the laundry appliance manufacturer's literature;
- f) the availability of a stable and rigid base on which to site the laundry appliance;
- g) the likely proximity of the laundry appliance to other appliances; and
- h) the best location for the make-up air inlet and exhaust outlet.

## 5.2 Risk assessment

### COMMENTARY ON 5.2

*The duty of an employer to carry out a risk assessment is imposed by the Management of Health and Safety at Work Regulations 2006 [2]. The risk assessment should cover, but not necessarily be limited to:*

- a) *all matters described in this British Standard regarding installation requirements; and*
- b) *matters affecting the health and safety of employees, self-employed persons and others during operation, maintenance, cleaning and installation.*

*It might be necessary for persons with knowledge of different areas to be involved in the risk assessment, e.g. the gas installer or the laundry operator.*

*For more information, reference should be made to IGEM/SR/24 [23].*

Prior to the installation of any non-domestic laundry appliance, a risk assessment shall be carried out to ascertain the best location for the appliance.

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## 6 Selection of laundry appliances

### COMMENTARY ON CLAUSE 6

*For a tumble dryer, the drying load capacity should be borne in mind during selection, together with the intended location and the provision of make-up air (see [Clause 10](#)) and exhaust venting, being particularly mindful of the manufacturer's maximum permitted exhaust runs (see [Clause 12](#)).*

*For rotary ironers, the size of the laundry to be ironed through the roller should be borne in mind during the selection, together with the intended location, the requirements for space to feed and return the laundry from the iron, and the provision of make-up air (see [Clause 10](#)) and exhaust ducting, being particularly mindful of the manufacturer's maximum permitted exhaust runs (see [Clause 12](#)). A typical rotary ironer is illustrated in [Figure 1](#).*

*The laundry appliances covered by this British Standard are generally stand-alone. Appliance flexible connectors, ducting and make-up air grilles are not supplied with these laundry appliances.*

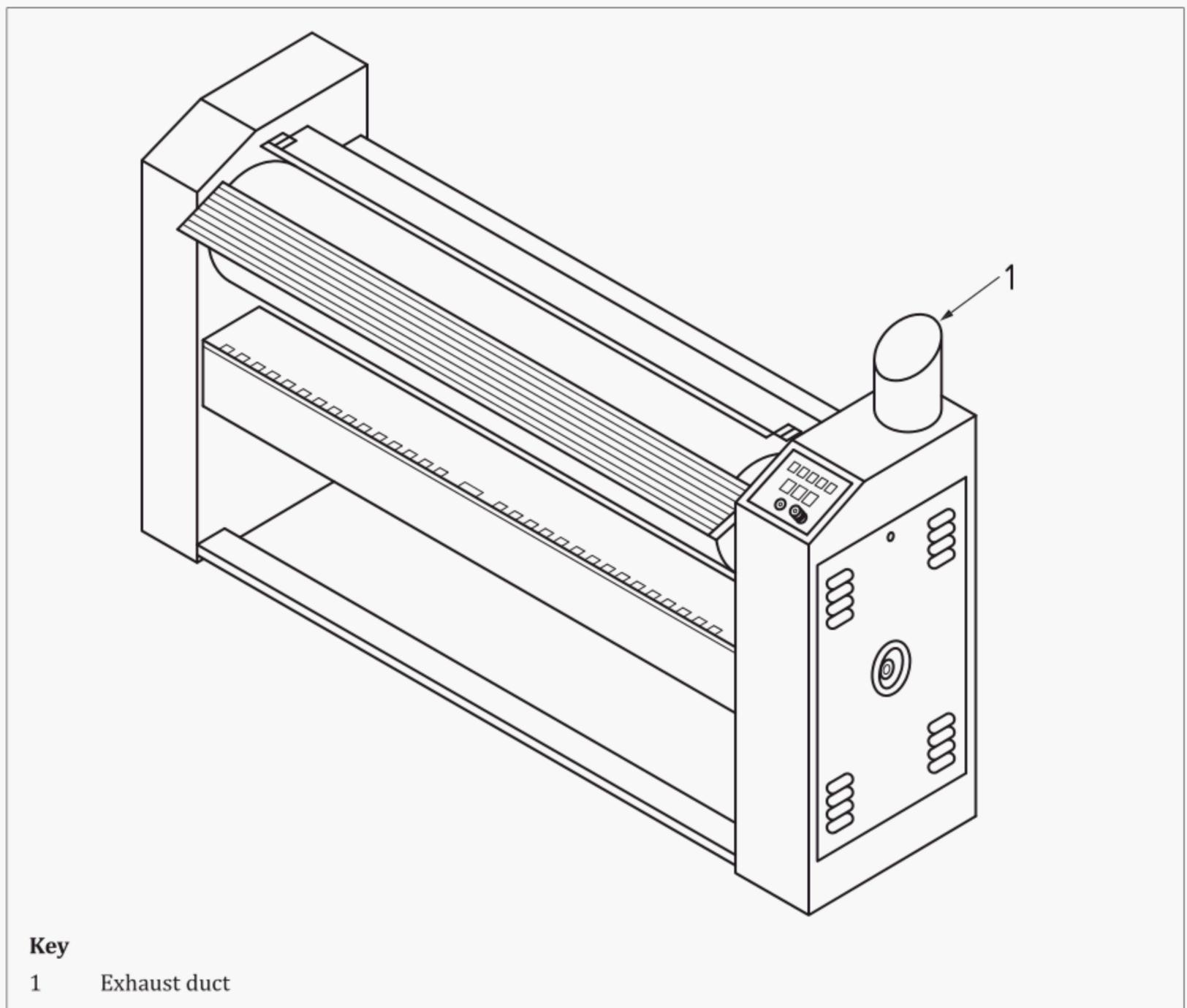
*The installer should check the data given with a laundry appliance to establish the basis on which the heat input is quoted.*

*For the purposes of this British Standard the ratio of gross: net heat input is 1:1.11. For example, to convert a 5 kW input appliance, gross calorific value (c.v.) to the equivalent net c.v. heat input, the following equation is used.  $5/1.11 = 4.504$  kW heat input.*

*The installer should, in all cases, refer to the data plate and/or take other steps to verify that the laundry appliance is suitable for the pressure and type of gas to be burnt. 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 laundry appliance for a particular gas, then the laundry appliance manufacturer should be consulted.*

*Further information on the labelling of gas appliances is given in [DD 221](#).*

**Figure 1** — A typical rotary ironer

## 6.1 New laundry appliances

### COMMENTARY ON 6.1

*Of the laundry appliances covered by this British Standard, new laundry appliances fall within the scope of the European Gas Appliances Directive [24], implemented in the UK by the Gas Appliances (Safety) Regulations 1995 [10], which requires new laundry appliances to be acceptably marked for being placed on the UK market. At the time of publication, CE marking is acceptable and future acceptable markings could include UKCA. Accordingly, the installer should check that the laundry appliance is acceptably labelled.*

*The installer should check that the packaging and the laundry appliance itself are marked with at least the following information:*

- a) the letters "GB" or "UK"; and
- b) the type of gas and appliance inlet pressure as follows:
  - 1) for an appliance adjusted for natural gas, G20 and/or natural gas 20 mbar plus the designation  $I_{2H}$ ;
  - 2) for an appliance adjusted for butane, G30 and/or butane 29 mbar plus the designation  $I_{3B}$ ;
  - 3) for an appliance adjusted for propane, G31 and/or propane 37 mbar plus the designation  $I_{3P}$ ; and

- 4) for an appliance which burns either butane or propane gas at the correct pressure, G30/G31 and/or butane/propane 29/37 mbar plus the designation  $I_{3+}$ .

Where a laundry appliance's data plate carries the letters CAT I or CAT II followed by gas type designations, (i.e. 2H, 2P, 2B), then the laundry appliance may be used for different types of gases when adjusted to do so.

In such a case, the installer should verify that the laundry appliance is correctly adjusted.

Any new laundry appliance selected for installation shall be one that has been marked by the manufacturer as being suitable for the gas with which it is to be used. It shall also be suitable for its intended location (see [Clause 7](#)).

The installer shall verify that any new laundry appliance selected for installation is marked with an acceptable certification scheme.

## 6.2 Used laundry appliances

### COMMENTARY ON 6.2

*The original packaging is generally not available with used laundry appliances. These might or might not carry the CE mark. Where the manufacturer's instructions are not available, these should be obtained from the manufacturer or their agent before installation of the laundry appliance begins.*

*Where the laundry appliance carries the CE mark, the appliance 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 laundry appliance manufacturer's instructions.*

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

*A used laundry appliance needs to be sold with a set of manufacturer's instructions for safe installation to be practicable.*

Only used laundry appliances with which the manufacturers' instructions are supplied or are otherwise available shall be selected for installation.

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## 7 Location of laundry appliances

### 7.1 General installation

- 7.1.1** A laundry appliance shall be installed in accordance with the manufacturer's instructions.
- 7.1.2** A laundry appliance shall not be installed in a room containing a bath or shower.
- 7.1.3** Where a laundry appliance is to be installed in the same location as a dry cleaner, it shall be separated by a minimum distance of 5 m or installed in a separate room. Make-up air shall not come from the area of the dry cleaner. Make-up air shall be provided separately for both a dry cleaner and a laundry appliance.

*NOTE* The separation of make-up air is intended to prevent the production of toxic gas from the interaction of the dry-cleaning chemicals with the burner flame within the laundry appliance. The flame picture should be confirmed as intended with the dry cleaner operating.

- 7.1.4** A laundry appliance for use with 3rd family gases shall not be installed in a room or internal space below ground level, e.g. a basement or a cellar.

*NOTE* This does not preclude the installation of such appliances in rooms or internal spaces which are below ground level with respect to one side of the building but open to ground level on the opposite side.

## **7.2 Siting of laundry appliances**

- 7.2.1** Siting shall be in accordance with the manufacturer's instructions, taking account of the intended user's needs.

*NOTE* Aspects to consider with regard to siting are as follows.

a) The laundry appliance should be conveniently positioned in relation to other appliances and allow adequate access for maintenance.

b) Locations that restrict the use of the laundry appliance's doors and other doors, furniture or utensils should be avoided. Some vertically hinged loading doors are reversible, i.e. capable of left- or right-hand hinge selection.

- 7.2.2** Clearance around the laundry appliance or within an enclosure shall be in accordance with the manufacturer's instructions regarding the supply of air, the method of venting and protection against excessive temperatures.

*NOTE* Where the laundry appliance is within an enclosure, ventilation openings should not be obstructed and ease of appliance maintenance should be unimpaired. Both the ventilation and the exhaust should terminate directly to the outside atmosphere. Protective cladding, which is insulating material that can be specified by the appliance manufacturer and is fitted between the appliance case and any adjacent combustible material, can reduce the amount of clearance required.

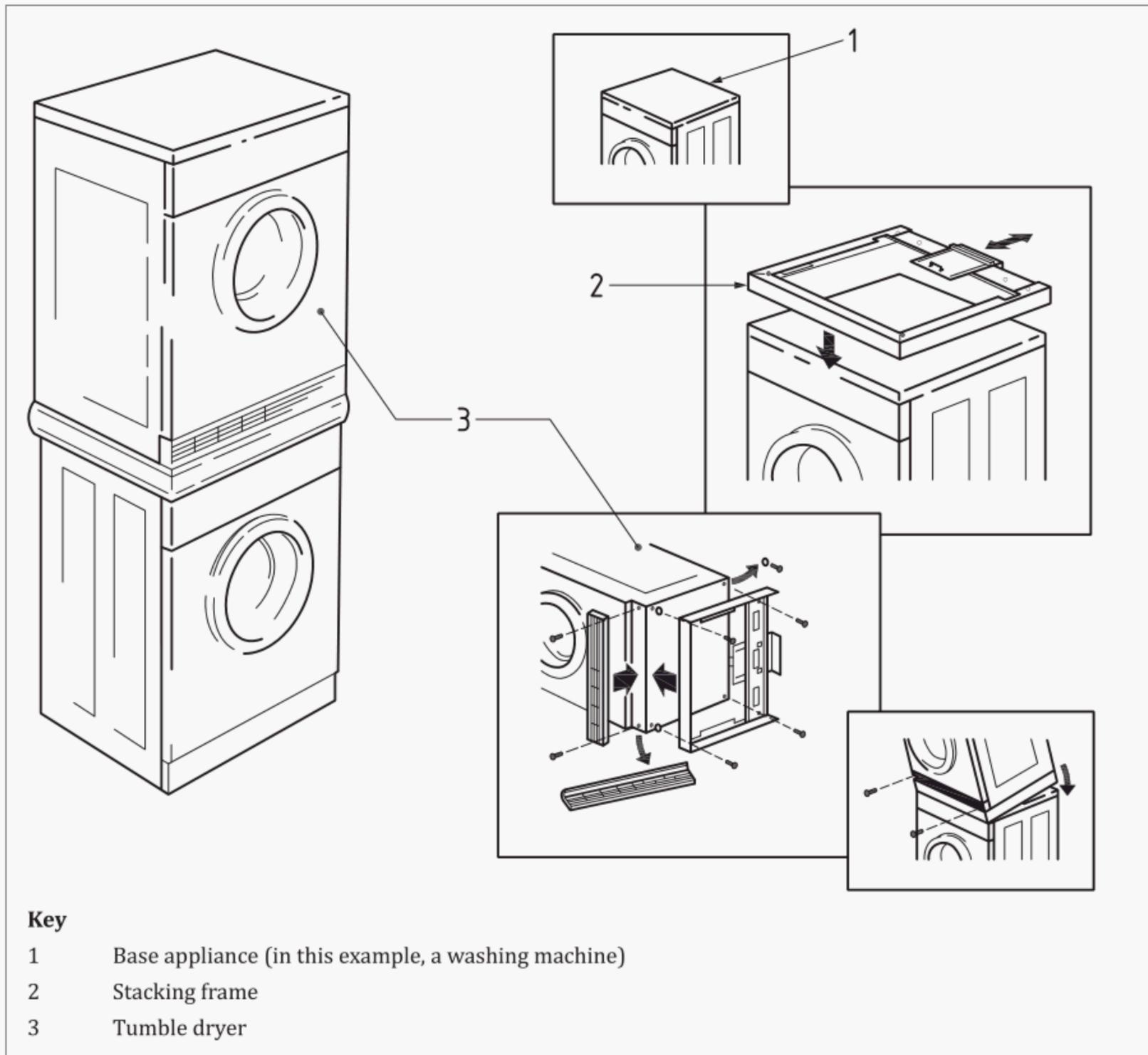
- 7.2.3** The laundry appliance shall be sited on a rigid and stable base of non-combustible materials such that the safe operation of a tumble dryer when fully loaded or a rotary ironer at full roller speed is possible. Space shall be provided around the laundry appliance in accordance with the manufacturer's installation instructions to facilitate maintenance and correct and safe operation.

*NOTE* The bottom of the laundry appliance should be levelled on the base in accordance with the appliance manufacturer's instructions.

- 7.2.4** A tumble dryer shall only be stacked on another stable appliance where the manufacturer's instructions permit such a practice. In such cases, the stacking kit recommended by the manufacturer shall be used.

*NOTE 1* The method of fixing the stacking frame included with the manufacturer's recommended stacking kit should be followed. No existing wall ventilator should be blocked or obstructed by the stacking of the laundry appliance. Attention is drawn to [8.1](#) regarding the need to fit a restraining device to a stacked laundry appliance. [Figure 2](#) illustrates a typical method of stacking a tumble dryer on another appliance using a stacking kit.

*NOTE 2* Some models of dryer can be marketed as a "stacker", "stack dryer" or similar. This refers to an arrangement where one tumble dryer is mounted on top of another. Sometimes, to highlight this, the individual units are called "pockets". For installation purposes, each "pocket" should be considered an individual tumble dryer, and the make-up air should be allowed for each "pocket".

**Figure 2** — Typical method of stacking a tumble dryer on to another appliance

## 8 Gas connections

### 8.1 General

#### COMMENTARY ON 8.1

*Means of restraining a laundry appliance can involve a suitably sized restraining wire or physically anchoring the chassis of the laundry appliance to the floor. If the laundry appliance is anchored to the floor, a notice to this effect should be attached to the appliance.*

*Where the operational conditions require, as perhaps identified by a risk assessment (see 5.2), the hose selected should be one that is fitted with additional protection. One method of achieving this would be to specify a hose with a metallic outer protection coil running down the length of the assembly.*

**8.1.1** Pipework shall be installed in accordance with IGEM/UP/2 [N1] or [BS 6891](#), as applicable. LPG installations shall be carried out in accordance with Liquid Gas UK CoP 22 [N2].

**8.1.2** Pipework shall be clearly identified as carrying a fuel gas by painting the pipework yellow ochre (to [BS 4800:2011](#), 08 C 35) or primrose yellow (to [BS 4800:2011](#), 10 E 53), or, alternatively, by applying a "Gas" marker tape at suitable intervals along the pipework.

- 8.1.3** Final connection shall be by means of a flexible connection in accordance with [BS 669-2](#) and installed in accordance with the manufacturer's installation instructions.
- 8.1.4** Only gas installation pipes and an appliance flexible connector of such size that it maintains the heat input of the laundry appliance, as specified by the manufacturer, shall be used. The flexible connector used shall be sized to deliver the minimum gas input specified by the appliance manufacturer for the correct and safe operation of the laundry appliance. A means of restraining the laundry appliance shall be fitted so as to prevent the appliance flexible connector being subjected to unnecessary strain.
- 8.1.5** The location of the termination point and appliance flexible connector shall be in accordance with the manufacturer's instructions. The termination point and the hose shall be installed such that they cannot suffer mechanical damage or undue force either in anticipated normal use or whilst being disconnected.
- 8.1.6** A suitable test and purge point(s) shall be provided to allow testing and purging to be carried out.
- 8.1.7** Testing and purging of the gas pipework shall be in accordance with IGEM/UP/1 [N3], IGEM/UP/1A [N4], IGEM/UP/1B [N5] and/or Liquid Gas UK CoP 22 [N2], dependent on pipe volume.

## **8.2 Manual isolation valves**

- 8.2.1** A manual isolation valve shall be installed on the installation pipework to each laundry area to enable the gas installation to be isolated in the event of an emergency. The manual valve shall be sited as near as practicable to the exit in a readily accessible location.

*NOTE* The isolation valve is fitted to provide isolation for routine maintenance/alterations, testing and purging of the downstream installation.

- 8.2.2** A pressure test point shall be installed as near as practicable to the exit downstream of the manual isolation valve to facilitate tightness testing.
- 8.2.3** In addition to the valves required in IGEM/UP/2 [N1] or [BS 6891](#), a manual isolation valve shall be included in the pipework to enable each individual appliance to be isolated for servicing, cleaning, etc.

## **8.3 Automatic isolation valves**

Where an automatic isolation valve conforming to BS EN 161 is fitted to the installation pipework serving a laundry area, the automatic isolation valve shall be installed as near as practicable to the point of entry to the laundry area downstream of a manual isolation valve and upstream of the gas appliances.

An automatic isolation valve shall be used to shut-off/isolate the gas supply to laundry appliance(s) as part of any interlock requirements.

In the event of an emergency the automatic isolation valve installed as near as practicable to the point of entry to the laundry area shall be operated by a safety control or emergency stop button(s) located near to the exit(s) of the laundry area.

To avoid inadvertent operation of an emergency stop button it shall be shrouded or located in a position where shrouding is not required.

## 8.4 Provision for emergency situations – notices

- 8.4.1** At locations where either the manual gas isolation valve is fitted or where an automatic isolation valve system can be reset, a suitably worded warning notice shall be affixed.

EXAMPLE

“IN THE EVENT OF AN EMERGENCY, THE GAS ISOLATION VALVE MUST BE CLOSED. ALL BURNERS AND PILOT VALVES ON APPLIANCES MUST BE TURNED OFF PRIOR TO ATTEMPTING TO RESTORE THE SUPPLY AFTER SHUT OFF.”

- 8.4.2** A suitably worded warning notice shall be located near to the emergency stop button(s).

EXAMPLE

“IN THE EVENT OF AN EMERGENCY, PUSH THE STOP BUTTON TO OPERATE SHUT DOWN. ALL BURNERS AND PILOT VALVES ON APPLIANCES MUST BE TURNED OFF PRIOR TO ATTEMPTING TO RESTORE THE SUPPLY AFTER SHUT OFF.”

## 8.5 Connections for 2nd family gases

The gas installation pipe selected for connection to the termination point shall conform to [BS 6891](#) or IGEM/UP/2 [N1], as applicable.

## 8.6 Connections for 3rd family gases

The gas installation pipes connected to the termination point shall be installed in accordance with [BS 5482-1](#), the Liquid Gas UK CoP 22 [N2] or IGEM/UP/2 [N1], as applicable.

Testing and purging shall be carried out in accordance with IGEM/UP/1 [N3], IGEM/UP/1B [N5] or Liquid Gas UK CoP 22 [N2] (dependent on pipe volume), respectively.

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## 9 Electrical connections

### COMMENTARY ON CLAUSE 9

*Examples of electrical connections are as follows.*

- a) *A heavy duty switched plug and socket assembly conforming to BS EN 60309-1 and BS EN 60309-2 protected by a fuse rated according to the laundry appliance manufacturer's instructions.*
- b) *A fused 13 amp plug and socket, switched or un-switched, or a fused switched spur conforming to BS 1363 (all parts) and fitted with a fuse rated according to the laundry appliance manufacturer's instructions. This might not be suitable for wet and humid environments.*
- c) *A fused double pole switch fitted with a correctly rated fuse suitable to the environment and conforming to BS EN 60529.*

*Where there is a risk of mechanical damage, braided, armoured, flexible or abrasion-resistant cable should be used.*

Each laundry appliance requiring a mains electrical supply shall be connected in accordance with [BS 7671](#).

The point of connection to the mains supply shall be readily accessible and adjacent to the laundry appliance or group of laundry appliances.

Any flexible electrical cable used shall conform to the voltage and current requirements of the laundry appliance and be long enough for the laundry appliance to be withdrawn for cleaning, servicing, etc.

Any electrical connection shall be made in accordance with the laundry appliance manufacturer's instructions regarding connection method, fuse rating, earth connection and voltage range.

Only electrical components designed for use with the electrical supply voltage and of a rating such that it can carry the electrical current required by the operation of the equipment shall be used.

## 10 Make-up air

### COMMENTARY ON CLAUSE 10

*It is acceptable to oversize the make-up air. [Table 3](#) and [Table 4](#) are given for guidance purposes in the absence of manufacturer's instructions.*

*When operating, laundry appliances move large amounts of air as can be seen in [Table 3](#). [Table 3](#) is only advisory and should not be used instead of manufacturer's instructions when these are available. [Table 3](#) and [Table 4](#) are taken as worst case and guidance should always be sought from the manufacturer or agent for recommended sizing. The tables should only be used in the absence of the manufacturer's instructions.*

*Means should be provided so that clean, cool air is introduced directly from the outside atmosphere to allow the drying process to occur whilst providing enough air for combustion. Air for combustion of the gas commonly takes around 2% to 6% of the total air volume required for the operation of a laundry appliance.*

A permanent, non-closable supply of make-up air shall be provided for the laundry appliance in accordance with the manufacturer's instructions.

The make-up air inlet vent shall be at least 2 000 mm away from any exhaust termination to prevent damp, warm air being re-introduced into the system.

*NOTE 1 Where there is potential for recirculation, the need to provide a guard or barrier should be determined and this can be tested by the use of smoke tablets whereupon if smoke does enter back in from the exhaust, actions to prevent this should be taken. This testing should be carried out at the appliance's operational temperature. The location of vents at external and internal corners should be taken into account and, where practicable, a minimum distance of 2 000 mm should be kept between inlets and exhaust outlets.*

Where fans or similar are installed, these shall be positioned such that they do not adversely affect the operation of the laundry appliance or the safety of other combustion and cooling equipment, either in that room or in adjacent rooms. Where the make-up air supply utilizes input fans or similar, these devices shall be positively interlocked with a manual reset in the gas supply so as to prevent combustion taking place in the dryer in the event of a failure.

The apertures of air vents shall allow the entry of a 5 mm diameter ball. No gauze or fly screen (i.e. mesh with apertures of less than 5 mm) shall be incorporated or subsequently fitted to an air vent.

*NOTE 2 Debris can block vents of little less than 5 mm and restrict the free area.*

Any obstructions, such as louvres or grilles, shall be deducted from the overall size of a vent and the vent increased in physical size until the minimum size specified by manufacturer's instructions is achieved, using [Table 3](#) or [Table 4](#) as guidelines.

Where tumble dryers are stacked they shall be regarded as separate appliances.

**Table 3** — Air flow and minimum free make-up air requirements

Exhaust diameter mm	Make-up air free cross-sectional areas mm <sup>2</sup> (cm <sup>2</sup> )
100	3 950 (395)
150	8 850 (885)
200	15 700 (1 570)
250	24 550 (2 455)

*NOTE 1* In all instances the manufacturer's installation instructions should be followed before referring to the table for ventilation.

*NOTE 2* Some manufacturers require less ventilation than is stated in the following table; therefore this table is only to be used when the relevant manuals relating to the installation cannot be found or sourced.

**Table 4** — Air flow and minimum free make-up air requirements according to drying load capacity for rotary ironers

Ironer bed length m	Air flow m <sup>3</sup> /min (ft <sup>3</sup> /min)	Make-up air free cross-sectional area mm <sup>2</sup> (cm <sup>2</sup> ) (in <sup>2</sup> )
0.8–2.1	4.17–16.7 (147–589)	10 000 (1 000) (155)
2.2–3.6	5–20 (177–706)	15 000 (1 500) (233)

## 11 Exhaust system

### COMMENTARY ON CLAUSE 11

*The exhaust ducting is intended to remove the products of combustion, lint and the water vapour formed during the operation of the laundry appliance. The dilution of products of combustion to air commonly exceeds 1:20.*

*The method and design of the ducting for the exhaust has a major effect on the efficiency of the installed laundry appliance(s).*

The exhaust system to be installed shall:

- discharge to the outside atmosphere (see [Clause 12](#) to [Clause 15](#));
- present a minimal resistance to airflow;
- be of smooth bore metal construction, as short as possible and have a minimum number of bends and changes in direction;
- include provision for internal access for cleaning and maintenance; and
- be capable of withstanding temperatures up to 80 °C for tumble dryers and 180 °C for rotary ironers.

Where the laundry appliance is to be fixed to an existing exhaust system, it shall only be fixed to a system which has these characteristics.

## 12 Flexible exhaust connections for tumble dryers

The flexible exhaust connection shall be as specified by the tumble dryer manufacturer. It shall not exceed 500 mm in length and shall be capable of withstanding the maximum known output temperature [see [Clause 11 e](#)]]. However, the internal bore of the flex section of the exhaust connection shall be maintained throughout its length, i.e. it shall not be kinked or deformed. There shall be no direction changes.

## 13 Ductwork

### COMMENTARY ON CLAUSE 13

*Other acceptable forms of sealing ductwork include high temperature silicon sealants. The advice of the ductwork manufacturer should be sought before using such sealing materials.*

*Where sections are joined, intrusions into the airflow should be minimized, i.e. any self-tapping screws or rivets should be as short as possible so as not to restrict airflow or act as an obstruction or gather lint. Small quantities of lint move with the air flow and, for this reason, neither filters nor grilles should be fitted.*

*The ideal design is a straight, short, smooth-bore duct pipe from the outlet of the laundry appliance directly to the outside atmosphere at the outlet level of the dryer, with a down-turned terminal and no grille. In all cases, the manufacturer's installation instructions should be followed.*

*The characteristics of ductwork for laundry appliance exhausts vary between appliance types. Therefore, laundry appliance ducts should serve only one type of appliance.*

*The maximum length of ductwork should never exceed that specified by the manufacturer's instructions.*

*Fire dampers might be required by local bylaws, regulations, fire authorities, etc. Where fire dampers are required, the size of the duct should be increased to overcome the pressure-loss arising therefrom.*

*Ductwork should be inspected and lint removed annually or as indicated by the risk assessment.*

The exhaust duct shall be supported throughout its length, and all joints shall be sealed. Sections of ductwork shall be joined with mechanical fixings, e.g. screws or rivets, and sealed with self adhesive tape suitable for the type of surface to which it is to be affixed and capable of maintaining its seal throughout the range of temperatures to which it is expected to be subjected.

In the case of single duct designs for multiple tumble dryer installations, the minimum overall cross sectional area of the duct shall be equal to or greater than the total sum of the cross sectional areas of all the dryer exhaust outlets.

Inspection openings shall be provided along the ductwork, and be sized such as to facilitate maintenance of the duct, e.g. manual removal of lint by the use of brushes and vacuum cleaners to remove lint from the ductwork.

Ancillary equipment shall not be added to the ducting unless this is agreed by the manufacturer's instructions or agent.

Ductwork shall only serve one type of laundry appliance installation, and shall be of the type specified by the manufacturer.

Filters shall not be fitted to any ductwork.

Fire dampers shall be fitted within the ductwork. Where these are fitted, the fire damper shall be positively interlocked with the gas supply.

## 14 Termination

### COMMENTARY ON CLAUSE 14

The termination in the outside atmosphere can have a detrimental effect on the overall efficiency of the laundry appliance(s) if this impairs the airflow.

There are many different styles of termination. Any design is acceptable, provided it conforms to this clause.

An unrestricted, open-ended termination that prevents ingress of weather whilst protecting the airflow from prevailing winds shall be used.

The termination shall be free of all filters and, where the termination is fitted with integral louvres, i.e. a plenum box, the termination shall be upsized to minimize resistance to the airflow and prevent lint build-up.

The termination shall:

- a) allow the exhaust and all its components to clear to the outside atmosphere;
- b) not allow a build up of lint to occur;
- c) prevent ingress of the weather; and
- d) not impair the operation of the laundry appliance(s).

The termination shall be at least 2 000 mm from any opening or fresh air inlet into the building. The configuration of the exhaust termination in respect of the make-up air inlet grille shall not allow re-circulation of the exhausted damp, warm air back into the make-up air vent.

*NOTE* A 45°, 90° or 180° elbow (as shown in [Figure 3](#)) may be used to prevent re-circulation of exhausted air back into the make-up air vent. A minimum clearance of 300 mm from ground level should be provided.

**Figure 3** — Possible configurations of the exhaust termination

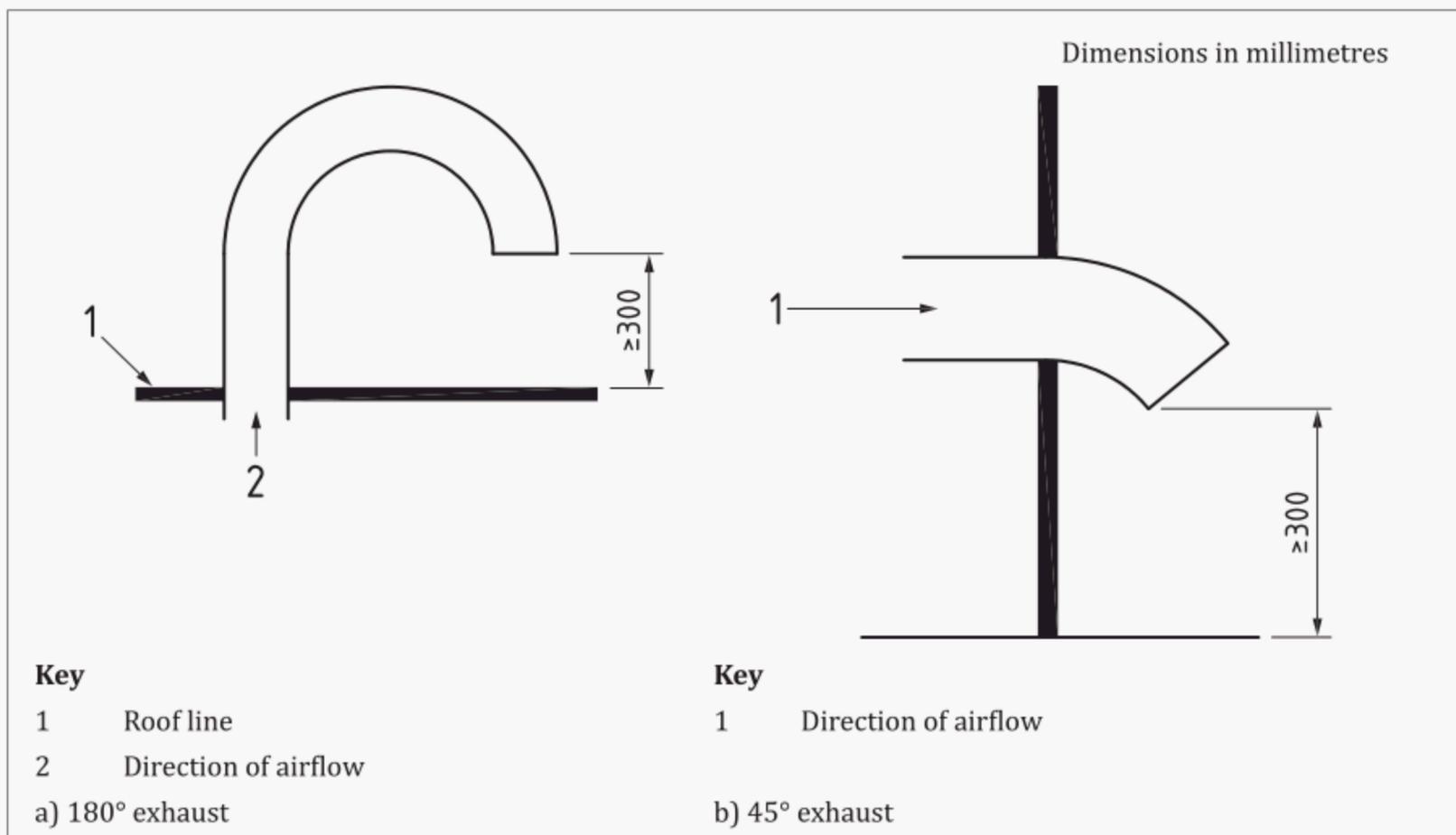
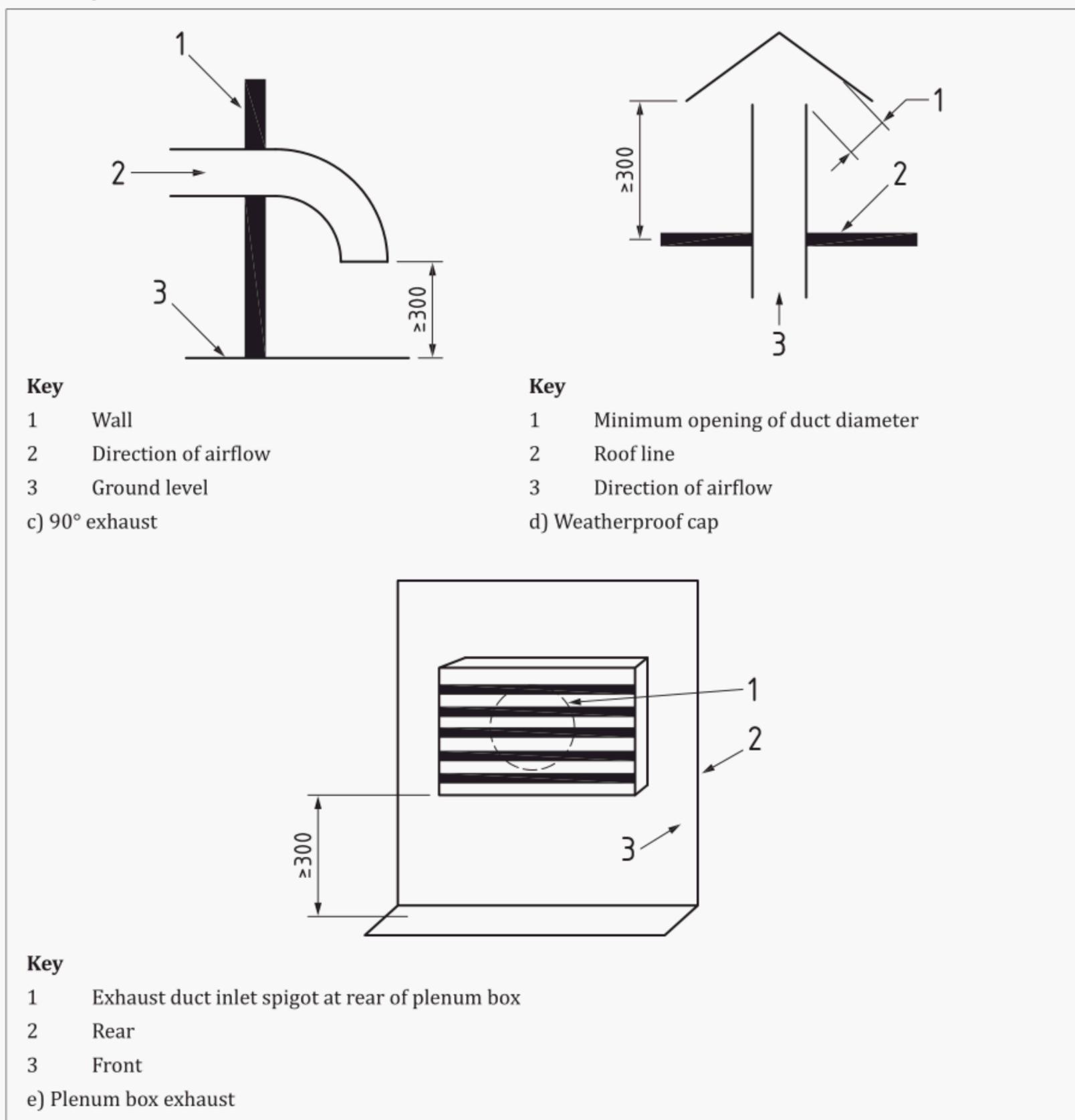


Figure 3 (continued)



## 15 Exhaust testing

### COMMENTARY ON CLAUSE 15

Exhaust tests seek to confirm that the design of the ductwork allows exhaust products to be dispersed to the outside atmosphere and that there are no areas where there can be a potentially dangerous build-up of exhaust products. The ductwork should be visually checked for sizing, construction, fabrication, distance, direction and termination. If the length of the ductwork exceeds that specified by the manufacturer for unaided air movement the laundry appliance exhaust system might have been designed with a fan integral to the ductwork to assist the airflow to atmosphere. In such a case, the interlock should be positive and prevent combustion by cessation of the gas supply in the event that the fan is switched off or faulty.

If a visual inspection indicates that the ductwork is satisfactory in all respects, the airflow should then be proved. The recommended method is to light a smoke pellet and place it in the duct-way within the laundry appliance and then turn the appliance on, but without the heating being operated. If all the

*pungent smoke is not observed to exit the ductwork at the termination or if the smoke exits elsewhere, the ductwork should be further examined, and rectification work organized, before the visual and airflow tests are repeated. The airflow test might need to be carried out several times to simulate worst case scenarios, i.e. with one laundry appliance operating and then all appliances operating, and with doors and windows open and then closed to allow the airflow within the duct. This test should always be carried out with the duct cold.*

*Once the visual and airflow tests have been completed satisfactorily, the backflow pressure should be checked to verify that it is at an acceptable level as indicated in the laundry appliance manufacturer's instructions. This check should be carried out with the ductwork at normal working temperature and again using worst case scenario, i.e. one appliance operational then all operational, with doors and windows open then shut.*

*The build-up of lint is a fire risk. While the airflow meets the parameters specified in this clause, lint would remain airborne and exit to the outside atmosphere. However, where new appliances are added to existing ductwork, assuming that the ductwork is correctly sized and terminated, it might be necessary to clean the ductwork thoroughly before putting the laundry appliance through the visual and airflow tests.*

Airflow testing shall be carried out to check that the ducting is within the parameters specified by the laundry appliance manufacturer. The exhaust system shall be tested to verify that all exhaust products are being removed to the outside air. When tested in the exhaust ducting within 500 mm of the laundry appliance operating at its normal running temperature, the airflow pressure measured shall be less than 1.25 mbar.

Where more than one laundry appliance is to be connected to a common duct, the system shall first be tested for its exhaust capabilities with one appliance in operation and all non-permanent openings closed, i.e. doors, windows, etc. The test shall then be repeated with all laundry appliances in operation.

During the test(s), any other air extraction systems in the premises shall operate at maximum. Where air-extraction systems can be operated in induce modes, the tests shall be carried out in both this and the extract mode, i.e. in "worst case" conditions.

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## **16 Inspection and commissioning**

### **16.1 Inspection**

An initial inspection shall be carried out prior to commissioning to verify that the installation has been completed in accordance with the system designer's specification. In particular, this shall include verification that the following design parameters have been satisfied:

- a) the provision of adequate ventilation sufficient for both combustion and purge requirements;
- b) the construction and design of the flue system;
- c) the location of the exhaust termination;
- d) the sizing and installation of gas and electrical supplies; and
- e) the stability of laundry appliance installation(s) and method of restraint.

### **16.2 Commissioning**

- 16.2.1** The laundry appliance shall be commissioned in accordance with the laundry appliance manufacturer's instructions to check the correct operation of all safety controls, safety-shut off valves and pressure/flow-sensing valves.

- 16.2.2** All gas fittings forming part of the installation shall be tested for tightness and purged in accordance with either IGEM/UP/1 [N3], IGEM/UP/1A [N4], IGEM/UP/1B [N5] or Liquid Gas UK CoP 22 [N2], as applicable.
- 16.2.3** The gas rate or burner pressure shall be adjusted, where necessary, to the correct setting as specified in the laundry appliance manufacturer's instructions, or as indicated on the laundry appliance's data plate.
- 16.2.4** Testing shall be carried out to verify that the operation of the tumble dryer or rotary ironer does not adversely affect the safe operation of any open-flued gas appliance(s) located in the same room or internal space or in an adjacent room or internal space. The testing shall be conducted in a worst-case scenario with all appliances operating at normal working temperatures, any fan assisted ventilation or exhaust operating, and all doors and windows closed in the room of the installation. In the case of an open-flued laundry appliance located in an adjacent room, this test shall be repeated with the connecting door open.

*NOTE 1 In some installations, e.g. those in which the room of the installation, and/or an adjacent room have been subject to draught proofing, double glazing etc., the operation of the laundry appliance fan might depressurize the room(s). This might adversely affect the correct operation of an open-flued appliance, leading to spillage. Where spillage is detected under such circumstances, additional ventilation should be provided. The need for additional ventilation can usually be established by opening a window and re-checking for spillage.*

*NOTE 2 Further advice on the effects of extractor fans and on the spillage testing of multi-appliance gas installations involving fanned appliances can be found in [BS 5440-1](#) and [BS 5440-2](#). The manufacturer's instructions for the other open-flued appliances referred to in [16.2.4](#) should be consulted for full details of the method of spillage testing for each appliance.*

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## 17 Information to be given to the user

### COMMENTARY ON CLAUSE 17

*Attention is drawn to the Gas Safety (Installation and Use) Regulations 1998 as amended [[4](#) and [5](#)]. The installer is required to leave any operator instructions supplied by the laundry appliance manufacturer with the owner or occupier of the premises. These instructions might include details of the wiring diagrams referred to in [17.1](#).*

*CO alarm systems, where fitted, should conform to BS EN 45544-3.*

*CO detection should not be regarded as a means to negate the obligation of establishments to maintain appliances and equipment so as to ensure an acceptable level of performance and safety.*

*Laundry establishments are regarded as a workplace. Not all domestic type detectors and alarms conforming to BS EN 50291-1 are suitable for these applications unless the manufacturer specifically warrants this and confirms it sounds at the workplace occupational exposure limits.*

*Action taken when in alarm is determined by the level of assessed risk and the environmental conditions within the area to be protected.*

- 17.1** The commissioning engineer shall check that wiring diagrams for the laundry appliance and any ancillary controls are either given to the operator (e.g. via the appliance instructions) or attached to the appliance.
- 17.2** If a computer program has been written in support of the intended method of laundry appliance operation, a record of this shall be given to the operator.
- 17.3** The installer shall demonstrate to the operator, or their representative, the correct and safe operation of the appliance, including the isolation of gas and electricity supplies.

## 18 Servicing and maintenance

### COMMENTARY ON CLAUSE 18

*If the premises in which a laundry appliance is installed are tenanted, the landlord is required by the Gas Safety (Installation and Use) Regulations 1998, as amended [4 and 5] to have a safety check carried out every 12 months. These regulations also impose a general obligation, with certain exceptions, on landlords providing laundry appliances in tenanted premises to have these checked for safety every 12 months. The same Regulations require employers and self-employed persons to verify that gas installations under their control are maintained in a safe condition so as to prevent the risk of injury to any person.*

*If a servicing requirement is specified by the manufacturer, this should be drawn to the attention of the user. The user should also be made aware of any expected user maintenance, e.g. cleaning of the lint filter. The user should be advised of the dangers of using add-on items, e.g. condenser converters, unless these are permitted by the laundry appliance manufacturer.*

*Where any defects are identified with an existing laundry installation or appliance, reference should be made to the appropriate guidance notes in the HSE Approved Code of Practice L56 [25].*

Written information shall be provided to the user on the need to have the laundry appliance regularly serviced by a competent (e.g. Gas Safe registered) person for continued safe and correct operation of the appliance.

Ductwork shall be annually inspected for lint and airflow. If lint is present, it shall be removed.

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