

Safety of domestic gas appliances —

**Part 17: Specification for direct
gas-fired tumble dryers (2nd and 3rd
family gases)**

Committees responsible for this British Standard

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- Association for Consumer Research (ACRE)
- British Gas plc
- Calor Appliances Testing Laboratories
- Consumer Policy Committee of BSI
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Gas Consumers' Council
- Society of British Gas Industries

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Foreword

This Part of BS 5258 has been prepared under the direction of the Gas Standards Policy Committee to meet the need for a standard specifying the safety requirements and associated methods of test for direct gas-fired tumble dryers for burning 2nd and 3rd family gases.

In common with other Parts of BS 5258 currently being revised and prepared, this Part can be applied to all production appliances through a recognized scheme of quality assurance, whereas originally the Parts were written with type approval in mind. The intention is that all appliances manufactured in accordance with this standard will be safe in normal use when installed and maintained in accordance with the relevant British Standard codes of practice and with the manufacturer's instructions.

Attention is also drawn to the requirements of the Gas Safety (Installation and Use) Regulations, the Low Voltage Electrical Equipment (Safety) Regulations and the various Building Regulations.

The following Parts of BS 5258 are already published:

- *Part 1: Specification for central heating boilers and circulators;*
- *Part 2: Cooking appliances (obsolescent);*
- *Part 4: Specification for fanned-circulation ducted-air heaters;*
- *Part 5: Specification for gas fires;*
- *Part 6: Specification for refrigerators and food freezers;*
- *Part 7: Storage water heaters;*
- *Part 8: Combined appliances: gas fire/back boiler;*
- *Part 9: Specification for combined appliances: fanned-circulation ducted-air heaters/circulators;*
- *Part 10: Flueless space heaters (excluding catalytic combustion heaters) (3rd family gases);*
- *Part 11: Flueless catalytic combustion heaters (3rd family gases);*
- *Part 12: Specification for decorative fuel effect gas appliances (2nd and 3rd family gases);*
- *Part 13: Specification for convector heaters;*
- *Part 14: Specification for barbecues (3rd family gases);*
- *Part 15: Specification for combination boilers;*
- *Part 16: Specification for inset live fuel effect gas fires (2nd and 3rd family gases).*

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 26, an inside back cover and back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1 Scope

This Part of BS 5258 specifies safety requirements and describes associated methods of test for direct gas-fired tumble dryers for domestic purposes having an input rating not exceeding 3 kW and burning 2nd or 3rd family gases. The requirements apply only to appliances in which the burner operation is under control of a full sequence automatic control system.

This Part of BS 5258 applies to type A (flueless appliances), including such appliances so designed that ducting may be connected to the outlet to enable combustion products and moisture to be exhausted outside the room housing the appliance.

An appliance intended to be fitted with such a duct is regarded as a flueless appliance.

In specifying requirements for appliances burning 2nd or 3rd family gases, it is assumed that a meter governor will be fitted and for appliances burning 3rd family gases it is assumed that the gas supply from the container will be governed by a pressure regulator complying with BS 3016.

This Part of BS 5258 is not applicable to:

- a) type B (open flued appliances);
- b) type C (room sealed appliances);
- c) tumble dryers designed exclusively for industrial or commercial purposes;
- d) tumble dryers intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust vapour or gas);
- e) condensation type tumble dryers wherein the heated air and products of combustion used for the drying process are dehumidified by cooling with water or air;
- f) tumble dryers intended to be used in vehicles or on board ships or aircraft, as additional requirements may be necessary.

NOTE 1 For tumble dryers intended to be used in tropical countries, special requirements may be necessary.

NOTE 2 The titles of publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 5258, the definitions given in BS 1179:1967, BS 1179-6 and the relevant British Standard codes of practice apply, together with the following.

2.1

adjustment pressure

the pressure, measured at the test point, that is required to obtain the rated heat input using the reference test gas

2.2

rated heat input

the manufacturer's declared heat input for the appropriate reference test gas

2.3

setting pressure

the pressure, measured at the test point, that is specified by the manufacturer for the purpose of adjusting the appliance heat input

2.4

cold condition

a condition of the appliance required for some tests and obtained by allowing the unlit appliance to attain equilibrium at room temperature

2.5

equivalent resistance

the resistance to flow in mbar, measured at the outlet of the appliance, which is equivalent to that of the actual flue

2.6

limits of tolerance of supply voltage

0.90 times the minimum rated voltage and 1.10 times the maximum rated voltage of the appliance

2.7

direct gas-fired tumble dryer

an 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

2.8

full sequence automatic control systems

a control system which brings the burner into operation from a completely shut-down condition in response to an external demand without manual intervention

2.9

minimum operational rate

80 % of the lowest heat input at which the appliance is intended to be operated

2.10

volatile lock out

a safety shut-down condition of the control system such that restart takes place only after either manual intervention or an interruption of the electrical supply to the control of at least 50 ms duration and its subsequent restoration

2.11

exhaust duct

a means of evacuating the moist air produced by the drying process to the outside of the building

2.12
aerated burner

a burner in which the gas flowing through a gas injector induces the primary air for subsequent combustion

2.13
non-aerated burner

a burner in which the gas is burned without previous mixture with air

2.14
air inlet

any openings in the appliance casing for the supply of combustion air

3 Classification of appliances

3.1 Classification by category

The category system of appliance classification is described in A.1.3 of BS 4947:1984 by which an appliance is denoted by a category number, I, II or III, according to the number of gas families that it is designed to burn. The families are identified by subscripts T, N and L for the 1st, 2nd and 3rd gas families respectively. Subscripts P and B refer to propane and butane respectively.

For the purpose of this Part of BS 5258 the following categories of appliance are permitted:

Categories I_N, I_L, I_{L/B}, I_{L/P}

Categories II_{NL}, II_{NL/B}, II_{NL/P}

Within a given category the changes that are allowed in adapting an appliance from operation on one gas or gas family to operation on another are limited as follows.

- a) Change of gas family.
 - 1) Adjustment of governor setting or exchange of governor springs or immobilization of the governor (when fitted).
 - 2) Exchange of injectors or non-aerated burner assemblies.
 - 3) Adjustment of aeration.
 - 4) Exchange or adjustment of auxiliary components (e.g. pilots, igniters, restrictors).
- b) Change of gases within 3rd family.
 - 1) Adjustment of aeration.

3.2 Classification by flue type

Appliances are also classified according to the flue system for which they are designed and the source of the combustion air. This Part of BS 5258 covers type A, i.e. flueless appliances only.

NOTE The relevant definition of this type of appliance is given in BS 1179-6.

However, the standard also includes requirements for a duct leading outside, i.e. appliances fitted with an exhaust duct.

For the purposes of this Part of BS 5258 these appliances are covered by flueless appliances.

4 General requirements

The appliance shall comply with this Part of BS 5258 when tested using the specified test gases of the appropriate gas family.

NOTE 1 Full details of the test gases are given in BS 4947.
NOTE 2 Appliances designed to burn 3rd family gases may be designed for use with either commercial butane or commercial propane, or both.

5 General conditions of test

5.1 Test room

The room shall be adequately ventilated but free from draughts likely to affect the performance of the appliance. If the test results are influenced by the temperature of the ambient air, the room temperature shall be maintained at 20 ± 5 °C.

5.2 Preparation of appliance

The appliance shall be installed and adjusted in accordance with the manufacturer's instructions, with particular reference to minimum clearances around the appliance and using the appropriate reference test gas at the following inlet pressure.

Family	Test gas	Inlet pressure
2nd	NGA	20 mbar ^a
3rd	LPGA LPGC	28 37

^a 1 mbar = 0.1 kPa = 10² N/m².

Except where otherwise specified in section 2, an appliance requiring an electrical supply shall be connected to a supply at the rated voltage.
Before any tests are made the appliance shall be operated at the maximum setting without a load in the drum for a period sufficient to dry out any insulation and remove any temporary finish that might interfere with observations.

5.3 Test conditions

- 5.3.1 The test conditions given in 5.3.2 to 5.3.7 shall apply except where otherwise specified in section 2.
- 5.3.2 The appliance shall be examined for gas soundness both before and after the tests. The test results are deemed invalid unless the system is sound (see clause 7).
- 5.3.3 The appliance shall be at room temperature at the start of each test.

5.3.4 During testing the initial adjustment of the appliance shall not be altered.

5.3.5 Precautions shall be taken to prevent thermostats or other variable controls from acting to interfere with the gas flow except as necessitated by the test.

5.3.6 Unless otherwise stated in section 2, the appliance shall be tested without exhaust ducting fitted.

5.3.7 Test pressure shall be measured correct to 0.2 mbar and the variation in test pressure shall not exceed ± 0.2 mbar.

NOTE 1 In general, except for tests involving governor performance, the appliance governor, if any, may be put out of operation and the specified test pressure obtained by adjustment of the gas pressure at the inlet to the appliance.

NOTE 2 The test gases (and, where appropriate, their conditions of application) to be used are specified in the relevant clauses of section 2.

5.3.8 Where tests are specified which require the drum of the appliance to be filled with a load, this load shall consist of a quantity of textile material having a mass in the dry condition equal to the maximum mass specified by the manufacturer.

The textile material shall be in the form of pre-washed double hemmed cotton sheets having dimensions of approximately 70 cm $\times$ 70 cm and a mass between 140 g/m² and 175 g/m² in the dry condition.

When the load is required to be wet, the textile material is saturated with a quantity of water having a temperature of 25 ± 5 °C and a mass equal to that of the textile material.

NOTE 1 For the purpose of this Part of BS 5258, cotton having a water content not exceeding 10 % is considered as being in the dry condition. If cotton is conditioned for 24 h in still air having a temperature of 20 ± 2 °C, a relative humidity between 60 % and 70 % and a pressure between 860 mbar and 1 060 mbar, cotton will contain approximately 7 % of water.

NOTE 2 As an alternative to the textile material specified, pieces of cloth with the same material and finishing specification as in **5.3.8** but having an area between 4 800 cm² and 5 000 cm², with one side of not less than 55 cm, may be used for the tests.

Section 2. Safety requirements and associated methods of test

6 General design and construction

6.1 Materials, fittings and finishes

Materials, fittings and finishes, the failure of which may affect the safe operation of the appliance, shall be appropriate to the conditions arising in the part of the appliance in which they are used. The appliance shall be free from swarf, grit or other foreign matter.

Asbestos or asbestos-containing materials shall not be used on the appliance.

The appliance and its accessories shall have no sharp edges, burrs, etc., which might cause injury to the user.

6.2 Component location

The burner shall be positively located and so arranged that it cannot be misaligned.

Parts that are intended to be removable by the user, e.g. for cleaning, shall be readily accessible, shall not require the use of tools for their removal and shall be easy to assemble correctly and difficult to assemble incorrectly.

It shall not be possible to loosen any component necessary for the safe operation of the appliance without the use of tools.

6.3 Materials in contact with gas

6.3.1 Copper tubing

Copper tubing shall not be used where it would be exposed to temperatures above 100 °C.

6.3.2 Jointing compounds

Jointing compounds shall comply with BS 5292.

6.4 Bolts and screws

6.4.1 Drillings for bolts and screws shall not connect with fuel gasways. The minimum residual wall thickness shall be 1 mm.

6.4.2 Screws used for securing components which may be removed during routine servicing or devices essential to the safe operation of the gas burner shall provide a secure fix upon the fifth tightening after loosening and tightening five times to the torque given in the table. The test screwdriver shall have a blade suitable for the screw head and the tightening action shall be smooth and not in jerks. The component shall be removed each time the screw is loosened.

NOTE This does not apply to screws having a full machine thread or to self-tapping screws used in conjunction with spring steel fasteners.

Torque values for screws	
Nominal diameter of screw	Torques
mm	N m
≤ 2.8	0.4
> 2.8 ≤ 3.0	0.5
> 3.0 ≤ 3.2	0.6
> 3.2 ≤ 3.6	0.8
> 3.6 ≤ 4.1	1.2
> 4.1 ≤ 4.7	1.8
> 4.7 ≤ 5.3	2.0
> 5.3 ≤ 6.0	2.5

In addition, screws affecting electrical safety shall comply with the relevant requirements of BS 3456.

6.4.3 Self-tapping screws shall not be used to ensure gas soundness.

In addition, a single self-tapping screw shall not be used to secure devices essential to the safe operation of the gas burner.

6.5 Aeration adjustment

There shall be no means of adjusting the primary aeration.

6.6 Insulation

Thermal or acoustic insulation shall be non-combustible (see BS 476-4), securely located and protected against mechanical damage and the effects of condensate.

6.7 Fans

The direction of rotation of fans shall be clearly marked if it is possible to install the fan such that the direction of rotation is incorrect.

Moving parts of fans shall be so arranged or enclosed as to provide, in normal use, adequate protection against personal injury. Access to such parts, for example for maintenance, shall not be possible without the use of tools. Compliance shall be checked by a test with standard test finger II, as specified in BS 3042.

6.8 Lint resistance of the burner

6.8.1 General

An appliance fitted with aerated burners and/or aerated pilots shall comply with 6.8.2 to 6.8.5.

6.8.2 Ignition

After testing in accordance with 6.8.3 and Appendix A, the appliance shall comply with 10.2.1.

6.8.3 Combustion

6.8.3.1 For type approval purposes, when the appliance is tested in accordance with Appendix A the CO/CO₂ ratios shall not exceed those specified in 6.8.3.2 and 6.8.3.3.

For a production appliance the requirements of 6.8.3.2 and 6.8.3.3 are deemed to be satisfied provided that the dimensions and/or specification of the lint arrester system are in accordance with drawings which the manufacturer shall supply to the test authority.

6.8.3.2 Up to a stage where the measured change in pressure differential is that given by curve A in Figure 1 for the appropriate height of the lowest point of the air inlet above the floor, the CO/CO₂ ratio shall be not greater than the larger of the following:

- a) the CO/CO₂ ratio that would be obtained at 110 % rated heat input in the absence of lint;
- b) 0.004 plus the CO/CO₂ ratio at rated heat input in the absence of lint.

6.8.3.3 At stages where the measured change in pressure differential is between those given by curve A and curve B in Figure 1 for the appropriate height of the air inlet above the floor, the CO/CO₂ ratio shall not exceed 0.02.

6.8.4 Cleanability

6.8.4.1 The manufacturer shall provide instructions for the cleaning of the appliance.

6.8.4.2 Where box type burners are employed that are not capable of being opened using standard tools, or are not otherwise accessible for internal cleaning, the combustion ratio at the end of the second linting test as described in A.4.8 shall be not more than 0.004 above the combustion ratio obtained at the end of the first linting test, subject to a maximum permissible combustion ratio of 0.02.

6.8.4.3 A burner that is not capable of being opened shall on examination in accordance with A.4.9 not exhibit any appreciable accumulation of lint.

6.8.5 Pilot performance

After the appliance has been tested in accordance with 6.8.3 and Appendix A, any aerated pilot shall comply with 11.2.

6.9 Lint collection

A lint filter or other means shall be provided for minimizing the discharge of lint from the exhaust of the appliance.

The lint screen shall be readily removable or easily accessible for cleaning without disconnecting the exhaust duct.

6.10 Discharge system

Air, lint and products of combustion associated with the drying process shall only discharge from the appliance through the purpose-designed outlet(s).

6.11 Space below burner

For an appliance burning 3rd family gases, the space below the burner shall be designed such that unburnt gas may escape through the base of the appliance.

6.12 Mechanical hazards

6.12.1 Requirements for appliances without an interlock

Appliances shall be provided with a means to prevent opening of the door while the appliance is operating as in normal use.

After testing in accordance with 6.12.3, the locking means or its components shall not be damaged to such an extent that this will impair compliance with this Part of BS 5258.

6.12.2 Requirements for appliances with an interlock

6.12.2.1 General

The interlock shall disconnect the motor before the door opening exceeds 75 mm. In addition, it shall not be possible to start the motor while the door opening exceeds 75 mm.

Any interlock shall be so designed that unexpected operation of the appliance is unlikely to occur while the door is open.

After testing in accordance with 6.12.3 the locking means or its components shall not be damaged to such an extent that this will impair compliance with this Part of BS 5258.

6.12.2.2 Requirements for appliances with an opening dimension exceeding 30 cm and a drum having a volume exceeding 100 dm³

Appliances with an opening dimension exceeding 30 cm and a drum having a volume exceeding 100 dm³ shall comply with the requirements of 6.12.2.1. In addition movement of the drum shall not be possible until a separate control is manually operated.

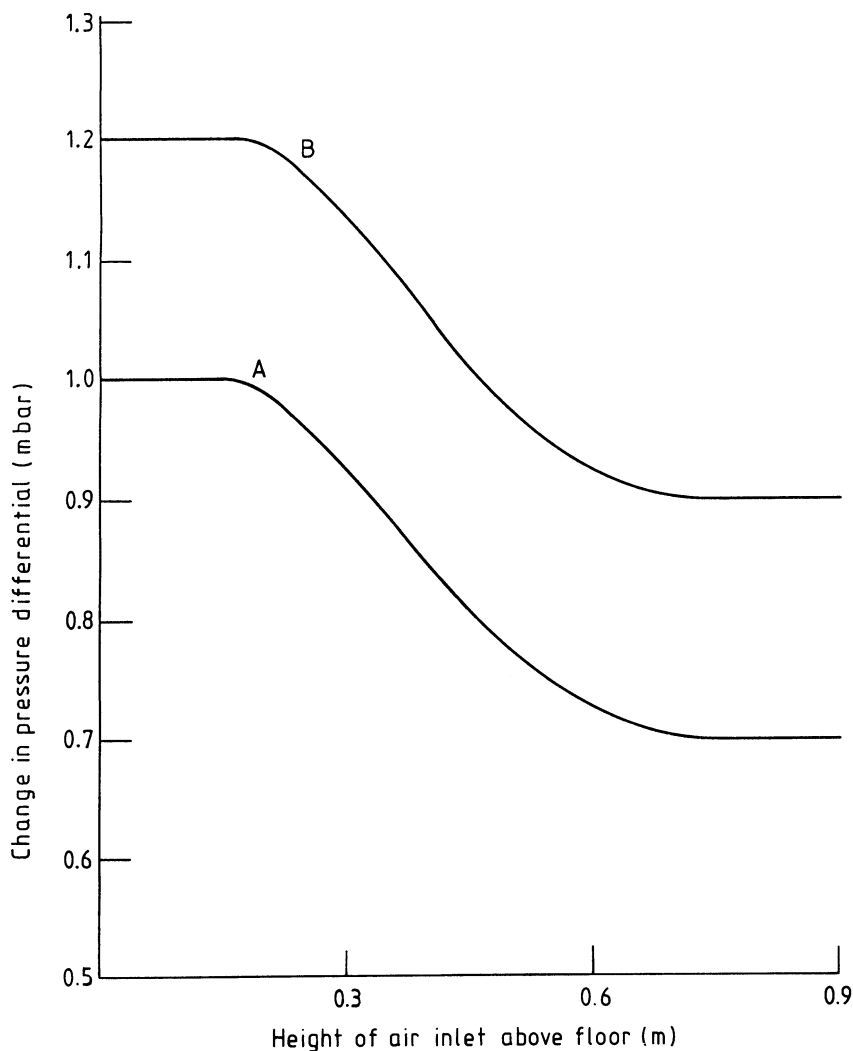


Figure 1 — Pressure differentials for lint resistance test

6.12.3 Method

Compliance shall be checked by inspection, by measurement and by a manual test.

Operate the appliance at rated voltage or at the upper limit of the rated voltage range, and under normal load.

If a means to prevent opening of the door while the appliance is in normal use incorporates a coil or similar component to hold the door locked in the closed position, this component is energized and de-energized 6 000 times, at a rate of six times per minute or at the rate imposed by the design and construction of the appliance, whichever is the lower.

NOTE 1 If opening and closing of the door is necessary for the mechanical operation of the interlock, the door is opened and closed during the test.

NOTE 2 Any interlock which can be released by means of the standard test finger shown in Figure 2 is considered likely to cause unexpected operation of the appliance.

6.13 Supplementary requirements for appliances with a door opening having a dimension exceeding 30 cm and a drum volume exceeding 100 dm³

6.13.1 Requirements

Appliances with a door opening having a dimension exceeding 30 cm and a drum volume exceeding 100 dm³ shall be tested in accordance with 6.13.2. After the test, it shall be possible to open the door from the inside.