

Specification for

Safety and efficiency of the gas heating equipment of commercial dishwashing machines

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Cooperating organizations

The Gas Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- British Combustion Equipment Manufacturers' Association
- British Gas Corporation*
- Chartered Institution of Building Services
- Department of Energy (Gas Standards)
- Department of the Environment (PSA)*
- Department of the Environment (Housing and Construction)
- Heating and Ventilating Contractors' Association
- Institution of Gas Engineers*
- Liquefied Petroleum Gas Industry Technical Association (UK)*
- National Association of Plumbing, Heating and Mechanical Services Contractors
- Society of British Gas Industries*
- Water-tube Boilermakers' Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- Association of Teachers of Domestic Science
- Catering Equipment Manufacturers' Association
- Chief and Assistant Chief Fire Officers' Association
- Cookery and Food Association
- Department of Education and Science
- Department of Health and Social Security
- Fire Protection Association
- Greater London Council
- Health and Safety Executive
- Home Office
- Hospital Caterers' Association
- Industrial Catering Association
- National Association of Restaurant Engineers
- Post Office

This British Standard, having been prepared under the direction of the Gas Standards Committee, was published under the authority of the Executive Board and comes into effect on 31 January 1980

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The following BSI references relate to the work on this standard:
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Foreword

BS 5809 has been prepared, under the direction of the Gas Standards Committee, to satisfy the need for a standard covering the safety and thermal performance requirements and associated methods of test for the gas heating equipment of commercial dishwashing machines burning 1st, 2nd and 3rd family gases. It therefore supersedes the requirements for dishwashers given in BS 2512 and BS 4104, which relate to gas heated catering equipment burning 1st and 3rd family gas respectively.

BS 2512 and BS 4104 are currently being revised and combined to form BS 5314, which provides a complete safety and performance specification for a wide range of gas heated catering equipment, and BS 5809 was at first intended to be a Part of that standard. However, at an early stage of drafting it was realized that it was neither practicable nor indeed appropriate, in view of the relatively minor role performed by the gas heating equipment, to include requirements for the dishwashing performance of the machine or for the safety of the complex electrically operated equipment found on many dishwashing machines. It was accordingly decided to restrict the scope of the specification to the safety and heating efficiency of the gas heating equipment and to publish the document as a separate standard.

The format of the standard follows that of BS 5314, where appropriate. The contents are divided into three sections as follows:

- *Section 1: General;*
- *Section 2: Safety requirements and associated methods of test;*
- *Section 3: Efficiency requirements and test methods.*

Clauses (except for **20** and **21**) and, where possible, subclauses refer to the same aspect of the specification as those of the same number in BS 5314.

Some of the provisions of this standard are set deliberately high to make allowance for manufacturing tolerances and variations in the supply of fuel gases. Some of the tests are destructive and it follows that it is not practicable to check each appliance made against all the provisions of the standard. However, the intention of the standard is that, if all its requirements are met when applied to a sample representing the average of production, this will ensure:

- that all appliances claimed to be designed in accordance with this British Standard are safe in normal use when installed and maintained in accordance with the relevant codes of practice and with the manufacturer's instructions;
- that such servicing as may be necessary to maintain the appliance in a safe condition can be carried out by a competent fitter without difficulty; and
- that the appliance will have a satisfactory standard of performance provided that it is used under the conditions for which it is intended.

Particular attention is drawn to the necessity for regular inspection and maintenance of catering equipment, particularly of safety devices, in order that it may be relied upon to give satisfactory service to the user.

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 14, an inside back cover and a 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 British Standard specifies safety requirements and associated methods of test for the gas heating equipment of the following types:

- a) dishwashing machines where water is heated by an integral gas burner;
- b) dishwashing machines where water is heated by circulating hot water supplied from an adjacent gas water heater;
- c) dishwashing machines where rinse water is supplied by a separate gas water heater.

It also specifies requirements for the efficiency of the water heating equipment on these machines.

For appliances of the types specified in b) and c) the requirements are mainly satisfied by reference to the appropriate British Standard, but certain additional requirements are detailed to make them suitable for use in this particular application.

In specifying requirements for these appliances it is assumed that the gas supply pressure available at the inlet to the appliance will be within the following range under normal operating conditions.

Family	Pressure range
	mbar ^a
1st	7.5 to 25
2nd	17.5 to 27.5
3rd	
butane	28 to 35
propane	37 to 45

^a 1 mbar = 10² N/m² = 0.1 kPa.

Requirements for controls given in this standard relate to those fitted as part of, or supplied with, particular appliances: they do not necessarily provide a complete specification for controls intended for general use and tested separately.

The attention of manufacturers and installers of equipment covered by this standard is drawn to additional requirements contained in the Health and Safety at Work etc. Act, 1974, in local authority regulations, with particular reference to water supply, in the Factories Act, in the Gas Safety Regulations 1972, in the Building Regulations issued by the Department of the Environment and in the Building Standards (Scotland) (Consolidation) Regulations issued by the Scottish Development Department.

Guidance on preferred dimensions may be found in PD 6444.

2 References

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

3 Definitions

For the purposes of this British Standard the following definitions apply. Definitions of other terms are to be found in BS 1179.

3.1

rated heat input

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

3.2

adjustment pressure

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

3.3

setting pressure

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

3.4

jet

a device containing one of more orifices from which a stream of gas is discharged

3.5

injector jet

a jet through which gas passes into the burner mixing tube of an aerated burner, thereby entraining primary air

3.6

burner jet

a jet on which gas is burnt, usually screwed into a gas manifold

3.7

primary flue

that part of an open flue system connecting an appliance to a draught diverter

3.8

working pressure

the operating water pressure range assigned to the appliance by the manufacturer

3.9

working level

the point at which the water contained within the appliance flows through an overflow or outlet aperture, or the point at which a level control device is operated to stop further inflow of water

3.10
working temperature

the water temperature designated by the manufacturer as being necessary for correct operation of the dishwashing machine

3.11
gas rate adjuster

a device intended for use by the installer or service engineer that enables the appliance gas rate to be set or readjusted in accordance with the manufacturer's instructions

4 General requirements

Appliances described in a) of clause 1 shall comply with the requirements of this British Standard.
Appliances described in b) and c) of clause 1 and shall comply with the requirements of BS 5258-1 or of BS 5978 as appropriate, and with those of clauses 6, 13, 20 and 21 of this standard.
Compliance shall be checked in general by carrying out the specified tests and, where appropriate, by inspection. The specified test gases of the appropriate gas family shall be used; full details of the test gases are given in BS 4947.

Notwithstanding the requirements specified in this standard, new designs, materials and methods of assembly are permissible provided that at least equivalent results are achieved.
Any features incorporated in the gas equipment of the appliance for which no provision for testing is made in this standard, shall be examined in the light of the manufacturer's claims and instructions. The claims shall be checked against the instructions and shall be shown to be valid.

5 General conditions of test

5.1 Test room. The tests shall be carried out at an ambient temperature of 20 ± 5 °C unless otherwise specified.
The room shall be adequately ventilated but free from draughts that are likely to affect the performance of the appliance.

5.2 Preparation of the appliance. The appliance shall, in general, be installed and adjusted in accordance with the manufacturer's instructions, using the reference test gas of the appropriate gas family (and gas group) at the following appliance inlet pressure.

Family	Test gas	Inlet pressure
		mbar
1st	TGA	17.5
2nd	NGA	17.5
3rd	LPGA	28
	LPGC	37

Before any tests are made, the appliance shall be operated at its full working temperature for a period sufficient to dry the insulation and to remove any temporary finish that might interfere with observations.

The appliance shall be at room temperature at the start of each test unless otherwise stated.

During testing, the initial adjustment of the appliance shall not be altered unless specifically required by the test method.

Test pressures shall be measured correct to 0.2 mbar and controlled so that the variation does not exceed ± 0.2 mbar.

Unless otherwise specified, appliances with regulating or limiting devices shall be tested with those devices at their maximum setting if the setting is intended to be altered by the user.

Appliances requiring a water supply shall be connected to a supply of appropriate pressure and filled to their working level in accordance with the manufacturer's instructions. This level shall be maintained during testing.

BS 4947 gives guidance on the measurement of heat input rate and BS 1041 on the measurement of temperature.

Section 2. Safety requirements and associated methods of test

6 Marking and instructions

6.1 Marking

6.1.1 Data plate. A data plate(s) shall be securely fitted to the appliance in a readily accessible position for inspection. It shall be durable and indelibly marked with the following information:

- a) identification of the manufacturer;
- b) type or model number;
- c) serial number and/or date of manufacture;
- d) the gas family for which the appliance is supplied. The letters "T", "N" and "L" for gas families 1, 2 and 3 respectively are acceptable and they should not appear on the data plate for any other purpose. Appliances suitable for butane only or propane only shall be marked accordingly;
- e) for 1st family gases, the gas group, and for 3rd family gases, the gas or gases for which the appliance is adjusted;
- f) the rated heat input in kilowatts;
- g) the setting pressure(s) at the pressure test point of the gas or gases for which the appliance is adjusted, in millibars;
- h) jet identification;