# Australian Standard®

# Gas space heating appliances



This Australian Standard® was prepared by Committee AG-001, Gas Appliances. It was approved on behalf of the Council of Standards Australia on 13 June 2008. This Standard was published on 30 June 2008.

The following are represented on Committee AG-001:

- Appliance and Component Testing
- Australian Gas Association
- Australian Greenhouse Office, Department of the Environment and Water Resources
- Consumers' Federation of Australia
- Energy Networks Association
- Gas Appliance Manufacturers Association of Australia
- Gas Association of New Zealand
- Gas Technical Regulators Committee
- Gas Utilisation Institute
- LPG Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- Ministry of Economic Development (New Zealand)
- New Zealand Employers and Manufacturers Association

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AS 4553—2008 (Incorporating Amendment No. 1)

# Australian Standard<sup>®</sup>

# Gas space heating appliances

Originated as AG 103—March 1978. Second edition AG 103—June 1998. Authorized Australian Standard AS 4553/AG 103—2000. Revised and redesignated AS 4553—2008. Reissued incorporating Amendment No. 1 (February 2011).

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#### PREFACE

This Standard was prepared by the Standards Australia Committee AG-001, Gas Appliances to supersede AS 4553/AG 103—2000, *Gas space heating appliances*.

This Standard incorporates Amendment No. 1 (February 2011). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with uniform minimum requirements for the safety, performance and use of gas space heating appliances.

This Standard should not be regarded as a design specification or as an instruction manual.

In its preparation, consideration has been given to—

- (a) continuity of satisfactory operation;
- (b) the prevention of fire hazards, and explosions;
- (c) the prevention of injury to persons or property;
- (d) gas rules and regulations now in force; and
- (e) relevant International Standards.

AS 5601 provides essential requirements and basic standards for gas installations.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

The principal differences between this edition and AS 4553/AG 103—2000, are marked by a line in the margin. These may be a new or revised definition, Clause, Figure or M.O.T. (Method of Test).

The following have been deleted:

Definitions AGA, ALPGA, approved, authority, bypass screw, connector ends, flame blow off, flame lift, interrupter screw, occupied zone, Piezo electric ignition, room sealed appliance type 2, semi-automatic ignition, statutory authority, task efficiency, terminal and under pressure cut-off device.

Clauses: 2.3.7, 2.5.1, 2.5.6 (p), 2.7.4, 3.1.2 (last paragraph), 5.4 (2nd sentence) 5.11.4.

Figures: 1, 2, 5, 7 (replaced by dew plate), 11.

M.O.T: 5.1.2—99 Flue operation—Spillage test, Preparation of apparatus—Method 1, Steps 5 & 6.

5.1.4-95 Determination of CO/CO<sub>2</sub> ratio of combustion products under conditions of flue blockage, downdraught or updraught.

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# STANDARDS AUSTRALIA

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# Australian Standard Gas space heating appliances

#### SECTION 1 SCOPE AND GENERAL

# 1.1 SCOPE

These requirements apply to gas space heating appliances (convectors, radiant convectors, wall furnaces) with natural draught or fan assisted combustion systems intended for use with natural gas, town gas, liquefied petroleum gas (LPG) and tempered liquefied petroleum gas (TLP) with gas consumptions not exceeding 150 MJ/h.

Decorative gas log fires are not covered by this Standard but are covered by the requirements of AS 4558.

This Standard covers direct fired air heaters with gas consumption up to and including 50 MJ/h.

NOTE: For direct fired air heaters with gas consumption greater than 50 MJ/h, refer to AS 5262.

#### **1.2 REFERENCE DOCUMENTS**

The following documents are referred to in this Standard are as follows:

AS 1074 Steel tubes and tubulars for ordinary service 1167 Welding and brazing—Filler metals Filler metal for brazing and braze welding 1167.1 Part 1: 1432 Copper tubes for plumbing, gasfitting and drainage applications 1450 Steel tubes for mechanical purposes 1722 Pipe threads of Whitworth form 1722.1 Part 1: Sealing pipe threads 1751 Copper brazed steel tubes 1769 Welded stainless steel tubes for plumbing applications 1832 Malleable cast iron 1881 Zinc alloys—Casting ingots and castings—Quality requirements 2129 Flanges for pipes, valves and fittings 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules) 3100 Approval and test specification-General requirements for electrical equipment Water supply—Metallic fittings and end connectors 3688 Twin wall metal flues - Gas appliances 4567 Manual shut off gas valves 4617 Thermoelectric flame safeguards 4620 Electronic flame safeguards and flame detectors 4625 4629 Automatic shut off valves and vent valves 4646 Gas appliance standards—Definitions and calculations 5601 Gas installation Tube fittings with Dryseal American standard taper pipe and unified D26 threads for automotive and industrial use AS/NZS

3500

Plumbing and drainage

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6976 Natural gas - Calculation of calorific values, density, relative density and Wobbe index from composition SPEIGHT, J., *Lange's Handbook of Chemistry*, 16<sup>th</sup> ed. USA: McGraw-Hill Professional, 2004

# **1.3 DEFINITIONS**

For the purpose of this Standard the definitions below apply.

# 1.3.1 Appliance flueway

A port or passage conveying flue gases within the appliance.

#### 1.3.2 Appliance flueway terminal

A protective device fitted to the exit of an appliance flueway of a flueless appliance.

# 1.3.3 Appliance regulator

A device fitted to an appliance to control the gas pressure or gas volume delivered to that appliance.

#### **1.3.4** Appliance ventilation duct

A duct through a building designed to bring combustion air from, and take products of combustion to, the outside air for Type 2 room sealed appliances.

#### 1.3.5 Atmospheric burner

A burner system where all the air for combustion is introduced by the inspirating effect of a gas injector and/or by the natural draught in the combustion chamber without mechanical assistance.

# 1.3.6 Authority having jurisdiction

The authority having statutory (legal) control.

# **1.3.7** Automatic ignition

The lighting of gas at a burner without a manual operation when ever gas flows from the burner.

#### **1.3.8** Automatic operation

The use of a sequence of operations, which once initiated, does not require any intermediate manual operation.

#### **1.3.9** Automatic shut off valve

An automatic valve used to shut off gas supply to an appliance.

# 1.3.10 Available gas (line gas)

Readily available gas with similar characteristics to the reference test gas.

# **1.3.11** Balanced flue appliance

A room sealed appliance which has combustion air ducted from, and combustion products ducted to, a common terminal assembly located externally.

# 1.3.12 Burner port

The opening in a burner through which gas or an air-gas mixture issues to be ignited and burned.

# 1.3.13 Bypass

An integral part of a gas control that enables a preset volume of gas to bypass the control.

# 1.3.14 Calibration

The determination of the relationship between the measured or indicated value of a parameter and its true value.

# 1.3.15 Certified/Certification

Assessed by a Certifying Body, and having a certificate number to demonstrate compliance with a Standard.

# 1.3.16 Certifying Body

A body acceptable to the Technical Regulator that provides assurance of compliance of appliances and components with nominated standards or other accepted safety criteria.

# **1.3.17** CO/CO<sub>2</sub> ratio

The ratio by volume of carbon monoxide to that of carbon dioxide in the combustion products.

# 1.3.18 Combination gas control

An assembly of two or more different control functions in a single body.

# **1.3.19** Combustible materials

Materials made of or surfaced with wood, compressed paper, plant fibres or other materials that will ignite and burn.

# **1.3.20** Combustion products

Constituents resulting from the combustion of a fuel with oxygen, including the inerts associated with the fuel and the oxygen but excluding any other diluent or contaminant.

# 1.3.21 Combustion products discharge safety device

A device that causes at least safety shutdown of the main burner when there is an unacceptable spillage of combustion products at the draught diverter.

# **1.3.22** Compression fitting

# **1.3.22.1** General

Compression fittings and components are as defined in AS/NZS 3500.0.

# **1.3.22.2** Type 1 (non-manipulative) compression fitting

A fitting for a compression joint that does not require any working of the tube other than cutting square. The joint is made tight by means of a loose compression ring that grips the outside wall of the tube when the coupling nut is tightened.

**1.3.22.3** *Type 2 (manipulative) compression fitting* 

A fitting in which the joint is made by flaring, croxing, capping or beading the end of the tube which is then compressed by the coupling nut against the shaped end of the corresponding section in the fitting.

# **1.3.23** Convection heater

An appliance with an effective output of heated air and no visible source of radiation.

# **1.3.24** Cross lighting

Lighting of one burner from another either directly or by means of an intermediate flame.

# 1.3.25 Determined gas consumption

Gas consumption rate, measured in megajoules per hour (MJ/h), using reference gas at specified test pressures and with ambient conditions corrected to standard temperature and pressure.

#### **1.3.26** Direct ignition device

A device which provides ignition of a burner without the use of another flame.

#### **1.3.27** Draught diverter

A device, without moving parts, fitted in the flue of an appliance for isolating the combustion system from the effects of pressure changes in the secondary flue.

#### 1.3.28 Electronic flame safeguard

A flame safeguard utilising electronic components to perform its function.

#### **1.3.29 Emission class**

A classification of appliances based on the emission rate of NO<sub>2</sub>.

**1.3.29.1** *Emission class 0 appliance* 

An appliance with an  $NO_2$  emission rate into the room of 0 ng/J.

**1.3.29.2** Emission class 1 appliance

An indoor flueless appliance with an NO<sub>2</sub> emission rate less than or equal to 2.5 ng/J.

**1.3.29.3** Emission class 2 appliance

An indoor flueless appliance with an  $NO_2$  emission rate greater than 2.5 ng/J, but less than or equal to 5 ng/J.

#### 1.3.30 Excess air

Air in excess of that required for complete combustion which is mixed unchanged with the combustion products, in the combustion chamber.

#### **1.3.31** External surfaces

All surfaces of an appliance other than working surfaces. External surfaces include -

- (a) handles for carrying or intended to be held for long periods while the appliance is operating;
- (b) controls or handles which are touched for short periods when the appliance is operating but which are not required to be gripped; and
- (c) all other external surfaces not closer than 25 mm to a working surface.

#### 1.3.32 Fan assisted combustion system

A system in which all or part of the combustion air is supplied and/or in which the products of combustion are evacuated by mechanical means that is an integral part of the appliance.

#### **1.3.33 Flame abnormality**

A flame condition which results in appreciable yellow tipping and carbon deposition (except in the case of appliances specifically designed for a luminous effect), lifting, floating, lighting back or objectionable odour.

NOTES:

- 1 If the length of the yellow tipping is less than 20% of the total length of the flame on visual inspection it is not considered to be appreciable yellow tipping
- 2 In appliances designed specifically for a luminous effect, yellow tipping or limited carbon deposition within the appliance, are not considered abnormal.