

AS/NZS 5263.1.8:2021



Australian/New Zealand Standard™

Gas appliances

Part 1.8: Decorative effect gas appliances



AS/NZS 5263.1.8:2021

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- Consumer Electronics Suppliers Association
- Consumers Federation of Australia
- Energy Networks Australia
- Gas Appliance Manufacturers Association of Australia
- Gas Association of New Zealand
- Gas Energy Australia
- Gas Technical Regulators Committee
- Gas Utilisation Institute, New Zealand
- Joint Accreditation System of Australia and New Zealand
- The Australian Gas Association
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Australian/New Zealand Standard™

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Part 1.8: Decorative effect gas appliances

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AG-001, Gas Appliances, to supersede AS/NZS 5263.1.8:2016, *Gas appliances, Part 1.8: Decorative effect gas appliances*.

This Standard provides particular requirements for Type 1 and Type 2 decorative effect gas appliances that apply in addition to or in place of the general requirements for gas appliances set out in AS/NZS 5263.0, *Gas appliances, Part 0: General requirements*. The combination of AS/NZS 5263.1.8 (this Standard) and AS/NZS 5263.0 supersedes the combination of AS/NZS 5263.1.8:2016 and AS 5263.0—2013.

This Part 1.8 of AS/NZS 5263, supplements or modifies the corresponding clauses of Part 0. The numbering of clauses in this Part 1.8 is consistent with the numbering in Part 0 for related requirements.

Statements used in this Part 1.8 to explain the relationship of clauses in this Standard to the corresponding clauses in Part 0 are as follows:

- (a) “This Clause of AS/NZS 5263.0 applies”, in which case the corresponding clause of Part 0 and its subclauses are used without modification.
- (b) “This Clause of AS/NZS 5263.0 applies, except as modified below”, in which case the corresponding clause of Part 0 and its subclauses are used but with the modifications, as listed in this document.
- (c) “Not applicable”, in which case the corresponding clause of Part 0 is not used in this context.

Otherwise the text in this Standard replaces the corresponding clause of Part 0.

Any clauses in this Standard that are additional to the requirements of Part 0 are numbered beginning from 101 (except for additional definitions, which begin from 201). Additional appendices in this Part 1.8 are designated with a letter starting from AA, or numbered beginning from 101 (e.g. ZA.101).

Where an appendix or part of an appendix (i.e. clause, figure or table) is cited in this Standard, reference should first be made to Part 0 for the content of the appendix, which may be modified by this Part 1.8.

This Standard (AS/NZS 5263.1.8), together with the Standard AS/NZS 5263.0 (Part 0), constitute a means of conformance to AS 3645, *Essential requirements for gas equipment*, for decorative effect gas appliances.

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

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

Consideration has been given to —

- (i) continuity of satisfactory operation;
- (ii) the prevention of fire hazards, and explosions;
- (iii) the prevention of injury to persons or property;
- (iv) gas rules and regulations now in force; and
- (v) relevant International Standards.

AS/NZS 5601 series of Standards provides essential requirements and means of conformance for gas installations. Any reference to “AS/NZS 5601” in AS/NZS 5263 series of Standards should be considered as reference to the appropriate part of AS/NZS 5601 series of Standards (i.e. AS/NZS 5601.1 or AS/NZS 5601.2).

The terms “normative” and “informative” are used in Standards 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.

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NOTES

Australian/New Zealand Standard

Gas appliances

Part 1.8: Decorative effect gas appliances

Section 1 Scope and general

1.1 Scope

This Standard provides specific requirements and test methods for Type 1 and Type 2 decorative effect gas appliances with natural draught or fan assisted combustion systems, with an energy input not exceeding 72 MJ/h.

For Australia, the fuel gases are natural gas (as described by AS 4564), town gas, liquefied petroleum gas (LP Gas, as described by AS 4670), simulated natural gas (SNG) and tempered liquefied petroleum gas (TLP).

For New Zealand, the fuel gases are natural gas (as specified in NZS 5442) and general product liquefied petroleum gas (NZLPG) (as specified in NZS 5435).

NOTE 1 Space heating appliances are not covered by this Standard but are covered by the requirements of AS/NZS 5263.1.3.

NOTE 2 Indoor flueless appliances are not covered by this Standard.

NOTE 3 Appliances falling within the scope of AS 2658 are not covered by this Standard.

NOTE 4 Other statutory or regulatory requirements may be applicable to a product that falls within the scope of this Standard. It is the responsibility of the manufacturer, importer or distributor (as appropriate) to ensure that products conform to such requirements.

Test methods are set out in [Appendices ZA, ZB and ZC](#) (see [Clause 1.4](#)).

1.1.2 Application

This Standard is complementary to, and is intended to be used in conjunction with AS/NZS 5263.0. The requirements given herein shall take precedence over corresponding requirements in that Standard.

AS 3645 specifies essential requirements for gas equipment that requires regulatory approval before sale. This Standard, together with AS/NZS 5263.0, is intended to provide a means of demonstrating conformance to AS 3645.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents for informative purposes are listed in the Bibliography.

AS 4566, *Flue cowls — Gas appliances*

AS 4567, *Twin wall metal flues — Gas appliances*

AS/NZS 5263.0, *Gas appliances, Part 0: General requirements*

1.3 Terms and definitions

For the purposes of this Standard the terms and definitions given in AS/NZS 5263.0 and the following apply:

1.3.36

flame abnormality

flame condition that results in spitting, sputtering, lifting or floating flames, lighting back, extinction, yellow tipping causing carbon deposition, carbon deposition or objectionable odour and undue noise

Note 1 to entry: 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.

Note 2 to entry: In appliances designed specifically for a luminous or visual effect, limited carbon deposition within the appliance, yellow tipping and limited lifting or floating flames are not considered abnormal.

1.3.201

CO safety system

system that causes the gas supply to be shut off before the carbon monoxide in the ambient air exceeds a specified concentration and before the oxygen in the ambient air falls below a specified concentration

1.3.202

console appliance

appliance designed to be mounted on or against a wall and not built into a fireplace or cavity

1.3.203

decorative effect gas appliance

gas appliance that simulates a solid fuel fire or uses a flame effect and whose primary function lies in the aesthetic effect of the gas flames

Note 1 to entry: Appliances that simulate a solid fuel fire or flame effect, where the primary function is to heat the space in which the appliance is installed, are considered to be space heating appliances (see [Clause 1.1](#) Note 1).

1.3.203.1

Type 1 appliance

decorative effect gas appliance without an enclosure and designed to be installed in an existing fireplace with a chimney, which vents the flue gases outside the building

1.3.203.2

Type 2 appliance

decorative effect gas appliance with an enclosure, for connection to a flue that vents the flue gases outside the building

1.4 Test methods

The modified and new test methods applicable for this Standard are located in the following appendices; apart from these, the test methods of AS/NZS 5263.0 apply.

Appendix ZA — Preliminary test methods (applicable for [Section 3](#))

There are no modifications or new methods for this Standard. Preliminary test methods from AS/NZS 5263.0 apply as set out in [Section 3](#).

Appendix ZB — Limiting conditions test methods (applicable for [Section 4](#))

[ZB.1](#) Determination of CO/CO₂ ratio for independent surface combustion burners — Underload test

[ZB.2](#) Determination of CO/CO₂ ratio for any independent burner — Overload test

Appendix ZC — Performance test methods (applicable for Section 5)

- [ZC.3](#) Spillage of combustion products test
- [ZC.4](#) Performance with downdraught, updraught and blocked flue test
- [ZC.5](#) Flue gas temperatures test
- [ZC.101](#) Spillage of combustion products test — Type 1 appliances
- [ZC.102](#) Determination of CO/CO₂ ratio of combustion products under conditions of normal operation — Type 1 appliances

Section 2 Design and construction

2.1 Scope

This Clause of AS/NZS 5263.0 applies.

2.2 General design requirements

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.2.13 Design of appliance base

Not applicable.

2.2.14 Provision for moving appliances

Not applicable.

2.2.101 Fuel storage container

The appliance shall not incorporate or have provision for a fuel storage container.

2.2.102 Surface finish of primary guard

All exposed surfaces of a primary guard shall be smoothly finished to prevent the possibility of abrasion or laceration to the user, or snagging of clothing.

2.3 Materials

This Clause of AS/NZS 5263.0 applies.

2.4 Design for assembly and installation

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.4.101 Assembly or kit for Type 1 appliances

A Type 1 appliance shall have the burner, gas manifold and controls provided as a single assembly.

NOTE Parts such as logs, granules, grate and decorative surround may need to be assembled by the installer.

2.5 Design for maintenance

This Clause of AS/NZS 5263.0 applies.

2.6 Design for operation

This Clause of AS/NZS 5263.0 applies.

2.7 Controls and safety devices

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.7.101 CO safety system for Type 1 appliances

A Type 1 appliance shall be equipped with a CO safety system.

2.7.102 Safety controls for exposed burners

Appliances fitted with exposed burners shall not have exposed controls capable of activating and sustaining ignition by momentary operation.

2.8 Gas train

This Clause of AS/NZS 5263.0 applies.

2.9 Combustion air and flue systems

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.9.4 Draught diverters

An open flued Type 2 appliance shall be supplied with a draught diverter or an alternative system unless satisfactory combustion is maintained against a back pressure of 140 Pa. The relief opening of whichever system is used shall be connected directly to the same space from which the air for combustion is drawn.

2.9.5 Design of flue connection

The flue connection of a Type 2 appliance shall provide means to prevent partial or complete blockage of flueways caused by the fitting of a flue pipe. The minimum length of engagement shall be not less than 13 mm for a vertical flue connection and 25 mm for a horizontal flue connection.

For Australia, in addition, flue connections shall conform to at least one of the following:

- (a) A horizontal flue connection on an open flued appliance having a gas consumption of up to 50 MJ/h shall be a rectangular spigot of nominal dimensions 250 mm × 50 mm, conforming to the requirements of Table 2.9.5.2. The use of an adaptor whose termination conforms to these dimensions and which is supplied with the appliance shall be deemed to conform to this requirement.
- (b) A vertical flue connection on an open flued appliance having a gas consumption of up to 50 MJ/h shall be a spigot suitable for connection to twin wall metal flue conforming to AS 4567. The use of an adaptor meeting this requirement and supplied with the appliance shall be deemed to conform to this requirement.
- (c) A vertical or horizontal flue connection on an open flued appliance having a gas consumption greater than 50 MJ/h shall be designed to accommodate both single wall and twin wall circular or rectangular metal flue pipes. The use of an adaptor to achieve this purpose shall be deemed to conform to this requirement.
- (d) Flue connections or adaptors designed only for a single wall metal flue pipe shall conform to the dimensions in Table 2.9.5.1 and Table 2.9.5.2.
- (e) The flue connection shall be suitable for a flue that is specified by the manufacturer.

2.9.101 Circulating air system

Type 2 appliances shall be so constructed that there is no leakage of circulating air into the heat exchanger or of combustion products into the circulating air system.

2.9.102 Flue cowls

Flue cowls for open flued appliances, specified by the manufacturer or supplied with the appliance shall meet the relevant requirements of AS 4566.

2.10 Fan assisted combustion systems

This Clause of AS/NZS 5263.0 applies.

2.11 Burners and ignition systems

This Clause of AS/NZS 5263.0 applies.

2.12 Components

This Clause of AS/NZS 5263.0 applies.

2.13 Cylinders and cylinder compartments

Not applicable.

2.14 Markings

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.14.2 Permanent markings on appliances

NOTE Other marking requirements (e.g. wiring diagrams, identification of certification body and certificate number) may be applicable to a product that falls within the scope of this Standard. It is the responsibility of the manufacturer, importer or distributor (as appropriate) to check other marking requirements.

Appliances shall be provided with clear and permanent markings readily accessible and easy to read, and such markings shall include the items specified in this Clause of AS/NZS 5263.0 and the following:

- (aa) For Type 1 and Type 2 appliances:
 - (i) The size of flue cowl for which the appliance is designed.
 - (ii) The statement: "PRIMARILY A DECORATIVE AND NOT A HEATING APPLIANCE".
- (bb) For a Type 1 appliance, the statements:
 - (i) "FOR USE ON NON-COMBUSTIBLE FIRE RESISTIVE FLUED FIREPLACES WITH PERMANENT CHIMNEY OPENING NOT LESS THAN 40 000 mm² OR AS SPECIFIED BY THE MANUFACTURER".
 - (ii) "AFTER INSTALLING THE APPLIANCE CHECK THAT THE CHIMNEY DRAWS PROPERLY".

2.14.14 Markings on packaging

The packaging of the appliance shall be marked in a prominent position. These markings shall include the items specified in this Clause of AS/NZS 5263.0 and the following:

- (aa) The text: "PRIMARILY A DECORATIVE AND NOT A HEATING APPLIANCE".
- (bb) The methods of installation for which the appliance is designed.

NOTE Where there is no packaging or the packaging is transparent, it is sufficient to place these markings on the appliance, as long as they are visible.

2.14.101 Appliances not protected by primary guards

For all Type 1 appliances and for Type 2 appliances with external surfaces which are not protected by a primary guard and which exceed 95 °C above ambient, a label carrying the following minimum

information shall be permanently attached to the appliance in a prominent position or adjacent to the gas controls:

“TO REDUCE THE RISK OF FIRE OR INJURY FROM BURNS AND FOR THE PROTECTION OF YOUNG CHILDREN OR THE INFIRM, A SECONDARY GUARD IS RECOMMENDED”.

2.15 Instructions

This Clause of AS/NZS 5263.0 applies, except as modified below.

2.15.2 Installation

2.15.2.1 Instructions supplied with the appliance

Each appliance shall be supplied with installation instructions that include the items specified in this Clause of AS/NZS 5263.0 and the following:

- (aa) Type 1 and Type 2 appliances:
 - (i) The minimum size of the flue (diameter/cross-sectional area and height) and flue cowl.
 - (ii) Where an appliance is not intended or designed for a fireplace installation, the following statement: “DO NOT INSTALL IN A FIREPLACE”.
 - (iii) A statement that the installer must check for spillage in accordance with AS/NZS 5601.1.
 - (iv) For open flued appliances, an instruction that flue cowls conforming to AS 4566, or the proprietary cowl specified by the manufacturer shall be used.
- (bb) Type 1 appliances:
 - (i) Details of the minimum fireplace depth and maximum height of the fireplace (front) opening for which the appliance has been designed.
 - (ii) The recommendation that a secondary guard in accordance with AS/NZS 2286 be installed.
- (cc) Type 2 appliances, information clearly specifying the type of flue system to be used with the appliance.
- (dd) Open flued Type 2 appliances fitted with a combustion products discharge safety device:
 - (i) A technical description of the combustion products discharge safety device.
 - (ii) Specific instruction that the combustion products discharge safety device not be disabled or bypassed.
 - (iii) If required, instructions on the mounting of the combustion products discharge safety device.
 - (iv) The waiting time for an appliance with automatic reset [see [Clause 5.2.7\(b\)\(iii\)](#)].

2.15.2.3 Warning statement

The instructions for a Type 2 appliance shall contain the statement —

“DO NOT USE AN UNLINED MASONRY CHIMNEY AS THE FLUE FOR THIS APPLIANCE”.

2.15.3 Operation

2.15.3.1 General

Each appliance shall be supplied with operation instructions that include the items specified in this Clause of AS/NZS 5263.0 and the following:

- (aa) For an appliance designed to operate with luminous flames a statement that it may exhibit slight carbon deposition.
- (bb) A warning to the user to only use logs or coals supplied by the manufacturer for the particular model.

2.15.3.2 Warning statements

The operation instructions shall contain the statements specified in this Clause of AS/NZS 5263.0 and the following:

- (aa) The statement: "PRIMARYLY A DECORATIVE AND NOT A HEATING APPLIANCE".
- (bb) Where the appliance is fitted with a primary guard:

"THE GUARD IS FITTED TO THIS APPLIANCE TO REDUCE THE RISK OF FIRE OR INJURY FROM BURNS AND NO PART OF IT SHOULD BE PERMANENTLY REMOVED. FOR PROTECTION OF YOUNG CHILDREN OR THE INFIRM, A SECONDARY GUARD IS REQUIRED".

2.15.3.101 Console appliances

The operation instructions for console appliances shall include a clearly defined and prominent warning against building the appliance into bookcases, walls, etc. Where manufacturers provide an insulated outer casing specifically designed to allow installation in walls, clear instruction shall be given for its use.

Section 3 Preliminary tests — Line gases

3.1 General

This Clause of AS/NZS 5263.0 applies.

3.2 Preparation for testing

This Clause of AS/NZS 5263.0 applies, except as modified below.

3.2.101 Setting up Type 1 appliances

Type 1 appliances shall be tested in an appropriate fireplace or an equivalent fabricated enclosure which conforms to the manufacturer's minimum specification for the following:

- (a) Enclosure/fireplace.
- (b) Flue.
- (c) Flue cowl.

Unless otherwise stated in the relevant test method, the test enclosure shall be flued with 0.6 m of flue.

3.2.102 Setting up Type 2 appliances

Type 2 appliances with forced or induced draught combustion systems shall be tested with a flue system that simulates the maximum flow resistance for which the appliance has been designed.

3.3 Gas leakage

This Clause of AS/NZS 5263.0 applies.

3.4 Gas consumption

This Clause of AS/NZS 5263.0 applies.

3.5 Gas pressure regulators

This Clause of AS/NZS 5263.0 applies.

3.6 Ignition and safety shut off systems

This Clause of AS/NZS 5263.0 applies.

3.7 Ignition of draped fabric

This Clause of AS/NZS 5263.0 applies.

Section 4 Tests under limiting conditions

4.1 General

This Clause of AS/NZS 5263.0 applies.

4.2 CO/CO₂ ratio limits for any independent surface combustion burner — Underload

This Clause of AS/NZS 5263.0 applies.

4.3 CO/CO₂ ratio limits for any independent burner — Overload

This Clause of AS/NZS 5263.0 applies.

4.4 CO/CO₂ ratio limits for permanent pilots — Overload

This Clause of AS/NZS 5263.0 applies.

4.5 Flame characteristics at maximum and minimum limiting conditions

This Clause of AS/NZS 5263.0 applies.

4.6 Burner ignition at maximum and minimum limiting conditions

This Clause of AS/NZS 5263.0 applies.

4.7 Delayed ignition at maximum and minimum limiting conditions

This Clause of AS/NZS 5263.0 applies.

4.8 Reignition at turndown under draught conditions

This Clause of AS/NZS 5263.0 applies.

4.9 Pilot ignition and stability at maximum and minimum limiting conditions

This Clause of AS/NZS 5263.0 applies.

4.10 Burner stability when changing setting

This Clause of AS/NZS 5263.0 applies.

4.11 Unburnt gas release from burner system

This Clause of AS/NZS 5263.0 applies.

4.12 Blocked flueway terminal

Not applicable.

4.13 Case pressure test

This Clause of AS/NZS 5263.0 applies.

4.14 Effect of opening and closing doors at turndown condition

This Clause of AS/NZS 5263.0 applies.

4.15 Sooting — Luminous effect appliances

This Clause of AS/NZS 5263.0 applies.

4.16 Burner interference at ignition or during combustion

This Clause of AS/NZS 5263.0 applies.

Section 5 Performance specifications

5.1 Combustion air supply

This Clause of AS/NZS 5263.0 applies.

5.2 Flue operation

This Clause of AS/NZS 5263.0 applies, except as modified below.

5.2.1 Diversion of combustion products

Not applicable.

5.2.2 Spillage of combustion products

Not applicable.

5.2.2.101 Type 1 appliances — Spillage of combustion products

When tested in accordance with Test Method [ZC.101](#) there shall be no leakage or spillage of combustion products from a Type 1 appliance, 10 min after cold start ignition, when the appliance is installed in accordance with the manufacturer's minimum fireplace depth and maximum height of the fireplace (front) opening requirements and when operated at nominal gas consumption.

Where the manufacturer's installation instructions (see [Clause 2.15.2.1](#)) specify the requirements for one or more of the types in [Table 5.2.2.101](#) as the only requirements for installation, the appliance is deemed to conform to this [Clause 5.2.2.101](#).

Table 5.2.2.101 — Type 1 appliance installation methods — Deemed to conform

Type	Installation requirements
Common masonry fireplace	Minimum 400 cm ² cross-sectional flue area with 225 mm (9") cowl. Unrestricted flue.
Pre-fabricated firebox into masonry fireplace	Minimum 400 cm ² cross-sectional flue area with 225 mm (9") cowl. Unrestricted flue. Flue gather of minimum 150 mm height. No fan installation.
Pre-fabricated firebox fitted with full length flue pipe	Minimum 200 mm (8") flue pipe with minimum 200 mm (8") cowl. Unrestricted flue. Flue gather of minimum 150 mm height. No fan installation.

5.2.2.102 Type 2 appliances — Spillage of combustion products

When tested in accordance with Test Method [ZC.3](#), there shall be no leakage or spillage of combustion products from the combustion circuit or draught diverter of an open flued Type 2 appliance, 5 min after ignition when the appliance is operated at nominal gas consumption.

5.2.3 Performance with updraught, downdraught and blocked flue

When an open flued Type 2 appliance is tested in accordance with Test Method [ZC.4](#), the CO/CO₂ ratio shall not exceed 0.02.

During testing the appliance is operated at nominal gas consumption and in the case of appliances with turndown or modulating controls, the appliance shall be tested down to the lowest setting and sufficient intermediate points which characterize the appliance performance.

5.2.5 Flue gas temperatures

When tested in accordance with Test Method [ZC.5](#), the temperature of flue gases at the flue connection of Type 2 appliances shall not exceed the lesser of —

- (a) 270 °C above ambient; and
- (b) the specified maximum continuous service temperature for the flue material.

5.2.7 Safety shutdown — Combustion products limits

Where an open flued Type 2 appliance is fitted with a system to prevent the release of combustion products in a dangerous quantity into the room, the appliance shall conform to the following:

- (a) An appliance fitted with an atmosphere sensing system (e.g. a CO detector) shall shut down before the CO concentration exceeds 200 ppm by volume in the atmosphere of the test room when tested in accordance with Test Method ZC.33.
- (b) When an appliance fitted with a combustion products discharge safety device is tested in accordance with Test Method ZC.34 —
 - (i) the appliance shall shut down within the times given in [Table 5.2.7](#);
 - (ii) nuisance shutdowns shall not occur; and
 - (iii) where safety shutdown occurs, automatic restart shall only be possible after a minimum waiting time of 10 min.

Table 5.2.7 — Shutdown times

Condition of flue blockage	Area of plate opening	Maximum shutdown time s	
		On/off	Modulating
Complete blockage	0	200	$200 \times Q_n/Q_m$
Appliances with atmospheric burners—blockage by means of a plate with hole area of $0.6A$	$0.6A$	600	
Appliances with fan assisted combustion—partial blockage as determined and recorded in ZC 34.6.4, Items (b) and (c)	Area as determined in ZC 34.6.4, Item (c)	600	
Key			
A = internal area of the test flue at its top			
Q_n = nominal input of the appliance			
Q_m = input at turndown for appliances with modulation or turndown			

5.3 Condensate

This Clause of AS/NZS 5263.0 applies.

5.4 Temperature hazards

This Clause of AS/NZS 5263.0 applies, except as modified below.

5.4.2 Appliance operating conditions

The appliance shall be operated with normal test gas pressure at the appliance inlet with the thermostat, if fitted, set at maximum for not less than 1 h or until thermal equilibrium is reached.

The room or return air thermostat sensor shall not be allowed to reduce input.

5.4.7 Temperature limits — Protection from contact with the heat source

5.4.7.2 Temperatures of unguarded surfaces (Australia only)

Where not protected by a primary guard:

- (a) For all working surfaces with an open area less than 85 % of the total area of the working surface, the temperature shall not exceed 200 °C above ambient.
- (b) For all heat sources and exposed surfaces within 25 mm of working surfaces, the temperature shall not exceed 200 °C above ambient.
- (c) For all exposed surfaces, except working surfaces and surfaces within 25 mm of a working surface, the temperature shall not exceed 95 °C above ambient.

For Type 1 appliances, the temperature of unguarded surfaces that lie behind the face of masonry fireplaces shall not be measured.

5.5 Heat resistance of appliance

This Clause of AS/NZS 5263.0 applies, except as modified below.

5.5.1 Resistance to temperatures

5.5.1.2 Test conditions

The appliance shall be operated continuously at overload gas consumption for 100 cycles of 2 h on and 1 h off with the thermostat, if fitted, set at maximum.

5.5.1.3 Assessment

After operation in accordance with Test Method ZC.9, the appliance shall function normally and satisfy the requirements listed under this Clause of AS/NZS 5263.0 and there shall be no accumulation of carbon that adversely affects the appliance performance or aesthetics.

5.6 Durability

This Clause of AS/NZS 5263.0 applies.

5.7 Electrical supply variation or failure

This Clause of AS/NZS 5263.0 applies.

5.8 Appliance operation under linting conditions

This Clause of AS/NZS 5263.0 applies.

5.9 Rain test for outdoor and room sealed appliances

This Clause of AS/NZS 5263.0 applies.

5.10 Operation under windy conditions

This Clause of AS/NZS 5263.0 applies, except as modified below.

5.10.4 Open flued appliances

Not applicable.

5.11 Strength and stability

This Clause of AS/NZS 5263.0 applies.

5.12 Thermal efficiency (Australia only)

Not applicable.

5.13 Vitiation and emissions

This Clause of AS/NZS 5263.0 applies, except as modified below.

5.13.4 CO/CO₂ ratio at the manufacturer's nominal test point pressure

When tested in accordance with Test Method [ZC.102](#) the CO/CO₂ ratio of the combustion products of a Type 1 appliance shall not exceed 0.007.

5.13.101 Operation of CO safety system

When an appliance fitted with a CO safety system is tested in accordance with Test Method ZC.29, the system shall shut off the gas supply before the concentration of carbon monoxide in the ambient air exceeds 200 ppm by volume. In addition, the oxygen concentration in the ambient air shall not be less than 15 %.

5.13.102 Emissions with CO safety system inoperative

When an Type 1 appliance is tested in accordance with Test Method ZC.30, with the CO safety system rendered inoperative, the concentration of carbon monoxide in the ambient air shall not exceed 500 ppm by volume and the oxygen concentration in the ambient air shall not be less than 15 %.

An appliance that has safely shut down prior to the oxygen concentration decreasing to 15 % conforms to this requirement provided the CO concentration does not exceed 500 ppm.

Appendix ZA (normative)

Preliminary test methods

This Appendix of AS/NZS 5263.0 applies.

Appendix ZB (normative)

Limiting conditions test methods

NOTE Where a test method or part of a test method (i.e. clause, figure or table) is cited in this Standard, reference should first be made to AS/NZS 5263.0 for the content of the test method, which may be modified by this Standard.

ZB.1 Determination of CO/CO₂ ratio for independent surface combustion burners — Underload test

This Test Method of AS/NZS 5263.0 applies, except as modified below.

ZB.1.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#).
All open flued appliances with atmospheric burners shall be tested with twin wall flue of the minimum length specified in manufacturer's instructions, or 0.6 m long if there is no minimum length specified.
- (b) Set up the test equipment.
- (c) Ensure that any thermostat or other temperature control device is rendered inoperative.
- (d) Place appropriate sampling hood or other device in a position to obtain a representative sample of combustion product.

ZB.2 Determination of CO/CO₂ ratio for any independent burner — Overload test

This Test method of AS/NZS 5263.0 applies, except as modified below.

ZB.2.3 Apparatus

The following apparatus shall be used:

- (a) Equipment as specified in Appendix F.
- (b) Flue gas sampling hood of stainless steel or aluminium (see Figure A.2, Figure A.3 and Figure A.4, Figure A.18 and Figure A.19).
- (c) Carbon monoxide analyser, calibrated to give accurate and reproducible results.
- (d) Carbon dioxide analyser, calibrated to give accurate and reproducible results.
- (e) Sampling apparatus (probe or hood, as appropriate) known to not affect the representativeness of the sampled gases under the prevailing conditions.
- (f) Sampling lines and conditioner (if used) known to be inert to the CO and CO₂.
- (g) Suitable timing device.

ZB.2.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#).

All open flued appliances with atmospheric burners shall be tested with twin wall flue of the minimum length specified in manufacturer's instructions, or 0.6 m long if there is no minimum length specified.
- (b) Set up test equipment.
- (c) Identify and note the location of the manufacturer's specified pressure test point(s).
- (d) Adjust the appliance in an attempt to achieve the overload gas rate as specified in Table 4.3 when measured in Item (e).

The specified overload conditions shall be obtained by adjusting the inlet pressure with the appliance regulator at its nominal setting. If the overload condition cannot be obtained with a maximum inlet pressure of 3.0 kPa then the appliance regulator shall be rendered inoperative or bypassed.
- (e) Operate the appliance without further adjustment for 15 min from a cold start and measure the gas rate within the next 2 min. If the overload gas rate is not achieved repeat Item (d).
- (f) Turn off the burner and allow appliance to cool.
- (g) Place an appropriate sampling hood or other device in a position to obtain a representative sample of combustion product.

Appendix ZC (normative)

Performance test methods

NOTE Where a test method or part of a test method (i.e. clause, figure or table) is cited in this Standard, reference should first be made to AS/NZS 5263.0 for the content of the test method, which may be modified by this Standard.

ZC.3 Spillage of combustion products test

This Test Method of AS/NZS 5263.0 applies, except as modified below.

ZC.3.1 Scope

This method sets out the procedure to determine if there is any spillage of combustion products from the flue system or draught diverter of Type 2 appliances.

ZC.3.3 Apparatus

The following apparatus shall be used:

- (a) Twin wall (or other appropriate) flue of the minimum length specified in the manufacturer's instructions, or 0.6 m in length if there is no minimum length specified.
- (b) Carbon dioxide analyser, calibrated to give accurate and reproducible results, and equipped with a small diameter stainless steel probe.

NOTE A sample probe of OD 3.0 mm and sample flow rate of 1.0 to 1.5 L/min is recommended.

- (c) An adequately sized enclosure capable of being cooled to 5 ± 3 °C.
- (d) Dew plate (see Figure A5).
- (e) Suitable timing device.

ZC.3.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#) in the enclosure to be cooled.
- (b) Set up test equipment.
- (c) Check that the test point pressure is in accordance with the manufacturer's recommendations.
- (d) Fit the length of flue to the appliance. Seal the joints between the appliance flue spigot and the flue, or, if applicable, between the flue spigot and the flue elbow, and between the flue elbow and the flue.
- (e) Shut off the appliance, operate the cooling apparatus and allow the appliance to stand at 5 °C until temperature equilibrium is reached.
- (f) Shut down the cooling apparatus.

ZC.4 Performance with downdraught, updraught and blocked flue test

This Test Method of AS/NZS 5263.0 applies, except as modified below.

ZC.4.1 Scope

This method sets out the procedure to determine the ratio of the carbon monoxide to carbon dioxide (CO/CO₂) in the combustion products of a Type 2 open flued appliance when the flue is subjected to downdraught, updraught and flue blockage.

ZC.4.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#).
- (b) Set up test equipment.
- (c) Attach 0.6 m of appropriate flue.
- (d) Attach the means to measure downdraught or updraught to the flue.
- (e) Place flue gas sampling probes as follows:
 - (i) For the downdraught test, in a position where a representative sample of the flue product entering the room from the draft diverter, relief opening or other location where combustion products could enter the room can be obtained.
 - (ii) For the updraught test, refer to the sampling techniques in Appendix D.

NOTE 1 Care should be taken to ensure that a sample representing the average CO/CO₂ is taken.

NOTE 2 For appliances with multiple draft diverter outlets, samples should be taken from all outlets and averaged.

ZC.4.6 Procedure

ZC.4.6.1 Open flued appliances with a draught diverter or alternative system

The procedure shall be as follows:

- (a) Begin continuous sampling of the flue gases and recording of CO/CO₂.
- (b) Operate the appliance in accordance with the manufacturer's instructions on the highest setting with normal test gas pressure at the appliance inlet.
- (c) Block off the secondary flue outlet.
- (d) Record the CO/CO₂ at 10 min after ignition.
- (e) Unblock the secondary flue.
- (f) Using the sampling probe(s) as described in [Clause ZC.4.5\(e\)\(i\)](#), with the appliance in the hot condition apply a downdraught with a velocity head starting at zero and increasing at discrete pressure intervals (0.5 Pa, 1.0 Pa, 1.5 Pa, etc.) up to 7.5 Pa (3.5 m/s) waiting for equilibrium to be achieved at each step. Once 7.5 Pa (3.5 m/s) is reached, maintain this for a further 5 min. Record the maximum CO/CO₂ ratio.
- (g) Using the sampling probe in the flue outlet, with the appliance in the hot condition apply an updraught with a velocity head starting at zero and increasing at discrete pressure intervals (0.5 Pa, 1.0 Pa, 1.5 Pa, etc.) up to 7.5 Pa (3.5 m/s) waiting for equilibrium to be achieved at each

step. Once 7.5 Pa (3.5 m/s) is reached, maintain this for a further 5 min. Record the maximum CO/CO₂ ratio.

- (h) For appliances with turn-down or modulating controls repeat Steps (f) and (g) at the lowest setting and sufficient intermediate points to characterize appliance performance.

ZC.4.6.2 Open flued appliance without a draught diverter or similar device

The procedure shall be as follows:

- (a) Begin continuous sampling of the flue gases and recording of CO/CO₂.
- (b) Operate the appliance in accordance with the manufacturer's instructions on the highest setting with normal test gas pressure at the appliance inlet.
- (c) Wait until 10 min after ignition.
- (d) Block off the flue progressively until lockout occurs.
- (e) Unblock the flue, reset the appliance and determine the velocity head in the flue with the appliance in operation.
- (f) With the appliance in the hot condition apply an updraught with a velocity head starting at zero and increasing at discrete pressure intervals (0.5 Pa, 1.0 Pa, 1.5 Pa, etc.) up to 7.5 Pa (3.5 m/s) waiting for equilibrium to be achieved at each step. Once 7.5 Pa (3.5 m/s) is reached, maintain this for a further 5 min. Record the maximum CO/CO₂ ratio.
- (g) For appliances with turn-down or modulating controls repeat Steps (c) to (f) at the lowest setting and sufficient intermediate points to characterize appliance performance.

ZC.5 Flue gas temperatures test

This Test Method of AS/NZS 5263.0 applies, except as modified below.

ZC.5.1 Scope

This method sets out the procedure to determine the maximum flue gas temperature for Type 2 appliances.

ZC.101 Spillage of combustion products test — Type 1 appliances

ZC.101.1 Scope

This method sets out the procedure to determine if there is any spillage of combustion products from the flue system or draught diverter of Type 1 appliances.

ZC.101.2 Principle

The presence of spillage is determined by carbon dioxide analysis or use of a dew plate.

ZC.101.3 Apparatus

The following apparatus shall be used:

- (a) Simulated metal fireplace with minimum fireplace depth and maximum height of the fireplace (front) opening specified by the manufacturer.
- (b) 2.7 m length vertical flue of minimum diameter specified by the manufacturer.
- (c) Cowl of minimum diameter specified by the manufacturer.
- (d) Carbon dioxide analyser, calibrated to give accurate and reproducible results and equipped with a small diameter stainless steel probe.

NOTE A sample probe of 3.0 mm OD and sample flow rate of 1.0 to 1.5 L/min is recommended.

- (e) Dew plate, in case Item (d) not used.
- (f) Suitable timing device.
- (g) An adequately sized enclosure capable of being cooled to 5 ± 3 °C.

ZC.101.4 Materials

The following materials shall be used:

- (a) Supply of appropriate test gas (see [Clause 3.1](#)) at normal test gas pressure.
- (b) Supply of cold water for dew plate.

ZC.101.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#) in the enclosure to be cooled.
- (b) Set up test equipment.
- (c) Check that the test point pressure is in accordance with the manufacturer's instructions.
- (d) Fit the appropriate flue and flue cowl to the fireplace.
- (e) Shut off the appliance, operate the cooling apparatus and allow the appliance to stand at 5 °C until temperature equilibrium is reached.
- (f) Shut down the cooling apparatus.

ZC.101.6 Procedure

The procedure shall be as follows:

- (a) Operate the appliance in accordance with the manufacturer's instructions.
- (b) 10 min after ignition check the unit for combustion product spillage by use of a dew plate or by sampling and carbon dioxide analysis. If sampling carbon dioxide, note the background level of carbon dioxide in the ambient air.
- (c) Position carbon dioxide sampling probe or dew plate at all locations where leakage or spillage of combustion products might occur, such as —
 - (i) heat exchanger joints/seams;
 - (ii) clam shell spigots; and
 - (iii) base of flue product collection hoods.
- (d) If partial disassembly is required to access these sample point locations, ensure that the operation of the appliance is not altered so as to cause spillage/leakage; also check that the appliance is correctly reassembled before proceeding with further testing.
- (e) Ensure that the sample probe location and suction does not interfere with the normal operation of the appliance.
- (f) Repeat Steps (a) and (b) with the appliance fan at each speed (if applicable).

ZC.101.7 Test report

All relevant observations shall be reported including at least the following:

- (a) Any spillage detected.
- (b) Location of any spillage detected.
- (c) The test apparatus used [Item (d) or Item (e) of [Clause ZC.101.3](#)].

ZC.102 Determination of CO/CO₂ ratio of combustion products under conditions of normal operation — Type 1 appliances

ZC.102.1 Scope

This method sets out the procedure to determine the ratio of carbon monoxide to carbon dioxide (CO/CO₂) in the combustion products of Type 1 appliances.

ZC.102.2 Principle

The appliance is operated under specified conditions at normal test gas pressure.

A representative sample of the combustion products is analysed by means of a sampling probe or other appropriate device for the CO and CO₂ concentration after a specified period of operation. From the results obtained the CO/CO₂ ratio is calculated.

ZC.102.3 Apparatus

The following apparatus shall be used:

- (a) Equipment as specified in Appendix F.
- (b) Carbon monoxide analyser, calibrated to give accurate and reproducible results.
- (c) Carbon dioxide analyser, calibrated to give accurate and reproducible results.
- (d) Sampling apparatus (flue gas sampling probe of stainless steel or other appropriate means).
- (e) An appropriate fireplace or an equivalent fabricated enclosure (refer to [Clause 3.2](#)).

ZC.102.4 Materials

Supply of appropriate test gas (see [Clause 3.1](#)) at normal test gas pressure.

ZC.102.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with [Clause 3.2](#).
- (b) Set up test equipment.

ZC.102.6 Procedure

The procedure shall be as follows:

- (a) Light the gas at the maximum control setting and operate with normal test gas pressure at appliance inlet for 15 min or until thermal equilibrium is reached.
- (b) Place flue gas sampling probe or hood above test enclosure to obtain a representative sample of flue gases.
- (c) Determine CO and CO₂ by the use of specified apparatus.
- (d) Block off the top opening of the test enclosure and position sample probe or hood above the front of the enclosure opening.
- (e) Determine CO and CO₂ by the use of specified apparatus.
- (f) Repeat Steps (a) to (e) with the gas control setting at the minimum setting.

ZC.102.7 Test report

All relevant observations shall be reported, including CO/CO₂ ratio of the combustion products.

Bibliography

AS 2658, *LP Gas — Portable and mobile appliances*

AS 3645, *Essential requirements for gas equipment*

AS 4564, *Specification for general purpose natural gas*

AS 4670, *Commercial propane and commercial butane for heating purposes*

AS/NZS 2286, *Space heaters — Secondary guards*

AS/NZS 5263.1.3, *Gas appliances, Part 1.3: Gas space heating appliances*

AS/NZS 5601.1, *Gas installations. Part 1: General installations*

NZS 5435, *Specification for liquefied petroleum gas (LPG)*

NZS 5442, *Specification for reticulated natural gas*

NOTES

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