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AS/NZS 5263.0:2023



Australian/New Zealand Standard™

Gas appliances

Part 0: General requirements



AS/NZS 5263.0:2023

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- Department of Mines, Industry Regulation and Safety — Building and Energy WA
- Energy Networks Australia
- Gas Appliance Manufacturers Association of Australia
- GasNZ
- Gas Energy Australia
- Gas Technical Regulators Committee
- Gas Utilisation Institute, New Zealand
- Joint Accreditation System of Australia & New Zealand
- Worksafe New Zealand — Energy Safety

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Australian/New Zealand Standard™

Gas appliances

Part 0: General requirements

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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 5263.0:2017.

The objective of the AS/NZS 5263 series of Standards is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with uniform minimum requirements for the safety, performance and use of gas appliances.

An appliance-specific part (Part 1.X) of the AS/NZS 5263 series may supplement or modify the corresponding clauses of Part 0 (this document) to provide the relevant requirements for each type of appliance. The numbering of clauses in Part 1.X is consistent with the numbering in Part 0 for related requirements.

Thus, for example, the combination of AS/NZS 5263.1.1 and AS/NZS 5263.0 specifies the requirements for domestic gas cooking appliances.

This document is not to be regarded as a design specification or as an instruction manual.

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/NZS 5263.0 contains minimum requirements for safety, performance and use common to many gas appliances. AS 3645 specifies which parts of the AS/NZS 5263 series are applicable to particular types of gas appliance.

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

The major changes in this edition are as follows:

- (i) There are additional definitions, design requirements and performance requirements for appliances incorporating gas/air ratio controls.
- (ii) A new requirement for resistance to vibration, and an associated test method, have been added for application to appliances that are suitable for caravan installation.
- (iii) Additional temperature hazards requirements and testing have been added for appliances fitted with air circulating fans.
- (iv) The requirements and test method for sealing of room sealed appliances have been amended to clarify the requirement and to limit the test to those parts of the combustion circuit carrying flue gas and in contact with room air.
- (v) The term “overload gas consumption” has been replaced with “excess gas consumption”, which is specified in [Section 3](#).
- (vi) The definition “turndown gas consumption” has been deleted and replaced with a requirement in [Section 3](#).

- (vii) Requirements previously written as part of the definitions for “normal test gas pressure” and “test gas” have been relocated to [Section 3](#).
- (viii) Updates to the terms and definitions clause, including several new terms.
- (ix) The requirement for “Means for gas pressure measurement” has been expanded to cover higher test pressures.
- (x) A requirement for the guarding of fan impellers has been added.
- (xi) The requirement for provision of a gas pressure regulator has been amended.
- (xii) The requirement for the design of the flue connection has been clarified.
- (xiii) The design requirement for burners with granular media has been amended to disallow their use in portable and mobile appliances.
- (xiv) The permissible classifications of gas hose assemblies have been specified.
- (xv) The requirement for flame tracking on ignition of a burner has been expanded.
- (xvi) The requirement for performance of multi-port pilots has been deleted.
- (xvii) The performance requirement for flue spillage systems has been restructured to correct an error in the previous edition of the document.
- (xviii) The performance requirement for flue cowls for open flued appliances has been deleted and replaced with a design requirement referencing AS 4566.
- (xix) An additional “Danger” label has been defined for use on multi-energy appliances.
- (xx) The drawing of the bubble leak detector in [Figure A.1](#) has been updated to agree with AS 4627.
- (xxi) In several test methods, the testing of appliances for installation in a masonry flue is to be carried out with a flue fitted.
- (xxii) The test method for “Ignition at reduced supply pressure test” has been updated and clarified, particularly for application to intermittent and interrupted pilots.
- (xxiii) The “downdraught, updraught and blocked flue” test method has been amended to clarify the sampling positions.
- (xxiv) The test methods for testing of burner ignition and pilot ignition under limiting conditions have been revised to clarify the test procedures.
- (xxv) The test method for the sooting test has been amended to clarify the repetition of the test.
- (xxvi) The test methods for the oxygen depletion system and for operation under vitiating conditions have been amended to correct errors in the calculations of corrected readings.
- (xxvii) Many changes to marking requirements have been made, including new markings for open flued appliances and for appliances that are suitable for boat or caravan installation, and their packaging.
- (xxviii) A requirement has been added for a maintenance schedule to be included in the service instructions.

The terms “normative” and “informative” are used in Standards to define the application of the appendices 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 0: General requirements

Section 1 Scope and general

1.1 Scope and application

1.1.1 Scope

This document specifies general requirements and test methods for appliances and equipment which use gas as a fuel and which are intended for domestic, commercial or light industrial use, to an energy input limit of 1 000 MJ/h or any lower limit specified in the appliance-specific part of the AS/NZS 5263 series of Standards. This document provides requirements for appliances for fixed installation, portable and mobile appliances and appliances for boat or caravan installation.

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:

- (a) The fuel gases are natural gas (as specified in NZS 5442) and general product liquefied petroleum gas (NZLPG, as specified in NZS 5435).
- (b) Thermal efficiency requirements are informative only, except where they relate to safety.

Appliance-specific parts of the AS/NZS 5263 series contain clauses that add to, delete or modify the corresponding clauses in this document to provide the relevant requirements for each type of appliance.

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

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

1.1.2 Application

This document (Part 0), together with other Standards in the AS/NZS 5263 series specific to appliance types (Part 1.X), constitute a means of conformance to AS 3645 for each appliance type.

This document may be applied, as far as is reasonable, to appliances not mentioned in any appliance-specific part of the AS/NZS 5263 series, and to gas appliances designed on new principles or technologies.

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 referenced for informative purposes are listed in the Bibliography,

AS 1722.2, *Pipe threads of Whitworth form, Part 2: Fastening pipe threads*

AS 1869 (all parts), *Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas*

AS 2700, *Colour standards for general purposes*

AS 4617, *Manually operated gas valves*

AS 4620, *Thermoelectric flame safeguards*

AS 4625, *Electronic flame safeguards and flame detectors*

AS 4627, *Quick-connect devices for gas*

AS 4629, *Automatic shut off valves and vent valves*

AS ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads, Part 1: Dimensions, tolerances and designation*

AS/NZS 2208, *Safety glazing materials in buildings*

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

ISO 6976, *Natural gas — Calculation of calorific values, density, relative density and Wobbe indices from composition*

ISO 23551-1, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves*

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-64, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance*

IEC Guide 117, *Electrotechnical equipment — Temperatures of touchable hot surfaces*

EN 88-1, *Pressure regulators and associated safety devices for gas appliances - Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 298, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

EN 12067-2, *Gas/air ratio controls for gas burners and gas burning appliances - Part 2: Electronic types*

BS 3193, *Specification for thermally toughened glass panels for use in domestic appliances*

1.3 Terms and definitions

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

1.3.1

ambient temperature

temperature of the air surrounding the appliance, as measured by a dry bulb thermometer or equivalent

1.3.2

appliance connection

point of connection on the appliance to consumer piping or to any hose assembly supplied with the appliance

Note 1 to entry: This may be the same as the gas inlet connection.

1.3.3

appliance regulator

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

1.3.4**atmospheric burner**

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

1.3.5**attended appliance**

appliance that is monitored by the user while it is in operation

1.3.6**authority**

person or body having statutory or legal control (e.g. a Technical Regulator)

1.3.7**automatic burner**

burner system that on starting follows a self-acting sequence to provide gas and ignition to the burner without any intermediate manual operation

Note 1 to entry: Start-up of an automatic burner may be initiated manually or automatically.

1.3.8**automatic flue damper device**

device, in the outlet of the primary flue of an individual automatically operated gas appliance, which is designed to automatically open the flue outlet during appliance operation and to automatically close off or restrict the flue outlet when the appliance is in the standby condition

1.3.9**automatic ignition**

lighting of gas at a burner without a manual operation whenever gas flows from the burner

1.3.10**automatic shut off valve**

valve that operates automatically to shut off the gas supply to an appliance

1.3.11**available gas****line gas**

readily available gas with similar characteristics to the reference test gas

1.3.12**balanced flue appliance**

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

1.3.13**bleed line**

small diameter pipe or tube that conveys gas to a safe place from a diaphragm valve

1.3.14**boat**

seagoing or inland watercraft

Note 1 to entry: Examples of boats include motorboat, yacht, cabin cruiser, launch, runabout, trailer-sailer, houseboat, motor-sailer or work-boat.

1.3.15**burner**

device that positions a flame in the desired location by delivering gas and air in such a manner that sustained combustion is accomplished

1.3.16**burner port**

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

1.3.17**calibrate**

determine the relationship between the measured or indicated value of a parameter and its true or a known value

1.3.18**caravan**

structure designed or adapted to be moved from one place to another, whether towed or transported, which is intended for human habitation or use as a workplace, and includes a self-propelled recreational vehicle or mobile home, and any associated annex, whether permanently or temporarily attached to, or adjoining, the main portion of the structure

Note 1 to entry: A large structure assembled in a factory and transported to a permanent location is not considered a caravan (e.g. portable school classrooms or transportable homes).

1.3.19**CO/CO₂ ratio**

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

Note 1 to entry: This is a measurement indicative of appliance combustion performance.

1.3.20**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

1.3.21**combustible material**

material that will ignite and burn and includes material that has been flame-proofed

1.3.22**combustion circuit**

circuit comprising the air supply circuit, combustion chamber, heat exchanger and combustion products circuit up to the point of discharge from the appliance

1.3.23**combustion products****products of combustion**

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

1.3.24**combustion products discharge safety device**

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

1.3.25**compression fitting****1.3.25.1****Type 1 compression fitting****non-manipulative compression fitting**

fitting for a compression joint that does not require any working of the tube other than cutting square

Note 1 to entry: 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.

1.3.25.2**Type 2 compression fitting
manipulative compression fitting**

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

1.3.26**control**

device designed to change the operation of the appliance or component

Note 1 to entry: Examples of controls include a valve and a thermostat.

1.3.27**cross lighting**

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

1.3.28**cylinder**

container for the storage of LP Gas with a capacity of more than 120 mL but not more than 500 L and does not include an aerosol container

Note 1 to entry: Capacity is often referred to as “water capacity” and is the total internal volume.

1.3.29**cylinder compartment**

compartment partially or fully enclosed on at least three sides, that is intended to contain an LP Gas cylinder or cylinders either for storage or for direct connection to an inlet

1.3.30**determined gas consumption**

gas consumption rate using reference gas at specified test pressures and with ambient conditions corrected to metric standard conditions

Note 1 to entry: Determined gas consumption is usually expressed in megajoules per hour (MJ/h).

1.3.31**draught diverter**

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

1.3.32**enclosed burner**

burner that is not readily visible to the operator during normal operation of the appliance

1.3.33**excess air**

air in excess of that required for complete combustion that is mixed with the combustion products in the combustion chamber

1.3.34**excess gas consumption****overload gas consumption**

gas consumption specified for certain tests

Note 1 to entry: The magnitude of excess gas consumption is specified in [Clause 3.2.9](#).

1.3.35**fan assisted combustion system**

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

Note 1 to entry: The mechanical means may be located within the appliance, the flue system, the air supply system or any terminal connected to the flue or air supply system.

1.3.36**fitting**

component used to join pipes together or to an appliance, to change the direction or the diameter of a pipe, to provide a branch connection to a pipe, or to terminate a pipe

1.3.37**flame abnormality**

flame condition that results in spitting, sputtering, lifting or floating flames, lighting back, extinction, yellow tipping, carbon deposition, 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 effect, yellow tipping and limited lifting or floating flames or limited carbon deposition within the appliance are not considered abnormal.

1.3.38**flame detector**

device that is sensitive to flame properties and initiates a signal when flame is detected

1.3.39**flame establishment period**

period that begins when the fuel valve is first energized and ends when the flame supervision system is first required to supervise that flame

1.3.40**flame failure response time**

time taken for the flame safeguard to detect loss of flame and de-energize the shut off valve

1.3.41**flame lifting**

separation of a flame from a burner port, while continuing to burn with its base some distance from the port

1.3.42**flame proving period**

supervised period following the flame establishment period and before any further operation other than shutdown is permitted

1.3.43**flame safeguard**

safety device that automatically cuts off the gas supply if the actuating flame is not detected

1.3.44**flame safeguard system**

system consisting of a flame detector(s) plus associated circuitry, integral components, valves and interlocks, the function of which is to shut off the fuel supply to the burner(s) in the event of ignition failure or flame failure

1.3.45**flame tracking**

ignition of discharged gas or gas/air mixture from one burner port to an adjacent burner port

1.3.46**flash ignition tube**

device for igniting a gas burner into which a flame is made to travel to the burner ports through a tube in which a flammable mixture of gas and air has been induced

1.3.47**flue**

passage through which flue gases are conveyed away from an appliance, excluding draught diverter, barometric device, fan or similar part

Note 1 to entry: The terms “flue” and “exhaust duct” may be used interchangeably when related to gas appliances.

1.3.48**flue connection**

device incorporated in an appliance for the connection of a flue system

Note 1 to entry: Where the draught diverter, barometric device, fan or similar component is an integral part of the appliance, the discharge point of that integral part is deemed to be the flue connection.

1.3.49**flue cowl**

device placed at the discharge point of a flue system, designed to prevent the entry of rain or birds and minimize the disturbing effect of wind while not hindering the discharge of flue gases

1.3.50**flue gases****exhaust gases**

combustion products plus all diluents and contaminants

Note 1 to entry: Diluents and contaminants may include excess air, dilution air, process air and waste products from the process.

1.3.51**flue system****exhaust system**

passage through which flue gases are conveyed from an appliance to a discharge point (i.e. flue terminal), including draught diverter, barometric device, fan or similar part

1.3.52**flue terminal**

<flueless appliance> point at which the flue gases discharge from the appliance

1.3.53**flue terminal**

<flued appliance> point at which the flue gases discharge from the flue system into the atmosphere or into an external flue cowl where fitted

1.3.54**flued appliance**

appliance designed to discharge its flue gases through a flue system

1.3.55**flueless appliance**

appliance designed to discharge its flue gases directly into the space in which it is located

1.3.56**flueway**

port or passage conveying flue gases within the appliance

1.3.57**flueway terminal**

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

1.3.58**forced draught burner**

burner system where all or part of the air for combustion is provided under positive pressure by mechanical means

1.3.59**gas**

any of the fuels: NG, SNG, TG, TLP, LP Gas or NZLPG

1.3.59.1**liquefied petroleum gas****LP Gas**

commercial propane, commercial butane or any combination of them in the vapour phase

Note 1 to entry: Commercial propane and commercial butane are specified in AS 4670.

1.3.59.2**natural gas****NG**

hydrocarbon gas primarily consisting of methane

1.3.59.3**NZ liquefied petroleum gas****NZLPG**

gas known as New Zealand general product LPG

Note 1 to entry: Refer to NZS 5435.

1.3.59.4**simulated natural gas****SNG**

mixture comprising approximately 55 % commercial propane and 45 % air

1.3.59.5**tempered liquefied petroleum gas****TLP**

mixture comprising approximately 27 % commercial propane and 73 % air

1.3.59.6**town gas****TG**

gas manufactured from coal or petroleum feedstocks

Note 1 to entry: Town gas usually contains high levels of carbon monoxide.

1.3.60**gas/air ratio control**

device that automatically varies the gas rate according to the combustion air rate or vice versa

1.3.60.1**adjustable gas/air ratio control**

gas/air ratio control with an offset adjuster and/or a throttle adjuster that are intended to be adjusted during appliance installation or servicing

Note 1 to entry: One of the two adjusters may be non-adjustable.

1.3.60.2**non-adjustable gas/air ratio control**

gas/air ratio control that is not intended to be adjusted during appliance installation or servicing

Note 1 to entry: For a non-adjustable gas/air ratio control, all factory adjustment mechanisms are rendered inoperative or otherwise put out of operation.

1.3.60.3**offset adjuster****zero adjuster**

adjustment mechanism of a gas/air ratio control that changes the outlet gas rate setpoint independently of the combustion air rate

Note 1 to entry: This corresponds to a lateral translation of the x-y intercept of the linear relationship between the combustion air rate and the gas rate, see [Figure 1.3.60.3](#).

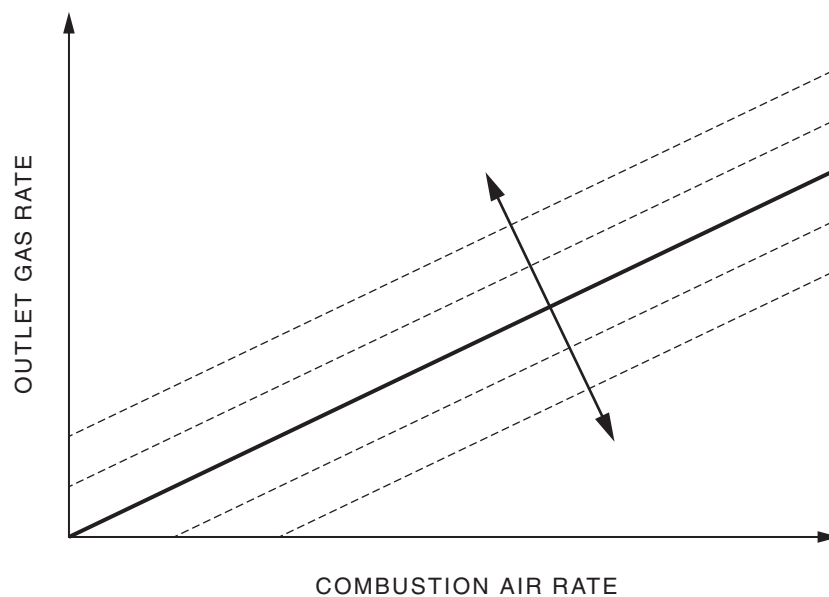


Figure 1.3.60.3 — Effect of offset adjuster

1.3.60.4**throttle adjuster****gas/air ratio adjuster****flow adjuster**

adjustment mechanism of a gas/air ratio control that adjusts the ratio of gas rate to the combustion air rate

Note 1 to entry: This corresponds to changing the gradient of the linear relationship between the combustion air rate and the gas rate, see [Figure 1.3.60.4](#).

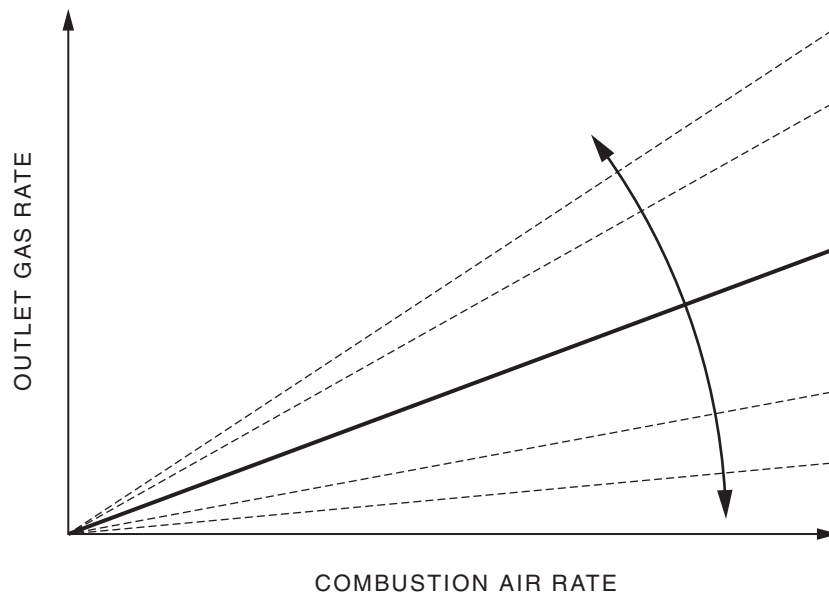


Figure 1.3.60.4 — Effect of throttle adjuster

1.3.61

gas consumption

rate at which gas is consumed by an appliance under specified conditions

Note 1 to entry: Gas consumption is usually expressed in megajoules per hour (MJ/h).

1.3.62

gas inlet connection

point of connection to consumer piping or to an LP Gas cylinder

Note 1 to entry: This may be the same as the appliance connection.

1.3.63

gas installation

combination of the following used or intended to be used in the supplying and utilization of gas, taken as separate items or as a whole: consumer piping; fittings; components; appliances; flues; sub-meters; apparatus or other devices; and associated requirements

1.3.64

gas manifold

gas supply pipe or chamber with multiple points to supply gas

1.3.65

gas train

gas circuit

pipework and components between the appliance gas inlet and the injector

1.3.66

granular media

loose, non-combustible material used largely in decorative or radiant heating or cooking appliances

Note 1 to entry: Granular media usually takes the form of vermiculite, crushed glass, pebbles, volcanic rocks or simulated coal.

1.3.67**heat source**

item which, for the satisfactory performance of the appliance, is required to be at high temperature

Note 1 to entry: Examples of heat sources are —

- (a) radiant elements;
- (b) burner components and flame;
- (c) radiant heat reflector(s);
- (d) heat exchangers; and
- (e) burning fuel.

1.3.68**heating value****gross heating value****higher heating value**

amount of energy released when a unit volume of dry gas, at metric standard conditions, is completely burnt in air with the products of combustion brought to metric standard conditions, with the water produced by combustion condensed to the liquid state

Note 1 to entry: For the purposes of this document, the term “heating value” refers to gross heating value.

Note 2 to entry: Heating value is expressed in megajoules per cubic metre (MJ/m³).

1.3.69**hose assembly**

flexible hose including end fittings connecting the gas supply to the appliance connection

Note 1 to entry: Hose assemblies may include other components (e.g. a regulator).

1.3.70**hotplate**

part of an appliance with one or more burners that heat the bases of the cooking vessels by direct flame

1.3.71**ignition cycle**

sequence of events including the release of gas, the provision of ignition energy and the attempt to detect flame

1.3.72**ignition safety time**

time that elapses between the order to open the gas supply to the burner and the gas supply being shut off in the event of the presence of flame not being detected

1.3.73**induced draught burner**

burner system where all or part of the air for combustion is provided under negative pressure or suction in the combustion chamber by mechanical means

1.3.74**injector**

component which causes air to mix with a stream of gas

Note 1 to entry: In the case of an aerated burner, the injector incorporates an orifice discharging gas into the mixing throat or tube of the burner.

1.3.75**injector orifice**

precise aperture in an injector that functions as a metering device to control the gas consumption of a burner

Note 1 to entry: An injector orifice is also a directional guide for the gas injected into the throat of an aerated burner.

1.3.76**interlock**

device or function that ensures the operation of items of equipment is dependent upon the fulfilment of predetermined conditions by other items of equipment

1.3.77**intermittent pilot**

pilot that is automatically ignited each time the burner is started and is automatically extinguished with the main burner

1.3.78**interrupted pilot**

pilot that is automatically ignited each time the burner is started and is automatically extinguished at the end of the main flame establishment period

1.3.79**jointing compound**

liquid, paste-like or semi-solid material used to assist in sealing joints

1.3.80**jointing material**

solid material used to assist in sealing joints

Note 1 to entry: Jointing material may be in the form of a tape, cord or sheet.

1.3.81**light back**

transfer of the flame from the burner tip or port back into the body of the burner or back to the injector

1.3.82**limit gas**

test gas, which is representative of an extreme variation in the characteristics of the gas for which the appliance has been designed

1.3.83**limit thermostat**

device that shuts off the gas supply when the temperature rises above a limit value and automatically re-establishes the gas supply when the temperature falls below a limit value

1.3.84**linting**

blocking of a burner port or air opening by dust or fluff

1.3.85**lockout****1.3.85.1****non-volatile lockout**

safety shutdown condition of the control system which can only be reset by a manual operation

1.3.85.2**volatile lockout**

safety shutdown condition of the control system which can be reset by a manual operation or by the loss and subsequent restoration of the electricity supply

1.3.86**lower explosive limit****LEL**

lowest percentage of gas in air at which combustion can be self-sustaining

Note 1 to entry: Lower explosive limit is usually determined at metric standard conditions.

1.3.87**manual ignition****1.3.87.1****direct manual ignition**

lighting of a burner by the use of a hand held ignition device

1.3.87.2**remote manual ignition**

lighting of a burner by a manual operation where the ignition activating device is remote from the ignition point

1.3.88**metric standard conditions****MSC**

absolute temperature of 288.15 K (15 °C) and an absolute pressure of 101.325 kPa

1.3.89**mixing tube**

part of an atmospheric burner in which the air and gas are mixed

1.3.90**mobile appliance**

appliance with one or more wheels designed to be easily moved from place to place by one person

Note 1 to entry: Where the appliance is permanently immobilized during appliance installation in accordance with the manufacturer's instructions, the appliance is not considered mobile.

1.3.91**natural draught**

upward flow produced by the tendency of warmed gases to rise

1.3.92**New Zealand gas consumption**

<natural gas appliance> nominal gas consumption ([1.3.94](#))

1.3.93**New Zealand gas consumption**

<NZLPG appliance> gas consumption calculated from the nominal gas consumption expected when operating on a mix of propane and butane gases with a Wobbe index of 84 MJ/m³ and a relative density of 1.73

Note 1 to entry: These gas properties correspond to New Zealand general product LPG (refer to NZS 5435).

1.3.94**nominal gas consumption**

appliance gas consumption as stated in the manufacturer's specifications, instructions, in general communications and on the appliance

Note 1 to entry: This is the fundamental quantity on which all methods of test are based and is the starting point for all performance requirements.

Note 2 to entry: Nominal gas consumption is usually expressed in megajoules per hour (MJ/h).

1.3.95**nominal outlet pressure**

outlet pressure or outlet pressure range of a regulator, as specified by the manufacturer

1.3.96**nominal test point pressure**

gas pressure specified by the manufacturer, at which the burner is designed to operate, and measured at a test point after any regulator or other valve in the gas train to the burner

1.3.97**normal test gas pressure**

minimum gas supply pressure, measured at the gas inlet connection

1.3.98**open flued appliance**

indoor appliance designed to be connected to a flue system, its combustion air being drawn from the room or space in which it is installed

1.3.99**operating components**

components that are critical to the normal operation of the appliance

Note 1 to entry: Examples of operating components include gas valves and thermostats.

1.3.100**outdoor**

above ground open-air situation with natural ventilation, without stagnant areas, where gas leakage and products of combustion are rapidly dispersed by wind and natural ventilation and convection

Note 1 to entry: [Appendix G](#) provides diagrammatical representations of outdoor areas.

1.3.101**outdoor appliance**

appliance designed for outdoor installation or use

1.3.102**oven**

portion of a gas cooker or separate unit consisting of an enclosed, insulated cabinet in which food is cooked

1.3.103**overheat cut-off device**

device that causes safety shutdown and non-volatile lockout before the approach to an unsafe condition and/or before the appliance is damaged

1.3.104**oxygen depletion system****ODS**

system which causes the gas supply to be shut off when the oxygen content of the ambient air is depleted to a specified concentration

1.3.105**pan support****trivet**

means designed to maintain the vertical position of a vessel to be heated relative to the burner

1.3.106**permanent pilot**

pilot that is permanently alight while the appliance is in service and that is controlled independently from the main burner

1.3.107**pilot**

permanently located burner independent of the main burner, small in relation to it, and arranged to provide ignition for the main burner

1.3.108**portable appliance**

appliance designed to be carried by hand from place to place, as required

1.3.109**pre-ignition purge**

introduction of air into the combustion chamber and appliance flueway so as to either displace any gas/air mixture to a safe place or to dilute the gas/air mixture to a non-combustible level

1.3.110**primary aeration control**

device for controlling primary air to a burner

1.3.111**primary air**

portion of the total air required for combustion that is mixed with the gas prior to burning on the burner ports

Note 1 to entry: Air admitted to the combustion zone after primary air combustion and required to complete the combustion process is known as secondary air.

1.3.112**primary air ports**

openings in the burner through which the primary air is drawn in by the gas issuing from the injector orifice into the mixing tube

1.3.113**primary flue**

passage conveying flue gases from the combustion chamber of an appliance to the draught diverter, barometric device, fan or similar part when fitted

1.3.114**primary guard**

guard supplied integral with an appliance and intended to prevent direct contact with, or close approach to a heat source(s)

Note 1 to entry: A primary guard is principally intended to reduce risk of accidental ignition of flammable materials; however, if personal contact occurs, it does not necessarily prevent accidental burning.

1.3.115**programmable electronic system****PES**

system based on one or more central processing units (CPUs), connected to sensors and/or actuators, for the purpose of control, protection or monitoring

Note 1 to entry: The term PES extends to and includes all elements in the system such as —

- (a) sensors and/or other input devices;
- (b) data links and/or other communication paths; and
- (c) actuators and/or other output devices.

Note 2 to entry: The term PES includes system software such as executive, users and communication, etc. which is configured to operate a process.

Note 3 to entry: The term PES is used to cover systems incorporating a wide range of programmable electronic devices and includes systems incorporating —

- (a) microprocessors;
- (b) programmable controllers (PCs);
- (c) programmable logic controllers (PLCs);
- (d) programmable state controllers; and
- (e) other computer based devices.

Note 4 to entry: A PES can include a microprocessor-based temperature, pressure, gas/air ratio, or level controller or monitor.

1.3.116

programmed ignition

multistage system of automatic ignition where each stage takes place in a pre-determined sequence

1.3.117

purge

<pipework and fittings> displacement of contents with another gas

1.3.118

purge

<appliance combustion circuit> forced or induced introduction of air through the combustion chamber and primary flue to displace any gas/air mixture and/or products of combustion

1.3.119

purge volume

volume of the combustion chamber and all areas where combustion products and combustible vapours, dusts or gases may accumulate in the appliance

1.3.120

quick-connect device

two-part mating plug and socket assembly for connecting an appliance or part of an appliance to a gas supply without the use of tools

1.3.121

rated voltage

voltage assigned to the appliance by the manufacturer

Note 1 to entry: The rated voltage may be a range of values, defined by a lower limit and an upper limit.

[SOURCE: AS/NZS 60335.1:2020, 3.1.1, modified, Note 1 to entry has been added.]

1.3.122

rated working pressure

maximum allowable inlet pressure specified by the manufacturer

1.3.123

reference gas

gas corresponding to an average of the gases most currently distributed, and for which the appliance has been specifically designed

Note 1 to entry: See also test gas ([1.3.142](#)).

1.3.124**regulator**

device that automatically regulates the outlet pressure or the outlet volume of gas passing through it to a predetermined value

Note 1 to entry: Regulators may be adjustable (usually spring-loaded) or non-adjustable (usually weight-loaded).

1.3.125**relative density****specific gravity**

ratio of the mass of a volume of gas to the mass of the same volume of dry air under metric standard conditions

1.3.126**removable**

component that is intended to be removed with or without the use of a tool

1.3.127**room sealed appliance**

indoor appliance that directly discharges combustion products to, and takes air for combustion from, outside the building

1.3.128**safety shutdown**

action of shutting off all gas and ignition energy by means of a safety control such that restart cannot be accomplished without a full start cycle

1.3.129**safety shut off system**

arrangement of valves and associated control systems which shuts off the supply of gas when required, using a device which senses the approach to an unsafe condition

1.3.130**safety shut off valve**

automatic valve used to shut off gas supply to an appliance when a signal is generated indicating the approach to an unsafe condition

1.3.131**secondary flue**

portion of the flue system conveying flue gases from the draught diverter, barometric device, fan or similar part to the flue terminal

1.3.132**secondary guard**

guard intended to prevent deliberate or accidental contact with any surfaces which are at such a temperature as would cause thermal damage to body tissue

Note 1 to entry: A secondary guard may be supplied integral with or separate from an appliance.

Note 2 to entry: A secondary guard is for use in situations where young children or the infirm may be at risk.

1.3.133**self-latching valve**

gas valve with a built-in safety catch, which locks automatically when the valve is closed, whereby a separate and distinct movement is required to unlock before the valve can be opened

1.3.134**soft solder**

solder for which the lowest temperature of the melting range, after application, is less than 450 °C

1.3.135**standard test vessel**

vessel with specified dimensions and properties for testing purposes

Note 1 to entry: See [Figure A.12](#) of [Appendix A](#) for specifications of standard test vessels.

1.3.136**start flame establishment period**

period during which the start gas safety shut off system is permitted to be open before the flame safeguard is required to supervise the start gas flame

Note 1 to entry: See [Appendix C](#) for an example.

1.3.137**start gas**

gas flowing at a pilot or, when no pilot is fitted, at a main burner during the flame establishment period for initial ignition

1.3.138**start gas rate**

restricted gas flow rate admitted either to a separate pilot or to the main burner during the start flame establishment period

1.3.139**surface combustion burner**

burner where combustion takes place on the surface of a perforated or porous material or gauze

1.3.140**table top appliance**

appliance designed specifically to be supported by a table

1.3.141**temperature limit device**

device that automatically interrupts the gas supply when the temperature at the control point reaches a pre-determined limit

1.3.142**test gas**

gas intended for the verification of the operational characteristics of appliances

Note 1 to entry: Test gases consist of reference gases and limit gases.

1.3.143**thermostat**

device that automatically maintains a pre-determined temperature

1.3.144**tray type burner**

main burner that utilizes granular or other porous media for the distribution of gas over a defined area

1.3.145**unattended appliance**

appliance that is normally not monitored by the user while it is in operation

1.3.146**Universal LP Gas appliance****ULPG appliance**

appliance intended for use with propane, butane or any mixture of propane and butane

1.3.147**unsafe condition**

condition which may lead to injury to persons or animals, damage to the appliance or damage to the surroundings

1.3.148**unvented**

having no provision for a vent permanently open between the water circuit and atmosphere

1.3.149**valve**

device for the purpose of controlling or shutting off flow

1.3.150**vented**

having provision for a vent permanently open between the water circuit and atmosphere

1.3.151**Wobbe index****Wobbe number**

gas property which measures the amount of heat released by a gas burner with a constant orifice

Note 1 to entry: Wobbe index is an indicator of the interchangeability of fuel gases, such as natural gas, LP Gas and town gas, and is used to compare the combustion energy output of a burner.

Note 2 to entry: Wobbe index is expressed in megajoules per cubic metre (MJ/m³) and is calculated as —

$$\text{Wobbe index} = \frac{\text{Heating value}}{\sqrt{\text{Relative density}}}$$

1.3.152**working parts**

components intended to be handled by the user while operating the appliance

Note 1 to entry: This may include controls, door handles, and buttons to operate piezo ignition systems.

1.3.153**working surfaces**

surfaces through which heat passes as part of the primary function of the appliance

1.4 Test methods

The following test methods are referred to in this document and are located after [Appendix H](#):

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

ZA.1: Gas leakage test

ZA.2: Gas consumption test

ZA.3: Gas pressure regulators test

ZA.4: Burner ignition — Pilot light back and blocked aeration test

ZA.5: Ignition at reduced pilot rate test

ZA.6: Ignition at reduced supply pressure test

ZA.7: Holding time of thermoelectric flame safeguard test

ZA.8: Flame tracking at ignition test

- ZA.9: Shut off time for safety shut off system test
- ZA.10: Ignition gas flow rate (delayed ignition) test
- ZA.11: Ignition cycles — Prior to lockout/after flame failure test
- ZA.12: Ignition of draped fabric test

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
- ZB.3: Determination of CO/CO₂ ratio for permanent pilots — Overload test
- ZB.4: Flame characteristics at maximum and minimum limiting conditions test
- ZB.5: Burner ignition at maximum and minimum limiting conditions test
- ZB.6: Delayed ignition at maximum and minimum limiting conditions test
- ZB.7: Reignition at turndown under draught conditions test
- ZB.8: Pilot ignition and stability at maximum and minimum limiting conditions test
- ZB.9: Burner stability when changing settings test
- ZB.10: Unburnt gas release from burner system test
- ZB.11: Blocked flueway terminal test
- ZB.12: Case pressure test
- ZB.13: Effect of opening and closing doors at turndown condition test
- ZB.14: Sooting — Luminous effect appliances test

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

- ZC.1: Combustion air supply test
- ZC.2: Diversion of combustion products test
- ZC.3: Spillage of combustion products test
- ZC.4: Performance with downdraught, updraught and blocked flue test
- ZC.5: Flue gas temperatures test
- ZC.6: Performance of combustion products temperature limit device test
- ZC.7: Blocked condensate drain test
- ZC.8: Temperature hazards test
- ZC.9: Resistance to temperatures — Excess gas consumption test
- ZC.10: Resistance to temperatures — Burner light back test
- ZC.11: Heat exchangers maximum and minimum temperatures test
- ZC.12: Zinc based alloys test
- ZC.13: Permanent markings test

- ZC.14: Effect of spillover on ignition systems test
- ZC.15: Electrical supply variation test
- ZC.16: Operation under linting conditions test
- ZC.17: Rain test
- ZC.18: Wind test — Outdoor unattended appliances
- ZC.19: Wind test — Outdoor attended appliances
- ZC.20: Wind test — Room sealed appliances
- ZC.21: Bearing pressure test
- ZC.22: Strength of flue connection test
- ZC.23: Stability test
- ZC.24: Hydrostatic strength test
- ZC.25: Pan stability test
- ZC.26: Body loading test
- ZC.27: Primary guard attachment test
- ZC.28: Primary guard attachment incorporating glass test
- ZC.29: Operation of oxygen depletion system test
- ZC.30: Vitiation test
- ZC.31: Combustion at low appliance inlet pressure test
- ZC.32: Emission rate test
- ZC.33: Spillage monitoring system test for appliances with an atmosphere sensing device
- ZC.34: Spillage monitoring system test for appliances with a combustion products discharge safety device
- ZC.35: Vibration test
- ZC.36: Combustion test for gas/air ratio controls, with electrical supply variation
- ZC.37: Combustion test for adjustable gas/air ratio controls with maladjustment

Section 2 Design and construction

2.1 Scope

This section specifies the requirements necessary to design, construct and present a gas appliance that conforms to AS 3645.

2.2 General design requirements

2.2.1 Adequacy of means of support

Appliances shall be provided with adequate means of support, which shall allow the appliance to remain stable on the intended supporting surface and shall not have sharp edges in contact with the supporting surface.

2.2.2 Positioning of removable components

User accessible removable components shall be positioned positively. Reasonable rearrangement of such parts shall not be possible unless it can be demonstrated that the changes do not adversely affect combustion or appliance safety.

NOTE Removable components include, for example, decorative logs and coals, pan supports and flame tamers.

2.2.3 Fitting of flame safeguards

Each burner system shall be protected by a flame safeguard system.

2.2.4 Fixing of gas manifolds

Gas manifolds shall be firmly fixed to prevent displacement during handling or installation.

2.2.5 Protection of vitreous enamel

Screw heads in contact with cover coat vitreous enamel shall be provided with means of preventing enamel damage.

NOTE This provision is optional in the case of ground coat or wiped areas.

2.2.6 Sealing of programmed ignition adjustments

Adjusting devices for programmed ignition shall be sealed against unauthorized alteration to settings.

2.2.7 Protection of aluminium tubing

The following measures shall be taken to protect aluminium tubing:

- (a) Aluminium tubing in areas of restricted ventilation shall be provided with a means to prevent corrosion due to contact with condensation, insulation and other materials.
- (b) In post-mounted appliances, aluminium tubing within the post shall not be used less than 150 mm above the intended ground level.

2.2.8 Protection of electric lamps

Electric lamps shall be protected from damage.

2.2.9 Thermal insulation

The following requirements apply to thermal insulation:

- (a) It shall not contaminate food or water in the appliance, nor produce obnoxious odours, fumes, nor corrode materials with which it is in contact.
- (b) It shall be fitted in such a way that it is not rendered ineffective or objectionable by —
 - (i) settling;
 - (ii) dislodgment; or
 - (iii) condensation during the normal operation of the appliance.
- (c) It shall be protected against rodents.

2.2.10 Protection of wiring and controls from weather conditions

Appliances shall have all controls and electrical wiring adequately protected from damage and weather conditions to ensure safe and reliable operation.

2.2.11 Sharp edges

Parts likely to be contacted by the installer, service person, assembler or user shall not have sharp points or edges.

2.2.12 Provision for removal of condensate

Where the appliance is specifically designed to operate under condensing conditions, adequate provision shall be made for the collection and removal of condensate.

2.2.13 Design of appliance base

The base of an appliance intended to stand on surfaces that may become wet shall be designed to resist corrosion of the base material.

2.2.14 Provision for moving appliances

Portable and mobile appliances shall be provided with means to facilitate moving the appliance safely.

NOTE Examples include carry handles, castors, etc.

2.2.15 Prevention of manual contact with fan impeller

An appliance shall be designed to prevent manual contact with any fan impeller during normal operation.

2.3 Materials

2.3.1 Suitability of materials and finishes

The quality and thickness of the materials used in the construction of an appliance, and the method of assembling the various parts, shall be such that the constructional and performance characteristics do not alter significantly during a reasonable life and under normal conditions of installation and use.

When the appliance is installed in accordance with the manufacturer's instructions, all components shall withstand the mechanical, chemical and thermal conditions to which they may be subjected in the course of normal operation.

NOTE This requirement does not apply to sacrificial anodes.

2.3.2 Resistance to corrosion

All materials shall be resistant to corrosion under normal conditions of installation and operation of the appliance.

NOTE This requirement does not apply to sacrificial anodes.

2.3.3 Materials containing asbestos

Materials containing asbestos shall not be used.

2.3.4 Materials in contact with gas

Materials in contact with gas shall be compatible with all gases that the appliance is intended to use.

2.3.5 Components required to be placed in a flame

Pilots, thermocouples and other components required to be placed in a flame shall be resistant to the effects of heat and corrosion. When refractory alloys are used they shall not produce a catalytic cracking effect.

2.3.6 Jointing compounds and jointing materials

Jointing compounds and jointing materials shall be of a type demonstrated as suitable for the conditions of use.

NOTE Refer to AS 4623 for information on jointing compounds and jointing materials for gas joints.

2.3.7 Zinc based alloys

A zinc based alloy shall not be used where it may be in contact with water or condensate under normal operation. Brass is excluded from this requirement.

2.4 Design for assembly and installation

2.4.1 Conformance of alternative forms

If appliances are so designed that certain components may be fitted or omitted, the appliances shall conform to all requirements in their alternative forms.

NOTE The optional components may include legs, trolleys, flue diverters, etc.

2.4.2 Fixing of gas connections

The gas inlet connection and appliance connection shall be fixed to prevent rotation.

This requirement is met if the connection can be held in position by means of a spanner while making or breaking the connection in accordance with the manufacturer's instructions.

NOTE The gas inlet connection and the appliance connection may be the same.

2.4.3 Gas inlet connection

Where the appliance is to be connected to consumer piping, the gas inlet connection shall —

- (a) have a thread in accordance with AS ISO 7.1 or AS 1722.2;

NOTE 1 Refer to AS 3688 for guidance on the appropriate class of thread for various types of connection.

- (b) have a quick-connect device in accordance with AS 4627, Type 1 or Type 2; or
- (c) have an SAE flare if the appliance is suitable for boat or caravan installation.

Where the appliance is to be directly connected to an LP Gas cylinder, the inlet connection to the hose and regulator assembly shall —

- (i) for Australia, conform to—

- (A) AS 4627, Type 27 for connection to cylinders up to 25 L water capacity; and

- (B) AS 2473.2, Type 21 without elastomer seals, for connection to cylinders exceeding 25 L water capacity; or

NOTE 2 25 L water capacity corresponds to nominally 10 kg of liquefied propane.

- (ii) for New Zealand, conform to UL 2061.

2.4.4 Access to connections

The gas and water connections shall have sufficient free space to enable connection and disconnection.

2.4.5 Restraint where a hose assembly is used

2.4.5.1 Appliances other than table top appliances

An appliance —

- (a) with a mass greater than 20 kg; and
- (b) connected to a fixed gas supply by a hose assembly; and
- (c) that is mobile or designed to be slid out for servicing or use,

shall have means to limit the extent of movement of the gas appliance to no greater than 80 % of the hose assembly length.

2.4.5.2 Table top appliances

A table top appliance shall be supplied with a means to prevent stress on the hose assembly. The following means are acceptable:

- (a) A restraining chain or wire of adequate strength for fixing to the appliance or table and the cylinder. The length of the chain or wire shall not exceed 80 % of the length of the hose assembly.
- (b) A device that adequately supports the cylinder and prevents displacement.

2.4.6 Securing of table top appliance

An appliance shall be provided with adequate means, including fastening devices, to secure the appliance to the table.

2.5 Design for maintenance

2.5.1 Accessibility for adjustment

Components and integral parts that may require adjustment shall be accessible for adjustment. In particular, the following shall be readily and easily adjusted without risk of injury while the appliance is installed:

- (a) Aeration controls.
- (b) Pilots.
- (c) Gas rate adjuster.
- (d) Thermostat adjustments.
- (e) Regulator adjustments.
- (f) Slow lighting adjusters.
- (g) Ignition devices.
- (h) Safety devices.
- (i) Pressure control devices.
- (j) Vacuum control devices.
- (k) Belt tension adjusters.
- (l) Water flow rate controls.
- (m) Gas/air ratio control adjusters.

It is acceptable for adjustments to be finalized with some components removed, provided no settings will be disturbed during replacement of those components.

2.5.2 Accessibility for replacement

Components that require removal for service work shall be accessible for replacement without undue risk of injury.

For appliances that cannot be easily disconnected and handled by one person, the following components shall be accessible for replacement without moving the appliance from the installed position:

- (a) Regulator diaphragms and valves (body exempt).
- (b) Injectors.
- (c) Thermostats (complete including sensing elements). Thermostat valve plug and bypass adjuster to be separately removable.
- (d) Filters (gas and water).
- (e) Pilot head assemblies, pilot injectors.
- (f) Clocks and timers.
- (g) Door springs or other door control mechanisms.
- (h) Burners.
- (i) Ignition devices.

- (j) Radiant elements.
- (k) Baffles when flue cleaning is necessary.
- (l) Drip trays.
- (m) Automatic control equipment.
- (n) Flame safeguards.
- (o) Safety shut off systems.
- (p) Electric light globes.
- (q) Fans, electric motors and drives.
- (r) Belts.
- (s) Pressure control devices.
- (t) Vacuum control devices.
- (u) Flue dampers.
- (v) Water flow controls/water operated gas valve assemblies.
- (w) Heat exchanger units.
- (x) Printed circuit boards.
- (y) Anode(s).

2.5.3 Dismantling and replacement by the user

Any dismantling required by the user shall be easily carried out without tools or undue force. Any replacement shall not require undue force and incorrect replacement shall be either impossible or completely obvious.

2.5.4 Threaded connections

Components and assemblies of components with threaded connections shall be provided with flats for spanners unless accessible unions are provided on inlet and outlet connections.

2.5.5 Inaccessible nuts or bolts

Nuts or bolts in inaccessible positions that secure parts required to be removed for service shall be captive.

2.5.6 Insertion and removal of injectors

Removable injectors shall be capable of insertion and removal without damage.

2.5.7 Viewing of flames

It shall be possible to view burner flames either directly or indirectly. It is acceptable if this can be achieved by removal of a part of the appliance.

2.5.8 Means for gas pressure measurement

Readily accessible means shall be provided to allow the gas pressure in the appliance to be measured while the appliance is in operation.

Any dedicated pressure test point shall —

- (a) if the nominal test point pressure does not exceed 7 kPa —
 - (i) be of the self-sealing type; or
 - (ii) be designed to accept 6 mm bore flexible tubing and contain a limiting orifice not exceeding 1.0 mm diameter or equivalent restriction; or
- (b) if the nominal test point pressure exceeds 7 kPa —
 - (i) be of the self-sealing type; or
 - (ii) have a manual shut-off valve and a suitable threaded connection.

2.5.9 Accessibility of electrical system

The appliance electrical system shall be readily accessible for servicing.

2.5.10 Connection of electrical components

Electrical components or assemblies which may be required to be removed from an appliance, shall not be connected by permanent or soldered joints.

2.5.11 Plug and socket connections

Plug and socket connections of electrical components within the appliance shall be —

- (a) non-interchangeable;
- (b) colour coded; or
- (c) appropriately identified.

2.6 Design for use

2.6.1 Prevention of injury at ignition

The method of ignition shall be such that it is not necessary for the operator to be exposed to any hazard.

2.6.2 Proving of burner or pilot ignition

It shall be possible to prove that a burner or pilot is alight when the appliance is in operation in the installed position.

2.6.3 Burner controls

Where it is intended that a user select individual burners, it shall be obvious which control is applicable to each burner.

Where controls and working parts may be operated by the user, they shall be designed such that —

- (a) they are accessible and easily operated; and
- (b) the movement of one does not cause inadvertent movement of another control.

2.6.4 Primary guard openings

Openings in a primary guard or openings between the edge of the guard and the appliance shall conform to the following requirements:

- (a) Major dimensions excluding horizontal openings, where the minor dimension exceeds 6 mm: not greater than 150 mm.

NOTE 1 Limitations on vertical openings are intended to prevent entry of fabrics.

- (b) Minor dimension: less than 6 mm or greater than 12 mm where finger entrapment is possible, but not greater than 35 mm.

NOTE 2 The range 6 mm to 12 mm is excluded because, within this range, a child's finger may be inserted with ease and only withdrawn with difficulty.

2.6.5 Touchability of flames

When an appliance is operating in its installed position, with any access doors or covers closed, flames shall not be touchable by children less than 6 years old, as assessed using the principles provided in IEC Guide 117.

2.6.6 Air filters

Where an air filter is fitted, it shall not interfere with the combustion.

2.7 Controls and safety devices

2.7.1 Safety shut off system

A safety shut off system shall be fitted to the appliance where required to prevent an unsafe condition.

2.7.2 Pilot shut off

Means shall be provided for shutting off the gas supply to a pilot.

2.7.3 Main burner shut off provision

Appliances with permanent pilots shall have provision to shut off gas to the main burner without extinguishing the pilot.

2.7.4 Programmable electronic systems

Where a programmable electronic system (PES) is employed for safety related functions of burner management systems, the PES shall conform to the relevant requirements of AS 4625 and EN 298 (or equivalent).

2.7.5 Safety devices and interlocks

Safety devices, interlocks and their associated parts shall be adequately protected and shall not be capable of being inadvertently overridden. Safety shut off valve(s) shall not be bypassed.

The operation of safety devices shall not be overridden by any other device.

2.7.6 Locking means for adjusting devices

Adjusting devices shall be provided with locking means that shall be sufficiently positive to prevent subsequent movement, either through accident or through the creep of sealing material. The tightening of a locking device shall not alter the setting.

2.7.7 Tip over system

A system shall be fitted to all portable, mobile and table top appliances so that in the event of the appliance being knocked over or tipped in any direction to an angle of 45° from the vertical, gas to all burner(s) (including pilots) shall be shut off.

2.7.8 Design of valve handles, movable dials and pointers

Valve handles, movable dials and pointers shall —

- (a) be so designed that they are not capable of being incorrectly assembled;
- (b) be securely attached to their spindles;
- (c) not contain loose parts that may become detached when the handles are removed; and
- (d) be located to avoid accidental change of setting while appliance is in use.

2.7.9 Fitting of self-latching valves

Manual valves other than pilot valves shall be self-latching valves unless —

- (a) the valve handles are adequately protected from unintentional operation;
- (b) a flame safeguard is fitted;
- (c) automatic ignition is provided; or
- (d) the valve automatically returns to the “OFF” position.

2.7.10 Shut off valve — Table top appliances

Where a table top appliance is intended to be used with a cylinder that does not have an integral shut off valve, a shut off valve shall be provided at the point of connection with the cylinder.

2.7.11 Gas/air ratio controls

2.7.11.1 General

Pneumatic gas/air ratio controls shall meet the performance requirements of EN 88-1 or ISO 23551-1.

Electronic gas/air ratio controls shall meet the performance requirements of EN 12067-2.

2.7.11.2 Non-adjustable gas/air ratio controls

If the appliance is fitted with a non-adjustable gas/air ratio control, there shall be provisions to prevent adjustment of the gas/air ratio control settings. This requirement applies to both the throttle adjuster and the offset adjuster.

NOTE Examples of such provisions include —

- (a) physical removal of the adjusters or rendering these inoperative; and
- (b) physically preventing access to the adjusters.

2.7.11.3 Adjustable gas/air ratio controls

If the appliance is fitted with an adjustable gas/air ratio control, means shall be provided to indicate that the control settings have been changed.

If either the offset adjuster or the throttle adjuster is non-adjustable, the requirements of [Clause 2.7.11.2](#) apply to that adjuster.

NOTE An example of a suitable means to indicate that the control settings have been changed is to use a paint spot on the adjusting device. For appliances that are adjusted electronically, the ability to review a stored alphanumeric code indicating the control settings or software version is also an acceptable means of indicating the control settings have been changed.

2.8 Gas train

2.8.1 Manual shut off valves

Manual shut off valves fitted to an appliance shall be either Type 1 or Type 2 in accordance with AS 4617.

2.8.2 Provision of pressure regulators

A gas pressure regulator(s) suitable for the appliance gas type(s) shall be provided. Regulator outlet pressures nominated by the appliance manufacturer shall not exceed —

- (a) TG, TLP: 0.63 kPa.
- (b) Natural gas —
 - (i) for Australia, 1.00 kPa; or
 - (ii) for New Zealand, normal test gas pressure minus 0.13 kPa.
- (c) LP Gas: 2.75 kPa.

2.8.3 Positioning of regulators

Regulators shall be placed so that —

- (a) breather vents cannot easily be blocked; and
- (b) overheating and the risk of ignition of any gas leaking from the breather vents is minimized.

2.8.4 Control of bleed lines

Where a bleed line exists, gas actuated controls shall be constructed so that there is no continuous bleed during the “off” period. The bleed line shall either re-enter the main gas line downstream from the control valve or be terminated with a suitable heat resistant tip and positioned such that ignition of the bleed gas by the main burner or pilot is ensured, and blockage of the bleed line tip is prevented.

2.8.5 Main burner automatic shut off valves

For appliances with automatic ignition, all gas to the main burner shall pass through at least two automatic shut off valves in series that may be in a single control body.

2.8.6 Holes for screws, pins and other fasteners

Holes for screws, pins and other fasteners intended for the assembly of components shall not penetrate the gas train.

2.8.7 Jointing

Joints shall not depend for their mechanical strength solely upon cement or jointing compounds.

2.8.8 Use of soft solder

Soft solder shall not be used to ensure the soundness of the gas train. However, it is permitted for internal connections within the gas train when they do not involve soundness.

2.8.9 Pilot gas filters

Gas filters shall be provided for continuously burning pilots of 0.5 MJ/h or less capacity (optional for LP Gas).

2.8.10 Gas hose assemblies

Gas hose assemblies shall conform to the appropriate parts of the AS 1869 series of Standards and, depending on the application, be one of Class A, Class B, Class C or Class D.

2.8.11 Protection of hose assembly

2.8.11.1 General

An appliance that may be installed with a hose assembly shall be constructed so that when installed in accordance with the manufacturer's instructions, the hose assembly shall not be either —

- (a) exposed to temperatures exceeding that for which it is designed or tested; or
- (b) subject to tension, abrasion, kinking or permanent deformation.

2.8.11.2 Table top appliance hose assemblies

Table top appliances shall be designed so that the hose does not pass over the table surface.

2.8.12 Quick-connect devices

Quick-connect devices, if provided, shall conform to AS 4627.

2.8.13 Compression fittings

Compression fittings on gas lines shall conform to the following conditions:

- (a) They shall be made to an acceptable standard and the mating surfaces shall be compatible.
- (b) Any olives shall be designed to prevent incorrect assembly.

NOTE Loose olives that are symmetrical or obviously asymmetrical will satisfy this requirement. Shear olives may be asymmetrical.
- (c) After making and breaking the fittings 10 times, and applying the torque value as listed in [Table 2.8.13](#) to remake the fittings, the joints shall conform to the requirements of [Clause 3.3](#).
- (d) The component parts shall be made of materials with a melting point not less than 430 °C.

Table 2.8.13 — Torque values

Nominal size mm	Torque Nm
6	15
8	20
10	35
15	50
20	75
25	125
32	160
40	200
50	250

2.8.14 Classification of safety shut off valves

The minimum classification of the safety shut off valve fitted shall be selected in accordance with [Table 2.8.14](#).

Table 2.8.14 — Safety shut off valve selection and classification

Burner type	Standard and classification
Atmospheric	AS 4620, AS 4629, Class 3 or AS 4629.1, Class D
Induced draught	AS 4629, Class 3 or AS 4629.1, Class D
Forced draught with air pressure not exceeding 3 kPa	AS 4629, Class 2 or AS 4629.1, Class B
Forced draught with air pressure exceeding 3 kPa	AS 4629, Class 1 or AS 4629.1, Class A

2.9 Combustion air and flue systems

2.9.1 Design of air entry and combustion product discharge

Appliances shall be so designed that openings for the entry of combustion air and the egress of combustion products are part of the appliance structure and are unlikely to be obstructed when the appliance is installed. This includes flueway terminals and draught diverter relief openings.

In the case of appliances specifically designed to be built-in, any clearance necessary to the safe and effective operation of the appliance shall be ensured by means of permanently attached spacers.

2.9.2 Flue terminal openings

No opening of an outdoor combustion air inlet or flue terminal shall permit the entry of a ball of 16 mm diameter with an applied force of 5 N.

2.9.3 Flue terminal and draught diverters construction

Flue terminals and draught diverters shall be constructed so that they can only be fitted in the correct position.

2.9.4 Draught diverters

For an open flued appliance, relief openings of any draught diverter or alternative system shall be connected directly to the same space from which the air for combustion is drawn.

NOTE An open flued appliance may need to have a draught diverter or an alternative system unless satisfactory combustion is maintained against a back pressure of 140 Pa, see [Clause 4.5](#).

2.9.5 Design of flue connection

The flue connection 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 not be less than 13 mm for vertical flue connection and 25 mm for horizontal flue connection.

For Australia, flues and flue connections shall conform to at least one of the following:

- (a) Flue connections or adaptors designed for twin wall metal flue pipes shall be suitable for use with flues conforming to AS 4567.
- (b) Flue connections or adaptors designed only for single wall metal flue pipes shall conform to the dimensions in [Table 2.9.5.1](#) or [Table 2.9.5.2](#).
- (c) Flue connections shall be suitable for use with a flue specified by the appliance manufacturer.

Table 2.9.5.1 — Circular flue connection (Australia only)

Nominal pipe diameter mm	Diameter of flue connection mm	
	Internal dimension of socket	External dimension of spigot
75	78 ⁺³ ₋₀	73 ⁺⁰ ₋₃
100	104 ⁺³ ₋₀	98 ⁺⁰ ₋₃
125	129 ⁺³ ₋₀	123 ⁺⁰ ₋₃
150	153 ⁺³ ₋₀	148 ⁺⁰ ₋₃

Table 2.9.5.2 — Rectangular flue connection (spigot) (Australia only)

Nominal size mm	Dimensions of flue connection mm	
	Width	Depth
250 × 50	247 ⁺⁰ ₋₅	45 ⁺⁰ ₋₅
300 × 65	295 ⁺⁰ ₋₅	60 ⁺⁰ ₋₅

2.9.6 Automatic flue dampers

2.9.6.1 Installation of automatic flue damper devices

If an automatic flue damper device is fitted in the primary flue, the flue damper and all its components shall be factory fitted.

2.9.6.2 Provision for a permanent pilot

For an appliance equipped with a permanent pilot that has an input rate over 1.5 MJ/h, the minimum internal free venting area of the flueway of the flue damper device, with the damper in the closed position, shall not be less than 3.2 cm² or 1.0 cm² per 1.0 MJ/h of the total permanent pilot input, whichever is the larger.

2.9.6.3 Automatic valves

An appliance equipped with a flue damper device shall have two automatic valves, in series, each of which opens and closes the main burner gas supply on each heating cycle. These valves may be in a single control body. For the purposes of this provision, a thermostatically operated valve is considered an automatic valve.

2.9.6.4 Electrical requirements

All electrical components of an electrically operated flue damper device shall be factory wired into the electrical circuit of the appliance or the flue damper device shall be supplied with a wiring harness.

2.9.6.5 Ignition safety interlock

An appliance shall be designed so that —

- (a) the damper of any flue damper device assumes its open position in the event of motive power failure or de-energization of the flue damper;
- (b) any flue damper device is electrically interlocked with an automatic gas ignition system so as to prevent operation of the automatic gas ignition system when the damper is in other than the fully open position; or
- (c) the loss of motive power will prevent operation of the automatic gas ignition system when any damper is in other than the fully open position.

2.9.6.6 Visual indication of damper position

The design of the appliance shall be such that the flue damper position can be visually determined when the appliance is installed in accordance with the manufacturer's installation instructions.

2.9.6.7 Automatic valve safety interlock

Flue damper devices shall incorporate integral means actuated directly by the damper, or by the assembly of parts securely attached to the damper, so as to maintain a fixed relationship to the damper, which will provide an interlock with both the automatic valves specified in [Clause 2.9.6.3](#) to prevent main burner firing unless the damper is in the open position.

2.9.6.8 Safe operation under interlock failure conditions

An appliance shall be equipped with a means, in addition to the interlock specified in [Clause 2.9.6.7](#), which will either prevent main burner firing, provide for main burner shutdown if the damper is in other than the open position, or bring the damper to a permanent full open position if the interlock specified in [Clause 2.9.6.7](#) fails unsafe.

A flue damper device with two systems, either of which will prevent main burner gas flow with the damper in other than the open position, one system which conforms to [Clause 2.9.6.7](#) and the other system being one of the means specified in this clause, shall be deemed as conforming to the intent of this clause. Each system shall operate completely independently of the other and each shall have a separate switch for operating either a separate automatic valve or two automatic valves in series.

2.9.7 Combustion products temperature limit device

If the appliance is intended to be connected to a flue likely to be adversely affected by abnormal temperature of the combustion products (e.g. a plastics flue or a plastics-lined flue), the appliance shall have a device that prevents the combustion products' temperature from exceeding the maximum permissible temperature declared by the manufacturer.

This device shall not be adjustable and shall not be accessible without a tool. The action of this device shall result in a non-volatile lockout of the appliance.

2.9.8 Flue cowls

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

2.10 Fan assisted combustion systems

2.10.1 Combustion air supply equipment

Any combustion air supply equipment shall be supplied with the appliance. This equipment shall be correctly sized and arranged to ensure an air flow adequate for all operating conditions specified by the manufacturer.

2.10.2 Combustion air flow proving interlock

Any combustion air flow proving device shall be interlocked to cause lockout or prevent an ignition attempt unless the device is in the "no flow" condition prior to the start-up of its respective supply fan.

NOTE Fan speed sensors are not considered to be air flow proving devices for the purposes of this clause.

2.10.3 Prevention of combustion air backflow

Where air at pressure is pre-mixed with the fuel gas, effective means shall ensure air does not pass back into the gas line.

2.11 Burners and ignition systems

2.11.1 Aeration adjustment for Universal LP Gas appliances

For Universal LP Gas and NZLPG appliances, primary burner aeration shall be non-adjustable, except for appliances with gas/air ratio control.

2.11.2 Protection of ports and injectors

Any ports and injectors that may be exposed in their normal operation to falling particles, grease drippings, accidental spills or boilover shall be protected against blockage.

2.11.3 Restrictions on gauze over primary air ports

Except for appliances with gas/air ratio control, gauze shall not be fitted over primary air ports of burners other than pilots.

2.11.4 Location of burner mixing tubes

Burner mixing tubes shall be positively located in relation to gas injectors. Where a mixing tube rests on an injector, provision shall be made to prevent the mixing tube from interfering with the correct functioning of the valve or injector.

2.11.5 Burner supports

Burner supports shall be such that the burners cannot be easily displaced in normal usage.

2.11.6 Support of pilots, igniters and flame sensing devices

Pilots, igniters and flame sensing devices shall be supported in such a manner that their position relative to each other and the main burner(s) shall remain fixed.

2.11.7 Positive location of flash ignition tubes

Flash ignition tubes shall be positively located in relation to the source of ignition and flame ports to prevent misalignment or rendering of the lighting system inoperative by normal handling, dismantling or reassembling, or cleaning of the appliance.

2.11.8 Securing of removable burner components

Removable burner components, when in position, shall be secure and shall be designed so that they cannot be disturbed in normal usage.

2.11.9 Burners with granular media (Australia only)

Portable and mobile appliances shall not use tray type burners incorporating granular media.

2.11.10 Tray type burners — Turndown limits

Appliances using tray type burners incorporating granular or other porous media through which gas passes before ignition shall be fitted with a device that limits turndown gas consumption to prevent flame abnormality at the turndown condition.

2.11.11 Burners with remote manual ignition

The remote manual ignition of a burner, including pilots, shall be visible or visibly indicated to the user while operating the ignition devices and the appropriate gas controls.

2.11.12 Burners with direct manual ignition

The direct manual ignition of a burner, including pilots, shall be accessible and visible while operating the appropriate gas controls.

2.11.13 Interconnected burners

When two or more burners are enclosed in the same compartment, or compartments that are interconnected by flues or other passages, the gas system shall be designed so that —

- (a) each burner has a flame safeguard; or
- (b) there is safe and reliable cross lighting between the burners; or
- (c) unburnt gas cannot be discharged from one burner while the other is alight.

2.11.14 Manually operated burners enclosed in a compartment

Where manually operated burners are enclosed in a compartment in which an explosive accumulation of gas can occur, it shall be necessary to open the compartment to light the burner, unless an adequate purge is provided.

2.11.15 Means of ignition for room sealed appliances

In the case of room sealed appliances, the means of ignition shall be incorporated as part of the appliance.

2.12 Components

2.12.1 Safety components

All components relating to the safe operation of the appliance shall conform to the requirements of the relevant component Standard(s) as far as they reasonably apply.

NOTE This includes, but is not limited to, automatic ignition systems, flame safeguards, flue cowls, gas valves, regulators, pressure switches and transducers, whether or not these carry gas.

2.12.2 Suitability of bearings

Bearings for motors, blowers or fans shall be suitable for the temperatures to which they are subjected in normal operation.

NOTE Normal operation means operating at nominal gas consumption with the fan operating at all fan speeds (including the "OFF" position if the appliance will function in that condition).

2.12.3 Protection of bearings

Fan and motor bearings shall be protected from dust and lint. Where, for this purpose, filters are fitted to the inlet air stream, they shall not interfere with the combustion air of the appliance.

2.12.4 Gas pressure regulators

For an appliance designed for connection to consumer piping, the regulator shall conform to AS 4618.

For an appliance designed for connection to an LP Gas cylinder, the regulator shall conform to AS 4621.

2.13 Cylinders and cylinder compartments

2.13.1 Indoor appliances

An indoor appliance shall not have a cylinder compartment.

2.13.2 Ventilation of cylinder compartments for cylinders exceeding 1.25 kg gas capacity

Cylinder compartments shall have permanent openings ventilating directly to the outside of the appliance and consisting of either of the following:

- (a) Perforations, uniformly distributed over the height of the enclosure and with a total free area of not less than 25 % of the sidewall area.
- (b) Separate openings at high and low level, such that —
 - (i) the total free area at high level is not less than 20 000 mm² and is within 125 mm of the top of the cylinder compartment; and
 - (ii) the total free area at low level is not less than 20 000 mm², and —
 - (A) at least 25 % of the required area is within 15 mm of the base of the cylinder compartment;