MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
G11 Gas as an Energy Source

G 11
BUILDING CODE

Status of Verification Methods and Acceptable Solutions

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Users should make themselves familiar with the preface to the New Zealand Building Code Handbook, which describes the status of Verification Methods and Acceptable Solutions and explains alternative methods of achieving compliance.

Defined words (italicised in the text) and classified uses are explained in Clauses A1 and A2 of the Building Code and in the Definitions at the start of this document.

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New Zealand Government

Document Status

The most recent version of this document (Amendment 5), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 14 February 2014 and supersedes all previous versions of this document.

The previous version of this document (Amendment 4) will cease to have effect on 14 August 2014.

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G11: Document History			
	Date	**Alterations**	
First published	July 1992		
Amendment 1	September 1993	p. vi, References	
Reprinted incorporating Amendment 1	October 1994		
Amendment 2	28 February 1998	pp. i and ii, Document History p. vi, References p. 3, 1.2.2	p. 4, 5.0.1 p. 5, 9.0.1
Amendment 3	23 June 2007	p. 2, Document History, Status p. 5, Contents p. 7, References p. 9, Definitions	p. 13, 1.2.1, 1.3, 1.4 p. 14, 5.0.1 p. 15, 9.0, 9.0.1 p. 17, Index
Amendment 4	Published 30 June 2010 Effective from 30 September 2010 until 14 February 2014	p. 2, Document History, Status p. 5, Contents p. 7, References	
Reprinted incorporating Amendments 1–4	30 September 2010		
Amendment 5	14 February 2014	p. 2A, Document History, Status p. 7, References p. 9 Definitions	pp. 13, 14, 15, G11/AS1 1.2.2, 1.3.2, 5.0.1, 8.0.1, 9.0.1
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.			

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New Zealand Building Code Clause G11 Gas as an Energy Source

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992.

FIRST SCHEDULE—*continued*

Clause G11—GAS AS AN ENERGY SOURCE

Provisions	Limits on application
OBJECTIVE **G11.1** The objective of this provision is to: (a) Safeguard people from injury arising from the use of gas as an energy source, (b) Safeguard people and *other property* from the risk of *fire* or explosion, and (c) Safeguard people from loss of *amenity* due to the gas supply being inadequate for the *intended use*.	
FUNCTIONAL REQUIREMENT **G11.2** *In buildings* where gas is used as an energy source, the supply system shall be of an *adequate* for its *intended use*.	
PERFORMANCE **G11.3.1** Supply systems shall be constructed to maintain a safe pressure range appropriate to the appliances and the type of gas used. **G11.3.2** The gas supply to all appliances in a single ventilated space, shall be fitted with an automatic cut-off activated by failure of any continuous forced ventilation system used for combustion, ventilation or safe operation of a fixed gas appliance. **G11.3.3** A flued fixed gas appliance shall have no adverse interaction with any other flued appliance. **G11.3.4** Supply systems shall have isolation devices which permit the whole installation, or individual items of apparatus, to be isolated from the supply for maintenance, testing, fault detection or repair.	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
G11.3.5 Where gas is supplied from an external source, the supply system within *buildings* shall be constructed to avoid the likelihood of: (a) Contamination of the external supply from other gas sources within the *building*, (b) Adverse effects on the pressure of the external supply, and (c) The external supply pipe acting as an earthing conductor.	
G11.3.6 The location and installation of meters and service risers shall meet the requirements of the *network utility operator*.	

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References

For the purposes of New Zealand Building Code compliance, the acceptable New Zealand and other Standards, and other documents referred to in this Verification Method and Acceptable Solution (primary reference documents) shall be the editions, along with their specific amendments, listed below. Where the primary reference documents refer to other Standards or other documents (secondary reference documents), which in turn may also refer to other Standards or other documents, and so on (lower order reference documents), then the applicable version of these secondary and lower order reference documents shall be the version in effect at the date this Verification Method and Acceptable Solution were published.

Amend 5 Feb 2014

Amend 3 Jun 2007

Amend 5 Feb 2014

Standards New Zealand	**Where quoted**
AS/NZS 5601.1: 2010 Gas installations Part 1 General installations *Amend 1*	AS1 1.2.2, 1.3.2, 5.0.1, 9.0.1

Amends 4 and 5

Amend 3 Jun 2007

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Definitions

Amend 3 Jun 2007

This is an abbreviated list of definitions for words or terms particularly relevant to this Verification Method and Acceptable Solution. The definitions for any other italicised words may be found in the New Zealand Building Code Handbook.

Amend 5 Feb 2014

Adequate *Adequate* to achieve the objectives of the *building code*.

Amend 3 Jun 2007

Building has the meaning ascribed to it by Sections 8 and 9 of the Building Act 2004.

Contaminant has the meaning ascribed to it by the Resource Management Act 1991.

Amend 3 Jun 2007

Escape route A continuous unobstructed route from any *occupied space* in a *building* to a *final exit* to enable occupants to reach a *safe place*, and shall comprise one or more of the following *open paths*, *protected paths* and *safe paths*.

COMMENT:
Doors are not obstructions in an *escape route* provided they comply with C/AS1–C/AS7 and D1/AS1.

Amend 5 Feb 2014

Flame safeguard system A 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.

Flue The passage through which the products of combustion are conveyed to the outside air.

Intended use in relation to a *building*:

a) includes any or all of the following:

i) Any reasonably foreseeable occasional other use that is not incompatible with the *intended use*; and

ii) Normal maintenance; and

iii) Activities taken in response to *fire* or any other reasonably foreseeable emergency

b) but does not include any other maintenance and repairs or rebuilding.

Amend 3 Jun 2007

Lock-out The safety shut down condition of the control system such that re-start cannot be accomplished without manual resetting.

Over-pressure protection Devices preventing the pressure in piping or appliances from exceeding a predetermined value.

Regulator A device which automatically regulates the pressure or volume of the gas passing through it to a predetermined level.

Safe path That part of an *exitway* which is protected from the effects of *fire* by *fire separations*, *external walls*, or by distance when exposed to open air.

Amend 3 Jun 2007

Town gas A manufactured gas.

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Verification Method G11/VM1

No specific test methods have been adopted for verifying compliance with the Performance of NZBC G11.

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Acceptable Solution G11/AS1

Amends 3 and 5

This Acceptable Solution relates essentially to gas appliances. It should be read in conjunction with G10/AS1, which deals with piping reticulation.

1.0 Pipe Sizing

1.1 Pressure ranges

1.1.1 Pipes shall be sized to maintain the pressure at any appliance inlet, when all appliances are in use, at no less than:

– 0.75 kPa for *town gas*,

– 1.13 kPa for natural gas, or

– 2.75 kPa for LPG.

1.2 Pressures less than 1.5 kPa

1.2.1 Where the meter outlet pressure does not exceed 1.5 kPa, and when all appliances on the supply are operating, the pressure drop between the meter outlet (or *regulator* outlet if no meter is installed), and any appliance, shall be no more than 0.075 kPa for either *town gas* or natural gas.

Amend 5 Feb 2014

1.2.2 Acceptable methods for sizing pipes are given in AS/NZS 5601.1, section 5.2 and Appendix F.

1.3 Pressures greater than 1.5kPa

1.3.1 Where the meter outlet pressure exceeds 1.5 kPa, and when all appliances on the supply are operating, the maximum pressure drop between the meter outlet (or *regulator* outlet if no meter is installed), and any appliance, shall be no more than 10% of the operating pressure.

Amend 3 Jun 2007

1.3.2 Acceptable methods for sizing pipes are given in AS/NZS 5601.1, section 5.2 and Appendix F.

Amend 5 Feb 2014

1.4 Flow velocities

Amend 3 Jun 2007

1.4.1 Flow velocities shall be no more than:

a) 45 metres per second for supplies filtered to give a 5 micron maximum particle size.

b) 20 metres per second for unfiltered supplies.

COMMENT:
The lower flow velocity for unfiltered supplies is necessary to protect the *regulator* from abrasive wear by any impurities.

2.0 Pressure Regulation

2.1 Regulators

2.1.1 *Regulators* shall be fitted to the supply pipe when:

a) Any appliance in the *building* is not fitted with its own *regulator*, and the supply pressure can exceed:

– 2.5 kPa for *town gas* and natural gas, or

– 3.5 kPa for LPG.

b) Appliance *regulators* are fitted to all appliances but the supply pressure may exceed the maximum rated inlet pressure of any appliance *regulator*.

3.0 Over-pressure Protection

3.1 Safety devices

3.1.1 *Over-pressure protection* shall be fitted if an appliance ***regulator*** inlet pressure exceeds 7 kPa or where:

a) The *regulator* inlet pressure exceeds the pressure rating of downstream equipment, or

b) The *regulator* outlet pressure is less than 70% of the inlet pressure.

3.1.2 The *over-pressure protection* device shall limit the pressure downstream of the *regulator* to:

a) No greater than the rated working pressure of the downstream equipment, and

b) No greater than 35% above the normal operating pressure.

4.0 Pipework Installation

4.0.1 G10/AS1 Piped Services is an acceptable solution for the installation of pipework to supply gas as an energy source.

5.0 Flues

5.1 Flue materials

Amends 3 and 5

5.0.1 Materials for *flues* shall comply with AS/NZS 5601.1, section 6.7.

5.2 Safety devices

5.2.1 Where flueing is dependent on the operation of an extractor fan:

a) A safety device shall be fitted to prevent the flow of gas to the burner if insufficient draught is provided, and

b) Appliances connected to the *flue* shall be fitted with a *safety shut-off system*.

5.3 Fire dampers

5.3.1 Automatic fire dampers fitted to combustion air ducts shall be interlocked with the gas supply to the appliance, in a way that shuts off that supply when the damper is closed.

6.0 Automatic Extinguishers

6.0.1 Appliances installed beneath automatic fire extinguishers that could, when operating, extinguish the appliance flame, shall be provided with:

a) A 100% shut-off *flame safeguard system,* or

b) Systems which shut-off and *lock-out* the gas supply system when the automatic extinguisher operates.

7.0 Protection of Supply

7.1 Gas contamination

7.1.1 One of the following types of protective device shall be fitted to prevent air, oxygen or other gases from entering the gas supply systems:

a) Non-return valves.

b) Three-way valves that completely close one side before opening the other.

c) Reverse flow detectors that control positive shut-off valves.

d) Normally closed air-activated positive shut-off pressure *regulators* (e.g. zero *regulator*).

e) A *flame safeguard system*.

7.1.2 Protective devices shall be installed as close as possible to the point at which *contaminants* could be introduced.

7.1.3 Gas and air combustion mixers incorporating double diaphragm zero *regulators* require no further protection against gas contamination unless directly connected to air, oxygen or other strong oxidising gases which operate at pressures above 7 kPa.

7.2 Low pressure

7.2.1 Protection against dangerously low pressures generated at the meter by the operation of equipment, such as gas compressors or gas engines shall be achieved by the installation of a suitable *lock-out* protective device between the meter and the equipment.

7.2.2 Mechanically or electrically operated diaphragm low pressure shut-off valves with a manual reset are acceptable.

8.0 Gas Meter Location

8.0.1 Gas meters shall not be located in:

a) A liftwell or lift machine room,

b) A space containing electrical switch gear,

c) Vertical *safe path* or riser ducts, or

d) A position that obstructs *escape routes* in the event of an emergency. (See C/AS1–C/AS7 for other *escape routes* requirements.)

Amend 5 Feb 2014

9.0 Another Acceptable Solution

Amend 3 Jun 2007

9.0.1 AS/NZS 5601.1, Sections 1, 3, 4, 5, 6 and Appendices A–M is another Acceptable Solution to Paragraphs 1.0 to 8.0.

Amend 5 Feb 2014

Amend 2 Feb 1998

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Index G11/VM1 & AS1

All references to Verification Methods and Acceptable Solutions are preceded by **VM** or **AS** respectively.

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