

Dear Customer

Please find enclosed Amendment 4, effective 1 January 2017, to the Acceptable Solution and Verification Method for Clause G4 Ventilation of the New Zealand Building Code. The previous amendment to G4 (Amendment 3) was in February 2014.

Section	Old G4	January 2017 Amendment 4
Title pages	Remove title page and document history page 1-2B	Replace with new title page and document history pages 1-2B
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MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
G4 Ventilation



Status of Verification Methods and Acceptable Solutions

Verification Methods and Acceptable Solutions are prepared by the Ministry of Business, Innovation and Employment in accordance with section 22 of the Building Act 2004. Verification Methods and Acceptable Solutions are for use in establishing compliance with the New Zealand Building Code.

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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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**Verification Methods and Acceptable Solutions
are available from www.building.govt.nz**

New Zealand Government

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Document Status

The most recent version of this document (Amendment 4), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 1 January 2017 and supersedes all previous versions of this document.

The previous version of this document (Amendment 3) will cease to have effect on 30 May 2017.

People using this document should check for amendments on a regular basis. The Ministry of Business, Innovation and Employment may amend any part of any Verification Method or Acceptable Solution at any time. Up-to-date versions of Verification Methods and Acceptable Solutions are available from www.building.govt.nz

G4: Document History		
	Date	Alterations
First published	July 1992	
Amendment 1	September 1993	p. 3, 1.1.2
Reprinted incorporating Amendment 1	July 1994	
Second edition	28 February 1998	Document revised – second edition issued
Amendment 1	23 June 2007	p. 2, Document History, Status p.5, Contents p.7, References p.9, Definitions pp. 13–16 G4/AS1
Third edition	1 November 2008	Document revised – third edition issued
Amendment 2	Effective from 10 October 2011 until 14 August 2014	p. 2, Document History, Status p.7, References
Amendment 3	14 February 2014 until 30 May 2017	p. 7 References p. 9 Definitions pp. 13, 19–20 G4/AS1 1.1.3 2.3.1, 2.4.1, 3.0.1 pp. 21–23 Figures 2, 3 and 4
Amendment 4	Effective 1 January 2017	p. 7 References p. 11 G4/VM1 2.0.1 p. 20 G4/AS1 2.4.1, 3.0.1
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.		

References

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

Amend 2
Oct 2011

Amend 3
Feb 2014

Amend 3
Feb 2014

Standards New Zealand

Amend 3
Feb 2014

AS/NZS 3666:– Air-handling and water systems of buildings –
Microbial control
Part 1: 2011 Design, installation and commissioning
Part 2: 2011 Operation and maintenance
NZS 4303: 1990 Ventilation for acceptable indoor air quality
AS/NZS 4740: 2000 Natural ventilators – Classification and performance

Amends
2 and 3

Amend 4
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AS/NZS 5601:– Gas installations
Part 1: 2013 General installations
Amend: 1, 2

Where quoted

AS1 1.5.1 b)
AS1 1.5.1 b)
AS1 1.5.1 a) d)
AS1 1.3.7 c)
AS1 2.3.1 b), 2.4.1 c),
3.0.1

Standards Australia

Amend 2
Oct 2011

AS 1668:– The use of mechanical ventilation and air-conditioning
in buildings
Part 2: 2002 Ventilation design for indoor-air contaminant control
Amends: 1, 2

AS1 1.2.4, 1.3.7 d)
1.5.1 a) c) i) ii) d)
e), f), g),

New Zealand Government Departments

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Department of Labour (Occupational Safety and Health)
Workplace Exposure Standards and Biological Exposure Indices
7th Edition

VM1 2.0.1

Chartered Institution of Building Services Engineers, London

CIBSE Code Series A: 1996 Air distribution systems

VM1 1.0.1,
AS1 1.5.1 h)

Verification Method G4/VM1

1.0 Ventilation Rate

1.0.1 In ducted mechanical ventilation systems the air-flow rate (and consequently number of air changes), may be verified using the methods of measurement given in the CIBSE Code Series A, Appendix A3.1. For determining the volume of *outdoor air*, measurements shall be taken close to the *outdoor air* inlet.

2.0 Air Purity

2.0.1 The acceptability of indoor air purity for workplaces may be verified by demonstrating that contaminant levels do not exceed the limits recommended in "Workplace Exposure Standards and Biological Exposure Indices 7th Edition".

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2.0 Ventilation of Spaces Containing Gas-fuel Appliances

2.1 Natural ventilation

2.1.1 Natural ventilation systems for appliances burning gas fuel designed to operate under *natural draught* conditions shall:

- a) Supply air under equal pressure conditions to the burners and to the *draught diverter* i.e. in the same room and as close as possible to the appliance, and
- b) For non *room-sealed appliances* having a combined gas input exceeding 1 kW for each m³ of the space in which they are installed, be provided with vents, in addition to the ventilation required by Paragraphs 1.1 and 1.2. The vents shall be sized and located according to Paragraphs 2.1.3 to 2.1.8.

2.1.2 Domestic gas cookers in non room-sealed spaces which are also used for sleeping, require permanent venting to the outside. The size of the vent shall be appropriate to the gas input to the cooker and shall be subject to specific design.

2.1.3 Vent sizes

Two permanent vent openings, one high level and one low level, shall be provided, each with a free ventilation area per kW of gas input (of all appliances in the space) of no less than:

- a) 1200 mm² for spaces vented directly to the outside, and
- b) 2300 mm² for spaces vented via adjacent spaces.

2.1.4 The vent opening areas given in Paragraph 2.1.3 may be halved for plant rooms and boiler rooms infrequently occupied by people.

2.1.5 Vent openings shall have vertical dimensions of no less than 50 mm, and no dimension of less than 6.0 mm in any other direction.

2.1.6 Low-level vents shall have their lower edge no more than 100 mm above floor level, and upper-level vents shall have their lower edge no less than 75 mm above the top of the draught diverter relief opening.

2.1.7 A louvred door is also an acceptable method of ventilation provided the bottom of the free area extends to not less than 100 mm above the floor, and the requisite high-level free area is available from the level of 75 mm above the *draught diverter* relief opening.

2.1.8 In plant room or boiler room installations, low- and high-level vents may be combined into a single opening, provided it reaches from floor to ceiling and has a total free area equivalent to that required for the two separate vents.

2.2 Mechanical ventilation

2.2.1 When mechanical ventilation is used, the system shall have either:

- a) Mechanical supply with mechanical extraction, or
- b) Mechanical supply with natural exhaust.

2.2.2 A mechanical ventilation system shall:

- a) For each kW of gas consumption (of all appliances in the plant room) provide *outdoor air* at the rate of:
 - i) 3.6 m³/h for *forced or induced draught appliances*, and
 - ii) 7.2 m³/h for appliances with *atmospheric burners*, and
- b) Remove exhaust air from the room either:
 - i) mechanically at one third the inlet rate, or
 - ii) naturally via high-level openings having a free ventilation area of no less than 600 mm² per kW of total gas consumption for all appliances in the room.

2.3 Flue construction

2.3.1 A *flue* system shall have:

- a) The cross-sectional area of a *natural draught flue* system external to the appliances, no less than the cross-sectional area of the appliance outlet, or
- b) The *flue* designed to comply with AS/NZS 5601.1, section 6.7 and Appendix H, and
- c) If a *draught diverter* is not fitted:

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- i) *flue* products discharged to the atmosphere only at the *flue* terminal, unless the discharge at other locations can be achieved without hazard to *persons*, property or appliance operation, and
- ii) a method of automatically shutting down the main burners of *forced or induced draught appliances*, should the normal free discharge of the *flue* be interrupted.

2.3.2 Draught diverters

Draught diverter installations shall discharge the total *flue* products including excess air and *draught diverter* dilution air, at the *flue* terminal without spillage from the skirt of the *draught diverter*.

2.4 Flue locations on dwellings

2.4.1 The location of a *flue* terminal on a dwelling shall have:

- a) Outlets from *natural draught flues* or *chimneys*, positioned relative to surrounding *construction* to avoid wind causing down draughts in the *flue*,
- b) *Flue* pipes which extend through the roof, terminated no closer than:
 - i) 500 mm to the nearest part of any roof,
 - ii) 2.0 m to the roof level of a flat roof intended for personal or public use, and
 - iii) 500 mm above any parapet, and
- c) *Flues* which terminate on the wall of a *building* located clear of inlets for outside air in accordance with the minimum clearances specified in AS/NZS 5601.1, section 6.9 and Figure 6.2.

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3.0 Another Solution for Gas-fuel Appliances

3.0.1 AS/NZS 5601.1 Sections 1, 3, 4, 5 and 6 and Appendices A – M and O - R is an Acceptable Solution, but may exceed the performance criteria of NZBC G4.

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