

Dear Customer

Please find enclosed Amendment 14, effective 4 November 2016 (except for Paragraph 14.1, which is effective 1 January 2017), to the Acceptable Solutions and Verification Methods for Clause B1 Structure of the New Zealand Building Code. The previous amendment to B1 was Amendment 13, June 2016.

Section	Old B1	B1 Amendment 14
Title pages	Remove document history and status page 3/4	Replace with new document history and status pages 3/4
Contents	Remove page 9/10	Replace with new page 9/10
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B1/VM1	Remove pages 21–22B	Replace with new pages 21–22F
B1/AS1	Remove pages 23–23C	Replace with new pages 23–23C
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Document Status

The most recent version of this document (Amendment 14), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment.

The previous version of this document (Amendment 13) 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

B1: Document History			
	Date	Alterations	
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Amendment 1	September 1993	p. ix–xii, References p. 1, 1.3, 1.4.1–1.4.3, 2.1, 2.2, 3.1–3.3, 4.1, 5.1 p. 2, 6.1, 6.2, 8.1, 9.1 p. 4, 11.1, 12.1 p. 5, 1.2, 2.1, 2.2, 3.1, 3.2,s 4.1, 4.2, 6.1, 6.2, 7.1	p. 9, 1.0.1, 1.0.5 b) c) p. 10, 2.3.5 p. 13, Figure 4 p. 14, 2.3.6 p. 16, 2.3.8, 2.3.9 p. 34, Table 1 p. 47, 1.0.1 pp. 49–54, Index
Amendment 2	19 August 1994	pp. i and ii, Document History pp. vii and viii, Contents pp. x and xi, References p. xiv, Definitions p. 1, 1.4.2, 5.1 p. 2, 6.1 p. 5, 1.3, 3.1, 4.1 p. 6, 7.1 p. 10, 2.3.5 p. 12, Figure 3 p. 13, Figure 4 p. 14, 2.3.6, 2.3.7	p. 15, Tables 4 and 5 p.16, 2.4.1 p. 21, Figure 2 p. 22, Figure 3 p. 32, 2.2.4 p. 33, 1.0.2 p. 34, 3.2.1, Table 1 p. 35, 4.1, 4.1.2, 4.1.3, 4.2.1, 4.2.2, 4.3, 4.3.1, 5.0.1, Table 2 p. 36, 6.1.2, 7.1, 7.1.1 p. 37, 7.3.4 pp. 49, 50, 51, 54, Index
Reprinted incorporating Amendments 1 and 2	October 1994		
Amendment 3	1 December 1995	p. ii, Document History p. ix, References p. 1, 3.1	p. 5, 6.2 p. 50, Index
Reprinted incorporating Amendments 1, 2 and 3	July 1996		
Amendment 4	1 December 2000	p. ii, Document History pp. vii and viii, Contents pp. ix – xii, Revised References pp. xiii and xiv, Definitions	pp. 1–4A, Revised B1/VM1 pp. 5 and 6, Revised B1/AS1 pp. 33–63, Revised B1/VM4 p. 65, Revised B1/AS4 pp. 67–72, Revised Index
Erratum	9 February 2001	p. 46, 4.3.2 a) i)	
Amendment 5 incorporating Erratum	1 July 2001	p. 2, Document Status p. 3, Document History p. 7, References	p. 41, 1.7.2 Comment p. 49, 2.2.4 p. 48, 1.9.1 b) i)
Amendment 6	1 March 2005	p. 11, References	
Amendment 7	1 April 2007	pp. 11–12, 14, References pp. 15–16, Definitions	p. 18, 6.1

B1: Document History

Amendment 8	1 December 2008	p. 2, Document Status p. 3, Document History p. 9, Contents pp. 11–14, References pp. 15–16, Definitions	pp. 17–22B, B1/VM1 p. 51, B1/VM4 1.0.5, 2.0.1 p. 56, B1/VM4 Figure 2 p. 70, B1/VM4 B1.0.2 pp. 83–84, 86 Index
Amendment 9	30 September 2010	pp. 2–3, Document History, Status, pp. 11–14, References p. 20, B1/VM1 2.2.13 p. 21, B1/VM1 3.0, 5.1 pp. 22–22B, B1/VM1 11.0 pp. 23–24, B1/AS1 6.0, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 7.4	p. 27, B1/AS2 1.0.5 p. 44, B1/AS3 1.7.9 p. 47, B1/AS3 1.8.5, 1.8.6 p. 49, B1/AS3 2.1.1, 2.2.4 p. 63, B1/VM4 4.3.2 p. 67, B1/VM4 5.3.1
Reprinted incorporating Amendments 4–9	30 September 2010		
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Amendment 10 (Canterbury)	Effective from 19 May 2011 until 31 January 2012	p. 9, Contents p. 12–14, References p. 15, Definitions p. 17, B1/VM1	p. 20, B1/VM1 2.2.14A to 2.2.14D pp. 23–23C B1/AS1 1.4, 2.0, 3.0, 4.0 p. 48, B1/AS3 1.9.3 p. 84, Index
Amendment 11	Effective from 1 August 2011 until 14 August 2014	p. 9, Contents p. 11–14, References p. 17–22B, B1/VM1 1.0, 2.0, 2.2.9, 2.2.14c, 5.2, 6.1, 7.1, 8.1, 12.1, 13.0	pp. 23–24, B1/AS1 1.2, 2.0, 3.0, 4.0, 7.0, 8.0, 9.0 pp. 27–34, B1/AS2 pp. 83–87, Index
Amendment 12	Effective from 14 February 2014 until 31 May 2016	p. 9, Contents pp. 11–13, References pp. 15, 16, Definitions pp. 17, 18, 20, 22, 22A, 22B, B1/VM1 2.1, 2.2.6, 2.2.11, 5.2, 9.0, 12.1	pp. 23–23C, 24 B1/AS1 1.1, 1.2, 2.1.1–2.1.10, 3.1.9, 4.1.5, 8.0, 9.0 p. 79, B1/VM4 C11.0
Amendment 13	Effective from 1 June 2016 until 30 May 2017	p. 13, References	p. 24, B1/AS1 7.3.3, 7.3.4
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Amend 4
Dec 2000

Amend 4
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		Where quoted
	AS/NZS 3725: 2007 Design for installation of buried concrete pipes	VM1 11.1
Amend 8 Dec 2008		
	AS/NZS 3869: 1999 Domestic solid fuel burning appliances – Design and construction	AS3 2.1
Amend 9 Sep 2010		
	AS/NZS 4058: 2007 Pre cast concrete pipes (pressure and non-pressure)	VM1 11.1
Amends 10 and 11	NZS 4210: 2001 Code of practice for masonry construction: materials and workmanship	AS3 1.8.1, 1.8.3 (f and g)
Amend 9 Sep 2010	<i>Amend: 1</i>	
Amend 11 Aug 2011	NZS 4211: 2008 Specification for performance of windows	VM1 12.1
Amend 8 Dec 2008		
Amend 11 Aug 2011	NZS 4219 : 2009 Seismic Performance of Engineering Systems in Buildings	VM1 1.3.1
Amend 9 Sep 2010	NZS 4223:- Part 1: 2008 Glazing in buildings Glass selection and glazing Part 2: 1985 The selection and installation of manufactured sealed insulating glass units	AS1 7.1, 7.2.1, 7.3.7 AS1 7.2
Amend 13 Jun 2016	Part 3: 2016 Human impact safety requirements	AS1 7.3.3
Amend 9 Sep 2010	Part 3: 1999 Human impact safety requirements Part 4: 2008 Wind, dead, snow, and live actions	AS1 7.3 AS1 7.4
Amends 10 and 11	NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design	AS1 1.4, 2.1 AS3 1.1.1, 1.8.4, 1.9.2, 1.9.5, 2.2.1 b)
Amend 12 Feb 2014		
Amend 8 Dec 2008	NZS 4230: 2004 Design of reinforced concrete masonry structures <i>Amend: 1</i>	VM1 4.0
Amend 11 Aug 2011	NZS 4251:- Part 1: 2007 Solid plastering Cement plasters for walls, ceilings and soffits	AS1 5.1
Amends 10 and 11	NZS 4297: 1998 Engineering design of earth buildings	VM1 8.1
	NZS 4299: 1998 Earth buildings not requiring specific design <i>Amend: 1</i>	AS1 1.4, 4.1
	NZS 4402:- Part 2: Test 2.2: 1986 Soil classification tests Determination of liquid limit Test 2.6: 1986 Determination of the linear shrinkage	VM1 11.1 Definitions Definitions

		Where quoted
	Part 4: Soil compaction tests	
	Test 4.2.3: 1988 Relative densities	VM4 4.1.1
	NZS 4431: 1989 Code of practice for earth fill for residential development <i>Amend: 1</i>	VM1 10.1
	AS/NZS 4600: 2005 Cold-formed steel structures	VM1 5.2
Amends 10 and 11	AS/NZS 4671: 2001 Steel Reinforcing Materials <i>Amend: 1</i>	AS1 2.1.5, 3.1.8 AS3 1.8.5, VM1 14.0
	AS/NZS 4680: 2006 Hot-Dip Galvanised (zinc) Coating	AS3 1.8.6
Amend 9 Sep 2010		
Amend 8 Dec 2008	SNZ HB 8630: 2004 Tracks and outdoor visitor structures	VM1 2.2.9
	The National Association of Steel Framed Housing Inc (NASH)	
Amend 11 Aug 2011	NASH Standard: Residential and Low Rise Steel Framing Part 1 2010 Design Criteria	VM1 5.3
	British Standards Institution	
	BS 8004: 1986 Code of practice for foundations	VM4 4.0.3
	Standards Australia	
Amend 14 Nov 2016	AS 1391: 2007 Metallic materials – Tensile testing at ambient temperature	VM1 14.1.1
Amend 9 Sep 2010	AS 1397: 2001 Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated	AS3 1.7.9
Amend 11 Aug 2011	AS 2159: 1995 Rules for the design and installation of piling (known as the SAA Piling Code) <i>Amend: 1</i>	VM4 4.0.3
	American Society of Testing and Materials	
	ASTM D1143: 1981 Test method for piles under static axial compressive load	VM4 4.0.3
	New Zealand Geomechanics Society	
	Guidelines for the field descriptions of soils and rocks in engineering use. Nov 1988	VM1 11.1
	New Zealand Legislation	
Amend 8 Dec 2008	Chartered Professional Engineers of New Zealand Act 2002	VM1 1.0
Amend 14 Nov 2016	International Organization for Standardization	
	ISO 15630-2 2010: Steel for the reinforcement and and prestressing of concrete – Test Methods – Part 2 Welded Fabric	VM1 14.1.1
	ISO 17025: 2005 General requirements for the competence of testing and calibration laboratories	VM1 14.1.1

2.2.15 NZS 1170 Part 5, Clause 4.2 Seismic weight and seismic mass After: "0.3 is the earthquake imposed action (live load) combination factor for all other applications" add the following:

"except roofs.

$\psi_E = 0.0$ is the earthquake imposed action (live load) combination factor for roofs."

2.2.16 NZS 1170 Part 5, Sections 5 and 6 Time history analysis Time history analysis is not part of this *Verification Method*.

COMMENT:

Time history analysis is a highly specialised method of assessing structural response to earthquakes. It requires many detailed and interdependent assumptions to be made in relation to the nature of earthquake shaking and its propagation from the source, the properties of the *building* site and the detailed characteristics of the *building* and its structural elements.

AS/NZS 1170 outlines the steps for time history analysis in some detail, but the applicability of each step needs to be evaluated on a *building-by-building* basis. More importantly, the output of the analysis needs to be examined carefully in each particular context.

Time history analysis can be an acceptable aid to verifying compliance with structural requirements provided that:

- It is carried out by specialists with in-depth experience in applying the technique.
- The output of the analysis and the viability of the resulting structural design are reviewed by an independent team experienced in both analysis and design.

2.2.17 NZS 1170 Part 5, Clause 5.2.2.3, equation 5.2(4) Delete equation 5.2(4) and replace with:

$$C_d(T) = \frac{C(T) S_p}{k_\mu} \quad \dots \text{5.2(4)}$$

2.2.18 NZS 1170 Part 5, Clause 6.1.4.1 Requirement for modelling Delete the last sentence of the first paragraph and replace with:

"The model shall include representation of the diaphragm's flexibility."

Delete the third (last) paragraph.

3.0 Concrete

3.1 NZS 3101: Part 1 subject to the following modifications:

a) Replace clause 4.8 **External walls that could collapse outward in fire** with:

4.8 External walls that could collapse inwards or outwards in fire

4.8.1 Application

This clause applies to external walls which could collapse inwards or outwards from a building as a result of internal fire exposure. All such walls shall:

- Be attached to the building structure by steel connections;
- Be restrained by these connections, when subject to fire, from inwards or outward movement of the wall relative to the building structure; and
- Comply with the appropriate provisions of this Standard for walls.

4.8.2 Forces on connections

The connections between each wall and the supporting structure shall be designed to resist all anticipated forces. In the absence of a detailed analysis, the connections shall be designed to resist the largest of:

- The force resulting from applying Clause 2.2.4 of Verification Method B1/VM1;
 - for walls fixed to a flexible structure of unprotected steel, the force required to develop the nominal flexural strength of the wall at its base;
 - for walls fixed to a rigid structure such as reinforced concrete columns or protected steel columns or another wall at right angles, the force required to develop the nominal flexural strength of the wall at mid-height.
- b) Amend Clause **9.3.9.4.13 Minimum area of shear reinforcement**

In Clause 9.3.9.4.13 c) delete the words after "750 mm" and substitute "and the depth of the precast unit is equal to or less than 300 mm."

c) Amend Clause **18.7.4 Floor or roof members supported by bearing on a seating**

Add to the end of Clause 18.7.4 (g)(ii) add an additional sentence:

“The details given by C18.6.7(e) may be applied to hollow-core units where the depth of the precast unit is equal to or less than 300 mm.”

Erratum 1
Sep 2010

Amend 9
Sep 2010

d) Amend NZS 3101 Clause **5.3.2.6 Ductile welded wire fabric**

Delete the clause and replace with:

“Welded steel mesh shall be Ductility Class E in accordance with Paragraph 14 of this Verification Method unless the conditions of Clause 5.3.2.7 for the use of lower ductility welded wire fabric are satisfied.”

Amend 14
Nov 2016

Amend 9
Sep 2010

3.2 NZS 3106

4.0 Concrete Masonry

Amend 8
Dec 2008

4.1 NZS 4230

5.0 Steel

Amend 9
Sep 2010

5.1 NZS 3404: Part 1

Amend 8
Dec 2008

5.2 AS/NZS 4600 subject to the following modifications:

- a) Actions must be determined in accordance with AS/NZS 1170. All references to NZS 4203 are replaced by equivalent references to AS/NZS 1170.
- b) The term “normative” identifies a mandatory requirement for compliance with this Standard.
- c) The term “informative” identifies information provided for guidance or background which may be of interest to the Standard’s users. Informative provisions do not form part of the mandatory requirements of the Standard.
- d) Where this Standard has provisions that are in non-specific or unquantified terms then these do not form part of the *Verification Method* and the proposed details must be submitted to the *territorial*

authority for approval as part of the *building consent* application. This includes, but is not limited to, special studies and manufacturer’s advice.

- e) All stages of *construction* of a structure or part of a structure to which this Standard is applied shall be adequately reviewed by a person who, on the basis of experience or qualifications, is competent to undertake the review.
- f) The extent of the review to be undertaken shall be nominated by the design engineer, taking into account those materials and workmanship factors which are likely to influence the ability of the finished construction to perform in the predicted manner.
- g) At the end of the first paragraph of Appendix A add the words “Unless noted otherwise a document referred to below shall be the version of that document current at the date of issue of this Standard or if amendments are cited to this Standard in the “References” pages of this document at the latest date of those amendments.”
- h) Appendix B shall be read as normative with “shoulds” changed to “shalls”.

Amend 12
Feb 2014

5.3 NASH Standard – Residential and Low-rise Steel Framing Part 1: Design Criteria.

Amend 11
Aug 2011

6.0 Timber

6.1 NZS 3603 subject to the following modifications:

- a) Actions must be determined in accordance with AS/NZS 1170. All references to NZS 4203 are replaced by equivalent references to AS/NZS 1170.
- b) Delete Clause 2.2.1.2 and replace with:
 - “Machine stress-grading shall be in accordance with AS/NZS 1748 as modified by NZS 3622. Machine stress-graded timber shall have its properties verified, and be identified, in accordance with the requirements of NZS 3622.”

Amend 11
Aug 2011

Amend 11
Aug 2011

Amend 7
Apr 2007

Amend 8
Dec 2008

7.0 Aluminium

7.1 AS/NZS 1664.1 subject to the following modifications:

- Amend 11
Aug 2011
- Amend 8
Dec 2008
- a) Actions must be determined in accordance with AS/NZS 1170. All references to NZS 4203 are replaced by equivalent references to AS/NZS 1170.
- b) The terms “capacity factor” and “strength limit state” are to be read as “*strength reduction factor*” and “ultimate limit state” respectively.
- c) Where this Standard has provisions that are in non-specific or unquantified terms then these do not form part of the *Verification Method* and the proposed details must be submitted to the *territorial authority* for approval as part of the *building consent* application. This includes, but is not limited to, special studies and manufacturer’s advice.
- d) All stages of *construction* of a structure or part of a structure to which this Standard is applied shall be adequately reviewed by a person who, on the basis of experience or qualifications, is competent to undertake the review.
- Amend 8
Dec 2008
- e) The extent of the review to be undertaken shall be nominated by the design engineer, taking into account those materials and workmanship factors which are likely to influence the ability of the finished *construction* to perform in the predicted manner.
- Amend 8
Dec 2008
- f) Clause 1.2 to read “**MATERIALS** This Standard applies to aluminium alloys listed in Table 3.3(A) that comply with AS 1734, AS 1865, AS 1866, AS 1867 and AS 2748.1.”
- Amend 8
Dec 2008
- g) At the end of the first paragraph of Clause 1.4 add the words “Unless noted otherwise a document referred to below shall be the version of that document current at the date of issue of this Standard or if amendments are cited to this Standard in the “References” pages of the Acceptable Solutions and Verification Methods at the latest date of those amendments.”
- Amend 12
Feb 2014

8.0 Earth Buildings

8.1 NZS 4297 subject to the following modifications:

Actions must be determined in accordance with AS/NZS 1170. All references to NZS 4203 are replaced by equivalent references to AS/NZS 1170.

Amend 11
Aug 2011

9.0 Foundations

See B1/VM4.

Amend 12
Feb 2014

10.0 Siteworks

10.1 NZS 4431

11.0 Drains

11.1 AS/NZS 3725 subject to the following modifications:

Clause 3 Add to the list of reference documents:

“NZS 3101 The design of concrete structures.

NZS 4402 Methods of testing soils for civil engineering purposes: Tests 2.4, 2.8, 4.1.1, 4.2.1, 4.2.2, 4.2.3 and 5.1.1.

New Zealand Geomechanics Society, Guidelines for the field description of soils and rocks in engineering use.”

Clause 4 In the paragraph headed “(c) Select fill”, after the words “given in Table 1” add “or the New Zealand Geomechanics Society Guidelines”.

Clause 5 In definition of Pt, replace “AS 4058” with “AS/NZS 4058”

Clause 6.4 Replace the word “may” with “shall”. Delete the words “Superimposed concentrated dead loads should be avoided.”

Clause 6.5.3.1 Delete the words “The appropriate road vehicle loading shall be specified by the relevant highway authority or owner”.

Clause 6.5.3.2.2.2 Replace the word “may” with “shall”.

Amend 9
Sep 2010

Clause 6.5.4.3 Delete the words “unless otherwise specified by the Relevant Authority”.

Clause 6.5.5 Delete the first words “For” and after the words “for aircraft types” add the words “is outside the scope of this Standard but...”

Clause 7 Replace the word “should” with “shall”.

Clause 10.3 After the words “the test load” add “or proof load”.

Appendix A Delete “Normative” and replace with “Informative”

Appendix B Delete “Normative” and replace with “Informative”

12.0 Windows

12.1 NZS 4211 subject to the following modification:

References to air leakage, water leakage and operational effectiveness of opening sashes in NZS 4211, are non-structural considerations and do not apply to this document.

Amend 11
Aug 2011

Amend 12
Feb 2014

13.0 Seismic Performance of Engineering Systems in Buildings

13.1 NZS 4219 subject to the following modifications in the *Canterbury earthquake region*:

Where the building structure period is less than 1.5 seconds, the zone factor Z shall be determined from the Standard but shall not be less than 0.3.

COMMENT:

All building structure periods in excess of 1.5 seconds should be subject to specific investigation, pending further research.

The component risk factor R_C shall be determined from the Standard but shall not be less than 0.33.

Amend 11
Aug 2011

Amend 9
Sep 2010

Amend 8
Jun 2008

14.0 Ductile Steel Mesh

14.1 Grade 500E welded steel mesh

Where Grade 500E welded steel mesh is specified, it shall meet the requirements of AS/NZS 4671 subject to the following modifications.

14.1.1 Laboratory accreditation

COMMENT:

Amendment 14 to Verification Method B1/VM1 is effective from 4 November 2016, except for this Paragraph 14.1.1 which is effective from 1 January 2017.

Laboratories that provide testing and certification of Grade 500E welded steel mesh for use in New Zealand must be accredited for testing to ISO 17025: General requirements for the competence of testing and calibration laboratories, with a scope of accreditation that includes:

- ISO 15630-2: 2010 Steel for the reinforcement and prestressing of concrete – Test methods – Part 2 Welded fabric.
- AS 1391: 2007: Metallic materials – Tensile testing at ambient temperature
- AS/NZS 4671: 2001 Steel Reinforcing Materials as modified by this Verification Method.

Accreditation must be by a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA).

COMMENT:

International Accreditation New Zealand (IANZ) in NZ and the National Association of Testing Authorities (NATA) in Australia are signatories to the ILAC MRA. Details of signatory accreditation bodies in other economies are available on request from IANZ or directly from the ILAC website at <http://ilac.org/signatory-search/?q=all>

Test certificates must be endorsed i.e. must carry the symbol of their accreditation body and/or a statement that they are accredited, by a named accreditation body, for the reported tests.

14.1.2 Interpretation and Clarification of AS/NZS 4671

Where conflicting or contradictory information is found between AS/NZS 4671:2001 and Standards it references, AS/NZS 4671:2001 takes precedence.

14.1.3 AS/NZS 4671 Clause 3.1 Ageing

Delete Clause 3.1 and replace with:

“The test samples must be brought up to a surface temperature of $100 \pm 10^\circ\text{C}$ (i.e. the surface of the steel is recorded at $100 \pm 10^\circ\text{C}$) then held at $100 \pm 10^\circ\text{C}$ for 60 minutes (+15, -0 minutes). The method used to generate the temperature increase can be a suitable calibrated oven (calibrated for both temperature and temperature spatial distribution) or boiling water.

“Once heating is completed as detailed above, the samples are to be cooled in still air to ambient room temperature.”

14.1.4 AS/NZS 4671 Clause 9.3 Labelling of reinforcing steel

Add a line:

“9.3 (a)(vii) that Grade 500E steel mesh complies with Paragraph 14 of B1/VM1.”

Add a line:

“9.3 (b)(vi) that Grade 500E steel mesh complies with Paragraph 14 of B1/VM1.”

14.1.5 AS/NZS 4671 Appendix A

Delete Appendix A.

14.1.6 AS/NZS 4671 Clause B1.1

Insert “through steel processing” after “steel melting”.

14.1.7 AS/NZS 4671 Clause B1.3.1

Delete paragraph (b) and replace with:

“Unless specified differently in Clauses other than Clause B1.3.1 in AS/NZS 4671, a batch shall be:

For mesh products:

- (i) A quantity of mesh not exceeding 1000 sheets produced from steel of the same surface geometry and nominal diameter, of the same nominal strength grade and of the same ductility class and the mesh is manufactured in the same run under the same conditions using the same equipment; or
- (ii) Where sheets of mesh have steel wires that differ in any of surface geometry, diameter, nominal strength grade, or

ductility class, a quantity of mesh not exceeding 1000 sheets considering each type of steel separately (e.g. if different types of steel wires are used in each direction then the wires in each direction will be considered a separate batch)."

COMMENT:

In (i) above, the term 'same run' allows for breaks in production (e.g. overnight or weekends etc. provided the other criteria remain constant).

14.1.8 AS/NZS 4671 Clause B1.3.5

Delete and replace with:

"The minimum length of specimen test piece will be determined by the requirement to obtain a test piece including at least one welded intersection and a gauge length for the measurement of elongation remote at least 20 mm from the welded intersections.

Furthermore, additional length of the test piece will be required to keep both the welded intersection and gauge length of the elongation measurement remote at least 20 mm from the jaws of the testing machine.

"There is no maximum limitation imposed on the length of the test piece. The test piece must not be subject to any post-production treatment that will unduly affect the test result."

14.1.9 AS/NZS 4671 Clause B1 Scope and general

Add a Clause:

"B1.4 For grade 500E steel mesh, all test certificates produced in compliance with AS/NZS 4671 shall note that they are compliant with B1/VM1 Paragraph 14."

14.1.10 AS/NZS 4671 Clause B3 (c)

Delete Amendment No 1 June 2003 to Clause B3 (c)(i).

Delete Clause B3 (c) i and ii and replace with:

"(i) Mechanical properties, one test per batch on each of three separate longitudinal bars and three separate transverse bars (i.e. 6 tensile tests). If different grade ductility class, surface geometry or nominal diameter edge bars are used on the mesh, one extra tensile test per batch is required on the differing edge bars per sheet.

(ii) Weld-shear tests, one test per batch on each of three separate intersections from different wires. If different grade ductility class, surface geometry or nominal diameter edge bars are used on the mesh, one extra shear test per batch is required on the differing edge bars per sheet."

Add after (v):

"(vi) Where a manufacturer can demonstrate long-term quality compliance for mesh with respect to Re, Agt and Rm/Re in accordance with Clause B6, the testing frequencies required in Clause B3 (c)(i) may be reduced to one test on each of two separate longitudinal and two transverse bars (i.e. 4 tensile tests). However, the testing requirement on edge wires will remain unchanged from Clause B3 (c)(i)."

14.1.11 AS/NZS 4671 Clause B4.1.1 Batch parameters

Add a Clause:

"The individual results for Agt shall be rounded to 0.1% and for Rm/Re to 0.01 and the average of these results shall be then rounded."

14.1.12 AS/NZS 4671 Clause B4.1.2

Delete the first sentence and replace with:

"A batch analysis shall be undertaken at the completion of all batch testing undertaken in accordance with Clause B3. The batch shall be deemed to conform with the tensile parameters specified in Table 2 if the following criteria are satisfied:"

Add a second line to Clause B4.1.2(b)

"For mesh manufactured from Grade 500E, all individual test sample results of Agt must be a minimum of 6%."

14.1.13 AS/NZS 4671 Clause B5

Add to the last sentence of paragraph 2:

"along with the original test results."

14.1.14 AS/NZS 4671 Clause B6

Add a comment:

"COMMENT:

Long-term conformance is shown by completing a statistical analysis in accordance with clause B6 on the collected batch results. Clause B6.3 requires all production and processing to be subject to continual control in accordance with Clause 8 and Clause B6. Clause B6.3 makes it mandatory to undertake batch testing."

14.1.15 AS/NZS 4671 Clause B6.1

Add the following to the end of the last sentence of paragraph 2:

"and including a minimum of four separate batches."

Add the following sentence:

"If different grade ductility class, surface geometry or nominal diameter edge bars are used on the mesh, then a separate analysis for long-term quality level shall be carried out on these bars."

Delete the Note to Clause B6.1 in Amendment No 1: June 2003.

Add the following paragraph:

"For New Zealand, the application of long-term quality compliance for mesh with respect to Agt and Rm/Re may be waived, at the choice of the manufacturer. However, all batch test results in the long-term compliance review must meet the requirements defined in Clause B4."

14.1.16 AS/NZS 4671 Clause B6.2.1

Add a comment:

"COMMENT:

The mean and standard deviation are to be calculated from the individual test values for each test sample from each batch as defined in Section B2."

14.1.17 AS/NZS 4671 Clause B6.3

Add a comment:

"COMMENT:

Clause 6.3 requires all production and processing to be subject to continued control in accordance with Clause 8 and Appendix B. Appendix B provides two pathways to compliance: using long-term conformance; and not using long-term conformance.

"When using long-term conformance:

- Individual batches (defined in B1.3.1) are subjected to testing in accordance with Clause B3 and evaluated to the requirement of Clause B4.
- A batch will fail the initial testing if it does not comply with all requirements of Clause B4.1.2 or Clause B4.2.
- If the additional testing on twice as many test samples (i.e. 12 tensile pieces or six weld shear pieces) for the specific parameter investigated, do not meet the requirements of Clause B4.1.2 or Clause B4.2, then the batch will have failed to comply with the Standard and needs to be downgraded and removed from the data for long-term quality analysis."

Add a sentence after the existing sentence as follows:

"Where the sample size of a batch falls between sample sizes given in Table B1, the value of the multiplier 'K' may be interpolated linearly between the next lowest and next highest number of samples given in Table B1 Statistical Multiplier 'K'."

Add a comment:

"COMMENT:

Clause B6.3 details the conformance criteria and makes reference to CvL (the lower characteristic value of a variable parameter) and CvU (the upper characteristic value of a variable parameter). For Re, these are detailed in Table 2 of the Standard as 500 MPa and 600 MPa respectively. One interpretation is that the 95% and 105% allowances can be applied to these having relied on the CvL: $p=0.95$, and CvU: $p=0.05$ figures in Table 2 to make this allowance. This is incorrect.

"The p-values are provided to indicate that this is a 90% confidence level and are used to determine the correct 'K' statistical multiplier from Table B1 that should be applied to the sample test results dataset, and to calculate the required confidence interval. These p-values are not to be used to expand the lower and upper limits of 500 MPa and 600 MPa within which the confidence interval is required to fall. The same issue exists for Agt and Rm/Re unless the manufacturer has waived the Long-term quality level (LTQL) for these parameters."

14.1.18 AS/NZS 4671 B6.4

Add a Clause after B6.3:

"B6.4 Non-conformance to long-term quality levels

Where steel of welded mesh is sourced on the spot market from random different suppliers, then Clause B6 cannot be used and Clause B7 must be used to show conformance.

14.1.19 AS/NZS 4671 Clause B7.2

Add the following before the first paragraph:

“Individual batches must be subjected to testing in accordance with Clause B7.2 and Clause B7.3.

“The results shall be evaluated against the requirements of Clause B7.4.1 (a) and Clause B7.4.2.

“If the steel does not comply with the requirements of Clause B7.4.1 (a) then it shall be subjected to additional testing in accordance with Clause B7.4.1 (b).

“If the additional results fail to meet the specified values, the batches are deemed to be non-conforming and the manufacturer/supplier must demonstrate ongoing compliance through B7 until a new LTQL can be established in accordance with B6.1 (for example 200 test results).”

Add a comment:

“COMMENT:

Test piece and specimen have the same meaning.”

14.1.20 AS/NZS 4671 Clause B7.3

Add a line in Clause B7.3(a) after (iv):

“(v) Shear strength of joints in mesh”

14.1.21 AS/NZS 4671 Clause B7.4.1(a)(iii)

Delete the two equations and replace them with:

$$\bar{x}_{15} - 2.33s_{15} \geq R_{ek,L}; \text{ and}$$

$$\bar{x}_{15} - 2.33s_{15} \leq R_{ek,U};$$

COMMENT:

The error in these equations only appears to affect downloaded copies of AS/NZS 4671.

14.1.22 AS/NZS 4671 Clause C2.2.2

Delete all but the last sentence and replace with:

“The uniform elongation Agt shall be determined in accordance with ISO 15630-2 with the following permitted amendments:

(a) a minimum extensometer gauge length of 50 mm may be used

(b) for measurements taken after failure gauge marks of up to 25 mm may be used.”

Amend the last sentence by deleting “unless otherwise agreed between the parties concerned.”

Add a sentence after the last sentence:

“Where possible when testing for Agt, the gauge length for the measurement of elongation shall exclude the welded intersection.”

Amend 14
Nov 2016

Amend 14
Nov 2016

Acceptable Solution B1/AS1

General

1.0 Explanatory Note

Amend 12
Feb 2014

1.1 B1/AS1 contains Acceptable Solutions for Masonry (Paragraph 2.0), Timber (Paragraph 3.0), Earth Buildings (Paragraph 4.0) and Stucco (Paragraph 5.0), Drains (Paragraph 6.0) and Glazing (Paragraph 7.0).

Amend 11
Aug 2011

1.2 B1/AS gives an Acceptable Solution for small *chimneys* (referred to in Paragraph 8.0).

1.3 Modifications to the Standards, necessary for compliance with the New Zealand Building Code, are given against the relevant clause number of each Standard.

1.4 Consequential changes due to 2010/11 Canterbury earthquakes

Amend 11
Aug 2011

COMMENT:

Raising the seismic hazard factor Z in NZS 1170 Part 5 (Table 3.3) for the *Canterbury earthquake region* through amendments to B1/VM1 requires consequential amendments to NZS 4229, NZS 3604 and NZS 4299 referenced in B1/AS1.

2.0 Masonry

2.1 NZS 4229 subject to the following modifications:

2.1.1 NZS 4229 Clause 7.8.3

Delete clause 7.8.3.

Replace with:

"All slab-on-ground reinforcing shall extend to within 75 mm of the outside edge of the slab (including the foundation wall) and shall consist of a minimum 2.27kg/m² welded Grade 500E reinforcing mesh sheets (1.14 kg/m² in each direction), which shall be lapped at sheet joints such that the overlap measurement between the outermost cross wires of each fabric sheet is equal to the greater of one of the following:

- the spacing of cross wires plus 50 mm;
- 150 mm; or
- the manufacturer's requirements.

Slabs shall have a maximum dimension of 18 m between free joints."

Amend 12
Feb 2014

2.1.2 NZS 4229

Foundations in the *Canterbury earthquake region* only where *good ground* has not been established.

COMMENT:

Foundations for houses built on ground that has the potential for liquefaction or lateral spread are outside the scope of B1/AS1.

Foundation designs for houses built in areas that have the potential for liquefaction, as defined by the Christchurch City Council, the Selwyn District Council and the Waimakariri District Council, may be in accordance with the MBIE Guidance Document "Repairing and rebuilding houses affected by the Canterbury earthquakes" (refer to www.mbie.govt.nz).

The foundation options in the MBIE Guidance Document apply to properties in the *Canterbury earthquake region* that have been categorised as Technical Category 1 to 3 (TC1, TC2 and TC3).

For TC1 properties, provided the conditions for *good ground* in Section 3 of NZS 3604 are met, house foundations following B1/AS1 can be used.

For TC2 and TC3 properties the MBIE Guidance Document provides a range of foundation solutions depending on expected ground movement and available bearing capacity. These parameters also determine the degree of involvement of structural and geotechnical engineers and the extent of specific engineering design.

Further guidance is being developed for other New Zealand regions and it is expected that this will inform the wider building and construction sector in due course. In the meantime for properties outside the *Canterbury earthquake region* that have the potential for liquefaction, MBIE recommends that further engineering advice is sought. For these properties a foundation solution following those provided for TC2 in the MBIE Guidance Document may be appropriate.

2.1.3 NZS 4229 Grade 500E welded steel mesh

Where Grade 500E welded steel mesh is specified, it shall meet the requirements of Paragraph 14.0 in B1/VM1.

Amends
11 and 12

Amend 14
Nov 2016

Amend 12
Feb 2014

3.0 Timber

3.1 NZS 3604 subject to the following modifications:

3.1.1 NZS 3604 Paragraph 1.3 Definitions

Add (in the definition for Good Ground):
“(liquefaction, lateral spread – for the *Canterbury earthquake region* only)”
after “subsidence” in subparagraph (c).

Amend 11
Aug 2011

Amend 10
May 2011

3.1.2 NZS 3604 Section 5 Bracing Design

Make the following amendments:

Amend Figure 5.4, Earthquake zones, so that all the area within the Christchurch City Council boundary is within Zone 2.

Amend Figure 5.4 Earthquake zones, so that the lowest zone within the Selwyn or Waimakariri District Council boundaries is within Zone 2. Areas within Selwyn District that are designated as Zone 1 in NZS 3604 shall become Zone 2.

3.1.3 NZS 3604 Clause 7.5.2.3

Delete: Clause 7.5.2.3

Replace with: “Clause 7.5.2.3 The combined foundation and edge details shall be constructed as shown in Figures 7.13(B), 7.14(B) or (C) (and Figures 7.15(B) and 7.16(B) or (C) for foundations supporting a masonry veneer).”

Amend 11
Aug 2011

3.1.4 NZS 3604 Figure 7.13

Delete: Figure 7.13(A) – Foundation edge details – In situ concrete – Dimensions & reinforcing for single storey.

Amend 11
Aug 2011

Amend title of Figure 7.13(B) to “Dimensions & reinforcing for 1 or 2 storeys”.

Amend 11
Aug 2011

3.1.5 NZS 3604 Figure 7.14

Delete: Figure 7.14(A) – Foundation edge details – Concrete masonry – Single storey

Amend title of Figure 7.14(B) to “1 or 2 storeys”, and add a note: “for a single storey foundation, 15 Series masonry may be used and the minimum footing width may be 190 mm”.

Amend 11
Aug 2011

COMMENT:

Unreinforced and untied slab to footing single storey option removed.

3.1.6 NZS 3604 Figure 7.15

Delete: Figure 7.15(A) – Masonry veneer foundation edge details – Dimensions and reinforcement for single storeys.

Amend 11
Aug 2011

Amend 10
May 2011

COMMENT:

Unreinforced and untied slab to footing single storey options removed.

Amend 11
Aug 2011

3.1.7 NZS 3604 Figure 7.16

Delete: Figure 7.16 (A) – Masonry veneer foundation edge details – Concrete masonry – Single storey.

COMMENT:

Unreinforced and untied slab to footing single storey option removed.

Amend 11
Aug 2011

3.1.8 NZS 3604 Clause 7.5.8.1

Delete: Clause 7.5.8.1

Replace with: "Clause 7.5.8.1 All slab-on-ground floors shall be reinforced concrete in accordance with Clauses 7.5.8.3, 7.5.8.4 and 7.5.8.6.4. All reinforcing steel, including welded mesh, shall be Ductility Class E in accordance with NZS 4671."

Where Grade 500E welded steel mesh is specified, it shall meet the requirements of Paragraph 14.0 in B1/VM1.

Amend 14
Nov 2016

Amend 11
Aug 2011

3.1.9 NZS 3604 Clause 7.5.8.3

Delete: Clause 7.5.8.3

Replace with: "Clause 7.5.8.3 All slab-on-ground reinforcing shall extend to within 75 mm of the outside edge of the slab (including the foundation wall) and shall consist of a minimum 2.27 kg/m² welded reinforcing mesh sheets (1.14 kg/m² in each direction), which shall be lapped at sheet joints such that the overlap measurement between the outmost cross wires of each fabric sheet is equal to the greater of one of the following:

- the spacing of cross wires plus 50 mm,
- 150 mm or
- the manufacturer's requirements.

Slabs shall have a maximum dimension of 24 m between free joints."

Amend 12
Feb 2014

Amend 11
Aug 2011

3.1.10 NZS 3604 Clause 7.5.8.6.2

Delete: Clause 7.5.8.6.2

3.1.11 NZS 3604 Figure 7.18

Delete title: Figure 7.18 – Irregular slab (plan view) (see 7.5.8.6.2)

Amend 11
Aug 2011

Amend 11
Aug 2011

Replace with: "Figure 7.18 – Irregular slab (plan view) (see 7.5.8.6.4)".

Amend 10
May 2011

3.1.12 NZS 3604 Clause 7.5.8.6.3

Delete: Clause 7.5.8.6.3.

3.1.13 NZS 3604 New Clause

Add new: "Clause 7.5.8.8 Free Joints.

At free joints, slab reinforcement shall be terminated and there shall be no bonding between vertical concrete faces (prevented by using building paper or a bituminous coating). R12 dowel bars 600 mm long shall be placed at 300 mm centres along the free joint and lapped 300 mm with slab reinforcement on both sides of the joint. All dowel bars on one side of the joint shall have a bond breaker applied, e.g. by wrapping dowel bars for 300 mm with petrolatum tape. Joint dowel bars must be installed in a single plane, in true alignment and parallel."

Amend 11
Aug 2011

Amend 11
Aug 2011

Amend 10
May 2011

3.1.14 NZS 3604 Foundations in the Canterbury earthquake region only where good ground has not been established

COMMENT:

Foundations for houses built on ground that has the potential for liquefaction or lateral spread are outside the scope of B1/AS1.

Foundation designs for houses built in areas that have the potential for liquefaction, as defined by the Christchurch City Council, the Selwyn District Council and the Waimakariri District Council, may be in accordance with the MBIE Guidance Document "Repairing and rebuilding houses affected by the Canterbury earthquakes" (refer to www.mbie.govt.nz).

The foundation options in the MBIE Guidance Document apply to properties in the *Canterbury earthquake region* that have been categorised as Technical Category 1 to 3 (TC1, TC2 and TC3).

For TC1 properties, provided the conditions for *good ground* in Section 3 of NZS 3604 are met, house foundations following B1/AS1 can be used.

For TC2 and TC3 properties the MBIE Guidance Document provides a range of foundation solutions depending on expected ground movement and available bearing capacity. These parameters also determine the degree of involvement of structural and geotechnical engineers and the extent of specific engineering design.

Further guidance is being developed for other New Zealand regions and it is expected that this will inform the wider building and construction sector in due course. In the meantime for properties outside the *Canterbury earthquake region* that have the potential for

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Aug 2011

Amend 12
Feb 2014

Amend 12
Feb 2014

liquefaction, MBIE recommends that further engineering advice is sought. For these properties a foundation solution following those provided for TC2 in the MBIE Guidance Document may be appropriate.

4.1.5 NZS 4299 Foundations in the Canterbury earthquake region only where good ground has not been established

Amend 11
Aug 2011

4.0 Earth Buildings

Amend 11
Aug 2011

4.1 NZS 4299 subject to the following modifications:

COMMENT:

Foundations for houses built on ground that has the potential for liquefaction or lateral spread are outside the scope of B1/AS1.

Amend 11
Aug 2011

4.1.1 NZS 4299, Paragraph 1.3 Definitions

Add (in the definition for Good Ground):
“(liquefaction, lateral spread – for the *Canterbury earthquake region* only)”
after “subsidence” in subparagraph (c).

Foundation designs for houses built in areas that have the potential for liquefaction, as defined by the Christchurch City Council, the Selwyn District Council and the Waimakariri District Council, may be in accordance with the MBIE Guidance Document “Repairing and rebuilding houses affected by the Canterbury earthquakes”(refer to www.mbie.govt.nz).

Amend 11
Aug 2011

4.1.2 NZS 4299, Clause 2.3 Earthquake zones

Add to the end of Clause 2.3:
“The earthquake zone factor > 0.6 shall apply to the *Canterbury earthquake region*.”

The foundation options in the MBIE Guidance Document apply to properties in the *Canterbury earthquake region* that have been categorised as Technical Category 1 to 3 (TC1,TC2 and TC3).

Amend 11
Aug 2011

4.1.3 NZS 4299, Figure 2.1 Earthquake zones

On the map shown in NZS 4299 Figure 2.1 Earthquake zones, the *Canterbury earthquake region* shall be interpreted as having an earthquake zone factor of > 0.6.

For TC1 properties, provided the conditions for *good ground* in Section 3 of NZS 3604 are met, house foundations following B1/AS1 can be used.

Amend 11
Aug 2011

4.1.4 NZS 4299, Clause 4.8.6.

Delete: Clause 4.8.6

Replace with: “Clause 4.8.6 The thickness and reinforcement and detail of concrete slabs shall comply with the requirements of NZS 3604 as modified in B1/AS1 Paragraph 3.1.”

For TC2 and TC3 properties the MBIE Guidance Document provides a range of foundation solutions depending on expected ground movement and available bearing capacity. These parameters also determine the degree of involvement of structural and geotechnical engineers and the extent of specific engineering design.

Further guidance is being developed for other New Zealand regions and it is expected that this will inform the wider building and construction sector in due course. In the meantime for properties outside the *Canterbury earthquake region* that have the potential for liquefaction, MBIE recommends that further engineering advice is sought. For these properties a foundation solution following those provided for TC2 in the MBIE Guidance Document may be appropriate.

Amend 12
Feb 2014

Amend 10
May 2011

5.0 Stucco

Amend 10
May 2011

5.1 NZS 4251

Index B1/VM1/VM2/VM3/VM4 & AS1/AS2/AS3/AS4 (Revised by Amendment 4)

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

Amend 11
Aug 2011

Buildings **AS3** 1.9.2, 1.9.4
 building elements **VM4** 2.0.3
 earth buildings **VM1** 8.0, **AS1** 4.0

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Dec 2008

masonry buildings **AS1** 2.0, **AS3** 1.1.1
 timber framed buildings **AS1** 3.0, **AS3** 1.1.1

Amend 11
Aug 2011

Chimneys **AS1** 1.2, 8.0, **AS3** 2.1

bracing units **AS3** 1.9, 1.9.3, 1.9.6, Table 2
 brick chimneys **AS3** 1.1, 1.1.3 a) b), 1.2.1 a), 1.6.2 a), 1.7.1,
 1.7.6, 1.8.1, 1.8.5 a), Figures 2, 3, 4, 7, Table 1

cantilever height **AS3** 1.1.2

chimney bases **AS3** 1.1.3 a), 1.6.1, 1.9.4 b)

chimney breasts **AS3** 1.5, Table 1

chimney depth **AS3** 1.1.3

chimney height **AS3** 1.1.2

chimney liners **AS3** 1.1.4

chimney lintels **AS3** Table 1

chimney materials **AS3** 1.8

chimney stacks **AS3** 1.1.2, 1.6.1

chimney wall thicknesses **AS3** 1.2, 1.2.1

chimney width **AS3** 1.1.3

concrete chimneys **AS3** 1.1.1, 1.1.3 a) c), 1.2.1 b) c),
 1.6.2 a) b), 1.7.1, 1.7.13, 1.8.2,
 1.8.5 b), Figures 4, 5, Table 1

concrete masonry **AS3** 1.8.4

floor brackets **AS3** 1.7.1, 1.7.3, 1.7.4, 1.7.5, 1.8.4, 1.9.4 b) c), Figure 6

foundations **AS3** 1.1.2, 1.1.3 a), 1.3, 1.3.1, 1.3.2,
 1.3.3, 1.7.4, 1.7.5, 1.8.4, Figure 1

 foundation slabs **AS3** 1.1.2, 1.3.2, 1.7.4, 1.7.5

gathers **AS3** 1.6.1, 1.6.2, 1.7.5

packers **AS3** 1.7.2, 1.7.6 c)

precast pumice concrete chimneys **AS3** 1.1.1, 1.1.3 a) c),
 1.2.1 c), 1.6.2 b), 1.7.1, 1.7.13, 1.8.3,
 1.8.3 c), 1.8.5 c), Figures 5, 7, Table 1

 compressive strength **AS3** 1.8.3 c)

 construction of **AS3** 1.8.3

restraint **AS3** 1.7, 1.7.1, 1.7.13, Figures 6, 7

roof brackets **AS3** 1.7.1, 1.7.3, 1.7.4, Figure 6

roof ties **AS3** 1.7.5

structural diaphragms **AS3** 1.9.5

Amend 8
Dec 2008

Chimneys (continued)

- wall ties **AS3** 1.7.5, 1.7.7, 1.7.8
- closely spaced wall ties **AS3** 1.7.5, 1.9.4 c)

Concealed works **VM4** A1.2.1 b)

Concrete see Design, concrete

Design

- aluminium **VM1** 7.0
- concrete **VM1** 3.0
- concrete masonry **VM1** 4.0, **AS1** 2.0, **AS3** 1.3.3
- drains see Drains
- earth building **VM1** 8.0, **AS1** 4.0
- foundations see Foundations
- loadings **VM1** 2.0
 - earthquake **VM1** 1.0, 2.0, **AS1** 1.4, **AS3** 1.9, Table 2
 - limit state **VM1** 2.0, 7.1

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Dec 2008

Amends
8 and 11

Amend 10
May 2011

Amend 8
Dec 2008

Amend 8
Dec 2008

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Aug 2011

- siteworks **VM1** 10.0
- steel **VM1** 5.0
- strength reduction factor **VM4** 2.0.1, 3.5.1, 4.7, Tables 1, 4
- structural design actions Standards **VM1** 2.0
- timber **VM1** 6.0, **AS1** 3.0
- windows see Windows

Drains **VM1** 11.0, **AS1** 6.0

Ductile steel mesh **VM1** 3.1(d), 14.0

- Grade 500E welded steel mesh **VM1** 14.1, **AS1** 2.1.3, 3.1.8

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Nov 2016

Earth retaining structures **VM4** 2.0.3

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Dec 2008

Effluents **VM4** A1.2.1 f)

Amend 8
Dec 2008

Amend 11
Aug 2011

Amend 8
Dec 2008

Foundations **VM1** 9.0, **VM4**

- design parameters
 - continuous vibration **VM4** 1.0.6
 - depth **VM4** 2.0.4
 - ground stability **VM4** 1.0.4
 - long-term loading **VM4** 2.0.6
 - short-term loading **VM4** 2.0.6
 - serviceability deformations **VM4** 1.0.3, Appendix B

Solid fuel burning domestic appliances **AS3** 2.0

Steel see Design, steel

Steel mesh **VM1** 3.1(d), 14.0

Grade 500E welded steel mesh **VM1** 14.1, **AS1** 2.1.3, 3.1.8

Stucco **AS1** 5.0

Subsidence **VM4** A1.2.1 a)

Timber see Design, timber

Timber barriers **AS2** 1.0

Windows **VM1** 12.0

glazing **AS1** 7.0

Amend 14
Nov 2016

Amend 11
Aug 2011

