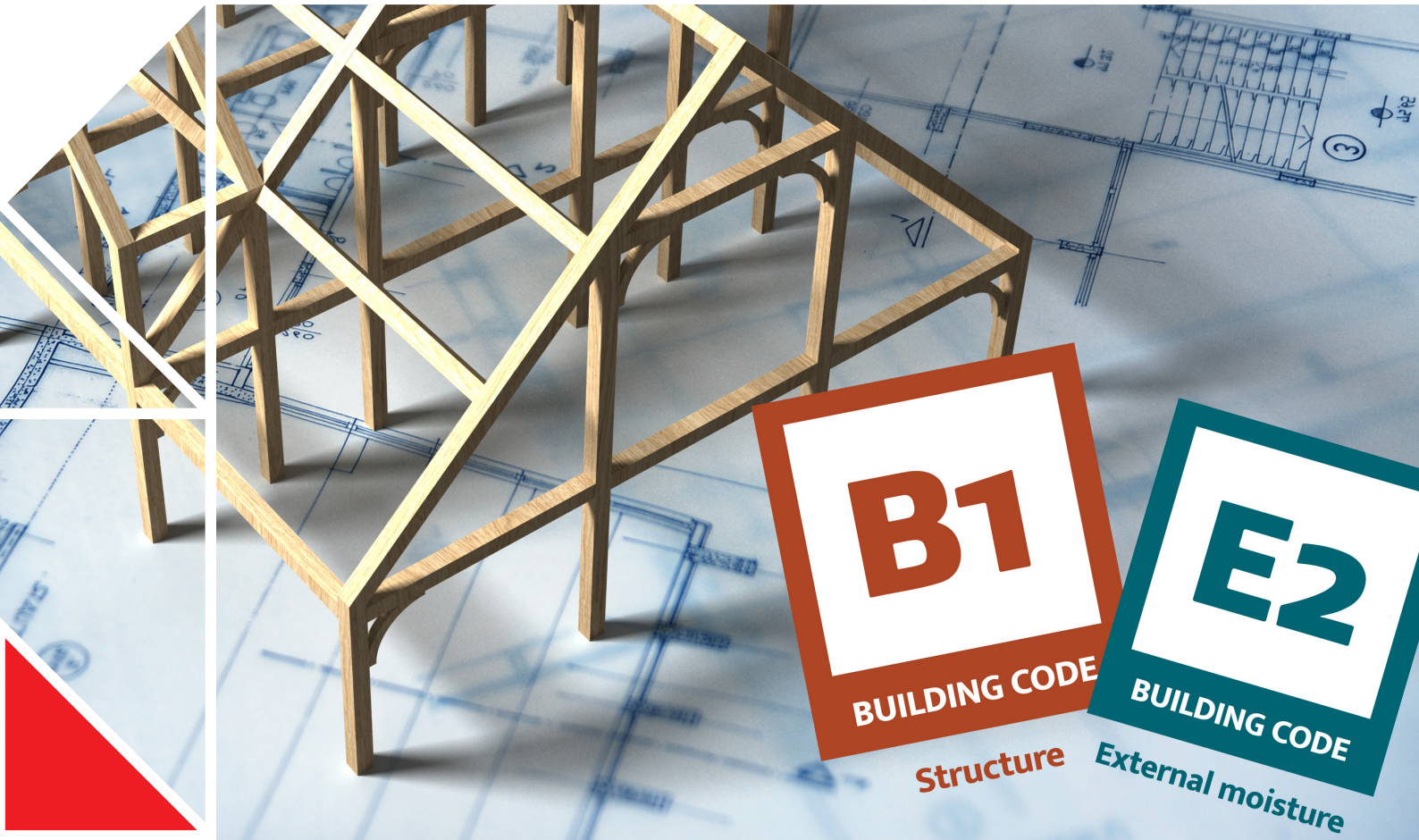


ISSUE 652 **BULLETIN**



AMENDMENTS TO ACCEPTABLE SOLUTIONS AND VERIFICATION METHODS FOR B1 AND E2

August 2020

■ This bulletin highlights some of the key changes to New Zealand Building Code Acceptable Solutions and Verification Methods for clauses B1 *Structure* and E2 *External moisture* that have come into effect since 2012.

■ It highlights the amendments introduced in 2019.

■ This bulletin replaces Bulletin 545 *Key changes to B1/AS1 and E2/AS1*.

1 INTRODUCTION

1.0.1 Acceptable Solutions and Verification Methods provide a means of demonstrating compliance with the relevant clauses of the New Zealand Building Code [NZBC]. It is not mandatory to use Acceptable Solutions and Verification Methods, but if used, building consent authorities [BCAs] and territorial authorities must accept them as providing compliance.

1.0.2 Acceptable Solutions describe specific methods of construction that, when followed, are deemed to comply with the NZBC. Verification Methods describe methods of testing, calculations and measurements that, when followed, are deemed to show compliance with the NZBC.

1.0.3 Prior to 2018, amendments to the Acceptable Solutions and Verification Methods were published irregularly, but since 2018, the Ministry of Business, Innovation and Employment [MBIE] has two regular consultation periods per year to ensure that the Acceptable Solutions and Verification Methods are up to date. This will be done annually from 2021.

1.0.4 To ensure the most up-to-date version of the particular Acceptable Solution or Verification Method is being used, users should therefore always check the MBIE website at www.building.govt.nz.

1.0.5 In 2019, MBIE sponsored more than 120 New Zealand standards that are referenced by the Acceptable Solutions and Verification Methods, making them freely available to download. They can be accessed at www.standards.govt.nz/sponsored-standards/building-standards. Free downloads are only available in .pdf format, but hard copies may be purchased from the Standards New Zealand website. [Note: Due to copyright content ownership, joint Australia/New Zealand standards are not included in the free downloads.]

1.1 OVERVIEW OF AMENDMENTS

1.1.1 In 2011, Amendment 11 to the Acceptable

Solutions and Verification Methods for NZBC clause B1 *Structure* was published to address issues arising from the Canterbury earthquakes of 2010 and 2011. Amendment 5 to the Acceptable Solutions and Verification Methods for NZBC clause E2 *External moisture* was also published in 2011.

1.1.2 BRANZ Bulletin 545 was published in 2012 to describe the changes to the Acceptable Solutions and Verification Methods for clauses B1 and E2.

1.1.3 Since then, many more amendments have been published. The most recent ones came into effect in November 2019:

- Amendment 19 to the Acceptable Solutions and Verification Methods for clause B1.
- Amendment 9 to the Acceptable Solutions and Verification Methods for clause E2, which includes:
 - a new Verification Method, E2/VM2 [see 4.2]
 - a new Acceptable Solution, E2/AS4 [see 4.1].

1.1.4 This bulletin outlines some of the significant amendments to the Acceptable Solutions and Verification Methods for clauses B1 and E2 since 2012.

1.1.5 The bulletin replaces Bulletin 545 *Key changes to B1/AS1 and E2/AS1*.

2 AMENDMENTS TO THE ACCEPTABLE SOLUTIONS AND VERIFICATION METHODS FOR B1

2.1 LIQUEFACTION-PRONE GROUND

2.1.1 Many of the amendments to the Acceptable Solutions and Verification Methods for clause B1 *Structure* that have been published since 2011 [Amendment 10 and later] have been introduced to improve the foundations and concrete slabs on ground of structures built on liquefaction-prone ground, as a result of the damage that was observed following the Canterbury earthquakes in 2010/11.



2.1.2 Initially, the amendments applied only to the region contained within the boundaries of the Christchurch City Council, Selwyn District Council and Waimakariri District Council – referred to as the Canterbury earthquake region.

2.1.3 Amendment 19 has changed this so all requirements pertaining to liquefaction-prone ground in the Acceptable Solutions and Verification Methods for clause B1 will apply to all of New Zealand by the end of the transition period [29 November 2021].

2.2 CHANGES TO B1/VM1

2.2.1 Amendment 18 to B1/VM1 references AS/NZS 2327:2017 *Composite structures – Composite steel-concrete construction in buildings* for designing composite steel-concrete structures.

2.2.2 It also references the National Association of Steel Framed Housing's NASH Standard Part 2: 2019 *Light steel framed buildings* for steel frame construction.

2.2.3 Amendment 19 references a number of new standards for specifying the durability requirements and steel corrosion protection systems for composite construction.

2.2.4 Specific changes in B1/VM1 include the following:

- The minimum hazard factor Z, defined in Table 3.3 of NZS 1170.5:2004 *Structural design actions – Part 5: Earthquake actions – New Zealand*, for the Canterbury earthquake region has been amended to 0.3 when designing for earthquake loads. Where hazard factors in this region are greater than 0.3, the higher value still applies [B1/VM1 2.2.14A].
- Clause 9.3.9.4.13 in NZS 3101.1&2:2006 *Concrete structures standard* is modified in B1/VM1 to include hollow-core units where the depth of the precast units is equal or less than 400 mm.
- Testing of ductile steel mesh to AS/NZS 4671:2001 *Steel reinforcing materials* must be carried out by laboratories that are accredited by a signatory to the

International Laboratory Accreditation Cooperation [ILAC] Mutual Recognition Arrangement [MRA]. Laboratories include International Accreditation New Zealand [IANZ] and the National Association of Testing Authorities [NATA] in Australia.

2.3 CHANGES TO B1/AS1 – GROUND CONDITIONS AND SLABS ON GROUND

2.3.1 B1/AS1 references NZS 3604:2011 *Timber-framed buildings* and makes a number of modifications to the standard:

- Clause 1.1.5 has been added to NZS 3604:2011 to describe requirements for buildings on expansive soils.
- The definition of 'good ground' in clause 1.3 *Definitions* has been amended to exclude ground subject to liquefaction and lateral spread [B1/AS1 3.1.1].
- Clause 7.5.2.3 and Figures 7.13, 7.14, 7.15 and 7.16 have been modified to clarify reinforcing requirements for combined foundation and edge details [B1/AS1 3.1.3–3.1.7].
- Clauses 7.5.8.1 and 7.5.8.3 and Figure 7.18 have been modified to clarify requirements for concrete slabs on ground [B1/AS1 3.1.8 and 3.1.9].
- Clause 7.5.13 containing specific criteria for constructing concrete slabs on ground on expansive soils has been added, and a new definition of 'expansive soil class' has been added in 7.5.13.1.2.

2.3.2 The following requirements for concrete slabs on ground now apply to the whole country:

- Slabs must be reinforced with grade 500E steel mesh in accordance with AS/NZS 4671:2001.
- Slab reinforcing must be tied to perimeter foundation reinforcing with R10 starter bars at 600 mm centres maximum as per Figures 7.13(B), 7.14(B) or (C), 7.15(B) and 7.16(B) or (C) in NZS 3604:2011.
- Free joints must be unbonded by applying building paper or a bituminous coating to the faces of the joint and inserting R12 dowel bars at 300 mm centres that are lapped 300 mm with the slab reinforcing on both



sides of the joint (Figure 1). A bond breaker must be applied to the dowel bars on one side of the joint [B1/AS1 3.1.13 – clause 7.5.8.8 added to NZS 3604:2011].

- Unreinforced concrete slabs and polypropylene fibre-reinforced slabs are no longer permitted under NZS 3604:2011 [B1/AS1 3.1.12 – clause 7.5.8.6.3 deleted from NZS 3604:2011].

2.3.3 New foundation slab thickening requirements are described in Tables 7.4A and 7.4B and Figures 7.2.2 and 7.2.3 of B1/AS1.

2.4 CHANGES TO B1/AS1 – STRUCTURAL GLASS BARRIERS

2.4.1 Amendment 13 to B1/AS1 introduced changes to glass barrier and balustrade requirements in June 2016. It cites section 22 of NZS 4223.3:2016 *Glazing in buildings – Part 3: Human impact safety requirements* as a means of compliance.

2.4.2 Amendment 19 introduced additional requirements in 2019:

- Structural glass barriers must have an interlinking rail at the required barrier height (1.0 m or higher) so that, if a pane breaks, the rail will span the broken pane.
- Where the structural glass barriers are heat strengthened or toughened, laminated safety glass must meet additional design criteria set out in clause 22.4.3. The interlinking rail must be designed to resist serviceability limit state (SLS) loads, specified in the

AS/NZS 1170 suite of standards and B1/VM1, in the event that a glass pane of the barrier breaks.

2.5 CHANGES TO B1/AS1 – TIMBER DECKS

2.5.1 Amendment 15 modified NZS 3604:2011, clause 7.4.1.3 and Figures 7.10(b) and 7.10(c) to clarify cantilevered balustrade requirements.

2.6 CHANGES TO B1/AS1 – NASH STANDARD PART 2:2019

2.6.1 NASH Standard Part 2:2019 *Light steel-framed buildings* is cited as an Acceptable Solution in B1/AS1 section 9.0 *Steel* under Amendment 18. The previous edition of this standard was an Alternative Solution. This change will facilitate building consent applications for light steel-frame construction by BCAs.

2.6.2 NASH Standard Part 2:2019 is available free online from http://nashnz.org.nz/wp-content/uploads/2019/02/NASH-Std-Part-2-2019_LR.pdf.

3 SIMPLE HOUSE ACCEPTABLE SOLUTION SH/AS1 REVOKED

3.0.1 The Simple House Acceptable Solution SH/AS1 gave design instructions for single-storey stand-alone household units. It was intended to be used for simple building designs and aimed to bring together in one place all the information needed to design a simple house.

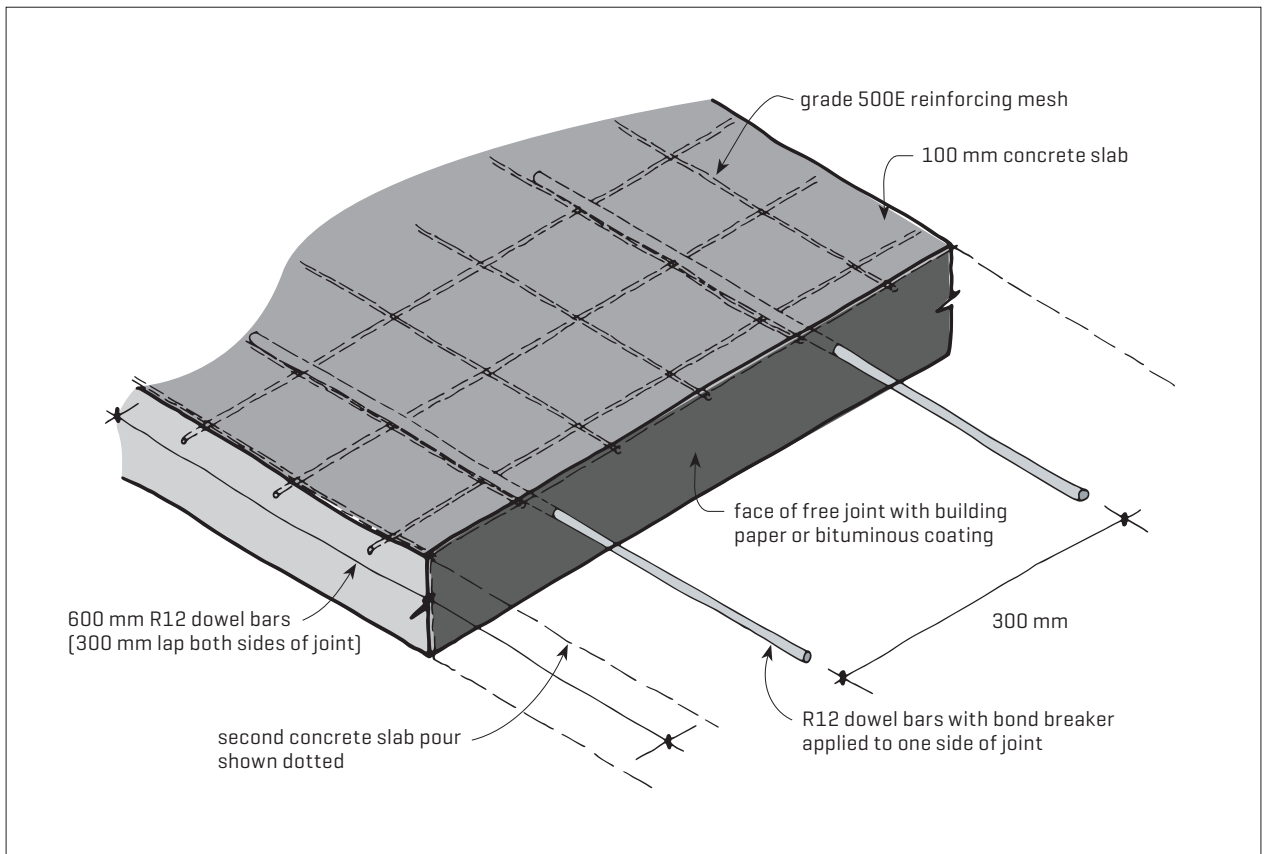


Figure 1. Reinforcing to free joint.

3.0.2 It has been revoked due to lack of uptake. Some content unique to SH/AS1 has been transferred to B1/AS1, and content from SH/AS1 may be used as an Alternative Solution.

4 AMENDMENTS TO THE ACCEPTABLE SOLUTIONS AND VERIFICATION METHODS FOR E2

4.1 E2/AS4 – WEATHERTIGHT SOLUTIONS FOR LIGHT STEEL FRAME CONSTRUCTION

4.1.1 NASH Building Envelope Solutions 2019 has become Acceptable Solution E2/AS4. It provides a means of demonstrating compliance of weathertightness of the building envelope with clause E2 for buildings constructed with light-gauge steel framing.

4.1.2 It applies to buildings that are:

- up to 3 storeys or a maximum of 10 m in height measured from the lowest ground level adjacent to the building to the highest point of the roof
- have vertical external walls and roofs 45° or less to the horizontal
- a structural design in accordance with the NASH Standard Part 2:2019 or having an equivalent stiffness if designed by an engineer.

4.1.3 NASH Building Envelope Solutions 2019 is available free online from <http://nashnz.org.nz/wp-content/uploads/2019/08/NASH-Building-Envelope-Solutions-2019.pdf>.

4.2 E2/VM2 – WEATHERTIGHTNESS FOR CLADDING SYSTEMS FOR BUILDINGS UP TO 25 M IN HEIGHT

4.2.1 E2/VM2, introduced in June 2019, describes means of testing and demonstrating compliance with clause E2 that a wall cladding system will prevent the penetration of water. It references BRANZ EM7 as a means of demonstrating that a wall cladding system meets the performance requirements of clause E2.

4.2.2 E2/VM2 applies to cladding systems for buildings up to 25 m in height and includes water penetration of cladding systems at junctions with windows, doors and other penetrations. It does not assess the water penetration resistance of the windows and exterior doors in the cladding system.



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