

Dear Customer

Please find enclosed Amendment 8, effective 14 February 2014, to the Acceptable Solution and Verification Method for Clause B2 Durability of the New Zealand Building Code. The previous amendment to B2 (Amendment 7) was in April 2011.

<b>Section</b>	<b>Old B2</b>	<b>February 2014 amendment to B2</b>
Title pages	Remove title page and document history pages 1–2	Replace with new title page and document history pages 1–2B
Contents	Remove page 5/6	Replace with new page 5/6
References	Remove page 7/8	Replace with new page 7/8
Definitions	Remove page 9/10	Replace with new page 9/10
B2/AS1	Remove page 13–15A, 15D–16	Replace with new pages 13–15A, 15D–16





**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HĪKINA WHAKATUTUKI

# **Acceptable Solutions and Verification Methods**

For New Zealand Building Code Clause  
**B2 Durability**

**Second Edition**



## **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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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**

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## Document Status

The most recent version of this document (Amendment 8), 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 7) will cease to have effect on 14 August 2014.

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.dbh.govt.nz](http://www.dbh.govt.nz)

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Amendment 2	1 December 2000	p. ii, Document History p. v, Contents p. vi, References	p. 5, 3.2.2, 3.3, 3.4 p. 9, Index
Amendment 3	1 July 2001	p. 2, Document History, Status p. 7, References	p. 8, 5.0.1
Amendment 4	1 April 2004	p. 2, Document History p. 7, References pp. 9–10, Definitions	p. 15, 3.2.1 Comment pp. 17–22 Table 1 p. 23 Index
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Amendment 5 regarding timber treatment is subject to a transitional provision.			
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Amendment 8	14 August 2014	p. 2A, Document History, Status p. 5, Contents p. 7, References	p. 9, Definitions pp. 13, 15, 15D–15F B2/AS1 3.2, 3.2.2, 3.2.2.3, 3.2.3, 3.2.3.1, 3.2.3.2,
Notes:			
<ul style="list-style-type: none"> <li>• B2/AS1 Amendment 7 version is effective from 4 April 2011.</li> <li>• Up to 30 June 2011, B2/AS1 Amendment 6 version may also be used.</li> <li>• From 1 July 2011, only B2/AS1 Amendment 7 version applies, and supersedes all previous versions of the document.</li> </ul>			
<b>Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.</b>			



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# 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 7  
Apr 2011

Amend 6  
Sep 2010

## Standards New Zealand

NZS 3101:- Concrete structures standard  
Part 1: 2006 The design of concrete structures  
*Amend: 1, 2*

Amend 7  
Apr 2011

Amend 5  
Apr 2004

NZS 3602:-  
Part 1: 2003 Timber and wood-based products for use in building

Amend 3  
Jul 2001

Amends  
2 and 8

NZS 3604: 2011 Timber framed buildings

Amends  
7 and 8

NZS 3640: 2003 Chemical Preservation of round and sawn timber  
*Amend: 1, 2, 3, 4, 5*

Amend 6  
Sep 2010

NZS 4251:- Solid plastering  
Part 1: 2007 Cement plaster for walls, ceilings and soffits

NZS 4297: 1998 Engineering design for earth buildings

Amend 2  
Dec 2000

NZS 4299: 1998 Earth buildings not requiring specific design  
*Amend: 1*

## Where Quoted

AS1 3.1.1

AS1 3.2.1, 3.2.2

AS1 3.2.3

AS1 3.2.1, 3.2.2.1,  
3.2.3

AS1 3.3.1

AS1 3.4.1

AS1 3.4.1

Amend 5  
Apr 2004

Amend 5  
Apr 2004



# Definitions

Amend 6  
Sep 2010

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

Amend 8  
Feb 2014

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

**Baluster** A post providing the support for the top and bottom rails of a barrier.

Amend 4  
Apr 2004

**Balustrade** The infill parts of a barrier (typically between floor and top rail).

Amend 6  
Sep 2010

**Building** has the meaning given to it by sections 8 and 9 of the *Building Act 2004*.

Amend 4  
Apr 2004

**Building Code** means the regulations made under section 400 of the *Building Act 2004*.

**Building element** Any structural and non-structural component or assembly incorporated into or associated with a *building*. Included are *fixtures*, *services*, *drains*, permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports.

Amend 4  
Apr 2004

**Cladding** The exterior weather-resistant surface of a *building*.

Amend 5  
Apr 2004

**Code compliance certificate** means a certificate issued by a *building consent authority* under section 95 of the *Building Act 2004*.

Amend 6  
Sep 2010

**Damp-proof course (DPC)** A narrow strip (generally up to 300 mm wide) of *durable vapour barrier* placed between *building elements* to prevent the passage of moisture from one element to another.

**Damp-proof membrane (DPM)** A sheet material, coating or vapour barrier, having a low water vapour transmission, and used to prevent water and water vapour movement through concrete in contact with the ground. (Also known as a concrete underlay.)

Amend 4  
Apr 2004

**Durable** Resistant to wear and decay.

**External wall** Any exterior face of a *building* within 30° of vertical, consisting of *primary* and/or *secondary elements* intended to provide protection against the outdoor environment, but which may also contain *unprotected areas*.

Amend 4  
Apr 2004

**Fixture** An article intended to remain permanently attached to and form part of a *building*.

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

**Handrail** A rail to provide support to, or assist with the movement of a *person*.

Amend 4  
Apr 2004

**Hazardous** Creating an unreasonable risk to people of bodily injury or deterioration of health.

**Intended use** in relation to a *building*,

(a) includes any or all of the following:

(i) any reasonably foreseeable occasional use that is not incompatible with the *intended use*;

(ii) normal maintenance;

(iii) activities undertaken in response to *fire* or any other reasonably foreseeable emergency; but

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

Amend 6  
Sep 2010

**Person** includes the Crown, a corporation sole, and also a body of *persons*, whether corporate or unincorporated.

**Primary element** A *building element* providing the basic load bearing capacity to the structure, and which if affected by *fire* may initiate instability or premature structural collapse.

**Secondary element** A *building element* not providing load bearing capacity to the structure and if affected by *fire*, instability or collapse of the *building* structure will not occur.

Amend 4  
Apr 2004

Amend 6  
Sep 2010

**Specified intended life** has the meaning given to it by section 113(3) of the Building Act 2004.

Section 113(3) states:

“(3) In subsection (2), **specified intended life**, in relation to a building, means the period of time, as stated in an application for a building consent or in the consent itself, for which the building is proposed to be used for its intended use.”

**Unprotected area** in relation to an *external wall of a building*, means any part of the *external wall* which is not *fire* rated or has less than the required *FRR*.

**COMMENT:**

*Unprotected area* includes non-*fire* rated windows, doors, or other openings, and non-*fire* rated *external wall construction*.

**Vapour barrier** Sheet material or coating having a low water-vapour transmission, and used to minimise water-vapour penetration in *buildings*. (*Vapour barriers* are sometimes referred to as *damp-proof membranes*.)

**Water heater** A device for heating water.

Amend 4  
Apr 2004

# Acceptable Solution B2/AS1

## 1.0 Durability Applications

**1.0.1** This acceptable solution applies to materials and components required to satisfy the performances specified in other NZBC clauses.

### COMMENT:

All *building work* shall comply with the NZBC. This means that *building elements*, both individually and as part of a system, shall meet all the performances required by the applicable NZBC clauses and shall continue to do so for the required durability period. In some cases, *building elements* (e.g. decorative coatings and trim) are not required to satisfy an NZBC performance criterion. Such *building elements* will then have no B2 durability requirement. However, where a *building element* serves two purposes, only one of which must satisfy the NZBC, it shall have the durability appropriate to its location and use. For example, a decorative finish applied to a *building element* required by the NZBC to have an impervious easily cleaned surface will need to satisfy the 5 year durability performance.

## 1.1 Acceptable Solutions and Verification Methods

**1.1.1** *Building elements*, including materials, components and systems, complying with a publication referenced in the Acceptable Solutions and Verification Methods, satisfy B2 requirements only when the conditions of use stated in the publication and Acceptable Solutions and Verification Methods prevail.

### COMMENT:

It is not practicable within the Acceptable Solutions and Verification Methods to cover all possible combinations, uses and conditions which may be applied to a *building element*. In special circumstances and where elements are called up but are used outside the scope of the application in the Acceptable Solution or Verification Method, durability shall be verified by B2/MM1.

Amends  
6 and 8

## 1.2 Assessing required durability

**1.2.1** Evaluation of *building elements* shall be based on the following concepts:

- a) **Difficult to access or replace** – applies to *building elements* where access or replacement involves significant removal or alteration of other *building elements*. Examples are works involving the removal of masonry or concrete *construction*, or structural elements or repair of buried tanking membranes. A 50 year durability is required.
- b) **Moderately difficult to access or replace** – applies to *building elements* where access or replacement involves the removal or alteration of other *building elements*. Examples are the replacement of services reticulation in wall cavities and skillion roofs, or of plant and hotwater cylinders built into roof spaces without adequately sized access openings. A 15 year durability is required.
- c) **Easy to access and replace** – applies to *building elements* where access or replacement involves little alteration or removal of other *building elements*. Examples are linings, trim, light fittings, hotwater cylinder elements and door hardware, or where specific provision for removal has been made. A 5 year durability is required.
- d) **Failure to comply with the NZBC would go undetected during both normal use and maintenance of the building** – applies where the *building elements* are hidden from view with no provision for inspection access, and failure would not be apparent until significant damage had occurred to other *building elements*. Examples are building paper behind a masonry veneer cladding, and insulation in a skillion roof. A 50 year durability is required.
- e) **Failure to comply with the NZBC would go undetected during normal use of the building but would be easily detected during normal maintenance** – applies where normal maintenance will identify faults unlikely to be observed by *building occupants* until significant damage has occurred. Examples are degradation of exterior claddings on roofs and walls, sealant filled joints, flashings, services with specific provision for inspection access, chimneys and flues. A 15 year durability is required.

f) **Failure to comply with the NZBC would be easily detected during normal use of the building** – applies where the failure is obvious to the *building* occupants. Examples are exposed *building elements* which are damaged or inoperative such as protective finishes, essential signs, sticking doors, slip resistant surfaces, stair treads and surface-run *building services* equipment. A 5 year durability is required.

1.2.2 Figure 1 provides a means of assessing the durability requirements for *building elements*.

1.3 **Examples of durability requirements**

1.3.1 Table 1 is an acceptable solution establishing durability requirements of nominated *building elements*.

2.0 **Maintenance**

2.1 **Normal maintenance**

2.1.1 Normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given *building element*. The extent and nature of that maintenance will depend on the material, or system, its geographical location and position within the *building*, and can involve the replacement of components subject to accelerated wear.

2.1.2 It is the responsibility of the person specifying the *building element* to determine normal maintenance requirements. These may be based on the manufacturer’s recommendations and may also include periodic inspections of elements not readily observable without a specific effort (e.g. access to roof or subfloor spaces).

2.1.3 Basic normal maintenance tasks shall include but not be limited to:

- a) Where applicable, following manufacturers’ maintenance recommendations,
- b) Washing down surfaces, particularly exterior *building elements* subject to wind driven salt spray,

- c) Re-coating interior and exterior protective finishes,
- d) Replacing sealant, seals and gaskets in joints,
- e) Replacing valves, washers and similar high wear components in easily accessed service equipment and other *building elements*,
- f) Cleaning and replacing filters in *building services* systems,
- g) The regular servicing of boilers, cooling towers, lifts, escalators, emergency lighting and *fire* protection equipment, and
- h) The maintenance of signs for access, *escape routes*, emergency equipment and *hazardous* areas.

**COMMENT:**  
Maintenance does not include such things as upgrading *building elements* to meet the demands of new technology or the increased environmental expectations of users.

2.2 **Scheduled maintenance**

2.2.1 Scheduled maintenance comprises the inspection, maintenance and reporting procedures for *building elements* required to have a *compliance schedule* in terms of section 44 of the Building Act. By those procedures the *building elements* concerned are effectively deemed to have a durability of the life of the *building* because they are required to perform as designed at all times. The relevant maintenance procedures may include total replacement.

3.0 **Generic Materials**

3.1 **Concrete**

3.1.1 **NZS 3101:** Part 1 Section 3 is an acceptable solution for meeting the durability requirements of concrete building elements subject to the following modification:

Provisions in this Standard that are in non-specific or unquantified terms do not form part of the Acceptable Solution. Non-specific

Amend 6  
Sep 2010

or unquantified terms include, but are not limited to, special studies, manufacturer's advice and references to methods that are appropriate, adequate, suitable, relevant, satisfactory, acceptable, applicable, or the like. Such provisions must be treated as the basis of an alternative solution proposal.

Amend 6  
Sep 2010

### 3.2 Timber and wood-based building products

**3.2.1** The following Standards form an *Acceptable Solution* for B2/AS1 meeting the durability requirements of timber and wood-based *building elements*,

- a) NZS 3602 Part 1 as modified by Paragraph 3.2.2.
- b) NZS 3640 as modified by Paragraph 3.2.3.
- c) NZS 3604, with reference to NZS 3602 (and NZS 3640), as modified by Paragraph 3.2.1 a) and b) above.

Amend 8  
Feb 2014

#### COMMENT:

The use of different timbers or timber treatments to those referred to in NZS 3602 are outside the scope of this *Acceptable Solution*. Where the use of a different timber or timber treatment is proposed, it shall be separately assessed for compliance with the *Building Code*. For example, if imported hard-wood is to be used to surface a deck, evidence that the timber was *durable* for a minimum of 15 years in the expected exposure conditions is required.

Amend 8  
Feb 2014

### 3.2.2 Modification to NZS 3602

**3.2.2.1** Level of treatment references to radiata pine and Douglas fir solid timber in Table 1 categories 'C', 'D' and 'E' and Table 2 category 'B' shall be replaced by Tables 1A and 2A below. Table 1A and Table 2A are to be read with NZS 3602 sections 108 to 111 inclusive, with the amendments in Paragraph 3.2.2.3 below.

Other references to radiata pine, Douglas fir solid timber and engineered wood products in NZS 3602, including Table 1 categories 'A', & 'B'; Table 2 category 'A'; and Table 3 are unaltered.

Amend 8  
Feb 2014

Amend 7  
Apr 2011

Laminated veneer lumber (LVL) treated using LOSP borne azoles as specified for H3.1 in NZS 3640 Table 6.2 satisfies the minimum treatment requirement of H 1.2.

Amend 8  
Feb 2014

**Table 1A** Requirements for radiata pine and Douglas fir solid timber to achieve a (minimum) 50 year durability performance

Ref No.	Wood-based building components	Species or type	Level of treatment <sup>(2)</sup> to NZS 3640
<b>C – Members protected from the weather but exposed to ground atmosphere (see section 108 of NZS 3602)</b>			
1C.1	Jackstuds, subfloor braces, bearers, wall plates, floor joists to the subfloor, blocking, subfloor wall studs, wallings and battens, wall studs and nogs, diagonal boards	Radiata pine Douglas fir	H1.2
1C.3	Interior flooring, suspended ground floors	Radiata pine Douglas fir	H1.2
<b>NOTE</b>			
(2) Throughout Table 1A, timber treated to a higher level than the minimum satisfies the minimum requirements			
<b>D – Members protected from the weather but with a risk of moisture penetration conducive to decay (see section 109 of NZS 3602)</b>			
<b>Roof members (in or associated with)</b>			
1D.1	Sarking and framing not protected from solar driven moisture through absorbent cladding materials <sup>(8)</sup>	Radiata pine Douglas fir	H1.2
1D.2	Enclosed flat roof framing and associated roof members	Radiata pine Douglas fir	H1.2
1D.3	Enclosed skillion roof framing and associated roof members	Radiata pine Douglas fir	H1.2
1D.4	Valley boards and boards supporting flashings or box gutters and flashings to roof penetrations and upstands to roof decks <sup>(10)</sup>	Radiata pine Douglas fir	H1.2
<b>Wall members (in or associated with)</b>			
1D.5	Framing and other members within or beneath a parapet	Radiata pine Douglas fir	H1.2
1D.6	Framing, and other members within enclosed decks or balconies	Radiata pine Douglas fir	H1.2
1D.7	Cantilevered enclosed deck joists and associated framing including joist trimmers, nogs, and blocking <sup>(5)</sup>	Radiata pine Douglas fir	H3.2
1D.8	Framing and other members supporting enclosed decks (including enclosed cantilevered decks) or balconies	Radiata pine Douglas fir	H1.2
1D.10	Battens used behind cladding to form a cavity	Radiata pine Douglas fir	H3.1
1D.14	All other exterior wall framing and other members including exterior and boundary joist <sup>(9)</sup> <sup>(11)</sup>	Radiata pine Douglas fir <sup>(14)</sup>	H1.2

**NOTE**

(5) H3.2 refers to preservative treatments outlined in NZS 3640.

(8) Timber shakes and shingles, and similar absorbent claddings, absorb moisture that can be driven in frame cavities by evaporation. Unless the cavities are adequately drained and ventilate, continuing condensation caused by solar driven transfer increases the moisture content in the cavities and timber framing requiring a higher level of timber treatment to resist decay.

(9) Such as joists, lintels, wall plate and double top plates, studs, together with parapets, enclosed balustrades, boxed columns and chimneys

(10) Any metal flashing shall be separated from the treated timber with building paper.

(11) Exposed ends of joists shall be protected by a boundary joist.

Amend 7  
Apr 2011



Amend 8  
Feb 2014**3.2.2.3 Modifications to to NZS 3602 sections 109, and 110**

Table 1A and Table 2A are to be read with NZS 3602 sections 109 and 110 including amendments below.

- 109.2 (a) (iii) Delete and replace with:  
Members supporting enclosed cantilevered decks having increased risk of failure due to there being single points of support.
- 109.2 (b) Delete and replace with:  
Timber framed elements exposed to exterior weather conditions on both faces such as parapets and balustrades, or exterior boxed beams columns or chimneys.
- 109 (c) (vi) Delete
- 109 (c) (vii) Delete and replace with:  
Framing and other members in exterior walls including boundary joists.
- Figure 1 Delete
- Figure 2 Delete
- Figure 3 Delete
- 110.2 (b) Delete
- 110.2 (c) Delete and replace with:  
Internal walls
- 110.3.1 Delete and replace with:  
Floor coverings in 'wet areas' such as laundries, bathrooms, kitchens and toilets shall be as set out in E3/AS1. Where maintenance of an impervious coating cannot be assured in wet areas, plywood flooring treated to minimum H3, or solid pinus species or Douglas fir flooring treated to minimum H1.2, shall be used.

Amend 7  
Apr 2011Amend 8  
Feb 2014

**3.2.3 Amendments to NZS 3640.**

**3.2.3.1** Delete comment C3.1 and replace with the following as normative text:

**3.1.1** NZBC clause B2.3.1 refers to minimum durability requirements for building elements. Timber used for structural purposes is required to be durable in-service for the life of the building, being not less than 50 years unless the building has a specified intended life. This is applicable to hazard classes H1.2, H3.2, H4, H5, and H6. Structural timber refers to timber that has been graded to characteristic strength and stiffness properties.

The minimum requirement for a H1.2 treatment for timber framing is to provide protection in-service but the preservative treatment is not designed for extended exposure to elevated moisture content.

Timber used for non-structural purposes, such as H1.1 and H3.1 is required to be durable in-service for a minimum of 5 years and 15 years respectively.

**3.2.3.2** Delete clause 6.3.1.1 and replace with:

**6.3.1.1** Complete sapwood penetration shall be achieved.

Amends  
7 and 8

### 3.3 Solid plastering

**3.3.1** NZS 4251: Part 1 is an acceptable solution for meeting the durability requirements of cement plasters for walls, ceilings and soffits within its scope.

### 3.4 Earth buildings

**3.4.1** NZS 4297 and NZS 4299 are acceptable solutions for meeting the durability requirements of earth *buildings* within their scope.

Amend 2  
Dec 2000

**Figure 1: Assessment of Durability Requirement**  
Paragraph 1.2.2

