MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Dear Customer

Please find enclosed Amendment 6, effective 1 January 2017, to the Acceptable Solution and Verification Method for Clause E3 Internal Moisture of the New Zealand Building Code. The previous amendment to E3 (Amendment 5) was in February 2017.

Section	**Old E3**	**January 2017 Amendment 6**
Title pages	Remove title page and document history pages 1–2B	Replace with new title page and document history pages 1–2B
E3/AS1	Remove page 13/4	Replace with new page 13/14

MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
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Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
E3 Internal Moisture

E3
BUILDING CODE

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.

A person who complies with a Verification Method or Acceptable Solution will be treated as having complied with the provisions of the Building Code to which the Verification Method or Acceptable Solution relates. However, using a Verification Method or Acceptable Solution is only one method of complying with the Building Code. There may be alternative ways to comply.

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

Document Status

The most recent version of this document (Amendment 6), 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 5) 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

E3: Document History			
	Date	**Alterations**	
First published	July 1992		
Amendment 1	September 1993	p. 7, 3.1.2	
Second edition	28 February 1998	Document revised – second edition issued	
Amendment 2	1 July 2001	p. 2, Document History, Status p. 9, Definitions	p. 14, 2.2.1
Amendment 3	14 October 2004	pp. 3 and 4 Code Clause	
Amendment 4	Effective from 10 October 2011 until 14 August 2014	p. 2, Document History, Status p. 7, References	p. 9, Definitions p. 13, E3/AS1 1.1.2
Amendment 5	14 February 2014 until 30 May 2017	p. 2A, Document History, Status p. 7, References	p. 9, Definitions p. 13, E3/AS1 1.1.4
Amendment 6	Effective 1 January 2017	p. 13 1.1.4	
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.			

2B

Acceptable Solution E3/AS1

1.0 Prevention of Fungal Growth

1.0.1 Fungal growth (mildew) is avoided by minimising internal condensation. Condensation is avoided or reduced by maintaining the correct balance between interior temperature and ventilation. Insulation assists in maintaining interior temperatures at a suitable level.

1.0.2 The New Zealand Building Code does not specify minimum heating requirements except for old people's homes and early childhood centres. Occupants will determine their own methods and levels of heating. Typically it is necessary and sufficient, for condensation control in winter, to keep interior temperatures 5°C to 7°C above exterior temperatures in a ventilated space.

1.1 Thermal resistance

1.1.1 *R-values* for walls, roofs and ceilings shall be no less than:

a) For light timber frame wall or other framed wall *constructions* with cavities, 1.5.

b) For single skin normal weight masonry based wall *construction* without a cavity, 0.6.

c) For solid timber wall systems no less than 60 mm thick, 0.6.

d) For roof or ceilings of any *construction*, 1.5.

Amend 4 Oct 2011

1.1.2 *R-values* shall be determined using the methods in NZS 4214. Laboratory test samples shall be truly representative of the wall, roof or ceiling system, including any provision for reducing thermal bridging.

1.1.3 Materials and installation

The BRANZ House Insulation Guide provides examples of acceptable wall, roof and ceiling *constructions* to satisfy the requirements of Paragraph 1.1.1.

COMMENT:

The BRANZ House Insulation Guide gives *constructions* for a range of *R-values*. It is essential to choose the correct *R-values* from these shown in the tables in order to comply with this Acceptable Solution.

1.1.4 For the *construction* to be acceptable:

a) Building paper shall extend from the upper side of the top plate to the underside of the bearers or wall plates supporting the ground floor joists.

b) Deleted

Amend 5 Feb 2014

c) There shall be no perimeter gaps between the *insulating material* and the framing members.

d) Where steel framing is used in Housing and Communical Residential building uses a thermal break with a minimum *R-value* of 0.25 m^2°C/W shall be provided at the outside face of each steel framing member. Expanded polystyrene (EPS) strips, 10 mm thick provide an *R-value* of 0.25 m^2°C/W. Other materials or methods may be used to provide the minimum *R-value* of 0.25 m^2°C/W.

Amend 5 Feb 2014

e) If foil insulation is used it must be placed on the lining side of studs, not the cladding side.

COMMENT:

Amend 5 Feb 2014

1. Frame *construction* with 10 mm plaster board linings and a single layer of foil has an *R-value* of approximately 0.9 and does not satisfy Paragraph 1.1.1.
2. Surface condensation can be a problem where vapour barriers are needed for *buildings* enclosing very warm or wet areas such as spa pools, saunas and swimming pools, or *buildings* in a very cold environment such as ski lodges and mountain huts. These situations are not covered by this Acceptable Solution and require specific design.
3. Thermal breaks should be specifically designed for steel framed *buildings* that are not covered by Building Code Clause E3 Internal Moisture. That is where:
   i) the *building* use is not *Housing* or *Communal Residential*, and
   ii) the moisture load is greater than in Housing, and the building use has high occupant moisture load (eg, schools), and
   iii) there is a temperature differential from inside to outside that is sufficient to cause condensation on steel framing members.

Amend 6 Jan 2017

Amend 5 Feb 2014

1.1.5 Insulation for energy efficiency

Insulation satisfying the energy efficiency requirements of NZBC H1 cannot automatically be assumed to meet the *R-values* for internal moisture requirements of Paragraph 1.1.1.

COMMENT:

Insulation to prevent condensation relates to *thermal resistance* of the *building element* in question (e.g. wall or roof). Insulation for energy efficiency relates to the *building* as a whole, and the requirement can be met in different ways. It is possible, for example, to obtain sufficient energy efficiency in a *building* by heavily insulating the floor and ceiling with no insulation in the walls. This would not satisfy the requirement for this acceptable solution because there would not be sufficient insulation in the walls to minimise condensation.

1.2 Ventilation

1.2.1 Ventilation shall be provided naturally or mechanically to comply with G4/AS1.

1.3 Condensation control

1.3.1 In *buildings* classified as *Housing or Communal residential* which are not air conditioned, metal-framed windows with single glazing shall be *constructed* with a means of condensation disposal. An acceptable method is the provision of a condensation collection channel which, either discharges the water to the outside or is of sufficient capacity to hold the water, without overflowing, until it evaporates.

1.3.2 Condensation channels shall have closed ends and no openings which permit ponded water to contact *building elements* susceptible to moisture. Where provision is made for drainage to the outside, drainage outlets shall have the capacity to expel all condensed water and shall have means of preventing condensed water from being blown back by wind pressure.

1.3.3 Condensation channels and drainage outlets shall be able to be cleaned. The minimum clear dimensions of collection channels shall be 10 mm wide by 5 mm deep.

COMMENT:

1. Condensation can be reduced by good ventilation. Windows incorporating passive ventilators, particularly those with full perimeter ventilation, are effective in reducing condensation.
2. While a 10 mm condensation channel width is normally adequate to prevent overflowing, it is awkward to clean adequately. A more practical width is 20 mm.

2.0 Overflow

2.0.1 If a *sanitary fixture* is located where accidental overflow could damage an adjoining *household unit*, containment and a *floor waste* shall be provided.

2.1 Containment

2.1.1 Containment may be achieved by using *impervious* floor coverings which are continuous and coved or joints sealed where they meet the wall. (See Figure 1.)

2.2 Floor wastes

2.2.1 *Floor wastes* shall comply with G13/AS1 Paragraph 3.4.3 c), but a graded floor is not essential in this situation.

Amend 2 Jul 2001

3.0 Watersplash

3.1 Lining materials

3.1.1 Floors

The following linings and finishes to floors satisfy the performance for *impervious* and easily cleaned surfaces in areas exposed to watersplash:

a) Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints.

b) Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment of use.

c) Cement based solid plaster or concrete having a steel trowel or polished finish, (semi-gloss or gloss paint must be used if a paint finish is required).

d) Cork tile or sheet sealed with waterproof applied coatings and with sealed joints.

e) Monolithic applied coatings having a polished non-absorbent finish (e.g. terrazzo).

f) A timber or timber based product such as particleboard sealed with waterproof applied coatings.