MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Please find enclosed Amendment 9, effective 27 June 2019, to Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3 and Verification Method E2/VM1 for Clause E2 External Moisture of the New Zealand Building Code. The previous amendment to the E2 Acceptable Solutions and Verification Methods (Amendment 8) was in November 2018.

Section	**Previous amendment**	**June 2019 Amendment 9**
Title page	Remove title page and document status and history pages 1–2B	Replace with new title page and document status and history pages 1–2B
Contents	Remove page 5/6	Replace with new page 5/6
E2/VM1	Remove page 21/22	Replace with new pages 21/22

MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Verification Methods E2/VM1 and Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3

For New Zealand Building Code Clause
E2 External Moisture

E2
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.

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.

Enquiries about the content of this document should be directed to:

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Ministry of Business, Innovation and Employment
PO Box 1473, Wellington 6140
Telephone 0800 242 243
Email: info@building.govt.nz

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 9), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 27 June 2019 and supersedes all previous versions of this document.

The previous version of this document (Amendment 8) will cease to have effect on 31 October 2019.

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

E2: Document History			
	Date	**Alterations**	
First published	July 1992		
Second Edition	28 February 1998	Document revised – Second edition issued	
Third Edition	E2/VM1 effective from 1 July 2004	E2/AS1 effective from 1 February 2005	
Amendment 1 September 2004	E2/AS1 effective from 1 July 2005	p. 2 Document Status	
Reprinted incorporating Amendment 1		September 2004	
Amendment 2	Effective from 1 July 2005	p. 2 Document History, Document Status pp. 5-7, 9, 10 Contents pp. 13-16 References pp. 17-20 Definitions pp. 21-24 E2/VM1	pp. 25-43, 45-47, 49, 50, 55-57, 59-67, 69-89, 93-100, 102, 103, 105-107, 111-119, 121-125, 127-135, 138, 140-144, 146, 147, 149, 150, 153-155, 157,163-169 E2/AS1 pp. 173, 174, 177, 178 Index
Erratum 1	Effective from 1 December 2005	p. 166 Table 23	
Amendment 3	21 June 2007	pp. 3 and 4, Building Code Clause E2	
Amendment 4	Effective from 1 May 2008 until 31 January 2012	p. 2 Document History, Document Status pp. 8 and 12 Contents pp. 13-14 References	pp. 171-180 E2/AS2 p. 181 Index
Amendment 5	1 August 2011	p. 2 Document History, Document Status pp. 5-12 Contents pp. 13-16A References pp. 17-20 Definitions pp. 21-24 E2/VM1	pp. 25-180 E2/AS1 pp. 183-184,189-190 E2/AS2 p. 191 E2/AS3 pp. 193-204 Index
Errata 2	Effective from 24 December 2011 until 14 August 2014	p. 2 Document History, Document Status p. 9 Contents	pp. 29, 41, 43, 49, 55-57, 80, 81, 87, 91, 93, 94, 101, 106-108, 110-115, 117, 158, 160, 172, 176, 191 E2/AS1
Amendment 6	Effective from 14 February 2014 until 30 May 2017	p. 2A, Document History, Document Status p. 5, Contents pp. 13,15,16A References p. 17, Definitions	p. 23, E2/VM1 1.5.1, 1.5.2, 1.5.3 pp. 36, 68, 172, 175, 175 E2/AS1 4.3.4, 8.3.4.2, Tables 20, 21, 22
Amendment 7	Effective 1 January 2017 until 31 March 2019	p. 16A References	
Amendment 8	Effective from 30 November 2018 until 31 October 2019	p. 5 Contents p. 14 References	p. 21–23A E2/VM1 1.3, 1.3.1, 1.3.2, 1.3.2.1, 1.4.4.1, 1.4.5.1, 1.5, 1.6, 1.7
Amendment 9	Effective 27 June 2019	p. 5 Contents	p. 21 E2/VM1 1.0
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.			

2B

Contents

Amend 2 Jul 2005

Amend 5 Aug 2011

Amend 5 Aug 2011

Verification Method E2/VM1

Amend 9 Jun 2019

1.0 Cladding systems of buildings up to 10 m in height, including junctions with windows, doors and other penetrations

1.1 General

This Verification Method is for determining compliance with *NZBC* E2.3.2 of *cladding systems* and associated window and door junctions only, for *buildings* of importance Levels 1 or 2 as described in Table 1.1(a) of NZS 3604.

The tests in this Verification Method shall be undertaken in a test facility with IANZ or equivalent accreditation for testing the *weathertightness* of *claddings* to the procedures of AS/NZS 4284, and as used to establish the performance criteria detailed in Paragraph 1.4 Test Procedures.

COMMENT:
The *weathertightness* testing of AS/NZS 4284 is modified in this Verification Method for generic domestic-oriented *cladding* because the Standard was developed primarily for testing specific, non-absorptive facades and curtain wall systems on high-rise commercial *buildings*.

1.2 Scope

1.2.1 The scope of this Verification Method shall be restricted to *buildings* that:

a) are in accordance with the scope of Paragraph 1.0 of E2/AS1, and within the *wind zones* covered by Section 5 of NZS 3604, and

b) have *claddings* that include a drained and vented cavity of nominal 20 mm minimum depth with minimum ventilation opening of 1000 mm^2/m at the foot, including any *claddings* that require a rigid *wall underlay* in accordance with Paragraph 9.1.7.2 of E2/AS1, and

c) include window and door units that are manufactured to comply with the relevant requirements of NZS 4211, and

Amend 5 Aug 2011

d) may include *buildings* based on (a), (b) and (c) above, but with specific engineering design frame elements of at least equivalent stiffness to the *framing* provisions defined in NZS 3604.

Amend 5 Aug 2011

1.2.2 This Verification Method may also be used for individual *buildings* that comply with (a) to (d) above, and that are designed for a specific wind pressure up to a maximum ultimate limit state (ULS) of 2500 Pa.

COMMENT:
While the test specimens used for this Verification Method may include window and door units, it is only the junctions of these elements with other *cladding* elements that are assessed in the test.

1.3 Specimen details

The minimum size of the wall *cladding* specimen to be tested shall be 2.4 m x 2.4 m.

Any *cladding system* within an Extra High *wind zone* or subject to a specific design wind pressure up to ULS 2500 Pa that relies on this Verification Method shall have a rigid *underlay* installed in accordance with Paragraph 9.1.7 of E2/AS1. In either of these two circumstances, a rigid *underlay* is not necessary for the verification tests as a flexible *wall underlay* may suffice – unless the *cladding* to be tested specifically includes a rigid *underlay* as part of the *cladding system*, and its removal would compromise the structural fixings or support for the *cladding*.

COMMENT:
Testing a *cladding* with flexible *underlay*, but then verifying the *cladding* for use with rigid *underlay*, is allowed in order to make testing quicker and easier. It is expected that *cladding systems* with a cavity within the scope of E2/VM1 will perform better with a rigid *underlay* than with a flexible *underlay*, although this has not been proven.

For *cladding systems* intended to be available for use in multiple situations, including *cladding systems* for which a New Zealand supplier has commissioned the testing for the purposes of providing product assurance, Class 1 or Class 2 testing must be selected. Class 1 and Class 2 each include a mandatory

Amend 8 Nov 2018

minimum set of details to be included in the specimen. If any of the mandatory details from Class 1 or Class 2 are omitted from the specimen, then E2/VM1 compliance to Class 1 or Class 2 cannot be claimed.

Amend 8 Nov 2018

1.3.1 Class 1: *Cladding systems* where only vertical joints are required, and having no penetrations through the *cladding*.

Amend 8 Nov 2018

Test specimens shall include vertical joints, internal and external corners of the external *wall* junctions, and footer and header termination systems.

Amend 8 Nov 2018

1.3.2 Class 2: All *cladding systems* within the scope of this document that are not Class 1.

Testing is to include representative samples of penetrating *building elements* or joints to be used.

a) Test specimens must include vertical and horizontal *control joints*, internal and external *wall* junctions, windows and/or doors, a *parapet* or *enclosed balustrade capping* with a *saddle flashing*, a 200 mm diameter pipe penetration, and footer and header termination systems.

b) Test specimens may also include other details relevant to the use of the *cladding system* on the building, such as *scupper* penetrations, meter boxes, junctions with other *cladding systems* or *building elements*, and junctions where roof and *enclosed deck* terminations, *gutters*, or other features occur within walls (including within the sides of framed chimneys with *cladding*).

Amend 5 Aug 2011

COMMENT:

Although only certain details are mandatory for inclusion within test specimens, the inclusion of other additional details could enable manufacturers, suppliers and specifiers who commission tests to demonstrate compliance for a wider range of situations than those which the mandatory details cover. Manufacturers, suppliers and specifiers should ensure that test specimens include all *cladding* details or junctions for which compliance with this Verification Method is intended to be demonstrated and claimed.

Amend 8 Nov 2018

A 15 mm diameter round hole shall be formed in the internal *lining* below the window to simulate the effect of power points, light switches and other air leakage through the internal *lining*. Where a *cladding* specimen is larger than 2.4 m x 2.4 m, an additional 15 mm hole shall be added for each 7 m² of *cladding* area (or part thereof).

Amend 5 Aug 2011

1.3.2.1 To allow the observation of any water penetration, one of the following options must be followed:

a) For specimens that include a rigid *wall underlay*, adjacent to critical elements where visual access is required a proportion of the *underlay* shall be made using transparent material of sufficient structural capability and similar airtightness to the specified wall *lining* material, and able to resist the applied wind pressures. The proportion shall be at least 2%, but shall be small enough that it does not affect the ability of the specimen to represent the performance of the *underlay* within the *cladding system*; or

b) For specimens that do not include a rigid *wall underlay*, adjacent to critical elements where visual access is required, the *wall underlay* shall be cut through and removed, or fastened back onto the *framing*, with a rigid transparent internal *lining* used to support the air pressure. It is required that between 2% and 100% of the area of the *wall underlay* (or equivalent) be so removed; or

c) For specimens that include a flexible or a rigid *underlay*, small video cameras and/or borescopes shall be installed within the cavity to provide a clear view of all critical elements where visual access is required. Borescopes and cameras must be positioned clear of all junctions, and must be installed in a manner that does not affect the airtightness of the air barrier (rigid *underlay* or internal wall *lining*) or affect the path of any moisture that enters the cavity.

Amend 8 Nov 2018