BRANZ
BUILDING ON KNOWLEDGE

TP1059

Weathertightness Test on Quik'n Tuff Cladding Using Rondo Beta-Fix System

Author: **Mark Hearfield**
Building Physics Technician

Reviewer: **John Burgess**
Senior Scientist

Contact:
BRANZ Limited
Moonshine Road
Judgeford
Private Bag 50908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax. +64 4 237 1171
www.branz.co.nz

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WEATHERTIGHTNESS TEST ON QUIK'N TUFF CLADDING USING RONDO BETA-FIX SYSTEM

1. CLIENT

EIFS International
PO Box 2106
Wellington
New Zealand

2. SAMPLE DESCRIPTION

The system as tested was a 'Quik'n Tuff' wall system consisting of Conpolcrete$_{TM}$ cladding panels installed on a timber frame using 'Rondo Beta-Fix System' metal channel and clip battens. Clear plastic was used instead of the reflective sarking and was mounted between the cladding and framing (Figure 1). The bottom plate detail used was Rebated Slab Type 1 (AS/NZ) (Figure 2).

The panel was constructed with one recessed window and one face fixed window. A 200mm kickback in the timber frame was used to give an external (male) and internal (female) corner in the sample. The internal corner also contained a vertical control joint (see Photo 1).

The sample was built by the client. Cladding fixing and corner details were in accordance with the manufacturers specifications as detailed in Figures 1-12.
Masking tape was used as the air-seal at the internal face of the windows. Internal linings were replicated by holding air pressure at the line of the building wrap.

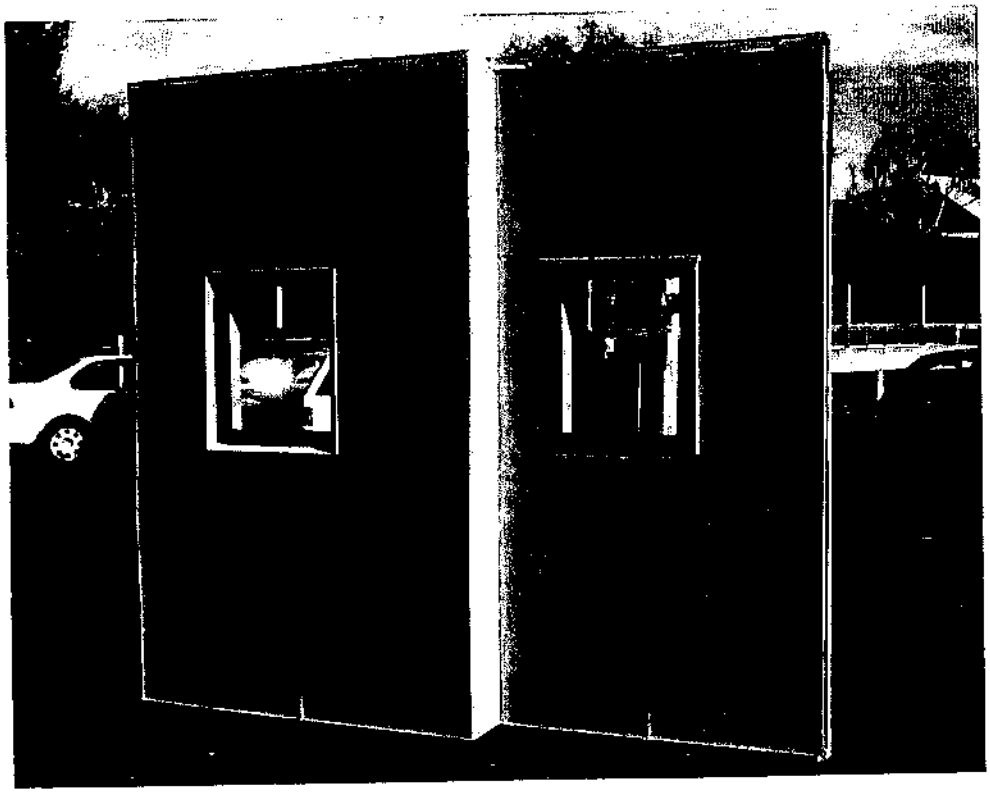

Photo 1 Sample layout

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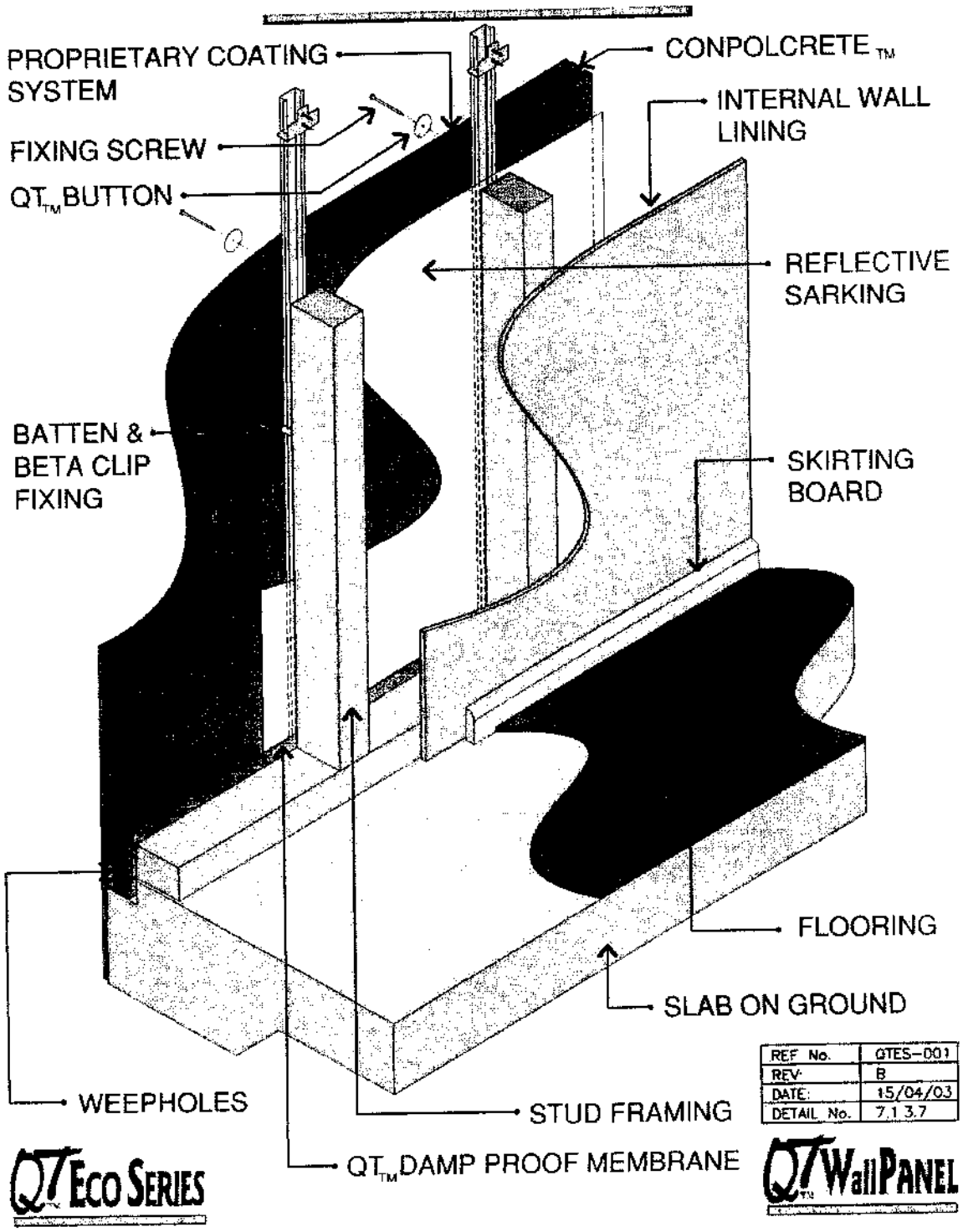

Figure 1: System Overview

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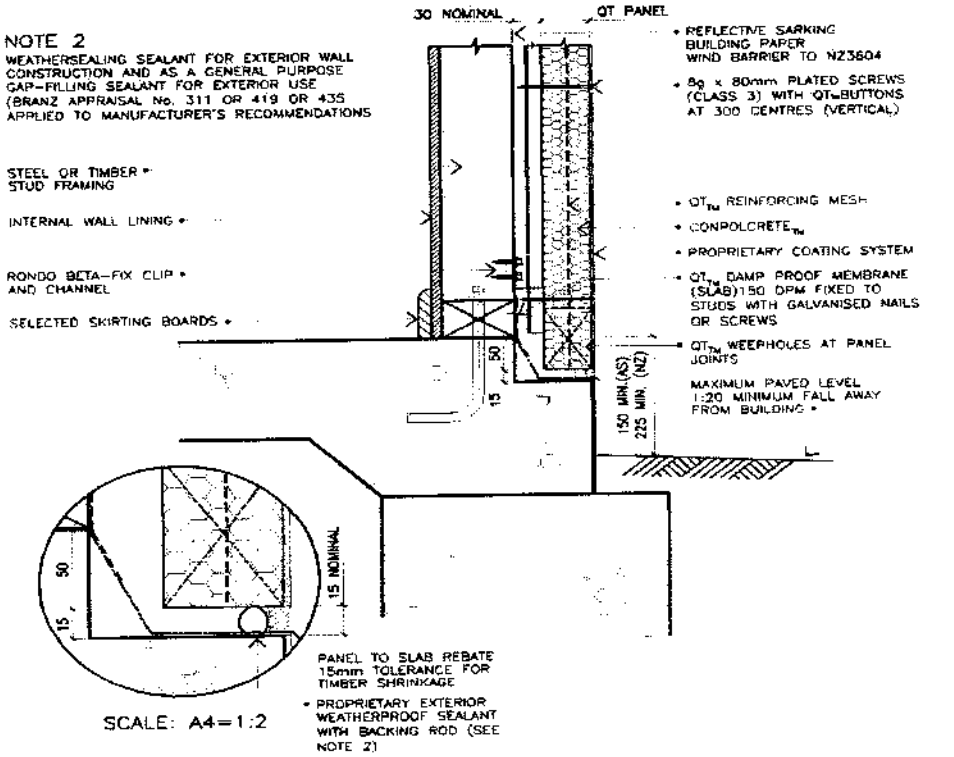

Figure 2 Footing detail

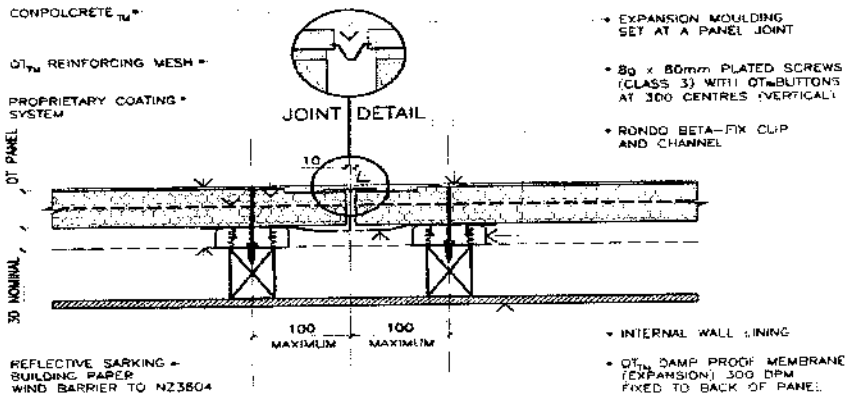

Figure 3: Vertical Control Joint

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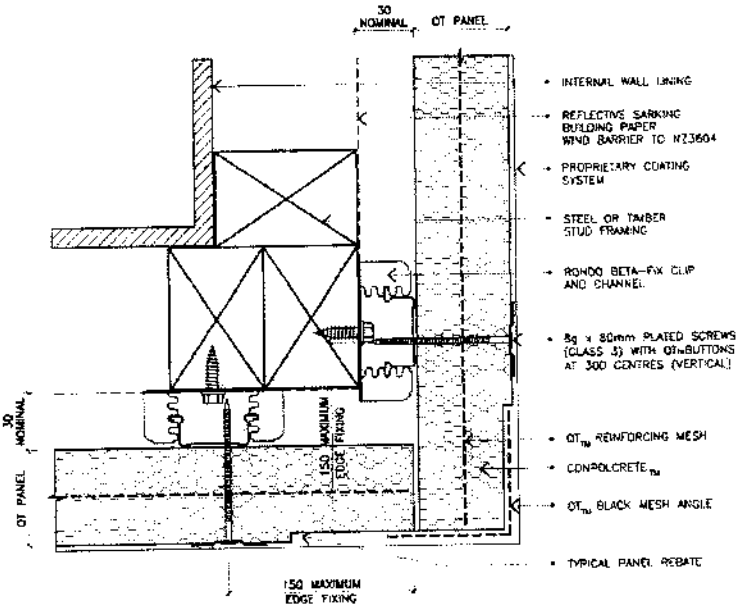
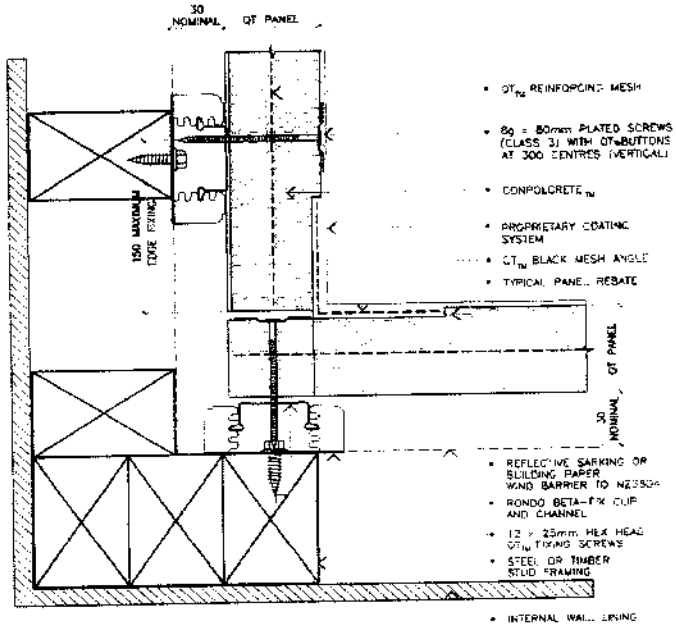


QT™ECO SERIES PANEL
TYPICAL EXTERNAL CORNER DETAIL (AS/NZ)
USING RONDO BETA-FIX SYSTEM

SCALE A4=1:2

REF No.	QTES-001
REV	B
DATE	18/04/03
DETAIL No.	7.1.6.10

Figure 4: External Corner



QT™ECO SERIES PANEL
TYPICAL INTERNAL CORNER DETAIL (AS/NZ)
USING RONDO BETA-FIX SYSTEM

SCALE: A4=1:2

REF No.	QTES-002
REV	B
DATE	18/04/03
DETAIL No.	7.1.6.8

Figure 5: Internal Corner

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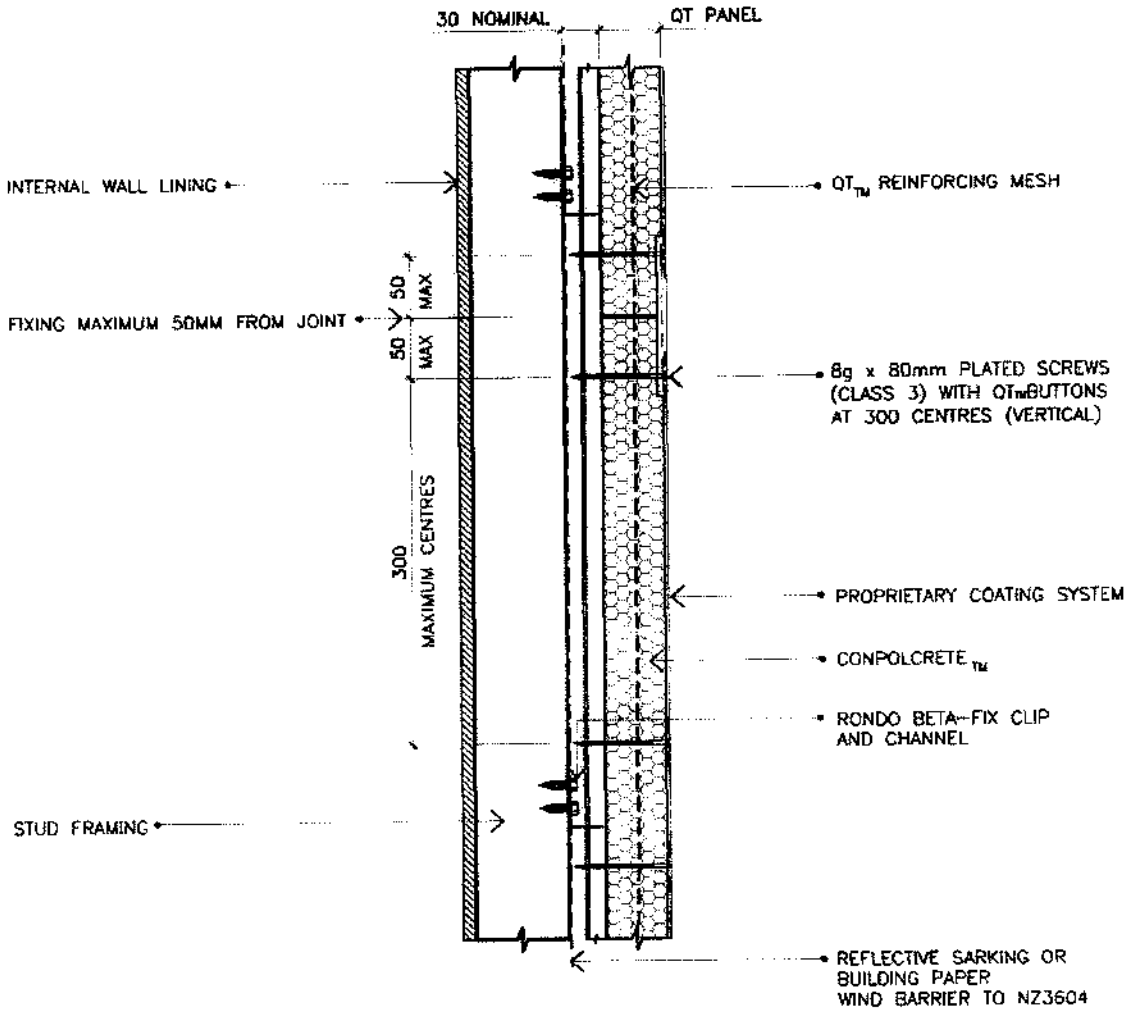

CROSS SECTIONAL VIEW

QT™ECO SERIES PANEL USING RONDO BETA-FIX SYSTEM TYPICAL CONSTRUCTION DETAIL

SCALE: A4=1:5

REF No.	QTES-001
REV:	B
DATE:	18/02/03
DETAIL No.	7.1.6.6

Figure 6: Cladding Cross Section

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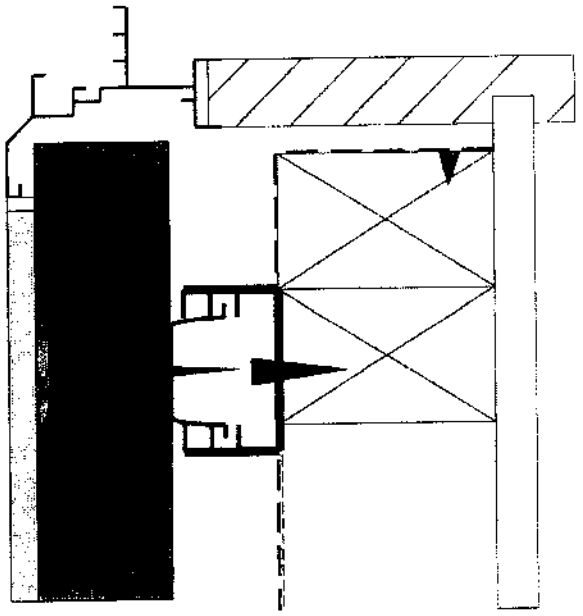

Figure 7: Flush Window Jamb Details

Quik'nTuff Wall Systems

Flush Window Sill Detail (NZ)

Building Wrap

Damp Proof Membrane

Weatherproof Sealant

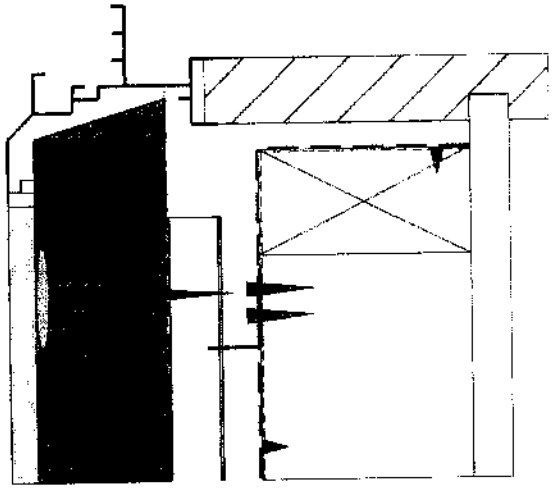

Figure 8: Flush Window Sill Details

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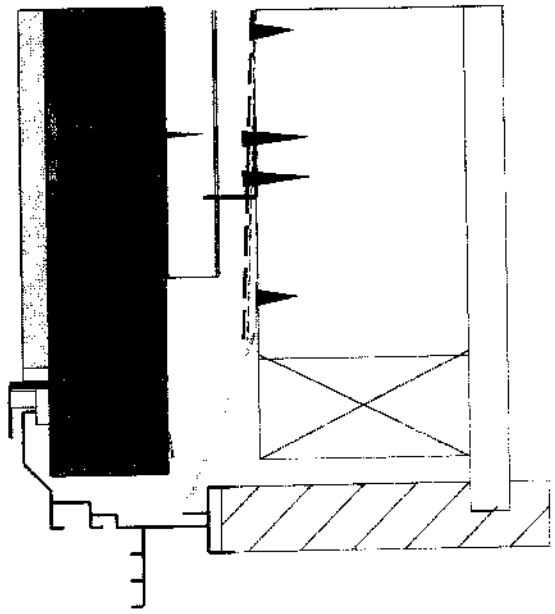


Figure 9: Flush Window Head Detail

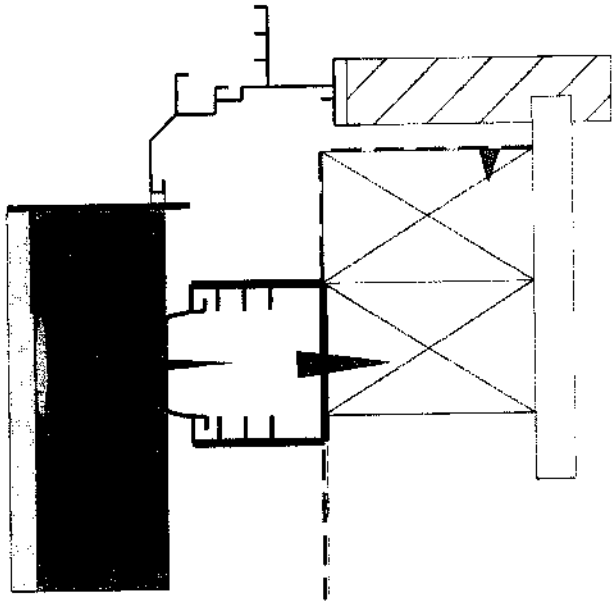


Figure 10 Recessed Window Jamb Detail

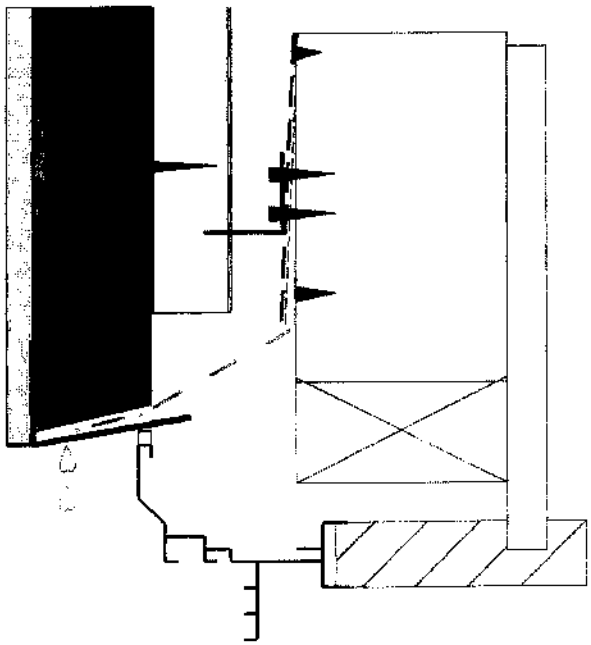
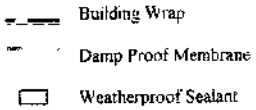


Figure 11 Recessed Window Head Detail



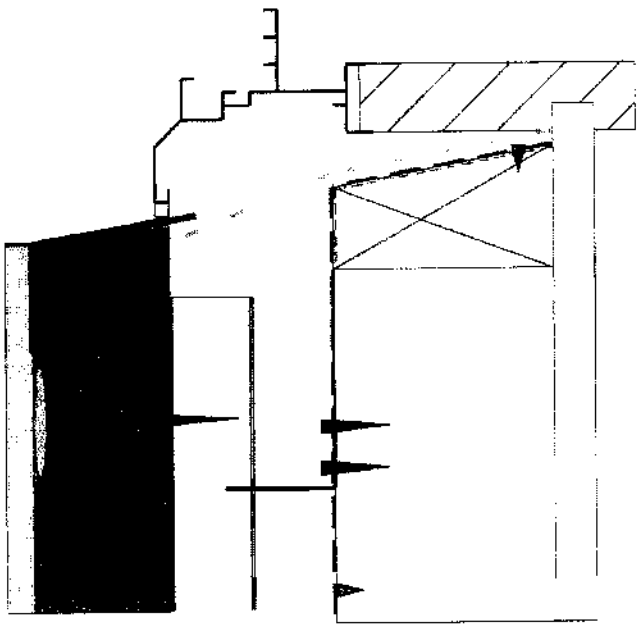


Figure 12 Recessed Window Sill Detail

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3. TEST

The sample was installed in the BRANZ weathertightness testing facility on Monday 5 May 2003 followed by testing to the general procedure of AS/NZS4284. The client was present.

The test was undertaken to determine the compliance of the composite cladding system and joints with the requirements of clause E2 of the New Zealand Building Code, through the use of an extension to the verification method included in clause E2 of the New Zealand Building Code – E2-VM1. BRANZ has established that for monolithic cladding systems assurance of weathertight performance is achieved through the modified use of the AS/NZS4284 building façade weathertightness test followed by a BRANZ-designed extension to this test, as outlined below.

3.1 Standard AS/NZS4284:1999 test

The standard test requirement is E2-VM1. This involves the exposure of a test sample to the requisites of clause 7.5 and 7.6 of the AS/NZS4284 'Testing of Building Facades'. Clause 7.5 involves subjecting the sample to a minimum of a 5 minute pre-wetting, followed by static air pressure at 300Pa and concurrent water spray exposure for 15 minutes at a minimum rate of 0.05 l/m^2s. Clause 7.6 involves subjecting the sample to fluctuating air pressure with concurrent water spray at the same intensity. The first stage of this exposure is at a pressure that fluctuates between 150 Pa and 300Pa. The second stage has a fluctuating air pressure varying between 300 and 600 Pa, and the third stage involves varying the air pressure application from 0.3 Wp to 0.6 Wp, where Wp is the design pressure of the site, or in the absence of a specification is 2kPa. Stages two and three are not typically performed for domestic buildings.

Note: Given that the requirements for testing and the pass/fail criteria are currently under discussion by the BIA, the following are BRANZ current interpretations of the requirements for appraisal purposes. It is required that the external cladding prevent the passage of water through it during the static pressure portion of the standard test. The cyclic pressure test is not routinely performed. If the sample initially fails, documented modifications are able to be made (such as the application of sealant) to prevent the entry of water. These modifications must be assessed, and practical solutions to the leakage found before a 'pass' will be registered in this test.

3.2 Modified AS/NZS4284:1999 test

Firstly, the static pressure regime of the standard test is applied across the wet wall only, rather than across the complete sample. This is achieved through either modifying the area of vents between the batten cavity and the test conditions, or by modifying the leakage area through the clear plastic, simulating the housewrap and the internal drywall. This test replicates the effect of the cyclic pressure from the AS/NZS4284 test, in a known way.
Secondly, defects are introduced through the external face of the cladding system to assess the ability of the secondary defences of the cladding system to remove water without wetting the framing cavity or framing. A static pressure is then generated across the wetwall only. The defects typically take the form of five mm diameter holes (or equivalent) that are formed through the external cladding to allow water to penetrate to the secondary line of defence, which may be formed of the building paper/building wrap, flashings and sealing materials. These were located in the following places, and introduce water through to the outer face of the building paper:

I. Through the LH jamb of a window (See Photo 2)
II. Through the RH jamb of a window (See Photo 2)
III. Through the cladding immediately above the window head (See Photo 2)
IV. Through the vertical control joint (See Photo 2)

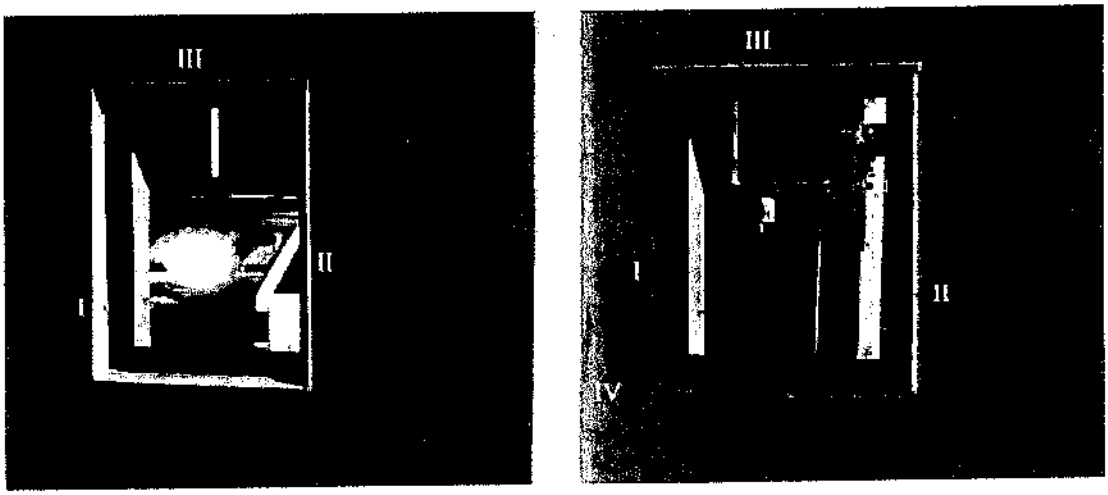

Photo 2: Introduced defects

Note: In the modified test, it is required that the cladding system manage any penetrating water, and demonstrate no transference of water from the back of the cladding or any cavity structure onto the face/line of the building wrap (plastic). Documented modifications are able to be made during the test to result in a pass. Spattering of water directly onto the building wrap (plastic) from defects is not deemed a fail.

Each instance where water was not controlled by the secondary defences but was able to wet the building wrap over the insulation cavity or framing and travel more than 300mm is labelled a fail. A pass is achieved where the system adequately controls water that has entered the cladding cavity without wetting the building wrap over the insulation cavity or the framework as viewed from the line of the interior lining.

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4. RESULTS

4.1 Results of Test to method from AS/NZS4284:1999 test (E2-VM1)

Pass

4.2 Results of Modified AS/NZS4284:1999 test

Pass.

4.3 Discussion

- Initial testing showed a defect in the footer which resulted in spattering of water within the cavity up 1200mm. This was modified to an 'L shape' to seal the cavity flashing as was intended.
- The recessed window initially had a leak through the left hand sill weep hole when tested at static pressure, which resulted in water hitting the wrap with water at 1 drop per second flowing down the back of the cladding panel. Then at both the cyclic and the static pressure tests the leakage increased to 10 drops/second from the weep hole flowing down the back of the cladding, but not hitting the wrap. The weep hole was sealed and further testing was successful.
- The testing showed that 90% of the air pressure difference was across the cladding panel. with only 10% falling across the housewrap.

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