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Report 22-07.a

AliClad horizontal and vertical aluminium weatherboard cladding system in accordance with AS/NZS 4284:2008 'Testing of Building Facades'

Project:	AliClad weathertightness
Client:	The Building Agency 14A Link Drive Wairau Valley Auckland, 0627
Specifier:	The Building Agency
Sample designer:	The Building Agency
Installer:	The Building Agency
Test dates:	2 - 3 June 2022
Test Schedule:	The test order specified in AS/NZS 4284:2008 was followed, with sections a, b, c, d, e, g, and h requested.
Persons present:	Richard Gibbs (Facadelab manager), and for parts of the testing: Emmett King, Mark Cinco, Lawrence Alcazar, Ranesh Prasad, Andre Van Der Walt.
Test facility:	Facadelab Ltd, 320 Rosedale Rd, Albany, Auckland.

IANZ accredited testing officer: Richard Gibbs

IANZ accreditation number for testing 1091, including AS/NZS 4284.

Notes:

- The "Test Request' has been attached as Appendix 10.
- The client has certified (See Appendix 10.3) that the sample is accurately represented by the drawings attached or referenced.
- Results relate only to the sample as received.
- Report updated to clarify excluded details from 7.2.1 and edit Figure 5

Tested by: Richard Gibbs Checked by: Ange Housley

Figure 1: Photo of centre of 'wet side' of sample prior to testing

Figure 2: Photo of 'wet side' of sample prior to testing

Contents

1. Figures

2. Tables

3. Summary

The AliClad horizontal and vertical aluminium weatherboard cladding system built on a timber frame was subjected to tests from the AS/NZS 4284:2008 testing suite at the Facadelab facility in Albany.

3.1. Preliminary tests

Complies – air pressure.

Complies – water penetration.

3.2. Serviceability limit state deflection test

Complies with deflection requirements at ±2500 Pa.

3.3. Air infiltration test

Complies with requirements at ±150 Pa.

3.4. Static water penetration test

Complies with requirements at +750 Pa.

3.5. Cyclic water penetration test

Complies with requirements, testing to 375 - 750, 500 – 1000, and 750 – 1500 Pa cyclic water.

3.6. Seismic testing at serviceability limit state.

Complies with requirements at ±10mm in-plane deflection, and subsequent cyclic water test requirements.

3.7. Pressure test at ultimate limit state

Complies with requirements at ±3.5 kPa and ±5.5 kPa

3.8. Seismic test at ultimate limit state.

Complies with requirements at ±60 mm and beyond, to ±70 mm in-plane deflection.

3.9. Supplementary ULS seismic wet-wall water penetration test

Controlled water noted with 50 Pa pressure across wetwall.

4. Notation

The reference numbers from the AS/NZS 4284:2008 ‘Testing of building facades’ document are used in the following, for ease of reference.

5. Principle

A sample of a building façade forms one face of an eternally mounted pressure chamber and is sealed at its perimeter and then successively subjected to tests.

6. Apparatus

The AliClad horizontal and vertical aluminium weatherboard cladding system was tested using the IANZ-accredited Facadelab test facility located at 320 Rosedale Rd, Albany.

7. Sample

7.1. Test sample

7.1.1. Orientation

The orientation of all elements are recorded in this report as viewed from the outside of the test booth (dry side), being the inside of the façade when constructed. The inside of the test booth has the outside (wet side) of the façade.

7.1.2. Sample Description

The test arrangement consisted of an assembly of the AliClad system with overall size 4214 mm x 3429 mm high. This included vertical and horizontal aluminium weatherboards, installed to a proprietary aluminium support rail system. Details for both orientations included:

Soffits, parapets, soakers, saddles, inter storey joints, seismic joints, internal & external corners, windows (on WANZ support bars and inset window configurations), overflows/scuppers, large & small pipe/services penetration, garage door jamb junction, vertical to horizontal transitions under and over windows, top of cladding, bottom of cladding, downpipe support penetration, soffit penetration.

This unit was installed into a timber framed opening in the test rig. Allowance for seismic movement was made prior to the seismic tests by removal of the interior lining.

The interior lining in the specimen was applied to the “dry side” of the framing line, and was clear polycarbonate, which allowed removal of the “RAB” for the seismic testing to solely assess the cladding response to in-plane racking.

The polycarbonate in this orientation also afforded a clear view of every element within the sample, allowing visual confirmation of performance.

The faces of timber members were packed continuously with 6mm polycarbonate strips to ensure full simulation of a rigid air barrier being present in the cavity without being present for the test. This ensured all flashing set outs and details aligned with the drawings.

The construction sequence of the sample, together with ‘as-built’ drawings are shown in the photos and drawings following.

The infill structure around the sample was constructed of 140 x 45 mm timber framing constructed to NZS3604 requirements.

7.2. Drawings

Drawings are referenced in the appendices at the end of this report.

7.2.1. Modifications to the sample during testing

As the testing progressed, several elements showed leakage that did not have an influence on the cladding, so were removed from the test.

These details included:

- two ‘letter boxes’
- one parapet face flashing junction, above the top RH window (this is the same detail as in the other parapet)
- The internal glazing beads of the windows were taped from the window frame into the glazing. This did not affect the AliClad window junctions.
- The design of the area under the two lower windows did not permit observation for performance, so these lower window sills and *the associated junction to the* jambs were not able to be assessed during testing. For clarity - the Head detail and its junction to the Upper Jamb are included in the results of this report.

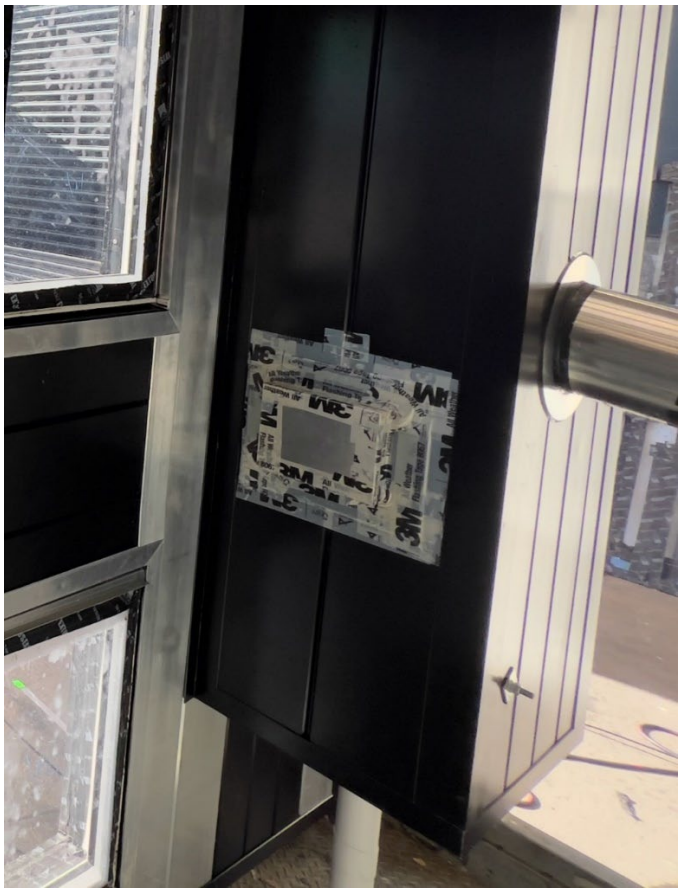


Figure 3: Letter box- sealed to remove from the test

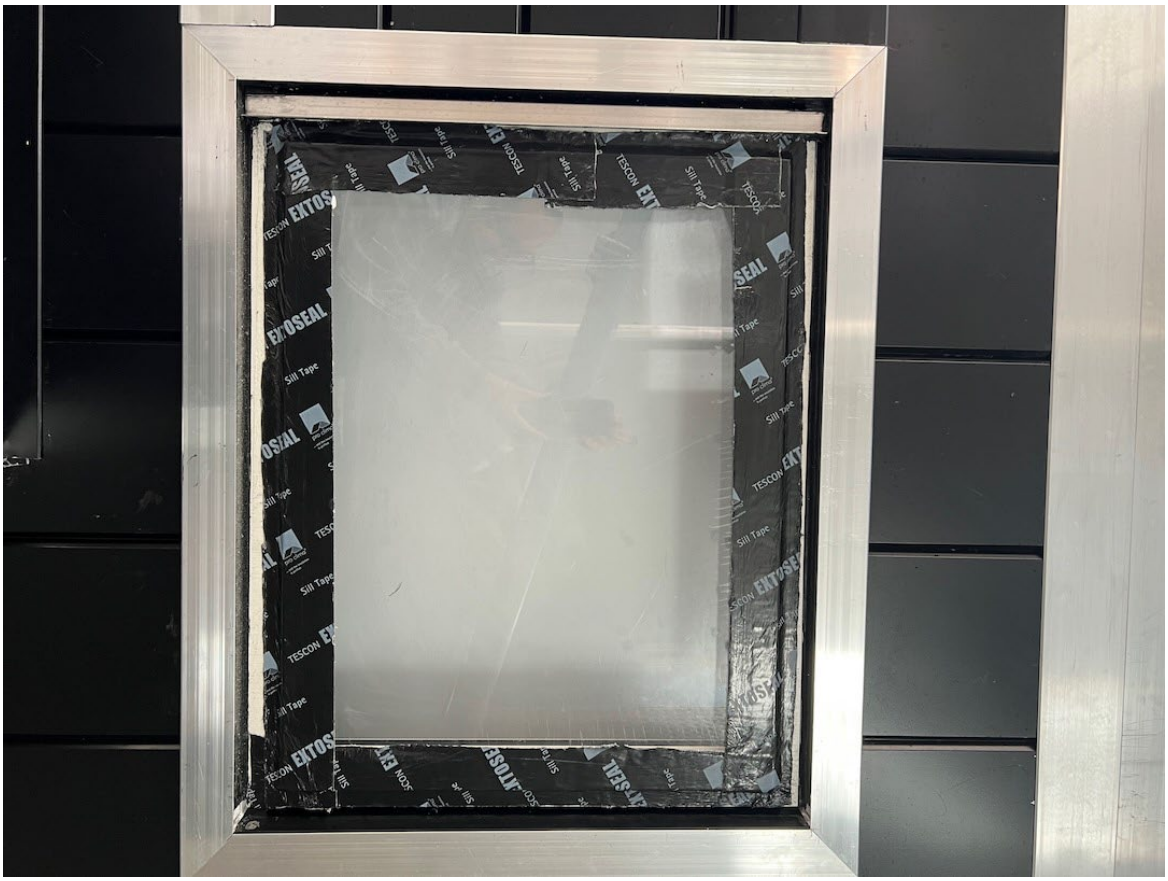


Figure 4: Window taped up to remove the glazing-to-frame joint from the testing

Any leakage due to the above listed elements was isolated and after confirmation of its effect, was eliminated from consideration in testing.

The other modifications to the sample during testing were as follows:

- Prior to the seismic SLS testing, the 6mm polycarbonate sheet (serving as a rigid air barrier on the “dry side” of the rig) was removed from the area to be racked, ensuring that the racking was not restricted by this bracing.
- Fixings between the seismic beam and the sample were modified during displacement testing to achieve the desired displacements in the second set of ULS tests.

Figure 5: Parapet- sealed to remove from the test

8. Procedure

Note the same clause numbers have been used as in AS/NZS 4284 for ease of reference in the below.

8.1. Test Sequence

8.1.1. General

The tests were performed using the testing procedures of AS/NZS 4284:2008 in the cladding test facilities of Facadelab Limited in the following sequence.

- Preliminary SLS pressure test at ±2500 Pa
- Preliminary water test (Static and cyclic) at 750 Pa, and cycles from 375 to 750, 500 – 1000, and 750 - 1500 Pa.
- Serviceability deflection tests on a timber stud at ±2500 Pa.
- Air infiltration test on the total of the sample and booth at ±150 Pa
- Water penetration static at 750 Pa
- Water penetration cycles from 375 to 750, 500 – 1000, and 750 - 1500 Pa.
- Removed polycarbonate air barrier and checked weathertightness of wetwall at 50 Pa
- Seismic SLS deflection at ±10 mm, followed by cyclic water test
- ULS air pressure at ±4.15 kPa, then other pressures up to ±5.6 kPa
- ULS Seismic test at ±75 mm lateral displacement
- Post ULS Seismic wet-wall water test – (information only)

8.1.2. Variation in test sequence

There was no variation in test sequence from the specification. Clause 8.9.2 allows for the ULS displacement test (seismic ram) to be carried out before or after the ULS structural test (air pressure). In this test the ULS structural test was carried out before the ULS seismic displacement test.

Wetwall tests (from EM7) were performed after the SLS seismic and cyclic water tests, and after the ULS seismic test for information.

8.2. Preliminary Tests

8.2.1. General

Preliminary testing (as below) was conducted.

8.2.2. Preliminary Static air Pressure

The test sample was subjected to the positive and negative SLS design wind pressures. Air pressures of +2.50 kPa and -2.50 kPa were applied to the test sample.

8.2.3.Water

8.2.3.1. Preliminary Static Water test

A preliminary static water penetration test at an air pressure of 750 Pa was carried out as required by clause 8.5 of AS/NZS 4284.

8.2.3.2. Preliminary cyclic Water test

A preliminary cyclic water penetration test at air pressures varying as follows, was carried out as required by clause 8.6 of AS/NZS 4284.

375 – 750 Pa

500 – 1000 Pa

750 – 1500 Pa

8.3. Structural Test at Serviceability Limit State (SLS)

8.3.1.Structural Test Pressures

The SLS test pressures used were calculated by the specifier as +2500 Pa, and -2500 Pa and applied to assess the deflection of a full height single timber stud.

8.3.2.Location of the Displacement Transducers

The displacement transducers were located as close as possible to the end of the timber stud. The photo shows the actual locations as tested which was within 5 mm of the end of the stud.

Figure 6: SLS displacement transducers on stud

8.3.3. Pressure Loading Sequence

The pressure loading sequence requested by the specifier was as per AS/NZS 4284 and required ramping up under positive pressure in five steps, being 20%, 40%, 60%, 80% and 100%, before continuing with negative pressures, as in Fig 1 of AS/NZS 4284: 2008. The optional ramping down pressures were omitted.

8.3.4. Displacement measurement of spandrel panels

*This testing is still underway and will be added as an Appendix when complete.

8.3.5. Calculation of deflection/span ratio

This was undertaken with a span of 2370 mm for the stud. The standard requires that no framing members shall deflect by greater than span/250 mm, with the distance measured between fixing positions.

8.3.6. Calculation of successive member displacement

This was undertaken with readings as the displacement increased and decreased, and is not allowed to exceed 3.0 mm.

8.3.7. Calculation of maximum displacement

This quantity was calculated and compared to the allowable displacement, which is normally 20 mm unless a lower displacement is allowed by the specifier.

8.4. Air Infiltration

An air infiltration test at a pressure difference of ±150 Pa across the unit of curtain wall was undertaken. The air infiltration shall not exceed 1.6 l/m²s.

8.5. Water Penetration by Static pressure

The static water penetration test pressure of 750 Pa was nominated by the specifier. No visible water leakage shall be recorded through the sample.

8.6. Water penetration test by cyclic pressure

The three stages of cyclic water penetration were nominated as follows:

Stage 1: 375 – 750 Pa

Stage 2: 500 – 1000 Pa

Stage 3: 750 – 1500 Pa

No visible water leakage shall be recorded through the sample.

8.6.1. Wetwall water penetration test by static pressure

A static water penetration test pressure of 50 Pa was nominated by the specifier to be applied just across the wetwall (as per E2/VM1) following removal of the polycarbonate serving as the air barrier. No visible water leakage shall be recorded through the sample.

8.7. Seismic Testing at Serviceability Limit State. (See 8.9)

8.7.1. Test displacement

A lateral displacement of ±10 mm between the cladding system and the surrounding framing was requested, being >3% of the 2555 wall height (giving 7.665 mm). With 5 cycles requested, and 10 cycles undertaken. The moving support beam was located above the cladding and bolted to the sample through a section of 15mm plywood fin. The displacements were measured with a laser system shining onto a measurement on the ground, or on an elevated scale. See Figure 7.

Figure 7: Elevated scale for measuring the seismic displacement with a laser

8.7.2.Procedure

8.7.2.1. Cyclic Water Test Post SLS Seismic Testing

Cyclic water testing was performed after the SLS testing.

Figure 8: Photo of specimen racking at maximum extent, showing gap at bottom of jamb stud.

8.8. Structural test at ULS

The test pressures of ±3500 Pa, and ±5500 Pa were nominated by the specifier.

8.9. Seismic Testing at Ultimate Limit State

A lateral displacement of >±60 mm was specified for the ULS seismic testing. There were some losses in the connections due to flex in the fixings, and the zero central point was not well obtained. A displacement of +70 and -75 mm was obtained by stopping the symmetric movement with the centre of the displacements aligned with the centre of the ram's stroke and re-attaching the ram in a non-symmetric manner to allow un-equal deflections in each direction. Hence the requirement was achieved in two separate sets of tests of ten cycles each.

8.9.1.Wetwall water penetration test by static pressure

A static water penetration test pressure of 50 Pa was nominated by the specifier to be applied just across the wetwall (as per E2/VM1). No visible water leakage shall be recorded through the sample.

9. Results

9.1. General

The performance requirements below, resulted from the request by the specifier.

9.1.1. Preliminary Tests

Results of preliminary testing undertaken are recorded below.

9.1.2. Preliminary Static Pressure

There was no visible dislodgement of any elements following SLS pressure testing.

9.1.3. Preliminary Static Water

Preliminary static water test			
Stage	Air pressure (Pa)	Duration	Result
0	0	5 minutes	Complies
1	750	15 minutes	Some water in cavity and on back of boards
2	0	5 minutes	Water remained.

Table 1: Preliminary static water test pressures

Water was noted on the backs of boards in some locations below complex joints, which remained controlled within the cavity, although some water was able to contact the inside of the polycarbonate which was taking the place of a rigid air barrier. (These issues were addressed in the later testing by removing the windows from the test).

9.1.4. Preliminary Cyclic Water

Preliminary cyclic water test			
Phase	Air pressure (Pa)	Duration	Result
	0	5 minutes	No water Leaks
1	375-750	5 minutes	No water Leaks
2	500-1000	5 minutes	No water Leaks
3	750-1500	5 minutes	No water Leaks
	0	5 minutes	No water Leaks

Table 2: Preliminary cyclic water test pressures

Water was noted on the backs of boards and was controlled within the cavity.

9.2. Structural test at serviceability limit state (SLS)

The full set of results for the SLS deflection test of the stud are contained in the appendix, section 0.

9.2.1. Deflection/span ratios

A summary of the deflection of the stud is shown in Table 3, where the uncertainty is expected to be within 2%. The deflection/span ratio of the stud complies with the requirements.

Deflection/span ratio					
Reference	Span (mm)	Max Net Deflection (mm)	Min span/ deflection	Requirement	Complies?
Stud	2370	-4.01	591	>1/250	Yes

Table 3: Deflection span table for stud

9.2.2. Successive member displacement

The successive member displacements are shown in Table 4

Successive member displacement (mm)				
Reference	Span (mm)	Value (mm)	Requirement	Compliance?
Stud	Z1	**0.315**	< 3.0	Yes
	Z2	**-0.285**	< 3.0	Yes
	Z3	**0**	< 3.0	Yes
	Z4	**-0.855**	< 3.0	Yes
	Z5	**0.75**	< 3.0	Yes
	Z6	0	< 3.0	Yes
	Z7	**1.555**	< 3.0	Yes
	Z6	**0**	< 3.0	Yes
	Z7	**0**	< 3.0	Yes

Table 4: Successive member displacements of mullion and glazing

The successive member displacements comply with the requirements.

9.2.3. Maximum displacement

The maximum displacement of the stud is shown in Table 3. The maximum displacements comply with the requirements.

9.3. Air Infiltration (AS/NZS 4284:2008 Part c)

This test was undertaken to determine the airtightness of the 4214 mm x 3429 mm high sample. The client did not want to undertake testing of the sealed sample, being content to only measure the total leakage of the booth plus the sample.

Overall area: 14.4 m²

Allowable leakage, at 1.6 l/m²/s 23.1 l/s

Airtightness measurements @ 150 Pa dP		
	Positive pressure (infiltration) l/s	Negative pressure (exfiltration) l/s
Measured (booth + sample)	8.55 ± 0.11	9.0 ± 0.5

Table 5: Air tightness leakage results

The uncertainty in the airflow measurements has been assessed with the facadelab Excel-based 'Expanded Uncertainty Calculator'. The airtightness of the sample complied with the air leakage requirements, having an air leakage of 8.55 ± 0.11 l/s under positive pressure, and 9.0 l/s under negative pressure. The expanded uncertainty is 0.11 l/s with a coverage factor of 2.07 in positive and is 0.5 l/s with a coverage factor of 2 in negative.

The expanded uncertainty is calculated with a coverage factor, k and defines an interval estimated to have a 95% level of confidence.

9.4. Water Penetration

The results of the static and cyclic water tests, as per clause 8.5 are shown below.

9.4.1. Static Pressure Water Penetration

Static water test			
Stage	Air pressure (Pa)	Duration	Result
0	0	5 minutes	No water Leaks
1	750	15 minutes	No water Leaks
2	0	5 minutes	No water Leaks

Table 6: Static water leakage results

There were no water leaks that penetrated beyond the cavity, meeting the requirement of the standard.

9.4.2. Cyclic Pressure Water Penetration

Cyclic water test			
Phase	Air pressure (Pa)	Duration	Result
	0	5 minutes	No water Leaks
1	375-750	5 minutes	No water Leaks
2	500 - 1000	5 minutes	No water Leaks
3	750 - 1500	5 minutes	No water Leaks

Table 7: Cyclic water test results

There were no water leaks beyond the cavity, meeting the requirement of the standard.

9.4.3. Wetwall static Pressure Water Penetration

When the air barrier was removed, water was observed passing through the cladding system into the cavity, where it was controlled across and along the backs of the weatherboards and allowed to drain. No water was observed crossing the cavity.

9.5. Seismic Testing at Serviceability Limit State (Clause 8.9.2)

Seismic Deflection Parameters (SLS)					
Limit State	Distance Specified (d ± x mm)	Distance Achieved (d ± x mm)	Cycles (n)	Period (T, seconds)	Pause at mid-point and ends (sec)
SLS	10	10 mm (Span/258)	5	Not specified	Not specified

Table 8: Seismic test results at SLS displacements

A lateral displacement of ±10 mm was specified and achieved. Span was 2581 with 10 mm deflection is a span ratio of 258. There was no visible damage to fixings, breakage of cladding or seals, or permanent distortion of cladding following SLS pressure testing.

9.5.1. Post seismic SLS Cyclic Pressure Water Penetration

Cyclic water test			
Phase	Air pressure (Pa)	Duration	Result
	0	5 minutes	No water crossing cavity
1	375-750	5 minutes	No water crossing cavity
2	500 - 1000	5 minutes	No water crossing cavity
3	750 - 1500	5 minutes	No water crossing cavity

Table 9: Cyclic water test results

9.6. BMU Restraint Test

Not requested.

9.7. Structural Test at Ultimate Limit State Air Pressure

Ultimate Limit State (ULS) air pressure test			
Air pressure (+kPa)	Result	Air pressure (-kPa)	Result
+ 4350	OK	-4140	OK
+ 5000	OK	-5600	OK
+5600	OK		

Table 10: Ultimate limit state air pressure results

On inspection, there was no visible dislodgement of weatherboards, trims, or accessories. There was no visible failure of fixings, breakage of cladding or permanent distortion of cladding following ULS pressure testing.

9.8. Seismic Testing at Ultimate Limit State

Seismic Deflection Parameters (ULS)					
Limit State	Distance Specified (d ± x mm)	Distance Achieved (d ± x mm)	Cycles (n)	Period (T, seconds)	Pause at mid-point and ends (sec)
ULS	>60 mm	-70, +75 (±5 mm)	10	Not specified	Not specified

Table 11: Seismic test results at SLS displacements

A lateral displacement of ±60 mm was specified. This proved difficult to achieve due to the arrangement of the sample in the test rig, and the location of the centre-point of the ram. Two sets of ten displacements were undertaken to achieve >60mm in each direction, achieved with a non-symmetric expansion and retraction of the ram. On inspection, there was no visible dislodgement of weatherboards, trims, or accessories. There was no visible failure of fixings, breakage of cladding or seals, or permanent distortion of cladding following ULS pressure testing.

9.8.1. Post seismic ULS wetwall test

A differential air pressure of 50 Pa was applied across the wetwall, After 5 min some water leakage was observed. In controlled areas, minor water leakage at one point was able to cross the cavity, however the quantity and intensity of this effect was nominal and localised.

(This test was supplementary to the normal AS/NZS 4284 test sequence, to provide further understanding around the ongoing resilience and performance of the system under extreme duress.)

Tested and reported by

Richard Gibbs
(Key technical personnel)
20th July 2022

10. Appendices

10.1. Test Request

THE BUILDING AGENCY
MATERIALS • SYSTEMS • SOLUTIONS

AliClad - 4284 03-06-22

Specific Test Requirements

Test: **AliClad**
Manufacturer: **The Building Agency**
Installation: **The Building Agency**

Section	*Test Name*	*Clause*	*Required parameters*	Pressure (Pa)	To Pressure (Pa)		*Duration*
			SLS ±	*2.5*	*kPa*		
			ULS ±	*3.5*	*kPa*		
			Additional ULS ±	*5.5*	*kPa*		
a	**Preliminary test**	8.2.1					
	SLS pressure	8.2.2/8.3	SLS(+)=		2500	Pa	± 10s Each Way
			SLS(-)=		2500	Pa	
	Water - Static	8.2.3/8.5	Static water test pressure =		750	Pa	15m
	Water - Cyclic	8.2.3/8.6	Cyclic test pressure Stage 1 =	375	750	Pa	05m
		8.2.3/8.6	Cyclic test pressure Stage 2 =	500	1000	Pa	05m
		8.2.3/8.6	Cyclic test pressure Stage 3 =	750	1500	Pa	05m
b	**Structural test at SLS**	8.3.2	Location of transducers noted on drawings?	Yes			
		8.3.3	Pressure steps?	500	Pa		
			Max. displacement? =	L/250	mm		
	Deflection/span limit ratio	**Structure**	Max. displacement? =	L/250	mm		
c	**Air infiltration test**	Test pressure	150	(+) Pa			
			150	(-) Pa			
		Air infiltration limit =	1.6	(l/ms^2s)			

d	**Water test (static and cyclic)**	Pressure (Pa)	To Pressure (Pa)	Duration and spray intensity	W_s - Multiplier	
	Static	750		15 min, 0.05 Lm^2s	0.3	
	Cyclic 1	375	750	5 min, 0.05 Lm^2s	0.15	0.3
	Cyclic 2	500	1000	5 min, 0.05 Lm^2s	0.2	0.4
	Cyclic 3	750	1500	5 min, 0.05 Lm^2s	0.3	0.6

	Additional water penetration requirements?		Repeat After Seismic at SLS - Per NZS4284 Procedure 8.9.2			
	Wet Wall Test	Test Pressure (±Pa)	Duration	Spray Intensity		
		50	15 min	0.05 Lm2s		
e	**Seismic at SLS**		± 10mm	(>3% of wall height - Per NZS 1170.5:2004 Table C.8)		
	Support beam movement allowed =		Any	Wall Height: 2555	mm	
	Number of cycles =		5x	SLS Movement Required: 7.665	mm	
	Frequency of movement =		NA	Hz		
			Repeat Section 'D' Parameters			
f	**BMU retraint**	**NA**	Test load across face of sample =		NA	kN
			Test load perpendicular to sample =		NA	kN
g	**Strength at ULS**	Test Pressure	3500	(-) Pa		
			3500	(+) Pa		
h	**Seismic at ULS**		> ± 60mm			
	Support beam movement allowed =		Any			
	Number of cycles =		10x			
	Frequency of movement =		NA	Hz		
	Additional Strength At ULS	Test Pressure	5500	(-) Pa		
			5500	(+) Pa		
	// NB - Stepped in ± 500 Pa increments up from 3500 Pa					
i	**Seal degradation**		NA			
	Describe seals to be altered		NA			

Additional - Wet Wall Test	Test Pressure (±Pa)	Duration	Spray Intensity
Investigative supplimentary test	50	15 min	0.05 Lm2s

Additional - Wet Wall Test	Test Pressure (±Pa)	Duration	Spray Intensity
Investigative supplimentary test	50	15 min	0.05 Lm2s

Additional Structural/Transom test

.: Separate Rig for Panel Deflections to be tested in tandem for measuremnet of Panel and Rail deflections, to be included in Apendices of Report

Deflection/span limit ratios:

Max. Structure Displacement=	L/250	
Substructure Rails =	L/250	
Weatherboards =	L/90	
Location of transducers noted on drawings?	Yes	
Pressure steps?	500	Pa
ULS Pressure	Rig Maximum	Pa

The above test request has been reproduced across three pages for legibility.

10.2. Drawings

The following drawings have been provided by the client following construction of the sample. The index follows (within this document), and then is repeated in the electronically attached drawings.

The laboratory can take no responsibility for any variation between the drawings and the sample tested.

10.3. Certificate of Identification

The following certificate of identification has been provided by the client verifying that the drawings accurately represent the sample tested.

THE BUILDING AGENCY
MATERIALS · SYSTEMS · SOLUTIONS

The Building Agency
14 Link Drive, Wairau Valley
Auckland, NZ

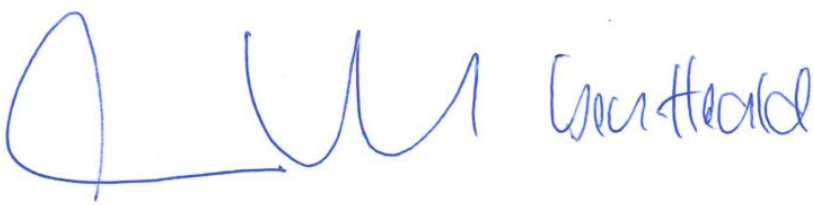
09 415 2669
info@buildingagency.co.nz
www.thebuildingagency.co.nz

AliClad – NZS 4284:2008 – Certificate of Identification

The detailed drawing set: *AliClad ASNZS4284 Test Rev.AB.pdf* dated 6th, July, 2022 in revision 'AB' accurately describes the test sample.
Contents of this drawing set:

ALICLAD ASNZS4284 Test Rev AB
Date of Issue
06/07/2022

Sheet No.	Sheet Title	Revision
0-01	CONTENT PAGE & GEN NOTES	AB
0-02	ALICLAD ACCESSARIES	AB
0-03	3D WINDOW HEAD	AB
0-04	3D WINDOW SILL	AB
0-05	3D TIMBER STRUCTURE	AB
0-06	3D CANOPY/WALL JUNCTION	AB
1-01	TIMBER STRUCTURE FL PLAN	AB
1-02	TIMBER STRUCTURE ELEV.	AB
1-03	TIMBER STRUCTURE ELEV.	AB
1-04	TIMBER STRUCTURE SECTION	AB
2-01	RAB SETOUT	AB
2-02	RAB SETOUT	AB
2-03	ALPHA RAIL SETOUT	AB
3-01	ALICLAD FLOOR PLAN	AB
3-02	ALICLAD PLANS	AB
3-03	ALICLAD ELEVATIONS	AB
5-01	SECTIONS	AB
5-02	SECTIONS	AB
6-01	SECTION DETAILS	AB
6-02	SECTION DETAILS	AB
6-03	SECTION DETAILS	AB
6-04	SECTION DETAILS	AB
6-05	SECTION DETAILS	AB
6-06	SECTION DETAILS	AB
6-07	SECTION DETAILS	AB
6-08	SECTION DETAILS	AB
6-09	SECTION DETAILS	AB
7-01	PLAN DETAILS	AB
7-01	PLAN DETAILS	AB
7-02	PLAN DETAILS	AB
7-03	PLAN DETAILS	AB
7-04	PLAN DETAILS	AB
7-05	PLAN DETAILS	AB
7-06	PLAN DETAILS	AB
8-01	DEFLECTION TEST	AB



Ben Heald - The Building Agency - Director

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Tested by: Richard Gibbs Checked by: Ange Housley and John Burgess

Tested by: Richard Gibbs

Checked by: Ange Housley and John Burgess

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ALICLAD

P - PRELIMINARY ISSUE
FC - FOR CONSTRUCTION
FA - FOR APPROVAL
I - INFORMATION

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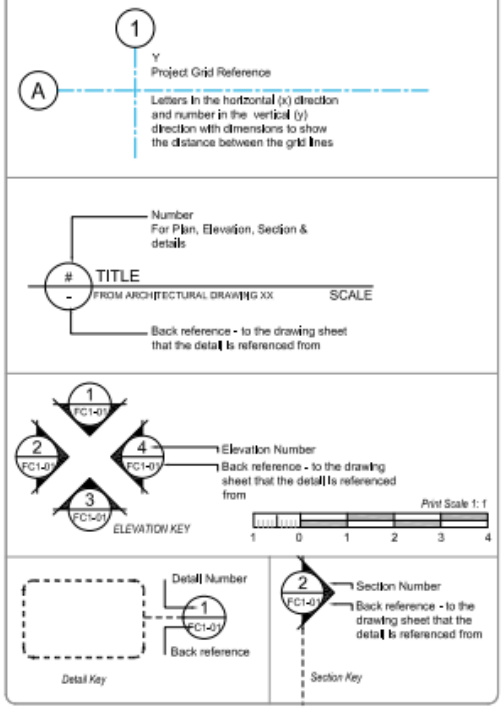
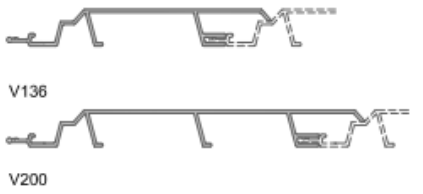
Date of Issue						
	Day	20	16	04	06	
	Month	04	05	07	07	
	Year	22	22	22	22	

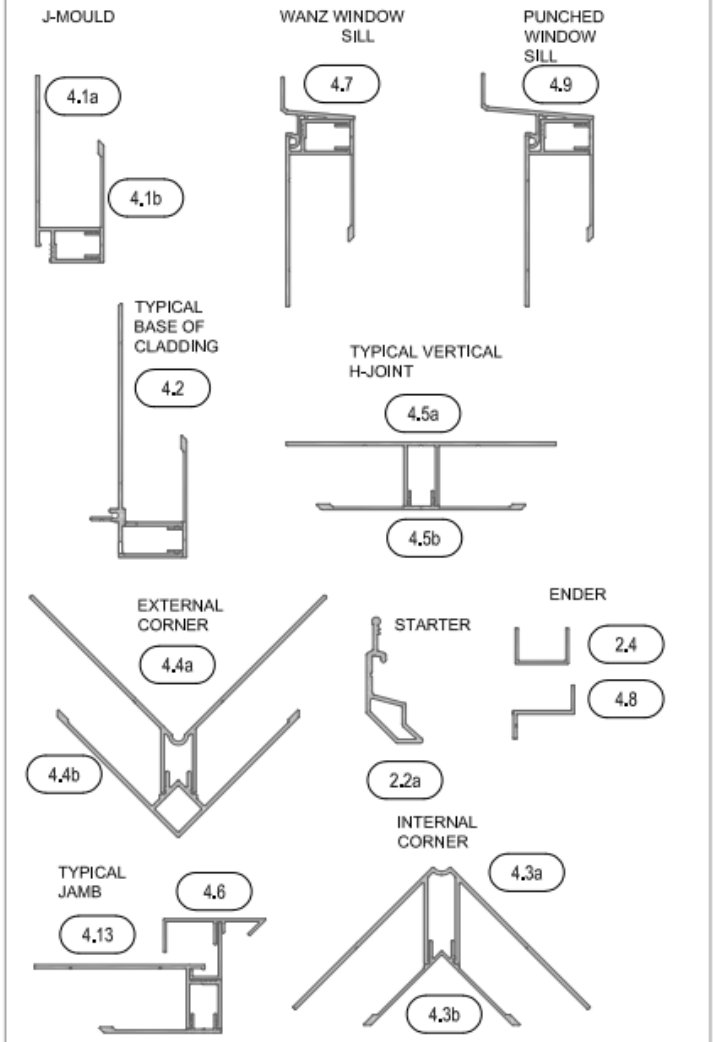
Sheet No	Sheet Title	Revision				
0-01	CONTENT PAGE & GEN NOTES	1	2	3	AB	
0-02	ALICLAD ACCESSARIES	1	2	2	AB	
0-03	3D WINDOW HEAD	1	2	2	AB	
0-04	3D WINDOW SILL	1	2	2	AB	
0-05	3D TIMBER STRUCTURE			1	AB	
0-04	3D CANOPY/WALL JUNCTION			1	AB	
1-01	TIMBER STRUCTURE FL PLAN	1	2	2	AB	
1-02	TIMBER STRUCTURE ELEV.	1	2	2	AB	
1-03	TIMBER STRUCTURE ELEV.	1	2	2	AB	
1-04	TIMBER STRUCTURE SECTION	1	2	2	AB	
2-01	RAB SETOUT	1	2	2	AB	
2-02	RAB SETOUT	1	2	2	AB	
2-03	ALPHA RAIL SETOUT		2	2	AB	
3-01	ALICLAD FLOOR PLAN	1	2	3	AB	
3-02	ALICLAD PLANS	1	2	3	AB	
3-03	ALICLAD ELEVATIONS	1	2	3	AB	
5-01	SECTIONS	1	2	2	AB	
5-02	SECTIONS	1	2	2	AB	
6-01	SECTION DETAILS	1	2	2	AB	
6-02	SECTION DETAILS	1	2	2	AB	
6-03	SECTION DETAILS	1	2	2	AB	
6-04	SECTION DETAILS	1	2	2	AB	
6-05	SECTION DETAILS	1	2	3	AB	
6-06	SECTION DETAILS	1	2	2	AB	
6-07	SECTION DETAILS	1	2	3	AB	
6-08	SECTION DETAILS	1	2	2	AB	
6-09	SECTION DETAILS	1	2	2	AB	
7-01	PLAN DETAILS	1	2	3	AB	
7-02	PLAN DETAILS	1	2	3	AB	
7-03	PLAN DETAILS	1	2	3	AB	
7-04	PLAN DETAILS	1	2	2	AB	
7-05	PLAN DETAILS	1	2	2	AB	
7-06	PLAN DETAILS	1	2	3	AB	
7-07	PLAN DETAILS	1	2	3	AB	
8-01	DEFLECTION TEST			1	AB	

TYPICAL SYMBOLS



CLADDING SCHEDULE





06/07/2022	AS BUILT	RP	MH/EK	AB
21/04/2022	ISSUED FOR APPROVAL	RP	MH/EK	A
DD/MM/YY	COMMENTS - NOTES	DRW	CHK	REV

Z:\Alpha\Test Wall Rev AB\Alpha Test ASNZS4284 Test Rev AB.dwg

DRAWINGS MUST BE READ IN CONJUNCTION WITH PROJECT SHEET FC0-01 AND FC0-02

THE BUILDING AGENCY
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Project Title: ALICLAD
AS/NZS 4284:2008 TEST
SHIPLAP CLADDING

Drawing Title: DRAWING REGISTER AND SYMBOLS

Drawn By: RP
Checked By: MH/EK
Scale @ A3: As Shown
Start Date: 19 MARCH 2022

Status: AS BUILT
Sheet No: 0-01
Rev: AB

10.4. Serviceability Deflections

10.4.1. Stud deflections

Serviceability Deflection						
Pressure	Gauge 1	Gauge 2	Gauge 3	Net Deflection		Span (mm)
(Pa)	Top	Mid	Down		Check	2370
	mm	mm	mm	mm	mm	Defl/Span
0	0	0	0	0	0	0.0000
2500	12.58	10.54	2.92	2.79	2.79	0.0012
0	1.17	1.09	0.38	0.32	0.315	0.0001
0	0	0	0	0	0	0.0000
500	6.2	3.88	0.73	0.42	0.415	0.0002
1000	7.83	5.44	1.23	0.92	0.91	0.0004
1500	9.17	6.89	1.72	1.45	1.445	0.0006
2000	10.5	8.35	2.2	2	2	0.0008
2500	11.76	9.77	2.66	2.56	2.56	0.0011
0	0.27	0.2	0.07	0.03	0.03	0.0000
0	0	0	0	0	0	0.0000
-2500	-14.58	-14.25	-5.9	-4	-4.01	-0.0017
0	-4.9	-4.61	-2.61	-0.83	-0.855	-0.0004
0	0	0	0	0	0	0.0000
-500	-4.02	-2.96	-0.81	-0.55	-0.545	-0.0002
-1000	-6.04	-4.96	-1.53	-1.17	-1.175	-0.0005
-1500	-7.45	-6.65	-2.2	-1.82	-1.825	-0.0008
-2000	-8.71	-8.34	-2.84	-2.57	-2.565	-0.0011
-2500	-9.99	-10.05	-3.52	-3.29	-3.295	-0.0014
0	-0.34	-0.38	-0.21	-0.1	-0.105	0.0000
2500	16.01	13.73	5	3.23	3.225	0.0014
0	4.37	4.08	2.39	0.7	0.7	0.0003
				Max	3.225	0.0014
				Min	-4.01	-0.0017

10.4.2. Zero pressure deflections

Successive member displacement (mm)				
Reference	Span (mm)	Value (mm)	Requirement	Compliance?
Stud	Z1	**0.315**	< 3.0	Yes
	Z2	**-0.285**	< 3.0	Yes
	Z3	**0**	< 3.0	Yes
	Z4	**-0.855**	< 3.0	Yes
	Z5	**0.75**	< 3.0	Yes
	Z6	**0**	< 3.0	Yes
	Z7	**1.555**	< 3.0	Yes
	Z6	**0**	< 3.0	Yes
	Z7	**0**	< 3.0	Yes

Successive member displacements can be seen in the table above.

10.4.3. Seismic serviceability deflections

Serviceability displacements (seismic)					
Cycle #	Displacements (mm)				
	Beam	Sample (+)	Zero	Sample (-)	Beam
1			0	10	13
2	12	10	0	10	14
3	13	10	0	10	13
4	12	10	0	11	14
5	12	10	0	10	13
	12	10	0		

10.5. Ultimate limit state deflections

Ultimate displacements (seismic)					
Cycle #	Displacements (mm)				
	Beam	Sample (-)	Zero	Sample (+)	Beam
1	80	70	-23	25	45
2	80	70	-23	25	45
3	80	70	-23	25	45
4	80	70	-23	25	45
5	80	70	-23	25	45
6	80	70	-23	25	45
7	80	70	-23	25	45
8	80	70	-23	25	45
9	80	70	-23	25	45
10	80	70	-23	25	45
Reset beam ‘zero’ location					
11		30	22	75	
12		30	22	75	
13		30	22	75	
14		30	22	75	
15		30	22	75	
16		30	22	75	
17		30	22	75	
18		30	22	75	
19		30	22	75	
20		30	22	75	