Nutex Coatings

Nuclad Cladding System

Grade-M EPS Foam Board

Structural Test Report

AS1562.1:1992

Region N2 Non-Cyclonic

Vipac Engineers & Scientists Ltd

279 Normanby Road, Private Bag 16
Port Melbourne VIC 3207
Australia
t. +61 3 9647 9700 | **f.** +61 3 9646 4370
www.vipac.com.au

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DOCUMENT CONTROL

Nuclad Cladding System Structural Test Report	
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PREPARED FOR: Nutex Coatings 67 Henderson Rd Clayton VIC 3168 **Contact:** Brian Gebing ☎: (+61) 03 9561 2682 Fax: (+61) 03 9561 3287	**PREPARED BY:** Vipac Engineers & Scientists Ltd 279 Normanby Road, Private Bag 16 Port Melbourne VIC 3207 **Contact:** Michael Petrovic ☎: +61 3 9647 9700 Fax: +61 3 9646 4370

PREPARED BY:

Michael Petrovic — 24 April 2012
Project Engineer — michaelp@vipac.com.au

REVIEWED BY:

Ken Betts — 24 April 2012
Senior Engineer — kenb@vipac.com.au

REVISION HISTORY:

Revision No.	Date Issued	Reason/Comments
0	22 Mar 2012	Initial Issue
1	20 Apr 2012	Revised Specimen Description
2	24 Apr 2012	Revised Specimen Drawing

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1 INTRODUCTION

Document Type: Report of Nuclad Cladding System structural test performed in accordance with AS 1562.1:1992.

Company: Nutex Coatings

Vipac Engineers & Scientists were retained by Nutex Coatings (herein referred to as *the client*) to perform structural performance testing in accordance with AS 1562.1:1992 and with reference from AS4284:2008 on a 2400mm x 2500mm Nuclad Cladding System test specimen. The purpose of this test is to verify that the structural performance requirements outlined in AS 1562.1:1992 are met.

1.1 Test Details

Date: 15th February 2012

Time: 10:00 AM to 4:00 PM

Venue: Test rig at Vipac laboratory, 279 Normanby Road, Port Melbourne.

Table 1: Test Personnel

Vipac Engineers & Scientists Ltd	Mr. K. D. Betts
	Mr. M. Petrovic
	Ms. S. Lamande

2 STANDARDS AND VARIATIONS

AS/NZS 4284:2008 Testing of building facades
AS 1562.1:1992 Design and Installation of sheet roof and wall cladding
AS 4040.2:1992 Method 2: Resistance to wind pressures for non-cyclonic regions.

3 TEST SAMPLE

3.1 Specimen Description

The client has specified the following procedure for manufacturing the Nuclad Cladding System test specimen:

- The cladding test specimen consisted of 75mm thick M Grade Expanded Polystyrene (EPS) panels fixed to a 35mm x 90mm pine stud frame at 450mm stud centres.
- The Nuclad Cladding System uses a synthetic, fire retardant wall wrap (112 gsm non-woven micro porous polyolefin fabric) for use under wall cladding on timber buildings.
- The external render and finish were applied to the test specimen as follows:
    1) The RIB Basecoat (polymer modified cement based render) is applied to the EPS insulation. The alkaline-resistant fiberglass reinforcing mesh (5mm x 5mm; 160g/m2 minimum) is then added and a second Rib Basecoat layer applied. The total render thickness is to be no less than 4mm.
    2) The acrylic texture coating is then applied.

The exterior surface of the test specimen was faced into a 5 sided test chamber built specifically for this series of testing, creating a pressure chamber over the test sample.

3.2 Specimen Size & Fixing

The Nuclad Cladding System test specimen panel dimensions and orientation are shown in **Figure 1**. The two 75mm thick grade M EPS panels were arranged to produce a total surface area of 6.0m^2. The client using their approved flexible foam sealant adhesive when sealing the inter-panel joins.

The test specimen panels were fixed to the frame using 100mm long, Class 3, 10 Gauge needlepoint screws and 48mm diameter NuClad Plastic Washer with an average vertical faster spacing of 370mm and horizontal spacing of 450mm.

3.3 Specimen Schematic

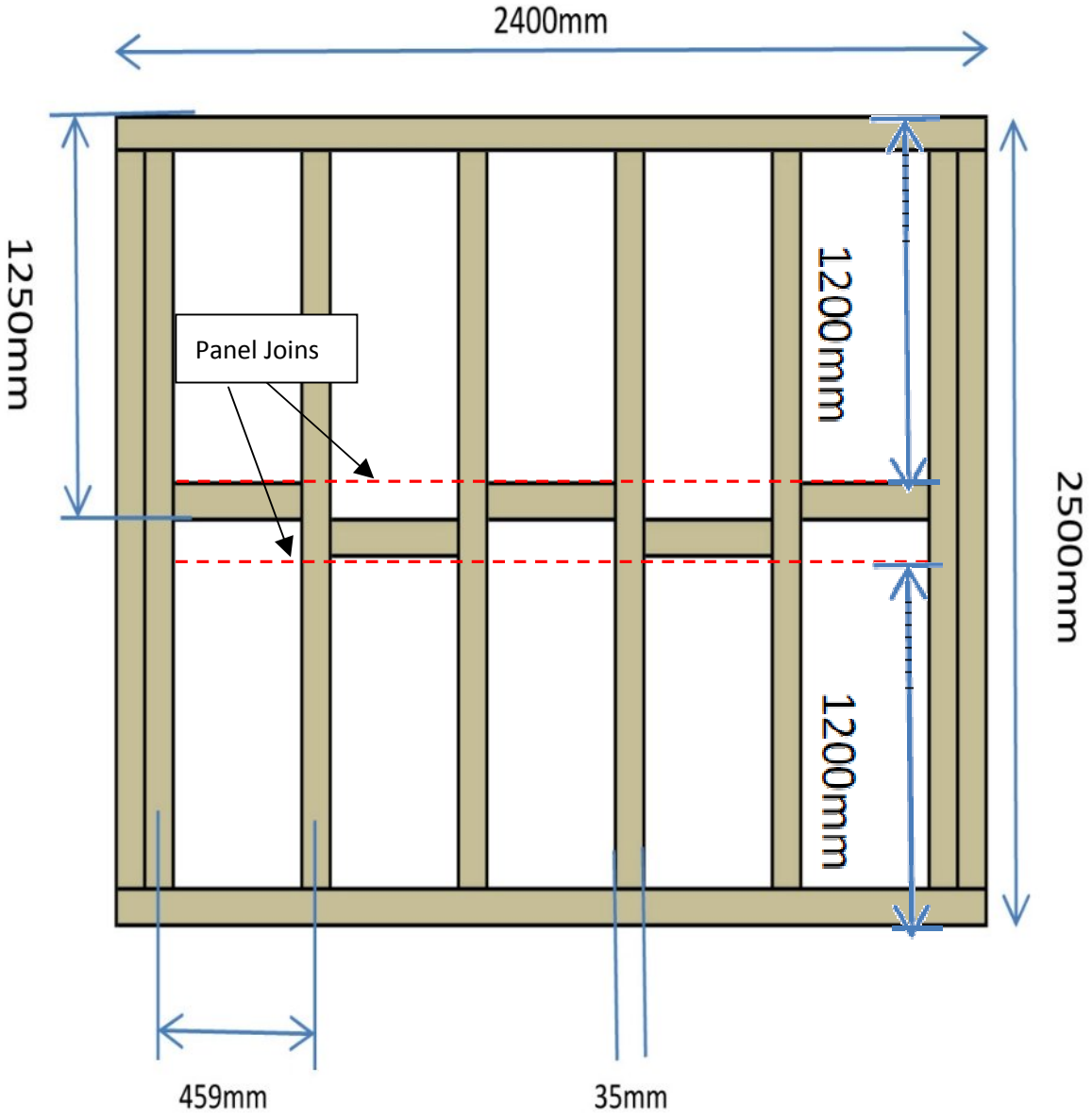

Figure 1: Test Specimen

4 APPARATUS

4.1 Test Chamber

A purpose built freestanding 5-sided test chamber was used.

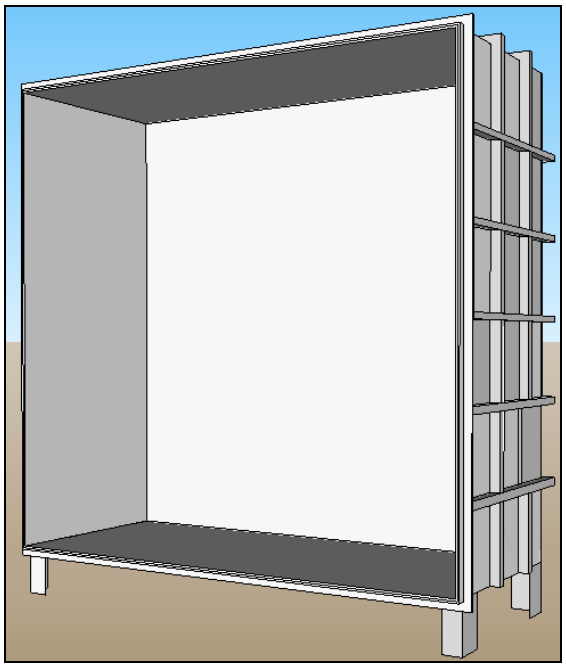

Figure 2: 5 Sided Test Rig

The external face of the test specimen is positioned facing into the 5-sided test rig to create a complete pressure chamber.

A high-pressure fan was ducted into the side of the chamber to generate the required positive and negative test pressures.

4.2 Instrumentation

Table 2: Instrumentation

Measurement	Vipac Asset No.	Uncertainty
Air pressure	000019184	± 0.02 kPa
Displacement	Multiple units	± 0.05mm

5 TEST SEQUENCE

The following tests were performed:

1. Structural – Serviceability Limit State
2. Structural – Ultimate Limit State

6 TEST RESULTS

This section summarises the results of the performance testing, which are also listed in **Table 4.**

6.1 Structural - Serviceability Limit State

Test Date: 15th February 2012

Test Standard: AS 1562.1: 1992

Test Pressure: Region N2 Non-Cyclonic - Positive 1000 Pa & Negative 1000 Pa

Section 8.3 of AS/NZS 4284 was used as a guide for the serviceability limit state pressure steps. The steps used in this test are shown in Figure 3.

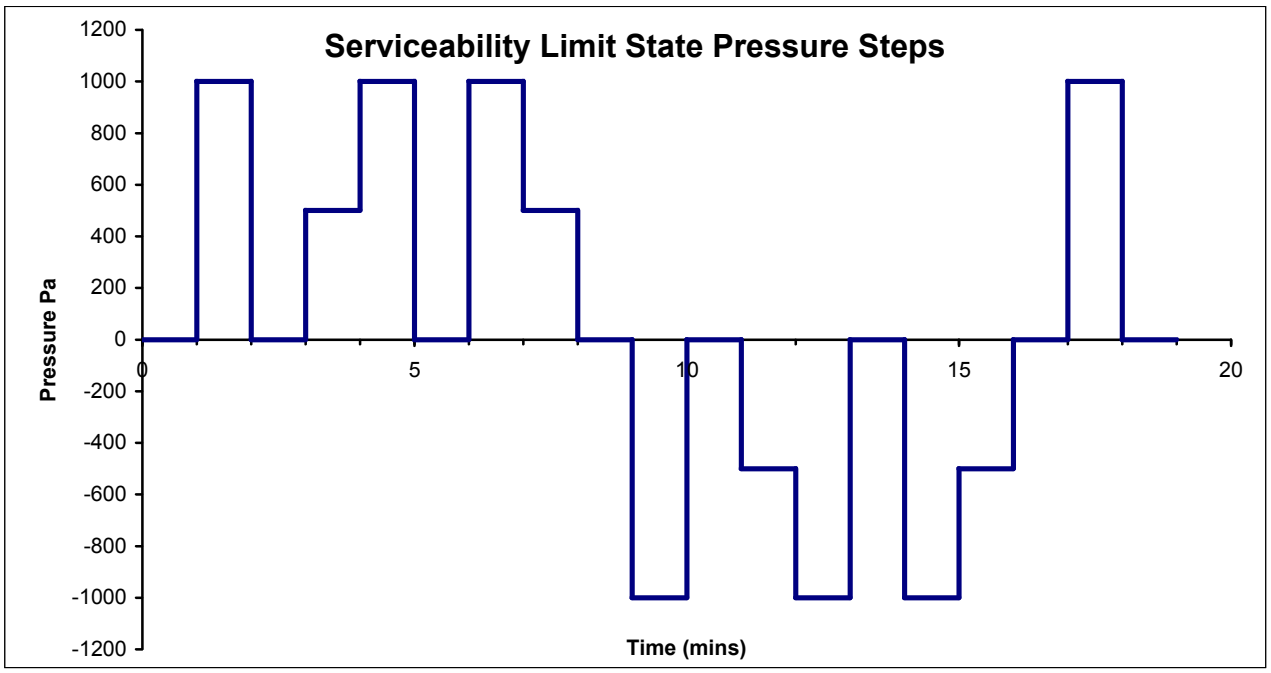

Figure 3: Serviceability Limit State Presure Steps

Net Deflection Results:

Formulae: The mid-span deflection (*d*) of each member is given by the following:

$d = D_m - D_e$

where

D_m = Net mid span displacement

D_e = Average of net end displacements.

Table 3: Member Number and Description

Member No	Member	Description
1	Wood Frame	Vertical frame
2	EPS Cladding Panel	Between Studs
3	Frame-cladding	Fixing movement

Table 4: Net Displacement and Test Results

Member No	Transducer Nodes	S Span (mm)	p Fastener Spacing Ave. (mm)	Max Displacement at Mid Span		Criteria Displ.	Remarks
				1000Pa	-1000Pa	<=S/120 + p/30	
1	1, 2, 3	2400	370	5.6		OK	Pass
			370		7.5	OK	Pass
2	4, 5, 6	443	450	0.1		OK	Pass
			450		0.2	OK	Pass
3	6,7	N/A	N/A	0.6		N/A	Pass
					1.0	N/A	Pass

Conclusion: The fasteners **did not** display any permanent deformation, unclipping, fracture or pull through. There was minimal separation of the frame and wall cladding. All member deflections **comply** with the requirements of AS 1562.1:1992 **Maximum Displacement** for region N2 non-cyclonic.

6.2 Successive Member Displacement Data

Nodes	Pressure Loading Sequence Zeros	
	Z 1	Z 7
N1	0	0.2
N2	0	0.5
N3	0	0.1
N4	0	0.0
N5	0	0.2
N6	0	0.3
N7	0	0.2

Conclusion: The residual displacements **do not** exceed **Span/1000** for any of the members and therefore **comply** with the requirements of AS 1562.1:1992 for wind region N2 non-cyclonic

6.3 Transducer Layout

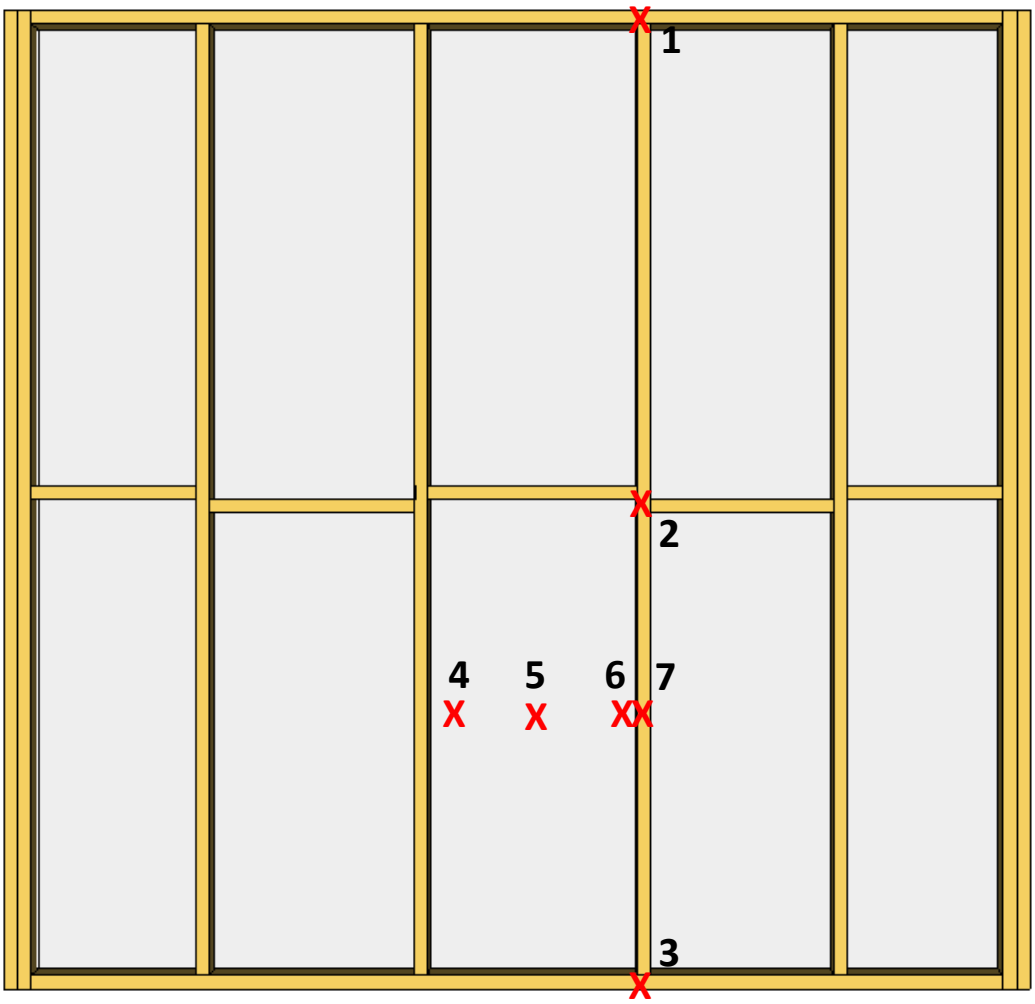

Figure 4: Transducer Layout

6.4 Structural - Ultimate Limit State

Date: 15th February 2012

Test Standard: AS 1562.1:1992 and AS/NZS 4284:2008

Test Pressure: Region N2 non-cyclonic positive and negative 1.44 kPa for the duration of no less than 1 minute

Criteria: At positive and negative ultimate limit state pressures of 1.44kPa all parts of the cladding system shall remain substantially in position, despite any permanent distortion of the sheeting or fasteners.

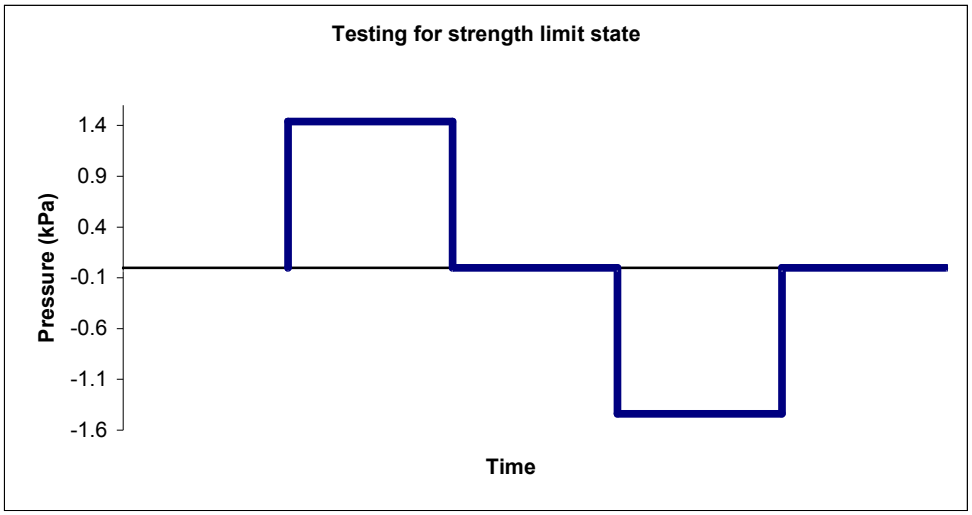

Figure 5: Strength Limit State Test Pressure Steps

Summary: The Nuclad Cladding System specimen remained intact and did not experience any abnormal defects during pressure application.

Conclusion: Ultimate limit state results **comply** with the requirements of AS 1562.1:1992 up to region N2 non-cyclonic.

7 SUMMARY OF RESULTS

The Nuclad Cladding System specimen as presented by Nutex Coatings **passed** all of the nominated criteria nominated in AS 1562.1:1992 and AS/NZS 4284:2008 region N2 non-cyclonic.

Table 5: Fixing Concentration Requirements

Wind Region	Stud Centre Spacing	Minimum Fixing Concentration
N1	450mm	8 Fixings per m^2
N2	450mm	8 Fixings per m^2

APPENDIX A

Test Images

Figure 6: Serviceability deflection setup

Figure 7: Cladding displacement transducer layout

Figure 8: Test specimen under ULS negative pressure