SUMMERMORE Pty Ltd ABN 42 108 898 433
PO Box 1671,
Browns Plains BC,
Queensland, 4118
Tel: 07 3800 0973 Fax: 07 3800 1860

Saturday, 4 March 2017

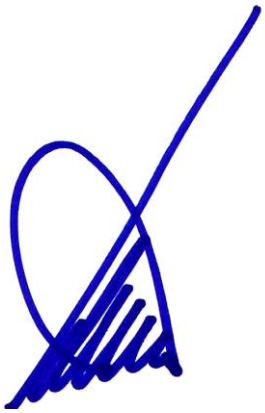
Mr Scott Lehn
NRG Building Systems
Unit 4, 32—38 Dover Drive
West Burleigh
QLD, 4220.

RE: Report on NRG Greenboard™ Cladding Fixing Requirements 17-12560

We have pleasure in presenting the enclosed report and certification to you with respect to the testing of the NRG Greenboard™ Cladding Fixing Requirements.

Should you have any queries with regard to the contents of the report, please do not hesitate to contact us.

Yours Faithfully



Ron Bell
Summermore Pty Ltd

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Mr Scott Lehn
NRG Building Systems
Unit 4, 32—38 Dover Drive
West Burleigh
QLD, 4220.

RE: NRG Greenboard™ Cladding Fixing Requirements

The purpose of this letter is to certify the results of testing of the NRG Greenboard™ Cladding Fixing Requirements as supplied by NRG Building Systems.

Observation:
Ronald Bell of this office supervised and witnessed the testing of the NRG Greenboard™ Cladding Fixing Requirements at University of Southern Queensland.

Certification
We, **Summermore Pty Ltd**, being Registered Structural and Civil Engineers, hereby confirm that the NRG Greenboard™ Cladding shall be connected to timber wall framing in accordance with the following table.

NRG Greenboard™ Cladding Fixing Requirements—General Areas

40mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	300
N4	450	300
N5	450	200
C1	450	300
C2	450	200
C3	450	130
C4	450	90

50mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	300
N4	450	300
N5	450	200
C1	450	300
C2	450	200
C3	450	130
C4	450	90

75mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	300
N4	450	300
N5	450	275
C1	450	300
C2	450	250
C3	450	175
C4	450	115

40mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	300
N2	600	300
N3	600	250
N4	600	225
N5	600	150
C1	600	250
C2	600	150
C3	600	95
C4	600	65

50mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	300
N2	600	300
N3	600	250
N4	600	225
N5	600	150
C1	600	250
C2	600	150
C3	600	95
C4	600	65

75mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	300
N2	600	300
N3	600	250
N4	600	225
N5	600	200
C1	600	250
C2	600	250
C3	600	130
C4	600	85

NRG Greenboard™ Cladding Fixing Requirements—Wihin 1200mm of Edges

40mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	250
N4	450	225
N5	450	150
C1	450	250
C2	450	150
C3	450	95
C4	450	65

50mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	250
N4	450	225
N5	450	150
C1	450	250
C2	450	150
C3	450	95
C4	450	65

75mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	450	300
N2	450	300
N3	450	300
N4	450	230
N5	450	160
C1	450	240
C2	450	160
C3	450	100
C4	450	70

40mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	250
N2	600	225
N3	600	210
N4	600	140
N5	600	90
C1	600	140
C2	600	90
C3	600	60
C4	600	45

50mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	250
N2	600	225
N3	600	210
N4	600	140
N5	600	90
C1	600	140
C2	600	90
C3	600	60
C4	600	45

75mm NRG Greenboard™ Cladding		
Wind Classification	Stud Spacing (mm)	Fastener Spacing Vertically (mm)
N1	600	250
N2	600	225
N3	600	210
N4	600	170
N5	600	120
C1	600	160
C2	600	120
C3	600	75
C4	600	50

Please note that the substrate material may determine that the fixing centres shown may not be achieveable and the fixing spacing for the substrate material shall be taken into account.

This certificate is limited to the compliance with the requirements of the published codes of practice listed and should not be used for any other purpose. Summermore Pty Ltd accepts no responsibility for information that has not been expressly identified as part of this certification. This certificate can only be relied upon by the addressee and cannot be relied upon by any third party. Summermore Pty Ltd accepts no responsibility for any third party that seeks to rely upon this certificate.

If we can be of any further assistance in this matter, please do not hesitate to contact this office.

Certified by

Ronald Bell

Grad Cert (Tech Mgt), BEng Civil (Hons), PEng, MIEAust (891940), RPEQ (6715), RBP(Vic)(EC27967), RBP(Tas)(CC5556C), RBP(NT)(60596ES), MAIB (9225), JP(Qual).

Director

Summermore Pty Ltd

NRG Greenboard™
Cladding Fixing Requirements
TESTING REPORT

COMPILED FOR

NRG BUILDING SYSTEMS

BY SUMMERMORE PTY LTD

04MAR2017

1.0 Introduction:

The aim of this report is to investigate the behaviour of the NRG Greenboard™ Cladding Fixing and assess the fixing centres for timber framing.

1.1 Objectives:

The focus is primarily on determining the connection capacity for wall cladding. The findings are used to recommend fixing spacings.

1.2 Format:

Section Two presents a brief description of the test samples, the layout of the testing station and the test method. A brief synopsis of the test results is presented.

The detailed analysis of the test results is presented in Section Three.

2.0 Panel Test Method:

Fourteen samples were delivered to Summermore Pty Ltd. The samples were connected to the test rig at the testing station.

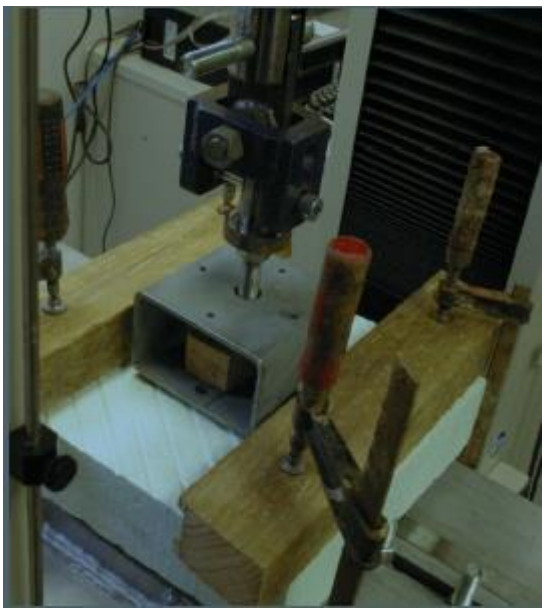
2.1 Selection of Materials

Summermore Pty Ltd had no input into the selection of materials used to manufacture the sample. NRG Building Systems manufactured the samples with no preference to sampling materials.

The samples were then transported The University of Southern Queensland—Toowoomba Campus and the samples were intact on delivery.

2.2 Test Method

The test rig used is shown below.



2.2.1 Test Method

The samples were tested by placing them into the testing machine. The samples were loaded until failure and logged with an electronic data collection system.

All of the samples were noted to fail with fastener withdrawal through the panel being the mode of failure.

3.0 Detailed Analysis:

50mm Samples

3.1 Assembly Description

The sample material is 50mm thick expanded polystyrene. The samples were all 300mm x 300mm.

3.1.1 Summary of Test Results

The minimum ultimate load reached for the samples was 329N as determined by the failure of the EPS. The standard deviation of the samples was 17N with a coefficient of variation of 5% giving k_t=1.15 and a capacity of 329/1.15=286N.

75mm Samples

3.1 Assembly Description

The sample material is 75mm thick expanded polystyrene. The samples were all 300mm x 300mm.

3.1.1 Summary of Test Results

The mean ultimate load reached for the samples was 432N as determined by the failure of the EPS. The standard deviation of the samples was 31N with a coefficient of variation of 6.7% giving k_t=1.21 and a capacity of 432/1.21=357N.

40mm Samples

3.2 Assembly Description

The sample material is 40mm thick expanded polystyrene. The samples were all 300mm x 300mm.

3.2.1 Summary of Test Results

The mean ultimate load reached for the samples exceeded that in the 50mm tests and no further analysis was undertaken and the 50mm results adopted.

4.0 Discussion of Results:

The test results were treated statistically to provide fixing spacings for the NRG Greenboard™ Cladding.

The results of the analysis have been used to provide a table of fixing spacings for the NRG Greenboard™ Cladding for the various wind classifications.

4.1 Determination of Load Capacity

The fixing spacings were determined by using the mean value for ultimate failue factored by k_t to account for testing variation. The resulting load was used to determine the fixing spacings based on stud centres of 450mm and 600mm. The Table below is taken from AS4055—Wind Loads for Housing.

TABLE 2.1

DESIGN GUST WIND SPEED (V_h) FOR CLASSIFICATION

Wind class		Design gust wind speed (V_h) at height (h) m/s	
Regions A and B (non-cyclonic)	Regions C and D (cyclonic)	Serviceability limit state ($V_{h,s}$)	Ultimate limit state ($V_{h,u}$)
N1	—	26	34
N2	—	26	40
N3	C1	32	50
N4	C2	39	61
N5	C3	47	74
N6	C4	55	86

For example, in a C3 wind classification using 75mm NRG Greenboard™ Cladding, P=357N. Stud Spacing= 450mm, $qu=\rho_{air}/2*V_{500}^2*F_c^2*C_{pn}=0.6*74^2*1.05^2*1.35=4890N/m^2$. Now, 357/4890/0.45=0.162, so the maximum spacing is 162mm.

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N4	450	300
N5	450	200
C1	450	300
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C3	450	130
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C1	450	300
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N1	600	250
N2	600	225
N3	600	210
N4	600	170
N5	600	120
C1	600	160
C2	600	120
C3	600	75
C4	600	50

5.0 Conclusion:

The samples tested were found to be adequate for use as a wall cladding with fixing spacings as detailed in the enclosed table.