



## **ASSESSMENT REPORT**

The bushfire resistance performance of a framed wall system if tested in accordance with AS 1530.8.1- 2007 as appropriate for external walls

### **EWFA Report No:**

26733-04

### **Report Sponsor:**

NRG Building Systems  
32-38 Dover Dr.  
West Burleigh, QLD 4220

## DOCUMENT REVISION STATUS

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29/05/12	26733-03	Inclusion of steel framing
30/04/17	26733-04	Revalidation and typographical amendments

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## 1 INTRODUCTION

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This report presents an assessment of the bushfire resistance performance of a framed wall system if tested in accordance with AS 1530.8.1- 2007 as appropriate for external walls.

The tested prototypes described in Section 2 of this report, when subject to the proposed variations described in Section 3, are to perform satisfactorily if tested in accordance with the referenced test method described in Section 4. The conclusions of the report are summarised in Section 5.

The validity of this assessment is conditional on compliance with Sections 6, 7, 8 and 9 of this report.

Summaries of the test data on which this assessment is based are provided in Appendix A together with a summary of the critical issues leading to the assessment conclusions including the main points of argument.

## 2 TESTED PROTOTYPES

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This assessment is based on reference test EWFA 2581501.1, being test on a framed wall system in accordance with AS 1530.8.1- 2007 at a BAL 29 level.

The test was sponsored by NRG Building Systems Pty Ltd and test was conducted by Exova Warringtonfire Aus Pty Ltd.

Refer to Appendix A for a full summary of the test data.

## 3 VARIATION TO TESTED PROTOTYPES

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The proposed construction shall be as tested in EWFA 2581501.1 and subject to the following variations:

- The render shall be NRG Polymer Modified Render in lieu of ROCKCOTE Q Render PM100 as tested, though the thickness shall be unchanged
- The 1mm texture finish shall be NRG Sand Medium or other similar 1mm acrylic texture coating in lieu of ROCKCOTE Sandcote as tested
- The final acrylic paint coating shall be NRG Shieldcoat in lieu of ROCKCOTE Armour Flex
- The fibreglass mesh shall remain as tested
- The tested EPS battens shall optionally be removed.
- Timber framing to be 90mm x 35mm or 70mm x 35mm in lieu of tested 90mm x 45mm.
- Wall framing to be optionally light gauge steel in lieu of timber.

## 4 REFERENCED TEST PROCEDURES

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This report is prepared with reference to the requirements of AS 1530.8.1-2007 as appropriate for wall exposed to BAL A-29.

## 5 FORMAL ASSESSMENT SUMMARY

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On the basis of the discussion presented in this report, it is the opinion of this testing authority that if the tested prototypes described in Section 2 had been varied as described in Section 3, they will achieve the bushfire fire resistance performance listed below if tested in accordance with the test method referenced in Section 4 and subject to the requirements of Section 7.

**BAL A-29**

## 6 DIRECT FIELD OF APPLICATION

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The results of this assessment are applicable to external walls of any size exposed to the simulated effects of bushfire from the outside only.

## 7 REQUIREMENTS

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This report details the methods of construction, test conditions and assessed results that would have been expected had the specific elements of construction described herein been tested in accordance with AS 1530.8.1- 2007.

Any further variations with respect to size, constructional details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the conclusions drawn in this report.

## 8 VALIDITY

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This assessment report does not provide an endorsement by Exova Warringtonfire Aus Pty Ltd of the actual products supplied.

The conclusions of this assessment may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

Because of the nature of fire testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

The assessment can therefore only relate only to the actual prototype test specimens, testing conditions, and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that this report be reviewed on or, before, the stated expiry date.

The information contained in this report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

## 9 AUTHORITY

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### 9.1 APPLICANT UNDERTAKINGS AND CONDITIONS OF USE

By using this report as evidence of compliance or performance, the applicant(s) confirms that:

- to their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the Standard against which this assessment is being made, and
- they agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test by a test authority in accordance with the Standard against which this assessment is being made and the results are not in agreement with this assessment, and
- they are not aware of any information that could adversely affect the conclusions of this assessment and if they subsequently become aware of any such information, agree to ask the assessing authority to withdraw the assessment.

### 9.2 GENERAL CONDITIONS OF USE

This report may only be reproduced in full without modifications by the report sponsor. Copies, extracts or abridgments of this report in any form shall not be published by other organisations or individuals without the permission of Exova Warringtonfire Aus Pty Ltd.

### 9.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD

Prepared by:

Reviewed by:



H. Wong



O. Saad

### 9.4 DATE OF ISSUE

30/04/2017

### 9.5 EXPIRY DATE

30/04/2022

## APPENDIX A - SUMMARY OF SUPPORTING DATA

### A.1 TEST REPORT- EWFA 2581501.1

#### A.1.1 Report Sponsor

A.1.1.1 NRG Building Systems, 4/32-38 Dover Drive, West Burleigh, QLD, 4220.

#### A.1.2 Test Laboratory

A.1.2.1 Exova Warringtonfire Aus Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.

#### A.1.3 Test Date

A.1.3.1 The fire resistance test was conducted on 31<sup>st</sup> May 2011.

#### A.1.4 Test Standards

A.1.4.1 The test was conducted in accordance with AS 1530.8.1-2007.

#### A.1.5 Variations to Test Method

A.1.5.1 The render was conditioned for 4 days in an internal laboratory environment prior to testing.

#### A.1.6 General Description of Tested Specimen

A.1.6.1 The test assembly comprised a nominal 3000 mm wide x 300 mm long x 211 mm thick wall system. The wall system consisted of two 90 x 45 timber stud frames; the central frame offset 250mm back incorporating an 800mm x 800mm timber reveal window. The unexposed side was faced with 10mm Gyprock plasterboard while the exposed side had a 10mm ROCKCOTE PM100 QRender over 73mm Greenboard™ foam cladding.

A.1.6.2 The specimen was asymmetrical with the exposed side of the wall coated with render and plasterboard on the unexposed side.

A.1.6.3 Refer to the test report for additional details.

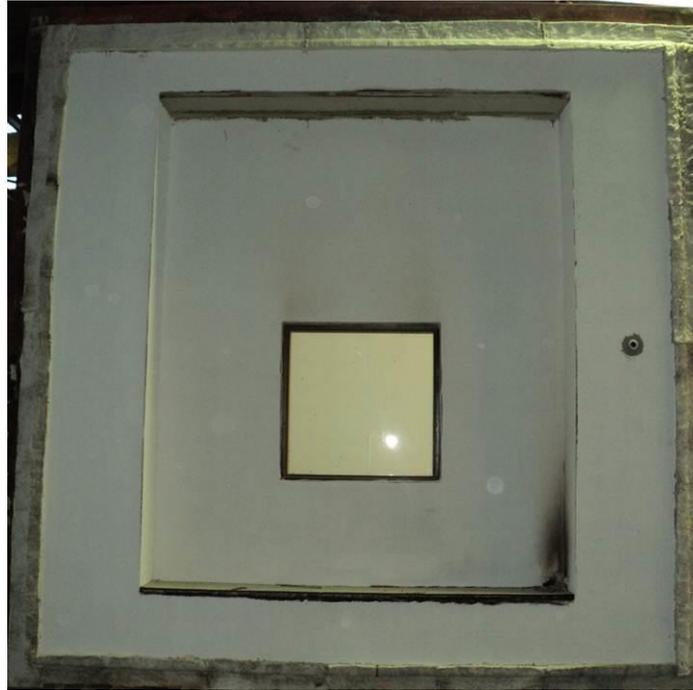
#### A.1.7 Instrumentation

A.1.7.1 The report states that the instrumentation was in accordance with AS 1530.8.1-2007.

#### A.1.8 Test Results

A.1.8.1 The test specimen achieved the following performance:

Performance Criteria	Time to Failure (minutes)	Position of Failure
Formation of through-gaps greater than 3mm	No failure	-
Sustained flaming for 10s on the non-fire side	No failure	-
Flaming on the fire exposed side at the end of the 60 minute period	No failure	-
Radiant heat flux 365mm from the non-fire side exceeding 15 kW/m <sup>2</sup>	Not applicable	-
Mean and maximum temperature rises greater than 140K and 180K respectively	No failure	-
Radiant heat flux 250mm from the non-fire side exceeding 3 kW/m <sup>2</sup> between 20 and 60 minutes	No failure	-
Mean and maximum temperature of internal faces exceeding 250°C and 350°C respectively between 20 and 60 minutes	No failure	-
<b>Crib Class</b>	<b>A</b>	<b>Peak Heat Flux</b>
		<b>29 kW/m<sup>2</sup></b>
<b>Test Result</b>		<b>BAL: A – 29</b>



A.1.8.2 Exposed face between 20 to 60 minutes after application of crib and Radiant Heat flux

## APPENDIX B - ASSESSMENT OF SPECIFIC VARIATIONS

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### B.1 VARIATION TO RENDER, BASE COAT AND TOP COAT

#### B.1.1 Proposed Construction

B.1.1.1 The proposed construction shall be as tested in EWFA 2581501.1 and subject to the following variations:

- The render shall be NRG Polymer Modified Render in lieu of ROCKCOTE QRender PM100 as tested
- The 1mm texture finish shall be NRG Sand Medium or other similar 1mm full acrylic texture coating in lieu of ROCKCOTE Sandcote as tested
- The final acrylic paint coating shall be NRG Shieldcoat in lieu of ROCKCOTE Armour Flex

#### B.1.2 Discussion

B.1.2.1 The key performance attributes of external walls when tested in accordance with AS 1530.8.1- 2007 are their ability to remain in place without the formation of 3mm gaps, no flaming on the non-fire side for 60 minute test period, no flaming on the fire side after 60 minutes test period, radiation from fire side of less than 3kW/m<sup>2</sup> between 20 and 60 minutes and not cause the unexposed side temperature to rise by 140°C (average) and 180°C (maximum).

B.1.2.2 With reference to the construction tested in EWFA 2581501.1 which comprised two 90x45 timber stud frames, the central frame offset 250mm back incorporating an 800mm x 800mm timber reveal window. The unexposed side was faced with 10mm Gyprock plasterboard while the exposed side had a 10mm Rockcote PM100 Q Render over 73mm Greenboard™ foam cladding incorporating 30mm x 26mm EPS battens. The specimen was configured in accordance with the requirements of AS1530.8.1.2007 as appropriate for walls.

B.1.2.3 For the duration of the test the specimen thermocouples on the non-fire side of the specimen did not rise more than 98°C for the duration of the test. Internal cavity thermocouples recorded a maximum temperature of 94°C for the duration of the test and a maximum temperature recorded by internal thermocouples located adjacent to crib was 50°C.

B.1.2.4 No flaming was evident during the test on non-fire side and during and after the test on fire side. In addition, it was observed that no gaps formed during the test which would allow the 3mm probe to pass through and radiant heat flux recorded on exposed side was less than the limits prescribed by AS 1530.8.1- 2007 for BAL 29.

B.1.2.5 It was observed that in test EWFA 2581501.1 the render had cured for 4 days prior to testing. With reference to internal Exova testing experience with render coated EPS, it is considered that in this particular case longer curing time would not have significantly changed the result of the referenced test.

B.1.2.6 The proposed variation to the base render coat comprises NRG Polymer Modified Render in, in lieu of the ROCKCOTE PM 100 Q Render

B.1.2.7 The manufacturer of the ROCKCOTE PM 100 Q Render (Rockcote Enterprises Pty Ltd) has confirmed in writing that NRG Polymer Modified Render has same material composition as ROCKCOTE PM 100 Q Render. Based on this fact the variation can be considered as a name change rather than a change to the composition, proposed construction base render is positively assessed. The mesh shall remain as tested.

B.1.2.8 The proposed variation to the 1mm texture finish shall be NRG Sand Medium or other similar 1mm acrylic texture coating in lieu of ROCKCOTE Sandcote as tested. ROCKCOTE Sandcote is an acrylic based coating system with sand and gravel to achieve various surface finishes.

B.1.2.9 The proposed coating systems are coating made from the same materials and unlike the base render are only 1mm thick (nominally 10% of base render thickness) and do not provide significant contribution to the thermal properties of the overall system.

B.1.2.10 The manufacturer of ROCKCOTE Sandcote (Rockcote Enterprises Pty Ltd) has confirmed in writing that NRG Sand Medium has same material composition as ROCKCOTE Sandcote.

- B.1.2.11 Based on this fact and discussion regarding other coating systems above, the variation can be considered as a name change rather than a change to the composition, proposed construction coating systems are positively assessed.
- B.1.2.12 The proposed final acrylic paint coating shall be NRG Shieldcoat in lieu of ROCKCOTE Armour Flex. The manufacturer of ROCKCOTE Armour Flex (Rockcote Enterprises Pty Ltd) has confirmed in writing that NRG Shieldcoat has same material composition as ROCKCOTE Armour Flex. Based on this fact the variation can be considered as a name change rather than a change to the composition, proposed construction base render is positively assessed.
- B.1.2.13 Based on the above it is considered that the proposed slight variations to the 1mm full acrylic texture coating and final paint coating would not introduce significant detrimental effects on the performance of the system if tested to AS1530.8.1-2007 at a BAL 29 level.
- B.1.2.14 Based on the above discussion, it is considered that proposed variations will not detrimentally affect the performance if tested in accordance with AS 1530.8.1- 2007 for a BAL 29 exposure.

## **B.2 OPTIONAL REMOVAL OF EPS BATTENS**

### **B.2.1 Proposed Construction**

- B.2.1.1 The proposed construction shall be as tested in EWFA 2581501.1 and subject to the following variations:
- The tested battens shall optionally be removed

### **B.2.2 Discussion**

- B.2.2.1 With reference to the construction tested in EWFA 2581501.1 which comprised two 90x45 timber stud frames, the central frame offset 250mm back incorporating an 800mm x 800mm timber reveal window. The unexposed side was faced with 10mm Gyprock plasterboard while the exposed side had a 10mm Rockcote PM100 Q Render over 73mm Greenboard™ foam cladding incorporating 30mm x 26mm EPS battens. The specimen was configured in accordance with the requirements of AS1530.8.1.2007 as appropriate for walls.
- B.2.2.2 It is also proposed to optionally remove the tested EPS Battens which were fixed to timber frame prior to the fixing of the 75mm NRG Greenboard™.
- B.2.2.3 Post-test observations suggest indicate that the EPS had melted away leaving a cavity. There was no evidence of smoking or smouldering behind the render in the wall cavity and the render remained in place and did not spall or fall away or allow gaps to form.
- B.2.2.4 The presence or absence of the EPS battens is unlikely to affect this behaviour, nor provide significant protection to the framing should cavity temperatures get high enough to melt the EPS.
- B.2.2.5 Based on the above discussion, it is considered that optionally removing the EPS battens will not contribute to failure with respect to radiation, insulation and gap formation. The proposed variations are hence positively assessed for BAL A29 if tested in accordance with AS 1530.8.1- 2007.

### **B.3 VARIATION TO FRAMING**

#### **B.3.1 Proposed Construction**

- B.3.1.1 The proposed construction shall optionally include 90mm × 35mm and 70mm × 35mm framing in lieu of the tested 90mm × 45mm framing.
- B.3.1.2 The framing shall be optionally steel and up to 2mm thickness.

#### **B.3.2 Discussion**

- B.3.2.1 With reference to the construction tested in EWFA 2581501.1, the wall system comprised of 90mm × 45mm timber framing configured in accordance with the requirements of AS1530.8.1.2007 as appropriate for walls.
- B.3.2.2 When tested all the internal thermocouples within the wall were less than 100°C and it is likely the key mode of heat transfer was via convection of steam from the fire side render coat.
- B.3.2.3 The proposed framing size introduces a small reduction in cavity volume; however it is considered that this change is unlikely to change the surface temperatures measured within the cavity and therefore unlikely to change the outcome of the test.
- B.3.2.4 The maximum recorded internal temperature was 135°C after 7 minutes at the eaves. It is considered that timber maintains its structural strength at 200°C and char begins to occur when timber surface temperature reaches 300°C. A reduction in timber section is unlikely to affect the measure temperatures at this location and therefore positively assessed.
- B.3.2.5 In addition the framing can be optionally made from steel up to 2mm thick.
- B.3.2.6 When steel is exposed to an increase in temperature there is a reduction in steel strength, however this effect is negligible up to approximately 200°C.
- B.3.2.7 Also, differential heating of a steel cross section, such that a temperature gradient is formed, produces transverse deflection of the element, due to the thermal expansion of the material. If a linear temperature gradient is assumed, the amount of thermal deflection an element undergoes is dependant only on the temperature gradient, not the actual temperature of the material.
- B.3.2.8 The above effects mean that even if a steel element is below 200°C, if a temperature gradient exists across the section, the stress in the element may be vastly increased from that at ambient conditions.
- B.3.2.9 When tested all the internal thermocouples within the wall were less than 100°C. At this temperature the key mode of heat transfer is likely to be convection of moisture laden air throughout the whole wall framing cavity.
- B.3.2.10 As this is the key mode of heat transfers it is expected the differential deflection of steel stud framing is likely to be negligible.
- B.3.2.11 The maximum recorded internal temperature was 135°C after 7 minutes at the eaves. In light of the above, it is considered that the proposed steel framing construction within the wall is likely to achieve a structural adequacy for the duration of the test.
- B.3.2.12 Based on the above discussion, it is considered that the proposed framing variations will not detrimentally affect the BAL rating of the wall if tested in accordance with AS 1530.8.1- 2007 at a BAL A29 level.