



## **OPINION REPORT**

The likely fire propagation performance of a 143mm thick external wall system clad with 16mm thick Cemintel® Territory Savanna Cloud panels if varied as described herein from the specimen tested in accordance with AS5113-2016 in EWFA 51212400.1

### **EWFA Report No:**

54309700.4

### **Report Sponsor:**

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**Testing. Advising. Assuring.**

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## 1 INTRODUCTION

This report presents an opinion on the likely fire propagation performance of a 143mm thick external wall system clad with 16mm thick Cemintel® Territory Savanna Cloud panels if varied as described in Section 2 from the specimen tested in accordance with AS5113-2016 in Test EWFA 51212400.1.

This opinion report will be limited to the likely improvement in the fire propagation performance of the façade wall system as installed and tested in EWFA 51212400 and varied as described herein.

## 2 PROPOSED VARIATIONS TO THE TESTED SPECIMEN

It is proposed that the tested specimen in EWFA 51212400.1 be varied as follows:

1. Removal of all 6mm cement sheet lining over the lintel of aperture of test specimen wall
2. Removal of all Cemintel L-Form Cavity Vent
3. Inclusion of the full range of Cemintel Territory panels

The Report also references Test Report EWFA 50510000.1 on a similar façade wall with different external cladding for discussion.

## 3 DISCUSSION

The criteria for failure in the façade test to AS 5113:2016 are as outlined in Clause 5.4.5 parts (a) to (g) and as seen in Table 1 below:

**Table 1- Comparison of test results based on AS5113:2016 EW Classification indices as related to BS 8414-2 tests:**

Classification Criteria	Related classification measure	Result from test EWFA 51212400	Result from test EWFA 50510000	Pass/Fail EWFA 51212400	Pass/Fail EWFA 50510000
5.4.5(a) $T_{w5m}$	$\leq 600^{\circ}\text{C}$	Maximum of $560^{\circ}\text{C}$ at 15 minutes 39 seconds after crib ignition.	$476.6^{\circ}\text{C}$	Pass	Pass
5.4.5(b) $T_{cavity5m}$ , Panels	$\leq 250^{\circ}\text{C}$	Maximum of $85^{\circ}\text{C}$ at 16 minutes 25 seconds after crib ignition.	$130.5^{\circ}\text{C}$	Pass	Pass
5.4.5(b) $T_{cavity5m}$ , Frame Cavity	$\leq 250^{\circ}\text{C}$	Maximum of $51^{\circ}\text{C}$ at 45 minutes 19 seconds after crib ignition.	$139.7^{\circ}\text{C}$	Pass	Pass
5.4.5(c) $T_{unexposedside0.9m}$	$\leq 180^{\circ}\text{C}$ Rise	Maximum of $69^{\circ}\text{C}$ at 49 minutes 45 seconds after crib ignition.	$116.5^{\circ}\text{C}$	Pass	Pass
5.4.5(d) flaming	No flaming	No flaming.	Flaming at 26 minutes 11 seconds after crib ignition on the unexposed side of the wing wall.	Pass	Pass
5.4.5(d) openings	No openings	No openings.	No openings.	Pass	Pass
5.4.5(e) spread	No spread beyond specimen	No spread.	No spreading.	Pass	Pass
5.4.5(f) debris flaming	$\leq 20$ s	Failure at 4 minutes 46 seconds after crib ignition.	Failure at 12 minutes 20 seconds after crib ignition	Fail	Fail
5.4.5(g) debris mass	$\leq 2$ kg	$> 2.1$ kg	$> 9.54$ kg	Fail	Fail
Indicative Classification					NIL

In test EWFA 51212400.1, the failure of the specimen wall system is due to the burning debris on the ground for more than 20secs and mass of debris totalling more than 2.0kg.

Upon closer inspection of the test observations it was apparent that the flaming of molten material on the ground was due to exposure of the polymeric material in the Cemintel L-Form



Cavity Vent that melted under heat exposure and flaming when either exposed to the hot gases or in direct flame contact.

It was also observed that in both tests the cement sheets lining the aperture cracked and fell off onto the ground contributing to the failure under 5.4.5 (g) for debris total mass greater 2.0kg.

The cement sheets when exposed to extreme heat would tend to dehydrate. Since the material is dense and does not have room for the moisture expanding within the material or migration to the outside, the expansion forces of the moisture breaks up the material's core.

The cracking and fall off of the cement sheets, being the primary external and exposed cladding component in test EWFA 50510000.1 caused the internal cavities of the wall to be exposed to hot gases and subsequent flaming internally and spread to the back and the side or wing wall.

This was not the case for the external cladding in EWFA 51212400.1 the panels incorporate a fibrous-wood particle material which could absorb moisture and also allow the egress of moisture. As a result, the panels remained in place right through the test duration. The only cracks were from the cement sheet strips lining the lintel. The cement sheet lining material fell off and contributed to the debris on the ground that exceeded 2.0kg.

In both tests the internal peak temperatures were below the limits for failure except for the flaming in test EWFA 50510000.1 due to the breaking up of the cement sheet cladding exposing the wall cavities. It can therefore be deduced that the elimination of all external cement sheet lining would likely reduce the amount of debris on the ground at the end of the tests to less than the 2.0kg prescribed limit.

As advised by the sponsor and from looking into the test data, the cement sheet strips lining the lintel in EWFA 51212400 if removed from the wall system would not cause any undue exposure of the external surfaces as the area is already been covered up by galvanised flashing and trims.

The Cemintel L-Form Cavity Vent over the flashing is only used to assist in the ventilation air flow, but would not cause any detrimental impact on the over fire resistance performance as there is already sufficient ventilation openings to the wall cavities. Removing the polymeric material based L-Form Cavity Vents would also not open up any additional gaps that would allow hot gases to infiltrate the wall cavities.

The removal of both the L-Form Cavity Vents and the cement sheet lining over the aperture from the tested specimen wall system in EWFA 51212400.1 would have eliminated the flaming of materials on the ground and also reduced the mass of materials falling onto the ground to negligible levels or a lot less than 2.0kg.

**Table 2- Full Range of Cemintel Territory external cladding panels:**

Code	Product Name
133975	Woodlands Teak
133976	Woodlands Smoked
163175	Woodlands Limed
163174	Woodlands Whitewash
163108	Woodlands Ebony
133935	Savanna Cloud (tested specimen)
133937	Savanna Mist
133938	Savanna Shade
133936	Savanna Haze
163234	Canyon Ripple
163231	Steppe Alpine
163232	Steppe Tundra
163233	Steppe Montane
163179	Riverbed Silt
163178	Riverbed Sand

Code	Product Name
163180	Riverbed Pebble
134702	Quarry Concrete
133977	Quarry Urban Grey
163176	Ridge Steel
163177	Ridge Pearl

There are 20 variants of the Cemintel panel surface finishes in terms of colours and profiles but only 19 were received from the sponsor. The missing sample, Savanna Mist, presumably would have been just of a different shade from the Savanna Cloud.

The Cemintel Territory range of panels show a variety of surface textured finishes and colours. The textures/profiles include cuts into the surface with ridges of up to a depth of about 5mm of the overall 16mm thickness of the panels.

The maximum reduction in the overall panel thickness is less than 10%.

The colours range from the white Savanna Cloud to the darkest, the Woodlands Ebony.

The reduction in the panel thickness would unlikely cause any significant change in the performance of the panels as the panels are cut at the tongue and groove joints where the surface of the groove would be approximately 0.5cm in thickness. There was no surface spalling nor cracks in the panels at the end of the test EWFA 51212400. The temperatures in the wall cavity remained relatively low throughout the test, well below the prescribed limits for failure set by the test Standard.

Even though it would have been expected that there would be a marginal rise in heat transfer rates due to a higher heat absorption rates and subsequent conduction with the darker coloured panel, the intensity of the heat generated by the crib exerted onto the panels would make the difference in the heat conduction rates across the panels of varying colours minuscule.

From the above discussion, it is considered that the change in cladding panels from the Cemintel Savanna Cloud to any of the panels in the Cemintel Territory range would unlikely cause any detrimental effects on the performance of the external wall system as tested in EWFA 51212400 in accordance with AS5113-2016.

## 4 CONCLUSION

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On the basis of the discussion presented in this report, it is the opinion of this testing authority that the if the 6mm cement sheet external lining over the façade aperture and the Cemintel L-Form Cavity Vents were removed from the specimen CSR External Wall System in Test EWFA 51212400.1, the modified CSR External Wall System would likely have performed positively if tested in accordance with AS 5113:2016.

The 6mm cement sheet shall not be installed anywhere exposed externally on the façade wall.

## 5 DIRECT FIELD OF APPLICATION

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The result of this opinion report is applicable to the CSR 143mm thick external wall system clad with the complete range of 16mm thick Cemintel® Territory panels and without the installation of Cemintel L-Form Cavity Vents and 6mm Cement sheet lining.

## 6 REQUIREMENTS

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This report is based on information provided by CSR Gyprock & Fibre Cement, test data from EWFA 51212400.1, EWFA 50510000.1 and variations as detailed in Section 2.



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.

The results of the opinion report are based on actual test data and the scope is necessarily limited to the specifications and discussed in the assessment.

## **7 VALIDITY**

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

The information contained in this report shall not be used for the assessment of variations other than those stated in the conclusions above. This opinion report 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 referenced test report and all referenced documents.

## **8 AUTHORITY**

### **8.1 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.

### **8.2 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.

### **8.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD**

Prepared by:



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Reviewed by:



O Saad

### **8.4 DATE OF ISSUE**

23/04/2018

### **8.5 EXPIRY DATE**

31/03/2023