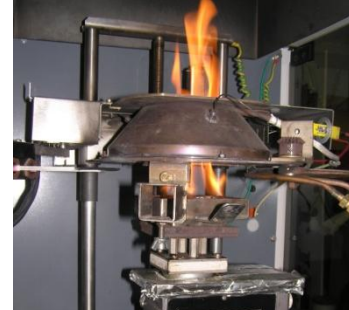




**BRANZ**

1222 Moonshine Road  
Judgeford RD1  
Porirua 5381  
New Zealand  
T +64 4 237 1170  
F +64 4 237 1171  
branz@branz.co.nz  
www.branz.co.nz



# FIRE TEST REPORT

## FH 5028

### CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2 APPENDIX A PERFORMANCE OF LAMINEX AQUAPANEL

#### CLIENT

The Laminex Group  
1 O'Rorke Road  
Penrose  
Auckland  
New Zealand



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

PROJECT NUMBER:

**FT5026**

ISSUE DATE:

**4 March 2013**

PAGE:

**1 of 9**

THE LEGAL VALIDITY OF THIS REPORT CAN ONLY BE CLAIMED ON PRESENTATION OF THE COMPLETE SIGNED PAPER REPORT. EXTRACTS OR ABRIDGMENTS OF THIS REPORT SHALL NOT BE PUBLISHED WITHOUT PERMISSION FROM BRANZ LTD.

# TEST SUMMARY

## Objective

To conduct cone calorimeter testing and reduce the data in accordance with ISO 5660 on client supplied specimens for the purposes of determination of the Group Classification in accordance with;

- New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A

## Test sponsor

The Laminex Group  
1 O'Rorke Road  
Penrose  
Auckland  
New Zealand

## Description of test specimen

The products submitted by the client for testing were identified by the client as Aquapanel, a nominally 2.7 mm thick compact laminate.

## Date of test

22<sup>nd</sup> and 27<sup>th</sup> November 2012

## Test results

TEXT For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1, and others as discussed in Section 6.

<b>Group Number Classification</b>	<b>3</b>
------------------------------------	----------

# LIMITATION

The results reported here relate only to the item/s tested.

# TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**2 of 9**

PNW

ES

# CONTENTS

<b>Signatories.....</b>	<b>4</b>
<b>Document Revision Status .....</b>	<b>4</b>
<b>1. General.....</b>	<b>5</b>
1.1 Sample measurements .....	5
<b>2. Experimental procedure .....</b>	<b>6</b>
2.1 Test standard.....	6
2.2 Test date.....	6
2.3 Specimen conditioning .....	6
2.4 Specimen wrapping and preparation.....	6
2.5 Test programme.....	6
<b>3. Test results and reduced data .....</b>	<b>7</b>
3.1 Test results and reduced data – NZBC C/VM2.....	7
<b>4. Summary .....</b>	<b>8</b>
<b>5. Classification in accordance with NZBC Verification Method C/VM2 Appendix A.....</b>	<b>9</b>
<b>6. Discussion.....</b>	<b>9</b>
<b>7. Conclusion .....</b>	<b>9</b>

## FIGURES

Figure 1 Representative specimens (exposed face of “Seal Grey” on left, “Storm” on right) .....	5
Figure 2 Rate of heat release versus time .....	8



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**3 of 9**

PNW

ES

## SIGNATORIES



---

**Author**

P. N. Whiting  
Senior Fire Engineer/Fire Testing Team Leader  
IANZ Approved Signatory



---

**Reviewer**

E. Soja  
Senior Fire Safety Engineer  
IANZ Approved Signatory

## DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	DESCRIPTION
1	4 March 2013	Initial issue



---

REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

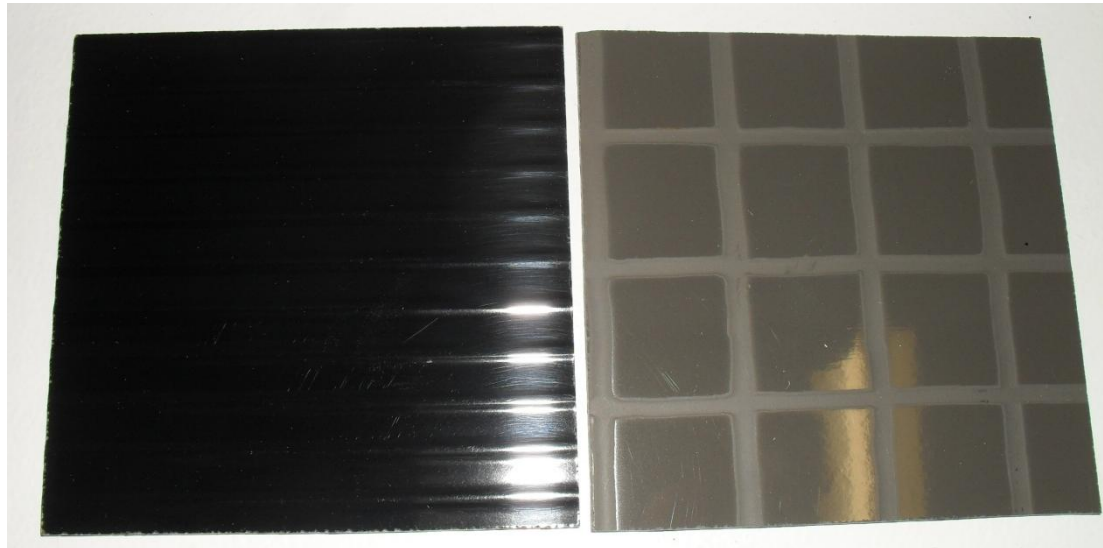
**4 of 9**

THE LEGAL VALIDITY OF THIS REPORT CAN ONLY BE CLAIMED ON PRESENTATION OF THE COMPLETE SIGNED PAPER REPORT. EXTRACTS OR ABRIDGMENTS OF THIS REPORT SHALL NOT BE PUBLISHED WITHOUT PERMISSION FROM BRANZ LTD.

# 1. GENERAL

The product submitted by the client for testing was identified by the client as Aquapanel, a nominally 2.7 mm thick compact laminate. Figure 1 illustrates a representative specimen of that tested.

**Figure 1 Representative specimens (exposed face of “Seal Grey” on left, “Storm” on right)**



## 1.1 Sample measurements

The following physical parameters were measured for each specimen prior to testing.

Specimen ID	Initial properties		Overall apparent density (kg/m <sup>3</sup> )
	Mass (g)	Mean thickness (mm)	
FH5028-50-1 (Fossil Tile)	37.2	2.7	1,378
FH5028-50-2 (Black Ripple)	39.0	2.8	1,393
FH5028-50-3 (Polar White Ripple)	40.0	2.9	1,379



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**5 of 9**

PNW

ES

## 2. EXPERIMENTAL PROCEDURE

### 2.1 Test standard

The tests were carried out and data reduced according to the test procedure described in ISO 5660: (2002), Reaction-to-fire tests – Heat release, smoke production and mass loss – Part 1: Heat release rate, and Part 2: Smoke production rate (the test standard). The sample preparation and test procedure were as described in 2.4 and 2.5.

### 2.2 Test date

The tests were conducted on 22<sup>nd</sup> and 27<sup>th</sup> November 2012 by Mr Roger Stanford at BRANZ Limited laboratories, Judgeford, New Zealand.

### 2.3 Specimen conditioning

All specimens were conditioned to moisture equilibrium (constant weight), at a temperature of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5\%$  immediately prior to testing.

### 2.4 Specimen wrapping and preparation

All tests were conducted and the specimens prepared in accordance with the test standard. The spark igniter and the stainless steel retainer frame were used. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces.

### 2.5 Test programme

The test program consisted of three replicate specimens as identified in the above table, tested at an irradiance level of  $50 \text{ kW/m}^2$ . All tests were carried out with the specimen horizontal, and with a nominal duct flow rate of  $0.024 \text{ m}^3/\text{s}$ .



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**6 of 9**

PNW

A blue ink signature inside a rectangular box.

ES

A blue ink signature inside a rectangular box.

### 3. TEST RESULTS AND REDUCED DATA

#### 3.1 Test results and reduced data – NZBC C/VM2

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
	FH5028-50-1	FH5028-50-2	FH5028-50-3	
Specimen test number	FH5028-50-1	FH5028-50-2	FH5028-50-3	
Time to sustained flaming s	46	57	50	51
Observations <sup>a</sup>	-	-	-	
Test duration <sup>b</sup> s	1846**	1857**	1850**	1851
Mass remaining, mf g	0.4	5.0	2.3	2.6
Mass pyrolyzed %	98.9%	87.2%	94.1%	93.4%
Specimen mass loss <sup>c</sup> kg/m <sup>2</sup>	3.86	3.70	4.14	3.90
Specimen mass loss rate <sup>c</sup> g/m <sup>2</sup> .s	52.1	14.7	15.3	27.4
Heat release rate				
peak, $\dot{q}''_{max}$ kW/m <sup>2</sup>	388.4	218.7	188.6	265.2
average, $\dot{q}''_{avg}$				
Over 60 s from ignition kW/m <sup>2</sup>	175.9	125.9	130.0	143.9
Over 180 s from ignition kW/m <sup>2</sup>	178.1	154.6	143.7	158.8
Over 300 s from ignition kW/m <sup>2</sup>	130.5	117.3	121.0	122.9
Total heat released MJ/m <sup>2</sup>	68.0	65.5	67.2	66.9
Average Specific Extinction Area m <sup>2</sup> /kg	82.7	78.8	56.1	72.5
Effective heat of combustion <sup>d</sup> , $\Delta h_{c,eff}$ MJ/kg	16.3	17.0	15.8	16.4

Notes :

<sup>a</sup> no significant observations were recorded

<sup>b</sup> determined by \* X<sub>O2</sub> returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes  
\*\* 30 minutes after time to sustained flaming

<sup>c</sup> from ignition to end of test;

<sup>d</sup> from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**7 of 9**

PNW

ES

## 4. SUMMARY

The test standard requires that the mean heat release rate (HRR) readings over the first 180 s from ignition for the three specimens should differ by no more than 10% of the arithmetic mean of the three readings. In the event of this criterion not being met, a further three specimens are required to be tested.

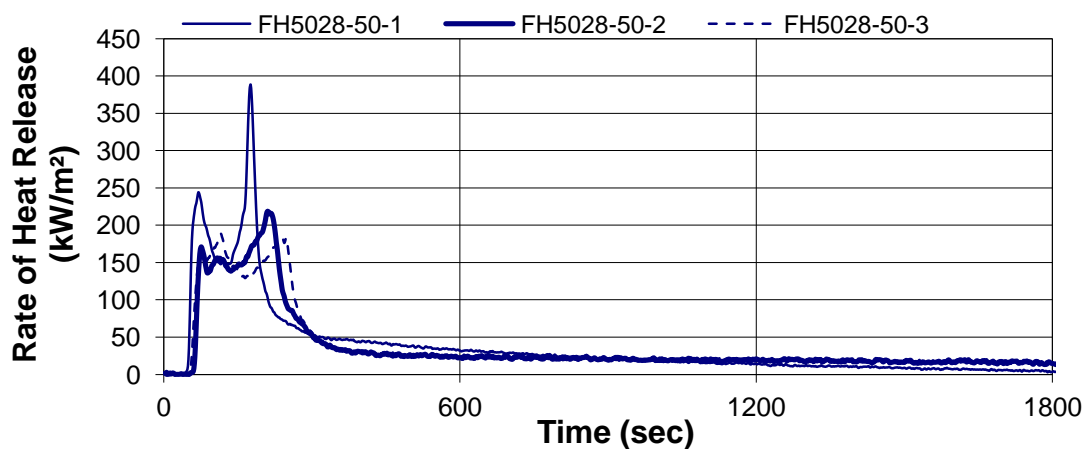
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH5028-50-1	178.1	158.8	12.1
FH5028-50-2	154.6		-2.7
FH5028-50-3	143.7		-9.5

The above table identifies one of the specimens exposed to 50 kW/m<sup>2</sup> irradiance exceeded the acceptance criteria. Although one of the specimens was outside of the variability criteria of the test standard, the same NZBC Group Classification was determined for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m<sup>2</sup> is:

Mean Specimen thickness (mm)	Irradiance (kW/m <sup>2</sup> )	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m <sup>2</sup> )	Average Specific Extinction Area (m <sup>2</sup> /kg)
2.8	50	51	265.2	72.5

Figure 2 Rate of heat release versus time



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**8 of 9**

PNW

ES



## 5. CLASSIFICATION IN ACCORDANCE WITH NZBC VERIFICATION METHOD C/VM2 APPENDIX A

The following classification has been assessed in accordance with the New Zealand Building Code Verification Method C/VM2 Appendix A: Establishing Group Numbers for lining materials. Calculations were carried out according to section A1.3 for predicting a material's group number for each specimen tested. It states that "If a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material." The classification for the specimens as described in Section 1 is as follows:

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	3	3	3	3

## 6. DISCUSSION

Three alternative variations in the finished colour of the specimens ranging from dark (Black Ripple) to light (Polar White Ripple) were tested with consistent results. It is therefore considered that any variation in the colour would not adversely affect the Group Number Classification or Average Specific Extinction Area achieved by the specimen tested in full and reported herein.

## 7. CONCLUSION

The cone calorimeter testing was carried out on the specimens as described in Section 1. For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1, and others as discussed in Section 6.

Group Number Classification	3
-----------------------------	---



REPORT NUMBER:

**FH 5028**

ISSUE DATE:

**4 March 2013**

PAGE:

**9 of 9**

PNW

ES