

# BRANZ Type Test

## FH12423-002 ISSUE 1

**CONE CALORIMETER TEST REPORT AND NZBC ACCEPTABLE SOLUTIONS C/AS2,  
SECTION 5.8.1 PERFORMANCE OF ALPOLIC™ NC**

### CLIENT

PSP Limited  
320 Rosedale Road  
Albany  
Auckland 0632  
New Zealand



All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation



REPORT NUMBER:

**FH12423-002 ISSUE 1**

ISSUE DATE:

**9 February 2021**

REVIEW/EXPIRY DATE

**9 February 2026**

PAGE:

**1 of 10**

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EXTRACTS OR ABRIDGMENTS OF THIS REPORT SHALL NOT BE PUBLISHED WITHOUT PERMISSION FROM BRANZ LTD.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 5660-1:2002 as specified in New Zealand Building Code (NZBC) Acceptable Solutions C/AS2, Appendix CC7.1, on client supplied specimens for the purposes of determination of the Exterior Surface Finishes performance in accordance with

- NZBC Acceptable Solutions Section 5.8.1.

## Test sponsor

PSP Limited  
320 Rosedale Road  
Albany  
Auckland 0632  
New Zealand

## Description of test specimen

The product as described by the client as ALPOLIC™ NC, a white coloured nominally 4 mm thick composite panel comprised of 3 mm thick highly mineral filled core including aluminium tri-hydroxide and calcium carbonate, with a 0.5 mm coated aluminium alloy laminate on both sides.

## Date of tests

11th December 2019, 20th and 24th February 2020

## Test results

For the purposes of compliance with the relevant building code documents, the following classification is considered applicable to the tested samples as described in Section 1.


Building Code Document		Performance
NZBC Acceptable Solutions Section 5.8.1	Type A	Satisfied
	Type B	Satisfied

## 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: <b>FH12423-002 ISSUE 1</b>	ISSUE DATE: <b>9 February 2021</b>	REVIEW/EXPIRY DATE <b>9 February 2026</b>	PAGE: <b>2 of 10</b>
---	--	---------------------------------------	--	-------------------------

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.

# 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 Special weathering .....	6
2.5 Specimen wrapping and preparation .....	6
2.6 Test programme .....	6
2.7 Specimen selection .....	6
<b>3. TEST RESULTS AND REDUCED DATA</b> .....	<b>7</b>
3.1 Test results and reduced data – NZBC Acceptable Solutions Appendix C7.1 .....	7
3.2 Indicative test result .....	8
<b>4. DISCUSSION</b> .....	<b>8</b>
<b>5. SUMMARY</b> .....	<b>8</b>
<b>6. RESULTS FOR NZBC ACCEPTABLE SOLUTIONS SECTION 5.8.1</b> ...	<b>10</b>
<b>7. NZBC CONCLUSION</b> .....	<b>10</b>

## FIGURES

Figure 1: Representative specimens (front face left, core centre, back face right) .....	5
Figure 2: Rate of heat release versus time .....	9
Figure 3: Smoke Production Rate .....	9

## TABLES

Table 1: Physical parameters .....	5
Table 2: Test results and reduced data in accordance with ISO 5660 .....	7
Table 3: Indicative test results and reduced data – NZBC Acceptable Solutions Appendix C7.1 .....	8
Table 4: Heat release rate .....	8
Table 5: Report summary .....	9
Table 6: NZBC Acceptable Solutions Section 5.8.1 a) and b) requirements .....	10
Table 7: Peak Heat Release Rate and Total Heat Released .....	10



REPORT NUMBER:

**FH12423-002 ISSUE 1**

ISSUE DATE:

**9 February 2021**

REVIEW/EXPIRY DATE

**9 February 2026**

PAGE:

**3 of 10**

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.

# SIGNATORIES



**Author**

J. R. Stallinger  
Associate Fire Testing Engineer  
BRANZ



**Reviewer**

L. F. Hersche  
Fire Testing Engineer  
IANZ Approved Signatory

# DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
1	9/02/2021	9/02/2026	Initial Issue

	REPORT NUMBER: <b>FH12423-002 ISSUE 1</b>	ISSUE DATE: <b>9 February 2021</b>	REVIEW/EXPIRY DATE <b>9 February 2026</b>	PAGE: <b>4 of 10</b>
---	--	---------------------------------------	--	-------------------------

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 ALPOLIC™ NC, a white coloured nominally 4 mm thick composite panel comprised of 3 mm thick highly mineral filled core including aluminium tri-hydroxide and calcium carbonate, with a 0.5 mm coated aluminium alloy laminate on both sides. .

Figure 1 illustrates representative specimens of those tested.

**Figure 1: Representative specimens (front face left, core centre, back face right)**



## 1.1 Sample measurements

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

**Table 1: Physical parameters**

Specimen ID	Initial properties		Overall apparent density (kg/m <sup>3</sup> )	Colour (front face)
	Mass (g)	Mean thickness (mm)		
FH12423-3-50-1	71.6	3.8	1884	Cream
FH12423-3-50-2	71.3	3.5	2037	Cream
FH12423-3-50-3	68.9	3.5	1969	Cream
FH12423-1-50-2	87.8	4.2	2090	White

Shaded rows – Replicate samples tested and reported in full herein.

## 2. EXPERIMENTAL PROCEDURE

### 2.1 Test standard

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

### 2.2 Test date

The tests were conducted on the 11th December 2019, 20th and 24th February 2020 by Mr James Quilter and Mr James Stallinger 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 Special weathering

According to Acceptable Solutions Appendix C 7.1.3, timber claddings which have a fire-retardant treatment incorporated in or applied to them are required to be subjected to the regime of accelerated weathering described in ASTM D 2898 Method B with the water flow rate from Method A before testing. The tested specimens were not timber claddings and therefore were not subjected to the accelerated weathering.

### 2.5 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 during testing. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces. The front facing aluminium skin of each replicate sample was removed prior to testing to expose the insulant core to the radiant heat during testing.

### 2.6 Test programme

The test programme consisted of three replicate specimens and one indicative specimen as identified in the Table 1, 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  $0.024 \text{ m}^3/\text{s}$ .

### 2.7 Specimen selection

BRANZ was not involved in the selection of the materials submitted for testing. The test materials used were supplied to the laboratory by the client.

	REPORT NUMBER: <b>FH12423-002 ISSUE 1</b>	ISSUE DATE: <b>9 February 2021</b>	REVIEW/EXPIRY DATE <b>9 February 2026</b>	PAGE: <b>6 of 10</b>
---	--	---------------------------------------	--	-------------------------

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.

### 3. TEST RESULTS AND REDUCED DATA

#### 3.1 Test results and reduced data – NZBC Acceptable Solutions Appendix C7.1

**Table 2: Test results and reduced data in accordance with ISO 5660**

Material	Test specimens as described in Section 1			Mean
Specimen test number	FH12423-3-50-1	FH12423-3-50-2	FH12423-3-50-3	
Test Date	20/02/2020	24/02/2020	24/02/2020	
C-factor	0.044069	0.043904	0.043904	
Time to sustained flaming s	321	389	0	237
Observations <sup>a</sup>	-	-	-	
Test duration <sup>b</sup> s	900 *	900 *	900 *	900
Mass remaining, m <sub>f</sub> g	52.9	57.0	51.3	53.7
Mass pyrolyzed %	26.1%	20.1%	25.5%	23.9%
Specimen mass loss <sup>c</sup> kg/m <sup>2</sup>	0.4	0.3	2.0	0.9
Specimen mass loss rate <sup>c</sup> g/m <sup>2</sup> .s	1.0	0.6	4.8	2.1
Heat release rate				
peak, $\dot{q}_{max}''$ kW/m <sup>2</sup>	24.1	17.5	13.7	18.4
average, $\dot{q}_{avg}''$				
Over 60 s from ignition kW/m <sup>2</sup>	21.4	14.2	-2.4	11.1
Over 180 s from ignition kW/m <sup>2</sup>	14.3	10.1	-1.6	7.6
Over 300 s from ignition kW/m <sup>2</sup>	9.7	7.0	1.8	6.1
Total heat released MJ/m <sup>2</sup>	3.5	2.4	2.9	2.9
Average Specific Extinction Area m <sup>2</sup> /kg	18.2	13.8	11.6	14.5
Effective heat of combustion <sup>d</sup> , $\Delta h_{c,eff}$ MJ/kg	2.4	3.3	1.0	2.2

Notes:

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

<sup>b</sup> determined by \* test duration of 15 minutes as specified in NZBC Acceptable Solutions Appendix C 7.1.2

<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:

**FH12423-002 ISSUE 1**

ISSUE DATE:

**9 February 2021**

REVIEW/EXPIRY DATE

**9 February 2026**

PAGE:

**7 of 10**

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.

## 3.2 Indicative test result

**Table 3: Indicative test results and reduced data – NZBC Acceptable Solutions Appendix C7.1**

Specimen ID	Specimen thickness (mm)	Irradiance (kW/m <sup>2</sup> )	Time to Ignition (s)	Peak Heat Release Rate (kW/m <sup>2</sup> )	Total Heat Released (MJ/m <sup>2</sup> )
FH12423-3-50-1	3.6	50	237	18.4	2.9
FH12423-1-50-2	4.2	50	No ignition	10.8	0.3

Shaded row – Sample 1 result for replicate test specimens

## 4. DISCUSSION

A single indicative test (FH12423-1-50-2) was completed of the composite panel to assess the performance of the painted surface coating. The Peak Heat Release rate and Total Heat Released as shown in Table 3 were less than the replicate test specimens and would not be expected to lead to an alteration of the final classification.

## 5. 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.

**Table 4: Heat release rate**

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH12423-3-50-1	14.3	12.2	17.2%
FH12423-3-50-2	10.1		-17.2%
FH12423-3-50-3	No ignition		-

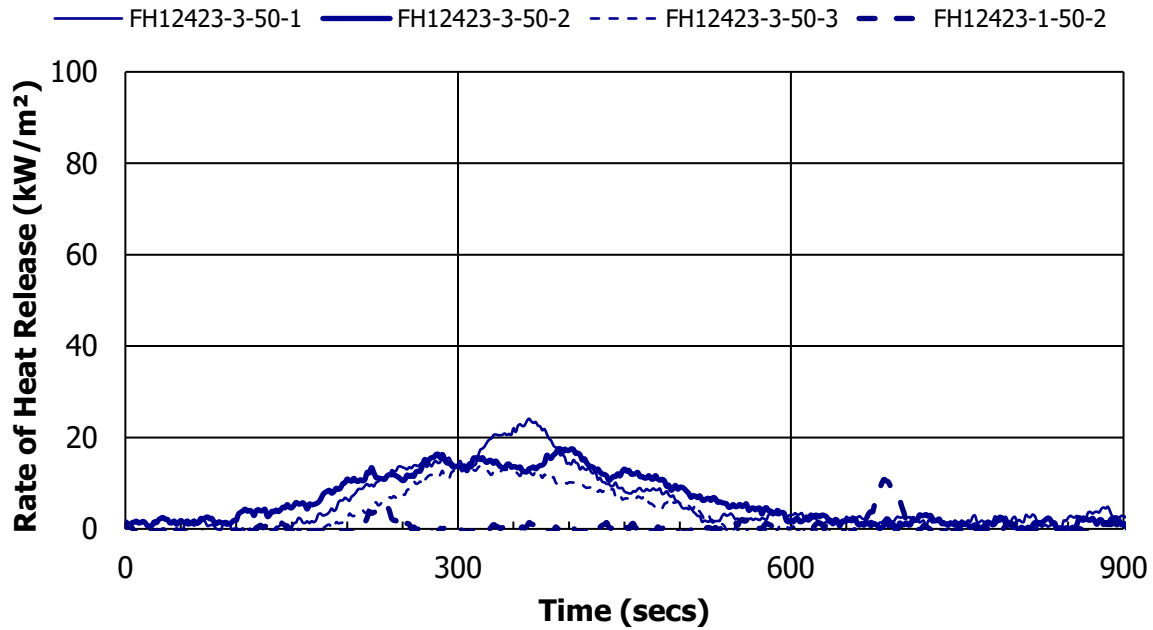
Table 4 identifies all specimens exposed to 50 kW/m<sup>2</sup> irradiance exceeded the acceptance criteria. Although all specimens were outside of the variability criteria of the test standard, the same performance criteria were met for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.



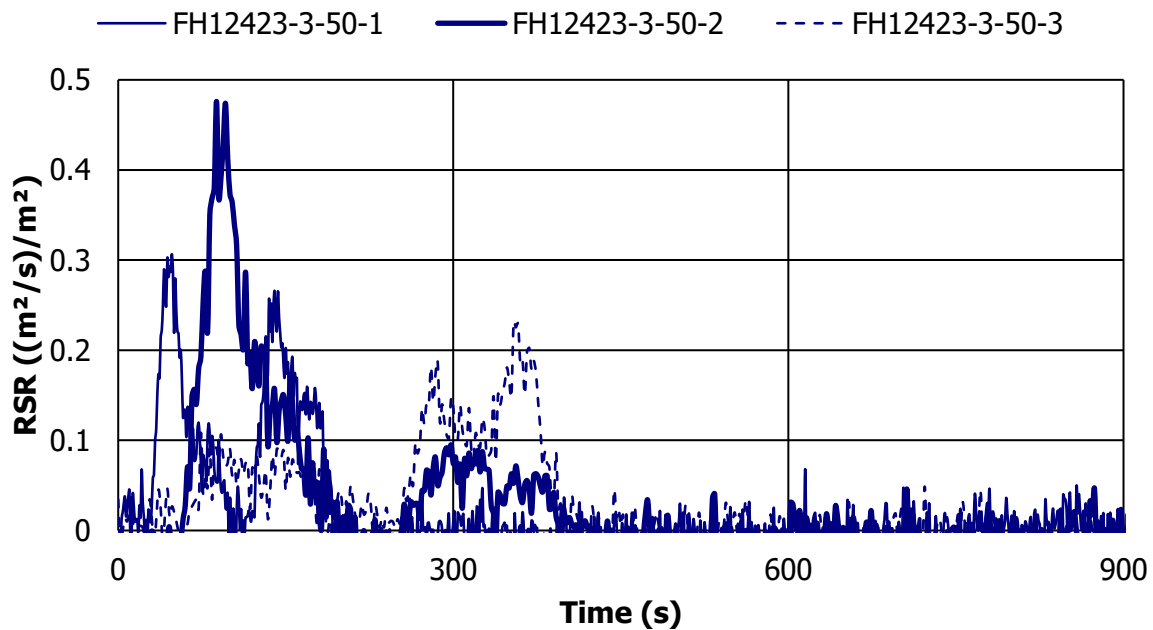
**Table 5: Report summary**

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> )	Mean Total Heat Released (MJ/m <sup>2</sup> )
3.6	50	237	18.4	2.9

**Figure 2: Rate of heat release versus time**



**Figure 3: Smoke Production Rate**



## 6. RESULTS FOR NZBC ACCEPTABLE SOLUTIONS SECTION 5.8.1

In accordance with NZBC Acceptable Solutions C/AS2 Section 5.8.1 for external walls the mean test results must not exceed the Peak Heat Release rate and Total Heat Release shown in Table 5.

**Table 6: NZBC Acceptable Solutions Section 5.8.1 a) and b) requirements**

	NZBC Acceptable Solutions Section 5.8.1 Requirement – values shall not exceed	
	Type A	Type B
Peak Heat Release rate (kW/m <sup>2</sup> )	100	150
Total Heat Release (MJ/m <sup>2</sup> )	25	50

The samples as described in Section 1 had the following results when reduced over the 15-minute (900 s) period as specified in Appendix C C7.1.2 as shown in Table 6.

**Table 7: Peak Heat Release Rate and Total Heat Released**

	Specimen 1	Specimen 2	Specimen 3	Performance
Peak Heat Release rate (kW/m <sup>2</sup> )	24.1	17.5	13.7	Meets Type A and Type B
Total Heat Release (MJ/m <sup>2</sup> )	3.5	2.4	2.9	Meets Type A and Type B

The tested samples recorded a mean Peak Heat Release of 18.4 KW/m<sup>2</sup> and a mean Total Heat Release of 2.9 MJ/m<sup>2</sup> and it is therefore considered to satisfy the requirements of NZBC Acceptable Solutions Section 5.8.1 a) and b).

## 7. NZBC CONCLUSION

For the purposes of compliance with the relevant building code documents, the following classification is considered applicable to the tested sample as described in Section 1.

Building Code Document	Performance	
NZBC Acceptable Solutions Section 5.8.1	Type A	Satisfied
	Type B	Satisfied



REPORT NUMBER:

**FH12423-002 ISSUE 1**

ISSUE DATE:

**9 February 2021**

REVIEW/EXPIRY DATE

**9 February 2026**

PAGE:

**10 of 10**

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.

# FH12423002C1

## NZBC CLASSIFICATION



This is to certify that the specimen described below was tested by BRANZ in accordance with ISO 5660-1:2002 as specified in New Zealand Building Code (NZBC) Acceptable Solutions Appendix C C7.1

### Test Sponsor

PSP Ltd  
320 Rosedale Road  
Albany  
Auckland 0632  
New Zealand

### Date of tests

11th December 2019, 20th and 24th February 2020

### Reference BRANZ Test Report

FH12423-002 Issue 1 – issued 9/02/2021

### Test specimens as described by the client

ALPOLIC™ NC, a white coloured nominally 4 mm thick composite panel comprised of 3 mm thick highly mineral filled core including aluminium tri-hydroxide and calcium carbonate, with a 0.5 mm coated aluminium alloy laminate on both sides.

Specimen ID	Mass (g)	Thickness (mm)	Apparent Density (kg/m <sup>3</sup> )	Colour
FH12423-3-50-1	71.6	3.8	1884	White
FH12423-3-50-2	71.3	3.5	2037	White
FH12423-3-50-3	68.9	3.5	1969	White

All parameters exclude 0.5 mm front facing aluminium laminate.

### Classification in accordance with the New Zealand Building Code

Calculations were carried out according to NZBC Verification Method C/VM2. The classification for the sample as described above is given in the table below.

Building Code Document	Performance
NZBC Acceptable Solutions Section 5.8.1	Type A Satisfied
	Type B Satisfied

### Issued by

J. R. Stallinger  
Associate Fire Testing  
Engineer  
BRANZ

### Reviewed by

L. F. Hersche  
Fire Testing Engineer  
IANZ Approved Signatory

Regulatory authorities are advised to examine test reports before approving any product.



### Issue Date

9/02/2021

### Expiry Date

9/02/2026

All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation