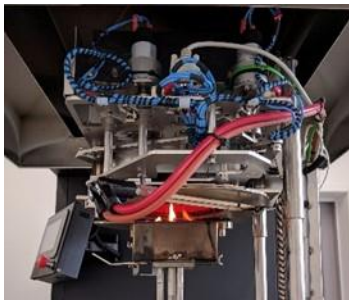
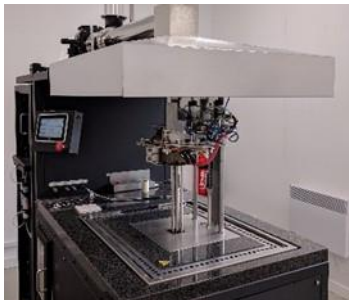




BRANZ Type Test

FH11279-002

CONE CALORIMETER TEST AND NZBC ACCEPTABLE SOLUTIONS SECTION 5.8.1 PERFORMANCE OF ALIBUILD A2 PLUS

CLIENT
Mulford Plastics
5 Arthur Brown Place
Mt Wellington
Auckland
New Zealand

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

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

TEST SUMMARY

Objective

To conduct cone calorimeter testing and reduce the data in accordance with ISO 5660 (2002) as specified in New Zealand Building Code (NZBC) Acceptable Solutions Appendix C 7.1, 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. a) and b)

Test sponsor

Mulford Plastics
5 Arthur Brown Place
Mt Wellington
Auckland
New Zealand

Description of test specimen

The product as described by the client as ALIBUILD A2 PLUS.

Date of tests	Report issue number
8 and 20 February 2019	1
18 and 24 October, and 14 November 2019	2

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	a)	Satisfied
	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.

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

CONTENTS

FIGURES

TABLES

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

SIGNATORIES

Author

L. F. Hersche
Fire Testing Engineer
BRANZ

Reviewer

P. C. R. Collier
Senior Fire Testing Engineer
IANZ Approved Signatory

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
2	19/12/2019	19/12/2024	Addition of Section 7: Revalidation of performance
1	14/3/2019	14/3/2024	Initial Issue

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

1. GENERAL

The product submitted by the client for testing was identified by the client as ALIBUILD A2 PLUS. A nominally 4 mm thick, black PVDF painted composite panel with 0.5mm aluminium skins on front and back faces bonded to an A2 core. Prior to testing the black front facing aluminium face was removed and the core material exposed during testing.

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

FH11279-1-50-1

1.1 Sample measurements

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

Table 1: Physical parameters

Specimen ID	Client ID	Initial properties		Overall apparent density (kg/m³)	Colour
		Mass (g)	Mean thickness (mm)		
FH11279-1-50-1	-	72.3	3.5	2066	Black
FH11279-1-50-2	-	72.7	3.5	2077	Black
FH11279-1-50-3	-	71.5	3.5	2043	Black
FH12227-1-50-1	NBR 01508	69.5	3.6	1931	Black
FH12227-1-50-2	NBR 01503	71.2	3.6	1978	Black
FH12227-1-50-5	NBR 01505	69.3	3.6	1925	Black
FH12227-1-50-6	NBR 01511	68.9	3.6	1914	Black
FH12227-1-50-7	NBR 01505	69.4	3.6	1928	Black
FH12227-1-50-10	NBR 01509	68.4	3.5	1954	Black

Notes: all measurements exclude front facing aluminium skin
shaded rows – revalidation specimens (2019)

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

2. EXPERIMENTAL PROCEDURE

2.1 Test standard

The tests were carried out and data reduced according to the test procedures 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 sample preparation and test procedure are as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted on the 8 and 20 February by Mr Lukas Hersche at BRANZ Limited laboratories, Judgeford, New Zealand.

The revalidation tests were conducted on 18 and 25 October, and 14 November 2019 by Mr James Quilter 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 ± 2°C and a relative humidity of 50 ± 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. Prior to testing all samples had the front facing aluminium skin removed.

2.6 Test programme

The test programme consisted of one set of three replicate specimens and one set of six replicate specimens as identified in the Table 1, tested at an irradiance level of 50 kW/m². All tests were carried out with the specimen horizontal, and with a nominal duct flow rate of 0.024 m³/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.

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

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

Material		Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
Specimen test number		FH11279-1-50-1	FH11279-1-50-2	FH11279-1-50-3	
Test Date		8/02/2019	20/02/2019	20/02/2019	
Time to sustained flaming	s	116	120	115	117
Observations[a]		-	-	-	
Test duration[b]	s	900*	900*	900*	900
Mass remaining, m_f	g	60.5	60.7	59.7	60.3
Mass pyrolyzed	%	16.3%	16.4%	16.4%	16.4%
Specimen mass loss[c]	kg/m^2	1.0	1.0	1.0	1.0
Specimen mass loss rate[c]	g/m^2 .s	2.8	3.0	2.7	2.8
Heat release rate					
peak, $\dot{q}''_{max}$	kW/m^2	63.0	52.4	57.2	57.5
average, $\dot{q}''_{avg}$					
Over 60 s from ignition	kW/m^2	50.7	47.1	44.6	47.5
Over 180 s from ignition	kW/m^2	42.4	39.2	34.9	38.8
Over 300 s from ignition	kW/m^2	31.3	29.7	27.5	29.5
Total heat released	MJ/m^2	11.3	11.0	10.6	11.0
Average Specific Extinction Area	m^2/kg	66.6	72.3	51.1	63.3
Effective heat of combustion[d], $\Delta h_{c,eff}$	MJ/kg	8.4	8.2	8.0	8.2

Notes:

[a] no significant observations were recorded

[b] determined by * test duration of 15 minutes as specified in NZBC Acceptable Solutions Appendix C 7.1.2

[c] from ignition to end of test;

[d] 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

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

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.

Table 3: Heat release rate

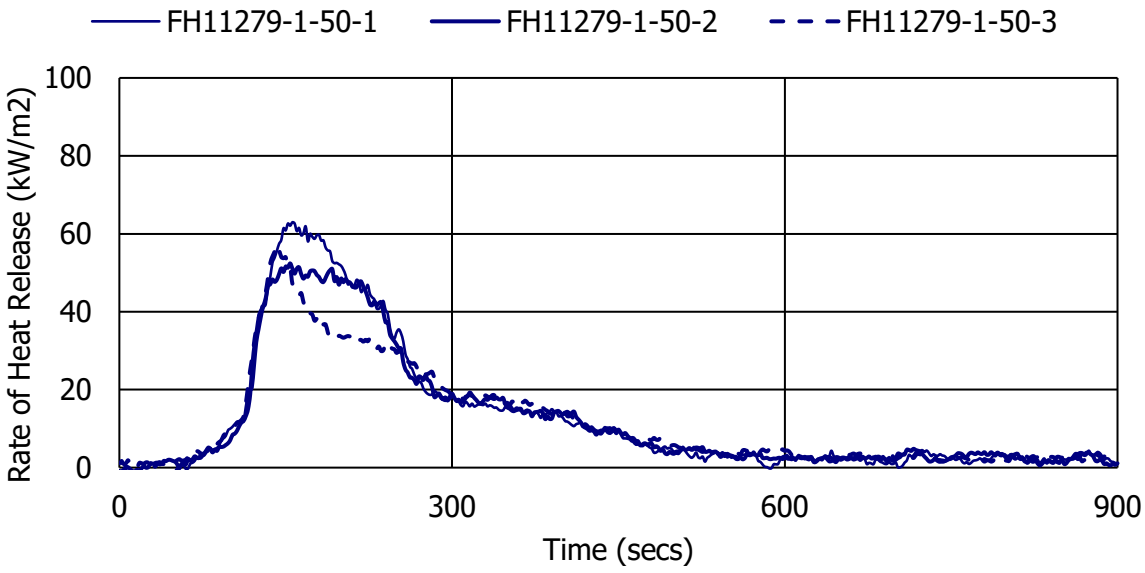
Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH11279-1-50-1	42.4	38.8	9.2%
FH11279-1-50-2	39.2		0.9%
FH11279-1-50-3	34.9		-10.1%

Table 3 identifies one specimen exposed to 50 kW/m² irradiance exceeded the acceptance criteria. Although outside of the variability criteria of the test standard, the same 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.

Table 4: Report summary for replicate specimens

Mean Specimen thickness (mm)	Irradiance (kW/m²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m²)	Mean Total Heat Released (MJ/ m²)
3.5	50	117	57.5	11.0

Figure 2: Rate of heat release versus time



branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

5. RESULTS FOR NZBC ACCEPTABLE SOLUTIONS SECTION 5.8.1

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

Table 5: NZBC Acceptable Solutions Section 5.8.1 a) and b) requirements

	NZBC Acceptable Solutions Section 5.8.1 Requirement – values shall not exceed	
	(a)	(b)
Peak Heat Release rate (kW/m²)	100	150
Total Heat Release (MJ/m²)	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 7.1.2 as shown in Table 6.

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

	Sample 1	**Sample 2**	**Sample 3**	**Performance**
Peak Heat Release rate (kW/m²)	63.0	52.4	57.2	Meets a) and b)
Total Heat Release (MJ/m²)	11.3	11.0	10.6	Meets a) and b)

The tested samples recorded a mean Peak Heat Release of 57.5 KW/m^2 and a mean Total Heat Release of 11.0 MJ/m^2 and it is therefore considered to satisfy the requirements of NZBC Acceptable Solutions Section 5.8.1 b).

6. 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	a)	Satisfied
	b)	Satisfied

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

7. REVALIDATION OF PERFORMANCE

A series of six replicate specimens were tested for the purpose of revalidation of performance. The samples were tested to the conditions of Section 2 on the 18 and 24 October, and 14 November 2019 at BRANZ Limited laboratories, Judgeford, New Zealand. The mean results across each set of replicate specimens is provided for comparison purposes in Table 7 below.

Table 7 : Revaluation parameters and test results

Material		**Feb 2019**	**Oct/Nov 2019**	**Deviation**
Test Method		ISO 5660	ISO 5660	
Specimen ID		FH11279-1	FH12227-1	
Time to sustained flaming	s	117	105	-12
Test duration	s	900	900	-
Mass remaining, m_f	g	60.3	60.2	-0.1
Mass pyrolyzed	%	16.4%	13.3%	-3.1
Specimen mass loss	kg/m^2	1.0	0.9	-0.1
Specimen mass loss rate	g/m^2. s	2.8	2.2	-0.6
Heat release rate				
peak, $\dot{q}''_{\max}$	kW/m^2	57.5	95.8	38.3
average, $\dot{q}''_{avg}$				
Over 60 s from ignition	kW/m^2	47.5	70.4	22.9
Over 180 s from ignition	kW/m^2	38.8	49.0	10.2
Over 300 s from ignition	kW/m^2	29.5	33.1	3.6
Total heat released	MJ/m^2	11.0	10.4	-0.6
Average Specific Extinction Area	m^2/kg	63.3	113.8	50.5
Effective heat of combustion $\Delta h_{c,eff}$	MJ/kg	8.2	10.0	1.8

Variations were detected in the revalidation testing of replicate specimens FH12227-1 but the results were within the limits of NZBC Acceptable Solutions Section 5.8.1. Further testing would not be expected to lead to an alteration of the classification as determined in test report FH11279-001 (2019).

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

FH11279-002
NZBC CLASSIFICATION

This is to certify that the specimen described below was tested by BRANZ in accordance with ISO 5660 Parts 1 and 2.

Test Sponsor

Mulford Plastics
5 Arthur Brown Place
Mt Wellington
Auckland
New Zealand

Date of tests

8 and 20 February 2019
18 October, 25 October, and 14 November 2019

Reference BRANZ Test Report

FH11279-002 – issued 19/12/2019

Test specimen as described by the client

ALIBUILD A2 PLUS

A nominally 4 mm thick, black PVDF painted composite panel with 0.5mm aluminium skins on front and back faces bonded to an A2 core.

Specimen ID	Mean Mass (g)	Mean Thickness (mm)	Mean Apparent Density (kg/m³)	Colour
FH11279-1-50-1, 2, 3	72.2	3.5	2062	Black

Classification in accordance with the New Zealand Building Code

Calculations were carried out according to NZBC Verification Method C/VM2 Appendix A. 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	a)	Satisfied
	b)	Satisfied

Issued by

L. F. Hersche
Fire Testing Engineer
BRANZ

Reviewed by

P. C. R. Collier
Senior Fire Testing Engineer
IANZ Approved Signatory

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

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

Issue Date
19/12/2019

Expiry Date
19/12/2024