

BRANZ Type Test

FH13948-001 ISSUE 1

CONE CALORIMETER TEST OF MULFORD PANELUX®

CLIENT

Mulford Plastics (NZ) Limited
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



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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) C/AS2 "Acceptable Solution for Buildings other than Risk Group SH" Appendix C C7.1 on client supplied specimens for the purposes of determination of performance.

Test sponsor

Mulford Plastics (NZ) Limited
5 Arthur Brown Place
Mt Wellington
Auckland
New Zealand

Description of test specimen

The product as described by the client as PANELUX®, comprising nominally 3 mm solid 3003 H24 Aluminium sheet, with a painted front face and a milled rear face.

Date of tests

13th and 28th April 2021

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	
	Type A	Satisfied
NZBC C/AS2 Appendix C C7.1	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.



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SIGNATORIES



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Reviewer

L. F. Hersche
Fire Testing Engineer
IANZ Approved Signatory

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
1	8/07/2021	8/07/2026	Initial Issue

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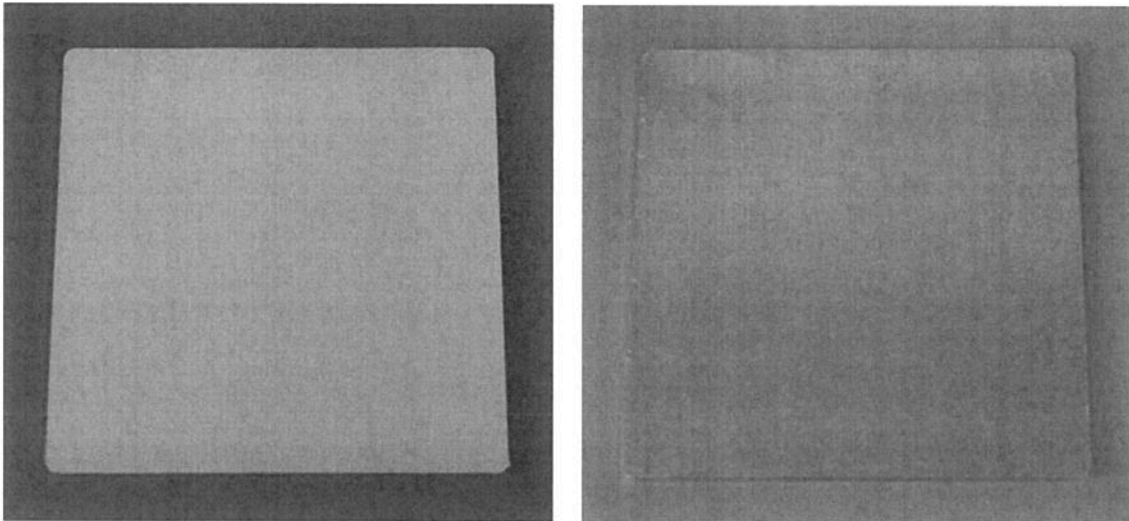
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1. GENERAL

The product submitted by the client for testing was identified by the client as PANELUX®, comprising nominally 3 mm solid 3003 H24 Aluminium sheet, with a painted front face and a milled rear face.

Figure 1 illustrates representative specimens of that tested.

Figure 1: Representative specimens (tested face on left, rear face on 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 ³)	Colour
	Mass (g)	Mean thickness (mm)		
FH13948-1-50-1	78.7	2.9	2714	White
FH13948-1-50-2	78.8	2.9	2717	White
FH13948-1-50-3	78.7	2.9	2714	White



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2. EXPERIMENTAL PROCEDURE

2.1 Test standard

To conduct cone calorimeter testing and reduce the data in accordance with ISO 5660-1:2002, as specified in New Zealand Building Code (NZBC) C/AS2 Appendix C C7.1 on client supplied specimens for the purposes of determination of performance.

2.2 Test date

The tests were conducted on the 13th and 28th April 2021 by 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 NZBC C/AS2 Appendix C C7.1, 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.

2.6 Test programme

The test programme consisted of three replicate specimens as identified in the Table 1, tested at an irradiance level of 50 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.



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3. TEST RESULTS AND REDUCED DATA

3.1 Test results and reduced data – ISO 5660

Table 2: Test results and reduced data

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean	
	FH13948-1-50-1	FH13948-1-50-2	FH13948-1-50-3		
Specimen test number	FH13948-1-50-1	FH13948-1-50-2	FH13948-1-50-3		
Test Date	13/04/2021	28/04/2021	28/04/2021		
Time to sustained flaming	s	No ignition	No ignition	No ignition	0
Observations ^a	-	-	-		
Test duration ^b	s	900	900	900	900
Mass remaining, m _f	g	77.9	78.0	78.0	78.0
Mass pyrolyzed	%	1.1%	1.0%	0.9%	1.0%
Specimen mass loss ^c	kg/m ²	0.1	0.1	0.1	0.1
Specimen mass loss rate ^c	g/m ² .s	0.1	0.1	0.1	0.1
Heat release rate					
peak, \dot{q}''_{max}	kW/m ²	4.9	2.0	3.3	3.4
average, \dot{q}''_{avg}					
Over 60 s from ignition	kW/m ²	0.4	-1.5	-0.2	-0.4
Over 180 s from ignition	kW/m ²	1.1	-1.0	-0.2	0.0
Over 300 s from ignition	kW/m ²	1.2	-0.4	0.3	0.4
Total heat released	MJ/m ²	0.4	0.1	0.3	0.3
Average Specific Extinction Area	m ² /kg	188.1	86.9	462.3	245.8
Effective heat of combustion ^d , $\Delta h_{c,eff}$	MJ/kg	0.0	0.0	0.0	0.0

Notes:

^a no significant observations were recorded

^b determined by test duration of 15 minutes as specified in NZBC C/AS2 Appendix C C7.1

^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



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4. HEAT RELEASE RATE 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

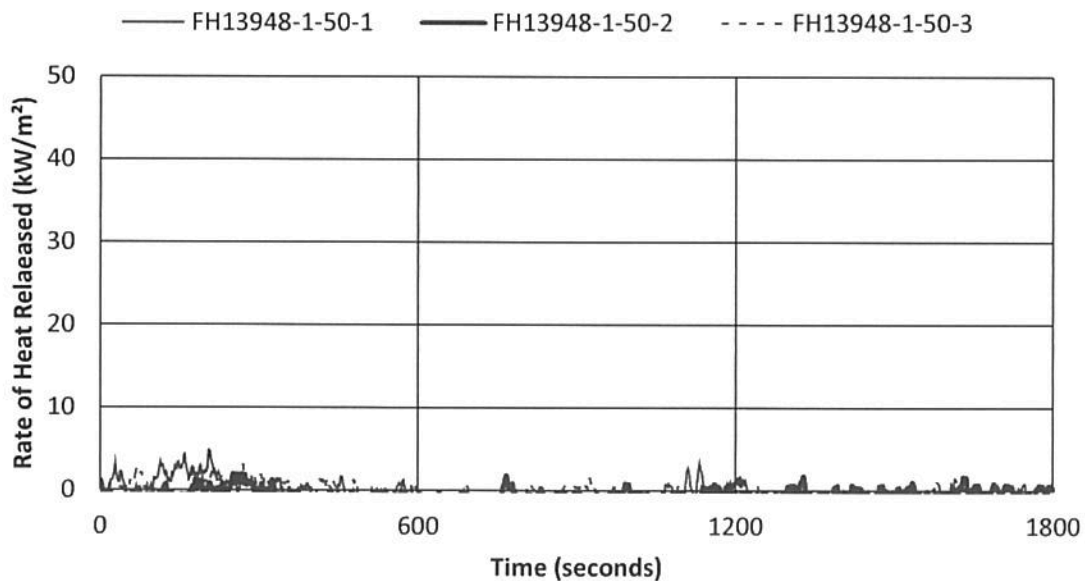
Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH13948-1-50-1	1.1	0.0	-3909.6%
FH13948-1-50-2	-1.0		3383.9%
FH13948-1-50-3	-0.2		525.7%

Table 3 identifies all specimens exposed to 50 kW/m² irradiance exceeded the acceptance criteria. A further set of three tests as required by the test standard was deemed not to be necessary as the arithmetic mean value was less than 10 kW/m² and would not be expected to lead to an alteration of the classification.

Table 4: Report summary

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Total Heat Release (MJ/m ²)
2.9	50	No ignition	3.4	0.3

Figure 2: Rate of heat release versus time



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5. RESULTS FOR NZBC C/AS2 APPENDIX C C7.1

In accordance with NZBC C/AS2 Appendix C C7.1 for cladding materials, the mean test results must not exceed the peak heat release rate and total heat release shown in Table 5.

Table 5: NZBC C/AS2 Appendix C C7.1

	Cladding Material Type	
	Type A	Type B
Peak Heat Release rate (kW/m ²)	100	150
Total Heat Release (MJ/m ²)	25	50

The samples as described in Section 1 had the results shown in Table 6 when reduced over the 15-minute (900 s) period as specified in NZBC C/AS2 Appendix C C7.1.

Table 6: Peak Heat Release and Total Heat Release

	Sample 1	Sample 2	Sample 3	Performance
Peak Heat Release rate (kW/m ²)	4.9	2.0	3.3	Meets Type A and Type B
Total Heat Release (MJ/m ²)	0.4	0.1	0.3	Meets Type A and Type B

The tested samples recorded a mean Peak Heat Release of 3.4 KW/m² and a mean Total Heat Release of 0.3 MJ/m² and it is therefore considered to satisfy the requirements of NZBC C/AS2 Appendix C C7.1.

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 C/AS2 Appendix C C7.1	Type A	Satisfied
	Type B	Satisfied

END OF TEST REPORT

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FH13948-001-C1 ISSUE 1 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 the New Zealand Building Code (NZBC).

Test Sponsor

Mulford Plastics (NZ) Limited
5 Arthur Brown Place
Mt Wellington
Auckland
New Zealand

Date of tests

13th and 28th April 2021

Reference BRANZ Test Report

FH13948-001 Issue 1 – issued 8 July 2021

Test specimen as described by the client

PANELUX®

Nominally 3 mm solid 3003 H24 Aluminium sheet, with a painted front face and a milled rear face.


Specimen Reference	Mass (g)	Thickness (mm)	Apparent Density (kg/m ³)	Colour
FH13948-1-50-1	78.7	2.9	2714	White
FH13948-1-50-2	78.8	2.9	2717	White
FH13948-1-50-3	78.7	2.9	2714	White

Classification in accordance with the New Zealand Building Code

Calculations were carried out according to NZBC C/AS2 Appendix C C7.1. The classification for the sample as described above is given in the table below.

Building Code Document	Performance	
NZBC C/AS2 Appendix C C7.1	Type A	Satisfied
	Type B	Satisfied

Issued by


J. 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.



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

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