
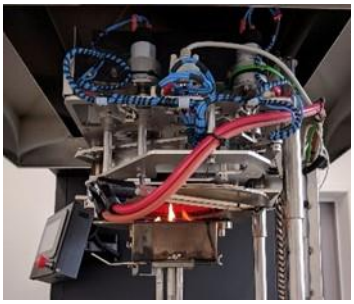


BRANZ Fire Test Report

FH17311-02-1

CONE CALORIMETER TEST OF INTEGRA AAC PANEL PAINTED WITH LIMELOCK AND RESENE LUMBERSIDER IN ACCORDANCE WITH ISO 5660: PART 1 (2002)

CLIENT

Rockcote Resene Limited T/A Resene Construction Systems
5 Venture Place
Middleton
Christchurch, 8024
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: Part 1 (2002) as specified in New Zealand Building Code (NZBC) Acceptable Solutions C/AS1 and C/AS2 Appendix C C7.1, on client supplied specimens for the purposes of determination of the cladding material type performance in accordance with:

- NZBC Acceptable Solution C/AS1 Table 5.1
- NZBC Acceptable Solution C/AS2 Table C1.3

Test sponsor

Rockcote Resene Limited T/A Resene Construction Systems
5 Venture Place
Middleton
Christchurch, 8024
New Zealand

Description of test specimens

The product as described by the client as nominally 50 mm thick Integra AAC Panel with a mineral base coat and mineral texture painted with Limelock and Resene Lumbersider.

Date of tests

30th June, 5th and 18th July 2023

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	Cladding Material Type
NZBC Acceptable Solutions C/AS1 Table 5.1	< 100 kW/m² and < 25 MJ/m²
NZBC Acceptable Solutions C/AS2 Table C1.3	Type A

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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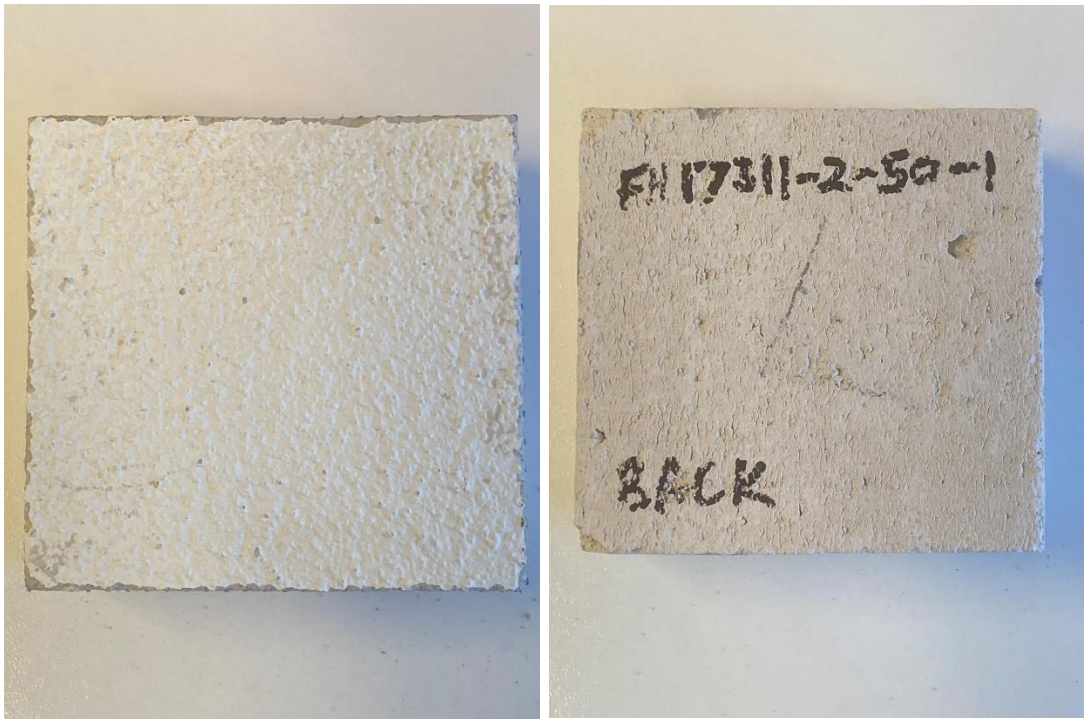
1. GENERAL

1.1 Sample description

The product submitted by the client for testing was identified by the client as nominally 50 mm thick Integra AAC Panel with a mineral base coat and mineral texture painted with Limelock and Resene Lumbersider. Figure 1 illustrates representative specimens of those tested.

Figure 1: Representative specimen (front face on left, back face on right)



1.2 Sample measurements

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

Table 1: Physical parameters

Client ID	Specimen ID	Initial properties		Overall apparent density (kg/m³)	Colour
		Mass (g)	Mean thickness (mm)		
Integra ACC Panel with Limelock & Resene Lumbersider	FH17311-2-50-2	318.8	48.1	663	White
	FH17311-2-50-3	314.7	48.3	652	White
	FH17311-2-50-4	313.7	49.0	640	White
	FH17311-2-50-5	308.1	47.5	649	White
	FH17311-2-50-6	315.4	47.3	667	White
	FH17311-2-50-7	343.3	46.5	738	White

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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 (the test standard). The sample preparation and test procedure were as described in 2.4 and 2.6.

except as follows:

- a test duration of 15 minutes, and
- the total heat release measured from start of the test

2.2 Test date

The tests were conducted on 30th June, 5th and 18th July 2023 by Ms Lisa Grant 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 C7.1.3, 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. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces.

2.6 Test programme

The test program consisted of six replicate specimens as identified in 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.

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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 – ISO 5660

Material		**Test specimens as described in Section 1 (in accordance with ISO 5660)**						**Mean**
Specimen test number		FH17311-2-50-2	FH17311-2-50-3	FH17311-2-50-4	FH17311-2-50-5	FH17311-2-50-6	FH17311-2-50-7	
Test Date		30/06/2023	30/06/2023	5/07/2023	5/07/2023	5/07/2023	18/07/2023	
Time to sustained flaming	s	65	64	57	58	65	72	64
Observations		No observations recorded						
Test duration[b]	s	900	900	900	900	900	900	900
Mass remaining, m_f	g	307.0	304.1	302.2	297.1	304.1	331.5	307.7
Mass pyrolyzed	%	3.7	3.4	3.7	3.6	3.6	3.4	3.6
Specimen mass loss[c]	kg/m^2	1.3	1.2	1.3	1.2	1.2	1.3	1.2
Specimen mass loss rate[c]	g/m^2.s	1.5	1.4	1.5	1.4	1.5	1.6	1.5
Heat release rate								
peak, $\dot{q}''_{max}$	kW/m^2	75.2	70.7	74.4	81.1	81.8	72.3	75.9
average, $\dot{q}''_{avg}$								
Over 60 s from ignition	kW/m^2	57.2	52.8	50.5	57.7	55.9	51.1	54.2
Over 180 s from ignition	kW/m^2	31.7	27.2	23.8	30.7	29.9	23.1	27.7
Over 300 s from ignition	kW/m^2	21.6	18.7	18.1	21.3	21.0	17.8	19.8
Total heat released	MJ/m^2	7.3	6.1	7.4	7.4	7.4	8.2	7.3
Effective heat of combustion[d], $\Delta h_{c,eff}$	MJ/kg	5.7	4.8	5.9	6.1	6.1	6.3	5.8

Notes: [a] no significant observations were recorded

[b] determined by test duration of 15 minutes as specified in NZBC Acceptable Solutions Appendix C C7.1.2

[c] from start of test

[d] from the reading after the last recorded negative value

N/R value not recorded

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4. VARIABILITY CRITERIA

The test standard requires 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
FH17311-2-50-2	31.7	27.6	15.1
FH17311-2-50-3	27.2		-1.5
FH17311-2-50-4	23.8		-13.7

Table 3 identifies that two of the specimens exposed to 50 kW/m² irradiance exceed the acceptance criteria. A further set of three tests was thus deemed to be necessary.

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH17311-2-50-5	30.7	27.9	10.0
FH17311-2-50-6	29.9		7.1
FH17311-2-50-7	23.1		-17.1

The average arithmetic mean of the 6 samples tested of HRR over 180 seconds from ignition is 27.7 kW/m².

5. SUMMARY

The report summary for the specimens as described in Section 1.1, exposed to an irradiance of 50 kW/m² is given in Table 4 below with rates of heat release illustrated in Figure 2.

Table 4: Report summary for six replicate specimens

Mean Specimen thickness (mm)	Irradiance (kW/m^2)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m^2)	Total Heat Released (MJ/kg)
47.8	50	64	75.9	7.3

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Figure 2: Rate of heat release versus time

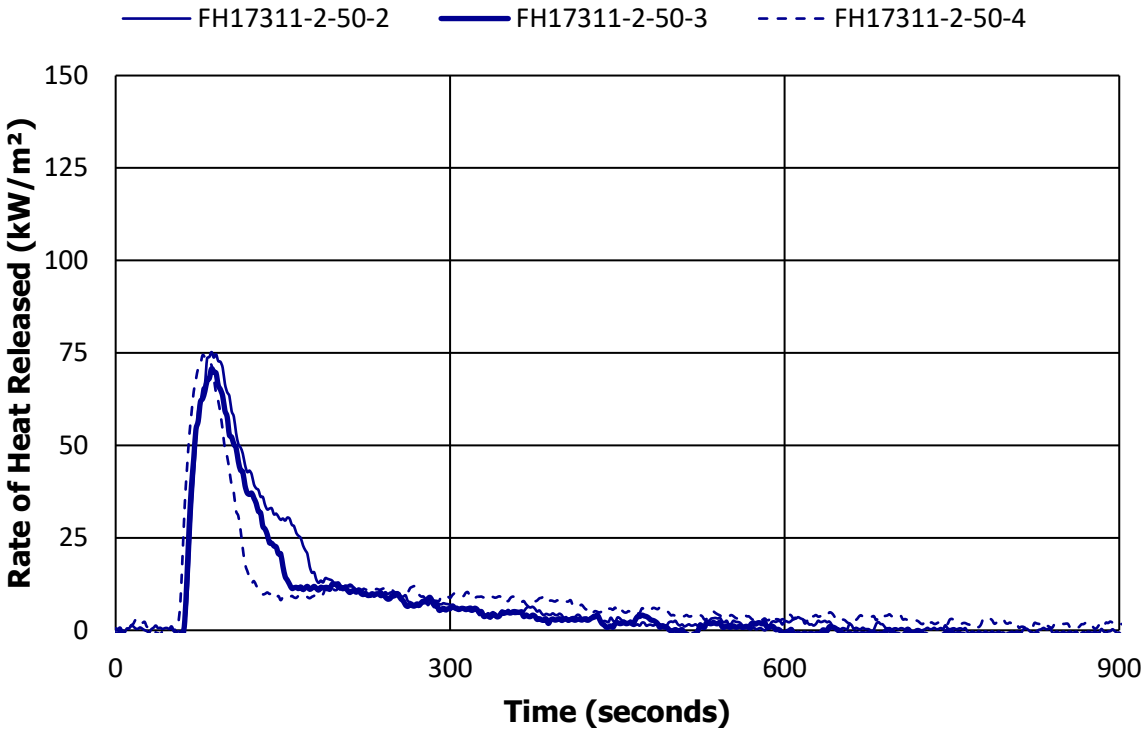
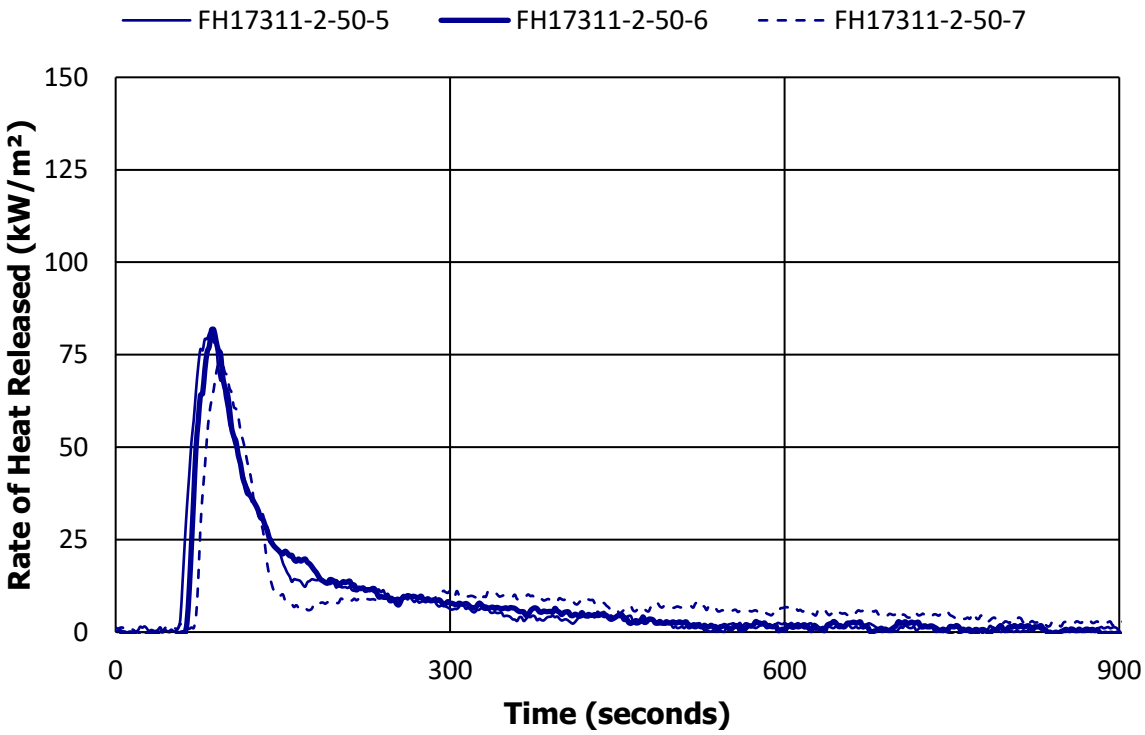


Figure 3: Rate of heat release versus time



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6. RESULTS FOR NZBC ACCEPTABLE SOLUTION C/AS1 AND C/AS2

In accordance with NZBC Acceptable Solution C/AS1 Table 5.1 and C/AS2 Table C1.3 for exterior cladding material the mean test results must not exceed the Peak Heat Release rate and Total Heat Release shown in Table 5.

Table 5: NZBC Acceptable Solution C/AS1 Table 5.1 and C/AS2 Table C1.3

NZBC Acceptable Solution Requirement		
Material Cladding Type	Type A	Type B
Peak Heat Release rate (kW/m²)	≤100	≤ 150
Total Heat Release (MJ/m²)	≤ 25	≤ 50

The samples as described in Section 1.1 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 7 and 8.

Table 6: NZBC Classification of cladding materials

	FH17311-2-50-2	FH17311-2-50-3	FH17311-2-50-4	Mean	Performance	
					C/AS1	C/AS2
Peak Heat Release rate (kW/m²)	75.2	70.7	74.4	73.5	<100 kW/m²	Meets Type A and Type B
Total Heat Release (MJ/m²)	7.3	6.1	7.4	7.0	<25 MJ/m²	Meets Type A and Type B

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Table 7: NZBC Classification of cladding materials

	FH17311-2-50-5	FH17311-2-50-6	FH17311-2-50-7	Mean	Performance	
					C/AS1	C/AS2
Peak Heat Release rate (kW/m²)	81.1	81.8	72.3	78.4	<100 kW/m²	Meets Type A and Type B
Total Heat Release (MJ/m²)	6.1	6.1	6.3	6.2	<25 MJ/m²	Meets Type A and Type B

The six tested samples recorded a mean Peak Heat Release of 75.9 KW/m^2 and a mean Total Heat Release of 7.3 MJ/m^2 and it is therefore considered to satisfy the requirements of NZBC Acceptable Solutions C/AS1 and C/AS2.

7. NZBC CONCLUSION

For the purposes of compliance with the relevant building code documents, the following classification is considered applicable to the product as described in Section 1.1.

Building Code Document	Cladding Material Type
NZBC Acceptable Solutions C/AS1 Table 5.1	< 100 kW/m² and < 25 MJ/m²
NZBC Acceptable Solutions C/AS2 Table C1.3	Type A

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FH17311-02-1-C1
CLADDING CLASSIFICATION

This is to certify that the specimen described below was tested by BRANZ in accordance with ISO 5660: Part 1 (2002)

Test Sponsor

Rockcote Resene Limited
T/A Resene Construction Systems
5 Venture Place
Middleton
Christchurch, 8024
New Zealand

Date of tests

30th June, 5th and 18th July 2023

Reference BRANZ Test Report

FH17311-02-1 – issued 24 July 2023

Test specimens as described by the client

Integra AAC Panel painted with Limelock and Resene Lumbersider

Nominally 50 mm thick Integra AAC Panel with a mineral base coat and mineral texture painted with Limelock and Resene Lumbersider.

Specimen ID	Mass (g)	Thickness (mm)	Apparent Density (kg/m³)	Colour
FH17311-1-50-2, 3,4,5,6,7	319.0*	47.8*	668*	White

Note: *mean value across replicate specimen.

Classification in accordance with the New Zealand Building Code

In accordance with NZBC Acceptable Solution C/AS1 Table 5.1 and C/AS2 Table C1.3, the classification for the samples as described above is given in the table below.

Building Code Document	Criteria	Cladding Material Type
NZBC Acceptable Solutions C/AS1 Table 5.1	Peak Rate of Heat Release	< 100 kW/m²
	Total Heat Released	< 25 MJ/m²
NZBC Acceptable Solutions C/AS2 Table C1.3	Cladding Material Type	Type A

Issued by

L. Q. Greive
Associate Fire Testing Engineer
BRANZ

Issue Date
24 July 2023

Reviewed and authorised for release by

L. F. Hersche
Fire Testing Engineer
BRANZ

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