



BRANZ Fire Test Report

FH18049-01-1

CONE CALORIMETER TEST OF DURALAM 3 & 6 MM ANTIBACTERIAL COMPACT LAMINATE IN ACCORDANCE WITH ISO 5660-1 AND 2:2002

CLIENT

Duraplan Systems Ltd
6 Springs Flat Road
Whangarei 0112
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 5660:2002 Parts 1 and 2
- ISO 5660:2015 Part 1

The testing was carried out to provide data for the Calculation of a Group Number in accordance with NZBC Verification Method C/VM2 Appendix A and AS 5637.1:2015.

Test Sponsor

Duraplan Systems Ltd
6 Springs Flat Road
Whangarei 0112
New Zealand

Description of Test Specimen

The product was described by the client as DuraLam Antibacterial Compact Laminate in 3 mm and 6 mm thicknesses, in Designer White, Classic Grey and Silver. Samples were supplied adhered to 10 mm plasterboard by the test sponsor.

Date of Tests

7th November and 19th December 2023

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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* The word "endorsed" means a certificate or report bearing an Arrangement signatory's accreditation symbol (or mark) preferably combined with the ILAC-MRA Mark.

Signed:

Jennifer Evans
NATA CEO

Date: 24 March 2014

Dr Llewellyn Richards
IANZ CEO

Date: 24th March 2014



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Authorised by



E. Soja
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DOCUMENT REVISION STATUS

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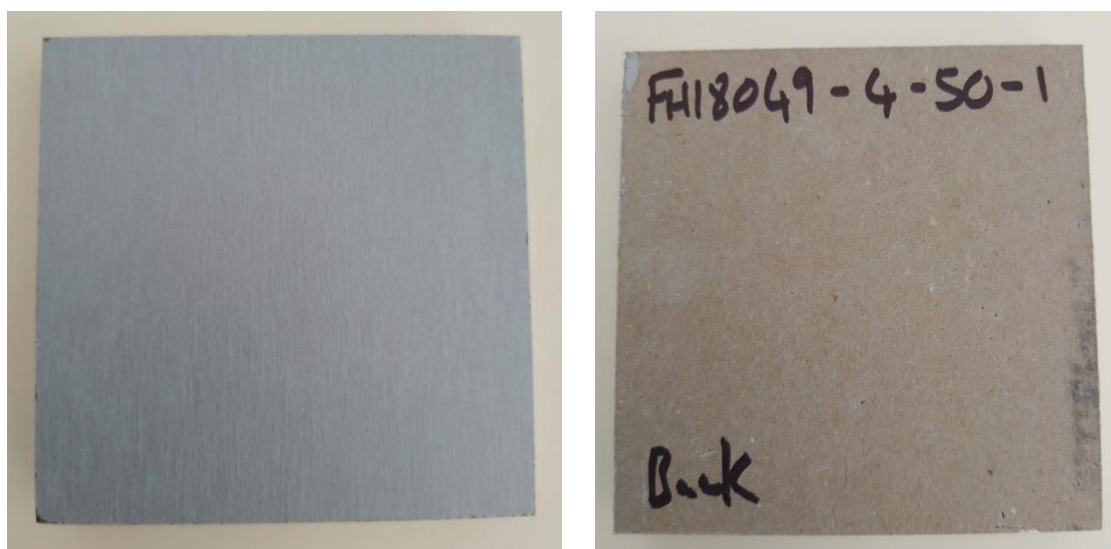
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1. GENERAL

1.1 Sample description

The product submitted by for testing was described by the sponsor as DuraLam Antibacterial Compact Laminate in 3 mm and 6 mm thicknesses in Designer White, Classic Grey and Silver. Samples were supplied adhered to 10 mm plasterboard by the test sponsor. The Designer White and Silver were selected for testing to cover off the range as the lightest and darkest colours available. Figure 1 illustrates a representative specimen of that tested.

Figure 1: Representative samples (front face on left, reverse 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/m ³)	Colour
		Mass (g)	Mean thickness (mm)		
49931 Silver 3 mm DuraLam	FH18049-4-50-1	137.7	13.2	1043	Silver
	FH18049-4-50-2	137.1	13.2	1039	
	FH18049-4-50-3	136.6	13.2	1035	
111 Designer White 6 mm DuraLam	FH18049-1-50-1	175.6	15.8	1111	White
49931 Silver 6 mm DuraLam	FH18049-2-50-1	180.4	16.2	1114	Silver
111 Designer White 3 mm DuraLam	FH18049-3-50-1	137.0	13.2	1038	White

*Shaded rows indicate replicate specimens

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 & 2015), Reaction-to-fire tests – Heat release, smoke production and mass loss – Part 1: Heat release rate, and Part 2: Smoke production rate; (2002). The sample preparation and test procedure were as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted on 7th November and 19th December 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 $23 \pm 2^\circ\text{C}$ 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 standards. 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 indicative and three replicate samples, as identified in 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 $0.024 \text{ m}^3/\text{s}$.

2.6 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 Replicate specimen test results and reduced data – ISO 5660

The test results obtained for the DuraLam Compact Laminate Panels, as described in Section 1, are presented in Table 2 below. The data has been reduced in accordance with Section 2.1.

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	FH18049-4-50-1	FH18049-4-50-2	FH18049-4-50-3	
Test Date	7/11/2023	19/12/2023	19/12/2023	
Time to sustained flaming s	49	44	48	47
Observations ^a	No significant observations recorded			
Test duration ^b s	1849**	1844**	1848**	1847
Mass remaining, m_f g	75.2	72.6	73.7	73.8
Mass pyrolyzed %	45.4	47.0	46.0	46.2
Specimen mass loss ^c kg/m ²	7.0	7.3	7.0	7.1
Specimen mass loss rate ^c g/m ² s	3.9	4.0	3.9	3.9
Heat release rate				
peak, \dot{q}_{max}'' kW/m ²	199.9	211.2	237.4	216.2
average, \dot{q}_{avg}''				
Over 60 s from ignition ^d kW/m ²	154.3	150.9	158.2	154.5
Over 180 s from ignition ^d kW/m ²	131.0	122.7	135.1	129.6
Over 300 s from ignition ^d kW/m ²	130.2	123.2	135.0	129.5
Total heat released MJ/m ²	86.1	94.1	85.8	88.6
Average Specific Extinction Area m ² /kg	17.3	10.2	7.0	11.5
Effective heat of combustion ^d , $\Delta h_{c,eff}$ MJ/kg	12.2	12.9	12.1	12.4
Total smoke production				
Non-flaming $S_{A,1}$ m ² /m ²	5.0	2.2	9.2	5.5
Flaming $S_{A,2}$ m ² /m ²	237.0	188.2	173.6	199.6
Total $S_A = S_{A,1} + S_{A,2}$ m ² /m ²	241.9	190.3	182.8	205.0

Notes: ^a no significant observations were recorded

^b determined by * X O₂ returns to the pretest value within 100 parts per million of oxygen concentration for 10 mins. ** 30 minutes after time to sustained flaming or without ignition

^c from start of test

^d from the reading after the last recorded negative value



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3.2 Indicative tests result

A single indicative test was conducted on specimens FH8049-1, FH18049-2, FH18049-3 and FH18049-4 representing the lightest and darkest colours of the range at both thicknesses, as described in Table 1. Among these, the 3 mm Silver (FH18049-4-50-1) specimen exhibited the highest peak heat release rate as evidenced in Table 3 below and was selected for replicate testing to represent the entire range.

Table 3: Indicative test results and reduced data

Specimen ID	Irradiance (kW/m ²)	Time to Ignition (s)	Peak Heat Release Rate (kW/m ²)	Total Heat Released (MJ/m ²)	Mean Average Specific Extinction Area (m ² /kg)
FH18049-1-50-1	50	48	169.6	119.2	89.2
FH18049-2-50-1	50	45	119.1	122.4	26.2
FH18049-3-50-1	50	35	179.1	86.3	55.6
FH18049-4-50-1	50	49	199.9	86.1	17.3

Note: Shaded row - Specimen 1 result for replicate test sample.

4. VARIABILITY ANALYSIS

The test standards require that the mean heat release rate (HRR) readings over the first 180s 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. For specimens which do not show ignition, the average values are calculated 180s from the first positive heat release reading after the test begins.

Table 4 presents the HRR results for each specimen and their comparison with the arithmetic mean:

Table 4: Heat release rate

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH18049-4-50-1	131.0	129.6	1.0
FH18049-4-50-2	122.7		-5.3
FH18049-4-50-3	135.1		4.3

Table 4 identifies that all three of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria and an additional set of tests was not deemed necessary.

5. SUMMARY

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is given in Table 5: Report summary for replicate test specimen below with rates of heat release illustrated in Figure 2.

Table 5: Report summary for replicate test specimen

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Mean Total Heat Release (MJ/m ²)	Average Specific Extinction Area (m ² /kg)
13.2	50	47	216.2	88.6	11.5

Figure 2: Rate of heat release versus time

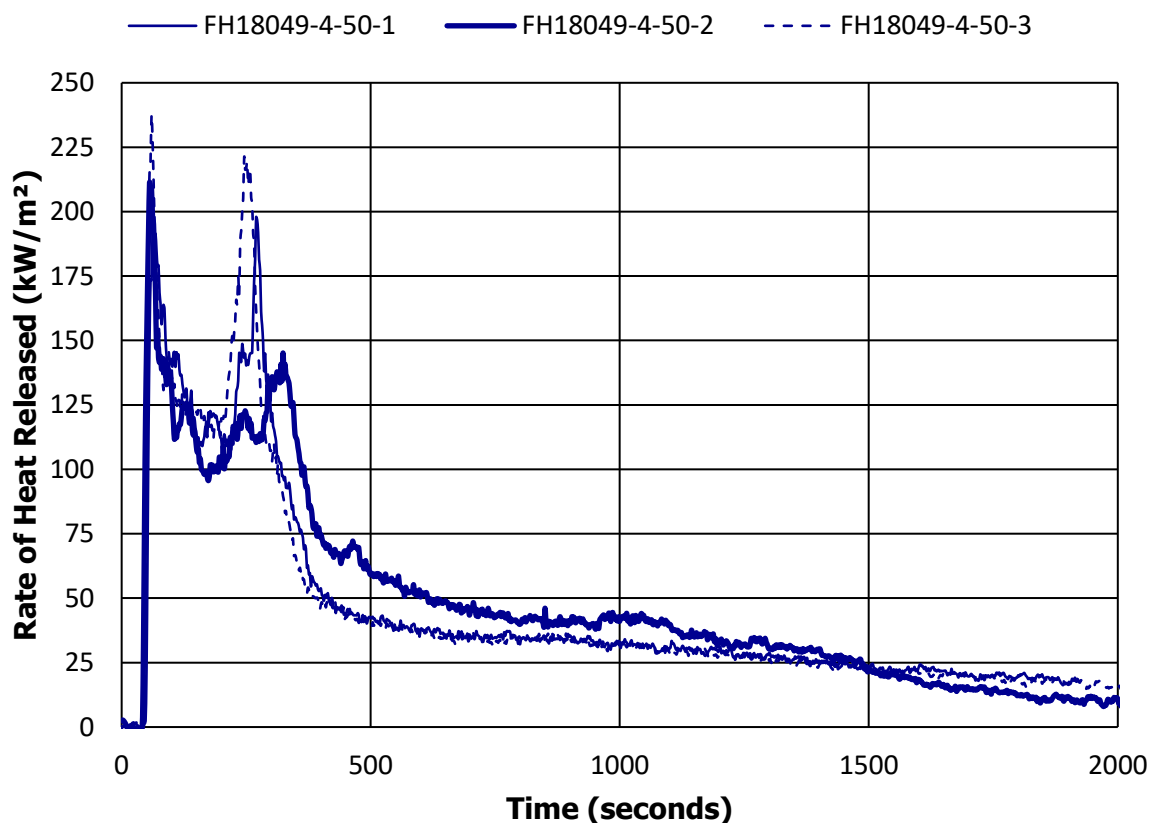
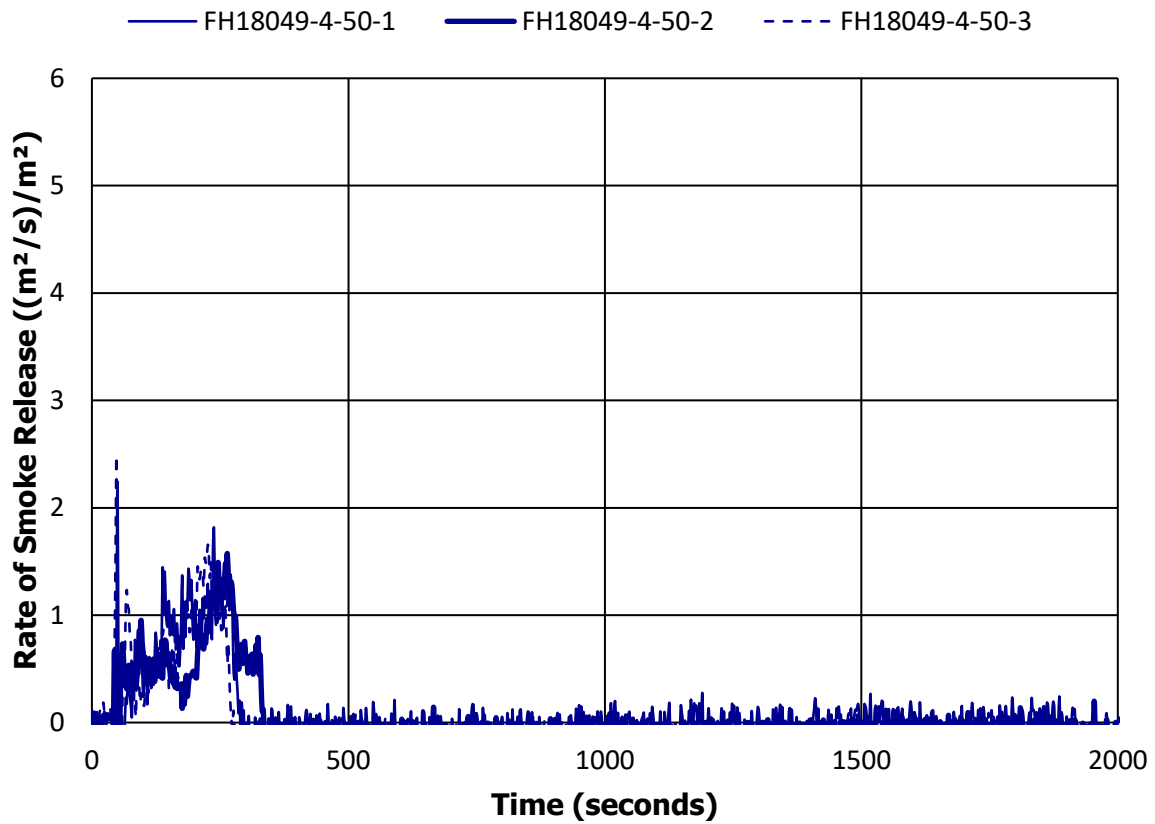


Figure 3: Rate of smoke release versus time



6. DISCUSSION

Variations of specimen thickness and colour were tested with consistent results. The most onerous product was tested in full as discussed in Section 3.2. As such, it is considered that the test data for the 3 mm Silver specimen may be used for all thicknesses in the range of 3 mm to 6 mm, in the three colours offered in the DuraLam Antibacterial Compact Laminate range as described in Section 1.1 to determine their Group Number Classification and Average Specific Extinction Area.

END OF TEST REPORT

FH18049-01-1-C1

GROUP NUMBER CLASSIFICATION



This is to certify that the specimens described below were tested in accordance with ISO 5660 by BRANZ for determination of Group Number classification.

Test Sponsor

Duraplan Systems Ltd
6 Springs Flat Road
Whangarei 0112
New Zealand

Date of tests

7th November & 19th December 2023

Reference BRANZ Test Report

FH18049-01-1 – 24 January 2024

Test specimens as described by the client:

DuraLam Antibacterial Compact Laminate

Compact Laminate in nominally 3 mm and 6 mm thicknesses in Designer White, Classic Grey and Silver, supplied adhered to 10 mm plasterboard by the test sponsor.

Specimen ID	Mass (g)	Thickness (mm)	Apparent Density (kg/m ³)	Colour	Indicative Group Number
FH18049-1-50-1	175.6	15.8	1111	White	Group 3
FH18049-2-50-1	180.4	16.2	1114	Silver	Group 3
FH18049-3-50-1	137.0	13.2	1038	White	Group 3
FH18049-4-50-1,2,3	137.1*	13.2*	1039*	Silver	Group 3

Notes: *mean values for replicate test samples.

Group Number Classification in accordance with the New Zealand Building Code and NCC Australia The specimens were deemed suitable for testing and calculations were carried out in accordance with NZBC Verification Method C/VM2 Appendix A and AS 5637.1:2015. Classification for the sample as described above is given in the table below.

Building Code Document	Classification
NZBC Verification Method C/VM2 Appendix A	Group Number 3
NCC 2022 Volume One Specification S7C4 determined in accordance with AS 5637.1:2015	Group Number 3

Issued by


L. M. Grant
Associate Fire Testing
Engineer
BRANZ

Issue Date
24 January 2024

Reviewed and authorised for release by


E. Soja
Senior Fire Safety Engineer
BRANZ

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