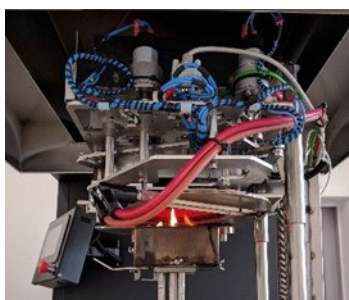




BRANZ Fire Test Report

FH20552-01-1

CONE CALORIMETER TEST OF FLEXIBLE WALL VENEER IN ACCORDANCE WITH ISO 5660

CLIENT

Linnovate Space Limited
127 Trigg Road
Kumeu
Auckland, 0891
New Zealand



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



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

1 of 13

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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

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.

Test sponsor

Linnovate Space Limited
127 Trigg Road
Kumeu
Auckland, 0891
New Zealand

Description of test specimen

The product is described by the client as a Flexible Wall Veneer composed of quartz sand, clay and a reinforcing fabric mesh. Samples were supplied in White Wave Line, Natural Wood, Black Lunar Stone and Metallic Green Artistic finishes and adhered to 10mm plasterboard substrate using Technorap tiling adhesive. The finish is an acrylic emulsion with a nominal 50 µm thickness, with the ratios of components being held on file at BRANZ.

Date of tests

17th April and 27th May 2025

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:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

2 of 13

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CONTENTS

SIGNATORIES	4
DOCUMENT REVISION STATUS.....	4
1. GENERAL.....	5
1.1 Sample description	5
1.2 Sample measurements.....	7
2. EXPERIMENTAL PROCEDURE.....	8
2.1 Test standard	8
2.2 Test date	8
2.3 Specimen conditioning	8
2.4 Specimen wrapping and preparation	8
2.5 Test programme.....	8
2.6 Calculation of heat release without ignition	8
2.7 Specimen selection	8
3. INDICATIVE TEST RESULTS.....	9
4. TEST RESULTS AND REDUCED DATA.....	10
4.1 Test results and reduced data – ISO 5660.....	10
5. VARIABILITY ANALYSIS	11
6. SUMMARY	11
7. DISCUSSION.....	13

FIGURES

Figure 1: Representative specimen of black stone (Exposed face on left, edge view centre, reverse face on right).....	5
Figure 2: Representative specimen wave line (Exposed face on left, edge view centre, reverse face on right)	5
Figure 3: Representative specimen Natural wood (Exposed face on left, edge view centre, reverse face on right).....	6
Figure 4: Representative specimen Metallic Green (Exposed face on left, edge view centre, reverse face on right).....	6
Figure 5: Rate of heat release versus time.....	12
Figure 6: Rate of smoke production versus time	12

TABLES

Table 1: Physical parameters	7
Table 2: Indicative test results and reduced data	9
Table 3: Test results and reduced data – ISO 5660	10
Table 4: Heat release rate	11
Table 5: Report summary	11



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

3 of 13

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SIGNATORIES



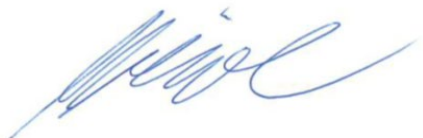
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DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	DESCRIPTION	AUTHOR	REVIEWER
1	5/06/2025	Initial Issue	LMG	LQG



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

4 of 13

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1. GENERAL

1.1 Sample description

The product submitted by the client for testing was identified by the client as a Flexible Wall Veneer composed of quartz sand, clay and a reinforcing fabric mesh. Samples were supplied in White Wave Line, Natural Wood, Black Lunar Stone and Metallic Green Artistic finishes and adhered to 10mm plasterboard substrate using Technorap tiling adhesive. The finish is an acrylic emulsion with a nominal 50 µm thickness, with the ratios of components being held on file at BRANZ. The adhesive was mixed according to manufacturer's specifications and samples were applied to substrate by BRANZ prior to conditioning. Figures 1 to 4 illustrate representative specimens of those tested.

Figure 1: Representative specimen of black stone (Exposed face on left, edge view centre, reverse face on right)

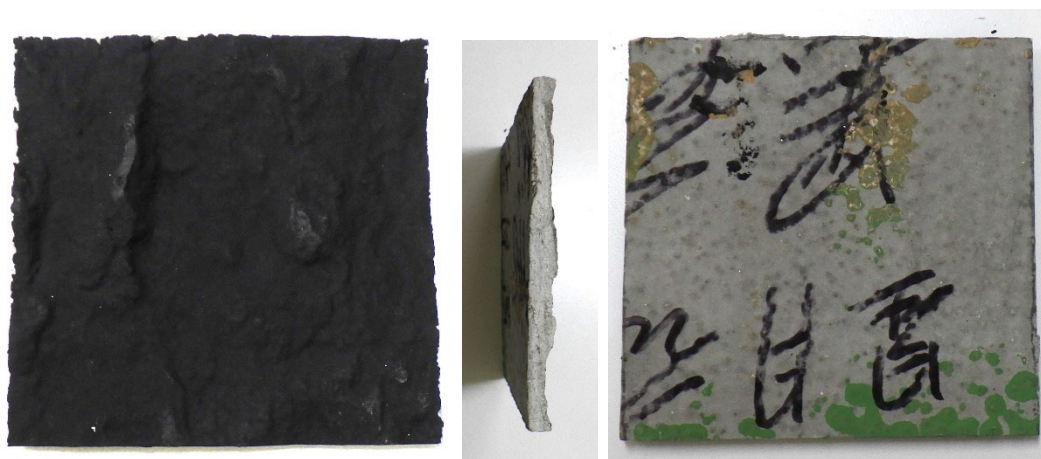


Figure 2: Representative specimen wave line (Exposed face on left, edge view centre, reverse face on right)

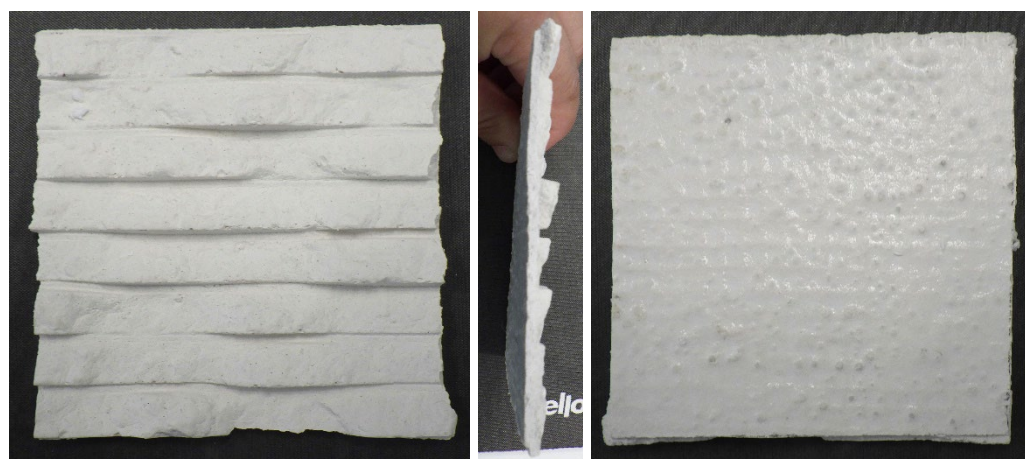


Figure 3: Representative specimen Natural wood (Exposed face on left, edge view centre, reverse face on right)

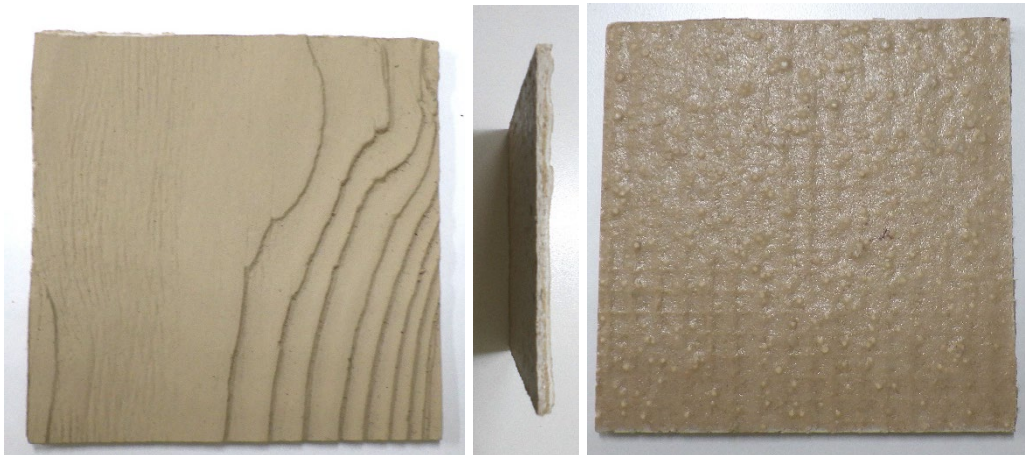
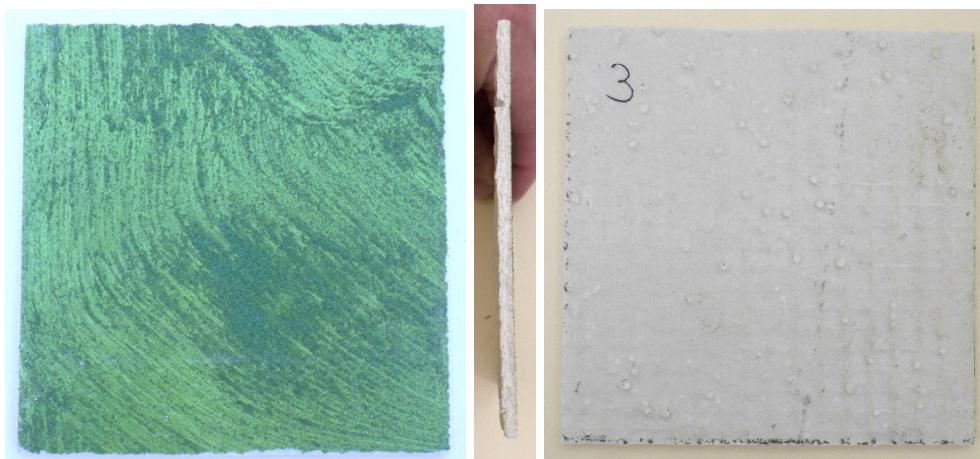


Figure 4: Representative specimen Metallic Green (Exposed face on left, edge view centre, reverse face on right)



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) sample only	Mass (g) incl substrate*	Mean thickness (mm)*		
White Wave Line	FH20552-2-50-4	77.5	192.8	20.0	964	White
Natural Wood	FH20552-4-50-1	73.4	181.8	17.7	1027	Light Brown
Black Lunar Stone	FH20552-3-50-1	103.7	214.8	20.5	1048	Black
	FH20552-3-50-2	112.6	213.6	20.0	1068	
	FH20552-3-50-3	106.3	219.5	20.0	1098	
Metallic Green Artistic	FH20552-7-50-1	66.9	195.4	17.0	1149	Metallic Green

*Includes adhesive and 10 mm plasterboard substate

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 test standard). The sample preparation and test procedure were as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted on 17th April and 27th May 2025 by 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 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.

2.5 Test programme

The test program consisted of four indicative and a further two replicate specimens 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 Calculation of heat release without ignition

If a tested specimen does not display ignition, the average heat release rate values are to be calculated from the last negative heat release reading after the test begins.

If the last recorded negative heat release reading is not able to be established as there were multiple negative heat release readings over the course of the test, average values are calculated from the first positive heat release reading after the start of the test.

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. The plasterboard substrate was supplied by BRANZ.



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

8 of 13

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3. INDICATIVE TEST RESULTS

Indicative tests were conducted on specimens FH20552-2-50-4, FH20552-3-50-1, FH20552-4-50-1 and FH20552-7-50-1.

Table 2: 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)
FH20552-2-50-4	50	143	68.2	26.9	15.9
FH20552-3-50-1	50	89	104.5	28.8	81.4
FH20552-4-50-1	50	142	106.7	18.0	108.4
FH20552-7-50-1	50	156	102.2	13.1	64.8

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

All Specimens tested adhered to 10 mm plasterboard substrate

As shown in Table 2 above, although sample FH20552-4-50-1 of the Natural Wood variant had a marginally higher peak heat release, the Black Lunar Stone specimens exhibited the fastest time to ignition and higher total heat release rate and was selected for replicate testing to represent the product range. Sample FH20552-7-50-1 was tested at a later date to represent additional variants in the range, and its time to ignition and heat release rates did not exceed that of the other samples tested.

4. TEST RESULTS AND REDUCED DATA

4.1 Test results and reduced data – ISO 5660

The test results obtained for the Black Lunar Stone veneer, as described in Section 1, are presented in Table 3 below. The data has been reduced in accordance with Section 2.1.

Table 3: Test results and reduced data – ISO 5660

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
Specimen test number	FH20552-3-50-1	FH20552-3-50-2	FH20552-3-50-3	
Test Date	17/04/2025	17/04/2025	17/04/2025	
C-Factor	0.0418	0.0418	0.0418	0.0418
Time to sustained flaming s	89	91	105	95
Observations ^a	No significant observations recorded			
Test duration ^b s	914*	992*	1905**	1270
Mass remaining, m_f g	186.7	185.3	186.5	186.2
Mass pyrolyzed %	13.1	13.2	15.0	13.8
Specimen mass loss ^c kg/m ²	3.1	3.2	3.7	3.3
Specimen mass loss rate ^c g/m ² s	3.8	3.5	2.0	3.1
Heat release rate				
peak, $\dot{q}_{\max}''$ kW/m ²	104.5	104.7	107.5	105.5
average, $\dot{q}_{\text{avg}}''$				
Over 60 s from ignition ^d kW/m ²	68.5	68.0	74.5	70.3
Over 180 s from ignition ^d kW/m ²	79.7	78.1	88.4	82.0
Over 300 s from ignition ^d kW/m ²	72.4	68.9	77.7	73.0
Total heat released MJ/m ²	28.8	25.8	32.8	29.1
Average Specific Extinction Area m ² /kg	81.4	77.3	71.2	76.7
Effective heat of combustion ^d , $\Delta h_{c,\text{eff}}$ MJ/kg	9.1	8.0	8.8	8.6
Total smoke production				
Non-flaming $S_{A,1}$ m ² /m ²	7.2	6.0	9.8	7.6
Flaming $S_{A,2}$ m ² /m ²	254.7	243.7	271.5	256.6
Total $S_A = S_{A,1} + S_{A,2}$ m ² /m ²	261.9	249.7	281.2	264.3

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

^c from ignition to end of test; ^d from the start of the test



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

10 of 13

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5. VARIABILITY ANALYSIS

The test standards require that the mean heat release rate (HRR) readings over the first 180 seconds 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. Specimens which do not ignite have values calculated as detailed in Section 2.6.

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
FH20552-3-50-1	79.7	82.0	-2.9
FH20552-3-50-2	78.1		-4.8
FH20552-3-50-3	88.4		7.7

Table 5 identifies that all the specimens exposed to 50 kW/m² irradiance were within the acceptance criteria, therefore a further three specimens were not required.

6. 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 below with rates of heat release illustrated in Figure 5.

Table 5: Report summary

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)	Average Specific Extinction Area (m ² /kg)
20.2	50	95	105.5	29.1	76.7

Figure 5: Rate of heat release versus time

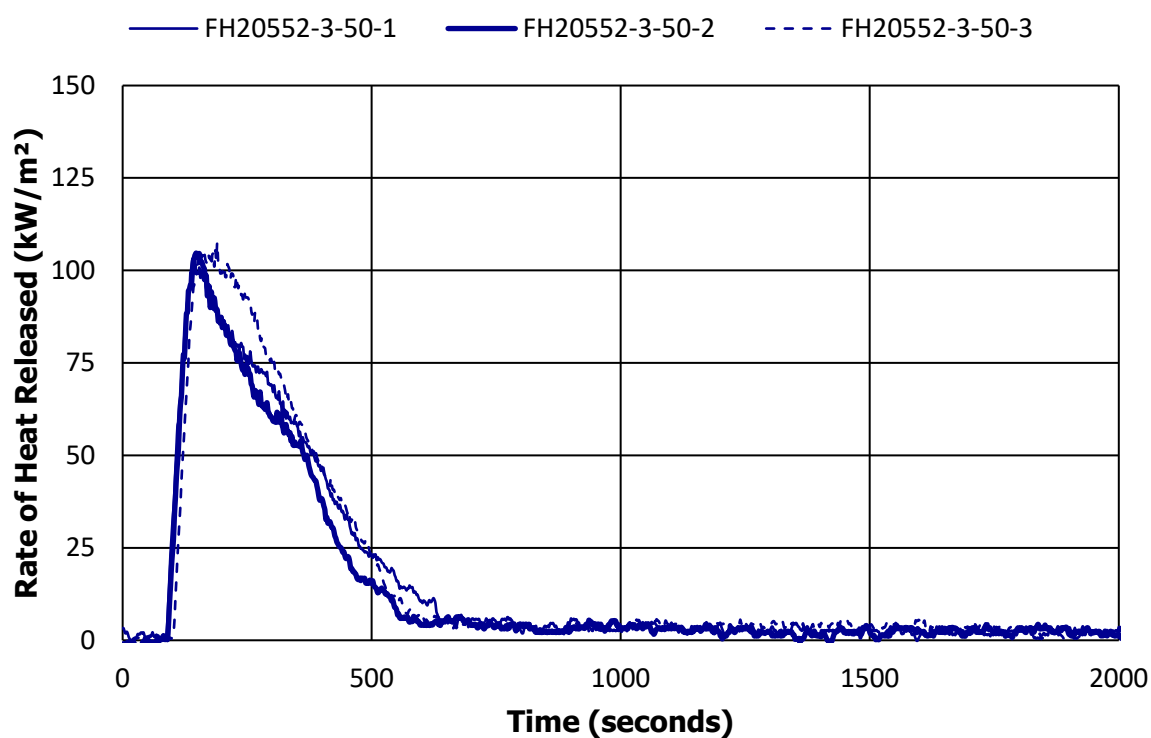
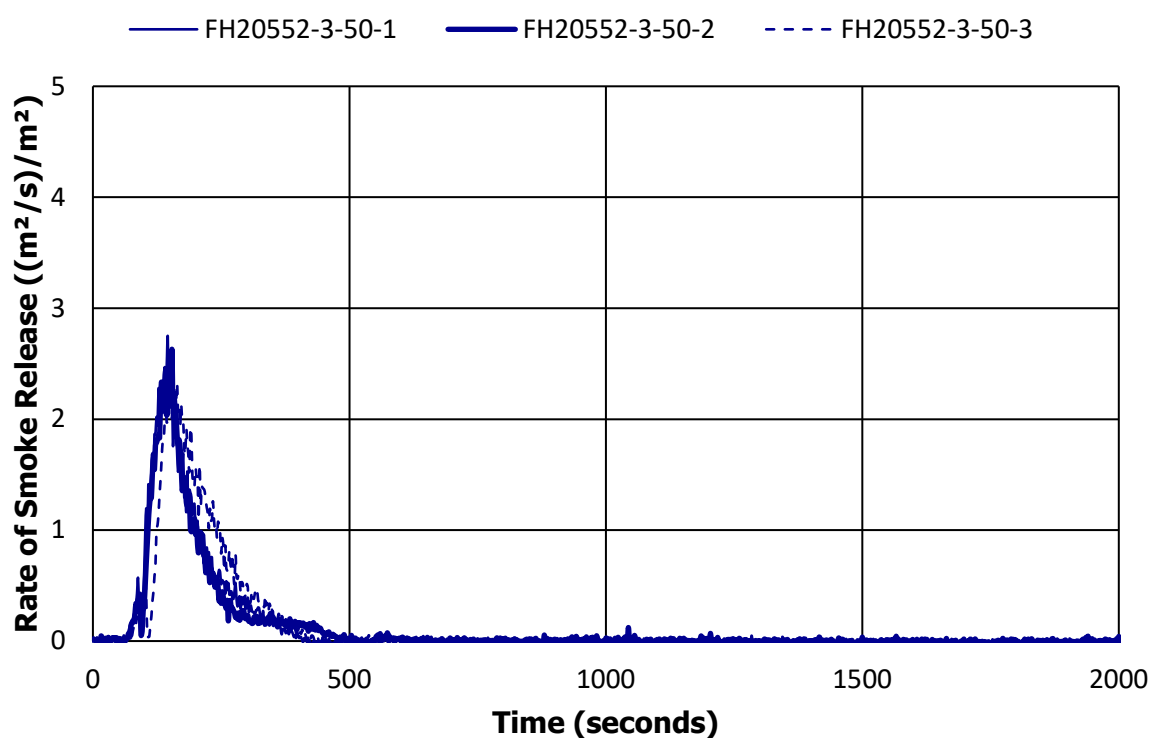


Figure 6: Rate of smoke production versus time



7. DISCUSSION

Samples of the flexible wall veneer were supplied in White Wave Line, Black Lunar Stone, Natural Wood and Green Artistic Panel variants to provide representative examples of the product ranges in terms of colour, finish and surface area. A range of samples were tested, with the most onerous variant supplied being tested in full, and all variants achieved the same material Group Number classification. As such, it would be expected that the other products in the flexible veneer range would achieve the same material Group Number Classification, provided that the variants retain equivalent material and finish composition and finish thicknesses to those tested.

END OF TEST REPORT



REPORT NUMBER:

FH20552-01-1

ISSUE DATE:

5 June 2025

PAGE:

13 of 13

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FH20552-01-1-C1

GROUP NUMBER ASSESSMENT



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

Test Sponsor

Linnovate Space Limited
127 Trigg Road
Kumeu
Auckland, 0891
New Zealand

Date of tests

17th April and 27th May 2025

Reference BRANZ Test Report

FH20552-01-1 – 5 June 2025

Test specimens as described by the client

Flexible Wall Veneer

Panels composed of quartz sand, clay and a reinforcing fabric mesh. Samples were supplied in White Wave Line, Natural Wood, Black Lunar Stone and Metallic Green Artistic finishes and adhered to 10mm plasterboard substrate using Technorap tiling adhesive. The finish is an acrylic emulsion with a nominal 50 µm thickness. The full finish composition ratios are held on file at BRANZ.

Specimen ID	Sample Values				Colour
	Mass (g) sample only	Mass (g) incl substrate	Thickness (mm)	Apparent Density (kg/m ³)	
FH20552-2-50-4	77.5	192.8	20.0	964	White
FH20552-3-50-1,2,3*	107.5*	216.0*	20.2*	1071*	Black
FH20552-4-50-1	73.4	181.8	17.7	1027	Light Brown
FH20552-7-50-1	66.9	195.4	17.0	1149	Metallic Green

*Mean values for replicate specimens

Discussion

Samples of the flexible wall veneer were supplied in White Wave Line, Black Lunar Stone, Natural Wood and Green Artistic Panel variants to provide representative examples of the product ranges in terms of colour, finish and surface area. A range of samples were tested, with the most onerous variant supplied being tested in full, and all variants achieved the same material Group Number classification. As such, it would be expected that the other products in the flexible veneer range would achieve the same material Group Number Classification, provided that the variants retain equivalent material and finish composition and finish thicknesses to those tested.

Group Number Classification in accordance with the New Zealand Building Code

The specimens were deemed suitable for testing and calculations for establishing a Group Number were carried out in accordance with New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A.

Classification for the sample as described above is given in the table below.

Building Code Document	Group Number Classification
NZBC Verification Method C/VM2, Amendment 7, Appendix A	1-S

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

Issued by


L. M. Grant
Fire Testing Engineer
BRANZ

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Fire Testing Engineer
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Issue Date

5 June 2025