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BRANZ TYPE TEST

FH 6140-TT [2017]

CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2 APPENDIX A
PERFORMANCE OF DESIGNER SERIES - CEMENT BONDED FIBROUS WOOD PANELS

CLIENT

NZ Brick Distributors Christchurch
1/99 Sawyers Arms Road
Northcote
Christchurch 8052
New Zealand



IANZ
ACCREDITED LABORATORY

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 on client supplied specimens for the purposes of determination of the Group Classifications in accordance with New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A.

Test sponsor

NZ Brick Distributors Christchurch
1/99 Sawyers Arms Road
Northcote
Christchurch 8052
New Zealand

Description of test specimen

The products as described by the client as Designer Series, nominally 14 mm thick cement bonded fibrous wood panels in various colours and surface patterns.

Date of tests

13th and 21st March 2017

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	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1-S

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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1. GENERAL

The products submitted by the client for testing were identified by the client as Designer Series, nominally 14 mm thick cement bonded fibrous wood panels in various colours and surface patterns. Figure 1 illustrates representative specimens of that tested.

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



FH6140-1-50-1



FH6140-2-50-1

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)		
FH6140-1-50-1	217.3	16.2	1341	Cream
FH6140-2-50-1	186.3	15.3	1218	Ebony
FH6140-2-50-2	200.8	14.0	1434	Ebony
FH6140-2-50-3	198.4	14.0	1417	Ebony

Shaded rows – material tested in full herein



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 13th and 21st March 2017 by Mr Lukas Hersche 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 during testing. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces.

2.5 Test programme

The test programme consisted of three replicate specimens and a single indicative specimen 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 $0.024 \text{ m}^3/\text{s}$.

2.6 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 Test results and reduced data – NZBC C/VM2

Table 2: Test results and reduced data – NZBC C/VM2

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean	
	Specimen test number	FH6140-2-50-1	FH6140-2-50-2		FH6140-2-50-3
Specimen test number		FH6140-2-50-1	FH6140-2-50-2	FH6140-2-50-3	
Test Date		13/03/2017	21/03/2017	21/03/2017	
Time to sustained flaming	s	59	53	57	56
Observations ^a		-	-	-	
Test duration ^b	s	734*	1853**	1857**	1481
Mass remaining, m _f	g	161.3	154.2	164.4	160.0
Mass pyrolyzed	%	13.4%	23.2%	17.1%	17.9%
Specimen mass loss ^c	kg/m ²	2.8	5.2	3.8	3.9
Specimen mass loss rate ^c	g/m ² .s	4.1	2.9	2.1	3.1
Heat release rate					
peak, \dot{q}_{max}''	kW/m ²	66.7	39.2	63.3	56.4
average, \dot{q}_{avg}''					
Over 60 s from ignition	kW/m ²	22.9	15.3	22.5	20.2
Over 180 s from ignition	kW/m ²	12.6	11.4	14.3	12.8
Over 300 s from ignition	kW/m ²	9.9	9.6	11.9	10.4
Total heat released	MJ/m ²	5.1	17.7	17.9	13.6
Average Specific Extinction Area	m ² /kg	8.2	1.9	6.9	5.7
Effective heat of combustion ^d , $\Delta h_{c,eff}$	MJ/kg	1.8	3.4	4.6	3.3

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pre-test value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^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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3.2 Indicative test results

Table 3: Indicative test results summary

Ref. no	Test date	Time to Ignition (s)	Peak Heat Release Rate (kW/m ²)	Total Heat Released (MJ/m ²)	Average Specific Extinction Area (m ² /kg)
FH6140-1-50-1	13/3/2017	0	27.1	2.3	11
FH6140-2-50-1	13/3/2017	59	66.7	5.1	8.2

Shaded row – Sample 1 results for material tested in full herein.

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 4: Heat release rate

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH6140-2-50-1	12.6	12.8	-1.5%
FH6140-2-50-2	11.4		-10.5%
FH6140-2-50-3	14.3		11.9%

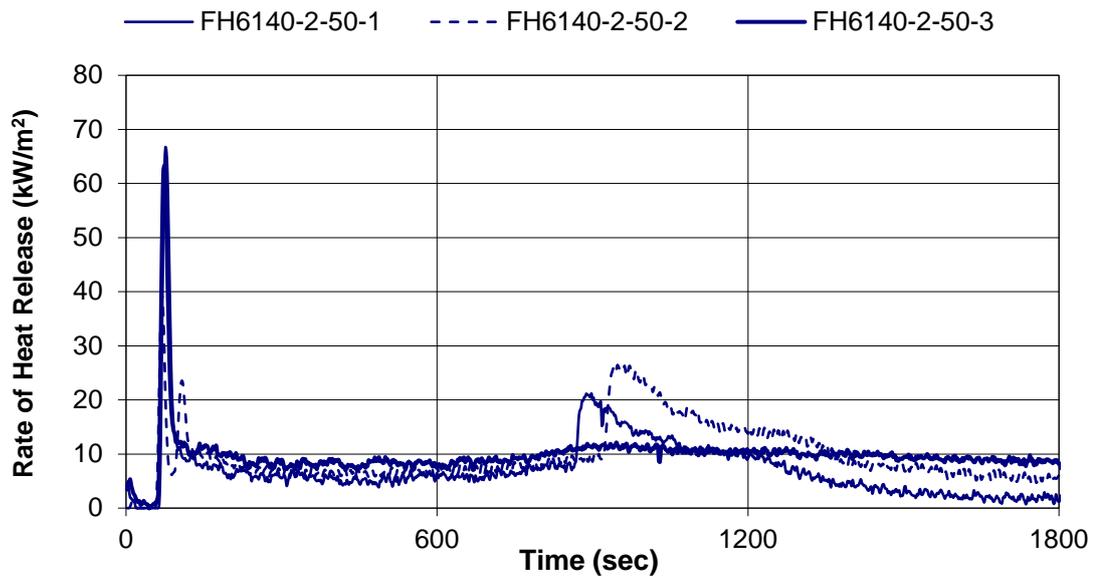
Table 4 identifies two of the specimens exposed to 50 kW/m² irradiance exceeded the acceptance criteria. Although two of the specimens were outside of the variability criteria of the test standard, the same Group Classification was determined for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.

Table 5: Report summary

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
14.4	50	56	56.4	5.7



Figure 2: Rate of heat release versus time



5. CLASSIFICATION IN ACCORDANCE WITH NZBC VERIFICATION METHOD C/VM2 APPENDIX A

The following classification has been assessed in accordance with the New Zealand Building Code Verification Method C/VM2 Appendix A: Establishing Group Numbers for lining materials. Calculations were carried out according to section A1.3 for predicting a material's group number for each specimen tested. It states that "If a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material." The classification for the specimens as described in Section 1 is as follows:

Table 6: NZBC Group classification and smoke extinction area

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	1	1	1-S
Average Specific Extinction Area (m ² /kg)	8.2	1.9	6.9	

In accordance with Verification Method C/VM2 Appendix A, samples achieving either a Group number classification 1 or 2, and with an average specific extinction area less than 250 m²/kg are identified with "S" post-script to the Group number. The tested samples recorded an average specific extinction area of 5.7 m²/kg which is less than the 250 m²/kg limit.



6. DISCUSSION

No significant variations were detected in the indicative testing of Smooth Cream or Textured Ebony Designer Series panels. Each sample was designated a Group 1-S classification. The following products within the Designer Series range are deemed to achieve equivalent Group classification to Smooth Cream (FH6140-1-50-1) and Textured Ebony (FH6140-2-50-1) cement bonded fibrous wood panels:

- Smooth – Cream, Mocha, Frappe, Latte
- Woodgrain – Teak, Wenge
- Textured – Ebony, Sandstone

7. NZBC CONCLUSION

The cone calorimeter testing was carried out on the specimens as described in Section 1. For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1.

Group Number Classification	1-S
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GROUP NUMBER CLASSIFICATION

This is to certify that the specimen described below was tested by BRANZ for determination of Group Number Classification and Average Specific Extinction Area in accordance with ISO 5660 Parts 1 and 2.

Test Sponsor

NZ Brick Distributors Christchurch
1/99 Sawyers Arms Road
Northcote
Christchurch 8052
New Zealand

Date of tests

13th and 21st March 2017

Reference BRANZ Test Report

FH 6140-TT – issued 18th May 2017

Test specimen as described by the client

Designer Series, nominally 14 mm thick cement bonded fibrous wood panels in various colours and surface patterns.

Specimen reference	Mass* (g)	Thickness* (mm)	Apparent density* (kg/m ³)	Colour
FH6140-1-50-1	217.3	16.2	1341	Cream
FH6140-2-50-1	186.3	15.3	1218	Ebony

Group Number 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	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1-S
<i>Regulatory authorities are advised to examine test reports before approving any product.</i>	

Issued by

L. F. Hersche
Fire Testing Technician

Reviewed by

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



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

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