

BRANZ Type Test

FH11292-001

CONE TEST REPORT AND PERFORMANCE IN ACCORDANCE WITH NZBC
VERIFICATION METHOD C/VM2 APPENDIX A OF FBL-100

CLIENT

12 Tokomaru Street
Welbourn
New Plymouth 4312
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 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

12 Tokomaru Street
Welbourn
New Plymouth 4312
New Zealand

Description of test specimen

The product as described by the client as FBL-100, a halogen free, low VOC, acrylic copolymer latex film intumescent coating applied at $\geq 165 \mu\text{m}$ to 12 mm thick paper-faced plasterboard.

Date of tests

12 March and 15 April 2019

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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TO WHOM IT MAY CONCERN

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- (i) recognises within its scope of recognition of this Arrangement the accreditation of an organisation by other signatories as being equivalent to an accreditation by its own organisation,
- (ii) accepts, for its own purposes, endorsed* certificates or reports issued by organisations accredited by other signatories on the same basis as it accepts endorsed* certificates or reports issued by its own accredited organisations,
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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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SIGNATORIES

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IANZ Approved Signatory

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
1	28/06/2019	28/06/2024	Initial Issue



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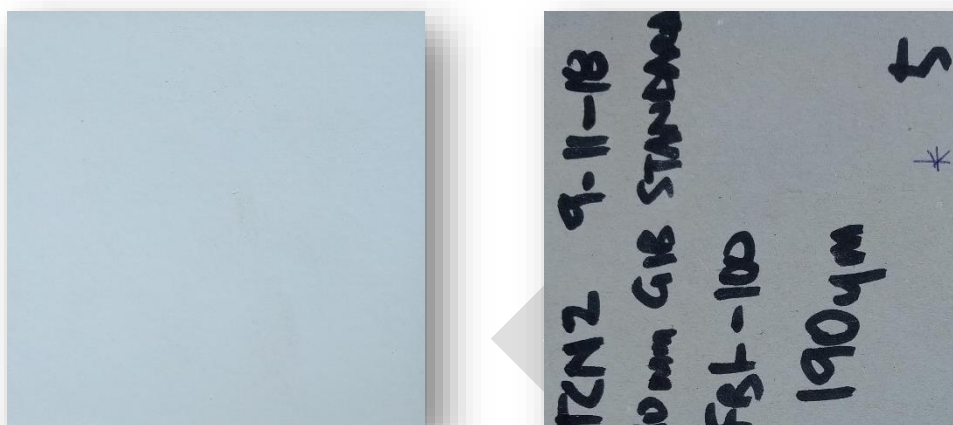
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1. GENERAL

The product submitted by the client for testing was identified by the client as FBL-100, a halogen free, low VOC, acrylic copolymer latex film intumescent coating applied at $\geq 165 \mu\text{m}$ to 12 mm thick paper-faced plasterboard. Figure 1 illustrates representative specimens of those tested.

Figure 1: Representative specimen (front face on left, back 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)		
FH11292-1-50-1	67.6	10.2	663	White
FH11292-1-50-2	67.2	10.2	659	White
FH11292-1-50-3	70.0	10.2	686	White
Mean values	68.3	10.2	669	

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 12 March and 15 April 2019 by Mr James Quilter and 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. 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 replicate specimens 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 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	
	FH11292-1-50-1	FH11292-1-50-2	FH11292-1-50-3		
Specimen test number	FH11292-1-50-1	FH11292-1-50-2	FH11292-1-50-3		
Test Date	12/03/2019	15/05/2019	15/05/2019		
Time to sustained flaming	s	29	27	29	28
Observations ^a	-	-	-		
Test duration ^b	s	300*	300*	300*	300
Mass remaining, m_f	g	62.8	63.9	66.1	64.2
Mass pyrolyzed	%	7.2%	4.9%	5.6%	5.9%
Specimen mass loss ^c	kg/m ²	0.5	0.3	0.4	0.4
Specimen mass loss rate ^c	g/m ² .s	1.8	1.2	1.5	1.5
Heat release rate					
peak, \dot{q}_{max}''	kW/m ²	12.6	25.2	18.8	18.9
average, \dot{q}_{avg}''					
Over 60 s from ignition	kW/m ²	1.8	5.6	2.8	3.4
Over 180 s from ignition	kW/m ²	0.7	3.4	1.4	1.9
Over 300 s from ignition	kW/m ²	0.7	2.8	0.9	1.5
Total heat released	MJ/m ²	0.2	0.9	0.3	0.5
Average Specific Extinction Area	m ² /kg	31.3	100.9	-	66.1
Effective heat of combustion ^d , $\Delta h_{c,eff}$	MJ/kg	0.4	2.3	0.7	1.1

Notes:

^a no significant observations were recorded

^b determined by * X_{O_2} returning to the pre-test value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming or without ignition

^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. SUMMARY

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
FH11292-1-50-1	0.7	1.9	-60.4%
FH11292-1-50-2	3.4		84.2%
FH11292-1-50-3	1.4		-23.8%

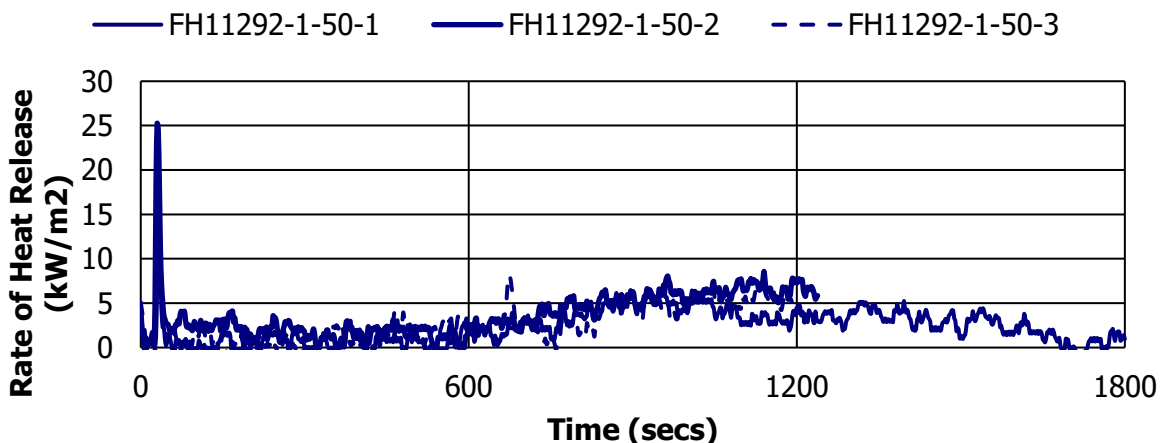
Table 3 identifies all specimens exposed to 50 kW/m² irradiance exceeded the acceptance criteria. Although the specimens were outside of the variability criteria of the test standard, the same Group Classification was determined for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.

The report summary for the specimens as described in Section 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

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)
10.2	50	28	18.9	66.1

Figure 2: Rate of heat release versus time



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5. DETERMINATION OF NZBC GROUP CLASSIFICATION

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 5: NZBC Group classification and smoke extinction area

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1-S	1-S	1-S	1-S
Average Specific Extinction Area (m ² /kg)	31.3	100.9	-	

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 66.1 m²/kg which is less than the 250 m²/kg limit.

6. 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 specimens described below were 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

12 Tokomaru Street
Welbourn
New Plymouth 4312
New Zealand

Date of tests

12 March and 15 April 2019

Reference BRANZ Test Report

FH11292-001 – issued 28/06/2019

Test specimens as described by the client

FBL-100, a halogen free, low VOC, acrylic copolymer latex film intumescent coating applied at $\geq 165 \mu\text{m}$ to 12 mm thick paper-faced plasterboard.

Specimen ID	Mass (g)	Thickness (mm)	Apparent Density (kg/m ³)	Colour
FH11292-1-50-1, 2, 3	68.3	10.2	669	White

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

Issued by

L. F. Hersche
Fire Testing Engineer
BRANZ

Reviewed by

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

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



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