
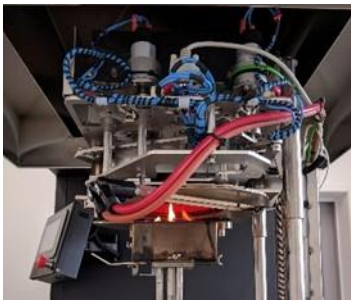


BRANZ Type Test

FH16267-01-1

CONE CALORIMETER TEST OF MAGNUM BOARD

CLIENT

Health Based Building Ltd
1062 Colombo Street
Edgeware, Christchurch 8014
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 5660-1:2015
- AS 5637.1:2015

Test sponsor

Health Based Building Ltd
1062 Colombo Street
Edgeware, Christchurch 8014
New Zealand

Description of test specimen

The products as described by the client as Magnum Board, nominally 9 mm thick, comprising a magnesium oxide based wall lining board with fibreglass scrim and smooth sanded front face.

Date of tests

10th and 23rd June 2022

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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NATA

IANZ

TO WHOM IT MAY CONCERN

Both NATA (National Association of Testing Authorities, Australia) and IANZ (International Accreditation New Zealand) are signatories to the ILAC Mutual Recognition Arrangement. Under the terms of this arrangement, each signatory:

(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,

(iii) recommends and promotes the acceptance by users in its economy of endorsed* certificates and reports,

* *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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IANZ Approved Signatory

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
1	1/07/2022	1/07/2027	Initial Issue

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1. GENERAL

The product submitted by the client for testing was identified by the client as Magnum Board, nominally 9 mm thick, comprising a magnesium oxide based wall lining board with fibreglass scrim and smooth sanded front face. Figure 1 illustrates a representative specimen of that tested.

Figure 1: Representative specimen (front face on left, reverse 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/m³)	Colour (Front Face)
	Mass (g)	Mean thickness (mm)		
FH16267-1-50-1	95.5	9.1	1049	White
FH16267-1-50-2	96.2	9.1	1057	White
FH16267-1-50-3	96.0	9.1	1055	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, and Part 2: Smoke production rate and ISO 5660-1:2015, Reaction-to-fire tests – Heat release, smoke production and mass loss – Part 1: Heat release rate, and smoke production rate; (the test standards). The sample preparation and test procedure were as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted on 10th and 23rd June 2022 by Mr James Quilter 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 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 replicate specimens, 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.

2.6 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
Specimen test number		FH16267-1-50-1	FH16267-1-50-2	FH16267-1-50-3	
Test Date		10/06/2022	23/06/2022	23/06/2022	
Time to sustained flaming	s	No ignition	No ignition	No ignition	N/A
Observations[a]		-	-	-	
Test duration[b]	s	1800 **	1800 **	1800 **	1800
Mass remaining, m_f	g	53.7	53.8	54.0	53.8
Mass pyrolyzed	%	43.8%	44.1%	43.7%	43.9%
Specimen mass loss[c]	kg/m^2	4.7	4.8	4.8	4.8
Specimen mass loss rate[c]	g/m^2 s	2.6	2.7	2.6	2.6
Heat release rate					
peak, $\dot{q}''_{max}$	kW/m^2	8.6	10.0	9.8	9.5
average, $\dot{q}''_{avg}$					
Over 60 s from ignition[d]	kW/m^2	-0.1	0.3	-2.0	-0.6
Over 180 s from ignition[d]	kW/m^2	-0.8	0.6	-1.2	-0.5
Over 300 s from ignition[d]	kW/m^2	-0.3	1.2	-0.6	0.1
Total heat released	MJ/m^2	6.3	9.3	8.4	8.0
Average Specific Extinction Area	m^2/kg	11.3	14.1	-10.1	5.1
Effective heat of combustion[d], $\Delta h_{c,eff}$	MJ/kg	1.3	1.9	1.7	1.6
Total smoke production					
Non-flaming $S_{A,1}$	m^2/m^2	53.6	67.9	9.1	43.5
Flaming $S_{A,2}$	m^2/m^2	N/A	N/A	N/A	N/A
Total $S_A = S_{A,1} + S_{A,2}$	m^2/m^2	53.6	67.9	9.1	43.5

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, minimum 5 minutes after start of test
** 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 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.

Table 3: Heat release rate

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH16267-1-50-1	-0.8	-0.5	59.9%
FH16267-1-50-2	0.6		-217.1%
FH16267-1-50-3	-1.2		157.2%

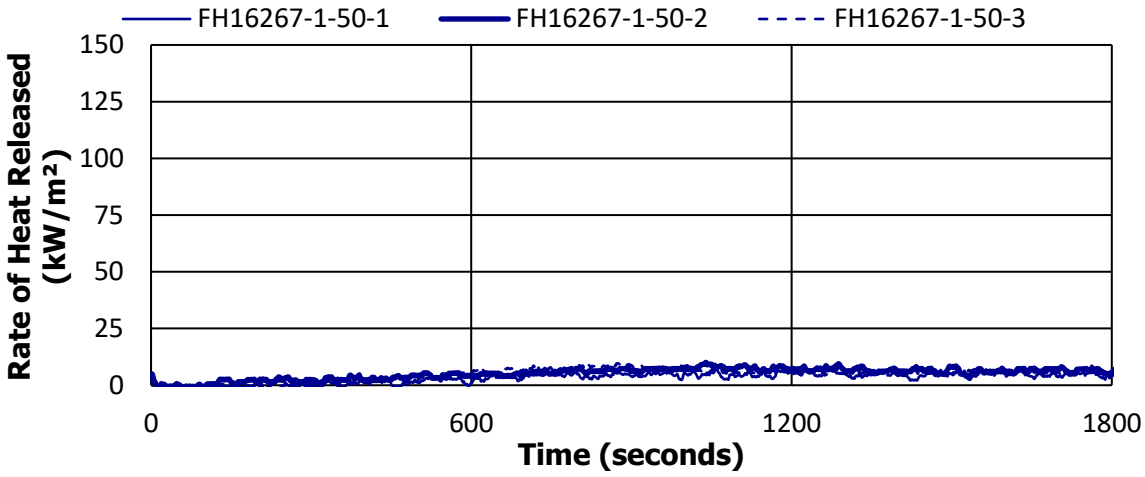
Table 3 identifies that all of the specimens exposed to 50 kW/m² irradiance exceeded the acceptance criteria. Although the specimens were outside of the variability criteria of the test standard, the same performance was determined for each specimen. A further set of three tests as required by the test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

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 2.

Table 4: Report summary

Mean Specimen thickness (mm)	Irradiance (kW/m²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m²)	Mean Total Heat Released (MJ/m²)	Mean Average Specific Extinction Area (m²/kg)
9.1	50	No ignition	9.5	8.0	5.1

Figure 2: Rate of heat release versus time



END OF TEST REPORT

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FH16267-01-1-C1
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 5660-1:2015 and ISO 5660:2002 Parts 1 and 2

Test Sponsor

Health Based Building Ltd
1062 Colombo Street
Edgeware, Christchurch 8014
New Zealand

Date of tests

10th and 23rd June 2022

Reference BRANZ Test Report

FH16267-01-1 – 1 July 2022

Test specimens as described by the client

Magnum Board

Nominally 9 mm thick, comprising a magnesium oxide based wall lining board with fibreglass scrim and smooth sanded front face.

Specimen Reference	Mass (g)	Thickness (mm)	Apparent Density (kg/m³)	Colour	Indicative Group Number
FH16267-1-50-1	95.5	9.1	1049	White	1-S
FH16267-1-50-2	96.2	9.1	1057	White	1-S
FH16267-1-50-3	96.0	9.1	1055	White	1-S

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.

Group Number Classification in accordance with NCC Australia

Calculations were carried out according to AS 5637.1:2015. The Group Number Classification and Average Smoke Extinction Area for the sample as described above is given in the table below.

Determination of Fire Hazard Properties

The specimens were deemed suitable for testing in accordance with AS 5637.1:2015 and testing was performed in accordance with ISO 5660 for the purposes of Group Number Classification as specified in the NCC Volume One Specification C1.10 Clause 4.

Building Code Document	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1-S
NCC Volume One Specification C1.10 Clause 4 determined in accordance with AS 5637.1:2015	1 The average specific extinction area was **less** than the 250 m2/kg limit

Issued by

J. R. Stallinger
Associate Fire Testing Engineer
BRANZ

Reviewed by

L. F. Hersche
Fire Testing Engineer
IANZ Approved Signatory

Issue Date
1 July 2022

Expiry Date
1 July 2027

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