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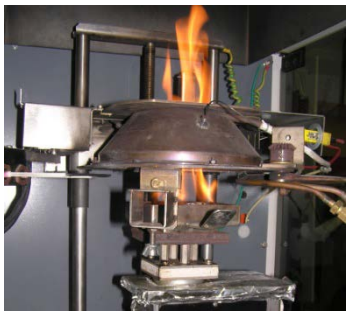

BRANZ Type Test

FH 6000-TT [2016]

CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2 APPENDIX A AND NCC SPECIFICATION C1.10 PERFORMANCE OF STOSILENT DIRECT

CLIENT
Stoanz
72 Abel Smith Street
Te Aro
Wellington 6011
New Zealand

ilac-MRA IANZ ACCREDITED LABORATORY

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

PROJECT NUMBER:	ISSUE DATE:	EXPIRY DATE:	PAGE:
FT6000	**20 October 2016**	**20 October 2021**	**1 of 11**

TEST SUMMARY

Objective

To conduct cone calorimeter testing and reduce the data in accordance with:

- ISO 5660 Parts 1 and 2
- AS/NZS 3837:1998

Test sponsor

Stoanz
72 Abel Smith Street
Te Aro
Wellington 6011
New Zealand

Description of test specimen

The product as described by the client as StoSilent Direct, a mineral wool and expanded glass granulate interior lining system with a paint-coated plaster finish.

The following variations of StoSilent Direct where tested herein:

Product Name	Specimen Number
StoSilent Top Basic	FH6000-1-50-1
StoSilent Finish	FH6000-2-50-1
StoSilent Décor M	FH6000-3-50-1
StoSilent Direct Colour Climasan	FH6000-4-50-1

Date of tests

16 and 25 August 2016

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.

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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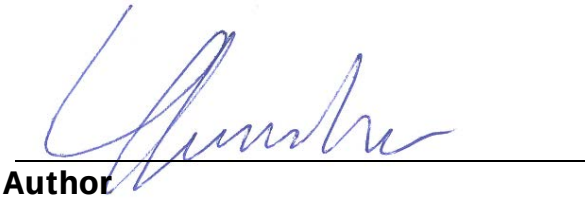
SIGNATORIES



Author

L. F. Hersche
Fire Technician

Reviewer

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

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	EXPIRY DATE	DESCRIPTION
1	20 October 2016	20 October 2021	Initial Issue

1. GENERAL

The product submitted by the client for testing was identified by the client as StoSilent Direct, a mineral wool and expanded glass granulate interior lining system with a paint-coated plaster finish. Figure 1 illustrates a representative specimen of that 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/m³)
	Mass (g)	Mean thickness (mm)	
FH6000-1-50-1	73.3	44.0	167
FH6000-2-50-1	78.6	44.5	177
FH6000-3-50-1	65.7	44.5	148
FH6000-4-50-1	59.2	43.5	136
FH6000-4-50-2	59.6	44.0	135
FH6000-4-50-3	56.8	44.0	129

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, and AS/NZS 3837:1998 'Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter'; (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 16 and 25 August 2016 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 ± 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 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 the above table, 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.

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		FH6000-4-50-1	FH6000-4-50-2	FH6000-4-50-3	
Test Date		16/08/2016	25/08/2016	25/08/2016	
Time to sustained flaming	s	10	8	8	9
Observations[a]		-	-	-	
Test duration[b]	s	1168*	1808**	1174*	1383
Mass remaining, m_f	g	54.8	54.2	52.1	53.7
Mass pyrolyzed	%	7.4%	9.1%	8.2%	8.2%
Specimen mass loss[c]	kg/m^2	0.4	0.6	0.5	0.5
Specimen mass loss rate[c]	g/m^2 .s	0.4	0.3	0.4	0.4
Heat release rate					
peak, $\dot{q}''_{max}$	kW/m^2	67.5	64.7	63.8	65.3
average, $\dot{q}''_{avg}$					
Over 60 s from ignition	kW/m^2	33.3	33.6	32.7	33.2
Over 180 s from ignition	kW/m^2	20.3	21.4	21.1	20.9
Over 300 s from ignition	kW/m^2	15.6	16.2	16.0	15.9
Total heat released	MJ/m^2	8.0	17.6	7.9	11.2
Average Specific Extinction Area	m^2/kg	17.8	34.8	16.6	23.1
Effective heat of combustion[d], $\Delta h_{c,eff}$	MJ/kg	16.3	28.8	14.9	20.0

Notes :

[a] no significant observations were recorded

[b] determined by * X_{O2} returning to the pretest 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

3.2 Test results and reduced data – AS/NZS 3837

Table 3: Test results and reduced data – AS/NZS 3837

Material		Test specimens as described in Section 1 (in accordance with AS/NZS 3837)			Mean
Specimen test number		FH6000-4-50-1	FH6000-4-50-2	FH6000-4-50-3	
Test Date		16/08/2016	25/08/2016	25/08/2016	
Time to sustained flaming	s	10	8	8	9
Observations[a]		-	-	-	
Test duration[b]	s	138**	137**	138**	138
Mass remaining, m_f	g	57.2	57.1	54.4	56.2
Mass pyrolyzed	%	3.4%	4.2%	4.3%	3.9%
Specimen mass loss[c]	kg/m^2	0.2	0.2	0.2	0.2
Specimen mass loss rate[c]	g/m^2 .s	3.0	3.7	3.7	3.5
Heat release rate					
peak, $\dot{q}''_{max}$	kW/m^2	67.5	64.7	63.8	65.3
average, $\dot{q}''_{avg}$					
Over 60 s from ignition	kW/m^2	33.3	33.6	32.7	33.2
Over 180 s from ignition	kW/m^2	20.3	21.4	21.1	20.9
Over 300 s from ignition	kW/m^2	15.6	16.2	16.0	15.9
Total heat released	MJ/m^2	3.0	3.2	3.1	3.1
Average Specific Extinction Area	m^2/kg	37.3	24.8	27.9	30.0
Effective heat of combustion[d], $\Delta h_{c,eff}$	MJ/kg	13.5	11.3	11.4	12.0

Notes :

[a] no significant observations were recorded

[b] determined by

* average mass loss over 1 minute dropped below 150 g/m^2
** two minutes after flameout or other signs of combustion cease
*** 60 minutes have elapsed or 10 minutes 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

3.3 Indicative results

Specimen ID	Specimen thickness (mm)	Irradiance (kW/m²)	Time to Ignition (s)	Peak Heat Release Rate (kW/m²)	Average Specific Extinction Area (m²/kg)
FH6000-1-50-1	44.0	50	21	78.2	3 (NZBC) 27 (NCC)
FH6000-2-50-1	44.5	50	45	31.4	8 (NZBC) 20 (NCC)
FH6000-3-50-1	44.5	50	18	43.5	8 (NZBC) 8 (NCC)
FH6000-4-50-1	43.5	50	10	67.5	23 (NZBC) 30 (NCC)

4. SUMMARY

The test standards require 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
FH6000-4-50-1	20.3	20.9	-3.1%
FH6000-4-50-2	21.4		2.4%
FH6000-4-50-3	21.1		0.7%

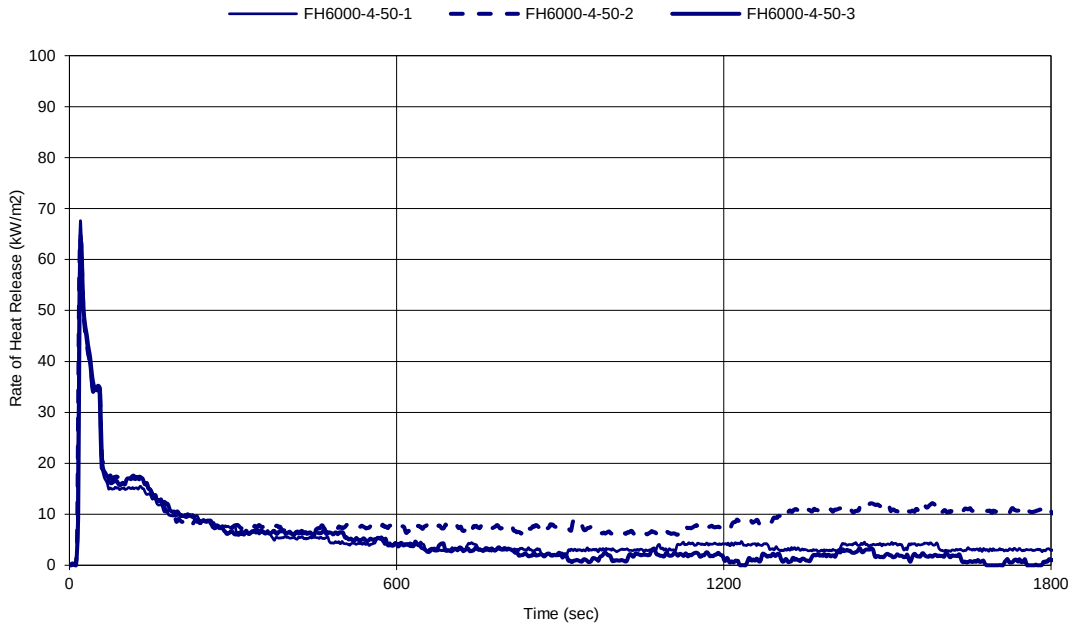
Table 4 identifies the specimens exposed to 50 kW/m² irradiance meet the acceptance criteria. A further set of three tests as required by the test standard was not necessary and were not tested.

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

Table 5: Report summary

Mean Specimen thickness (mm)	Irradiance (kW/m²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m²)	Average Specific Extinction Area (m²/kg)
43.8	50	9	65.3	23 (NZBC) 30 (NCC)

Figure 2: Rate of heat release versus time



BRANZ Technical Opinion

Group Number Assessment

This is to certify that the specimen described below has been tested by BRANZ Ltd on behalf of

Stoanz
72 Abel Smith Street
Te Aro
Wellington 6011
New Zealand

Test standards: ISO 5660 Parts 1 and 2, AS/NZS 3837:1998

Specimen name: StoSilent Direct

- StoSilent Top Basic
- StoSilent Finish
- StoSilent Décor M
- StoSilent Direct Colour Climasan

Specimen description: A mineral wool and expanded glass granulate interior lining system with a paint-coated plaster finish.

Orientation: From the direction tested.

A full description of the test specimen and results are given in BRANZ Reports:

FH 6000-TT (test date 16 and 25 August 2016) and FH 6000-TO

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

The test results were the basis for the following:

Classification Document	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1-S
NCC Specification C1.10 Clause 4 determined in accordance with AS 5736.1	1

The average specific extinction area was less than the 250 m^2/kg limit

Issue Date: **20 October 2016**

Expiry Date: **20 October 2021**

ilac-MRA IANZ ACCREDITED LABORATORY

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