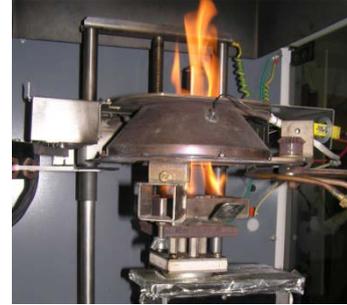




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# BRANZ **Type Test**

## FH 5999-TT [2016]

CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2  
APPENDIX A OF ROCKCOTE MARRAKESH AND OTSUMIGAKI

### CLIENT

Resene Construction Systems  
10B Abros Place,  
Burnside  
Christchurch, 8053  
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 Parts 1 and 2 on client supplied specimens for the determination of the Group Classification in accordance with:

- New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A

## Test sponsor

Resene Construction Systems  
10B Abros Place,  
Burnside  
Christchurch, 8053  
New Zealand

## Description of test specimens

The products as described by the client as Rockcote Marrakesh and Otsumigaki, polished lime/clay plasters on plasterboard substrates.

## Date of tests

11<sup>th</sup> August and 12 October 2016

## Test results

For the purposes of compliance with the relevant building code documents, the following classification is considered applicable to the tested sample 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

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: 24<sup>th</sup> March 2014



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# SIGNATORIES



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# DOCUMENT REVISION STATUS

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



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# 1. GENERAL

The products as described by the client as Rockcote Marrakesh and Otsumigaki, polished lime/clay plasters on plasterboard substrates.

**Figure 1: Representative specimens (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 <sup>3</sup> )
	Mass (g)	Mean thickness (mm)	
FH5999-1-50-1	89.4	10.8	828
FH5999-1-50-2	90.0	10.8	833
FH5999-1-50-3	92.3	11.0	839

## 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 were as described in 2.4 and 2.5.

### 2.2 Test date

The tests were conducted on the 11th August and 12 October 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  $23 \pm 2^\circ\text{C}$  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 the above table, tested at an irradiance level of  $50 \text{ kW/m}^2$ . 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
Specimen test number	FH5999-1-50-1	FH5999-1-50-2	FH5999-1-50-3	
Test Date	11/08/2016	12/10/2016	12/10/2016	
Time to sustained flaming s	-	-	-	
Observations <sup>a</sup>	-	-	-	
Test duration <sup>b</sup> s	1800**	1800**	1800**	1800
Mass remaining, $m_f$ g	70.1	70.6	71.2	70.6
Mass pyrolyzed %	21.6%	21.5%	22.9%	22.0%
Specimen mass loss <sup>c</sup> kg/m <sup>2</sup>	2.2	2.2	2.4	2.3
Specimen mass loss rate <sup>c</sup> g/m <sup>2</sup> .s	1.2	3.1	3.2	2.5
Heat release rate				
peak, $\dot{q}_{max}''$ kW/m <sup>2</sup>	18.1	11.7	15.3	15.1
average, $\dot{q}_{avg}''$				
Over 60 s from ignition kW/m <sup>2</sup>	2.7	0.9	1.2	1.6
Over 180 s from ignition kW/m <sup>2</sup>	10.3	5.4	6.1	7.2
Over 300 s from ignition kW/m <sup>2</sup>	10.0	5.5	6.2	7.2
Total heat released MJ/m <sup>2</sup>	13.3	6.2	5.8	8.4
Average Specific Extinction Area m <sup>2</sup> /kg	10.1	21.6	10.9	14.2
Effective heat of combustion <sup>d</sup> , $\Delta h_{c,eff}$ MJ/kg	6.1	2.8	2.4	3.8

Notes:

<sup>a</sup> no significant observations were recorded

<sup>b</sup> 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

<sup>c</sup> from ignition to end of test;

<sup>d</sup> 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 <sup>2</sup> )	Total Heat Released (MJ/m <sup>2</sup> )	Average Specific Extinction Area (m <sup>2</sup> /kg)
FH5999-1-50-1	11/8/2016	-	18.1	13.3	10
FH5999-2-50-1	11/8/2016	-	9.7	10.4	21

Shaded row – results for material tested in full herein.

## 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
FH5999-1-50-1	10.3	7.2	41.5%
FH5999-1-50-2	5.4		-25.0%
FH5999-1-50-3	6.1		-16.5%

Table 4 identifies that all specimens exposed to 50 kW/m<sup>2</sup> irradiance did not meet the acceptance criteria. 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.

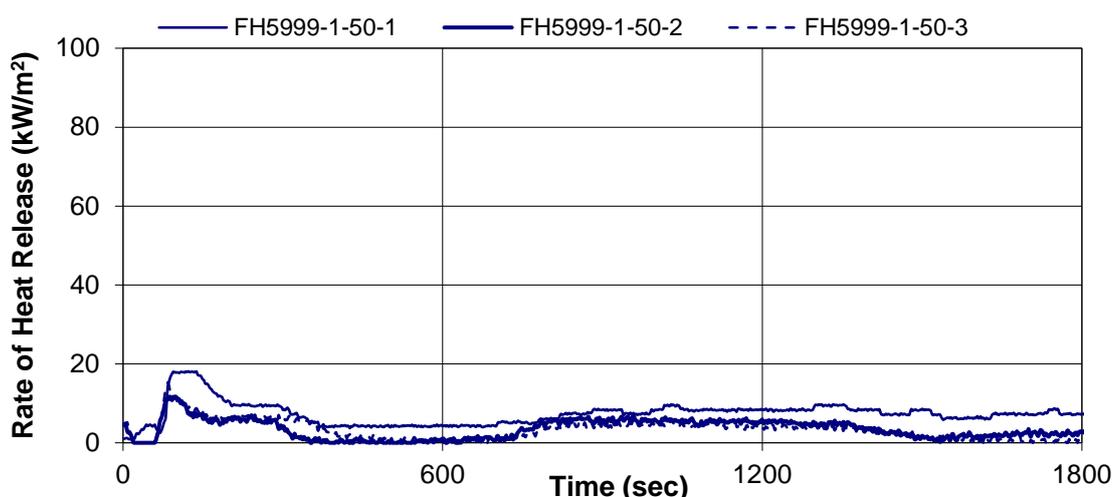
The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m<sup>2</sup> is given in Table 5 with rates of heat release illustrated in Figure 2.

**Table 5: Report summary**

Mean Specimen thickness (mm)	Irradiance (kW/m <sup>2</sup> )	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m <sup>2</sup> )	Average Specific Extinction Area (m <sup>2</sup> /kg)
10.9	50	-	15.1	14.2



**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. 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	<b>1-S</b>
Average Specific Extinction Area (m <sup>2</sup> /kg)	10.1	21.6	10.9	

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 m<sup>2</sup>/kg are identified with "S" post-script to the Group number. The samples achieved a Group 3 classification, therefore no identifier is used.



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## 6. DISCUSSION

No significant variations were detected in the indicative testing of Rockcote Otsumigaki. The sample was designated a Group 1-S classification.

## 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.

<b>Group Number Classification</b>	<b>1-S</b>
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# BRANZ Group Number Classification

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

Resene Construction Systems  
10B Abros Place,  
Burnside  
Christchurch, 8053  
New Zealand

**Test standards:** ISO 5660 Parts 1 and 2

**Specimen name:** Rockcote Marrakesh

**Specimen description:** Rockcote Marrakesh polished lime/clay plaster on a plasterboard substrate.

**Specimen name:** Rockcote Otsumigaki

**Specimen description:** Rockcote Otsumigaki polished lime/clay plaster on a plasterboard substrate.

**Orientation:** From the direction tested.

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

FH 5999-TT - test dates 11th August and 12 October 2016

**The test results were the basis for the following:**

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

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

**Issue Date:** 20 October 2016

**Expiry Date:** 20 October 2021



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