FH 4517

Cone Calorimeter Test on ClimateLine® and BCA Specification C1.10a Performance of ClimateLine®

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All tests reported herein have been undertaken at the BRANZ Ltd laboratories located in Judgeford, Porirua, New Zealand, unless stated otherwise.

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Cone Calorimeter Test on ClimateLine® and BCA Specification C1.10a Performance of ClimateLine®

1. CLIENT

Climate Coating Limited
9 Doncaster Street
Mangere
Auckland
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2. GENERAL

The product submitted by the client for testing was identified by the client as ClimateLine®. It was described as a "Solid White" coloured epoxy/polyester powder coat applied to 10 mm thick standard grade paper-faced plasterboard.

Figure 1. Test specimen (underside – left, exposed upper surface - right)

2.1 Sample Measurements

The following physical parameters were measured for each specimen prior to testing.

Specimen	Specimen ID	Initial properties		Overall apparent density (kg/m^3)
		Mass (g)	Mean thickness (mm)	
ClimateLine®	FH4517-50-1	70.1	9.9	708.1
	FH4517-50-2	69.8	9.9	705.1
	FH4517-50-3	69.5	9.9	702.0

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3. EXPERIMENTAL PROCEDURE

3.1 Test Standard

The tests were carried out according to the test procedure described in 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 3.4 and 3.5.

3.2 Test Date

The tests were conducted on 24 September 2010 by Mr Paul Wong.

3.3 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.

3.4 Specimen Wrapping and Preparation

All tests were conducted and the samples 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.

3.5 Test Program

The test program consisted of three replicate specimens as identified in the above table, 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 m^3/s.

4. EXPERIMENTAL PROCEDURE

4.1 Test Results and Reduced Data

Material		ClimateLine®			Mean Value
Specimen test number		FH4517-50-1	FH4517-50-2	FH4517-50-3	
Time to sustained flaming	s	32	32	34	32.7
Observations		i	i	i	
Test duration[a]	s	234**	280**	224**	246
Mass remaining, m_f	g	62.1	59.5	60.7	60.8
Mass pyrolyzed	%	11.4%	14.8%	12.7%	13.0%
Specimen mass loss[b]	kg/m^2	0.78	1.05	0.86	0.90
Specimen mass loss rate[b]	g/m^2.s	5.6	7.8	6.4	6.6
Heat release rate					
peak, $\dot{q}''_{\max}$	kW/m^2	194.4	190.8	187.8	191.0
average, $\dot{q}''_{avg}$					
Over 60 s from ignition	kW/m^2	52.3	52.8	51.3	52.1
Over 180 s from ignition	kW/m^2	20.9	21.9	21.0	21.2
Over 300 s from ignition	kW/m^2	-	-	-	-
Total heat release[c]	MJ/m^2	3.8	4.0	3.8	3.9
Average Specific Extinction Area[c]	m^2/kg	84.6	149.7	83.8	106.0
Effective heat of combustion[c], $\Delta h_{c,eff}$	MJ/kg	4.2	3.4	3.8	3.8

Notes :

[a] determined by

* two minutes after flaming combustion ceased

** mass loss criterion, mass loss < 150 g/m^2

[b] from ignition to end of test;

[c] from the start of the test

i no significant observations were recorded

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5. SUMMARY

AS/NZS 3837 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.

Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH4517-50-1	20.9	21.2	-1.6
FH4517-50-2	21.9		2.9
FH4517-50-3	21.0		-1.3

The above table identifies all specimens exposed to 50 kW/m^2 irradiance were within the acceptance criteria.

The report summary for ClimateLine® as described in Section 2, exposed to an irradiance of 50 kW/m^2 is:

Mean Specimen thickness (mm)	Irradiance (kW/m^2)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m^2)	Mean Total Heat Released (MJ/m^2)
9.9	50	33	191.0	3.9

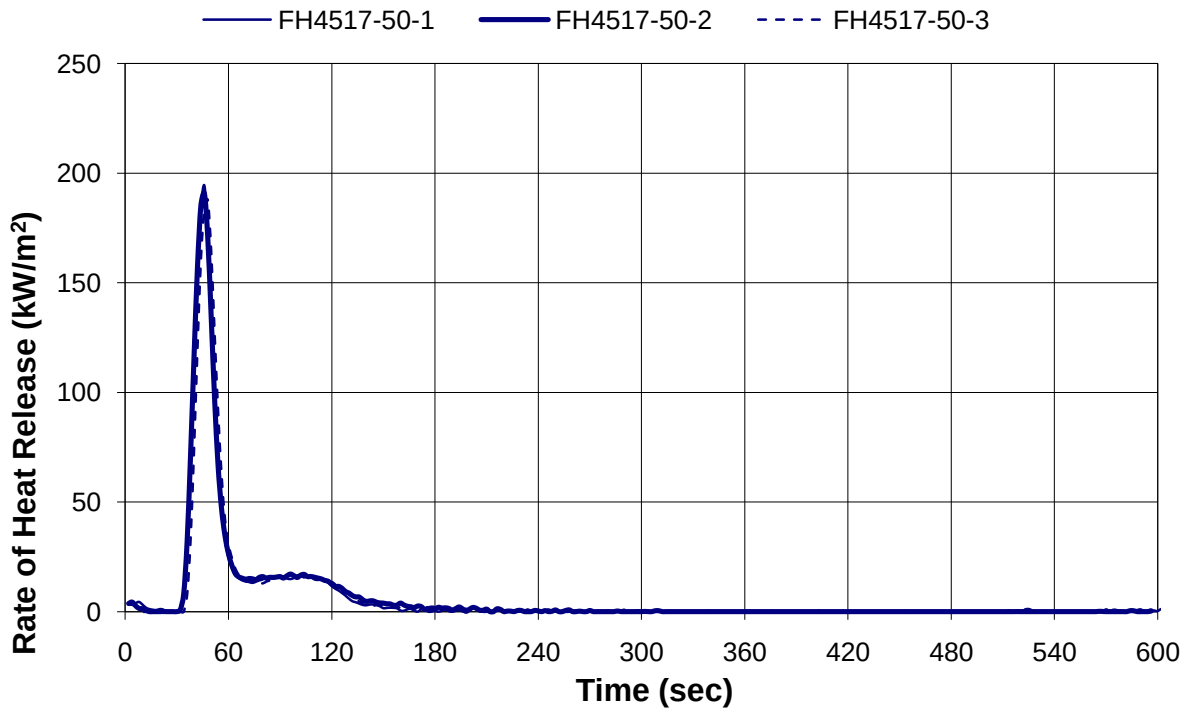

Figure 2. Rate of heat release versus time

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6. CLASSIFICATION IN ACCORDANCE WITH SPECIFICATION C1.10A OF THE BUILDING CODE OF AUSTRALIA (BCA) 2010

Calculations were carried out according to BCA 2010 Specification A2.4. The classification for ClimateLine® are as follows:

	Sample 1	Sample 2	Sample 3	Classification
Classification	Group 1	Group 1	Group 1	Group 1

The average specific extinction area for the sample of 106.0 m^2/kg is less than the 250 m^2/kg limit and therefore ClimateLine® may be used in buildings with or without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10a Table 2.

7. CONCLUSION

The cone calorimeter testing was carried out on ClimateLine®. For the purposes of compliance with the BCA 2010 Specification C1.10a for the Classification of Fire Performance of Wall and Ceiling Lining Materials, the following classification is considered applicable to the material as described below.

Product	Classification
ClimateLine®	Group 1

The average specific extinction area was less than the 250 m^2/kg limit (ClimateLine® 106.0 m^2/kg).

8. LIMITATION

The results reported here relate only to the item/s tested.

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