Reaction-to-fire test report

A reaction-to-fire test in accordance with AS 1530.1:1994 (R2016)

Test sponsor: Mitsubishi Chemical Corporation

Product: Mitsubishi ALPOLIC™ NC

Job number: RTF190153

Test date: 2 July 2019 Revision: R3.0

Accreditation No. 3277

Amendment schedule

Version	Date	Information about the report		
R1.0	8 July 2019	Description	Initial issue	
			Prepared by	Reviewed and Authorised by
		Name	Emma Richardson	Anthony Rosamilia
		Signature		
R2.0	11 July 2019	Description	Change to product name	
			Prepared by	Reviewed and Authorised by
		Name	Emma Richardson	Anthony Rosamilia
		Signature		
R3.0	24 July 2019	Description	Change to the company address	
			Prepared by	Reviewed and Authorised by
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		Signature		

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1. Introduction

This report documents the findings of the fire hazard properties of Mitsubishi ALPOLIC™ NC tested in accordance with AS 1530.1:1994 (R2016) and the supplementary standard of ISO 1182:2010 on 2 July 2019.

Warringtonfire Australia did the test at the request of Mitsubishi Chemical Corporation.

Table 1 Test sponsor details

Test sponsor	Address
Mitsubishi Chemical Corporation	1-1, Marunouchi 1 - chome Chiyoda-Ku Tokyo 100-8251 Japan

2. Product description

Table 2 describes the sampled product.

Table 2 Product description

Product name	Description
Mitsubishi ALPOLIC™ NC	The material was comprised of Aluminium Tri-Hydroxide, Calcium Carbonate and a polymer binder as nominated by the test sponsor. The material is to be used as the core of Mitsubishi ALPOLIC™ NC Aluminium Composite Panels, which will be used on internal and external walls as lining and cladding, as nominated by the test sponsor. The material was firm, not brittle, was off white in colour and had a measured density of 1803 $kg \cdot m^{-3}$. Warringtonfire personnel were not involved with the selection of the material. Before conducting these tests, the test specimens were conditioned in a ventilated oven maintained at a temperature of 60±5° C for between 20 and 24 hours. Prior to conducting these tests, the samples were cooled to room temperature in a desiccator.

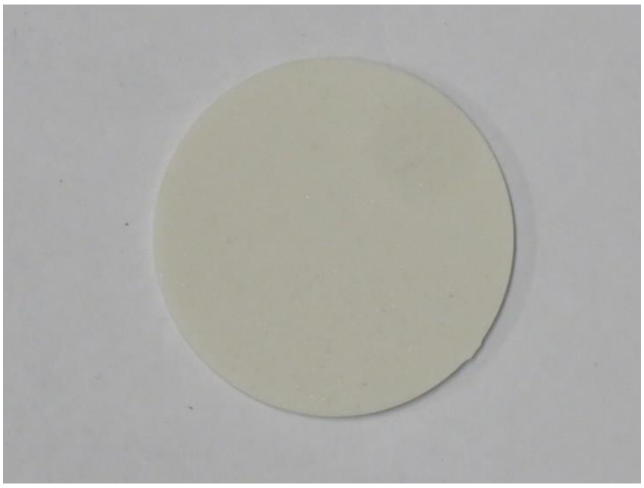

Figure 1 Photo of product

3. Test results

Table 3 shows the summary of observations and calculations of the material samples.

Table 3 Test calculations

Parameter	Symbol or expression	Unit	Results 1	2	3	4	5	Arithmetic mean = ∑results/5
Initial specimen mass	m_{si}	g	141.9	142.1	141.9	133.6	141.9	
Final specimen mass	m_{sf}	g	93.2	93.0	93.3	87.7	93.2	
Mass loss	$\delta m = (m_{si} - m_{sf})/m_{si}$	%	34.3	34.6	34.2	34.4	34.3	34.4
Total duration of sustained flaming	Cumulative total of duration of flaming (>5s)	s	0	0	0	0	0	0
Initial furnace thermocouple temperature	T_{fi}	°C	747.8	745.8	745.6	745.0	745.1	
Maximum furnace thermocouple temperature	T_{fm}	°C	760.5	762.9	766.9	763.6	772.7	
Final thermocouple temperature	T_{ff}	°C	758.8	762.1	764.7	762.0	770.7	
Furnace thermocouple temperature rise	$\delta T_f = T_{fm} - T_{ff}$	°C	1.7	0.8	2.2	1.6	2.0	1.7
Maximum specimen centre thermocouple temperature	T_{cm}	°C	743.9	716.0	726.3	759.0	763.6	
Final specimen centre thermocouple temperature	T_{cf}	°C	736.9	715.7	726.1	744.0	743.6	
Specimen centre thermocouple temperature	$\delta T_c = T_{cm} - T_{cf}$	°C	7.0	0.3	0.2	15.0	20.0	8.5
Maximum specimen surface thermocouple temperature	T_{sm}	°C	803.3	799.2	803.9	799.2	789.7	
Final specimen thermocouple temperature	T_{sf}	°C	803.0	799.0	803.5	798.4	789.3	
Specimen surface thermocouple temperature rise	$\delta T_s = T_{sm} - T_{sf}$	°C	0.3	0.2	0.4	0.8	0.4	0.4
Test duration		s	3600	3600	3600	3600	3600	

Table 4 Summary of results

Characteristic	Result
Mean furnace temperature rise:	1.7 °C
Mean specimen centre thermocouple temperature rise:	8.5 °C
Mean specimen surface thermocouple temperature rise:	0.4 °C
Mean duration of sustained flaming:	0 seconds
Mean mass loss:	34.4 %

4. Criteria of combustibility

Clause 3.4 of AS 1530.1:1994 (R2016) defines a combustible material as one for which; the duration of sustained flaming – as determined by summing the individual durations of flaming of 5 seconds or longer for all the samples and dividing by five, is greater than zero, or the arithmetic mean of the temperature rise of the furnace thermocouple exceeds 50° C or the arithmetic mean of the specimen surface thermocouple temperature rise exceeds 50° C.

Decision rule

Any measurement resulting in a temperature rise of 50° C or more is taken to meet the temperature rise criteria for combustibility.

5. Observations

Table 5 Test observation

Observations
The top of each specimen charred. Charring started around the edge and spread to cover the top before gradually disappearing.
A light odour and ‘crackling’ sound were both detected.

Post-test observation

The specimens maintained their shape during testing but became powdery in texture and crumbled with very little force. The colour of the specimens had also changed. The specimens were bright white after having been tested.

6. Comments

The material is NOT DEEMED COMBUSTIBLE according to the test criteria for combustibility specified in Clause 3.4 of AS 1530.1:1994 (R2016).

A suitable alternative insulating material was used to fill the annular space between the furnace tubes, as specified in Clause 4.2 of ISO 1182:2010.

All five tests were ended after 3600 seconds as per Section 7.4.7 in ISO 1182:2010.

7. Application of test results

This test report does not provide an endorsement by Warringtonfire Australia Pty Ltd of the performance of the actual products supplied.

These test results only relate to the behaviour of the tested specimens under the particular conditions of the test and they are not intended to be the sole criterion for the assessing the potential fire hazard of the material in use.