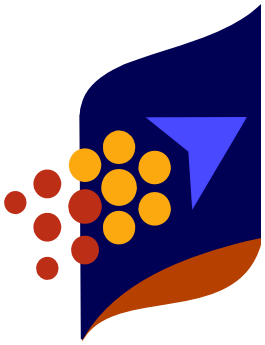

Centre for
Advanced
Composite
Materials

CACM Report 3443-18-01

Fire Testing

of

External Building Cladding Material

according to ISO 5660

Conducted for

PSP Limited.

by

Stephen Cawley

Centre for Advanced Composite Materials
Department of Mechanical Engineering
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November 2018

Summary

Samples of aluminium composite panel identified as Apolic A2 were provided to CACM by Craig Hogan of PSP Limited for flammability testing in accordance with the New Zealand Building Code. Four samples 100mm square were prepared and tested using a Fire Testing Technology Cone Calorimeter. The Apolic A2 material met the requirements of Type A cladding systems.

Test Procedure

Testing was undertaken according to the requirements of ISO 5560: (2002), Reduction –to-fire tests – Heat release, smoke production and mass loss.

The tests were conducted by Stephen Cawley at the Centre for Advanced Composite Materials (CACM) on 14th November 2018.

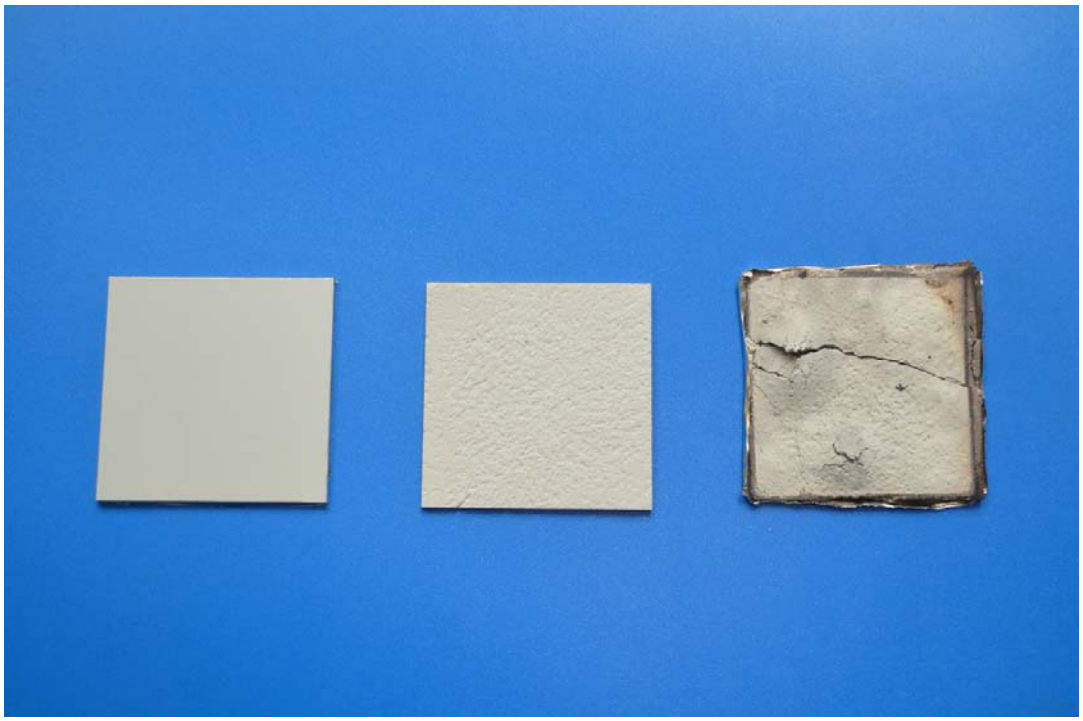
The test specimens were prepared for testing by removing the outer aluminium skin (as per Clause C7.1.5 according to Code Verification Method C/VM2 Appendix A) They were preconditioned in an environmental chamber at a temperature of 23 ± 2°C and relative humidity of 50 $\pm$ 5% for 12 hours prior to testing. A full 98 step calibration of the cone calorimeter was undertaken before conducting the testing. The test specimens had a single layer of aluminium foil covering the unexposed surfaces, and were tested using a stainless steel retainer frame in a horizontal orientation with a 12mm spacer underneath the specimen. The tests were conducted at an irradiance level of 50 kW/m^2 and with a nominal duct flow of 24 l/s.

Test Results

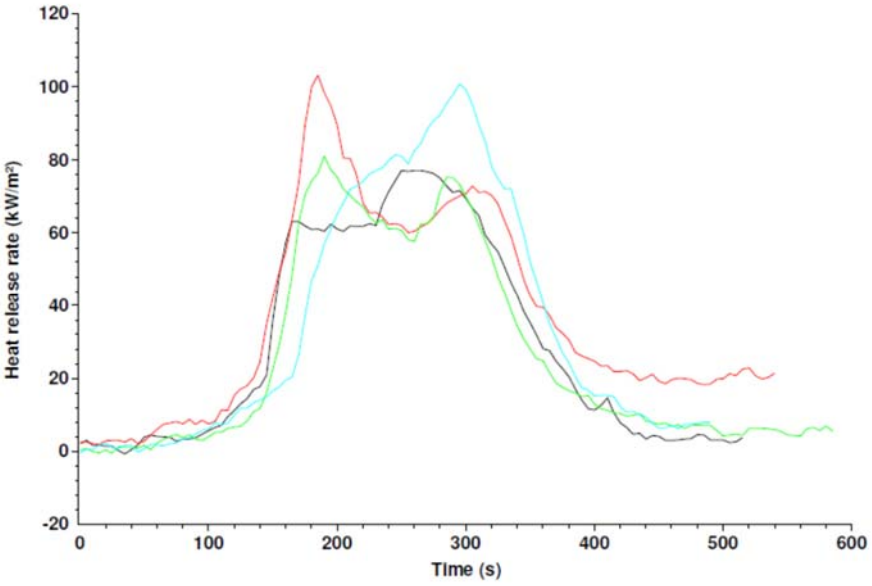
Summary

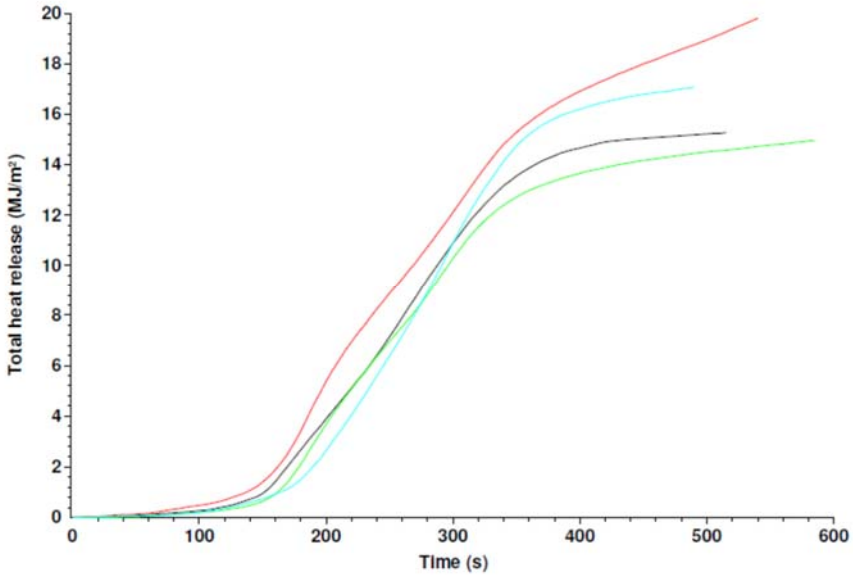
Mean Specimen thickness (mm)	Irradiance (kW/m^2)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m^2)	Mean Total Heat Release Rate (MJ/m^2)
3.7	50	148.5	90.44	15.95

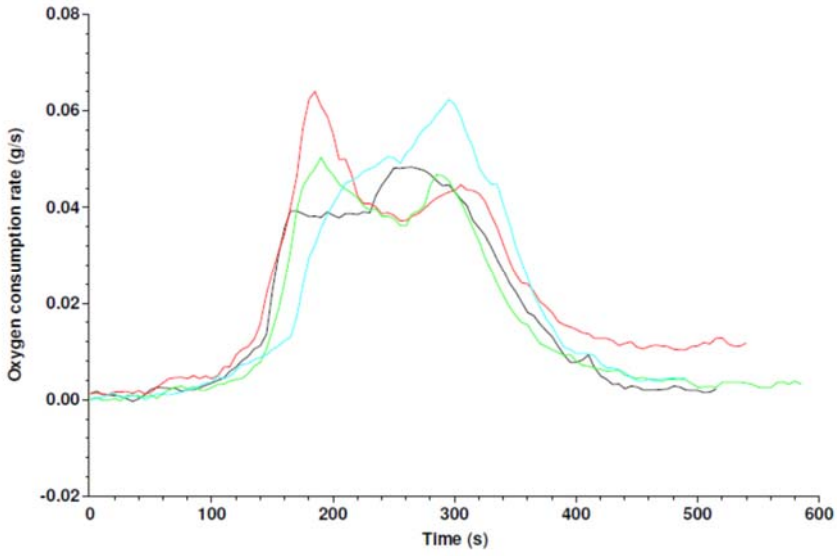
The following graphs from the tests provide the main parameters and clearly indicate there were only minor variations between the flammability performances of the 4 samples.



Picture showing a) specimen as received, b) specimen with front face removed prior to testing, c) specimen at completion of flammability testing.


Heat release rate (kW/m²)
Time (s)
120
100
80
60
40
20
0
-20
0
100
200
300
400
500
600


Total heat release (MJ/m²)
Time (s)
20
18
16
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600



Conclusion

External cladding material described as ”Alpolic A2” was tested according to the requirements of ISO 5660 and the results assessed according to the New Zealand Building Code. The mean Heat Peak Heat Release Rate was 90.44 kW/m^2 and the mean Total Heat Release Rate was 15.95 MJ/m^2.

In accordance with Amendment 4 of Acceptable Solutions C/AS2-7 the material meets the requirement for ‘Type A” cladding system

Equipment

Item:	Dual Cone Calorimeter
Manufacturer:	Fire Testing Technology Ltd
Serial #:	8065290
Item	Precision Environmental Chamber
Manufacturer	W A Instruments ECC150
Serial #	1059 0817