



Consulting Fire Engineers

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New Zealand

Compliance Report

**The use of
Alpolic® FR Aluminium Composite Panel
as an Exterior Cladding for the Purposes of
the New Zealand Building Code Fire Safety Clauses**

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For: PSP Limited

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1.0 Executive Summary

A recent fire in Australia has highlighted the potential risks of using combustible ACP for the exterior cladding of buildings.

It is widely recognised that the only method for determining the fire performance of external cladding systems is full scale testing. There are a number of combustible ACP products available (and installed) in New Zealand that do not demonstrate compliance with the minimum requirements of the Building Code through cited tests or specific fire engineering design.

Alpolic® FR 4 mm and 6 mm thick ACP is compliant as an exterior cladding for the purposes of the New Zealand Building Code Acceptable Solutions C/AS1 to 6 and for Verification Method C/VM2 for buildings with an importance level not greater than 3.

The compliance of Alpolic® FR has been determined in accordance with the NFPA 285 test methodology as referenced in the New Zealand Building code Compliance Documents.

2.0 Introduction

In recent times there has been considerable discussion as to the fire performance of Aluminium Composite Panels (ACP) in the New Zealand Built environment. This discussion was initiated by the Melbourne Docklands fire where the performance of a particular ACP was determined to be a contributing cause to extensive vertical spread of fire over the exterior of a multi-story building. While this debate is relatively recent in New Zealand there is a considerable loss history associated with external vertical fire spread in tall buildings involving ACP, related combustible cladding systems and insulation.

There are many manufacturers of ACP panel and a particular manufacturer may offer a number of different panel systems. None can be assumed to be identical. The fire performance of a combustible external cladding system will depend on a number of factors including the cladding material, fixing and sealing details, the presence or absence of cavities beneath the cladding, the fire performance of associated insulation and weather membranes, and the nature of the ignition source.

White and Delichatsios state in their 2014 paper, 'Fire Hazards of Exterior Wall Assemblies Containing Combustible Components':

Full-scale façade tests are currently the only method available for absolutely determining the fire performance of complete assemblies which can be influenced by factors which may not be adequately tested in small scale tests. These factors include the severity of fire exposure, interaction of multiple layers of different types of materials, cavities, fire stopping, thermal expansion, fixings and joints.

The assessment of the fire performance of ACP panel systems is particularly challenging. ACP panels can buckle and distort, delaminate, melt, and decorative or protective surface finishes may contribute to flame spread. Fire spread in ACP cannot be determined with any degree of confidence by modelling or specific fire engineering design, except in limiting cases where the composite is either entirely non-combustible, or highly combustible.

This report is limited to the consideration of the fire performance of Alpolic® FR ACP for the purposes of the New Zealand Building Code 2004 Fire Safety Clauses. It shall not be used to infer the compliance of any other ACP system.

3.0 Establishing Compliance for the Purposes of the New Zealand Building Code Fire Safety Clauses

The prescribed methods for establishing the compliance of ACP as an external cladding for the purposes of the New Zealand Building Code are documented in the Acceptable Solutions C/AS2 to 6 and the Verification Method C/VM2 as follows:

C/AS2 to 6:

5.8.1 The *external wall* cladding system shall be tested in accordance with the relevant *standard test* in Appendix C C7.1 and shall satisfy the following requirements:

- a) If the distance to the *relevant boundary* is less than 1.0 m, the peak *heat release rate* shall not exceed 100 kW/m² and the total heat released shall not exceed 25 MJ/m², and
- b) If the distance to the *relevant boundary* is 1.0 m or more and the *building height* is greater than 7.0 m the peak *heat release rate* shall not exceed 150 kW/m² and the total heat released shall not exceed 50 MJ/m².

5.8.2 The requirements in Paragraph 5.8.1 do not apply if:

a) *Surface finishes* are no more than 1 mm in thickness and applied directly to a *non-combustible* substrate, or

b) The entire wall assembly has been tested at full scale in accordance with NFPA 285 and has passed the test criteria.

C/VM2

4.5 Design scenario (HS): Horizontal fire spread

Cladding

To demonstrate that NZBC C3.7 is achieved, it is expected that relevant *fire* test results for the selected cladding system will be provided. Engineers may also choose to comply with Paragraph 5.8 of the relevant Acceptable Solutions C/AS2 to C/AS6 or with Table 4.1 to satisfy the performance criteria of this clause.

4.6 Design scenario (VS): External vertical fire spread

Part A

Method

For Part A, either:

- a) Comply with Table 4.2 in C/VM2, or
- b) Use *non-combustible* materials, or

c) Use large or medium scale facade type tests to determine the extent of vertical flame test is not more than 3.5 m above the *fire* source.

Comment: Validated flame spread models could be used for some materials

The requirements given in the relevant Acceptable Solution Paragraph 5.8 for *fire* properties of external claddings are acceptable means of demonstrating compliance with Part A above for *buildings* with an *importance level* not higher than 3.

A Building Consent Authority must accept these tests as demonstrating compliance with the Building Act. Clause 19(1)(b) of the Building Act 2004 states:

19 How compliance with building code is established

(1) A building consent authority or, as the case may be, a regional authority must accept any or all of the following as establishing compliance with the building code:

(b) compliance with the provisions of a compliance document:

4.0 The Compliance of Alpolic® FR

Alpolic® FR 4 mm and 6 mm thick ACP has been tested by an Accredited Laboratory as an entire wall assembly to NFPA 285 and has passed the test criteria.

The associated test reports have been reviewed and confirmed by FireNZE against the test method and test criteria. The review included detailed examination of commentaries and observations. Copies of these test reports can be obtained from PSP Limited.

Alpolic® FR 4 mm and 6 mm thick ACP is therefore compliant for as an exterior cladding for the New Zealand Building Code Acceptable Solutions C/AS1 to 6 and for Verification Method C/VM2 for buildings with an importance level not greater than 3 when installed in accordance with the tested system. Installation instructions can be obtained from PSP Limited.

5.0 Notes

Alpolic® FR is available in a number of decorative finishes that include a fluoropolymer protective surface finish up to 45 um thick. While other ACP products may have combustible surface finishes, fluoropolymers do not support combustion. Further these finishes were incorporated in the standard Alpolic® FR products subjected to the NFPA 285 test method.

Where a proposed installation differs from the Alpolic® FR tested system then you may need a fire engineering assessment of the proposed variation to the satisfaction of the relevant Building Consent Authority.

Alpolic® FR is not non-combustible. If your application requires a non-combustible exterior cladding system please contact PSP Limited for advice on alternative ACP products.

Alpolic® FR is a compliant exterior cladding system but it will not provide a Fire Resistance Rating (FRR) or limit exposure to other property through unprotected openings or fire plumes. These aspects of the fire safety performance of a building are to be met by other primary and secondary systems in accordance with the New Zealand Building Code.

A handwritten signature in blue ink, appearing to read 'T.G. O'Brien', followed by a period.

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