Scott Richardson

From: Dean Goldsmith <dean@bmplusg.com.au>
Sent: Wednesday, 8 August 2018 12:09 PM
To: Scott Richardson
Cc: Tom Johnston; 'Tom Newton'; Jaryd Fulcher-Collin; David Sanders; Sharlene Paparoa
Subject: RE: FDC Marsden Park

Scott,

This product is still a Composite Panel by definition and has only had the core material tested for non-combustibility (which was found to be compliant). Under current BCA C1.9 provisions this cladding is deemed “non-combustible” given the testing of the core and thickness of the outer layer and adhesives, and as such is compliant for use to satisfy the Bushfire requirements applicable to the project.

Please note that the “deemed non-combustible” provisions relating to Composite Panels (that have been utilised for the Alcadex A1 product) are being deleted in BCA 2019 and as such the documentation provided will not be able to be used on projects approved after 1 May 2019.

Regards,

Dean Goldsmith
M. 0417309034

BLACKETT MAGUIRE+ GOLDSMITH

SYDNEY + WOLLONGONG + NEWCASTLE

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From: Scott Richardson [mailto:scottr@fdcbuilding.com.au]
Sent: Thursday, 19 July 2018 5:04 PM
To: Dean Goldsmith
Cc: Tom Johnston; 'Tom Newton'; Jaryd Fulcher-Collin; David Sanders
Subject: FW: FDC Marsden Park

Hi Dean,

As discussed, please see attached information on an aluminium cladding product called ‘Alcadex A1’. We propose to use this from ground level up to 400mm for the office façade on E Store.

I think it is pretty clear from the reports attached that this product is classed as 'non-combustible', but can you please confirm you are happy for us to proceed with using it?

Thanks,

Scott Richardson | Project Manager | FDC Construction (NSW) Pty Ltd
22 - 24 Junction Street Forest Lodge NSW 2037
Sydney | Canberra | Melbourne | Adelaide | Brisbane | Perth
T 61 2 8117 5189 | M 0434 563 386 | F 61 2 9566 2900 | www.fdcbuilding.com.au
Accreditations: QA | WHS | EMS | FSC | NSW Government

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From: John Cantore [mailto:johnc@networkbuilding.com.au]
Sent: Thursday, 19 July 2018 11:24 AM
To: Scott Richardson <scottr@fdcbuilding.com.au>
Cc: Terry Lockerbie <terry@networkbuilding.com.au>; Jaryd Fulcher-Collin <jarydf@fdcbuilding.com.au>
Subject: FDC Marsden Park

Hi Scott,

Thanks for the update.

For the 400mm areas we can offer Alcadex A1 which is our 1530.1 compliant Aluminium Composite panel.

Please find attached Alcadex fire documentation for review by your fire certifier. The lead time for Alcadex is approximately 10 weeks from order confirmation.

We thank you for your enquiry and should you require any additional information please do not hesitate to contact the undersigned.

Regards,

John Cantore

71 Marigold Street Revesby NSW 2212 Australia
P: 02 8316 5000 |**F:** 02 9771 9911 |**M:** 0400 565 101
E: johnc@networkbuilding.com.au | **W**: www.networkbuilding.com.au | **W**: www.sgi-architectural.com.au

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From: Scott Richardson [mailto:scottr@fdcbuilding.com.au]
Sent: 18 July 2018 5:01 PM
To: John Cantore <johnc@networkbuilding.com.au>
Cc: Terry Lockerbie <terry@networkbuilding.com.au>; Jaryd Fulcher-Collin <jarydf@fdcbuilding.com.au>
Subject: RE: Alpolic Fr Codemark & Fire Certification - FDC Marsden Park

Hi John,

Our certifier and bushfire consultant have confirmed that we can use the Alpolic Fr product on office facades above 400mm, but from ground level to 400mm we need a non-combustible product.

Do you the solid aluminium panels that would meet this requirement? I would like to use something that looks the same as the Fr product, rather than having to look at alternate materials.

Please call me to discuss if easier.

Thanks,

Scott Richardson | Project Manager | FDC Construction (NSW) Pty Ltd
22 - 24 Junction Street Forest Lodge NSW 2037
Sydney | Canberra | Melbourne | Adelaide | Brisbane | Perth
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Please consider the environment before printing this email

From: John Cantore [mailto:johnc@networkbuilding.com.au]
Sent: Monday, 2 July 2018 3:24 PM
To: Scott Richardson <scottr@fdcbuilding.com.au>
Cc: Terry Lockerbie <terry@networkbuilding.com.au>
Subject: Alpolic Fr Codemark & Fire Certification - FDC Marsden Park

Hi Scott,

Please find attached the Alpolic 'Fr' Fire Certification as requested.

These documents confirm that Alpolic 'Fr' can be used on all classes of building and satisfies the 3 main Criteria for Cladding Systems in CP2, CP4 & CP8.

If the Fire Certifier for this project requires any additional information please do not hesitate to contact the undersigned.

MITSUBISHI ALPOLIC fr Satisfies the 3 Main Criteria for Cladding Systems in CP2, CP4 & CP8

CP2

(a) A building must have elements which will, to the degree necessary, avoid the spread of fire—

(i) to *exits*; and

(ii) to *sole-occupancy units* and *public corridors*; and

Application:
CP2(a)(ii) only applies to a Class 2 or 3 building or Class 4 part of a building.

(iii) between buildings; and

(iv) in a building.

(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—

(i) the function or use of the building; and

(ii) the *fire load*; and

(iii) the potential *fire intensity*; and

(iv) the *fire hazard*; and

(v) the number of *storeys* in the building; and

(vi) its proximity to *other property*; and

(vii) any active *fire safety systems* installed in the building; and

(viii) the size of any *fire compartment*; and

(ix) *fire brigade* intervention; and

(x) other elements they support; and

(xi) the *evacuation time*.

CP4

To maintain tenable conditions during occupant evacuation, a material and an assembly must, to the degree necessary, resist the spread of fire and limit the generation of smoke and heat, and any toxic gases likely to be produced, appropriate to—

(a) the *evacuation time*; and

(b) the number, mobility and other characteristics of occupants; and

(c) the function or use of the building; and

(d) any active *fire safety systems* installed in the building.

Application:
CP4 applies to linings, materials and assemblies in a Class 2 to 9 building.

CP8

Any building element provided to resist the spread of fire must be protected, to the degree necessary, so that an adequate level of performance is maintained—

(a) where openings, construction joints and the like occur; and

(b) where penetrations occur for building services.

Regards,

John Cantore

71 Marigold Street Revesby NSW 2212 Australia
P: 02 8316 5000 |**F:** 02 9771 9911 |**M:** 0400 565 101
E: john@sgi-architectural.com.au | **W**: www.networkbuilding.com.au | **W**: www.sgi-architectural.com.au

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This engineering certificate relates to the following product:

Alcadex A1

The product is deemed and proven to be **non-combustible**

with the following risk allocation

NON-COMBUSTIBLE
Low Risk

Engineering Certificate

No. 4045 I02R01

Ignis Evaluation Report

Evaluation No.4045 [2016]

Technical Assessments of products for compliance under the National Construction Code of Australia

This evaluation report serves as a certificate from professional engineer in accordance with Clause A2.2(a)(iii) of the National Construction Code Volume One Building Code of Australia

IGNIS EVALUATION REPORT

No. 4045 I02R01

Alcadex A1

Aluminium Composite Panel

NON-COMBUSTIBLE
Low risk

SGI Architectural
Unit 31/5-7 Inglewood Place
Baulkham Hills, NSW 2153
Ph: 02 9620 7988
www.sgi-architectural.com.au

CSP Architectural
1029-1035 Ballarat Road
Deer Park, VIC 3023
Ph: 03 9361 9999
www.csparchitectural.com.au

07 April 2016
Date of Issue

31 April 2019
Date of Expiry

Ignis Solutions
ABN: 24 160 047 325
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Civic Square ACT 2608
t: 0402 433 236
mail@ignissolutions.com.au
www.ignissolutions.com.au

1 Scope

The reference to the 'Alcadex Cladding System' or 'Alcadex' in this evaluation report relates to the Alcadex A1 product.

1.1 The Alcadex Cladding System is certified for use as a non-combustible external and internal cladding system (being a finish, attachment, member, facing or lining to the interior or exterior part of a wall, ceiling or roof including an awning attached to a building, soffit or overhang. A wall in accordance with this certificate, consists of multiple parts being internal linings and external attachments to a primary building element or non-loadbearing wall frame i.e. panel or curtain wall) mechanically attached to the primary building element or non-loadbearing wall frame.

1.2 It is suitable for the Alcadex Cladding System to be fixed through any insulation, weatherproofing sarking-type, fire resistance or acoustic material directly applied to the wall frame.

1.3 Given the core material has been proven and deemed non-combustible, it is permitted for the core to be exposed as part of the installation.
The Alcadex panel satisfies the requirement and proof that the product as an assembled non-combustible bonded laminated material in accordance with the BCA. The Alcadex Cladding System is not required to have a non-combustible layer between it and the building element being the wall frame be it timber, steel, concrete or masonry.

1.4 The Alcadex cladding system is permitted to be used on buildings of Type A, B or C construction, being fitted with or without an automatic fire sprinkler system and at any distance on walls that do or do not require a Fire Resistance Level.

2 Product

2.1 Alcadex is composed of a non-combustible mineral matrix core sandwich between two adhesive layers and two skins of aluminium alloy with a painted finish fixed to either an internal or external wall system or rame through the Alcadex installation method 1, 2, 3, 4, 5, 8 or 9 known as the Alcadex fixing system. The Alcadex panel and fixing system collectively are referred to as the Alcadex Cladding System.

2.2 **Alcadex Panel:** The Alcadex Panel consists of six layers

- **Layer 1:** 26-µm thick polyvinylidene fluoride (PVDF) coating;
- **Layer 2:** 0.5-mm thick aluminium sheet;
- **Layer 3:** 50-µm thick polymeric membrane;
- **Layer 4:** 3-mm thick inorganic compound core;
- **Layer 5:** 50-µm thick polymeric membrane;
- **Layer 6:** 0.5 -mm thick aluminium sheet.

2.3 **Product Name:** Alcadex.

2.4 **Fixing Methods:** Alcadex installation method 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14.

3 National Construction Code 2016

The Alcadex A1 Panel complies with the following:
Volume One – Building Code of Australia

3.1 **Clause A0.2** (b) complying with the Deemed-to-Satisfy Solution

3.2 **Clause A1.1** Definitions – Non-Combustible

3.3 **Clause A2.2** sub-clause (a)(iii) as evidence to support that the Alcadex Cladding System meets the nominated Performance Requirements through the Deemed-to-Satisfy Provisions under an Engineering Certificate.

3.4 **Clause C1.10 (c)(xv)** a material that does not significantly increase the hazard of fire.

3.5 **Clause C1.12** – bonded laminated material deemed non-combustible.

3.6 **Specification C1.1** – Non combustible material.

4 Conditions and Limitations

4.1 This certificate is limited to the details within this evaluation report including the above compliance elements, product description and scope. This evaluation report is to be read, considered and used as a whole document being 7 pages.

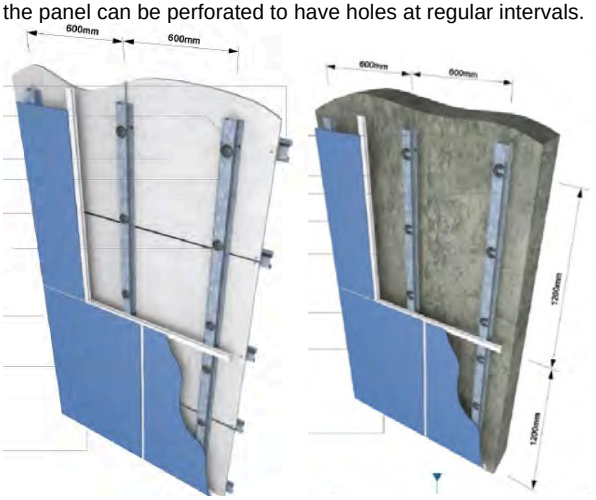
4.2 The Alcadex Cladding System is to be installed in accordance with Alcadex Installation Manual.

4.3 The Alcadex Cladding System is approved to be installed in accordance with an Alcadex approved fixing system being method 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14.

Technical Specification

Product

The Alcadex panel consists of a inorganic matrix core. Testing to AS 1530.1 has proven the core to be non-combustible offering low risk fire safety qualities whilst maintaining the look of an aluminium panel for use on the interior or exterior of buildings. Alcadex also provides a ecofriendly option where no plastics are used in the core.
The core material is available in 3, 4, 5 and 6mm thicknesses.
The Alcadex panel can be fixed to the interior or exterior of a façade substructure being an existing or constructed wall compliant with the requirements of the BCA.
The Alcadex panel can be penetrated by materials and building services without the requirement for additional protection measures. In addition, the panel can be perforated to have holes at regular intervals.



Panel Fixing

The Alcadex panel can be mechanically or flat stick adhesive fixed directly to the wall frame or be connected via a top hat sub-frame. The fixing technique is dependent on the fixing location and wind impact. Where fixed in high wind areas the system design is to be reviewed by an appropriately qualified façade engineer. Where the top hat sub frame system is used, they are to be spaced at intervals no greater than 600mm with the panel fixed on one side no greater than 1200mm.

The various installation and approved fixing systems are detailed further below.

Accessories

The accessories for installation of the aluminium composite panel include the following items:

1 – Aluminium profile and angles	
2 – Weather resistant silicone	
3 – Backing rods	
4 – Self Drill Screws	
5 – Hanger	
6 – Anchor Bolts	
7 – Rivets	

Storage, handling and transport

The Alcadex panel is shipped to Australia in wooden crates that can be stacked up to four crates high.

The Alcadex panel is a rigid panel. Physical impact may cause an edge deformation. Inclusion of hart particles such as grains of sand and cutting chips caust between the Alcadex panels may cause visible dent-damages in one or more adjacent panels.

The Alcadex panel is to be stored in a covered area or protected by weather until fabrication and installation. The protective film, provided to protect the surface from scratching and soiling, will withstand up to six months of outdoor exposure without loosing any of its original peel-off characteristics or causing stains or other damage. It is recommended that the Alcadex panels be stored in a dry indoor atmosphere, to minimize the natural degradation of the protective film.

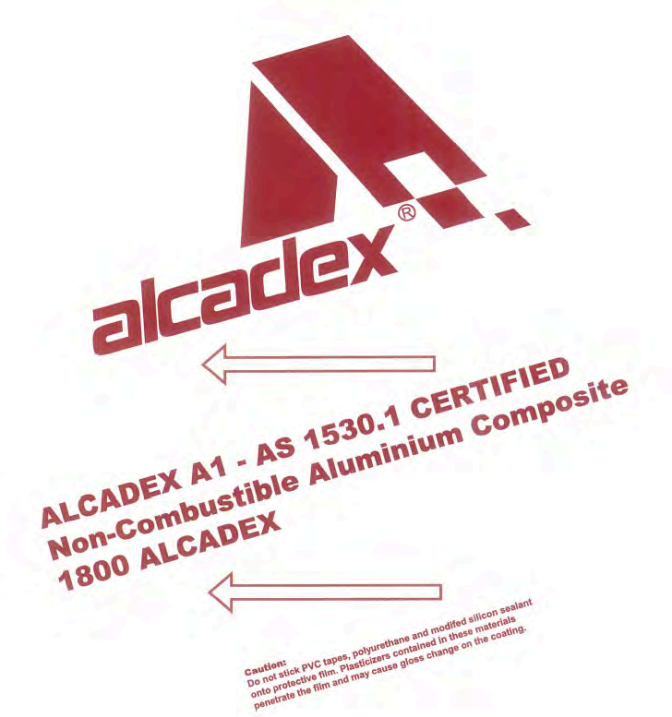
Unpacking and repacking of the Alcadex panels should occur in a clean place. Removal of dust and chips from the Alcadex packing as well as any hard particles should occur. The Alcadex panel is to be handled on a worktable and not on a floor. The Alcadex panel should be always handled by two persons with the external face upward to avoid damage.

For transport, lay the packed Alcadex horizontally and do not place heavy goods on it. Mark “Handle with Carew”, “Keep Dry”, “No Hooks” and “This Side Up” clearly on the packaging.

Additional and more specific detail on the products storage, handling and transport is provided in the Alcadex fabrication and installation manual.

Identifiable features

The Alcadex A1 panel can be identified by the following protective film. The protective film is to be removed following installation and not to be exposed for more than six months to outdoor conditions. After six months exposure it is likely that the protective film will loose its original peel off characteristics.



Technical Literature

The National Construction Code.

The National Construction Code (NCC) is an initiative of the Council of Australian Governments developed to incorporate all on-site construction requirements into a single code. The Building Code of Australia (BCA) is Volume One and Volume Two of the NCC.
The BCA is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and each State and Territory government.
The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia whilst allowing for variations in climate and geological or geographic conditions.

CSIRO AS 1530.1 test report FNC11569

The CSIRO is a Registered Testing Authority with the National Association of Testing Authorities registration 165. Testing to AS 1530.1 is within the CSIRO scope of testing.
The test sample is described as a core material made of non-inorganic compounds comprising of calcium carbonate ($CaCO_3$), magnesium hydroxide ($Mg(OH)_2$) and aluminium hydroxide (($Al(OH)_3$), and 0.5% organic compounds. The testing was undertaken on 16 December 2015.
The report has provided the following designation:
The material is NOT deemed COMBUSTIBLE according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

CSIRO AS 1530.3 test report FNE11541

The CSIRO is a Registered Testing Authority with the National Association of Testing Authorities registration 165. Testing to AS 1530.3 is within the CSIRO scope of testing.
The test sample is described as an aluminium composite panel comprising the following layers:

- **Layer 1:** 26-µm thick polyvinylidene fluoride (PVDF) coating;
- **Layer 2:** 0.5-mm thick aluminium sheet;
- **Layer 3:** 50-µm thick polymeric membrane;
- **Layer 4:** 3-mm thick inorganic compound core;
- **Layer 5:** 50-µm thick polymeric membrane;
- **Layer 6:** 0.5 -mm thick aluminium sheet.

The test was undertaken on 20 November 2015 on the full assembly and produced the following results:

Ignitability Index (0-20)	Spread of Flame Index (0-10)	Heat Evolved Index (0-10)	Smoke Developed Index (0-10)
0	0	0	1

SGS AS 1530.1 test report SZIN1507007414ML

SGS is a Registered Testing Authority with a Mutual Recognition Agreement and Signatory with the International Laboratory Accreditation Cooperation which is recognized by the National Association of Testing Authorities. SGS accreditation number is L2929.
The test was undertaken on 29 July 2015. AS 1530.1 set the following criteria for a material to be deemed combustible:

(a) The mean duration of sustained flaming is other than zero
(b) The mean furnace thermocouple temperature rise exceeds 50°C
(c) The mean specimen surface thermocouple temperature rise exceeds 50°C

The results of the test are as follows:

(a) 0 seconds
(b) 8.4°C
(c) 8°C

Therefore based on the above results the product core is deemed non-combustible in accordance with testing to AS 1530.1.

Risk Assessment

Within the Building Code of Australia, cladding material is categorized into five categories from non-combustible materials to combustible as detailed below. Ignis Solutions has applied a risk category to each of the five stages of permitted fire hazard properties as tested in accordance with AS 1530.3. The risk categories range from Low to High as detailed below.

Low - Non-combustible	A non-combustible material by virtue of the material or proven to be non-combustible in accordance with AS 1530.1
Minimal combustible / Deemed non combustible	A material deemed to be non-combustible by Clause C1.12 of the BCA, has a Spread of Flame of 0 and Smoke Development Index of 3 or less as determined by AS 1530.3 or deemed to be non-combustible by a Registered Testing Authority.
Minor Combustible	A material that has a Spread of Flame of ≤ 5, as determined by AS 1530.3 the Smoke Development Index is not relevant.
Moderate combustible	A material that has a Spread of Flame of ≤ 9 and a Smoke Development Index of ≤ 8 as determined by AS 1530.3.
High combustible	A material that has a Spread of Flame of ≥ 9 and a Smoke Development Index of ≥ 8 as determined by AS 1530.3.

The Alcadex cladding system is deemed to be a non-combustible aluminium composite material as tested to AS 1530.1 and deemed by the CSIRO. Accordingly, the product is allocated a low risk ranking.

Product Evaluation

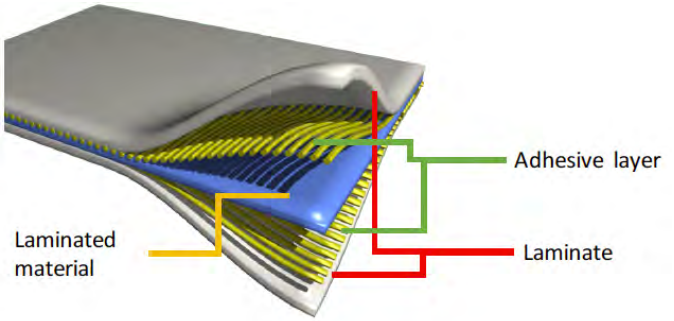
In accordance with Clause A1.1 definitions are provided within the Building Code of Australia. The clause defines non-combustible as follows:

- a) Applied to a material – not deemed combustible as determined by AS 1530.1 – Combustible Tests for Materials; and
- b) Applied to construction or part of a building – constructed wholly of materials that are not deemed combustible.

In addition to the definition of non-combustibility, the BCA details a provision of bonded laminated materials under Clause C1.12(f). It is required that under sub-clause (f) of Clause C1.12 that:

(i) Each laminate is non-combustible; and
(ii) Each adhesive layer does not exceed 1mm in thickness; and
(iii) The total thickness of the adhesive layers does not exceed 2mm; and
(iv) The Spread-of-Flame Index and the Smoke-Developed Index of the laminated material as a whole does not exceed 0 and 3 respectively.

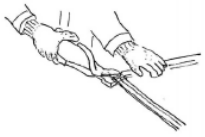
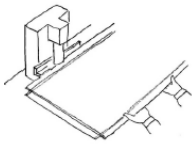
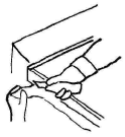
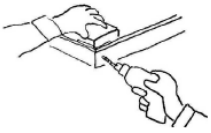
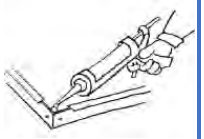
A graphic depiction of the above clause in relation to the requirements of Clause C1.12 is detailed below.



The material core has been proven to be non-combustible, equally the two laminate layers are aluminium and considered non-combustible. In accordance with Clause C1.12, the composite panel being a bonded laminated material is permitted to have two adhesive layers provided each layer is no greater than 1mm in thickness. The adhesive layer being a polymeric membrane is 50-µm thick being less than 1mm and therefore satisfying the requirements of Clause C1.12 for a bonded laminated material to be deemed non-combustible.
The aluminium panel is deemed to be the laminate and non-combustible. This is based on Aluminium being a chemical element in the boron group of the periodic table and classified as a metalloid. With Aluminium classified as a metal, the acceptance as a non-combustible material is supported by Clause C1.12(e) which permits a pre-finished metal sheeting having a combustible surface finish not exceeding 1mm thickness and where the Spread-of-Flame Index of the product is not greater than 0. This has been proven in CSIRO test FNE11541 for the entire assembly.
Based on the testing undertaken on the core material as well as the permissions under Clause C1.12, the bonded laminated material is proven and deemed to be non-combustible.

Installation information

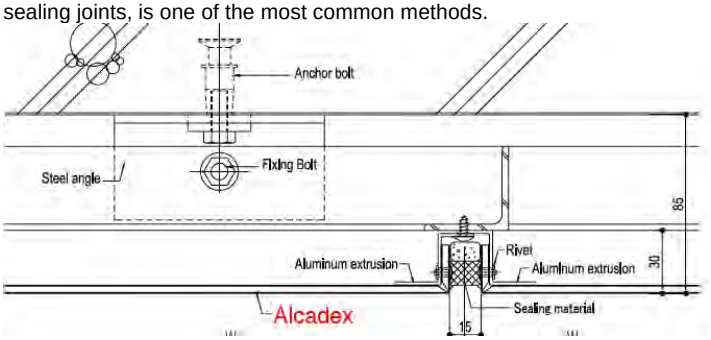
The fabrication work of the Alcadex panel is an integrated work with the installation of the panel. The fabrication consists of various machining procedures, assembling and inspection. The following figures detail a typical fabrication process for a standard tray type (route and return) Alcadex panel. Given the core material has been proven non-combustible, protecting the core from free air is not a fire hazard.

1. Check fabrication drawings 	2. Check raw Alcadex 	3. Marking on panels 
Check fabrication drawings and confirm the details.	Confirm raw Alcadex panels for size, colour and quantity with the drawings.	Mark cutting and grooving lines on the back of panels, based on the drawings.
4. Cut 	5. Groove 	6. Corner-notch 
Cut the panel with a hand circular saw, based on marked lines.	Adjust the remaining thickness with pre-tests.	Remove the panel corner with a notching tool or a punching press.
7. Punch hanging holes 	8. Cut aluminium extrusions 	9. Fold 
Making hanging holes with a punching press, if necessary	Cut aluminium extrusions, based on the drawings.	Fold the panel with a folding jig. Check 90-degree after folding.
10. Cut of protective film 	11. Fix corner angle 	12. Fix aluminium flange 
Peel and cut off the protective film edge with a utility knife.	Fix the corner with corner angle piece and rivets.	Fix aluminium flange bars with rivets, to complete a tray type panel.
13. Apply sealant on panel corners 	14. Final check 	
Apply sealant on panel corners from the back, if necessary.	Inspect the completed panels	

A number of fixing methods have been detailed by CSP Architecture for the Alcadex panel. The methods detailed below are examples of approved fixing techniques. As the core is proven and deemed non-combustible, its exposure to free air does not present a fire hazard. The panel in the following fixing methods can be installed within the horizontal or vertical plane, to the interior or exterior of a building. The following fixing methods detail in the horizontal position.

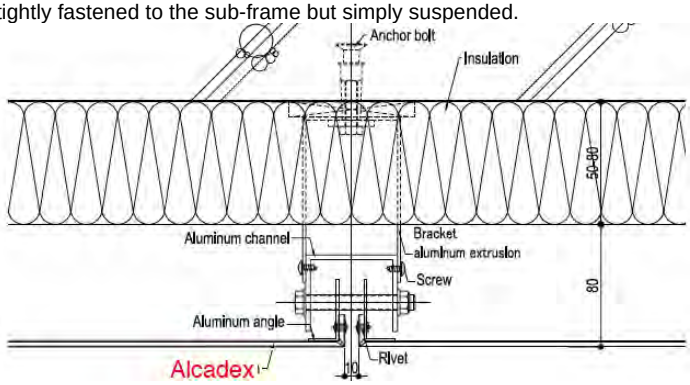
1 – External wall cladding – wet sealant joint

This installation system, with tray type (route and return) panels and sealing joints, is one of the most common methods.



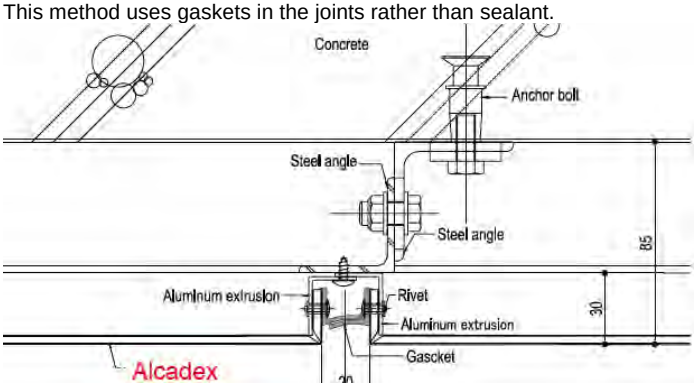
2 – External wall cladding – hanging method

The hanging method includes fixing through a bolt where the panels not tightly fastened to the sub-frame but simply suspended.



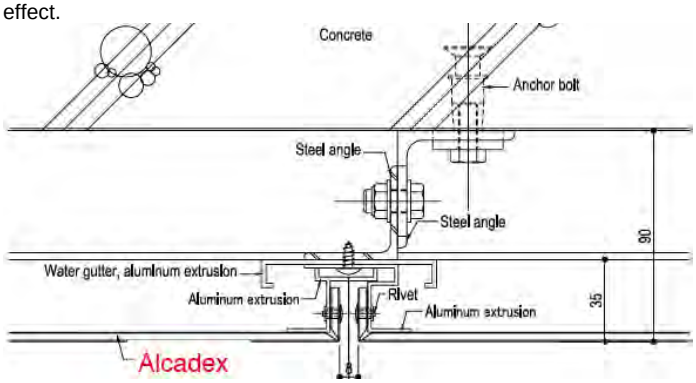
3 – External wall cladding – dry gasket joint

This method uses gaskets in the joints rather than sealant.



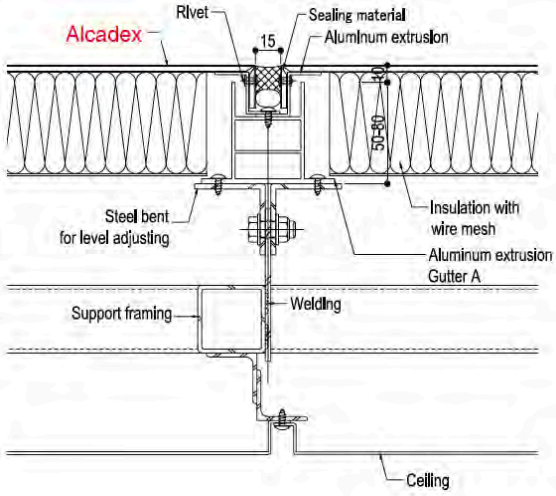
4 – External wall cladding – narrow open joint

The narrow open joint method provides a narrow joint for aesthetic effect.



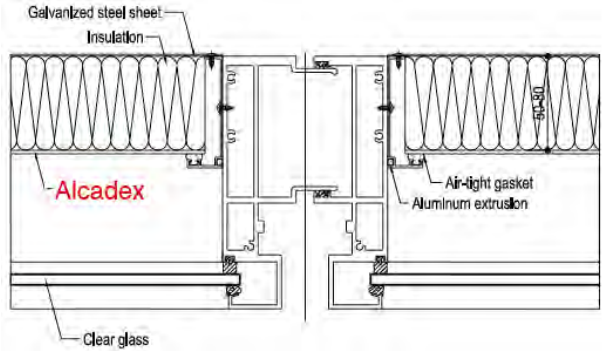
5 – Roof covering

The Alcadex panel can be used as a roof covering. A water gutter or waterproof sheets is required to be installed behind the panel so that leaked water can drain outside.



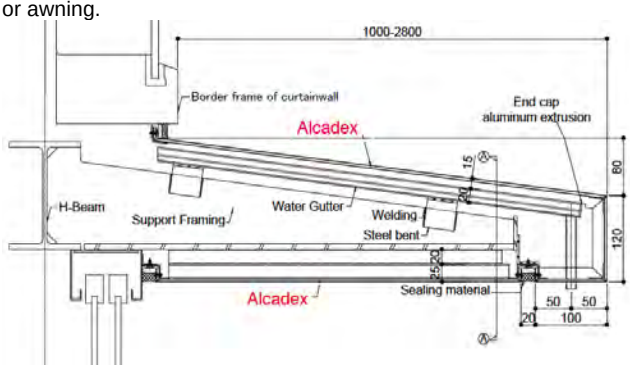
6 – Back panel of glass curtain wall

A glass curtain wall on occasion requires an opaque back panel behind glass for aesthetic and energy-saving purpose. The following details an option to use the Alcadex panel. This fixing technique can also include the Alcadex panel in place of the clear glass.



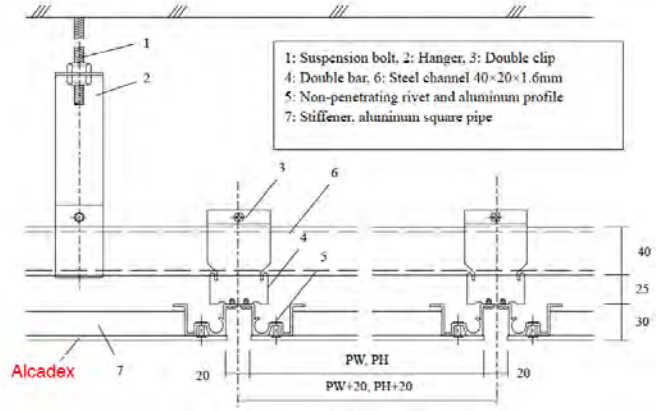
7 – Sunshade or cornice

The Alcadex panel can be used as a sunshade, cornice of the building or awning.



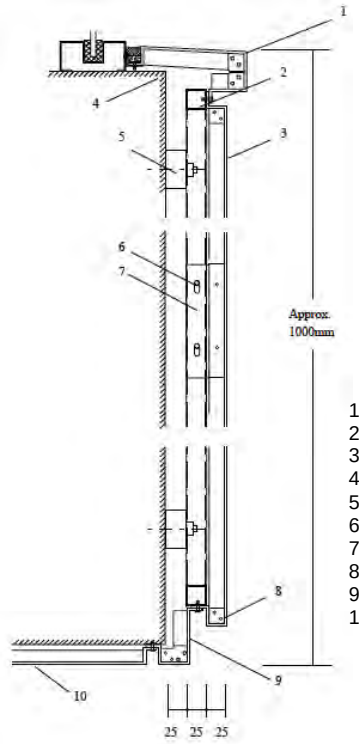
8 – Ceiling panel with non-penetrating rivet

The Alcadex panel can be used as an indoor ceiling panel or soffit. The following method presents an installation method for a ceiling panel.



9 – Parapet and soffit, renovation

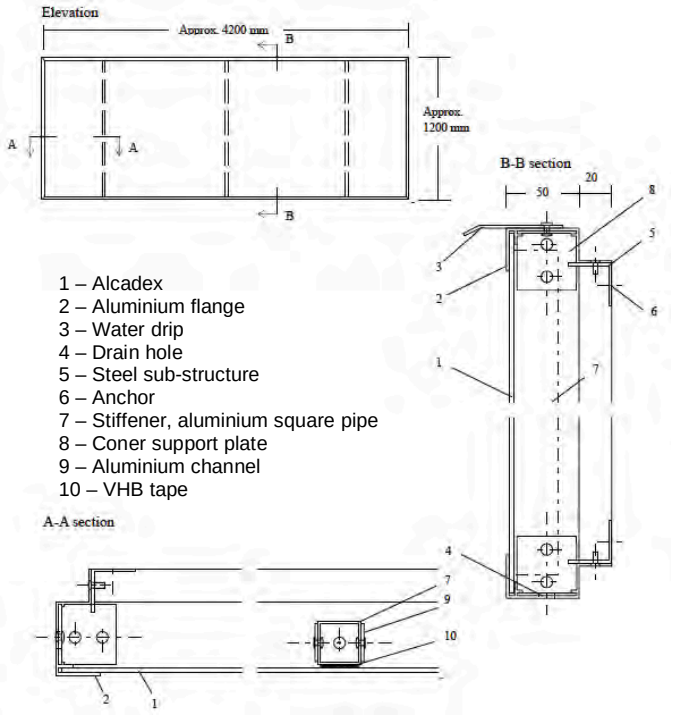
The Alcadex panel is permitted to be used as a parapet or soffit on a building in the following fixing method.



1 – Alcadex, water drip
2 – Aluminium sub-structure
3 – Alcadex, parapet
4 – Existing external wall
5 – Level-adjustment and anchor
6 – Suspension bolt
7 – Aluminium support plate
8 – Aluminium L-shaped support plate
9 – Alcadex, water drip
10 – Alcadex, eaves soffit

10 – Corporate shop front signboard

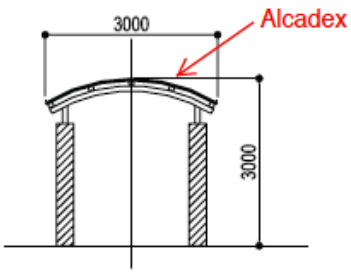
The Alcadex panel is permitted to be used as a corporate shop front signboard.



1 – Alcadex
2 – Aluminium flange
3 – Water drip
4 – Drain hole
5 – Steel sub-structure
6 – Anchor
7 – Stiffener, aluminium square pipe
8 – Coner support plate
9 – Aluminium channel
10 – VHB tape

11 – Roof of pedestrian passage

The Alcadex panel can be used as the roof of a pedestrian passage.



Primary Reference Documents

1. National Construction Code – 2016 – Volume One – Building Code of Australia Class 2 to 9 Buildings.
2. SGS test report SZIN1507007414ML to AS 1530.1-1994 dated 11 August 2015
3. CSIRO report FNC11569 to AS 1530.1-1994 dated 16 December 2015
4. CSIRO report FNE11541 to AS/NZS 1530.3:1999 dated 20 November 2015

In the opinion of Ignis Solutions, that the Alcadex Cladding System is fit for purpose and will comply with the National Construction Code 2016 to the extent specified in this Evaluation Report provided it is used, designed, installed and maintained as set out in this Evaluation Report.

The Evaluation Report is issued only to CSP Architecture and SGI Architecture, and is valid until expiry, subject to the Conditions of Evaluation Report.

Conditions of Evaluation Report

1. This Evaluation Report:
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   (b) must be read, considered and used in full together with the technical literature;
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Fire performance of Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating

Assessment Report

Author: Russell Collins
Assessment Number: FCO-3189
Quote Number: CO4690

Date: 9 August 2016
Version: Revision A

Client: CSP - Architectural & SGI - Architectural

Commercial-in-confidence

Enquiries should be addressed to:

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Assessment Report Details

Report CSIRO Reference number: FCO-3189/4690.

Report Status and Revision History

VERSION	STATUS	DATE	DISTRIBUTION		ISSUE NUMBER
Revision A draft	Draft for review	18/04/2016	CSIRO; CSP	Architectural; SGI – Architectural	FCO-3189
Revision A	Final for issue	09/08/2016	CSIRO; CSP	Architectural; SGI – Architectural	FCO-3189

Test Report Authorisation

AUTHOR	REVIEWED BY	AUTHORISED BY
Russell Collins	Brett Roddy	Brett Roddy
		
9 August 2016	9 August 2016	9 August 2016

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Contents

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Executive summary

This report provides the assessment of this Division on the likely performance of “Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating” when assessed to the non-combustible materials requirements specified by Part C1.12 of the Building Code of Australia.

“Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating” was described as an aluminium composite sandwich panel comprising of 6 layers:

Layer 1: 26-µm thick polyvinylidene fluoride (PVDF) coating;
Layer 2: 0.5-mm thick aluminium sheet;
Layer 3: 50-µm thick 9.3 g/m² polymeric membrane adhesive;
Layer 4: 3-mm thick inorganic core with organic binder additives;
Layer 5: 50-µm thick 9.3 g/m² polymeric membrane adhesive;
Layer 6: 0.5-mm thick aluminium sheet.

Based on the AS/NZS 1530.3 test results in CSIRO Certificate of Test FNE114686A, AS 1530.1 test results in CSIRO Certificate of Test numbered FNC11685, and requirements specified in Part C1.12 of the Building Code of Australia, “Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating” may be used where non-combustible materials are required.

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Fire performance of Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating

1 Introduction

This report provides the assessment of this Division on the likely performance of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" when assessed to the non-combustible materials requirements specified by Part C1.12 of the Building Code of Australia.

This Division conducted an AS/NZS 1530.3 test on "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating", reported in CSIRO Certificate of Test FNE11686A, and an AS 1530.1 test on the core material of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating", reported in CSIRO Certificate of Test FNC11685. The data from these tests is used to support this assessment report.

2 Supporting Data

2.1 CSIRO Certificate of Test numbered FNE11686A

On 20 November 2015 this Division conducted a fire test on "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" to AS/NZS 1530.3-1999. Certificate of Test numbered FNE11686A, issued 11 April 2016 by CSIRO, details the test results. The results of this test were:

Ignitability Index:	0
Spread of Flame Index:	0
Heat Release Index:	0
Smoke Developed Index:	1

"Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" was described as an aluminium composite sandwich panel comprising of 6 layers:

Layer 1: 26-µm thick polyvinylidene fluoride (PVDF) coating;
Layer 2: 0.5-mm thick aluminium sheet;
Layer 3: 50-µm thick polymeric membrane;
Layer 4: 3-mm thick inorganic core with organic binder additives;
Layer 5: 50-µm thick polymeric membrane;
Layer 6: 0.5-mm thick aluminium sheet.

The layers were adhered together using polymeric membrane adhesive with an application rate of 9.3 g/m².

2.2 CSIRO Certificate of Test numbered FNC11685

On 16 December 2015 this Division conducted a fire test on the core material of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" to AS 1530.1-1994. Certificate of Test

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numbered FNC11685, issued 11 April 2016 by CSIRO, details the test results. The maximum furnace temperature rise was 2.8°C for all specimens, the maximum temperature rise for the specimen surface thermocouple was 1.8°C for all specimens and the duration of sustained flaming was 0 seconds. The material is NOT deemed COMBUSTIBLE according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

The core material of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" was described as a core material made of inorganic compounds comprising of calcium carbonate ($CaCO_3$), magnesium hydroxide ($Mg(OH)_2$) and aluminium hydroxide (($Al(OH)_3$), and a small percentage of organic compounds.

2.3 Fire Protection Handbook

Table 8.16.1 of the Fire Protection Handbook indicates that aluminium in solid state will ignite above 1000°C.

3 Proposal

You have proposed the design of an aluminium faced bonded laminated material, with a core comprising 3-mm thick inorganic core with organic binder additives. The core comprises of calcium carbonate ($CaCO_3$), magnesium hydroxide ($Mg(OH)_2$) and aluminium hydroxide (($Al(OH)_3$), and a small percentage of organic compounds, faced with 0.5-mm thick aluminium skin finished with polyvinylidene fluoride, and backed with 0.5-mm aluminium thick skin.

4 Analysis

Part C1.12 (e) of the Building Code of Australia (BCA), 2016, states that 'Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0' may be used wherever a non-combustible material is required. Based upon Certificate of Test FNE11686A the facing of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" aluminium sheet fits these criteria.

Part C1.12 (f) of the Building Code of Australia (BCA), 2016, states that 'Bonded laminated materials...' where: '...

i. Each laminate is *non-combustible*; and
ii. Each adhesive layer does not exceed 1 mm in thickness; and
iii. The total thickness of the adhesive layers does not exceed 2 mm; and
iv. The *Spread-of-Flame Index* and the *Smoke-Developed Index* of the laminated material as a whole does not exceed 0 and 3 respectively.'

Your product comprises facings of aluminium sheet. To deem a material combustible when tested to AS 1530.1, the material is tested in a tube furnace at 750°C. Table 8.16.1 of the Fire Protection Handbook indicates that aluminium in solid state will not ignite at this temperature. Consequently, the aluminium base of these facings would not be deemed combustible when tested to AS 1530.1 and would meet the definition of non-combustible in the Building Code of Australia. CSIRO Certificate of Test FNC11685 shows that the a core material of "Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating" is not deemed combustible when tested to the requirements of AS 1530.1-1994

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Each layer of the sandwich panel comprises non-combustible material; each adhesive layer is not greater than 1-mm thick and the total thickness of adhesive layers is not greater than 2-mm; the Spread-of-Flame Index and Smoke-Developed Index for the sandwich panel was 0 and 1 respectively.

Considering the above information, the finished panel meets both (e) and (f) of Part C1.12 of the Building Code of Australia, and consequently, according to Part C1.12, may be used where non-combustible materials are required.

5 Conclusion

Based on the factors detailed previously it is the assessment of the Division that your “Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating” may be used where non-combustible materials are required, as specified by Part C1.12 of the Building Code of Australia.

6 Term of validity

This assessment report will lapse on 31 August 2021. Should you wish us to re-examine this report with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this assessment in the light of new knowledge.

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References

The following informative documents are referred to in this Report:

AS 1530.1-1994	Australian Standard 1530, Method for fire tests on building components and structures, Part 1 – Combustibility test for materials. 1994
AS/NZS 1530.3-1999	Australian/New Zealand Standard 1530: Method for fire tests on building materials, components and structures, Part 3: Simultaneous determination of ignitability, flame propagation, heat release and smoke release, 1999
FNE11686A	AS/NZS 1530.3-1999 Certificate of Test on “Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating”
FNC11685	AS 1530.1 Certificate of Test on the core material of “Alcadex A1 - 4mm Fireproof Aluminium Composite Panel with PVDF coating”
BCA	Building Code of Australia (BCA), 2016
Fire Protection Handbook, Nineteenth Edition, Volume II, NFPA 2003	

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Certificate of Test

Quote No.: NC7459 **REPORT No.: FNC11685A**

COMBUSTIBILITY TEST FOR MATERIALS IN ACCORDANCE WITH AS 1530.1-1994

TRADE NAME: Alcadex A1-4mm Fireproof Aluminium Composite Panel with PVDF Coating

SPONSOR:

CSP-Architectural
1029-1035 Ballarat Rd
Deer Park, VIC
AUSTRALIA

SGI-Architectural
Unit 31/ 5-7 Inglewood Place
Baulkham Hills, NSW
AUSTRALIA

DESCRIPTION OF TEST SAMPLE: The sponsor described the tested specimen as a core material made of inorganic compounds comprising of calcium carbonate ($CaCO_3$), magnesium hydroxide ($Mg(OH)_2$) and aluminium hydroxide (($Al(OH)_3$), and organic compounds.

Nominal thickness:	3 mm (50-mm for the test)
Nominal density:	955 kg/m³
Colour:	off white

TEST PROCEDURE: Five (5) samples were tested in accordance with Australian Standard 1530 Methods for fire tests on building materials, components and structures, Part 1- 1994: Combustibility Test for Materials.
An alternative suitable insulating material was used to fill the annular space between the furnace tubes, as specified in Clause 4.2 of ISO 1182:2010.

RESULTS:

Mean furnace thermocouple temperature rise	2.8°C
Mean specimen centre thermocouple temperature rise	2.4°C
Mean specimen surface thermocouple temperature rise	1.8°C
Mean duration of sustained flaming	0 seconds
Mean mass loss	41.8 %

DESIGNATION: The material is NOT deemed COMBUSTIBLE according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

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

DATE OF TEST: 16 December 2015 TEST No.: 11569
Issued on the 22nd day of April 2016 without alterations or additions.
This certificate supersedes Report No. FNC11685 issued on 11 April 2016.

Heherson Alarde
Testing Officer

Brett Roddy
Team Leader, Fire Testing and Assessments

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Number: 165
Corporate Site No 3625
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