



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

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## 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 rafter 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

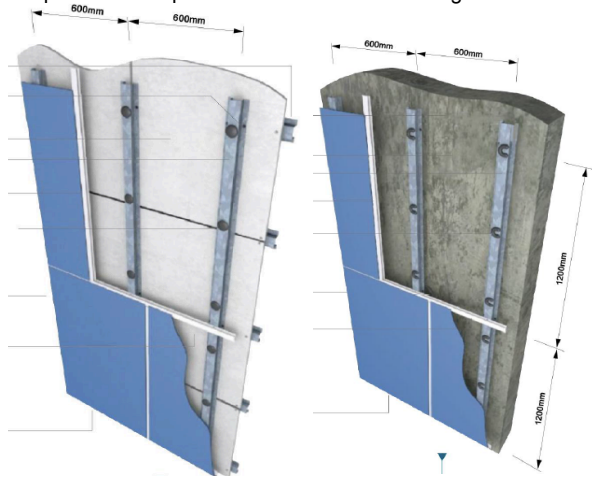
## Product

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.

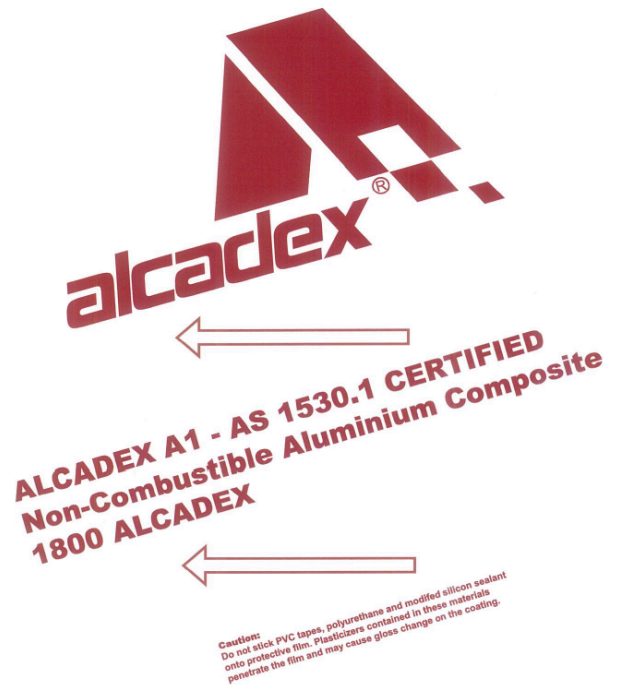
Unpacking and repacking of the Alcadex panels should occur in a clean place. Removal of dust and chips from the Alcadex packing as well as any hard particles should occur. The Alcadex panel is to be handled on a worktable and not on a floor. The Alcadex panel should be always handled by two persons with 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<sub>3</sub>), magnesium hydroxide (Mg(OH)<sub>2</sub>) and aluminium hydroxide ((Al(OH)<sub>3</sub>), 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	Spread of Flame Index	Heat Evolved Index	Smoke Developed Index
(0-20)	(0-10)	(0-10)	(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

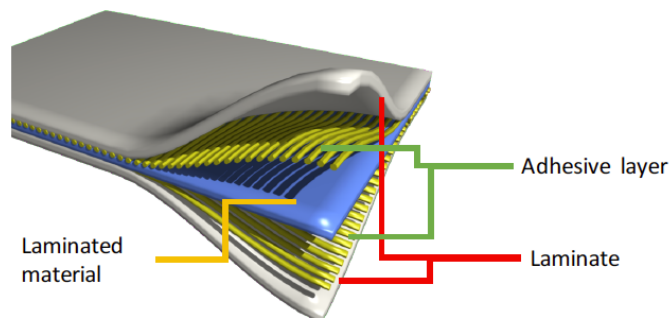
In accordance with Clause A1.1 definitions are provided within the Building Code of Australia. The clause defines non-combustible as follows:

- 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.








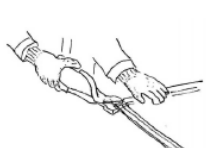
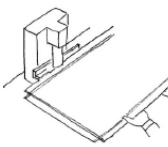


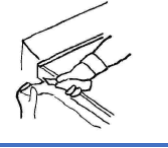
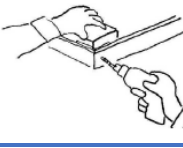
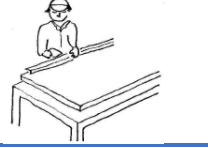


The material core has been proven to be non-combustible, equally the two laminate layers are aluminium and considered non-combustible. In accordance with Clause C1.12, the composite panel being a bonded laminated material is permitted to have two adhesive layers provided each layer is no greater than 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

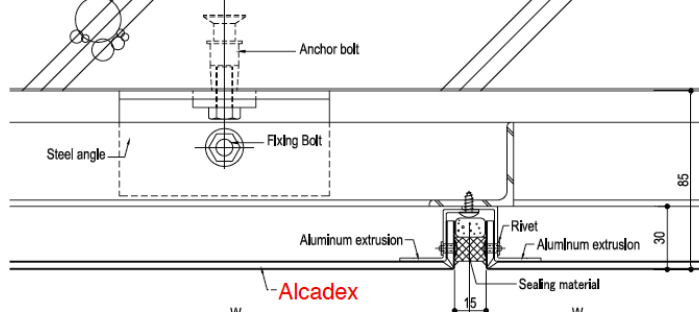
The fabrication work of the Alcadex panel is an integrated work with the installation of the panel. The fabrication consists of various machining procedures, assembling and inspection. The following figures detail a typical fabrication process for a standard tray type (route and return) Alcadex panel.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

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

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.

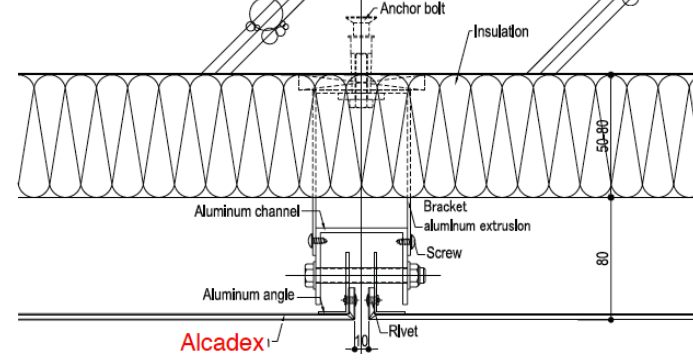
## 1 – External wall cladding – wet sealant joint

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



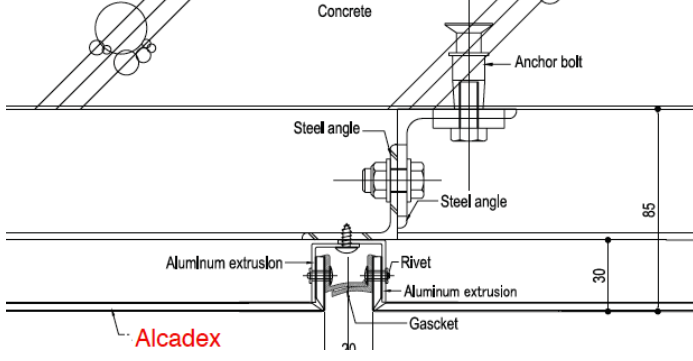
## 2 – External wall cladding – hanging method

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



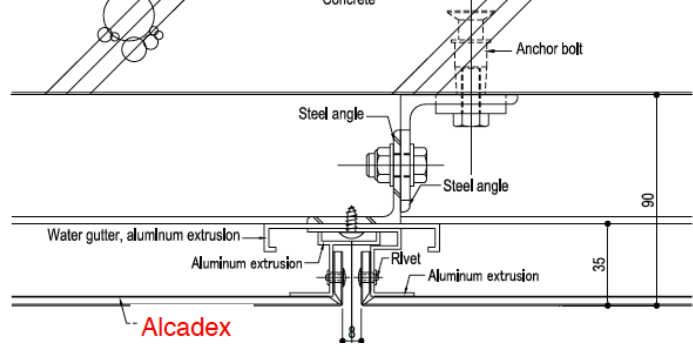
## 3 – External wall cladding – dry gasket joint

This method uses gaskets in the joints rather than sealant.



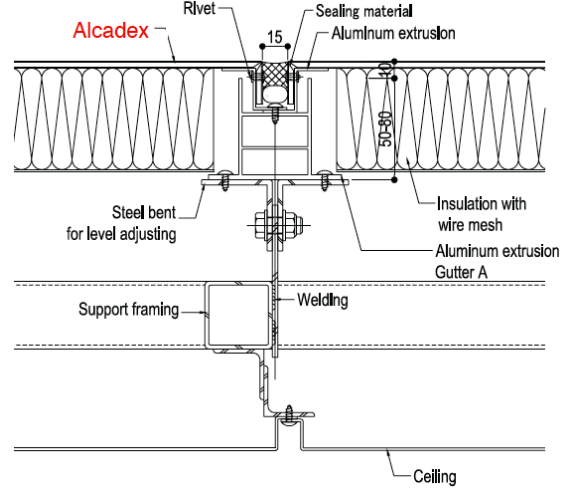
## 4 – External wall cladding – narrow open joint

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



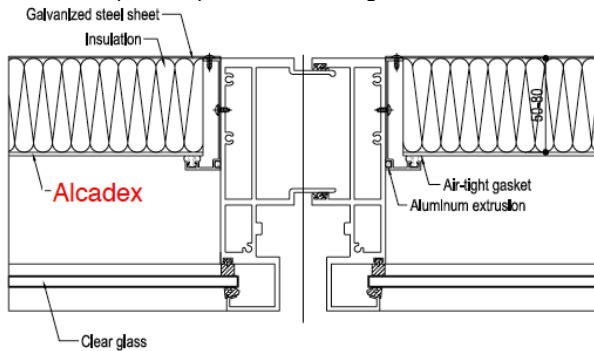
## 5 – Roof covering

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.



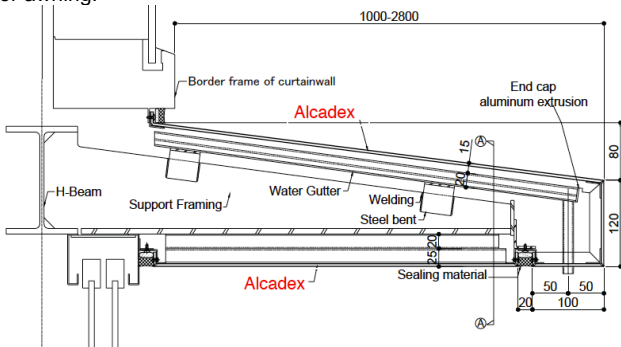
### 6 – Back panel of glass curtain wall

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.



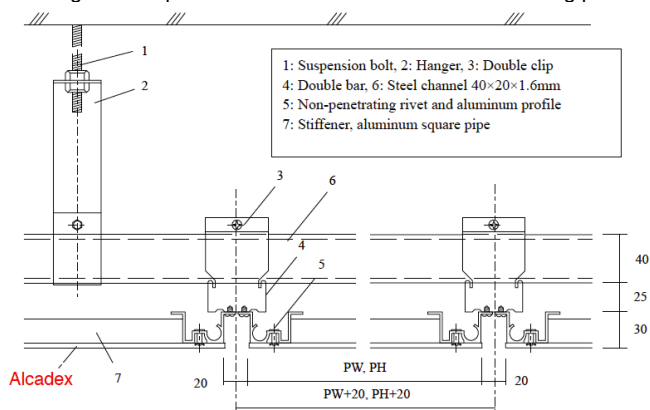
### 7 – Sunshade or cornice

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



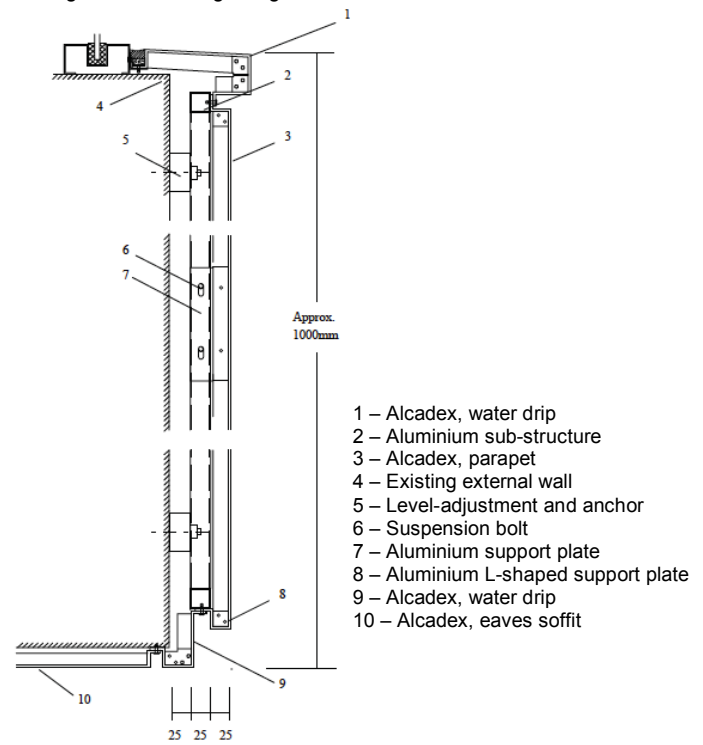
### 8 – Ceiling panel with non-penetrating rivet

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



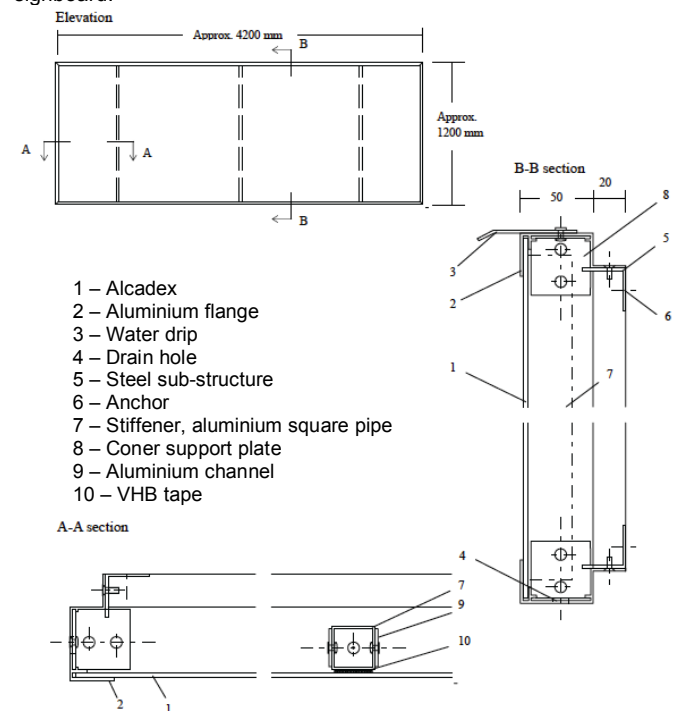
### 9 – Parapet and soffit, renovation

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



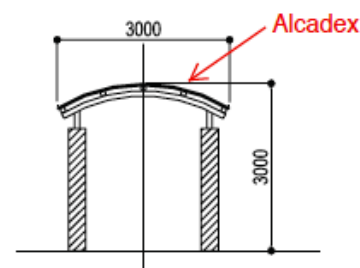
### 10 – Corporate shop front signboard

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



### 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:
  - (a) relates only to the product as described herein;
  - (b) must be read, considered and used in full together with the technical literature;
  - (c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
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3. Any reference in this Evaluation Report to any other publication shall be read as a reference to the version of the publication specified in this Evaluation Report.
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