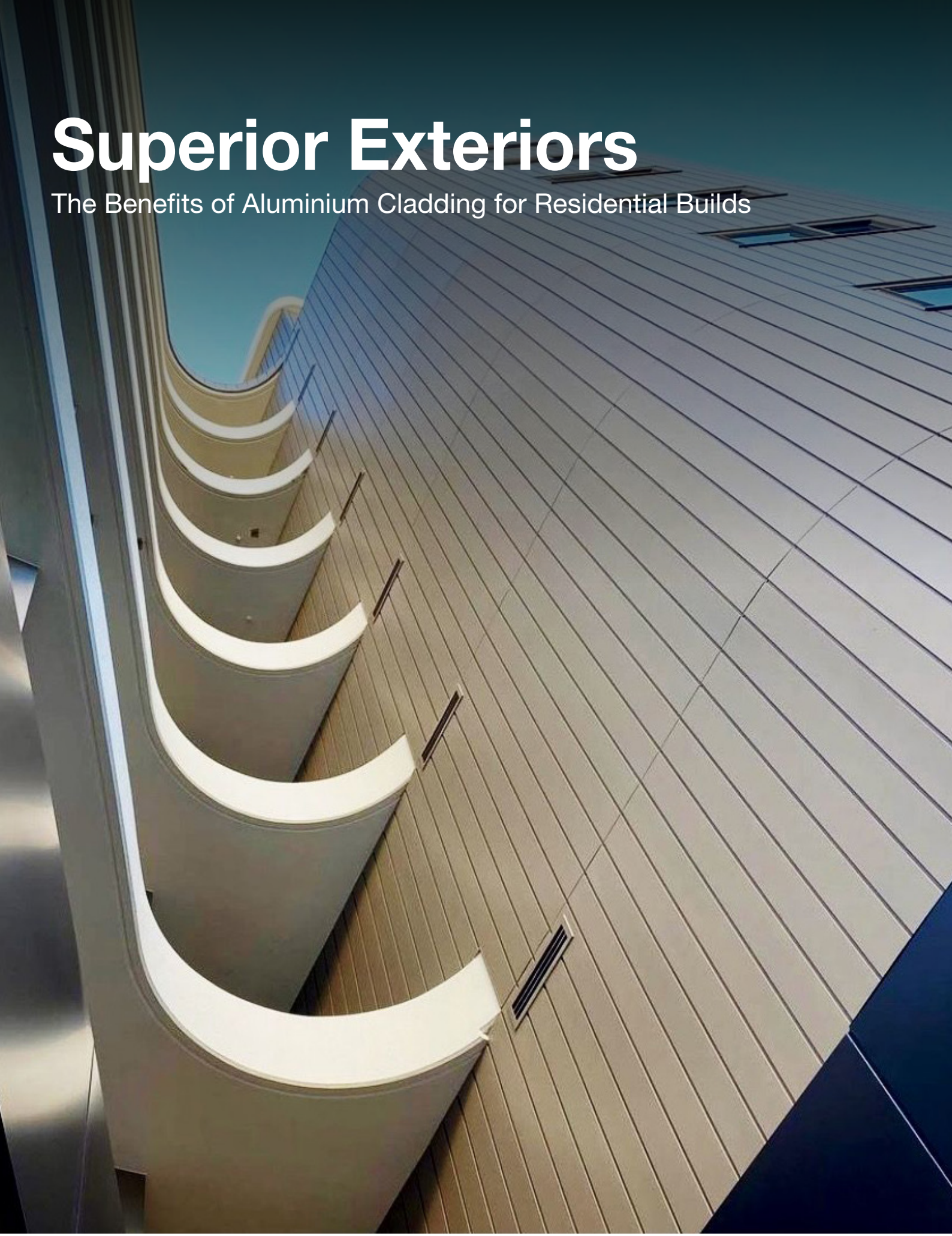
Superior Exteriors

The Benefits of Aluminium Cladding for Residential Builds



ALUMINIUM FACADE SYSTEMS
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Introduction

The design of exterior cladding systems has evolved significantly over time. The basic function of cladding was to provide a protective barrier against external weather elements that could damage the health of the structure. With today's focus on sustainability, cladding has taken on a more high-profile role in forming the building envelope and creating a controlled internal environment. Given its importance to building performance, the choice in cladding materials can often be the difference between a successful project or a failed one.

In the residential sector, traditional cladding materials such as timber and brick remain popular with architects and designers. However, increasingly stringent building regulations and an environmentally-conscious clientele has put the spotlight on alternative solutions, particularly low weight and energy-efficient exterior panels, that are better suited to Australia's harsh climate. Beyond brick and timber, there is a growing selection of products and materials for residential cladding systems on the market, all with different performance properties and design options.

Against this backdrop, few cladding materials can match solid aluminium for its broad range of architectural benefits. Its low weight, high strength, fire-resistant and corrosion-resistant properties make it suitable for a range of applications. Its flexibility offers unlimited design possibilities, making it possible to create striking yet functional structures in a cost-effective and sustainable manner.

However, the architectural advantages of using aluminium for exterior cladding are sometimes not well understood. This whitepaper addresses this gap and explores how aluminium compares to materials such as brick, timber, fibre cement and steel in residential cladding applications.

Design considerations for residential cladding

When designing cladding systems, a range of factors need to be considered on a project-by-project basis. In residential projects, aesthetic considerations are usually among the most important. The variety of different colours, textures and profiles available for different cladding products will usually mean that designers can achieve most desired aesthetic outcomes.

However, aesthetics has to be balanced with performance and functionality, especially in difficult site conditions. By choosing cladding materials best suited to a geographic location, climate and building type, you can often achieve the best in physical performance and aesthetics. This means assessing the needs of the site, and matching it to a cladding product based on its ability to withstand wind and earthquake loads, sound and thermal insulation, strength, durability, and resistance to corrosion (especially in harsh or coastal environments).

Cladding is generally a non-bearing element, but some projects require it to fulfil a structural bracing role in lightweight framing applications. This can have implications for visual appearance, waterproofing, condensation, ventilation and drainage.[1] Other practical considerations when choosing cladding materials include, the availability of materials, budget, ease of installation, and maintenance requirements.

Cladding for multi-residential and single detached dwellings are regulated by the National Construction Code (NCC). The NCC specifies performance requirements for a range of elements, including fire resistance, wind loads, energy efficiency, weatherproofing and structural integrity. When choosing a cladding product, ensure that it meets the requirements within each category and complies with the appropriate Australian Standards. New and innovative cladding systems may require additional testing and certification if they are relatively unproven in the market.

With all of the above considerations in mind, we examine the pros and cons of different cladding materials in more detail below.

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Common cladding materials
Pros and Cons

TIMBER

Timber products are among the most sustainable of all residential cladding options. This is because timber has a comparatively lower carbon footprint than other building materials,[2] is generally non-toxic (though some paints and sealants may have toxicity issues), and renewable.

The natural aesthetic of timber remains popular in the residential sector. It also offers strength and good durability, and has been used for building applications for centuries. It is suitable for some low-rise construction, but it is combustible and is therefore limited in its applications given the focus on fire safety in the NCC.

Despite its popularity, timber has several downsides when used for exterior cladding. While the extent varies within species, timber is subject to movement in service when exposed to weather elements and fluctuations in temperature and humidity. As an organic material, it is also vulnerable to pest infestation, but the main cause of failure is fungal decay when subject to prolonged exposure to moisture. Due to these weaknesses, timber needs to be treated with chemical preservatives,[3] sealed and/or finished for added protection from moisture and other elements. It also requires regular retreatment over its life to ensure longevity.

FIBRE CEMENT

Fibre cement is a composite material that is made up of sand, cement and cellulose fibres and produced as planks, weatherboards or sheets. It has gained popularity as a building material due to its high levels of strength and stability. It is also suited for modern construction as it offers high fire resistance and can be made waterproof with the right backer boards and underlay.

For cladding applications, fibre cement is limited in some key performance categories. It has low insulation values and must be combined with additional insulation to achieve satisfactory thermal performance. It also rates poorly in terms of sound insulation,[4] so care must be taken if it is specified for sites surrounded by many noise sources.

While manufactured in a factory-controlled environment, the quality of fibre cement products and their sustainability credentials has been known to vary between manufacturers. The material itself contains some renewable ingredients, such as the plantation-grown cellulose reinforcing fibre, but cement itself is a non-renewable resource with high embodied energy.

BRICK

In recent history, brick is probably the most common cladding material used for residential homes. With high durability and excellent fire resistance, brick is appealing as a relatively low maintenance material. Brick comes in variety of colours and textures, but compared to other cladding materials, the choice is limited.

In modern construction, brick is falling out of favour due to a range of factors. One of the leading reasons is the high environmental cost associated with the material. Brick and blockwork construction can have high embodied energy. Bricks have to be fired in a high temperature kiln, which means the use of fossil fuels. Concrete is even worse in this regard with cement, its key ingredient, responsible for 8% of global emissions.[5] Masonry construction also has high transport and labour costs as compared to other lighter weight materials.

STEEL

Steel cladding is available in a variety of cold-formed profiles, with varying base metal gauge and structural capacity.[6] It is known for its durability, with galvanised corrugated steel able to last more than 100 years on a building.[7] In comparison to wood, stone and painted surfaces, steel cladding panels require very little maintenance or repair work, and also provide high fire resistance. It is also generally easy to work with as it is a very ductile material that is easy to weld on site.

One disadvantage of steel is that it must be treated for corrosion resistance. Stainless steel is coated with a chromium oxide layer to prevent rust,[8] whereas galvanized steel uses a thin protective layer of zinc.[9] There are newer types of ‘weathering’ steel that form a protective layer over time.[10] Any damage to the exterior can reduce the effectiveness of the surface protection, resulting in localised rusting zones. Other metals, specifically aluminium, are better suited for corrosive environments.

Why aluminium cladding?

As it provides a unique balance of performance, usability and aesthetics, aluminium is an excellent cladding material for residential applications. This material's strengths provide almost limitless design possibilities for contemporary Australian homes, and makes it possible to create structures that cannot be made from wood, brick or steel.

Aluminium is fast becoming a preferred cladding material across Australia. Below we break down why you should consider aluminium cladding for your next project.

DESIGN VERSATILITY

One of aluminium's main appeals is that it is one of the most flexible design materials. One of the easiest materials to bend or fabricate with, aluminium can be extruded to almost any shape. Designers can achieve special designs that include curved and uncommon shapes, three-dimensional effects, waved and corrugated patterns, and more. In comparison, steel is more difficult to customise as it requires machining to achieve complex designs. Aluminium cladding is also available in a wide range of colors, patterns, shapes, sizes, and effects, and can be brushed or polished to achieve an appealing surface look.

EASE OF INSTALLATION

Aluminium panels can be ordered to custom lengths, which eliminates additional fabrication and decreases waste. Leading cladding products are simply interlocked and tightened, then simply fixed on site with no specialist installers required. The low weight of aluminium panels makes them easy to work with on site and quicker to install, further reducing labour and transport requirements.

STRENGTH-TO-WEIGHT RATIO

Aluminum is about one-third the weight of steel, allowing building elements to be made thicker while still reducing weight.[11] Its low weight does not come at the cost of strength. Depending on specifications, aluminium can be forged to be just as strong (if not stronger) than some types of steel.[12]

Aluminium's strength-to-weight ratio offers several architectural benefits. For example, its low weight also allows aluminium cladding to be added to the exterior of existing buildings without any need to dramatically change the building's structure.

FIRE RESISTANCE (NON-COMBUSTIBLE)

Aluminum is an inherently non-combustible material.[13] Due to this quality, solid aluminium panels are typically fire resistant and meet the non-combustibility requirements of the NCC. This is not the case for some popular cladding materials, such as timber, which is combustible and thus is not suitable for some types of building applications. Furthermore, while aluminium alloys melt at approx. 600-650°C, they do so without emitting any toxic fumes.

When choosing any cladding product, it is important to ensure that the product has undergone testing to AS/NZS 1530.1:1994 "Methods for fire tests on building materials, components and structures, Part 1: Combustibility test for materials", and complies with all other fire safety requirements in the NCC.

ENVIRONMENTALLY FRIENDLY

Aluminium is considered the "green" metal for a variety of reasons. Its longevity and durability contribute to longer lasting and sustainable buildings. Its low weight enables quicker and more efficient construction. Aluminium is also 100% recyclable and, in fact, aluminium from a recycled source contains less than 10% of the embodied energy of aluminium manufactured from raw materials.[14]

The aluminium manufacturing industry is also making great strides in reducing their environmental impact through recycling, operational improvements and adoption of new, energy-efficient technology.[15] Reports indicate that the energy required to produce new aluminum is down more than a quarter since 1995 and the industry's carbon footprint is down nearly 40%.[16]

CORROSION RESISTANCE AND DURABILITY

Aluminium has a natural oxide coating that provides an effective protective layer against weather elements that can corrode other metals. Unlike steel, which must have a protective layer applied to its surface, aluminium's protective oxide coating forms spontaneously when the material is freshly exposed to air. If the proper alloy is selected, most industrial, marine and chemical atmospheres do not cause corrosion on aluminium cladding, thus making the material better suited for highly corrosive environments than other building materials.

LOW MAINTENANCE

Due to its natural durability, non-combustibility and corrosion resistance, the maintenance requirements for aluminium cladding are relatively low. Periodic cleaning is required to maintain a premium aesthetic, but this is relatively minimal compared to the regular treatment required to maintain other traditional cladding materials. Finishes on aluminium cladding generally have a long life expectancy, and rarely need repainting.

ProClad™ LINEAR
Aluminium Facade Systems (powered by Alspec)

Australian owned, designed and manufactured, ProClad™ LINEAR is an intelligent aluminium interlocking facade system that is 100% non-combustible and provides a modern and aesthetically-pleasing element to any facade. The range consists of four different profiles (Empire, Urban, Manor and Walsh), each with a unique look and supplied as a complete system with components for fixing and corner details.

The ProClad™ LINEAR range is designed and engineered in house by Aluminium Facade Systems to meet the demands of every sector in the facade industry. The range offers the flexibility to select from the different profiles and finishes to meet any style including ultra modern, industrial and contemporary facades. These cladding products provide confidence with the highest quality characteristics of each profile, providing an incomparable reliability and longevity with a commitment to sustainability and our surrounding environment.

This easy-to-install interlocking aluminium cladding system is customisable to specific project requirements. ProClad™ panels can be ordered to custom lengths which eliminates additional fabrication. Panels are simply interlocked and tightened, then fixed. This also optimises usability and decreases waste.

With the extensive range of colours and finishes, including powdercoated, anodised and wood grain finishes, ProClad™ LINEAR has limitless aesthetic and design options for use in applications of any scale and in any environment. Custom colours are also available on request. ProClad™ LINEAR finishes are guaranteed to perform and outlast to the highest standards.

Due to these qualities, and its ease of installation, maintenance and a market leading 25-year product warranty, ProClad™ LINEAR is proving to be the preferred product in the architectural cladding category.

KEY BENEFITS

- 25-year warranty
- Premium aesthetics
- Minimal fabrication
- Environmentally friendly
- 100% Australian owned, designed and manufactured
- Pre-finished
- Intelligent installation design
- Non-combustible (in accordance with meeting AS1530.1 and AS1530.3)
- Interlocking facade system

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REFERENCES

1 Australian Government. “Cladding systems.” YourGov. https://www.yourhome.gov.au/materials/cladding-systems (accessed 31 October 2021).

2 Ibid.

3 Mayer, Peter. “Whole life costing - Timber cladding.” Green Spec. https://www.greenspec.co.uk/building-design/timber-cladding (accessed 31 October 2021).

4 Architizer Editors. “An Architect’s Guide To: Fiber Cement Cladding.” Architizer. https://architizer.com/blog/product-guides/product-guide/eaktna-fiber-cement-cladding (accessed 31 October 2021).

5 Beyond Zero Emissions. “Rethinking cement.” BZE. https://bze.org.au/research_release/rethinking-cement (accessed 31 October 2021).

6 Above n 1.

7 Ibid.

8 Architizer Editors. “An Architect’s Guide To: Metal Cladding.” Architizer. https://architizer.com/blog/product-guides/product-guide/eantka-metal-cladding (accessed 31 October 2021).

9 Ibid.

10 Ibid.

11 The Aluminium Association. “The Strength of Aluminum.” The Aluminum Association. https://www.aluminum.org/strength-aluminum (accessed 31 October 2021).

12 Ibid.

13 Aluminium Federation. “Aluminium and Fire.” Aluminium Federation. http://www.alfed.org.uk/files/Fact%20sheets/11-aluminium-and-fire.pdf (accessed 31 October 2021).

14 Australian Government. “Embodied energy.” YourHome. https://www.yourhome.gov.au/materials/embodied-energy (accessed 31 October 2021).

15 The Aluminium Association. “Aluminum Sustainability.” The Aluminium Association. https://www.aluminum.org/aluminum-sustainability (accessed 31 October 2021).

16 Ibid.

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