



BLUECHIP

# ADDRESSING THE CORE PROBLEM

The Benefits of Non-Combustible Aluminium  
Core Panels for Cladding Applications

## INTRODUCTION

From Lacrosse to Grenfell, high profile building fires around the world heightened fire safety concerns throughout the architecture and construction industries, with their impact still felt to this day. Subsequent building investigations discovered the underlying problem – the widespread use of non-compliant aluminium composite panels (ACPs) with combustible polyethylene cores used as external cladding across hundreds of buildings across Australia.

Architects, designers and specifiers are seeking cost-effective yet high-performance cladding alternatives to cheap yet dangerous ACPs. Due to fears of non-compliance, many are considering solid 3mm aluminium sheets for cladding applications. However, there are serious inherent issues associated with using solid 3mm aluminium sheet, as well as the installation system being currently employed throughout Australia.

The negative perception of ACPs since the Grenfell and Lacrosse tower fires have led designers and specifiers to avoid compliant, best practice materials and instead opt for lesser quality systems and solutions. The critical compliance question with ACPs is whether they have a combustible core. Some products claim to have a non-combustible core however these are still deemed an ACP if the core is not 100% aluminium, potentially leading to insurance complications.

To avoid these issues, designers and specifiers can consider laminated aluminium, an intelligent non-combustible cladding material made of three layers of 100% aluminium laminated together, that offers huge benefits over 3mm solid aluminium panels, along with proven non-combustibility, superior thermal and mechanical performance, fast installation and premium aesthetics.

In this whitepaper, we take a look at the issues associated with the use of 3mm solid aluminium panels cladding panels in a sealed facade and why laminated aluminium cladding products such as BLUECHIP's ULTRACORE IQ offer a superior high-performance solution.







## THE RISE OF 3MM SOLID ALUMINIUM CLADDING

The Grenfell and Lacrosse fires emphasised the dangers of flammable cladding. Lightweight ACPs, along with installation methods that quickly exposed the cores to ignition such as tape-fixing, were the critical factor in the fires accelerating across the exterior surface of the buildings. This was due to the material's combustible polyethylene (PE) cores, which acted as a potent fuel for the fire.

With the industry's focus sharply on preventing such disasters from happening again in the future, a raft of investigations and building audits were conducted by regulators throughout the country, the sum of which told a shocking story of non-compliance. In New South Wales alone, over 440 buildings were reported to be potentially clad in flammable material.<sup>1</sup> To this day, while some progress has been made, work still continues to rectify buildings found to contain combustible cladding.

Over recent years, Australian building regulations and fire performance requirements have been strengthened. The use of ACPs with a core of over 30% PE was banned

in New South Wales for external cladding applications.<sup>2</sup> A similar ban on high-risk cladding products was established in Victoria.<sup>3</sup> These developments placed an onus on designers and specifiers to identify cladding materials that meet strict fire testing and non-combustibility requirements for specific building types.

Solid aluminium was an obvious alternative as it is inherently non-combustible. Aluminium also offers a range of architectural benefits, including strength, durability, light weight, flexibility, and corrosion-resistance. On the sustainability front, aluminium can be recycled and reused indefinitely, making it an attractive option for the eco-conscious specifier. It is important to note however the production of new aluminium remains highly carbon and pollution intensive.

The adoption of 3mm or 4mm solid aluminium for cladding applications, on face value, has provided seeming certainty of approval, insurance and building value sought by owners in the current climate. However, this is not the full story.

## COMMON PROBLEMS WITH SOLID ALUMINIUM CLADDING

Metal cladding, such as 3mm solid aluminium panels, will experience 'oil-canning', which refers to visual distortion and waviness on the facade caused by an uneven distribution of tension in the panel. This phenomenon can be caused by thermal expansion and contraction, but it is also inherent to the mechanical properties of solid aluminium.

There is also concern regarding the use of 3mm solid aluminium sheet cladding panels in a sealed facade using the V-groove cassette-fix installation system. V-groove cassette-fix installation systems are currently being widely used in Australia for both new builds and recladding combustible ACP facades. Australia is the only country globally using this system and it has not been proven over decades.

V-grooving refers to the process of using a special groover to cut a V-shaped groove of a certain depth in the sheet, before folding the panel to create a cassette. This method is used to fabricate cassette panels. The cassette profile is a popular way to mechanically secret-fix large sheets of facade material on a large-scale structure. Cassettes are installed to steel framing, and the sheets are mechanically fixed with rivets, screws, clips and hooks, and secured to a load-bearing support system.

The V-groove cassette-fix installation system has been proven to be an excellent and durable system over 50 years when used with bonded laminated aluminium panels, however, it is a flawed method when applied to 3mm solid aluminium panels. Below are several key issues:

### Thermal performance

Solid aluminium has inherently high thermal conductivity, which can negatively impact a building's energy efficiency. This property means that solid aluminium, when used in a sealed facade, has no way of reducing heat transfer into the building. During summer months, a greater heat load into the building will increase dependence on mechanical heating and cooling unless effective ventilation methods are implemented. This has implications on meeting the requirements for energy efficiency under Section J of the NCC, and also for fire safety.

### Structural durability

Given its composition, V-grooving can impact the structural integrity of the solid aluminium panel. In the same way scoring and snapping plasterboard will increase the likelihood of it snapping or cracking, V-grooving a 3mm sheet of solid aluminium weakens the material at the fold and may result in future cracking and structural failure. It would be dangerous to incorporate a component into an airplane, car or ship using this methodology.

### Weather/waterproofness

The structural weakness at folds creates a vulnerability that increases the risk of water ingress. While not every building will experience a major fire event during its lifespan, every building will need to withstand the effects of wind and rain. A facade that does not adequately prevent moisture ingress can lead to costly building damage, including visual degradation of the exterior and structural decay. Buildings that are not water and waterproof also generally perform poorly in terms of energy efficiency and indoor air quality.



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# INTELLIGENT CORE ALUMINIUM CLADDING

## A way forward with ULTRACORE IQ

ULTRACORE IQ is a non-combustible aluminium core panel supplied by BLUECHIP made of three layers of 100% aluminium laminated together. This construction means this product is not composite panel because it is made from all the same material, so it does not carry the risk and complications associated with those type of cladding products. It also offers significant advantages over solid aluminium panels in terms of performance and functionality.

Approved as replacement material under the Project Remediate program by the NSW Cladding Product Safety Panel (CPSP), this cladding product is proven to be safe, compliant, economical and of very high quality. Unlike other aluminium panel products, the ULTRACORE IQ aluminium core contains zero percent flammable polyethylene, and each lamina is 100% non-combustible.

This product overcomes the issues commonly associated with solid aluminium panels and ACPs. The mechanical properties of the panel spreads and reduces thermal tension to avoid the oil-canning effect. The multi-layered aluminium construction helps the panel maintain its structural integrity during V-grooving and folding. This is because the V-grooving process does not impact the front skin of the ULTRACORE IQ panel during the process (as has always been intended), resulting in improved corner durability. Finally, the panel has 80x less thermal conductivity than solid aluminium, greatly reducing heat transfer into the building and greatly improving energy performance and thermal comfort of the building.

From a compliance perspective, the NCC makes specific provision for the use of products like ULTRACORE IQ. On 1 May 2019, the states and territories adopted an updated version of the NCC, superseding the 2016 version. As part of its effort to achieve elevated fire safety outcomes across the building industry, the NCC 2019 contains several changes to Section C 'Fire Resistance'. The bonded laminates inclusion in Clause C1.9(e)(vii) was

retained in the 2019 update. It has also been retained in NCC 2022 coming into effect in May 2023 which moves the inclusion to Clause C2D10. The NCC 2022 inclusion also covers the requirement for correct cassette-fix installation as has long been advocated for by BLUECHIP to eliminate non-mechanical methods such as tape fixing.

ULTRACORE IQ is a Deemed-to-Satisfy non-combustible intelligent aluminium core panel when tested to AS 1530.1 and AS 1530.3 as per the requirements of the NCC 2022, Clause C2D10(6)(g). It has also been tested by Exova Warrington fire to BS 8414 and AS 5113 full-scale testing to prove it does not contribute to the spread of fire. As it has zero combustible core content, this product achieves the lowest risk rating, category D, from the Insurance Council of Australia.

In terms of sustainability, ULTRACORE IQ aluminium core panel outperforms solid aluminium as it uses around 50% less aluminium per m<sup>2</sup> than solid aluminium. This means it has a much smaller carbon footprint than solid aluminium panels, and it is also 50% lighter for significant structural and labour savings.

In summary, ULTRACORE IQ offers the following benefits:

- Proven V-groove durability
- AS 1530.1 DTS Non-Combustible
- AS 5113 Fire Testing
- Zero polyethylene (0%)
- Less thermal conductivity
- Faster fabrication time making it more cost effective
- Oil-canning resistance
- Environmentally friendly
- 100% recyclable and lightweight
- Lower carbon footprint compared to 3mm solid aluminium
- Less debris compared to 3mm solid aluminium





## ABOUT BLUECHIP

Founded in 2003 by five brothers, BLUECHIP has grown every year since to become one of Australia's leading suppliers of architectural building envelopes. BLUECHIP's product range, covers the complete system from the structure out, including all types of cladding materials, composite decking, sub-framing, insulation, weatherproofing and fixings.

With many years combined experience, BLUECHIP has now supplied more than 3,000,000m<sup>2</sup> of materials to Australian projects since 2003. Our commitment to innovation and ongoing investment in R&D ensures BLUECHIP will continue to lead the market with BCA/NCC compliant facade solutions in the years ahead.

For architects and consultants, BLUECHIP's wide range of different materials and 'complete-system' approach enables the creation of inspiring high-performance facades. For builders and contractors, BLUECHIP's large local stock, well-established supply chains and genuine appreciation for our clients means you can trust us to deliver as promised every time.

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## REFERENCES

- <sup>1</sup> Rabe, Tom and Nick Bonyhady. "Cladding list kept secret amid demands for action on 'construction crisis'." Sydney Morning Herald. <https://www.smh.com.au/national/nsw/cladding-list-kept-secret-amid-demands-for-action-on-construction-crisis-20191104-p537dg.html> (accessed 12 July 2022).
- <sup>2</sup> NSW Government. "Aluminium composite panel ban." Fair Trading. <https://www.fairtrading.nsw.gov.au/trades-and-businesses/construction-and-trade-essentials/building-products/aluminium-composite-panel-ban> (accessed 12 July 2022).
- <sup>3</sup> Victorian Government. "Banning dangerous cladding and keeping Victorians safe." VIC Government. <https://www.vic.gov.au/banning-dangerous-cladding-and-keeping-victorians-safe> (accessed 12 July 2022).

All information provided correct as of October 2022

