



NAVIGATING SUSTAINABILITY

Key Considerations when Selecting Aluminium Cladding





Introduction

Given the various attractions of aluminium cladding – which include everything from visual appeal, cost-effectiveness and low maintenance requirements to durability, ease of installation, and more – its continued popularity, for a range of applications, is understandable.

That said, it is important to note that aesthetic and functional benefits such as these are only part of the equation. As is now broadly accepted across the construction sector, product choice should also involve environmental considerations. Given the urgency of the climate change challenge – and the built environment's status as the largest global emitter of greenhouse gases¹ – architects and designers need to be part of the solution.

When specifying aluminium cladding, they need to not only consider the strength and aesthetic appeal of the various product options, but also the raw material extraction methods used to produce them, whether their manufacture includes recycled material, and so on. And they need to be aware of what will happen to those same products at the end of their service lives.

In this context, this White Paper examines the environmental credentials of aluminium cladding. Beginning by identifying the key variables that contribute to the sustainability (or otherwise) of such products, it goes on to outline the best ways for specifiers to identify those that are genuinely sustainable.

TYPES OF ALUMINIUM CLADDING

The first thing to note, before attempting to assess their environment impacts, is that there is more than one variety of aluminium cladding. The main types include:

Solid Aluminium Cladding – An older type of cladding, which has been around for decades, 3mm solid aluminium cladding consists of a homogenous aluminium material with a protective film and paint. On the negative side, cladding of this type is prone to oil canning (i.e. an expansion and contraction over time, which leads to buckling or peeling, as well as inconsistency between the colours of panels).

Aluminium Composite Panels (ACP) – Featuring two aluminium skins over a solid core of some type, this is a more recent option than 3mm solid aluminium. Characterised by lower levels of heat transfer than 3mm solid aluminium, panels of this type are not associated with oil canning and require significantly less aluminium.

Corrugated Core Panels / Honeycomb Core Panels – Lightweight products that feature aluminium skins with either honeycomb or corrugated egg carton cores, these panels also include air pockets or air chambers. Though they require less aluminium than solid aluminium, their air pockets mean they are prone to denting and are therefore less durable.



ENVIRONMENTAL IMPACTS & HOW TO ASSESS THEM

Life Cycle Stages

Quantifying the environmental impacts of these various cladding products – or indeed any type of building product – requires an understanding of the various product life cycle stages. Broadly speaking, each of these stages involves separate, quantifiable environmental impacts:

- ‘The Product Stage’, includes A1 (raw material extraction), A2 (transport of those raw materials), and A3 (manufacturing of the product)
- ‘The Construction Stage’, includes A4 (transport of the finished product) and A5 (installation of the product)
- ‘The Use Stage’, includes B1 (Use of the product), B2 (Maintenance of the product), B3 (Repair of the product), B4 (Refurbishment), B5 (Replacement), B6 (Operational Energy Use), and B7 (Operational water use)
- ‘The End-of-Life Stage’, includes C1 (Deconstruction and demolition), C2 (Transport of this deconstructed material), C3 (Waste processing), and C4 (Disposal)
- ‘The Next Product Phase’ includes D (Re-use, recovery, recycling)

Lifecycle Assessment

Given these many variables, measuring the lifecycle impacts of specific aluminium cladding products is a complicated task. The best and most accurate way to achieve this is by way of a Life Cycle Assessment (LCA), which is defined as “...a systematic analysis of environmental impact over the course of the entire life cycle of a product, material, process, or other measurable activity.”ⁱⁱ

Following strict procedural rules and conducted according to standards ISO14040 and ISO14044, LCAs measure all impacts, including those associated with raw materials extraction, manufacturing, and transport, as well as the use and end-of-life lifecycle stages.ⁱⁱⁱ They cover Global Warming Potential, Acidification, Eutrophication, Fossil fuel depletion, and more.

Accepting LCAs as the most accurate method of assessment leaves specifiers with the task of identifying cladding products that have undergone assessments of this type and are therefore genuinely sustainable. Broadly speaking, the best way to do this is by seeking products that carry either an Environmental Product Declarations (EPD) or other third-party verified environmental certification.

Environmental Product Declarations

EPDs are independently verified and registered documents that communicate the data from LCAs. Type III environmental declarations that follow the principle



of ISO 14025, construction products EPDs also follow EN15804. This means that they are transparent and their findings are comparable to other EPDs in the sector.

Overseen in Australia by one of two EPD certification providers (Australasia EPD and Global Greentag), they report on everything from global warming potential (GWP), acidification, and eutrophication abiotic depletion to human health impacts, water depletion, and resource use.

Environmental Certifications

As mentioned, the other sure means of identifying sustainable aluminium cladding products is by reference to third-party environmental certifications. The best of these include:

Good Environmental Choice Australia (GECA) - Australia’s only independent, not-for-profit, multi-sector sustainability and environmental certification program, GECA follows ISO 14024 principles for global best practice in ecolabelling.^{iv}

Global Green Tag (GGT) - Recognised in over 70 countries, including Australia and New Zealand, Global GreenTag complies with various standards, including 14025 for Environmental Product Declarations and ISO 21930 and EN 15804 for specific need EPDs.^v

Climate Active Carbon Neutral - An initiative of the Federal Government, Climate Active Carbon Neutral is a voluntary standard designed to help manage greenhouse gas emissions, achieve carbon neutrality and to seek Climate Active certification.^{vi}



THE CIRCULAR ECONOMY & RECYCLING

The concept of the circular economy contrasts starkly with the more traditional linear economic model, in which products are purchased, used until they are no longer of any worth, and then discarded.

As the Ellen Macarthur Foundation notes – “The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources.”^{vii}

One key thing to understand about aluminium – and one factor that makes it unique – is that, though its production is carbon intensive, it can be infinitely recycled without losing its original properties.^{viii} In addition, recycling aluminium requires only about 5% of the energy needed for smelting.^{ix} Compared to other widely-used building materials, the aluminium recycling process rates as one of the most energy efficient.

Given that manufacturers are using more and more recycled materials in their products (global aluminium recycling rates currently vary from 34% to 70%^x), the material – along with cladding products that feature it – have an important role to play in the future circular economy.

ABOUT NETWORK ARCHITECTURAL

Network Architectural is focussed on serving the construction market with high quality façades and architectural finishes.

Dedicated to matching durability and functionality with safety and style, the company has become renowned for its industry-leading levels of service. As such, its skilled and experienced team has a demonstrated track record of working closely with its clients across all stages of the project lifecycle, from conception and specification through to project completion.

As its status as the exclusive Australian distributor of several key cladding brands, including ALPOLIC™ attests, Network Architectural also ranks environmental sustainability among its top priorities.

A brand of Mitsubishi Chemical Infratec Co., Ltd, ALPOLIC™ boasts over 50 years' experience in the development and production of aluminium composite panels. Having reduced the greenhouse emissions associated with production of its composite panels (at its manufacturing facilities in Japan, the United States and Germany) by 20% since 2017, ALPOLIC™ has further committed to cut these by a further 30% by 2030. Durable, EPD certified, and designed for easy reuse, ALPOLIC™ NC/A1 aluminium composite panels represents the future of façade innovation.

They are available across Australia and New Zealand from Network Architectural.

REFERENCES

- ⁱ UN Environment Programme, 'Building Materials and The Climate: Constructing A New Future', www.unep.org/resources/report/building-materials-and-climate-constructing-new-future#:~:text=The%20buildings%20and%20construction%20sector,have%20a%20significant%20carbon%20footprint.
- ⁱⁱ Rochester Institute of Technology, 'What is Lifecycle Assessment (LCA)?', www.rit.edu/sustainabilityinstitute/blog/what-life-cycle-assessment-lca#:~:text=In%202002%2C%20the%20United%20Nations,of%20the%20Life%20Cycle%20Initiative.
- ⁱⁱⁱ Ibid.
- ^{iv} Good Environmental Choice Australia, 'Sustainable Solutions For Planet And People', geca.eco
- ^v Global GreenTag, 'About Global Greentag', www.globalgreentag.com/about.html
- ^{vi} Climate Active, 'Certification', www.climateactive.org.au/be-climate-active/certification
- ^{vii} Ellen Macarthur Foundation, 'What is a circular economy?', www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview
- ^{viii} Australian Aluminium Council, 'Recycling', aluminium.org.au/about-aluminium/how-aluminium-is-made/recycling/
- ^{ix} Ibid.
- ^x UN Environment Programme, 'Recycling Rates of Metals – A Status Report', www.resourcepanel.org/reports/recycling-rates-metals

All information provided correct as of September 2024.