nu-wall CLADDING

ENVIRONMENTAL PRODUCT DECLARATION

EPD OF MULTIPLE PRODUCTS, BASED ON A REPRESENTATIVE PRODUCT

A full list of products covered by this EPD is presented within this document on page seven

NU-WALL ALUMINIUM CLADDING
BOARDS - ANODISED

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An EPD should provide current information and may be updated if conditions change.
The stated validity is therefore subject to the continued registration and publication at epd-australasia.com

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What is an Environmental Product Declaration?

An Environmental Product Declaration (EPD) tells the environmental story of a product over its life cycle in a format that is clear and transparent. It is science-based, independently verified and publicly available. EPDs are often compared to the nutrition labels on food products.

EPDs help manufacturers translate complex sustainability information about their product's environmental footprint into simpler information that governments, companies, industry associations and end consumers can trust to make decisions.

An EPD communicates the environmental impacts at different stages in a product's life cycle. This may include the carbon emitted when it's made, and any emissions that pollute the air, land or waterways during its use.

This EPD covers the environmental impacts of Nu-Wall Boards - Anodised when used both inside and outside a building envelope subject to treatment level.

This EPD is based on a 'cradle-to-gate' Life Cycle Assessment (LCA), with end-of-life options included. 'cradle' refers to the raw material extraction and 'gate' is the gate of the Nu-Wall manufacturing facilities as the product is ready to be dispatched to customers.

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ABOUT NU-WALL

Established in 1985, Nu-Wall® is one of New Zealand's leading aluminium cladding specialists, with products and systems designed and manufactured in New Zealand, enabling a reliable and resilient supply chain. Our core product – Nu Wall® Cladding – is a high-performance, low-maintenance and non-combustible BRANZ-appraised cladding system, with a 100-year base metal durability warranty. We are committed to providing innovative product designs that fulfil market needs in terms of aesthetics, functionality and sustainability.

Our services and support differentiate us

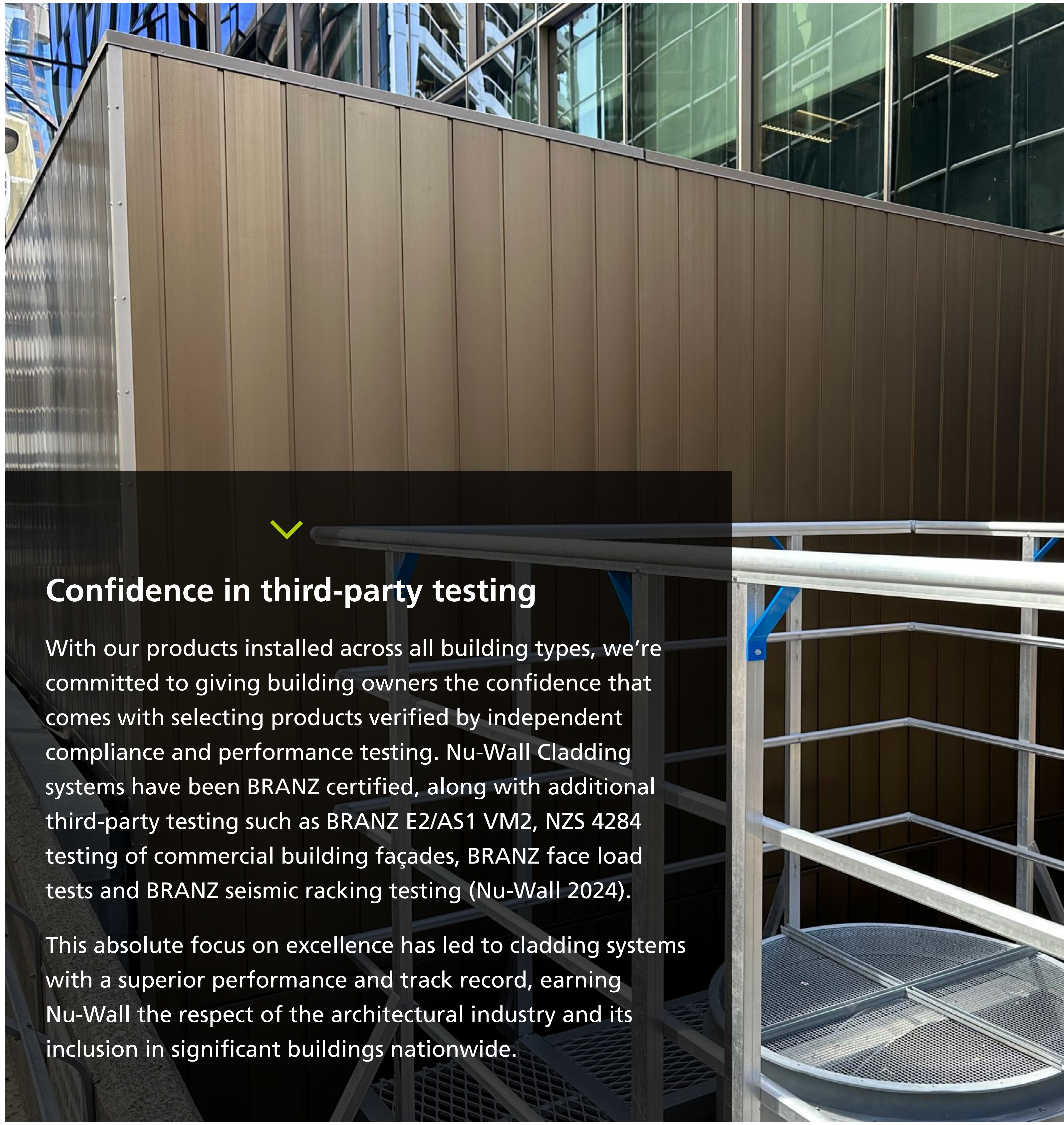
Nu-Wall Cladding systems are distributed throughout New Zealand and managed from our ~1,000m² premises in Penrose, Auckland. Our team is well known and respected for our superior 'can do' pragmatic technical and compliance support, and we possess deep product and regulatory knowledge for specification and installation excellence.

We maintain an extensive resource library of CAD files, specifications, compliance and technical data to ensure the optimal application of Nu-Wall products in diverse architectural applications. Our showroom has full-scale displays of our product range, colour and finish samples and our friendly team are readily available as a source of trusted and accurate advice and support.

Genuine product innovation

As a values-driven business, we're on a continuous improvement pathway in new product development and environmental practices, choosing a manufacturing process that drives low-carbon and healthy new buildings. Having a local supply chain means minimal transportation carbon emissions and supply chain resilience, where all partners work together – from materials supply to design, manufacturing and backup support.

As part of a nimble and innovative local building industry, Nu-Wall cladding systems stay at the forefront of all metrics that matter to New Zealanders. Research and ingenuity guide our thinking, leading to a product range that meets the highest design and performance standards. Continuous investment in research and development has led to products that perform optimally for New Zealand conditions, with a continually expanding range of new profiles and accessories to meet evolving market needs.



Confidence in third-party testing

With our products installed across all building types, we're committed to giving building owners the confidence that comes with selecting products verified by independent compliance and performance testing. Nu-Wall Cladding systems have been BRANZ certified, along with additional third-party testing such as BRANZ E2/AS1 VM2, NZS 4284 testing of commercial building façades, BRANZ face load tests and BRANZ seismic racking testing (Nu-Wall 2024).

This absolute focus on excellence has led to cladding systems with a superior performance and track record, earning Nu-Wall the respect of the architectural industry and its inclusion in significant buildings nationwide.

SUSTAINABILITY

We are committed to developing and supplying enduring, environmentally and socially responsible cladding systems. Regular reviews and updates to our sustainability practices show us how to incorporate the latest technologies and processes into what we do. We audit the business to identify target areas, and this Environmental Product Declaration is a major initiative to understand and publish a broad suite of environmental indicators, including product carbon footprint (PCF) data.

Endlessly recyclable material

The great attraction of aluminium is that it is an incredibly durable and endlessly recyclable material, with the remelting process never degrading structural integrity or durability. Our New Plymouth-based manufacturing partner, McKechnie® Aluminium, is a leader in sustainable processes and are currently the only manufacturer in New Zealand with its own aluminium recycling remelt facility.

All Nu-Wall Cladding products are high in recycled material content which results in a lower carbon footprint. Products contain a high percentage of recycled aluminium, with the remelting process requiring only 5% of the energy needed to create virgin aluminium. The remaining virgin content is sourced from various suppliers, including Tiwai Point smelter in the South Island. The result is that Nu-Wall boards have a carbon footprint that is significantly lower than the global average of virgin aluminium.

Minimal lifecycle costs and resources

A low-maintenance product, Nu-Wall cladding effectively extends the overall lifespan of structures by eliminating the need for resource-intensive re-oiling or repainting required for various cladding alternatives. Nu-Wall cladding remains in 'as new' condition for many years, providing an attractive return on investment and peace of mind for asset owners.




Images top middle, top right: McKechnie Aluminium

MANUFACTURING

We selected our extrusion partner , McKechnie Aluminium, because they are New Zealand based, produce extrusion product with a low carbon footprint, a high recycled content and therefore very low embodied energy.

McKechnie Aluminium, located in New Plymouth, met this specification. McKechnie Aluminium sources waste extruded aluminium from the wider New Zealand aluminium extrusion industry, as well as remelting its own offcuts for a zero-waste manufacturing line.

More than 94% of powder coating occurs at McKechnie Aluminium.

McKechnie®
Transforming Aluminium

McKechnie Aluminium holds a coveted Toitū enviromark diamond certification, and being the only extruder to achieve Toitū carbon reduce product certification means Nu-Wall products meet the requirements of ISO 14067:2018, one of the world's best-known environmental standards.

TOITŪ CARBON REDUCE

TOITŪ ENVIRO MARK DIAMOND

HOW TO USE THIS EPD

Nu-Wall has developed this product specific EPD to help to showcase the environmental credentials of their products.

This independently verified EPD provides environmental performance information from cradle to gate (modules A1-A3), plus end of life modules C1-C4 and module D (reuse-recovery-recycling-potential).

The results are presented as one square metre (1 m^2) of coverage, that being the amount required to provide a clad wall face of 1 m^2, including fastening clips.

These data sets may be used by specifiers and developers to calculate and present the environmental impacts of particular construction projects.

Green Star

Green Star is Australasia's largest voluntary sustainability rating system for non-residential buildings, fitouts and communities

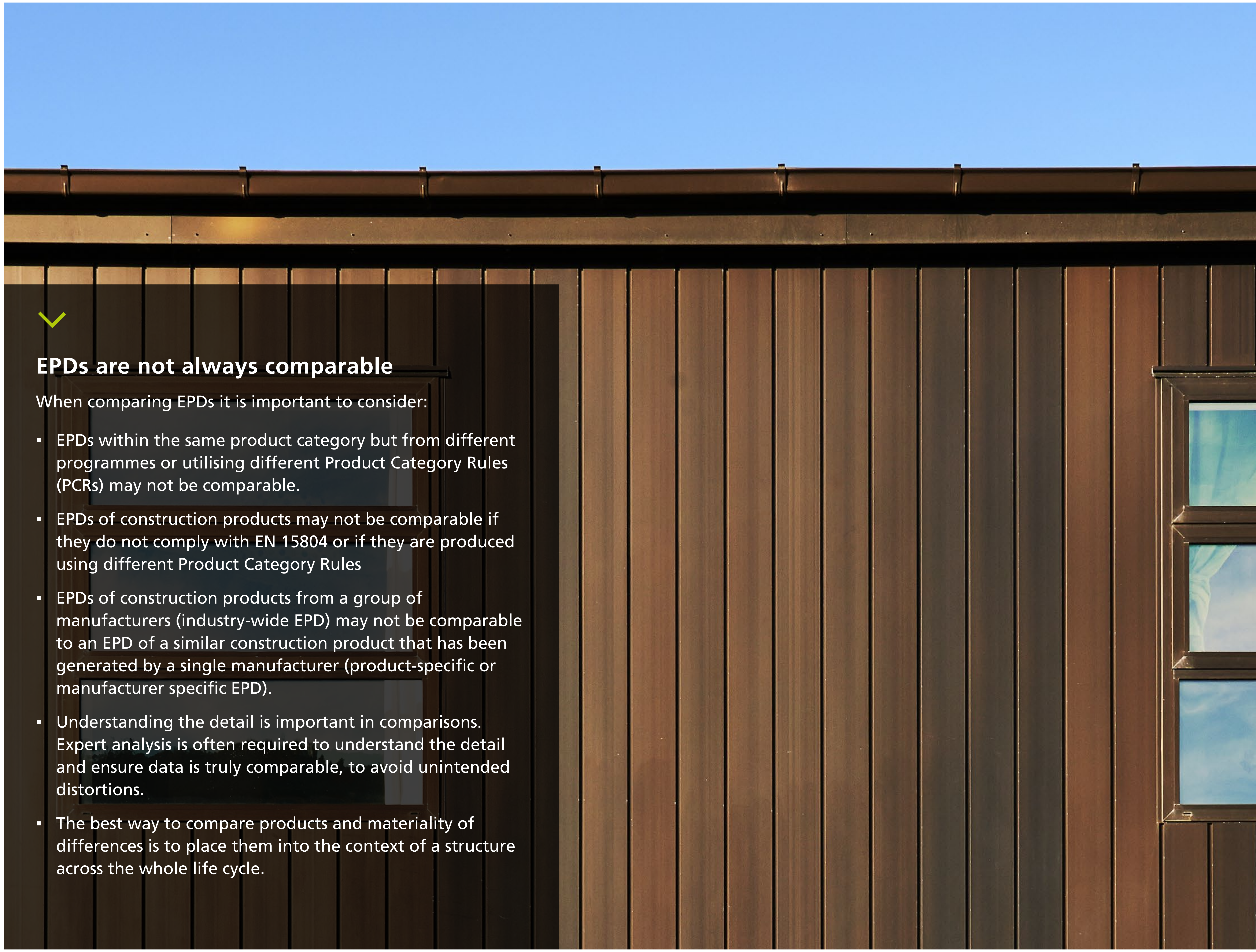
This EPD can allow the represented products to qualify for points under the Green Building Council Australia (GBCA) Green Star rating system.

The Green Star rating system has also been adopted and adapted for New Zealand conditions by the New Zealand Green Building Council.

NZGBC
TE KAUNIHERA HANGANGA TAUTAIAO

greenstar

Infrastructure Sustainability Council



EPDs are not always comparable

When comparing EPDs it is important to consider:

- EPDs within the same product category but from different programmes or utilising different Product Category Rules (PCRs) may not be comparable.
- EPDs of construction products may not be comparable if they do not comply with EN 15804 or if they are produced using different Product Category Rules
- EPDs of construction products from a group of manufacturers (industry-wide EPD) may not be comparable to an EPD of a similar construction product that has been generated by a single manufacturer (product-specific or manufacturer specific EPD).
- Understanding the detail is important in comparisons. Expert analysis is often required to understand the detail and ensure data is truly comparable, to avoid unintended distortions.
- The best way to compare products and materiality of differences is to place them into the context of a structure across the whole life cycle.

PRODUCT INFORMATION

Display of values

Where required, a comma is used as a thousands separator.

Nu-Wall Cladding (Boards Anodised)

Nu-Wall Cladding is a cavity-based, interlocking aluminium weatherboard system designed for external wall cladding for residential and light commercial buildings. Nu-Wall weatherboards and ancillaries are locally manufactured in New Zealand from 6063-T5 or 6060-T5 aluminium alloy. The extruded aluminium profiles are supplied as a finished product with an anodised finish to a maximum length of 7m.

Anodising is an electro-chemical process that infuses a 25-micron hard-anodised layer into the aluminium by immersing the metal into an acid electrolyte bath and then passing an electric current through it.

The aluminium oxide is not attached to the surface like paint or plating. It is fully integrated with the underlying aluminium substrate, which prevents chipping or peeling.

A limited colour range can be achieved during this process which provides a finish that can range from a golden glow in direct light through to a sullen brown in low-light conditions.

Representative product E200

This EPD is of the representative type, with product E200 –anodised representing the products - anodised - identified in Table 1. E200 has been identified as representative as it is the highest seller (~42% in 2022) within the represented product range. This EPD shows results that are specific to the product E200 – anodised.

E200 Profile

Table 2: Product code

Product Code	
E200 - Powder Coated	NC156

Clips

To fix the boards to the building structure, small aluminium clips are required. There are an average of ten clips per m² of coverage – nine fixing clips and one starter clip. Clips remain in 'mill finish'. Clips are considered integral to the board product and are therefore included as part of the declared unit.

Conversion factor

The conversion factor for one m² of coverage into kilograms for the representative product is 6.10 kg per m² coverage.

Represented Products

Table 1: Represented products - Boards

Product Name	Product Code	kg per m² cover
Aero-115	NC132	5.59
Aero-200	NC150	5.86
Aero-70	NC131	5.38
Classique	NC100	5.57
Disco 1	NC161	8.00
E100	NC154	6.20
E200	NC156	6.10
E70/130	NC157	6.18
Louvre-120	NC140	5.77
Louvre-150	NC152	6.02
Louvre-60	NC133	5.88
Mono100	NC158	6.41
Mono200	NC148	5.89
Mono400	NC160	10.1
N200	NC159	6.7
Ripple- 150	NC127	5.43
Ripple-200	NC149	5.25
Shiplap	NC123	5.59
SS200	NC153	7.87
ZZ200	NC155	6.71

Individual Product Results

Full results for each of individual anodised products listed in Table 2 can be obtained directly from Nu-Wall.

TECHNICAL INFORMATION

Declared Unit

ISO 14040 defines a functional unit as “quantified performance of a product system for use as a reference unit”. EPDs that do not cover the full product life cycle from raw material extraction through to end-of-life use the term “declared unit” instead.

The declared unit for Nu-Wall anodised boards is: **one square metre (1 m^2) of coverage,** that being the amount required to provide a clad wall face of 1 m^2, including fastening clips. This is a typically specified quantity.

Nu-Wall anodised board products are used to clad a range of buildings, both residential and commercial. Board products are complemented by a range of ancillary profiles which, for example, provide a finish at corners, edges, and between building levels.

Classification

Table 3: Industry Classification

Product	Classification	Code	Category
Aluminium boards	UN CPC Ver. 2	41532	Bars, rods and profiles of aluminium
	ANZSIC 2006	2223	Architectural aluminium product manufacturing

*Nu-Wall's Ancillary and Board products are covered in 4 EPDs: Ancillaries Anodised: EPD-IES-0014120, Ancillaries Powder Coated: EPD-IES-0014121, Boards Anodised: EPD-IES-0014122, and Boards Powder Coated: EPD-IES-0014123.

Content Declaration

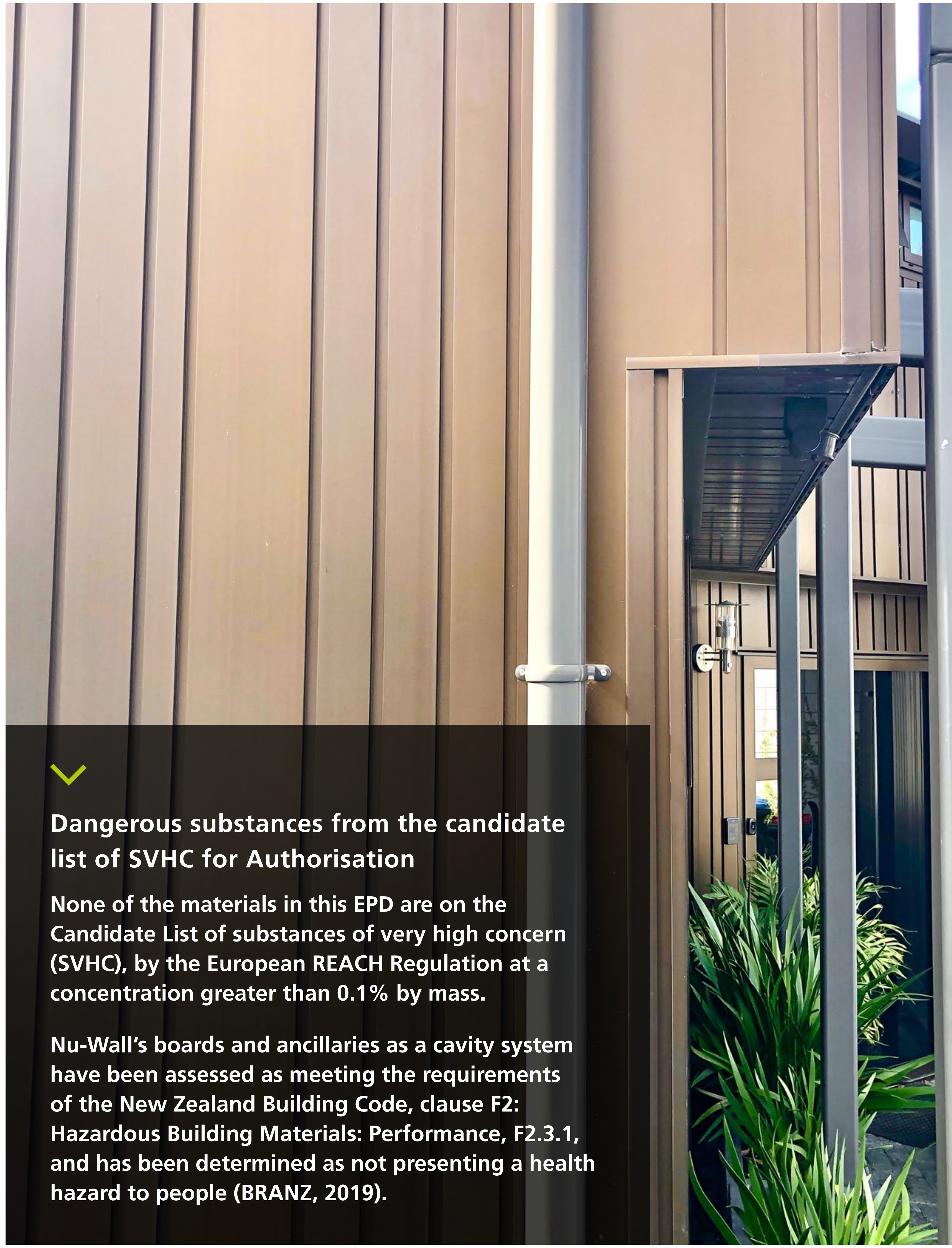
According to the General Programme Instructions, the EPD shall include a content declaration with a list of materials and chemical substances including information on their hazardous properties. The composition of Nu-Wall boards is given in Table 4, with packaging associated with boards in Table 5.

Table 4: Composition of board - anodised product (per 1 m^2 coverage)

Product components	E200 NC156 (kg)	Range across the products within group (kg)	Post-consumer material, % mass	Biogenic material, weight-% and kg C per kg
Anodised aluminium	6.10	5.25-10.1	CONFIDENTIAL	0

Table 5: Composition of board packaging (per 1 m^2 coverage)

Packaging materials	(kg)	Weight-% (versus the product)	Biogenic carbon, kg C/kg
Timber	0.137	2.56-1.34	0.46
Cardboard	0.0320	0.598-0.314	0.46
Polystyrene	0.000352	0.007-0.003	0
LDPE	0.0107	0.200-0.105	0
PE-LD Polyethylene film	0.00478	0.089-0.047	0
PP Polypropylene	0.00129	0.0241-0.0126	0
Total	0.186	3.48-1.82	



Dangerous substances from the candidate list of SVHC for Authorisation

None of the materials in this EPD are on the Candidate List of substances of very high concern (SVHC), by the European REACH Regulation at a concentration greater than 0.1% by mass.

Nu-Wall’s boards and ancillaries as a cavity system have been assessed as meeting the requirements of the New Zealand Building Code, clause F2: Hazardous Building Materials: Performance, F2.3.1, and has been determined as not presenting a health hazard to people (BRANZ, 2019).

SYSTEM BOUNDARIES

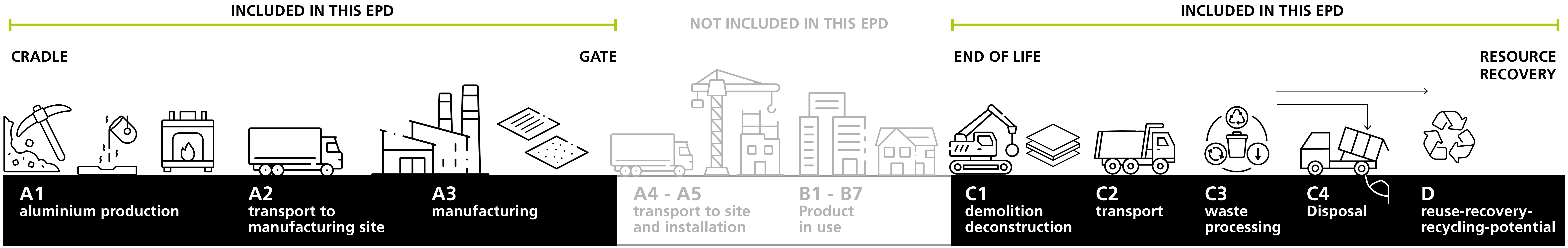
In Life Cycle Assessments (LCA), the system boundary is a line that divides the processes which are included from those which are excluded.

As shown in Table, 6 this EPD is of the type A 'Cradle to gate with modules C1-C4 and module D (A1–A3 + C + D). The production stage (Modules A1-A3) includes all aspects of coated profile production from cradle to gate, utilising elementary and product flows. Other life cycle stages (Modules A4-A5, and B1-B7) are dependent on particular scenarios and best modelled at the building or construction level.

Table 6: Modules included in the scope of the EPD (X = declared module | ND = module not declared)

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU	AU	NZ	-	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ
Specific data	>40%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-11% to +41%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD; ND = Module not declared



PRODUCT STAGE

The product stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of average product at the exit gate of the manufacturing site. The impacts include the production and use of fuels and electricity, production of auxiliary materials and packaging materials, and waste treatment of production wastes. Figure 1 shows internal product flows.

Module A1 (raw material supply) includes the mining of bauxite in Queensland, Australia, the refining of bauxite into alumina in Queensland, smelting of alumina into aluminium - including the production, supply, and use of anodes - provision of recycled scrap, production of additives, generation and transmission of electricity in Australia and New Zealand, and generation of thermal energy from natural gas and LPG. Raw materials are typically delivered in bulk, so packaging is unnecessary.

Module A2 (transportation) includes transport of bauxite via coastal shipping between Weipa, Queensland, to Gladstone, Queensland. Alumina is then shipped by bulk carrier to Bluff, New Zealand, or by conveyor to Boyne Island, Queensland. Transport from Bluff or Boyne Island is by ship to New Plymouth for manufacturing. Transport for additives is a mixture of truck, rail, and sea freight as appropriate.

Module A3 (manufacturing) includes product manufacture in New Plymouth, anodising in Auckland, internal transport, and recycling and the disposal of manufacturing wastes including packaging used for internal distribution.

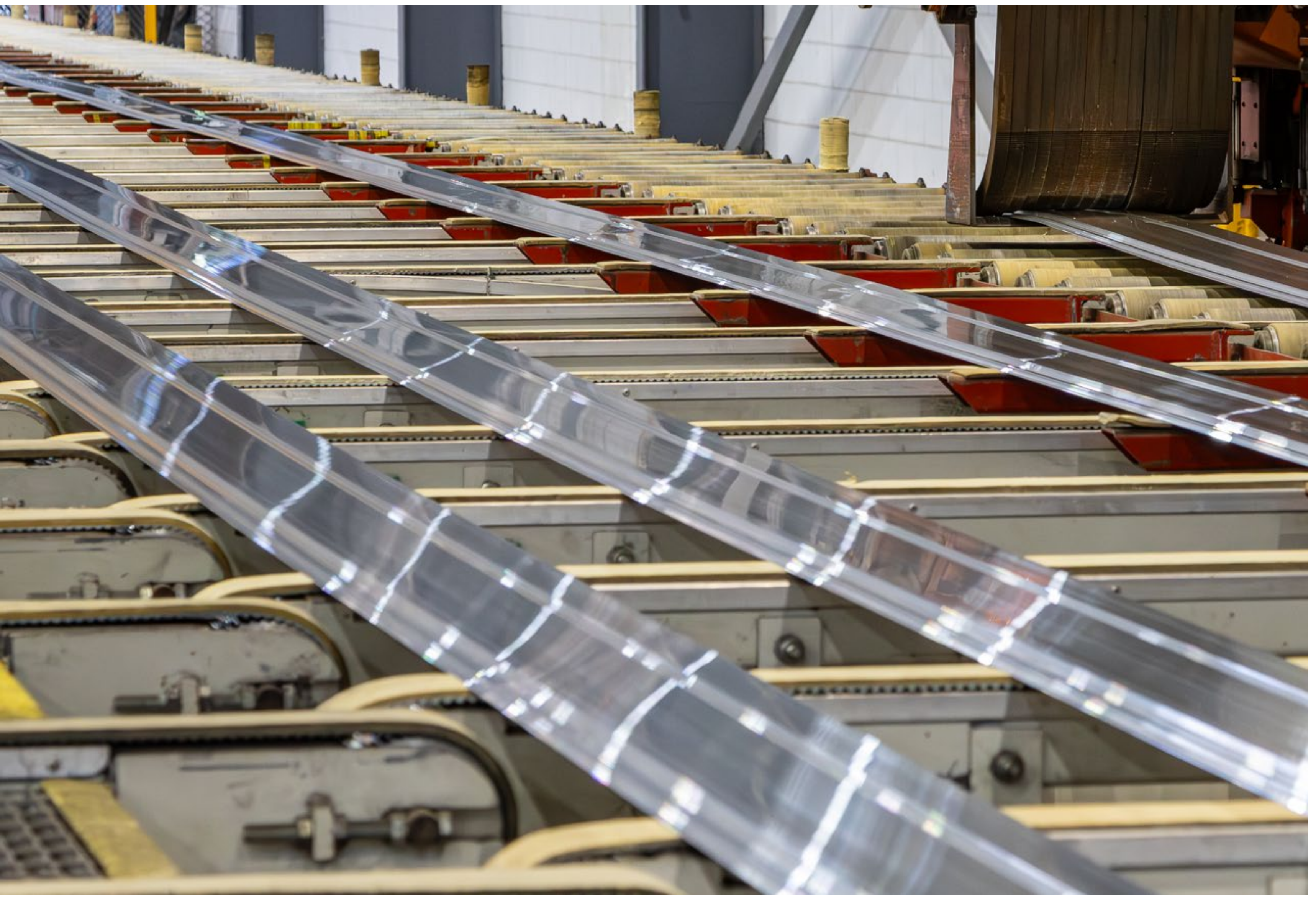
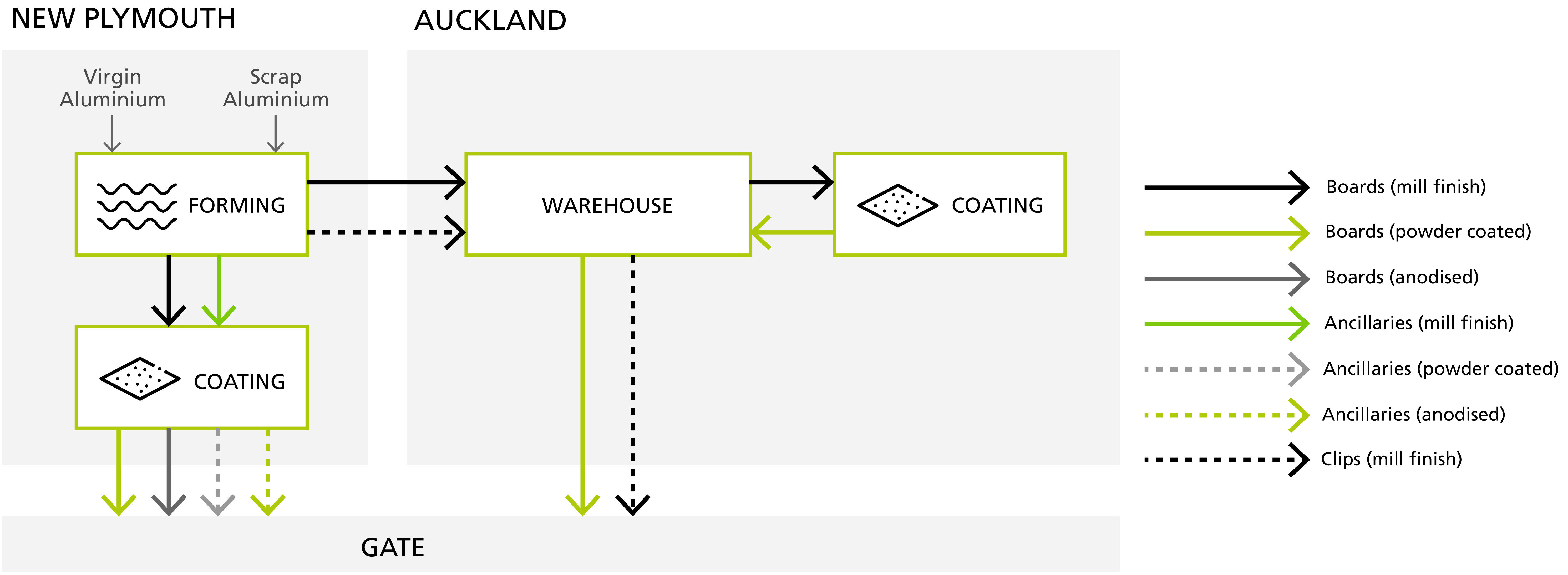


Image: McKechnie Aluminium

Figure 1. Internal product flows



END-OF-LIFE STAGE

Module C1 (deconstruction/demolition) includes demolition of the whole building including aluminium cladding, using a 100-kW construction excavator.

Table 7: End of life scenarios for boards - anodised

Process	Quantity per m² coverage E200 (kg)	Unit (expressed per functional unit or per declared unit of components products or materials and by type of material)
Collection process specified by type	6.10	kg collected separately
	-	kg collected with mixed construction waste
Recovery system specified by type	0	kg for re-use
	5.19	kg for recycling
	0	kg for energy recovery
Disposal to landfill	0.910	kg product or material for final deposition
Assumptions for scenario development	-	Excavator (100kW) using 0.172 kg diesel per tonne Truck (14-20t GW), 50km

Module C2 (transport to end-of-life) includes transport of recovered aluminium following demolition of the wall or building where it was used. After demolition, all aluminium is assumed to be sent to a resource recovery centre. The estimated transport distance by truck is 50 km, with a truck capacity utilisation of 50%.

Module C3 (waste processing) includes the processing of recovered aluminium at a recovery centre, for reuse or recycling. Aluminium is a valuable resource in high demand and with ready access to recycling processes. The Building Research Association of New Zealand (BRANZ) indicates that the recovery levels of aluminium In New Zealand is typically 85%,* in best practice cases 100% (BRANZ, 2022).

As aluminium has a high scrap value and cladding is comparatively easy to recover, the proportion of scrap for recycling is high. As a conservative approach, it is assumed that 85% of boards and ancillaries are easily recovered. Unrecovered product is assumed to go directly to landfill at end-of-life, with no processing involved. Therefore, waste processing impacts have been modelled as zero for this EPD.

Module C4 (disposal) Fifteen percent of demolished aluminium cladding product is assumed to be deposited in a landfill site (BRANZ, 2022). This would be unrecovered material, material integrated with other wastes, or minor amounts too small for recovery.

*The European Union Guidance on PEF identifies an R2 value of 95% for aluminium building cladding (European Commission, 2020). It is more accurate to use the New Zealand value.

Module D (reuse-recovery-recycling-potential) declares a potential credit or burden for the net scrap associated with Nu-Wall's aluminium products. Net scrap is the amount of scrap left after scrap from post-consumer needs are removed from scrap produced from product. That is, secondary product used in product manufacture is subtracted from the overall amount of recycled product after the first life cycle. If the net balance is positive, a credit given. The credit is calculated by comparing the impacts associated with primary product produced.

Image: McKechnie Aluminium

LIFE CYCLE INVENTORY (LCI) AND ASSUMPTIONS

LCA Software and Database

The LCA model was created using the Life Cycle for Experts (LCA FE) v10.7.0.183 (formerly known as GaBi Software) for life cycle engineering, developed by Sphera Solutions, Inc.

The Managed LCA Content (MLC) database v2023.1 (Sphera, 2023) (formerly known as GaBi LCI database) provides the life cycle inventory data for several of the raw and process materials obtained from the background system.

Data and assumptions

Primary data were used for all manufacturing operations up to the plant gate, including upstream data for inputs. Primary data for Nu-Wall operations were sourced for the calendar year 2022 (from 2022-01-01 to 2022-12-31).

All secondary data come from MLC Database 2023.1 (Sphera, 2024) and are representative of the years 2019-2022. As the study intended to compare the production systems for the reference year 2022, all background data fall within the 10-year limit allowable for generic data under EN 15804.

UPSTREAM DATA

Data for upstream raw materials and unit processes were obtained from the MLC Database. The primary smelt process, anode production, and ingot production are based on available North American datasets. These have been adapted with Australian and/or New Zealand electricity, diesel, and natural gas input processes.

Similarly, location-based water inputs are used and regionalised for Australia and New Zealand.

Transport and distances have been adjusted for Australian and New Zealand situations.

ELECTRICITY

Nu-Wall is not in direct control of electricity purchase and use within any upstream manufacturing facility.

The composition of the New Zealand electricity grid mix is modelled in LCA FE and updated annually. The New Zealand electricity grid consumption mix (Sphera 2024) is made up of hydro (60.50%), geothermal (17.46%) natural gas (12.79%), wind (5.42%), hard coal (2.32%), biomass (0.78%), biogas (0.6%), photovoltaics (0.12%), and heavy fuel oil (0.02%).

The calculated GWP-GHG for the New Zealand country mix for 1-60 kV is 0.174 kg CO_2-e/kWh.

Nu-Wall has direct control of the electricity used within its Auckland warehouse. A residual mix dataset was used to model electricity use within this facility.

The composition of the residual electricity grid mix for New Zealand is modelled in LCA FE based on published data for the year 1 April 2021 – 31 March 2022 (BraveTrace, 2023). The New Zealand residual electricity mix is made up of hydro (56.6%), geothermal (19.7%), natural gas (12.5%), wind (6.55%), coal (4.25%), biomass (0.266%) and biogas (0.16%).

The emission factor for the New Zealand residual grid mix for the GWP-GHG indicator is 0.151 kg CO_2e/kWh (based on EF3.1).

SCRAP

Nu-Wall's product uses a CONFIDENTIAL% post-consumer scrap. Post-consumer scrap is assumed to be burden free. The input and use of scrap contribute less than 7% to the GWP-GHG result of modules A1-A3.

LIFE CYCLE INVENTORY (LCI) AND ASSUMPTIONS CONTINUED.

TRANSPORT

Actual transport methods and distances, including within module A1 where known, have been used. Where the transport distances were unknown – typically for the supply of minor additives – a transport distance to the port of Tauranga was used. For wastes and recyclables, a transport distance of 50 kilometres has been assumed.

ASSUMPTIONS

Assumptions made during the LCI collection and modelling process are as follows:

- Average packaging has been assumed within product types.
- Where specific life cycle inventory data were unavailable, proxy data were used, giving preference to regional data.
- Use of any required secondary data from outside Australasia is sufficiently representative of the impacts of the material.
- Land use within the A3 module is modelled with assumed site occupation and uses historical production to approximate annual production.
- The assumed scenario presented for EOL (C1-C4) is supported by industry data (BRANZ, 2022). This scenario is considered conservative given the dimensions and value of the Nu-Wall product

ALLOCATION

Process inputs, energy, water and waste used during product manufacture and coating were allocated on a mass basis.

CUT OFF CRITERIA

According to EN 15804

'LCI data shall 'include a minimum of 95% of total inflows (mass and energy) per module.... [and] ... at least 95% of the environmental impact per module.... Plausibility assessments and expert judgement can be used to demonstrate compliance with these criteria.

If less than 100% of the inflows or environmental impact are accounted for, proxy data (e.g., conservative estimates) or extrapolation should be used to achieve 100% completeness, as this is better than data gaps.'

These cut-off rules have been followed within the underlying study.

INFRASTRUCTURE AND PERSONNEL

thinkstep-anz consistently excludes environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process, ('capital goods') regardless of potential significance.

High-quality infrastructure-related data isn't always available, and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods were previously excluded from EPDs, thus including capital goods in current EPDs would further reduce their comparability.

Infrastructure used in electricity generation is included as standard in the LCAFE datasets, as this is important for renewable generation.*

Environmental impacts from personnel are excluded as per section 4.3.2 of the PCR 2019:14 v1.3.4 (EPD International, 2024).

*The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes. (CEN, 2019).

ENVIRONMENTAL IMPACT INDICATORS

An introduction to the core environmental impact indicators is provided here. The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the following results tables.

Climate change (GWP-total, GWP-f, GWP-b, GWP-luluc)

(Global Warming Potential)

A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. The Global Warming Potential (GWP-total) is split into three sub indicators: fossil (GWP-f), biogenic (GWP-b), and land-use and land-use change (GWP-luluc).

Ozone Depletion Potential (ODP)

Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. The Ozone Depletion Potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.

Acidification potential (AP)

Acidification Potential is a measure of emissions that cause acidifying effects to the environment. A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Water use (WDP)

Water scarcity is a measure of the stress on a region due to water consumption.

Abiotic Resource Depletion (ADP-mm, ADP-f)

The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral resources and non-renewable energy resources are reported separately. Depletion of mineral resources is assessed based on total reserves.

Eutrophication Potential

(EP-fw, EP-m, EP-t)

Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.

Photochemical Ozone Formation Potential

(POCP)

Photochemical Ozone Formation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.

RESULTS INFORMATION

The results tables describe the different environmental indicators for each product per declared unit, for each declared module. The EN 15804 reference package based on EF 3.1 is used.

Additional information

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C is discouraged.

The following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.
- Materials for energy recovery (MER) is zero since no credits are claimed for any incinerated wastes, applying the cut-off approach.
- Exported electrical energy (EEE) is zero since there is none produced.
- Exported thermal energy (EET) is zero since there is none produced.

Environmental performance

Results for 1 m² of coverage with E200 anodised board

The reported impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions would (a) follow the underlying impact pathway and (b) meet certain conditions in the receiving environment while doing so. The environmental impact results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

Long-term emissions (>100 years) are not taken into consideration in the impact estimate.

If you need help interpreting the data in this EPD, please contact NuWall on: 0800 689 255 or via info@nuwall.co.nz

Table 8: Environmental impact (EN15804+A2) covering modules A1-3, C1-4 and D

EN15804+A2			Production	End-of-life				Mod D
Environmental impact	Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Climate change - total	GWP-total	kg CO_2-eq.	37.4	0.00374	0.0403	0	0.0140	-40.4
Climate change - fossil	GWP-fossil	kg CO_2-eq.	36.7	0.00374	0.0403	0	0.0138	-40.3
Climate change - biogenic	GWP-biogenic	kg CO_2-eq.	0.759	1.84E-07	2.01E-06	0	1.78E-04	-0.0712
Climate change - land use and land use change	GWP-luluc	kg CO_2-eq.	0.00360	4.35E-08	4.75E-07	0	4.34E-05	-0.00368
Ozone Depletion	ODP	kg CFC11-eq.	5.77E-11	8.26E-17	9.01E-16	0	3.55E-14	-3.27E-11
Acidification	AP	Mole of H^+ eq.	0.184	1.80E-05	2.45E-04	0	9.90E-05	-0.142
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.	4.89E-04	6.53E-10	7.12E-09	0	2.81E-08	-1.35E-05
Eutrophication aquatic marine	EP-marine	kg N eq.	0.0324	8.80E-06	1.24E-04	0	2.56E-05	-0.0240
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.	0.355	9.63E-05	0.00136	0	2.81E-04	-0.262
Photochemical ozone formation	POCP	kg NMVOC eq.	0.0893	2.46E-05	2.37E-04	0	7.72E-05	-0.0714
Depletion of abiotic resources - minerals and metals*	ADP-minerals&metals	kg Sb-eq.	0.00118	1.19E-11	1.30E-10	0	6.46E-10	-1.42E-06
Depletion of abiotic resources - fossil fuels*	ADP-fossil	MJ	433	0.0507	0.553	0	0.186	-545
Water use*	WDP	m³ world equiv.	-12.8	6.20E-06	6.77E-05	0	0.00153	-2.50

* The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Resource use indicators

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water.

Note: Water consumption: The FW indicator in the EPD results tables reports consumption (i.e. net use) of 'blue water' (which includes river water, lake water and ground water). This indicator deliberately excludes consumption of 'green water' (rain water), as net loss should be interpreted as any additional water loss beyond what would occur in the original, natural system.

Table 9: Resource use indicators covering modules A1-3, C1-4 and D

EN15804+A2			Production	End-of-life				Mod D
Resource Use	**Parameter**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Renewable primary energy as energy carrier	PERE	MJ	353	4.46E-05	4.86E-04	-0.298	0.0303	-185
Renewable primary energy resources as material utilization	PERM	MJ	7.10	0	0	0	0	0
Total use of renewable primary energy resources	PERT	MJ	361	4.46E-05	4.86E-04	-0.298	0.0303	-185
Non-renewable primary energy as energy carrier	PENRE	MJ	618	0.0507	0.553	9.23	0.186	-392
Non-renewable primary energy as material utilization*	PENRM	MJ	-3.83	0	0	-9.23	0	-154
Total use of non-renewable primary energy resources	PENRT	MJ	615	0.0507	0.553	0	0.186	-546
Use of secondary material	SM	kg	0	0	0	0	0	0
Use of renewable secondary fuels	RSF	MJ	0	0	0	0	0	0
Use of non-renewable secondary fuels	NRSF	MJ	0	0	0	0	0	0
Use of net fresh water	FW	m^3	0.935	1.16E-07	1.27E-06	0	4.70E-05	-0.374

* The PENRM values (MJ) appear as negative values in A1-A3 and C3 as C3 scrap for reuse cycles back into the production system A1-A3.

Waste material and output flow indicators

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class, End-of-Life fate and exported energy content.

Table 10: Waste material and output flow indicators covering modules A1-3, C1-4 and D

EN15804+A2			Production	End-of-life				Mod D
Waste categories and output flows	**Parameter**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	HWD	kg	6.56E-07	3.15E-14	3.43E-13	0	4.04E-12	6.09E-08
Non-hazardous waste disposed	NHWD	kg	3.28	5.73E-07	6.25E-06	0	0.930	-9.35
Radioactive waste disposed	RWD	kg	0.00378	1.57E-09	1.71E-08	0	2.13E-06	-0.0420
Components for re-use	CRU	kg	0	0	0	0	0	0
Materials for recycling	MFR	kg	0	0	0	5.27	0	0
Materials for energy recovery	MER	kg	0	0	0	0	0	0
Exported electrical energy	EEE	MJ	0	0	0	0	0	0
Exported thermal energy	EET	MJ	0	0	0	0	0	0

Additional environmental impact indicators

Optional environmental impact categories provide further information on environmental impacts.

Table 11: Additional environmental indicators covering modules A1-3, C1-4 and D

EN15804+A2			Production	End-of-life				Mod D
Additional Indicators	**Parameter**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
IPCC AR5 GWP (excluding biogenic carbon)***	IPCC AR5 GWP-GHG	kg CO_2-eq.	37.0	0.00374	0.0403	0	0.0138	-40.2
GWP-GHG**	GWP-GHG	kg CO_2-eq.	37.1	0.00374	0.0403	0	0.0138	-40.3
Respiratory inorganics	PM	Disease incidences	5.87E-01	2.04E-10	7.88E-10	0	1.22E-09	-1.51E-06
Ionizing radiation - human health+	IRP	kBq U235 eq.	0.587	1.60E-07	1.74E-06	0	2.46E-04	-9.33
Eco-toxicity - freshwater*	ETP-fw	CTUe	417	0.0119	0.130	0	0.135	-141
Human toxicity, cancer	HTPc	CTUh	1.65E-08	1.97E-13	2.16E-12	0	1.56E-11	-1.70E-08
Human toxicity, non-canc.	HTPnc	CTUh	1.70E-07	4.33E-12	4.67E-11	0	1.65E-09	-3.52E-07
Land use related impacts / soil quality*	SQP	Pt	86.2	4.36E-05	4.76E-04	0	0.0452	-14.9

* The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

** This indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero. It has been included in the EPD following the PCR.

*** GWP-GHG (IPCC AR5) is an additional GWP100 indicator that is aligned with the Intergovernmental Panel on Climate Change (IPCC) 2013 Fifth Assessment Report (AR5) (IPCC 2013), national greenhouse gas reporting frameworks in Australia and New Zealand and previous versions of the Construction Products PCR (PCR2019:14v1.11). It excludes biogenic carbon and indirect radiative forcing.

+This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

Biogenic carbon content

1 kg biogenic carbon is equivalent to 44/12 kg CO_2

Table 12: Biogenic carbon content covering modules A1-3, C1-4 and D

EN15804+A2			Production	End-of-life				Mod D
Biogenic carbon content	**Parameter**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Biogenic carbon content - product	BCC-prod	kg	0	0	0	0	0	0
Biogenic carbon content - packaging	BCC-pack	kg	0.349	0	0	0	0	0

Environmental impact (EN15804+A1) indicators

EN 15804+A1 Core environmental impact categories aid comparison and backwards compatibility with rating tools.*

Table 13: Environmental impact (EN15804+A1) indicators covering modules A1-3, C1-4 and D

EN15804+A1			Production	End-of-life				Mod D
Environmental impact	**Parameter**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	GWP	kg CO_2-eq.	37.1	0.00373	0.0401	0	0.0139	-40.1
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11-eq.	6.87E-11	9.72E-17	1.06E-15	0	4.18E-14	-3.85E-11
Acidification potential of land and water	AP	kg SO_2-eq.	0.153	1.24E-05	1.66E-04	0	7.88E-05	-0.119
Eutrophication potential	EP	kg PO_4^{3-}-eq.	0.0150	2.95E-06	4.17E-05	0	8.94E-06	-0.00857
Photochemical ozone creation potential	POCP	kg C_2H_4-eq.	0.00872	1.21E-06	-6.77E-05	0	5.93E-06	-0.00717
Abiotic depletion potential – elements	ADPE	kg Sb-eq.	0.00118	1.19E-11	1.30E-10	0	6.57E-10	-1.72E-06
Abiotic depletion potential – fossil fuels	ADPF	MJ	420	0.0506	0.552	0	0.178	-418

*The indicators and characterisation methods are from EN 15804:2012+A1:2013, but other LCA rules (system boundaries, allocation, etc.) are according to EN 15804:2012+A2:2019. The results of the presented A1 indicators are not claimed to be compliant with EN 15804:2012+A1:2013.

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An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

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PROGRAMME-RELATED INFORMATION AND VERIFICATION

Declaration owner		**Aluminium Cladding products, trading as Nu-Wall Cladding**		
	Web:	www.nuwall.co.nz	**Email:**	info@nuwall.co.nz
	Post:	24b Greenpark Rd, Penrose, Auckland 1061 New Zealand		
Geographical scope		New Zealand		
Reference year		1 Jan 2022 to 31 Dec 2022		
EPD produced by		**thinkstep ltd.** LCA Practitioner: Barbara Nebel LCA PM: Ian Appleton		
	Web:	www.thinkstep-anz.com	**Email:**	anz@thinkstep-anz.com
	Post:	11 Rawhiti Road, Pukerua Bay, Wellington 5026 New Zealand		
EPD Programme		**The International EPD ® System**		
	Operator:	EPD International AB		
	Web:	www.environdec.com	**Email:**	info@environdec.com
	Post:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden		
Regional programme		**EPD Australasia**		
	Web:	www.epd-australasia.com	**Email:**	info@epd-australasia.com
	Post:	EPD Australasia, 315a Hardy Street, Nelson 7010 New Zealand		
	Phone:	NZ: +64 9 889 2909	AU:+61 2 8005 8206	
PCR		CEN standard EN 15804 served as the core Product Category Rules (PCR) Product Category Rule (PCR) 2019:14 Construction products v1.3.4, EPD International 2024-04-30. Valid until 2025-06-20		
PCR review conducted by		The Technical Committee of the International EPD System. No chair appointed. See www.environdec.com for a list of members. The review panel may be contacted via the Secretariat: www.environdec.com/contact		
Independent verification of the declaration and data, according to ISO 14025:2006		☐ EPD process certification (Internal) ☑ EPD verification (External)		
Third party verifier		**The most recent review chair:** Claudia A. Peña, PINDA LCT SpA	**Location:** Santiago, Chile **Email:** pinda.lct@gmail.com	
Approved by		**EPD Australasia Limited**		
Procedure for follow-up of data during EPD validity involved third-party verifier		☐ Yes ☑ No		

CONTACT:

www.nuwall.co.nz

0800 689 255

info@nuwall.co.nz
technical@nuwall.co.nz

24b Greenpark Rd
Penrose Auckland 1061