THE INTERNATIONAL EPD® SYSTEM

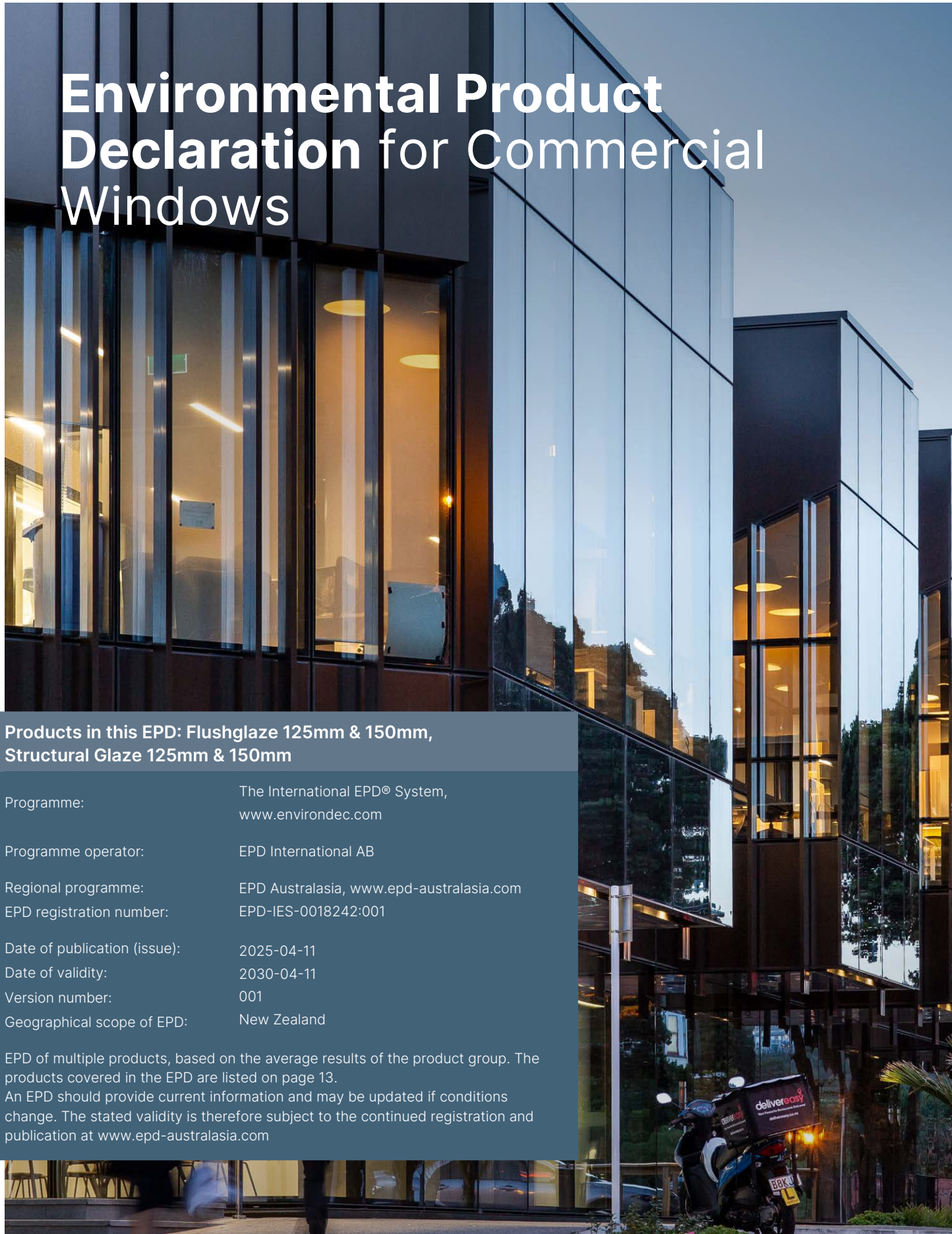
AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

APL WINDOW SOLUTIONS

In accordance with ISO 14025:2006 and EN 15804+A2:2019/AC:2021 for: Commercial Windows (Flushglaze 125mm & 150mm, and Structural Glaze 125mm & 150mm) from APL Window Solutions

Environmental Product Declaration for Commercial Windows



Products in this EPD: Flushglaze 125mm & 150mm, Structural Glaze 125mm & 150mm

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Regional programme:	EPD Australasia, www.epd-australasia.com
EPD registration number:	EPD-IES-0018242:001
Date of publication (issue):	2025-04-11
Date of validity:	2030-04-11
Version number:	001
Geographical scope of EPD:	New Zealand

EPD of multiple products, based on the average results of the product group. The products covered in the EPD are listed on page 13.
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 www.epd-australasia.com

Programme-Related Information and Verification

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).

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The results for EN15804+A1 compliant EPDs are not comparable with EN15804+A2 compliant studies as the methodologies are different. Results that are EN15804+A1 compliant are given in this document to assist comparability across EPDs.

Declaration owner:	APL Window Solutions Web: www.aplnz.co.nz Email: marketing@aplnz.co.nz Post: 19 Northpark Drive, Hamilton 3241, New Zealand
Geographical Scope	New Zealand
Reference Year for Data	2023-01-01 to 2023-12-31
EPD Programme:	The International EPD® System 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 Limited Web: www.epd-australasia.com Email: info@epd-australasia.com Post: EPD Australasia Limited, 315a Hardy Street, Nelson 7010, New Zealand
Product Category Rules (PCR) CEN standard EN 15804+A2 served as the core Product Category Rules (PCR)	
Product Category Rules (PCR):	PCR 2019.14 Construction Products, version 1.3.4 (published on 2024-04-30, valid until 2025-06-20) c-PCR Windows and Doors (EN 17213:2020) to PCR 2019:14 – c-PCR-007 (version 2024-04-30, valid until 2025-06-20)
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.
Review Chair:	The most recent review chair: Claudia Peña, PINDA LCT SpA. The review panel may be contacted via the Secretariat: www.environdec.com/contact
Life cycle assessment (LCA)	
LCA accountability:	thinkstep ltd Barbara Nebel Chanjief Chandrakumar Haoran Lei Web: www.thinkstep-anz.com Email: anz@thinkstep-anz.com Post: 11 Rawhiti Road, Pukerua Bay, Wellington 5026, New Zealand
Third-party verification Independent verification of the declaration and data, according to ISO 14025:2006, via:EPD verification by individual verifier	
Third party verifier:	Sazal Kundu Web: www.edgeimpact.global Email: sazal.kundu@edgeimpact.global
Verifier approved by:	EPD Australasia
Procedure for follow-up of data during EPD validity involved third-party verifier	☐ Yes ☑ No

Table of Contents

Raising the Profile of Manufacturing in Aotearoa

50 Years Young

APL Window Solutions (APL) is the largest window solutions organisation in Aotearoa New Zealand and has been proudly family-owned and NZ Made for over 50 years. We've grown alongside our manufacturers to bring quality architecture and building to every corner of the country.

Since 1971, APL have been successfully designing, developing, testing and manufacturing window and door systems for our three brands: Altherm Window Systems, First Windows & Doors and Vantage Windows & Doors.

New Zealand Made

We take huge pride in our track record of supplying window and door solutions for New Zealand home and building owners. Everything we manufacture is designed and tested specifically for New Zealand conditions.

Our Centre of Innovation houses our dedicated research, development and testing facility where our products are developed for our country's unique landscape, coastlines, weather patterns and design aesthetics. Part of our commitment to designing for New Zealand is designing and operating in a way that reduces our environmental footprint.

Our Partners

We supply independently-owned manufacturers, all over the country, as well as in some areas of the South Pacific. These dedicated operators work on a wide variety of residential and commercial projects and are the exclusive suppliers of APL products through our three brands: Altherm, First and Vantage. They share our commitment to excellence and our spirit of innovation.

Proudly part of the Profile Group of businesses

APL is proudly part of the Profile Group of businesses. Profile Group represents a family of businesses that together form New Zealand's only integrated supply chain for aluminium window and door solutions.

The key to keeping things simple is to keep them seamless – the one-stop-shop approach. As we've grown, we've developed an end-to-end service for our customers that covers every major step in the process, from extruding the aluminium to delivering our systems and parts directly to manufacturers all over New Zealand. Our eco-system of businesses work together to shape a better future for all.

Profile®

Our Integrated Supply Chain of Businesses

INEX (independent Extrusions) is the largest extruder of aluminium in New Zealand, supplying aluminium for approximately 70% of New Zealand's windows and doors. INEX is the first step within our group's end-to-end operations.

Colour Works has three powdercoat lines and is continuously exploring new methods of coating aluminum extrusion for NZ. These powdercoat lines are designed as a seamless step within the group's manufacturing processes.

Finishing Excellence (FINEX) is our on-site anodising plant and is the most modern facility of its kind in New Zealand. Ensuring the highest finishing quality in all our window and door solutions made for New Zealand.

APL Window Solutions (APL) is NZ's largest window solutions organisation – known for high quality products that are designed, developed, tested, and manufactured in, and specifically for NZ buildings and conditions. APL serves our fabricator network with Altherm, First and Vantage Windows & Doors product.

APL Manufacturing houses NZ's largest Aluminium Entrance Door manufacturing unit, extensive priority hardware assembly and a wide range of CNC fabricated accessory products. Essential for manufacturing the industry's niche product for APL customers.

PPL Plastic Solutions specialise in the design and manufacturing of both flexible and rigid profile extrusions, and injection moulded parts, supplying a variety of market sectors. PPL solutions are used in products across the group, and in our reusable packaging systems.

Architectural Glass Products (AGP) is a state of the art, double-glazing manufacturing business, created to complete the end-to-end supply chain solutions within Profile's Group. Glass is integral to any window solution and AGP enables us to offer the most advanced glass technology.

APL Direct maintains a fleet of purpose-designed trucks with the highest of environmental standards and optimised management. APL Direct distributes all product and componentry to our networks across the country on behalf of Profile Group's businesses.

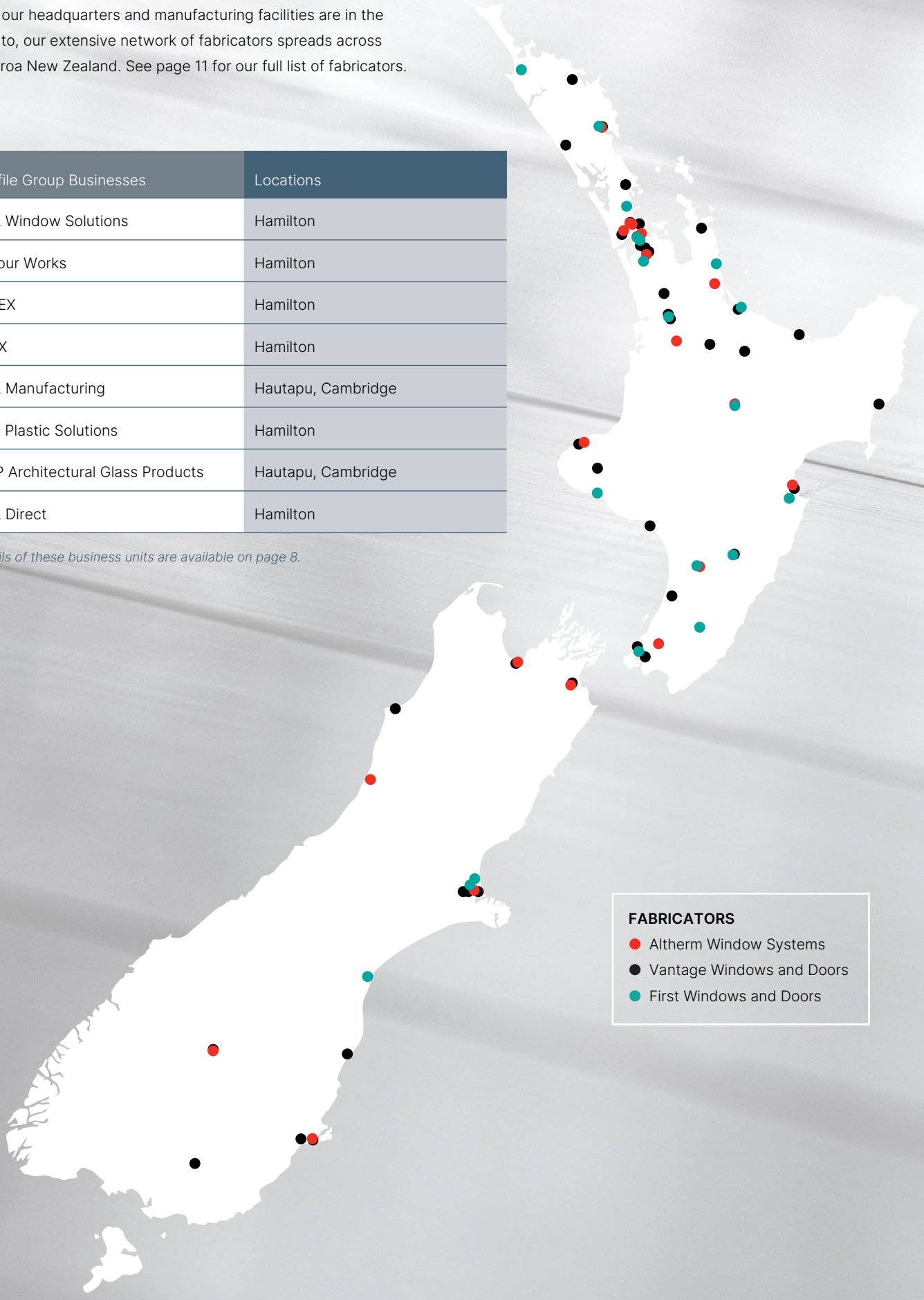
Together - we design, make and deliver end - to - end solutions for New Zealand environments.

Nationwide Network

While our headquarters and manufacturing facilities are in the Waikato, our extensive network of fabricators spreads across Aotearoa New Zealand. See page 11 for our full list of fabricators.

Profile Group Businesses	Locations
APL Window Solutions	Hamilton
Colour Works	Hamilton
FINEX	Hamilton
INEX	Hamilton
APL Manufacturing	Hautapu, Cambridge
PPL Plastic Solutions	Hamilton
AGP Architectural Glass Products	Hautapu, Cambridge
APL Direct	Hamilton

**Details of these business units are available on page 8.*



Fabricators Nationwide

Fabricator Businesses	Location
Aitken Joinery	Gore
Bay Aluminium	Kerikeri
Central Aluminium	Stratford
Composite Joinery	Warkworth
Counties Aluminium	Papakura
Dannevirke Glass	Dannevirke
Dargaville Aluminium and Glass	Dargaville
Design Windows Vantage	Christchurch
Envision Aluminium	Blenheim
Elite Windows and Doors	Whangarei
Evolution Windows	Lower Hutt
Glenns Glass and Aluminium	Whakatane
Glenns Glass and Aluminium	Rotorua
Hagley Windows and Doors	Christchurch
Hopkins Joinery	Putaruru
Huntly Joinery Window Systems	Huntly
Insite	Nelson
Lancer Windows and Doors	Henderson, Auckland
Lancom Commercial	St Johns, Auckland
Kalos Windows and Doors	Levin
Monarch Aluminium	Christchurch
Nichol Glass and Aluminium	Napier
NZ Windows Hamilton	Hamilton
NZ Windows Tauranga	Tauranga
Regal Joinery	Hamilton
Reids Joinery	Mosgiel
Seymour Windows and Doors	New Plymouth
Summit Windows and Doors	Wiri, Auckland
TRT Builders	Westport
Vantage Windows	Glenfield, Auckland
Vantage Aluminium Oamaru	Oamaru
Vision Windows	Takanini, Auckland
Wight Aluminium	Whanganui

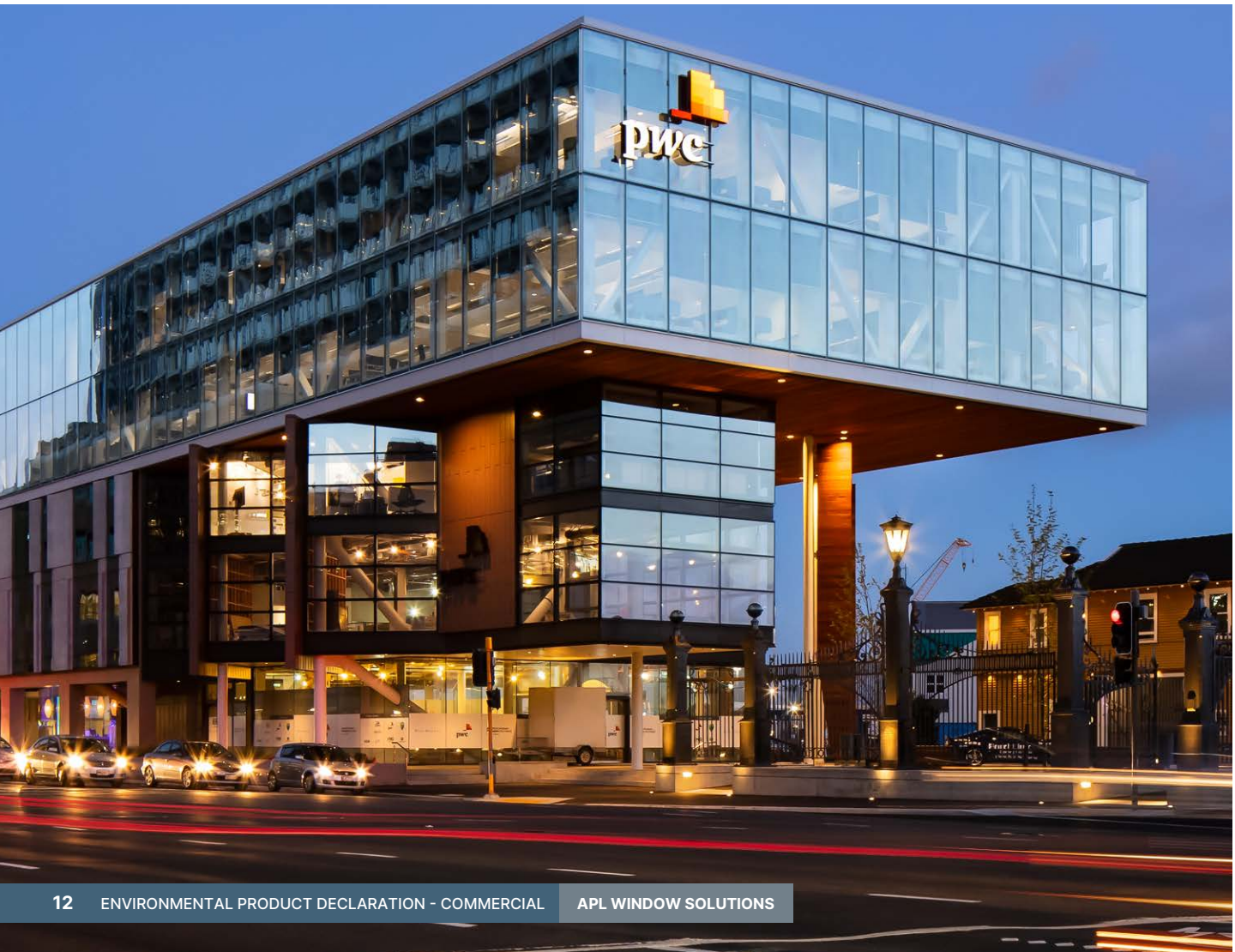
Fabricator Businesses	Location
Altherm Canterbury	Christchurch
Alitech Window Systems	Waihi
Altherm Window Systems	Palmerston North
Altherm Napier	Napier
Altherm Aluminium Northland	Whangarei
Altherm Taranaki	New Plymouth
Altherm West Auckland	Henderson
Apex Windows	Taupo
Dawson Aluminium	Blenheim
Door and Window Systems Auckland	Penrose, Auckland
Design Windows Central Otago	Cromwell
Design Windows Nelson	Nelson
Design Windows Dunedin	Dunedin
Design Windows West Coast	Greymouth
NT Joinery	Te Awamutu
Phoenix Windows and Doors	Wairau Valley
Premier Aluminium	Drury
Westview Aluminium	Upper Hutt
View Master Windows and Doors	St Johns, Auckland

Fabricator Businesses	Location
Aluminium City	Penrose, Auckland
First Aluminium Hawera	Hawera
Bernie Walsh Aluminium and Glass	Dannevirke
CBD Windows and Doors	Penrose, Auckland
DuCo Windows and Doors	Cambridge
Epic Windows and Doors	Mt Maunganui
Franklin Windows and Doors	Pukekohe
First Christchurch Windows and Doors	Christchurch
First Whangamata	Whangamata
First Windows and Doors Taupo	Taupo
Hollings First Aluminium	Masterton
Kaiapoi Aluminium Joinery	Christchurch
Kaitaia Glass and Aluminium	Kaitaia
Kennedy Aluminium	Timaru
Kalos Windows and Doors	Palmerston North
Twin City Aluminium	Napier
Wellington Windows and Doors	Porirua
Whangarei Aluminium	Whangarei
Wight Aluminium	Hamilton
Windowmakers	Wainui, Auckland

Commercial Series

APL's Commercial Series is an innovative range of shopfront windows, overhead glazing, commercial doors and flush glaze systems to suit commercial builds.

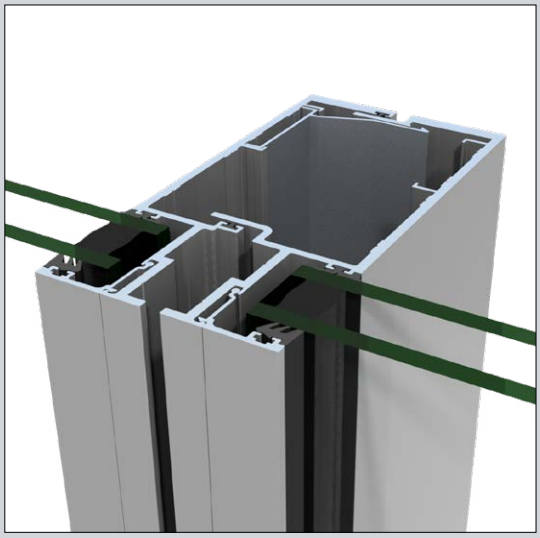
This EPD presents Flushglaze 125mm & 150mm, and Structural Glaze 125mm & 150mm from APL's Commercial Series. These systems are intended to be used in shopfront and medium rise commercial applications. The glazing is nearly flush with the outside face, reducing the visual effect of aluminium profiles as viewed from the outside.



Product Information

Table 1: APL windows considered in this EPD

Product	Standard size (m^2)	Mass (kg/m^2)	Share per group (%)
Flushglaze 125 mm	6 × 4	34.4	37.9%
Flushglaze 150 mm	6 × 4	35.2	37.9%
Structural Glaze 125 mm	6 × 4	34.7	12.1%
Structural Glaze 150 mm	6 × 4	35.4	12.1%



150mm Flushglaze Mullion

Flushglaze 125mm and 150mm

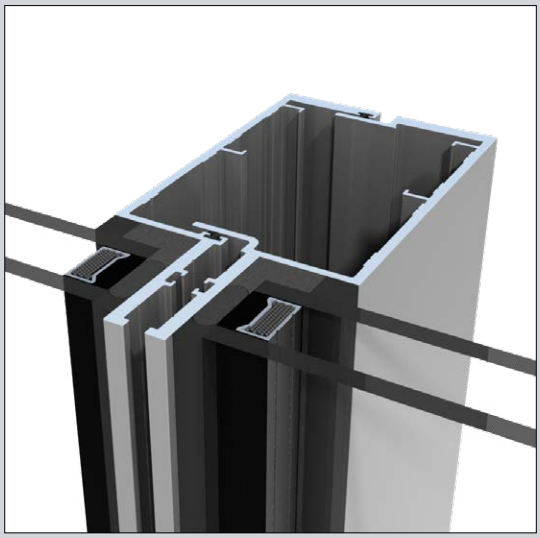
Specifications

Dimensions
Capable of a range of spans depending on aspect ratio, mullion spacing and wind pressure. Consult your manufacturer for specific information

Maximum Glass Thickness
125mm and 150mm single glazing 12mm, IGU 30mm

Thermal Values
Consult APL Technical Department

Performance
Tested to Extra High / Specific Design wind zones.
Projects may require project specific testing



150mm Structural Glaze Mullion

Structural Glaze 125mm and 150mm

Specifications

Dimensions
Capable of a range of spans depending on aspect ratio, mullion spacing and wind

Maximum Glass Thickness
Single glazing 18mm and 32mm IGU

Thermal Values
Consult APL Technical Department

Performance
Tested to Very High and Specific Design wind zone.
Projects may require project specific testing

Declared Unit

The declared unit for the EPD is 1 m² of window including packaging. Conversion factor to mass is presented in Table 1.

Industry Classification

APL commercial windows are manufactured in accordance with the UN CPC product group, ANZSIC 2006 code, and the relevant standards for New Zealand Building Codes and relevant New Zealand standards.

Table 2: Industry classification of products included in this EPD

Product	Classification	Code	Category
Commercial Series Flushglaze and Structural Glaze Systems	UN CPC Ver.2.1	42120	Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium
	ANZSIC 2006	C2223	Architectural Aluminium Product Manufacturing

Manufacturing

APL manufactures windows using aluminium extrusions, glass units and other window/door components (such as screws, rivets, gaskets/seals, and sealants) at their manufacturing facility located at 19 Northpark Drive, Te Rapa, Hamilton, New Zealand.

At Independent Extrusions Ltd (INEX) in Hamilton, extrusion profiles are processed from aluminium billet, sourced from both local and international suppliers - using hydraulic extruders.

Extrusion profiles are then surface finished (powder coated) at Colour Works Limited (Hamilton), before being distributed to the independently owned fabricators across Aotearoa New Zealand and in the South Pacific.

Glass units are manufactured by Architectural Glass Products (AGP in Hautapu, Cambridge) and Thermaseal Smart Glass Solutions (Christchurch), using imported glasses from Southeast Asia, East Asia and Europe. These glass units are also distributed to the fabricators across Aotearoa New Zealand and in the South Pacific.

Other components screws, rivets, gaskets/seals, and sealants required for the final window assembly are sourced from a mix of New Zealand (APL Manufacturing in Hautapu, Cambridge and PPL Plastic Solutions in Hamilton) and overseas manufacturers – mainly from East Asia.

Finally, the extrusions are fitted with glass units and other window components (such as screws, rivets, gaskets/seals, and sealants) to form a full window assembly, which is subsequently installed into commercial buildings.

Content Declaration

Table 3: Content declaration of Flushglaze (125 and 150 mm) and Structural Glaze (125 and 150 mm) windows (per 1 m²)

Product components	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
Aluminium extrusions	6.42 (5.96-7.00)	0	0	0
Glass	28.4	0	0	0
Stainless steel fittings	0.0218 (0.0166-0.0309)	0	0	0
Plastic components - polypropylene	0.157 (0.127-0.167)	0	0	0
Total	35 (34.5-35.6)	0	0	0

Table 4: Content declaration of Packaging (per 1 kg of product)

Packaging materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/ product
Timber (cleats and pallets)	0.113	11.3	0.46
Paper (interleaving, cardboard, and labels)	0.0426	4.26	0.46
Steel straps	0.0057	0.57	0
Plastics (polyethylene wrap films, bubble wraps, polyurethane foam, polystyrene expanded)	0.00998	0.998	0
Total	0.171	17.1	0.0716

**Note that the packaging data is calculated as an average across all APL commercial windows produced during the calendar year 2023.*

Dangerous substances from the candidate list of SVHC for Authorisation

The products declared within this EPD

- Do not release dangerous substances to soil and water
- Do not contain hazardous substances requiring labelling
- Do not contain materials identified in the European Chemicals Agency's Candidate List of Substances of Very High Concern in the products at a concentration greater than 0.1% (ECHA, 2022).

System Boundaries

As shown in the table below, this EPD is of the type a - cradle to gate with modules C1–C4 and module D (A1–A3 + C + D). Other life cycle stages (Modules A4-A5, B1-B7) are dependent on particular scenarios and best modelled at the building level.

Table 5: Modules included in the scope of the EPD

	Product stage			Construction process stage		Use stage							End-of-life stage				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	GLO*	GLO	NZ**	-	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ
Share of specific data	50% §			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation: products	-3.8 to 4.7%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation: sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

**Float glasses are sourced from Taiwan, Italy, China, Indonesia, Thailand and Belgium. Some components (such as screws, rivets, gaskets/seals, and sealants) required for the final window/door assembly are sourced from China and Taiwan.*

***1.67% of APL windows and doors are shipped to and fabricated in the South Pacific - Fiji, Rarotonga, Samoa, and Tahiti. Hence, a weighted average distance between APL manufacturing site and fabricators is considered.*

§ specific data covers aluminium extrusion process data, surface finishing process data, glass production process data, material transport (extrusions, glasses and components), and energy use for all processes including fabrication. This is based on the GWP-GHG analysis.

The processes below are included in the product system to be studied. For modules beyond A3, the scenarios included are currently in use and are representative for one of the most probable alternatives.

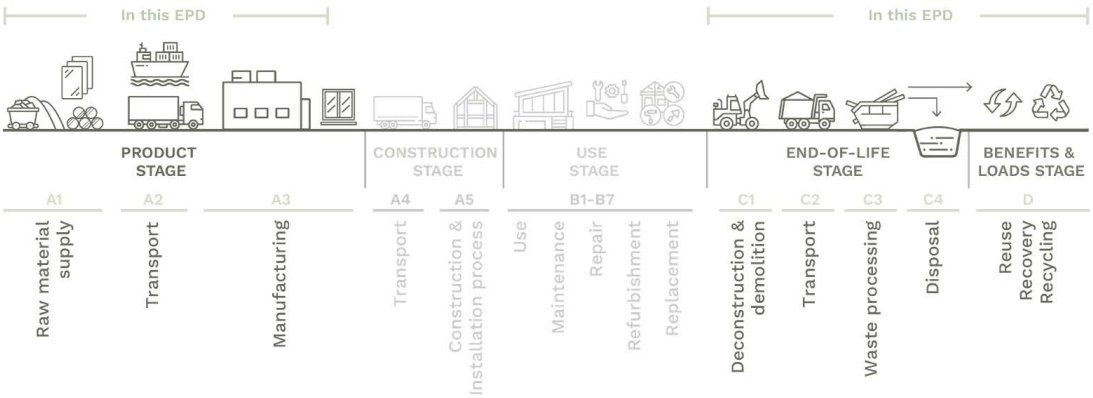


Figure 1: System boundary considered in this EPD

Product Stage (Modules A1-A3)

The production stage covers the manufacturing, surface finishing and packaging of aluminium extrusion profiles (including extraction and processing of raw materials and the transport to manufacturing site), manufacturing of the rest of the components of the window (glasses, hardware fittings, gaskets/seals, and sealants), transportation of these components, and window assembly (aka fabrication). Packaging of windows is also included.

- Using hydraulic extruders, aluminium extrusion profiles are processed from aluminium billet from local and overseas suppliers
- Extrusions then undergo a surface finishing process, which can be either powder coating or anodising. Note that the product considered in this EPD use aluminium extrusions that are powder coated
- Glasses are imported and supplied by two suppliers
  - Architectural Glass Products (AGP) - a custom-built facility in Hautapu, near Cambridge and part of Profile Group. AGP imports glass from Southeast Asia
  - Thermaseal Smart Glass Solutions - a New Zealand-based supplier, which imports glasses from East Asia and Europe
  - Note that, in CY2023, AGP supplied 97.5% of glasses whereas Thermaseal supplied the rest
- Other components screws, rivets, gaskets/seals, and sealants required for the final window assembly are sourced from a mix of New Zealand and overseas manufacturers – mainly from East Asia
- All these components – aluminium extrusions, glasses, screws, rivets, gaskets/seals, and sealants, are then distributed to fabricators across New Zealand and in the South Pacific (Fiji, Rarotonga, Samoa, and Tahiti), through individual distribution networks. Once there, the extrusions are fitted with glasses and other components to form a full window assembly, which is installed into commercial buildings
- Modules A1-A3 also include the generation and transmission of electricity in New Zealand, generation of thermal energy from natural gas, generation of liquid petroleum gas, supply of water, and solid waste and wastewater management
- Aluminium scraps generated during aluminium extrusion and fabrication processes are sold to a metal recycler - hence, modelled as co-products using economic allocation. Transport between APL and recycling facility is accounted for
- Glass offcuts are generated during glass cutting process at AGP and Thermaseal. Economic allocation for glass offcuts with no economic value was applied. Transport between AGP/Thermaseal and waste glass collection facility is accounted for.

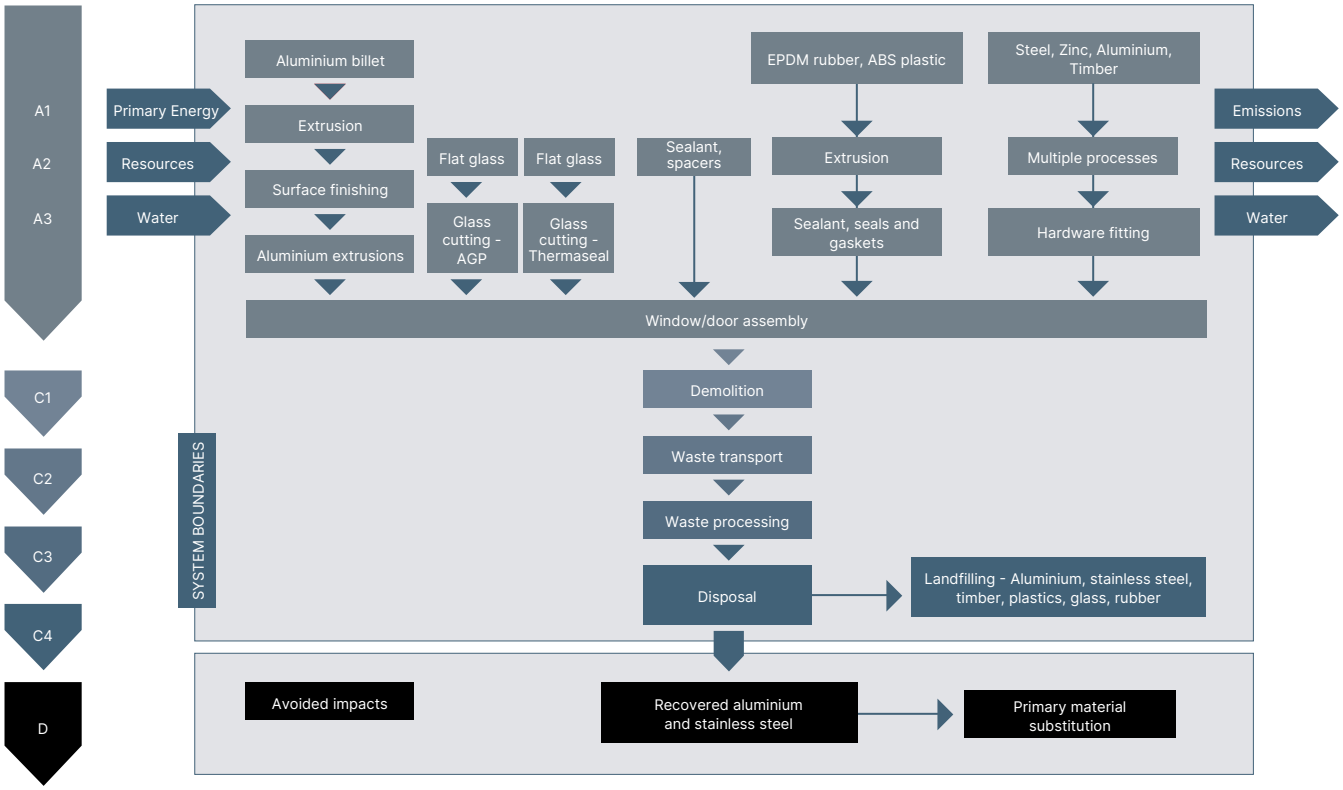


Figure 2: High level processes (Modules A1-A3, C1-C4, D)

End-of-life Stage (Modules C1-C4)

The end-of-life stage (Modules C1-C4) covers the following:

- Module C1 (deconstruction/demolition) includes demolition of the whole building including a window/door using mass allocation, based on a 100-kW construction excavator
- Module C2 (transport to end-of-life) includes transport of waste window to waste management facilities, following building demolition
- Module C3 (waste processing) includes the processing of window waste for reuse or recycling
- Module C4 (disposal) includes window end-of-life which is a combination of recycling and landfill.

Table 6: End-of-life scenarios for products considered in this EPD

Process	Unit (expressed per 1 kg of window)
Excavator	1 kg collected separately (includes metals, glass and plastics)
Recovery system specified by type	0% for re-use
	85% of metals for recycling (BRANZ, 2024)
	0% for energy recovery
Disposal specified by type	15% of metals modelled as ferrous metals in landfill (BRANZ, 2024) 100% of glass and plastics modelled as inert material in landfill
Assumptions for scenario development	C1 - demolishing with an Excavator (100kW); fuel consumption is calculated at 0.172 kg diesel input per tonne of material C2 - 50 km of transport by truck with a utilisation rate of 50% C3 - waste processing for recycling C4 - 15% of recovered metals are landfilled; 100% glass and plastics are landfilled. Modelled as inert matter (metal and glass) on landfill

Recovery and Recycling Potential (Module D)

Benefits and loads beyond system boundary (Module D) include recovered aluminium and stainless steel scraps that are fed into a second life cycle.

Credits for aluminium credits are calculated based on the avoided virgin aluminium produced in New Zealand (modelled in this study for upstream aluminium billet input). Per 1 kg of aluminium scrap recovered in Module C3, 0.95 kg of virgin aluminium credits are assigned - based on a metal recycling efficiency rate of 95% (Sphera, 2023).

Credits for stainless steel are calculated based on the "GLO: Recycling of steel with credit" dataset available in the Managed LCA Content (MLC) Database 2023.2 (Sphera, 2023). Per 1 kg of stainless steel scrap recovered in Module C3, 0.95 kg of steel credits are assigned - based on a metal recycling efficiency rate of 95% (Sphera, 2023).

The energy recovered from landfill is also accounted for.

Life Cycle Inventory (LCI) Data and Assumptions

Primary data was used for all manufacturing operations up to the factory gate, including upstream data for aluminium extrusion and finishing (powder coating and anodising). Primary data for aluminium extrusion, finishing, hardware component manufacturing (including seals), and fabrication was sourced for the 2023 calendar year (1 Jan 2023 to 31 Dec 2023). Background data was used for input materials sourced from other suppliers such as glass, components, and packaging materials.

Overseeing and managing the data collection for APL was Rebecca McQueen – Sustainability Project Manager.

Upstream Data

Aluminium billets

APL uses aluminium supplied by New Zealand Aluminium Smelters (NZAS) in Tiwai (82.2%) and overseas suppliers in Middle East (17.8%).

Glasses

APL uses glasses supplied by two New Zealand-based suppliers who import glass from overseas. APL's main supplier-AGP, imports glass from Southeast Asia. Thermaseal Smart Glass Solutions imports glasses from East Asia and Europe.

LCA Software and Database

The underlying LCA model was developed according to the ISO standards for LCA (ISO, 2006a, 2006b), using the Life Cycle for Experts (LCA FE) (formerly known as GaBi Software) for life cycle engineering, developed by Sphera Solutions, Inc.

Data for all energy inputs, transport processes and raw materials are from the Managed LCA Content (MLC) Database 2023.2 (Sphera, 2023). The reference year for the data ranges from 2015 to 2022 and therefore, all datasets are within the 10-year limit allowable for generic data under EN 15804 and the PCR.

Electricity

Profile Group is the parent company to APL; 100% of Profile Group's electricity consumption is covered via New Zealand Energy Certificate System (NZECS). These NZECS certificates were generated by Kawatiri Energy - one of New Zealand's newest hydroelectricity projects which generates hydropower from the Lake Rochfort Scheme near Westport (APL Window Solutions, 2024). Hence, electricity use for all operations at APL, AGP, INEX, FINEX, and ColourWorks are covered by the NZECS certificates.

Profile Group (including APL, AGP, INEX, FINEX, and ColourWorks) has committed to source NZECS certificates for the next six months and beyond.

The emission factor for the New Zealand hydroelectricity (including transmission and distribution losses) for the GWP-GHG indicator is 0.00769 kg CO_2-eq./kWh (based on EF3.1).

Operations undertaken at Thermaseal or fabrication sites use purchased grid electricity. The composition of the residual electricity grid mix of 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 (0.160%).

Onsite consumption (3.00%), and the medium voltage (1kV-60kV) grid's transmission and distribution losses (3.17%) are calculated based on data from the Ministry of Business, Innovation & Employment (MBIE, 2023).

The emission factor for the New Zealand residual grid mix for the GWP-GHG indicator is 0.146 kg CO_2-eq./kWh (based on EF3.1).

Location-based grid mix EFs (using the published grid mix) is used for other electricity consumption including Modules C and D.

Recycling

Benefits from recycling the recovered aluminium and stainless steel in Module C4 are considered in Module D; for metals, a recycling rate of 85% is considered and 15% is landfilled (BRANZ, 2024).

Both metals' credits are modelled as avoided burdens of virgin materials. Both metals are modelled towards fully virgin production, considering recycling efficiency. This leads to recycling credits being slightly lower than the impact of virgin production.

Transport

Primary transport data was used for transport of production inputs (A2). Any wastes from the production process (A3) are assumed to be transported over a 50 km distance to a treatment or disposal site. Transport modes:

- Truck (diesel), Euro 0 - 6 mix, 34 - 40 t gross weight / 27 t payload capacity
- Container ship (heavy fuel oil), 5 000 to 200 000 dwt payload capacity, ocean going

Explanation of Average & Variation

This is an EPD of multiple products – four products. The results were calculated for individual products and weighted based on the sales volume for the 2023 year. The variation for the GWP-GHG indicator is within the ±10% range.

Cut-Off Criteria

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

Infrastructure/capital goods are excluded from all MLC datasets. An important exception is the inclusion of capital goods for electricity generation, where the capital goods are very important for modelling of changes towards more renewable generation. Capital goods related to electricity generation are included in all MLC electricity datasets.

Note: The system boundaries on manufacturing of equipment and for employees are not regarded as limiting the scope of the inventory or as an incomplete inventory (i.e. a cut-off).

Furthermore, cut-off criteria were applied to the following:

- Glasses are delivered with packaging materials such as timber pallets, steel band and cardboard. Cut-off was applied to these packaging materials given most of them are reused or sent for recycling
- Cut-off was applied to the VOCs released to air during the powder coating process, due to data unavailability
- The effects of the exclusions are minimal given the impacts of the windows are largely driven by aluminium and glass.

Allocation

Multi-output allocation generally follows the requirements of PCR 2019:14 v1.3.4 (EPD International, 2024) section 4.5.1. When allocation becomes necessary during the data collection phase, the allocation rule most suitable for the respective process step is applied based on the following principles:

- Impacts due to multi-output processes within the foreground system are allocated to coproducts by economic value, if the difference in the revenue of coproducts is high (>25% according to EN 15804)
    - ☐ This is applicable for processes that involves aluminium and scraps – such as aluminium extrusion and fabrication
    - ☐ Aluminium scrap is generated during aluminium profile extrusion and fabrication (Module A3). The aluminium scrap is sold to recyclers, which has an economic value compared to the main product. In this study, we applied economic allocation for aluminium scrap, according to section 4.5.1 of the PCR (EPD International, 2024). FY 2023/24 annual average prices of aluminium extrusion and aluminium scrap were used for allocation
- The emission factor for the aluminium extrusion produced at INEX for the GWP-GHG indicator in 2023 is 8.23kg CO_2-eq./kg (based on EF3.1)
- A sensitivity analysis was undertaken to understand the effect of price change for both aluminium extrusion and scrap produced at INEX. A ±20% price change in aluminium extrusion and scrap showed little effects on the overall impacts of the aluminium extrusion produced at INEX (up to 2.17%). However, it is crucial to monitor these effects continuously.
- For other processes such as glass production, site overheads (e.g. water, wastewater, fuels, electricity, and waste) are allocated based on the mass of outputs
- The packaging materials are allocated by mass across the total output of packaged APL products.

End-of-life allocation generally follows the requirements of ISO 14044, section 4.3.4.3.

- *Material recycling (avoided burden approach):* Open scrap inputs from the production stage are subtracted from scrap to be recycled at end-of-life to give the net scrap output from the product life cycle. This remaining net scrap is sent to material recycling. Credits are assigned at Module D based on the potential benefit of recovering the secondary material in substitution for primary material production. If net scrap is negative (e.g. the production stage scrap inputs are higher than the scrap available for recycling at end-of-life), Module D will assign a burden. The Module D impacts are modelled using industry average inventories
- *Landfilling (avoided burden approach):* In cases where materials are sent to landfills, they are linked to an inventory that accounts for waste composition, regional leachate rates, landfill gas capture as well as utilisation rates (flaring vs. power production). A credit is assigned for power output using the national grid mix.

Assumptions

- Several packaging materials are used with aluminium extrusions and window components delivered to fabricators. It was assumed that aluminium extrusions and window components packaging materials are sent to landfill, given there is no information on packaging post-consumer recycling rates in New Zealand. This is a conservative assumption
- We acknowledge that there are faulty components that are returned to the suppliers which were not accounted for in this study due to data limitations. However, we understand that the overall effect of this exclusion is insignificant given the impacts of the components themselves are minimal
- Due to limited data, it is assumed that aluminium window and door waste management practices in the South Pacific are same as in New Zealand. The impact of this assumption is minimal as only 1.67% of APL windows and doors are exported to and used in the South Pacific
- For some materials/processes, country- or region-specific datasets were unavailable in the MLCA Database. Hence, datasets from other countries/regions were used as geographic proxies. However, we realise that the effect of using these datasets was minimal given the production technologies are generally consistent. The aggregated GWG-GHG impacts of proxy datasets for APL windows were <11%, for Module A1-A3.

Data Quality Assessment

Primary data for aluminium extrusion, finishing, hardware component manufacturing (including seals), and fabrication was sourced for the 2023 calendar year (1 Jan 2023 to 31 Dec 2023).

This study utilises the system for "Data quality level and criteria of the UN Environment Global Guidance on LCA database development" (CEN, 2019), as shown below.

Table 7: Data Quality Assessment

Material/Life cycle stage	Collected foreground data	Data Source and Year	Representativeness		
			Geographical	Technological	Time
AGP Glass (A1-A3)	Raw materials and suppliers, land use, manufacturing processes, energy and water use, production volumes, transport modes and distances	Supplied by AGP, for CY2023	Good	Very Good	Very Good
Thermaseal Glass (A1-A3)	Raw materials and suppliers, land use, manufacturing processes, energy and water use, production volumes, transport modes and distances	Supplied by Thermaseal, for CY2023	Fair	Very Good	Very Good
Al Extrusions (A1-A3)	Raw materials and suppliers, land use, manufacturing processes, energy and water use, production volumes, transport modes and distances	Supplied by INEX, for CY2023	Very Good	Very Good	Very Good
Powder Coating (A1-A3)	Raw materials and suppliers, land use, manufacturing processes, energy and water use, production volumes, transport modes and distances	Supplied by ColourWorks, for CY2023	Very Good	Very Good	Very Good
Hardware components (A1-A3)	Quantities, supplier locations, transport modes and distances	Supplied by APL, for CY2023	Fair	Good	Good
Fabrication (A1-A3)	Raw materials and suppliers, land use, manufacturing processes, energy and water use, production volumes, transport modes and distances	Supplied by APL fabricators, for CY2023	Very Good	Very Good	Very Good
Module C1	Inputs for deconstruction & demolition	Assumptions for deconstruction energy	Fair	Good	Fair
Module C2	Transport modes and distances to end-of-life destinations	General assumption	Fair	Fair	Fair
Module C3	Inputs for waste processing including metal recovery rates	(BRANZ, 2024)	Good	Fair	Fair
Module C4	End-of-life destinations	(BRANZ, 2024)	Fair	Fair	Fair
Module D	Inputs for scrap recycling	Assumptions for recycling and credits	Good	Fair	Fair

Assessment Indicators

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.

- Table 8 contains the core environmental impact indicators in accordance with EN 15804:2012+A2:2019, describing the potential environmental impacts of the product
- Table 9 shows the life cycle inventory indicators for resource use
- Table 10 displays the life cycle inventory indicators for waste and other outputs
- Table 11 provides additional environmental impact indicators in accordance with EN 15804:2012+A2:2019
- Table 12 displays biogenic carbon content indicators
- Table 13 contains results for environmental impact indicators in accordance with EN 15804:2012+A1:2013 to aid backward comparability.

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 primary energy is separated into energy used as raw material and energy used as energy carrier as per option C in Annex 3 in the PCR (EPD International, 2024).

Energy indicators (MJ) are always given as net calorific value.

Table 8: EN15804+A2 Core Environmental Impact Indicators

Impact category	Indicator	Unit
Climate change – total	GWP-total	kg CO_2-eq.
Climate change – fossil	GWP-fossil	kg CO_2-eq.
Climate change – biogenic	GWP-biogenic	kg CO_2-eq.
Climate change – land use and land use change	GWP-luluc	kg CO_2-eq.
Ozone depletion	ODP	kg CFC11-eq.
Acidification	AP	Mole of H^+ eq.
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.
Eutrophication aquatic marine	EP-marine	kg N eq.
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.
Photochemical ozone formation	POCP	kg NMVOC eq.
Depletion of abiotic resources – minerals and metals[1]	ADP-m&m	kg Sb-eq.
Depletion of abiotic resources – fossil fuels[1, 5]	ADP-fossil	MJ
Water use[1]	WDP	m^3 equiv. deprived

Table 9: Life cycle inventory indicators on use of resources

Parameter	Indicator	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ
Use of renewable primary energy resources used as raw materials	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ
Total use of non-renewable primary energy resources[5]	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Net use of fresh water	FW	m^3

Table 10: Life cycle inventory indicators on waste categories and output flows

Parameter	Indicator	Unit
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for reuse	CRU	kg
Materials for energy recovery	MER	kg
Materials for recycling	MFR	kg
Exported electrical energy	EEE	MJ
Exported thermal energy	EET	MJ

Table 11: EN15804+A2 Additional Environmental Impact Indicators

Impact Category	Indicator	Unit
Climate Change[2]	GWP-GHG	kg CO_2-eq.
Climate Change[3]	GWP-GHG (IPCC AR5)	kg CO_2-eq.
Particulate Matter emissions	PM	Disease incidences
Ionising Radiation – human health[4]	IRP	kBq U235 eq.
Eco-toxicity (freshwater)[1]	ETP-fw	CTUe
Human Toxicity, cancer[1]	HTP-c	CTUh
Human Toxicity, non-cancer[1]	HTP-nc	CTUh
Land use related impacts / soil quality[1]	SQP	Dimensionless

Table 12: Biogenic carbon content indicators

Parameter	Indicator	Unit
Biogenic carbon content - product	BCC-prod	kg C
Biogenic carbon content - packaging	BCC-pack	kg C

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

Table 13: EN15804+A1 Environmental Impact Indicators

Impact Category	Indicator	Unit
Global warming potential	GWP (EN15804+A1)	kg CO_2-eq.
Ozone depletion potential	ODP (EN15804+A1)	kg CFC11-eq.
Acidification potential	AP (EN15804+A1)	kg SO_2-eq.
Eutrophication potential	EP (EN15804+A1)	kg PO_4^{3-}-eq.
Photochemical ozone creation potential	POCP (EN15804+A1)	kg C_2H_4-eq.
Abiotic depletion potential for non-fossil resources	ADPE (EN15804+A1)	kg Sb-eq.
Abiotic depletion potential for fossil resources	ADPF (EN15804+A1)	MJ

Disclaimers

[1] 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.

[2] 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.

[3] 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.

[4] 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.

[5] ADP-fossil and PENRT results may not be the same since the characterisation factors for some of the flows in the LCA FE software are not the same.

Environmental Performance

The following tables show the weighted average results for 1 m² of Flushglaze (125 and 150mm) and Structural Glaze (125 and 150mm) windows.

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.

Table 14: EN15804+A2 Core environmental impact indicators

INDICATOR	UNIT	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	1.26E+02	2.36E-02	1.60E-01	9.74E-02	4.46E-01	-2.79E+01
GWP-fossil	kg CO_2-eq.	1.25E+02	2.34E-02	1.60E-01	9.53E-02	4.42E-01	-2.78E+01
GWP-biogenic	kg CO_2-eq.	1.26E+00	1.92E-04	2.15E-05	7.12E-04	1.41E-03	-1.48E-02
GWP-luluc	kg CO_2-eq.	1.27E-01	6.11E-07	4.20E-06	1.43E-03	2.64E-03	-1.76E-03
ODP	kg CFC11-eq.	4.80E-10	2.33E-15	1.60E-14	2.95E-13	1.20E-12	-3.36E-11
AP	Mole of H^+ eq.	9.26E-01	1.22E-04	4.06E-04	4.61E-04	3.13E-03	-1.90E-01
EP-freshwater	kg P eq.	1.53E-04	3.58E-09	2.46E-08	2.67E-07	3.63E-06	-6.75E-06
EP-marine	kg N eq.	2.03E-01	5.93E-05	1.80E-04	2.14E-04	8.06E-04	-1.84E-02
EP-terrestrial	Mole of N eq.	2.25E+00	6.50E-04	1.98E-03	2.37E-03	8.87E-03	-2.01E-01
POCP	kg NMVOC eq.	5.09E-01	1.67E-04	4.34E-04	5.89E-04	2.47E-03	-6.05E-02
ADP-mm	kg Sb-eq.	1.59E-05	3.06E-10	2.11E-09	1.05E-07	2.87E-08	-2.50E-06
ADP-fossil	MJ	1.50E+03	3.07E-01	2.12E+00	1.72E+00	5.85E+00	-2.50E+02
WDP	m^3 equiv. deprived	2.08E+01	8.75E-05	6.02E-04	1.59E-02	5.07E-02	-1.05E+01

Table 15: Use of resources

INDICATOR	UNIT	A1-A3	C1	C2	C3	C4	D
PERE	MJ	5.72E+02	1.33E-03	9.15E-03	2.40E-01	1.02E+00	-3.58E+02
PERM	MJ	9.84E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.71E+02	1.33E-03	9.15E-03	2.40E-01	1.02E+00	-3.58E+02
PENRE	MJ	1.47E+03	3.07E-01	2.12E+00	1.72E+00	5.85E+00	-2.50E+02
PENRM	MJ	2.45E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.50E+03	3.07E-01	2.12E+00	1.72E+00	5.85E+00	-2.50E+02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.86E+00	1.78E-06	1.23E-05	4.98E-04	1.55E-03	-1.14E+00

Since Module C is included in the EPD, the use of Module A1-A3 results without considering the results of Module C is discouraged.

Table 16: Waste production and output flows

INDICATOR	UNIT	A1-A3	C1	C2	C3	C4	D
HWD	kg	8.86E-05	4.95E-12	3.41E-11	3.63E-10	1.46E-09	6.56E-08
NHWD	kg	4.30E+01	7.54E-06	5.19E-05	5.13E-04	2.94E+01	-1.81E+01
RWD	kg	6.87E-03	6.00E-08	4.13E-07	1.34E-05	6.16E-05	-9.19E-04
CRU	kg	9.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.33E+01	0.00E+00	0.00E+00	5.45E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 17: EN15804+A2 Additional Environmental Impact Indicators

INDICATOR	UNIT	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO_2-eq	1.27E+02	2.34E-02	1.60E-01	9.74E-02	4.46E-01	-2.79E+01
GWP-GHG (IPCC AR5)	kg CO_2-eq	1.26E+02	2.34E-02	1.60E-01	9.60E-02	4.44E-01	-2.74E+01
PM	Disease incidences	1.04E-05	1.54E-09	4.13E-09	9.06E-09	3.93E-08	-2.53E-06
IRP	kBq U235 eq.	1.05E+00	6.43E-06	4.43E-05	1.41E-03	7.15E-03	-1.50E-01
ETP-fw	CTUe	1.26E+03	1.37E-01	9.44E-01	1.33E+00	3.53E+00	-1.18E+02
HTP-c	CTUh	7.17E-08	2.26E-12	1.55E-11	2.88E-11	8.10E-11	-1.20E-08
HTP-nc	CTUh	9.24E-07	4.99E-11	3.40E-10	1.01E-09	3.09E-09	-2.51E-07
SQP	Dimensionless	6.39E+02	6.26E-04	4.31E-03	7.34E-01	1.60E+00	-6.20E+00

Table 18: Biogenic Carbon Content

INDICATOR	UNIT	A1-A3
BCC-prod	kg C	0.00E+00
BCC-pack	kg C	2.75E+00

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

Since Module C is included in the EPD, the use of Module A1-A3 results without considering the results of Module C is discouraged.

Table 19: EN15804+A1 Environmental Impact Indicators

INDICATOR	UNIT	A1-A3	C1	C2	C3	C4	D
GWP (EN15804+A1)	kg CO_2-eq.	1.25E+02	2.33E-02	1.59E-01	9.43E-02	4.38E-01	-2.76E+01
ODP (EN15804+A1)	kg CFC11-eq.	4.74E-10	2.74E-15	1.89E-14	3.47E-13	1.41E-12	-3.96E-11
AP (EN15804+A1)	kg SO_2-eq.	7.41E-01	8.44E-05	2.88E-04	3.21E-04	2.49E-03	-1.65E-01
EP (EN15804+A1)	kg PO_4^{3-}-eq.	7.37E-02	1.99E-05	6.10E-05	7.51E-05	3.12E-04	-6.25E-03
POCP (EN15804+A1)*	kg C_2H_4-eq.	-9.35E-03	8.78E-06	-3.93E-05	4.30E-05	2.06E-04	-8.58E-03
ADPE (EN15804+A1)	kg Sb-eq.	1.59E-05	3.07E-10	2.11E-09	1.05E-07	2.90E-08	-2.50E-06
ADPF (EN15804+A1)	MJ	1.46E+03	3.05E-01	2.10E+00	1.66E+00	5.60E+00	-2.46E+02

**The results of this environmental impact indicator shall be used with care. In MLCA database, NO_x emissions have been split into NO_2 and NO. Due to the split of NO_x a potential negative value for the POCP may occur, according to the characterisation factor in the CML method (Sphera, 2016). Note that for POCP in CML, NO is characterised with a factor of -0.427. This explains the negative results for some modules.*

Since Module C is included in the EPD, the use of Module A1-A3 results without considering the results of Module C is discouraged.

References

APL Window Solutions. (2024). Going Electricity-Neutral. Retrieved from Electricity-Neutral Initiative: www.aplnz.co.nz/our-responsibility/carbon-neutral-electricity-initiative

BRANZ. (2024). New Zealand whole-building whole-of-life framework: Development of datasheets to support building life cycle assessment. Retrieved from www.branz.co.nz/environment-zero-carbon-research/framework/data/

BraveTrace. (2023). NZECS Residual Supply Mix for electricity certification. New Zealand.

CEN. (2013). EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products. Brussels: European Committee for Standardization.

CEN. (2019). EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products. Brussels: European Committee for Standardization.

ECHA. (2022). Candidate List of Substances of Very High Concern for Authorisation. Helsinki: European Chemicals Agency

EPD International. (2024). PCR 2019:14 Construction Products version 1.3.4 of 2024-04-30 (valid until 2025-06- 20). Stockholm: EPD International AB.

EPD International. (2024a). Complementary Product Category Rules to PCR 2019:14 (c-PCR-007 to PCR 2019:14, version 2024-04-30, valid until 2025-06-20). Stockholm: EPD International AB.

IPCC. (2013). Climate Change 2013: The Physical Science Basis. Geneva: IPCC.

ISO. (2006a). ISO 14040: Environmental management – Life cycle assessment – Principles and framework. Geneva: International Organization for Standardization.

ISO. (2006b). ISO 14044: Environmental management – Life cycle assessment – Requirements and guidelines. Geneva: International Organization for Standardization.

ISO. (2006c). ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures. Geneva: International Organization for Standardization.

MBIE. (2023). Annual Electricity Data Updates. New Zealand.

Sphera. (2016). Gabi Database and modelling principles. Echterdingen: Sphera.

Sphera. (2023). Life Cycle Inventory Database 2023 Documentation. Retrieved from Sphera: www.sphera.com

APL
WINDOW SOLUTIONS

19 Northpark Dr, Hamilton 3200 | P 07 849 2113 | W aplnz.co.nz
W altherm.co.nz | firstwindows.co.nz | vantage.co.nz

window & glass association nz
MEMBER