david trubridge

ENVIRONMENTAL PRODUCT DECLARATION

Kitset Pendant Light Fittings

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
for Kitset Pendant Light Fittings from David Trubridge

Programme:	The International EPD System | www.environdec.com
Programme operator:	EPD International AB
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Type of EPD:	EPD of multiple products, based on a representative product. Products covered in this EPD are listed on page 6.
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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 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 or end-of-life.

This EPD covers the environmental impacts of kitset pendant light fittings. The products are manufactured at the David Trubridge facility located in Whakatu, New Zealand.

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 'the gate' is the gate of David Trubridge's manufacturing facilities as the product is ready to go out to customers.

David Trubridge Ltd, 2 Groome Place, Whakatu, Hastings, Hawkes Bay, New Zealand, as the EPD owner, has the sole ownership, liability, and responsibility for the EPD.
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david trubridge

Who we are

David Trubridge is a designer and manufacturer of premium lighting and furniture products operating from Whakatu, Hastings, New Zealand. For us, good design means bringing cultural nourishment into people's lives without using up precious resources and energy. As a result, all of our products are designed to leave a delicate footprint and most are inspired directly by nature (illustrated by the Nikau light at right).

Life Cycle Assessment (LCA) is a key way in which we quantify the footprint of our products. We also use LCA to influence key business decisions, such as our initiative to convert the vast majority of our products to flat-pack designs in order to reduce environmental impacts from packaging and distribution.

Nikau pendant light next to a nikau palm

Our values

- In all management, design and manufacturing operations to consider and minimise our impact on the environment, people and future generations, leaving a delicate footprint at all times.
- To be absolutely open and honest about our environmental performance.
- Our mission is to create and pass on culture, layering ideas and emotions onto physical objects.
- Everything that we produce is made to the highest possible standards of craftsmanship and materials, designed to last a maximum lifespan with no regard to ephemeral fashion, and to be finally easily recycled or safely disposed of.
- To act ethically, and with respect and integrity, in all dealings with people.
- To promote a culture of direct personal openness, honesty and integrity, which is never deflected or subverted by spin, artifice or deceit.
- To make sure everyone in the company maintains a good balance between their work and their life; that they are happy, sufficiently rewarded and fulfilled in their work; that they can take time off whenever they wish as long as deadline commitments are kept; that there is a sense of community support between everyone in the team.
- To never stand still, always re-evaluating and reassessing goals and achievements whether they be design, environmental or personal.
- To always help each other maintain the highest standards of design and making.
- The company's cultural, artistic, social and environmental roles are all more important than increasing profit.
- To seek to promote our values, particularly environmental concerns, at all times, in personal interchanges and through exhibitions, lectures and written information.
- To aim to be a role model for other businesses to follow.

Bamboo plywood used in our pendants is sustainably sourced from managed plantations in China certified by the Forest Stewardship Council® (FSC®).

FSC

Product information

This EPD covers permanently wired David Trubridge indoor pendant lights manufactured from bamboo plywood. It includes all size variants and surface finishes for the product families shown below and in Table 1. Lights are assembled and packaged as kitsets for self-assembly (see example of Coral kitset next page).

Cloud (2 sizes)

REPRESENTATIVE PRODUCT

Coral (6 sizes)

Floral (6 sizes)

Sola (3 sizes)

Toru (3 sizes)

Koura (7 sizes)

Nikau (2 sizes)*

Hinaki (3 sizes)

Tui (3 sizes)

Flax (3 sizes)

Kina (5 sizes)

Snowflake (2 sizes)**

Maru (2 sizes)***

Sunflower (2 sizes)

Navicula (3 sizes)***

* Nikau available at half or full height (shown).

**Snowflake comes in three sizes but the largest size is excluded from the EPD as it's not commonly sold (one sold every two years).

***Navicula and Maru are different to previous designs. They have LEDs, an LED driver manufactured by Tridonic, aluminium heatsinks behind the LEDs and polycarbonate diffusers. They are otherwise like the existing products.

The kitset includes (in the scope of this EPD):

- pendant
- fixings/suspension
- lamp holder
- electrical cable for installation by a qualified electrician
- instructions

The kitset accessories not included in the scope of this EPD:

- light bulb (Requires lamp type E27 / (E26 USA) – max. 60W)
- ceiling rose
- wall plug

How to use this EPD

To apply the results from this EPD to a specific product, multiply the representative data from this EPD by the product mass. Mass for each product in this EPD is in Table 1.

Table 1. Product list

Product (kitset)	Mass (kg)
Cloud Large	3.4
Cloud Small	2.4
Coral 1600	9
Coral 1200	3.8
Coral 1000	2.3
Coral 800	1.5
Coral 600	1
Coral 400	0.4
Flax 1500	7
Flax 1100	2.6
Flax 800	1.5
Floral 1600	9
Floral 1200	3.8
Floral 1000	2.3
Floral 800	1.5
Floral 600	1
Floral 400	0.4
Hinaki 1400	3.8
Hinaki 900	0.7
Hinaki 500	0.3
Kina 1400	9.2
Kina 1000	2.45
Kina 800	1.5
Kina 600	0.9
Kina 440	0.5
Koura 2400	12.5

Product (kitset)	Mass (kg)
Koura 2000	10
Koura 1600	7
Koura 1200	2.2
Koura 1000	1.8
Koura 750	0.75
Koura 500	0.45
Maru Large	4.9
Maru Small	3.4
Navicula Large	6
Navicula Medium	3
Navicula Small	2
Nikau Full	1.4
Nikau Half	0.7
Snowflake 1000	2.5
Snowflake 800	1.7
Sola 1350	7
Sola 1000	2.3
Sola 800	1.7
Sunflower Large	0.4
Sunflower Small	0.2
Toru Large	1.8
Toru Medium	1.4
Toru Small	0.8
Tui Large	2.4
Tui Medium	0.7
Tui Small	0.52

Classification

These tables show the relevant standard and application for the products in this EPD.

Table 2. Industry classification

Product	Classification	Code	Category
Light fitting	UN CPC Ver.3	31450	Plywood, veneer panels and similar laminated wood of bamboo
		2191	Other products of wood
	ANZSIC 2006	1499	Other wood product manufacturing not elsewhere classified, including wicker ware, cork, bamboo or cane products (excluding furniture).

Table 3. Technical specification applying to the products

Product group	Relevant standards
Light fitting	AS/NZS 60598.2.1:2014, Luminaires, Part 2.1: Particular requirements – Fixed general purpose luminaires (AS/NZS, 2014)
	IEC 60598-2-1:2020, Luminaires, Part 2.1: Particular requirements – Fixed general purpose luminaires (IEC, 2020)

Kitset is labelled and packaged using cardboard box, polyethylene (PE) plastic bag, rubber band, instructions and moisture pack.

The EPD provides results for a number of products. See Table 1 to see the full list of products covered by this EPD. This is an EPD of multiple products based on a representative product. The representative product used is Coral 400 with carbonised finish.

Content declaration

The content declaration for this EPD of multiple products is based on a representative product – Coral 400 in carbonised finish.

Product packaging includes cardboard box, polyethylene (PE) plastic bag, rubber band, instructions and moisture pack.

Table 4. Content declaration for one kg of representative product (Coral 400 in carbonised finish) and product range

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Light pendant (bamboo plywood with PVAc adhesive)	0.617 (0.617 - 0.951)	0	61.7 (61.7 - 95.1)	0.267 (0.267 - 0.411)
Electrical cable	0.292 (0 - 0.292)	0	0	0
Nylon parts	0.0309 (0.0127 - 0.0505)	0	0	0
Polyamide (PA) parts	0.0177 (0 - 0.0177)	0	0	0
Polyamide (PA) glass filled parts	0.0106 (0 - 0.0106)	0	0	0
Polyethylene Terephthalate (PET) glass filled parts	0.0279 (0 - 0.0279)	0	0	0
Steel (galvanised) parts	0.00352 (0 - 0.00352)	0	0	0
Chrome parts	0 (0 - 0.00992)	0	0	0
Copper parts	0 (0 - 1.22E-04)	0	0	0
Sum	1.00	0	61.7 (61.7 - 95.1)	0.267 (0.267 - 0.411)

Table 5. Content declaration of packaging for one kg of representative product (Coral 400 in carbonised finish) and product range

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Cardboard	0.863 (0.384 - 0.863)	86.3 (38.4 - 86.3)	0.341 (0.152 - 0.341)
Moisture pack	0.0288 (8.53E-04 - 0.0750)	2.88 (0.0853 - 7.50)	0
Instructions	0.116 (0.00343 - 0.359)	11.6 (0.343 - 35.9)	0.0459 (0.00136 - 0.0264)
Polyethylene (PE) plastic bag	0.00296 (6.03E-04 - 0.00771)	0.296 (0.0603 - 0.771)	0
Rubber band	0.00374 (2.22E-04 - 0.00528)	0.374 (0.0222 - 0.528)	0
Sum	1.01 (0.389 - 1.01)	101 (38.9 - 131)	0.387 (0.153 - 0.367)

Cluster of Coral pendant lights

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, 2025)

LCA information

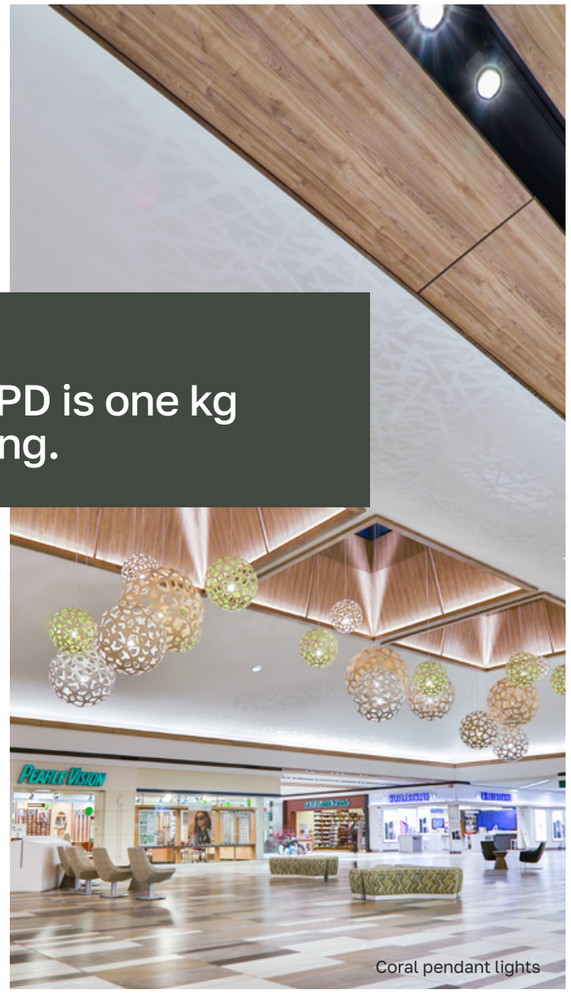
Declared Unit

The declared unit for the EPD is one kg of product plus its packaging.

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



Coral pendant lights

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

	Product stage			Construction stage		Use stage							End-of-life				Recovery
	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	NZ	NZ	-	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ

Product Stage

Light fittings are manufactured from bamboo plywood sourced from China. The plywood has a carbonised finish (achieved using thermal treatment). It is delivered by sea and truck to our factory in Whakatu, Hastings, New Zealand. It is painted offsite in Hastings (painted products only), and cut to shape on-site using a CNC router. The cut plywood shapes are packed into a kitset box along with additional fittings (e.g. Nylon clips, lamp holder and cabling) ready for shipping. All wood manufacturing scrap is disposed of within New Zealand using incineration with energy recovery.

An overview of the kitset light fittings product system is shown in Figure 1.

Raw material supply (Module A1)

- Extraction and processing of raw materials, such as bamboo plywood, MDF sheets, paint, primer and packaging materials.
- Generation of electricity from primary energy resources, also including their extraction, refining and transport. This includes energy needed for raw material supply and energy for manufacturing in core process.

Transportation (Module A2)

- Inbound transport of the raw material and packaging to the manufacturing sites.

Manufacturing (Module A3)

- spray painting of the bamboo plywood sheets.
- CNC routing and drilling to cut the plywood into shape.
  - Treatment of waste generated from the manufacturing processes up to the end-of-waste state.
  - For all solid waste that is disposed of, transport to incineration is included.
- Kitset assembly and packaging.

Product system

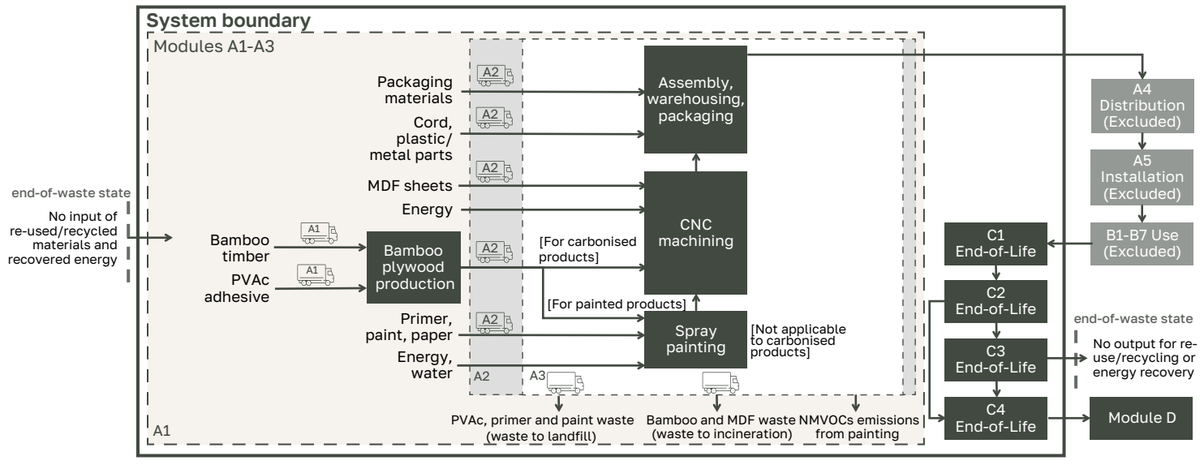


Figure 1. Kitset lighting fitting product system

LCA software and database

The LCA model was created using the Life Cycle for Experts (LCA FE) (formerly known as GaBi) Software for life cycle engineering, developed by Sphera Solutions, Inc. The Managed LCA Content (MLC) database CUP2024.2 (Sphera, 2024), 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.

Electricity

46% of electricity used at Whakatu production site uses electricity generated from on-site solar panels. There is no contractual instrument demonstrating the origin of that electricity has been sold to a third party. Therefore, this electricity has been modelled with dataset 'GLO: Electricity from photovoltaic'. These value is provided by direct measurements made by the photovoltaic management system, provided by iSolarCloud. No losses are modelled since the electricity is generated on site.

The emission factor for the on-site photovoltaic energy for the GWP-GHG indicator is 0.0272 kg CO_2-eq/kWh (based on EF3.1).

Market-based modelling has been used, for the remaining 54%, for grid supplied electricity consumed in processes at David Trubridge manufacturing site. Electricity is modelled using MLC datasets for New Zealand generation source in the composition detailed below.

The composition of the residual electricity grid mix of New Zealand is modelled based on published data for the year 1st April 2021 – 31st 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%).

On-site consumption (3.00%), and the low voltage (<1kV) grid's transmission and distribution losses (6.73%) 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 0.151 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.

Modelling of infrastructure/capital goods

In general, the production and end-of-life processes of infrastructure and capital goods used in the product system are not included within the system boundary. An exception is for 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 is included in all electricity datasets used in this study. This is not regarded as limiting the scope of the inventory or as an incomplete inventory (i.e. a cut-off).

Allocation

Multi-output Allocation

Multi-output allocation generally follows the requirements of PCR 2019:14 v2.0.1 (EPD International, 2025a). When allocation becomes necessary during the data collection phase, the allocation rule most suitable for the respective process step is applied.

Irrespective of any allocation between product systems, the inherent properties of the product and the packaging, such as calorific content or biogenic or fossil carbon content are not allocated away and always follow the physical downstream flow and the product system that finally uses it.

Allocation of site data

Bamboo plywood mass, electricity use, paint and water use, per product, were allocated to specific products based on factors such as mass and coating area.

Consistent allocation procedures are uniformly applied to similar inputs and outputs of the product system under consideration. The sum of inputs and outputs allocated to these products is equal to the total inputs and outputs of the allocated unit process at the site level.

Allocation of co-products

Following the requirements of PCR 2019:14 v2.0.1 section 4.5.1 (EPD International, 2025b), the product system does not generate any co-products thus the co-product allocation was not applied.

Allocation of wastes

The study follows the polluter pays principle for allocation of waste, following the requirements of PCR 2019:14 v2.0.1 section 4.5.2 (EPD International, 2025b) and the system boundary is set where the waste reaches the end-of-waste state.

Bamboo plywood and MDF wood waste do not fulfil end-of-waste criteria. Transport of the wood waste to an incineration facility and the incineration with energy recovery of the material is included. Energy use, which was generated by incineration with energy recovery, is not included.

PVAc waste from bamboo plywood manufacturing does not fulfil end-of-waste criteria. Transport of the PVAc waste to disposal (landfill) facility and the disposal (landfill) of the material is included.

Coating (primer and paint) waste from spray painting process, does not fulfil end-of-waste criteria. Transport of the coating waste to disposal (landfill) facility and the disposal (landfill) of the material is included.

Recycling and recycled inputs

There are no inputs of recycled material into the production process.

There are no outputs of material, from the production process, for recycling.

In the packaging materials there is some recycled content. This is captured in modules A1-A3 in Use of secondary material (SM) indicator result.

Data Quality Assessment

The data quality information has been provided according to the requirements of EN 15941:2024 (CEN, 2024) and utilises the system for “Data quality level and criteria of the UN Environment Global Guidance on LCA database development”, according to EN 15804+A2, Annex E, Table E.1 (CEN, 2019/2021).

This EPD covers the products from a single David Trubridge facility in Whakatu, New Zealand. Manufacturing data for production year (2023-08-01 to 2024-07-31) was collected. Pendants are made from bamboo plywood by CNC cutting process. Other parts, included in the kitset pendant light fitting, are manufactured by suppliers and delivered to Whakatu facility, for kitset assembly. The manufacturing site uses 54% of electricity from grid and 46% of electricity supplied by on-site photovoltaic system (see Electricity section for more information). This EPD covers production and end-of-life in New Zealand. Background data was sourced from MLC database CUP2024.2

The data has fair geographical representativeness, fair technological representativeness and poor temporal representativeness.

Total share of primary data, of GWP-GHG results for A1-A3 is 12.5%. The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Bamboo plywood production has fair geographical and technological and poor time representation. No other more representative data was available in the database used. It accounts for 41.6% of GWP-GHG and over 30% for all core environmental impact indicators apart from GWP-total, ODP, ADP minerals & metals, and WDP. Bamboo plywood manufacturing was modelled using MLC database but the data for the manufacturing process is based on literature data (INBAR, 2014) that is more than 10 years old (2013-10-01-2014-01-31).

Parts needed for assembly has fair geographical and technological representation. No other more representative data was available in the database used. It accounts for 22.7% of GWP-GHG and over 30% for ADP minerals & metals core environmental impact indicator.

Table 7. Data sources and share of primary data

Process	Source type	Source	Ref year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Bamboo plywood production (including PVAc adhesive production)	Collected data/ Database/ Literature	MLC v2024.2/ INBAR, 2014	2014	Proxy data	0.0%
Transport of materials/ assembly parts to manufacturing site	Collected data/ Database	MLC v2024.2	2024	Primary data	5.8%
Pendant painting	Collected data/ Database	MLC v2024.2	2024	Primary data, representative secondary data	0.0%
CNC machining	Collected data/ Database	MLC v2024.2	2024	Primary data, representative secondary data	5.4%
Parts required for assembly	Collected data/ Database	MLC v2024.2	2024	Primary data, representative secondary data	0.0%
Production of packaging	Collected data/ Database	MLC v2024.2	2024	Representative secondary data	0.0%
Electricity use for warehousing	Collected data/ Database	MLC v2024.2	2024	Primary data	1.3%
Total share of primary data, of GWP-GHG results for A1-A3					12.5%

Modelling beyond A1-A3

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.

End of Life (Modules C1-C4)

The end-of-life processes include deconstruction/demolition of the product (C1), transport of the discarded product (C2), waste processing (C3), and landfilling (C4).

At the end of useful life kitset will be disassembled manually and disposed. The end-of-life stage (Modules C1-C4) is modelled using 100% landfill scenario. David Trubridge sell >60% of their products domestically in New Zealand, and export the remainder internationally across Europe, USA, Australia, and rest of world. The elements of pendant kitset cannot be recycled owed to the laminates, glues and paints included in the product. New Zealand currently has no facility for incineration with energy recovery. Therefore, it is assumed the product is sent 100% to landfill (see Table 8).

This scenario is currently in use and is representative for one of the most likely scenario alternatives. Since this scenario is 100% landfill there are no alternative end-of-life scenarios modelled.

Table 8. End of life scenarios for products

Process	1kg
	EOL Main Scenario
Collection process specified by type	1 kg collected separately
Recovery system specified by type	0 kg for re-use
	0 kg for recycling
	0 kg for energy recovery
Disposal specified by type	1 kg modelled as biogenic material in landfill according to EN 16485:2026 (CEN, 2026)
	0 kg for incineration
Assumptions for scenario development, e.g. transportation	• C1: Demolition/deconstruction – no impact as done by manual disassembly with no use of any power tools • C2: 80 km of transport by Truck, Euro IV, 14 - 20t gross weight, 11.4t payload capacity (with SCR)*, 50% load factor • C3: no impacts • C4: biogenic material in landfill according to EN 16485:2026 (CEN, 2026)

* Truck dataset selected is a deviation from the truck specification (16-32 tonne lorry (EURO 5)) given in PCR 2019:14 v2.0.1. The truck type specified in PCR is not available in the MLC database. The selected dataset in MLC database was checked, based on GWP-total (or GWP-GHG) impact results versus ecoinvent dataset, and it represents a conservative option.

Emissions from landfill are dependent on the Degradable Organic Carbon fraction (DOC_f).

The degradable organic carbon fraction (DOC_f) of bamboo plywood is 0.013%. This value is based on bioreactor laboratory research by (Ximenes et al., 2018). These values can be considered as an upper limit for degradation of carbon in solid wood products placed in a landfill (and is applied to the EN 15804+A2 results also included in the EPD as information for comparison to earlier studies). However, in accordance with EN 15804+A2, any remaining biogenic carbon not degraded is treated as an emission of biogenic CO_2 to the air.

The impacts associated with the landfill are declared in module C4. All landfill gas that is combusted for energy recovery is assumed to occur in a power plant with an electric conversion efficiency of 36% (MBIE, 2023) (module C4) and the resulting electricity receives a credit for offsetting average electricity from the New Zealand residual grid (module D) in line with EN 16485:2026 (Section 6.3.4.5).

The landfill scenario assumed the following for carbon emissions:

- Decomposition rate of organic carbon to landfill gas is 0.013% (DOC_f).
- 68% of the methane is captured based on landfill gas capture in New Zealand landfills (MfE, 2024) (see section 4.2.2.5 for more information) and on methane capture efficiency (Hyder Consulting, 2007).
- Of this, one quarter (17% of the total) is flared and three quarters (51% of the total) is used for energy recovery (Carre, 2011).
- Of the 32% of methane that is not captured, 10% (3% of the total) is oxidised (released as carbon dioxide) (Australian Government, 2016a) and 90% (29%) is released to the atmosphere as methane.
- In summary, for every kilogram of carbon converted to landfill gas, 85.6% is released as carbon dioxide and 14.4% is released as methane.

In accordance with EN 15804+A2, any remaining biogenic carbon not degraded (100% of the carbon in the wood) is modelled as an emission of biogenic CO_2 to the air.

The emission of biogenic CO_2 in landfill is calculated, following EN15804, which does not allow consideration of permanent storage. The biogenic carbon balances in A1-A3 and C4, but due to methane emissions during production and landfill the GWP-biogenic values do not balance.

Recovery and Recycling potential (Module D)

Module D starts at the 'end-of-life' when the kitset is no longer a product in its first life cycle and start to be a potential input for its second life cycle.

For kitset, the end-of-life is reached when product is landfilled. Landfill gas is combusted in an engine with an efficiency of 36% (module C4) to generate electricity to be supplied to the New Zealand national grid mix (Australian Government, 2016b). Therefore, in module D, the resulting electricity receives a credit for offsetting average electricity from the New Zealand grid (module D). in line with EN 16485:26 (CEN, 2026).

Cut off criteria

Packaging of raw materials has been excluded. Raw materials are delivered in bulk and represents a proportion below 1% of cumulative mass and environmental relevance of inputs to the representative product.

Key assumptions

- Proxy data was used to model bamboo plywood manufacturing due to the lack of primary data. The modelling assumptions were based on a literature source (INBAR, 2014), which introduces uncertainty into the results.
- Bamboo plywood inputs were based on the average mass of bamboo plywood sheets of varying thicknesses supplied during the reference period.
- Finished product mass was determined using a combination of measured product weights and CAD-based calculations:
  - For stocked carbonised pendants, average measured product weights from January–December 2024 were used.
  - For made-to-order carbonised pendants, bamboo plywood mass was calculated from the known surface area of the finished product and the average sheet area density.
  - For painted pendants, the mass was calculated from the carbonised plywood mass, adjusted for paint addition, evaporation of water, paint losses, and VOC emissions.
- Electricity consumption was calculated rather than measured:
  - For CNC routing, electricity use was calculated from machine run time and measured power demand of the CNC room, using a conservative estimate based on summer operating conditions.
  - For assembly, warehousing, and packaging, annual electricity consumption was allocated to products based on total production volume, as separate electricity metering was not available.
- Biogenic carbon content and calorific value were calculated using bamboo plywood properties, including carbon content (0.48 kg C per kg), moisture content (10%), density (1050 kg per m3), and net calorific value (19.02 MJ per kg) sourced from recognised literature and databases (TNO, 2025).

Navicula pendant light

Assessment indicators

An introduction the core environmental impact indicators is provided below. 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 (global warming potential)

(GWP-total, GWP-fossil, GWP-biogenic, GWP-luluc)

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. GWP is split into three sub-indicators: fossil, biogenic, and land-use and land-use change.

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.

Eutrophication potential

(EP-freshwater, EP-marine, EP-terrestrial)

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 (O3). 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.

Abiotic resource depletion

(ADP-m&m, ADP-fossil)

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.

Water use

(WDP)

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

Kina pendant light

Environmental performance

The following tables show the results for one declared unit of the representative product – Coral 400 in carbonised finish.

Results for 1 kg of product plus its packaging.

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 results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Biogenic carbon and/or recovered energy leaving the product system in module A5 has been balanced out already in modules A1-A3.

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, 2023).

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

The three significant figures are used for all values in the EPD, including results. The three significant figures are used to maintain consistency across published EPDs.

Kina pendant light

Results for primary scenario

Environmental impact indicators

These results show environmental impacts, including global warming potential and other factors. Some indicators have endnotes linking through to disclaimers – see page 27 for more details.

Table 9. Abbreviations for EN15804+A2 core environmental impact indicators

Abbr	Indicator
GWP-total	Climate change (total)
GWP-fossil	Climate change (fossil)
GWP-biogenic	Climate change (biogenic)
GWP-luluc	Climate change (land use and land use change)
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential
EP-freshwater	Eutrophication potential (freshwater)
EP-marine	Eutrophication aquatic (marine)
EP-terrestrial	Eutrophication (terrestrial)
POCP	Formation potential of tropospheric ozone
ADP-m&m	Depletion abiotic resources – minerals & metals
ADP-fossil	Depletion abiotic resources – fossil fuels
WDP	Water (user) deprivation potential, deprivation-weighted water consumption

Table 10. EN15804+A2 core environmental impact indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D	A-C variation
GWP-total	kg CO_2 eq.	9.56E+00	0	1.07E-02	0	8.56E-01	-7.43E-04	0.0%/+83%
GWP-fossil	kg CO_2 eq.	1.02E+01	0	1.07E-02	0	3.24E-02	-7.38E-04	0.0%/+84%
GWP-biogenic	kg CO_2 eq.	-6.73E-01	0	1.04E-05	0	8.24E-01	-5.05E-06	-3.7%/+81%
GWP-luluc	kg CO_2 eq.	7.70E-02	0	3.00E-07	0	5.75E-05	-1.45E-07	-17%/+50%
ODP	kg CFC 11 eq.	3.85E-10	0	3.66E-16	0	5.73E-14	-4.41E-15	-16%/+16%
AP	Mol H+ eq.	7.42E-02	0	4.68E-05	0	1.36E-04	-3.60E-06	0.0%/+52%
EP-freshwater	kg P eq.	1.53E-04	0	1.78E-09	0	3.12E-08	-3.23E-09	-6.8%/+51%
EP-marine	kg N eq.	2.15E-02	0	2.33E-05	0	4.31E-05	-7.52E-07	0.0%/+50%
EP-terrestrial	Mole N eq.	2.34E-01	0	2.55E-04	0	4.74E-04	-1.33E-05	0.0%/+53%
POCP	kg NMVOC eq.	5.47E-02	0	4.49E-05	0	1.29E-04	-1.85E-06	0.0%/+186%
ADP-m&m[1]	kg Sb eq.	3.27E-04	0	2.26E-10	0	1.46E-09	-1.33E-10	-195%/+0.0%
ADP-fossil[1]	MJ	1.43E+02	0	1.41E-01	0	4.76E-01	-7.57E-03	0.0%/+88%
WDP[1]	m^3 world eq.	2.25E+00	0	1.76E-05	0	4.63E-03	-1.42E-03	0.0%/+116%

Additional environmental impact indicators

Optional environmental impact categories provide further information on environmental impacts. Some indicators have endnotes linking through to disclaimers – see page 27 for more details.

Table 11. Abbreviations for EN15804+A2 additional environmental impact indicators

Abbr	Indicator
GWP-GHG	Global warming potential
GWP-GHG (IPCC AR5)	IPCC AR5 GWP-GHG
PM	Respiratory inorganics
IRP	Ionising Radiation – human health
ETP-fw	Ecotoxicity – freshwater
HTPc	Human Toxicity, cancer
HTPnc	Human Toxicity, non-cancer
SQP	Land use related impacts / soil quality

Table 12. EN15804+A2 additional environmental impact indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D	A-C variation
GWP-GHG[2]	kg CO_2 eq.	1.05E+01	0	1.07E-02	0	5.24E-02	-7.45E-04	0.0%/+83%
GWP-GHG (IPCC AR5)[3]	kg CO_2 eq.	1.04E+01	0	1.07E-02	0	5.12E-02	-7.44E-04	0.0%/+83%
PM	Disease incidences	9.07E-07	0	2.50E-10	0	1.26E-09	-2.63E-11	0.0%/+63%
IRP[4]	kBq U235-eq.	1.52E-01	0	1.84E-06	0	2.64E-04	-7.59E-07	-34%/+87%
ETP-fw[1]	CTUe	1.31E+02	0	3.42E-02	0	2.25E-01	-8.15E-02	0.0%/+124%
HTPc[1]	CTUh	2.04E-08	0	5.89E-13	0	5.00E-12	-5.00E-13	-17%/+59%
HTPnc[1]	CTUh	1.31E-07	0	1.39E-11	0	1.68E-10	-4.74E-13	0.0%/+86%
SQP[1]	Dimensionless	4.03E+02	0	1.86E-04	0	4.18E-02	-6.08E-03	-17%/+28%

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.

Table 13. Abbreviations for use of resources

Abbr	Indicator
PERE	Renewable primary energy as energy carrier
PERM	Renewable primary energy resources as material utilization
PERT	Total use of renewable primary energy resources
PENRE	Non-renewable primary energy as energy carrier
PENRM	Non-renewable primary energy as material utilization
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

Table 14. Use of resources

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2.13E+02	0	1.96E-04	0	5.34E-01	-5.04E-02
PERM	MJ	3.38E+01	0	0	0	-4.66E-01	0
PERT	MJ	2.47E+02	0	1.96E-04	0	6.81E-02	-5.04E-02
PENRE	MJ	1.35E+02	0	1.41E-01	0	4.76E-01	-7.57E-03
PENRM	MJ	7.59E+00	0	0	0	0	0
PENRT	MJ	1.43E+02	0	1.41E-01	0	4.76E-01	-7.57E-03
SM	kg	5.12E-01	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	1.32E-01	0	3.57E-07	0	3.43E-04	-1.06E-04

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 15. Abbreviations for waste production and output flows

Abbr	Indicator
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for re-use
MFR	Materials for recycling
MER	Materials for energy recovery
EEE	Exported electrical energy
EET	Exported thermal energy

Table 16. Waste production and output flows

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
HWD	kg	1.42E-04	0	3.07E-12	0	7.71E-11	-1.46E-11
NHWD	kg	7.21E-01	0	2.35E-06	0	1.61E+00	-7.76E-06
RWD	kg	1.29E-03	0	2.09E-08	0	2.48E-06	-5.46E-09
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	3.61E+00	0	0	0	0	0
EEE	MJ	0	0	0	0	2.13E-02	0
EET	MJ	0	0	0	0	0	0

Biogenic carbon content

Biogenic carbon refers to the carbon stored in organic materials. This is sequestered during growth and released at end of life. EN15804+A2 requires the declaration of biogenic carbon content of the product and its packaging.

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

Table 17. Abbreviations for biogenic carbon content

Abbr	Indicator
BCC-prod	Biogenic carbon content – product
BCC-pack	Biogenic carbon content – packaging

Table 18. Biogenic carbon content results

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
BCC-prod	kg	2.67E-01	0	0	0	0	0
BCC-pack	kg	3.87E-01	0	0	0	0	0

Additional environmental impact indicators

EN15804+A1 results are included to aid comparison and backwards compatibility with rating tools. Results for EN15804+A1 indicators are not compliant with EN 15804:2012+A1:2013 (CEN, 2013) standard, due to changes in methodology.

Table 19. Abbreviations for EN15804+A1 environmental impact indicators

Abbr	Indicator
GWP (EN15804+A1)	Global warming potential (total)
ODP (EN15804+A1)	Depletion potential of the stratospheric ozone layer
AP (EN15804+A1)	Acidification potential of land and water
EP (EN15804+A1)	Eutrophication potential
POCP (EN15804+A1)	Photochemical ozone creation potential
ADPE (EN15804+A1)	Abiotic depletion potential – elements
ADPF (EN15804+A1)	Abiotic depletion potential – fossil fuels

Table 20. EN15804+A1 environmental indicator results

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP (EN15804+A1)	kg CO_2-eq.	9.31E+00	0	1.06E-02	0	8.52E-01	-7.37E-04
ODP (EN15804+A1)	kg CFC11-eq.	4.53E-10	0	4.30E-16	0	6.75E-14	-5.19E-15
AP (EN15804+A1)	kg SO_2-eq.	5.68E-02	0	3.20E-05	0	1.05E-04	-2.48E-06
EP (EN15804+A1)	kg PO_4^{3-}-eq.	9.69E-03	0	7.84E-06	0	1.49E-05	-4.39E-07
POCP (EN15804+A1)	kg C_2H_4-eq.	2.65E-03	0	-1.31E-05	0	1.10E-05	-1.27E-07
ADPE (EN15804+A1)	kg Sb-eq.	3.26E-04	0	2.26E-10	0	1.48E-09	-1.33E-10
ADPF (EN15804+A1)	MJ	1.37E+02	0	1.39E-01	0	4.67E-01	-7.55E-03

Variation in results

Significant variation between products was observed. This was due to three main differences between the analysed products:

- Mass of bamboo plywood per pendant: varies between pendant designs and sizes, which determine the quantity of bamboo plywood used per product.
- Paint mass or lack of paint use per pendant:
  - Pendants painted have higher impact than carbonised pendants
  - Impacts for painted pendants differ based on amount of paint used:
  - Kitsets painted on both sides have higher impact compared to the kitsets painted on the single side only.
  - Kitsets painted black have higher impact as black required two coats of primer, compared with one coat of primer for white and colour painted products.
- Mass and type of parts required per product kitset specification: The impacts from assembly parts vary between products based on the kit specification (parts list per kit) and the materials used (plastic, aluminium, steel or galvanised steel).

Table 21. GWP-GHG A1-A3 variation

LCA result of one declared unit product (A1-A3)	Unit	Variation of products
GWP-GHG	**kg CO_2-eq.**	0% - 83%

Differences to previous versions

The main differences between published EPD and this EPD version include:

- Update of the Managed LCA Content (MLC) database version 2020 (database service pack 40) to database version 2024.2
- Update of work from PCR 2012:01 version 2.33 and GPI 3.0.1, and Australasian GPI v2.0 to PCR 2019:14 version 2.0.1 and GPI 5.0.1, and Australasia GPI v4.2
- Update of activity data from the period 2018 – 2019 to January 2024 – December 2024
- Change of the functional unit from ‘per product’ to ‘per 1 kg’
- Removal of select product families from the EPD: Belle, Ulu, Dunes, Hills, Pebbles, BOL, Pola
- Addition of new product families to the EPD: Cloud, Tui, Toru, Flax, Koura
- Updates to pendant finishes: Removal of the Natural range; All products are now carbonised, after which some are painted
- Addition of solar energy generation at the manufacturing facility.
- Electricity modelling updated from location -based New Zealand grid mix to combination of photovoltaic renewable energy and New Zealand market- based residual mix use
- Water regionalised to New Zealand
- NCV (Net Calorific Value) of bamboo updated with more recent data from Phylis database
- Addition of land use modelling
- Transport assumptions updated from EURO 3 vehicles to EURO 4 vehicles to be in line with NZ transport fleet

The results for EN 15804+A1 indicators for this EPD version have been compared to the previously published EPD. To allow for results comparison to the previously published EPD, the declared unit (per product) was converted to ‘per 1 kg’ by dividing the previously published EPD results by product mass.

Differences to previous versions, continued

The comparison of the results show:

- The GWP (EN 15804+A1) impact of the representative kitset, Coral 400 Carbonised, is significantly higher than in the previous study. Analysis across all Coral 400 product finishes shows that the increase in GWP (EN 15804+A1) is less pronounced for the painted versions than for the carbonised finish. This difference is primarily attributable to a correction of the bamboo plywood input per kitset to account for bamboo waste generated during production. Additional differences are attributable to updates in the background database version.
- The ODP (EN 15804+A1) impact of the representative kitset, Coral 400 Carbonised, shows a substantial increase compared to the previous results. Analysis across all Coral 400 product finishes indicates an even greater increase in ODP (EN 15804+A1) for the painted versions than for the carbonised finish. This is primarily due to changes in electricity generation modelling, which was updated from a market-based approach to a combination of residual mix and photovoltaic (PV) electricity generation. Additional differences are attributable to updates in the background database version.
- The AP (EN 15804+A1), EP (EN 15804+A1), POCP (EN 15804+A1), ADPE (EN 15804+A1), and ADPF (EN 15804+A1) results are broadly consistent with those reported in the previous EPD. Minor differences are attributable to updates in the background database version.

Additional environmental information

All products comply with the European Union's RoHS Directive (2011/65/EU) and are formaldehyde-free. Our manufacturing site complies with local government requirements.

The use stage has been excluded from this EPD as it varies significantly depending on the type of bulb selected and the use pattern of the light. David Trubridge recommends that you choose a high-efficiency bulb / lamp, such as a light-emitting diode (LED), as the environmental impacts during use will often be many times larger than the impacts of producing and disposing of the light fitting.

seed system

In 2011, David Trubridge re-imagined the way lighting is designed, shipped and experienced. The result was the Seed System, a sustainability-driven innovation that transforms lighting from a product into a participatory process.

Each light in the Seed System is shipped in a compact, flat-pack form, around 1/30th the size of its final shape. This radically reduces shipping volume and packaging waste. But more than that, it invites customers into the creative journey.

Assembling a Seed System light isn't just putting together a fixture; it's growing something beautiful in your own space. By engaging users in the making process, the Seed System nurtures a deeper connection between people and the objects they live with, proving that sustainable design can be both responsible and inspiring.

Coral, Kina and Koura pendant lights

Endnotes

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.

Abbreviations

ANZSIC	Australian and New Zealand Standard Industrial Classification
CEN	European Committee for Standardization
DOC_f	Degradable Organic Carbon Fraction
EoL	End-of-Life
EPD	Environmental Product Declaration
GaBi	Ganzheitliche Bilanzierung (German for holistic balancing)
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCA FE	Life Cycle Assessment for Experts (software)
MLC	Managed LCA Content database
MC	Moisture content
NCV	Net Calorific Value
NMVOC	Non-Methane Volatile Organic Compound
NZ	New Zealand
PCR	Product Category Rules
SVHC	Substance of Very High Concern
UN CPC	United Nations Central Product Classification
VOC	Volatile Organic Compound

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Toru pendant light

General information

Programme information		
EPD programme operator	**EPD International AB**	
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Product Category Rules (PCR)	
CEN standard EN 15804 served as the core Product Category Rules.	
PCR	PCR 2019.14 Construction Products, version 2.0.1 (published on 2025-06-05, valid until 2030-04-07) C-PCR-006 Wood and wood-based products for use in construction (EN16485:2014), (published on 2019-12-20) CPC codes: 31450, 2191
PCR review conducted by	The Technical Committee of the International EPD System. See www.environdec.com for a list of members.
Review Chairs	Rob Rouwette, start2see Pty Ltd (chair), Noa Meron, thinkstep Ltd (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support

An Environmental Product Declaration (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 published in different EPD programmes may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); 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. To support backwards comparability and compatibility, environmental performance results have also been provided for the indicators required in EN15804+A1, although the study does not claim compliance with this standard.

Verification		
External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through:		
☑ Individual EPD verification without a pre-verified LCA/EPD tool	☐ EPD Process Certification* without a pre-verified LCA/EPD tool	☐ Fully pre-verified EPD tool
☐ Individual EPD verification with a pre-verified LCA/EPD tool	☐ EPD Process Certification* with a pre-verified LCA/EPD tool	
Third party verifier	**Kimberly Robertson, Force Consulting**	
	Email:	kimberlyrobertson@xtra.co.nz
Verifier approved by	**EPD Australasia and The International EPD System**	
Procedure for follow-up of data during EPD validity involves third-party verifier	☐ yes	
	☑ no	

*EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.environdec.com.

Information about EPD owner		
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Geographical scope	Global or New Zealand	
Reference year	2024-01-01 to 2024-12-31	

Version history			
	001	2015-04-15	Original version of the EPD. EPD Number: S-P-00556, Version 1
	002	2020-10-02	Revised version of the EPD. EPD Number: S-P-00556, Version 2
	003	2026-07-13	EPD-IES-0000556:003 EPD update based on data from the reference period: 2024-01-01 to 2024-12-31

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