Environmental Product Declaration

of multiple products based on a representative product of the product group.
In accordance with ISO 14025:2006 and EN 15804:2012+A2: 2019/AC:2021

NZ Panels Group

Melamine MDF Panels 9mm
Melamine MDF Panels 12mm
Melamine MDF Panels 16mm
Melamine MDF Panels 18mm
Melamine MDF Panels 25mm
Melamine MDF Panels 30mm

from
NZ Panels Group

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-0024101
Publication date:	2025-06-11
Valid until:	2030-06-10
Geographical Scope	Australia and New Zealand

EPD AUSTRALASIA ENVIRONMENTAL PRODUCT DECLARATION

EPD INTERNATIONAL EPD SYSTEM

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.environdec.com.

ECO PLATFORM EPD VERIFIED

About NZ Panels Group

New Zealand Panels Group was founded in 2002 as Prime Panels and has grown to become a leading supplier of interior decorative surfaces to the joinery and construction industry.

The company employs close to 300 staff and operates its main panel production facility in Auckland with a melamine plant based in Nelson.

The company offers two ranges of melamine panels under the Prime and Bestwood brands and collectively has a range offer of over 100 designs.

New Zealand Panels Group sells its melamine panels via its own network of joinery merchants and to independent hardware and joinery merchants, as well as direct to some select larger joinery businesses.

New Zealand Panels Group has long held Eco Choice Aotearoa accreditation for its melamine products and has a commitment to improving the sustainability of its products and operations, increasing recycling and reducing waste.

Product information

NZ Panels Melamine MDF

New Zealand Panels Group is the country's leading manufacturer and distributor of interior products with a range that covers pressed decorative panels, benchtop surfaces, sinks and taps, commercial stainless products and custom benching.

Melamine is a tough low pressure laminate surface which is pressed onto MDF substrates to produce highly durable panels for use in interior cabinetry and wall panels. Melamine panels are double-sided and available in a range of thicknesses and surface texture finishes. Designs range from solid colours through to woodgrains and patterns.

Melamine can be used for cabinetry doors, drawers and panels in kitchens, wardrobes, bathroom vanities, laundries, commercial furniture, shop fittings, shelving and decorative wall panels.

MDF used in the Melamine MDF panels are Forrest Stewardship Council certified[1], with 100% of wood used in the MDF sourced from certified forests.

The UN CPC code for these products is according to version 2.1, 2015.

Table 1 | UN CPC and ANZSIC codes

Classification	Code	Category
UN CPC Ver.2.1	31441	Fibreboard of wood or other ligneous materials
ANZSIC	149400	Other Wood Product Manufacturing

[1] https://www.nelsonpine.co.nz/wp-content/uploads/FSC-Certificate-of-Registration-Expires-21.06.2029.pdf

This EPD covers multiple products based on a representative product (RP), Melamine MDF 18mm, and is valid for 1 m^2 of Melamine MDF products. These products are available in six varieties produced in Auckland and Nelson, New Zealand. The rationale for choosing the representative product is that it is NZ Panels' highest selling melamine MDF product, contributing to over 50% of NZ Panels' average sales for the reporting year. Table 2 lists the products included in this EPD and identifies the representative product. As per Section 5.4.6.1 of the PCR, the environmental impacts of the representative product are detailed in the Environmental Performance section. Conversion factors for calculating the impacts of other Melamine MDF product variants, based on the declared modules, are provided in the Additional Environmental Information section of this EPD.

Table 2 | Overview of NZ Panels Melamine MDF products

Melamine MDF products	Thickness (mm)	Width (mm)	Length (mm)	Product weight per m^2 (kg/m2)	Conversion factor for 1kg (m^2/kg)
Melamine MDF 9mm	9	1 220	2 440	6.83	0.146
Melamine MDF 12mm	12	1 220	2 440	9.01	0.111
Melamine MDF 16mm	16	1 220	2 440	11.89	0.084
Melamine MDF 18mm	**18**	**1 220**	**2 440**	**13.35**	**0.075**
Melamine MDF 25mm	25	1 220	2 440	17.86	0.056
Melamine MDF 30mm	30	1 220	2 440	21.37	0.047

General Information

PROGRAM INFORMATION

Program: EPD International AB Box 210 60, SE-100 31 Stockholm, Sweden e: info@environdec.com	**Regional Program: EPD Australasia Limited** 315a Hardy Street Nelson, 7010, New Zealand t: +61 (02) 8005 8206 w: https://epd-australasia.com e: info@epd-australasia.com

ACCOUNTABILITIES FOR PCR, LCA AND INDEPENDENT, THIRD-PARTY VERIFICATION

LIFE CYCLE ASSESSMENT (LCA)

Owner of EPD	NZ Panels Group	
Contact person	Desiree Keown	t: +64 27 489 5779 e: desiree.keown@nzpanels.co.nz w: https://www.nzpanels.co.nz/ 15 Kerwyn Ave, East Tamaki, Auckland 2013
Manufacturer sites:	Auckland, New Zealand	Nelson, New Zealand
Reference Year for Data	2023-07-01 to 2024-06-30	
EPD Prepared by: edge impact™	Pasindu Samarakkody Edge Environment Pty Limited Greenhouse, Level 3, 180 George Street, Sydney NSW 2000 W: www.edgeimpact.global E: info@edgeimpact.global	

PRODUCT CATEGORY RULES (PCR)

CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):	c-PCR-006 (EN 16485:2014), v 1.0.0 - Wood and wood-based products for use in construction PCR 2019.14 Construction Products, version 1.3.4
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com for a list of members
Review Chair:	Claudia A. Peña, PINDA LCT SpA, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

THIRD-PARTY VERIFICATION

Independent verification of the declaration and data, according to ISO 14025:2006	☐ EPD process certification ☒ EPD verification by individual verifier
Third Party Verifier	Claudia Peña claudia@epd-americalatina.com
Verifier approved by:	EPD Australasia Ltd
Procedure for follow-up of data during EPD validity involved third-party verifier	☐ Yes ☒ No

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 sole ownership, liability, and responsibility for this EPD. To the best of NZ Panels' knowledge, the information provided in this document is accurate and reliable. However, no warranty, guarantee or representation is made as to its accuracy, reliability or completeness.
EPDs within the same product category but registered in different EPD programs, 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.

Life cycle content information

Table 3 | LCA information

Product Characteristics	
Declared Unit	The declared unit adopted is 1m^2 of NZ Panels Melamine MDF manufactured, over its technical lifetime of 25 years. The relative density of the panels are approximately 732 kg/m, with a moisture content of 6-8%.
Modules Included	Cradle to gate with options, modules C1–C4, and module D
Technical lifetime	25 years
Geographical Coverage	New Zealand
Time Period	2023-07-01 to 2024-06-30

Scope of Declaration

The scope of this EPD is cradle-to-gate (modules A1-A3) with options, module C1-C4 and module D. The scope of this declaration is according to the General Program Instructions (GPI) and four life cycle stages according to ISO 21930 and EN 15804 as given in Table 4.

Table 4 | Life Cycle of building products: stages and modules included in this EPD

Product stage				Construction process stage		Use stage							End of life stage					Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal		Reuse-Recovery-Recycling-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
Specific data used	<57%			-	-	-	-	-	-	-	-	-	-	-	-	-		-
Variation – products	-40% to 58%			-	-	-	-	-	-	-	-	-	-	-	-	-		-
Variation – sites	17% to 60%			-	-	-	-	-	-	-	-	-	-	-	-	-		-

ND = not declared

The following modules have not been declared: A4 – transport, A5 – construction and installation, B1 – material emissions from usage, B2 – maintenance including transport, B3 – repair, B4 – replacement, B5 – refurbishment, B6 – operational energy use and B7 – operational water use.

Module A4 has been excluded due to the large variability in distribution from year to year. Module A5 has been excluded as it is not within the control of NZ Panels, with any inputs/outputs related to installation considered attributable to the building/site's environmental impacts. Additionally, no offcuts are generated during installation.

Use related modules B1-B7 are excluded as no material inputs/outputs occur during use.

System Diagram:

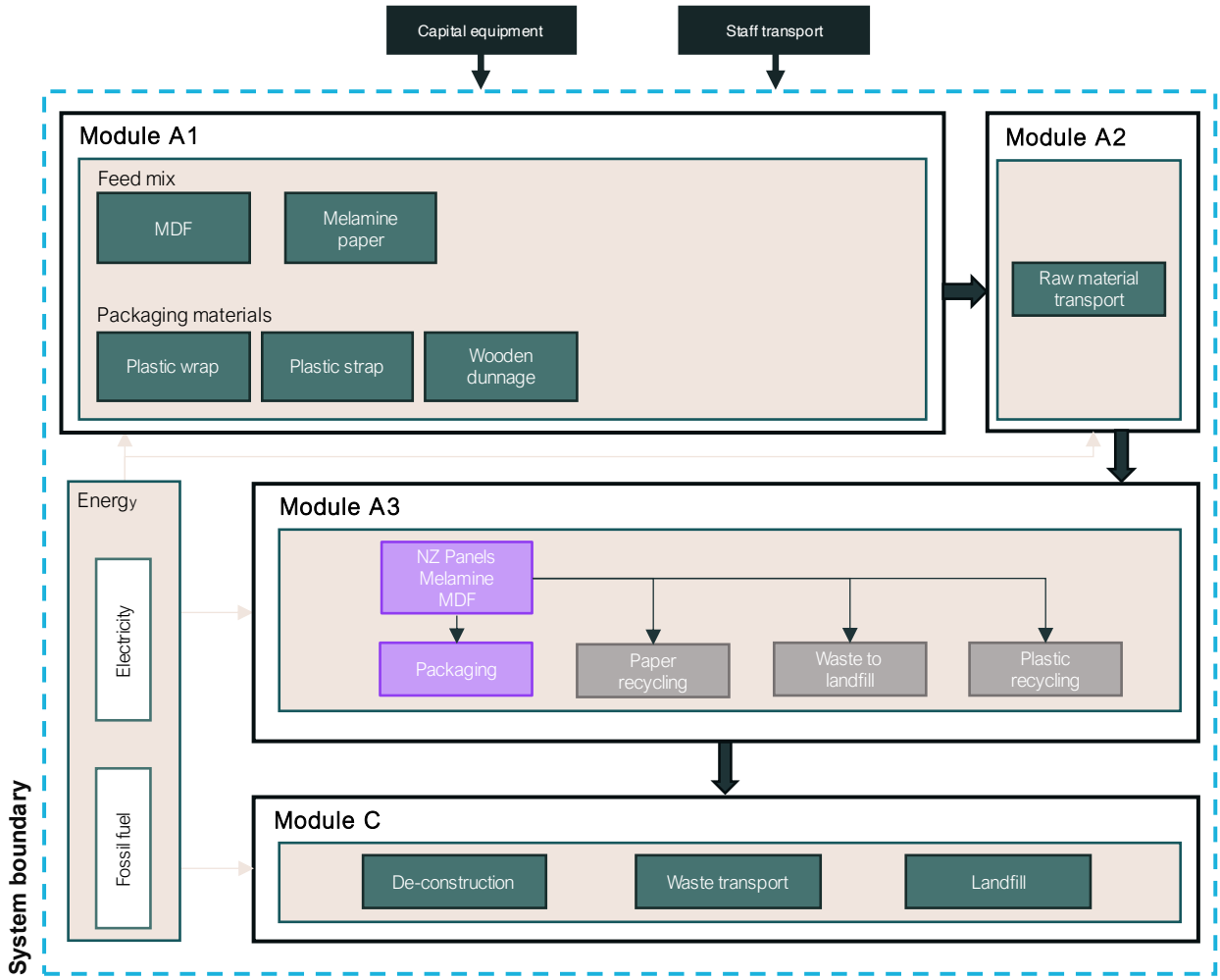

Figure 1 | System boundary of the study

Upstream processes

The upstream processes include those involved in Module A1 – Raw material supply. This module includes:

- Extraction, transport and manufacturing of raw materials.
- Generation of electricity from primary and secondary energy resources, also including their extraction, refining and transport for Modules A1 and A3.
- Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

Core Processes

The core processes include those involved in Module A2 and Module A3, including:

- External transportation of materials to the core processes and internal transport.
- Manufacturing of NZ Panels products.
- Packaging.
- Processing of waste to landfill and recycling.

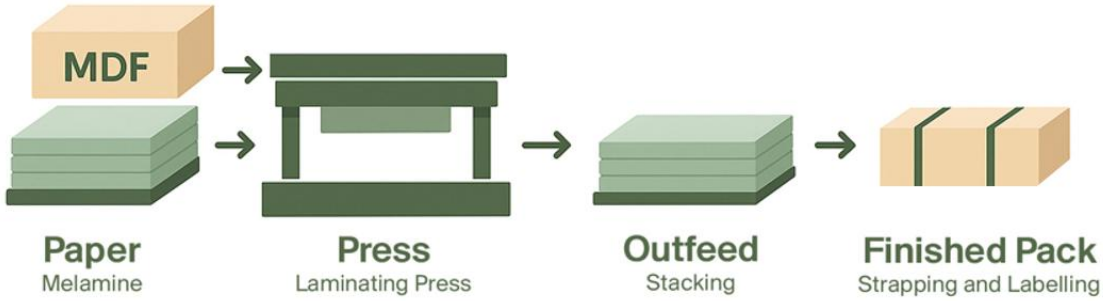

Figure 2 | Melamine panel manufacturing process

Downstream Processes

The downstream processes include those involved in Module C1 to C4, with C1 being impacts related to deconstruction, C2 being impacts related to transport to end of life treatment, C3 being recycling, if any, of the end-of-life product, and C4 being landfill of end-of-life product. This EPD considers manual deconstruction and that 100% of end-of-life product is landfilled. The basis of the parameters used in the modelling of the downstream modules is provided in more detail in the subsection related to modules C-C4 in the Content Information section of this EPD.

- Transport of waste generated at the end of life.
- Treatment of waste generated at the end of life.

Database(s) and LCA software used:

The inventory data for the processes are entered into the SimaPro (v9.6) LCA software program and linked to the pre-existing data for the upstream feedstocks and services selected in order of preference from:

- For Australia, the Australian Life Cycle Inventory (AusLCI) v1.42 compiled by the Australian Life Cycle Assessment Society ((ALCAS), Australian Life Cycle Inventory (AusLCI) – v1.42, 2023). The AusLCI database at the time of this report was 1 year old.
- Other authoritative sources (e.g., ecoinvent v3.10, (Wernet, et al., The ecoinvent database version 3.10, 2024), where necessary adapted for relevance to Australian conditions (energy sources, transport distances and modes and so on, and documented to show how the data is adapted for national relevance). At the time of reporting, the ecoinvent v3.10 database was less than 1 year old.

Cut-off rules and Exclusion of Small Amounts

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a "significant" impact it should be included. According to the PCR 2019:14, Life cycle inventory data shall according to EN 15804 + A2 include a minimum of 95% of total inflows (mass and energy) per

module. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (2007) with no further investigation.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impact of employees are excluded.

Allocation

According to EN 15804+A2, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes. In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.
The following stepwise allocation principles shall be applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

The NZ Panels Melamine MDF boards are manufactured in two plants, Nelson and Auckland, New Zealand. Mass and energy data have been sourced for the manufacturing plants from NZ Panels. Manufacturing volume related data was collected for individual products in FY24. Energy and utilities used as well as waste generated during production are allocated to individual products using the mass allocation method, based on production volumes of each product.

Impacts of manufacturing waste that is being landfilled is 100% allocated to the product system at A1-A3. For wastes that are being recycled, all disposal impacts up to the point where the waste

reaches its end-of-waste stage has been allocated to the product system at A1-A3. No credits for recycling manufacturing waste have been assigned.

Data Quality and Validation

The specific data used for the study (core module) has been sourced from NZ Panels' enterprise resource planning (ERP) system, providing accurate data for utilities consumption, feedstock quantities, and production volumes. Edge used contribution analysis to focus on the key pieces of data contributing to the environmental impact categories. Edge considers the data to be of high quality for the core module. The data was benchmarked against relevant benchmark data in ecoinvent. Overall, the data was deemed to be of high quality for the core module. The data quality ranking is as follows: geographical representativeness – very good; technical representativeness – very good and time representativeness – very good.

Assumptions, Choices, and Limitations

Table 5 | Key assumptions, choices and limitations of this EPD

Assumption or limitation	Impact on LCA results	Discussion
Melamine paper transport distances	Minor	The same distance is used for transport of melamine paper from the paper treaters in Malaysia and Thailand to NZ Panels plants in Nelson and Auckland due to similarity in distances. There may be very slight variations int these distances, which are considered immaterial.
Exclusion of employees, capital good and infrastructure	Minor	Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.
Average distance for transport from deconstruction site to waste plant	Minor	Using information and averages from similar EPDs to determine the average distance travelled from deconstruction to waste plant.

Compliance with Standards

The methodology and report format has been modified to comply with:

- ISO 14040:2006 and ISO14044:2006 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA).
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations -- Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations.
- EN 15804+A2:2019: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (referred to as EN15804+A2).

- EN 15804+A1:2012: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (referred to as EN15804+A1).
- Product Category Rules (PCR) 2019:14, v1.3.4 – Construction products – Hereafter referred to as PCR 2019:14.
- c-PCR-006 (EN 16485:2014), v 1.0.0 - Wood and wood-based products for use in construction.
- General Programme Instructions (GPI) for the International EPD System V4.0 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System.
- Instructions of EPD Australasia V4.2 – a regional annex to the general programme instructions of the International EPD System.

Content Information

Cradle to Gate (Modules A1 – A3)

Modules A1 – A3 covers the extraction and transport of raw materials, and the production stage of NZ Panels Melamine MDF products.

Raw materials for producing NZ Panels Melamine MDF products include MDF and melamine impregnated paper. MDF boards arrive in minimal packaging, with dunnage and plastic strapping being used. The dunnage is reused by NZ Panels as product packaging, whilst the plastic strapping is sent for recycling. Printed paper is sourced from various printers. The printed paper is impregnated with melamine resin at paper treatment facilities prior to being transported to NZ Panels. Melamine paper arrives packaged in plastic wrap, which is routed for recycling.

Typical production process includes the use of energy (electricity and natural gas) to heat and press the melamine paper onto both sides of the MDF boards. The heat and pressure from the press allows the melamine resin in the paper to flow and bond to the surface of the MDF board. Energy inputs and waste outputs related to the manufacture of melamine MDF panels are based on aggregated plant data. Mass allocation has been used to allocate the plant level inputs and outputs data to individual products.

The residual electricity mix for New Zealand as published on Brave Trace[2] has been used for the modelling of electricity used by NZ Panels. Table 6 below provides the breakdown of electricity sources, yielding an emission of 0.09 kg CO_2 eq./kWh (GWP-GHG).

Table 6 : Residual electricity mix for New Zealand for 2023/24

	kWh	%
Hydro	2.43E+10	60.6%
Wind	2.78E+09	6.93%
Solar	9.10E+06	0.02%
Geothermal	7.87E+09	19.6%
Co-generation	8.14E+08	2.03%

[2] https://bravetrace.co.nz/residual-supply-mix/

Natural gas	3.73E+09	9.31%
Coal	5.96E+08	1.49%
Diesel	9.20E+02	0.00%
TOTAL	**4.01E+07**	**100%**

The typical packaging is made up of wooden dunnage, plastic strap, and a cardboard banner. The same wooden dunnage received as packaging of the raw material MDF is used for the packaging of the Melamine MDF panels, they are therefore not modelled as they enter and exit the system at the same module (A1-A3) and are wastes that are being reused.

None of the products contain one or more substances that are listed in the "Candidate List of Substances of Very High Concern for authorisation". Based on available information and safety data sheets, NZ Panels products are not classified as hazardous according to criteria of Safe Work Australia GHS 7.

Table 7: Content declaration for 1 m² of NZ Panels Melamine MDF products

	RP: Melamine MDF 18mm				Other Melamine MDF products			
Product components	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
MDF	1.31E+01	0	97%	5.87E+00	6.55E+00 to 2.12E+01	0	95% to 98%	2.93E+00 to 9.47E+00
Melamine paper	3.20E-01	0	2.7%	8.00E-02	3.62E-01 to 4.59E-01	0	2% to 5%	8.00E-02
Sum	**1.34E+01**	**-**	**99.5%**	**5.95E+00**	**6.91E+00 to 2.16E+01**	-	**97% to 99%**	**3.01E+00 to 9.55E+00**

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO^2

Note: The period of carbon storage is considered the same as the service life of the product, which is considered as 25 years.

Table 8: Content declaration of packaging for 1 m² of NZ Panels Melamine MDF products

	RP: Melamine MDF 18mm			Other Melamine MDF products		
Packaging components	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/product or declared unit	Weight, kg	Weight-% (versus the product	Biogenic material, kg C/product or declared unit
Packaging – plastic strap	1.39E-03	0.01%	-	6.94E-04 to 2.31E-03	100	-
Packaging – cardboard	3.55E-04	0.003%	1.77E-04	1.77E-04 to 5.91E-04	0	8.86E-05 to 2.95E-04

Deconstruction and End of Life (Modules C1 – C4)

Following the use of the NZ Panels Melamine MDF products, NZ Panels has limited evidence of what the end-of-life fate of their products is. As per the recommendations of the applicable standards, the environmental profile of the end-of-life modules will be based on the most common scenario, which in the case of these products is landfill at end-of-life. As is common practice, the panels are expected to be removed by hand prior to being sent for disposal. There are hence no deconstruction related inputs or outputs.

The following assumptions have been used in this study to model deconstruction and end of life scenarios of the NZ Panels products:

- Deconstruction is by hand, thus not requiring any other inputs or outputs. Deconstruction by hand is standard industry practice, and NZ Panels observe this to be the prevalent means of deconstruction for our Melamine MDF products.
- 100% of the products are assumed to be diverted to landfills. This is based on the product being and composite of melamine paper and MDF, which cannot be separated at a commercially feasible rate prior to recycling, rendering landfill as the available commercially viable option. NZ Panels observe this to be the prevalent means of treatment at end of life for our Melamine MDF products.
- 50 km transport distance to landfill. Due to the lack of published data related to average distances to landfill in New Zealand, 50km has been considered a conservative assumption.

Benefits and loads beyond the system boundary (Module D)

The information in module D may contain technical information as well as LCA results from post-consumer recycling, i.e., environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system e.g., as secondary materials or fuels. Avoided impacts from co-products from module A to C shall not be included in Module D.

As 100% of products are diverted to landfill at end-of-life, there are no loads or benefits related to Module D.

Environmental Impact Indicators

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.6 tool and are listed in Table 9. The characterisation factors applied to the calculation of potential environmental impacts are based on version 3.1 of the reference package for CFs used in the Product Environmental Footprint (PEF) framework (EF 3.1).

All tables from this point will contain abbreviations only. 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 9 | Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods in accordance with EN15804+A2

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Potential Environmental Impacts			
Total global warming potential	GWP - Total	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (fossil)	GWP - Fossil	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (biogenic)	GWP - Biogenic	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Land use/ land transformation	GWP - Luluc	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Acidification potential	AP	mol H^+ eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – aquatic marine	EP - marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML 2002 (v4.8)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML 2002 (v4.8)
Water Depletion Potential*	WDP	m^3 equivalent deprived	Available Water Remaining (AWARE) Boulay et al., 2016 (includes Australia flows calculated using 36 Australian catchments)

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

Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	Manual for direct inputs [3]
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs[4]
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	ecoinvent version 3.8 and expanded by PRé Consultants[5]
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value	Manual for direct inputs[6]
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	Manual for direct inputs[7]
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	ecoinvent version 3.108 and expanded by PRé Consultants[8]
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m^3	ReCiPe 2016
Waste categories			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [9]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
Output flow categories			
Components for re-use	CRU	kg	Manual for direct inputs
Material for recycling	MFR	kg	Manual for direct inputs
Materials for energy recovery	MERE	kg	Manual for direct inputs
Exported energy - electricity	EE - e	MJ per energy carrier	Manual for direct inputs
Exported energy – thermal	EE – t	MJ per energy carrier	Manual for direct inputs
Additional environmental impact indicators			
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021[10]

3 PERE = PERT - PERM
4 Calculated based on the lower heating value of renewable raw materials. LHV is taken from https://phyllis.nl/, as recommended by SimaPro in compliance with EN15804+A2: https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro
5 Calculated as sum of renewables, biomass; renewable, wind, solar and geothermal, and renewable, water.
6 PENRE = PENRT - PENRM
7 Calculated based on the lower heating value (LHV) of non-renewable raw materials. LHV is taken from https://phyllis.nl/, as recommended by SimaPro in compliance with EN15804+A2: https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro
8 Calculated as sum of non-renewables, fossil and non-renewable, nuclear.
9 Calculated as sum of Bulk waste and Slags/ash.
10 This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh	USEtox
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox
Soil quality*	Potential soil quality index (SQP)	dimensionless	Soil quality index (LANCA®)
Potential Environmental Impacts – Indicators According to EN 15804+A1			
Global warming (GWP100a)	GWP	kg CO_2 equivalents	CML (v4.02) based on IPCC AR4
Ozone layer depletion	ODP	kg CFC-11 equivalents	CML (v4.02) based on WMO 1999
Acidification	AP	kg SO_2 equivalents	CML (v4.02)
Eutrophication	EP	kg PO_4^{3-} equivalents	CML (v4.02)
Photochemical oxidation	POCP	kg C_2H_4 equivalents	CML (v4.02)
Abiotic depletion	ADPE	kg Sb equivalents	CML (v4.02)
Abiotic depletion (fossil fuels)	ADPF	MJ, net calorific value	CML (v4.02)

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

***Disclaimer – 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 from some construction materials is also not measured by this indicator.*

Results of the environmental performance indicators

The interpretation of results is presented in the following sections. Note that the use of results of modules A1-A3 or A1-A5, without considering the results of module C may mislead the communication and decision-making. 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 10 | Potential Environmental impacts per 1 m² of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A2:2019

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-9.28E+00	0.00E+00	1.03E-01	0.00E+00	1.98E+01	0.00E+00
GWP-fossil	kg CO2 eq.	1.04E+01	0.00E+00	1.03E-01	0.00E+00	5.58E-02	0.00E+00
GWP-biogenic	kg CO2 eq.	-1.97E+01	0.00E+00	0.00E+00	0.00E+00	1.97E+01	0.00E+00
GWP-luluc	kg CO2 eq.	1.06E-02	0.00E+00	3.02E-06	0.00E+00	3.46E-05	0.00E+00
ODP	kg CFC 11 eq.	1.03E-06	0.00E+00	1.38E-09	0.00E+00	7.61E-10	0.00E+00
AP	mol H+ eq.	8.73E-02	0.00E+00	2.80E-04	0.00E+00	5.07E-04	0.00E+00
EP - F	kg P eq.	1.09E-03	0.00E+00	2.10E-06	0.00E+00	4.27E-07	0.00E+00
EP - M	kg N eq.	1.76E-02	0.00E+00	1.02E-04	0.00E+00	2.21E-04	0.00E+00
EP - T	mol N eq.	2.47E-01	0.00E+00	1.11E-03	0.00E+00	2.42E-03	0.00E+00
POCP	kg NMVOC eq.	1.87E-01	0.00E+00	7.66E-04	0.00E+00	1.23E-01	0.00E+00
ADP	kg Sb eq.	1.18E-04	0.00E+00	6.12E-09	0.00E+00	2.04E-09	0.00E+00
ADPF	MJ	1.76E+02	0.00E+00	1.38E+00	0.00E+00	6.74E-01	0.00E+00
WDP	m3 eq. deprived	1.63E+01	0.00E+00	1.94E-03	0.00E+00	2.77E-03	0.00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 11 | Resource use per 1 m² of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A2:2019

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	6.65E+01	0.00E+00	2.24E-03	0.00E+00	1.43E-02	-1.75E+02
PERM	MJ	1.95E+02	0.00E+00	0.00E+00	-1.75E+02	0.00E+00	0.00E+00
PERT	MJ	**2.62E+02**	0.00E+00	2.24E-03	-1.75E+02	1.43E-02	-1.75E+02
PENRE	MJ	1.41E+02	0.00E+00	1.38E+00	0.00E+00	6.74E-01	-3.14E+00
PENRM	MJ	3.49E+01	0.00E+00	0.00E+00	-3.14E+00	0.00E+00	0.00E+00
PENRT	MJ	**1.76E+02**	0.00E+00	1.38E+00	-3.14E+00	6.74E-01	-3.14E+00

SM	kg	8.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	4.63E+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	m3	7.12E-01	0.00E+00	4.62E-05	0.00E+00	5.77E-05	0.00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 12 | Waste generated per 1 m² of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	5.90E+00	0.00E+00	0.00E+00	0.00E+00	1.20E+01	0.00E+00
Radioactive waste disposed/stored	kg	2.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 13 | Output flows per 1 m² of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	7.73E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 14 | Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A2:2019

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq	1.08E+01	0.00E+00	1.03E-01	0.00E+00	1.34E+01	0.00E+00
Particulate matter	disease incidence	9.32E-07	0.00E+00	6.87E-09	0.00E+00	1.35E-08	0.00E+00
Ionising radiation - human health**	kBq U-235 eq	2.66E-01	0.00E+00	2.09E-04	0.00E+00	1.36E-04	0.00E+00
Ecotoxicity – freshwater*	CTUe	1.84E+02	0.00E+00	9.07E-02	0.00E+00	2.43E+00	0.00E+00
Human toxicity potential - cancer effects*	CTUh	1.19E-07	0.00E+00	8.69E-12	0.00E+00	3.73E-12	0.00E+00
Human toxicity potential - non cancer effects*	CTUh	1.10E-07	0.00E+00	6.82E-10	0.00E+00	4.88E-08	0.00E+00
Soil quality*	Pt	2.89E+01	0.00E+00	5.63E-03	0.00E+00	2.31E-02	0.00E+00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage						

Table 15 | Environmental impacts per 1 m^2 of NZ Panels Melamine MDF 18mm (representative product) product in accordance with EN15804+A1 2019

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	kg CO_2 eq	1.04E+01	0.00E+00	1.03E-01	0.00E+00	1.12E+01	0.00E+00
Ozone layer depletion	kg CFC-11 eq	8.54E-07	0.00E+00	1.09E-09	0.00E+00	6.02E-10	0.00E+00
Acidification potential	kg SO_2 eq	6.57E-02	0.00E+00	2.09E-04	0.00E+00	3.28E-04	0.00E+00
Eutrophication potential	kg PO43— eq	1.42E-02	0.00E+00	4.21E-05	0.00E+00	7.59E-05	0.00E+00
Photochemical ozone creation potential	kg C2H4 eq	4.71E-03	0.00E+00	1.24E-05	0.00E+00	2.69E-03	0.00E+00
Abiotic depletion potential for non-fossil resources	kg Sb eq	1.18E-04	0.00E+00	6.12E-09	0.00E+00	2.04E-09	0.00E+00
Abiotic depletion potential for fossil resources	MJ	1.05E+02	0.00E+00	0.00E+00	0.00E+00	8.33E-02	0.00E+00

Annex

This EPD is declared as 1m² of NZ Panels 18mm Melamine MDF products. The environmental impacts provided are for 18mm Melamine MDF.

As per section 5.4.6.1 of PCR, the following conversion factors can be applied to the results of the declared modules above to calculate the impacts of other product variants (e.g. 9mm Melamine MDF) of NZ Panels products.

Conversion factors of per m² of Melamine MDF 9mm

Table 16 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	0.40	1.00	0.51	1.00	0.51	1.00
GWP-fossil	kg CO2 eq.	0.60	1.00	0.51	1.00	0.51	1.00
GWP-biogenic	kg CO2 eq.	0.51	1.00	1.00	1.00	0.51	1.00
GWP-luluc	kg CO2 eq.	0.57	1.00	0.51	1.00	0.51	1.00
ODP	kg CFC 11 eq.	0.51	1.00	0.51	1.00	0.51	1.00
AP	mol H+ eq.	0.49	1.00	0.51	1.00	0.51	1.00
EP - F	kg P eq.	0.81	1.00	0.51	1.00	0.51	1.00
EP - M	kg N eq.	0.47	1.00	0.51	1.00	0.51	1.00
EP - T	mol N eq.	0.48	1.00	0.51	1.00	0.51	1.00
POCP	kg NMVOC eq.	0.45	1.00	0.51	1.00	0.51	1.00
ADP	kg Sb eq.	0.50	1.00	0.51	1.00	0.51	1.00
ADPF	MJ	0.60	1.00	0.51	1.00	0.51	1.00
WDP	m3 eq. deprived	0.58	1.00	0.51	1.00	0.51	1.00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 17 | Conversion Factors for Resource use per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A2:2019

Indicator	A1-A3	C1	C2	C3	C4	D
PERE	0.50	1.00	0.51	1.00	0.51	0.51
PERM	0.51	1.00	1.00	0.51	1.00	1.00
PERT	0.51	1.00	0.51	0.51	0.51	0.51
PENRE	0.60	1.00	0.51	1.00	0.51	0.55
PENRM	0.60	1.00	1.00	0.55	1.00	1.00

PENRT	0.60	1.00	0.51	0.55	0.51	0.55
SM	0.50	1.00	1.00	1.00	1.00	1.00
RSF	0.50	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00
FW	0.54	1.00	0.51	1.00	0.51	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 18 | Conversion Factors for Waste generated per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	0.50	1.00	1.00	1.00	1.00	1.00
Non-hazardous waste disposed	0.50	1.00	1.00	1.00	0.51	1.00
Radioactive waste disposed/stored	0.50	1.00	1.00	1.00	1.00	1.00

Table 19 | Conversion Factors for Output flows per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	0.50	1.00	1.00	1.00	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00

Table 20 | Conversion Factors for Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
GWP-GHG	0.60	1.00	0.51	1.00	0.51	1.00
Particulate matter	0.62	1.00	0.51	1.00	0.51	1.00
Ionising radiation - human health**	0.61	1.00	0.51	1.00	0.51	1.00
Ecotoxicity – freshwater*	0.60	1.00	0.51	1.00	0.51	1.00
Human toxicity potential - cancer effects*	0.67	1.00	0.51	1.00	0.51	1.00
Human toxicity potential - non cancer effects*	0.54	1.00	0.51	1.00	0.51	1.00
Soil quality*	0.79	1.00	0.51	1.00	0.51	1.00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage					

Table 21 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 9mm product in accordance with EN15804+A1 2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	0.60	1.00	0.51	1.00	0.51	1.00
Ozone layer depletion	0.51	1.00	0.51	1.00	0.51	1.00
Acidification potential	0.49	1.00	0.51	1.00	0.51	1.00
Eutrophication potential	0.57	1.00	0.51	1.00	0.51	1.00
Photochemical ozone creation potential	0.55	1.00	0.51	1.00	0.51	1.00
Abiotic depletion potential for non-fossil resources	0.50	1.00	0.51	1.00	0.51	1.00
Abiotic depletion potential for fossil resources	0.50	1.00	1.00	1.00	0.51	1.00

Conversion factors of per m² of Melamine MDF 12mm

Table 22 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	0.61	1.00	0.67	1.00	0.67	1.00
GWP-fossil	kg CO2 eq.	0.73	1.00	0.67	1.00	0.67	1.00
GWP-biogenic	kg CO2 eq.	0.67	1.00	1.00	1.00	0.67	1.00
GWP-luluc	kg CO2 eq.	0.72	1.00	0.67	1.00	0.67	1.00
ODP	kg CFC 11 eq.	0.67	1.00	0.67	1.00	0.67	1.00
AP	mol H+ eq.	0.64	1.00	0.67	1.00	0.67	1.00
EP - F	kg P eq.	0.87	1.00	0.67	1.00	0.67	1.00
EP - M	kg N eq.	0.62	1.00	0.67	1.00	0.67	1.00
EP - T	mol N eq.	0.64	1.00	0.67	1.00	0.67	1.00
POCP	kg NMVOC eq.	0.61	1.00	0.67	1.00	0.67	1.00
ADP	kg Sb eq.	0.67	1.00	0.67	1.00	0.67	1.00
ADPF	MJ	0.73	1.00	0.67	1.00	0.67	1.00
WDP	m3 eq. deprived	0.72	1.00	0.67	1.00	0.67	1.00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 23 | Conversion Factors for Resource use per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A2:2019

Indicator	A1-A3	C1	C2	C3	C4	D
PERE	0.67	0.67	1.00	0.67	1.00	0.67
PERM	0.67	0.67	1.00	1.00	0.67	1.00
PERT	0.67	0.67	1.00	0.67	0.67	0.67
PENRE	0.73	0.73	1.00	0.67	1.00	0.67
PENRM	0.73	0.73	1.00	1.00	0.70	1.00
PENRT	0.73	0.73	1.00	0.67	0.70	0.67
SM	0.67	0.67	1.00	1.00	1.00	1.00
RSF	0.67	0.67	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00
FW	0.70	0.70	1.00	0.67	1.00	0.67
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 24 | Conversion Factors for Waste generated per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	0.67	1.00	1.00	1.00	1.00	1.00
Non-hazardous waste disposed	0.67	1.00	1.00	1.00	0.67	1.00
Radioactive waste disposed/stored	0.67	1.00	1.00	1.00	1.00	1.00

Table 25 | Conversion Factors for Output flows per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	0.67	1.00	1.00	1.00	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00

Table 26 | Conversion Factors for Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
GWP-GHG	0.73	1.00	0.67	1.00	0.67	1.00
Particulate matter	0.74	1.00	0.67	1.00	0.67	1.00
Ionising radiation - human health**	0.74	1.00	0.67	1.00	0.67	1.00
Ecotoxicity – freshwater*	0.73	1.00	0.67	1.00	0.67	1.00
Human toxicity potential - cancer effects*	0.78	1.00	0.67	1.00	0.67	1.00
Human toxicity potential - non cancer effects*	0.69	1.00	0.67	1.00	0.67	1.00
Soil quality*	0.86	1.00	0.67	1.00	0.67	1.00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage					

Table 27 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 12mm product in accordance with EN15804+A1 2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	0.73	1.00	0.67	1.00	0.67	1.00
Ozone layer depletion	0.67	1.00	0.67	1.00	0.67	1.00
Acidification potential	0.64	1.00	0.67	1.00	0.67	1.00
Eutrophication potential	0.70	1.00	0.67	1.00	0.67	1.00
Photochemical ozone creation potential	0.69	1.00	0.67	1.00	0.67	1.00
Abiotic depletion potential for non-fossil resources	0.67	1.00	0.67	1.00	0.67	1.00
Abiotic depletion potential for fossil resources	0.67	1.00	1.00	1.00	0.67	1.00

Conversion factors of per m² of Melamine MDF 16mm

Table 28 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	0.87	1.00	0.89	1.00	0.89	1.00
GWP-fossil	kg CO2 eq.	0.91	1.00	0.89	1.00	0.89	1.00
GWP-biogenic	kg CO2 eq.	0.89	1.00	1.00	1.00	0.89	1.00
GWP-luluc	kg CO2 eq.	0.90	1.00	0.89	1.00	0.89	1.00
ODP	kg CFC 11 eq.	0.89	1.00	0.89	1.00	0.89	1.00
AP	mol H+ eq.	0.87	1.00	0.89	1.00	0.89	1.00
EP - F	kg P eq.	0.96	1.00	0.89	1.00	0.89	1.00
EP - M	kg N eq.	0.86	1.00	0.89	1.00	0.89	1.00
EP - T	mol N eq.	0.87	1.00	0.89	1.00	0.89	1.00
POCP	kg NMVOC eq.	0.86	1.00	0.89	1.00	0.89	1.00
ADP	kg Sb eq.	0.89	1.00	0.89	1.00	0.89	1.00
ADPF	MJ	0.91	1.00	0.89	1.00	0.89	1.00
WDP	m3 eq. deprived	0.91	1.00	0.89	1.00	0.89	1.00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 29 | Conversion Factors for Resource use per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A2:2019

Indicator	A1-A3	C1	C2	C3	C4	D
PERE	0.89	1.00	0.89	1.00	0.89	0.89
PERM	0.89	1.00	1.00	0.89	1.00	1.00
PERT	0.89	1.00	0.89	0.89	0.89	0.89
PENRE	0.91	1.00	0.89	1.00	0.89	0.90
PENRM	0.91	1.00	1.00	0.90	1.00	1.00
PENRT	0.91	1.00	0.89	0.90	0.89	0.90
SM	0.89	1.00	1.00	1.00	1.00	1.00
RSF	0.89	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00
FW	0.90	1.00	0.89	1.00	0.89	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 30 | Conversion Factors for Waste generated per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	0.89	1.00	1.00	1.00	1.00	1.00
Non-hazardous waste disposed	0.89	1.00	1.00	1.00	0.89	1.00
Radioactive waste disposed/stored	0.89	1.00	1.00	1.00	1.00	1.00

Table 31 | Conversion Factors for Output flows per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	0.89	1.00	1.00	1.00	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00

Table 32 | Conversion Factors for Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
GWP-GHG	0.91	1.00	0.89	1.00	0.89	1.00
Particulate matter	0.91	1.00	0.89	1.00	0.89	1.00
Ionising radiation - human health**	0.91	1.00	0.89	1.00	0.89	1.00
Ecotoxicity – freshwater*	0.91	1.00	0.89	1.00	0.89	1.00
Human toxicity potential - cancer effects*	0.93	1.00	0.89	1.00	0.89	1.00
Human toxicity potential - non cancer effects*	0.90	1.00	0.89	1.00	0.89	1.00
Soil quality*	0.95	1.00	0.89	1.00	0.89	1.00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage					

Table 33 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 16mm product in accordance with EN15804+A1 2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	0.91	1.00	0.89	1.00	0.89	1.00
Ozone layer depletion	0.89	1.00	0.89	1.00	0.89	1.00
Acidification potential	0.87	1.00	0.89	1.00	0.89	1.00
Eutrophication potential	0.90	1.00	0.89	1.00	0.89	1.00
Photochemical ozone creation potential	0.89	1.00	0.89	1.00	0.89	1.00
Abiotic depletion potential for non-fossil resources	0.89	1.00	0.89	1.00	0.89	1.00
Abiotic depletion potential for fossil resources	0.89	1.00	1.00	1.00	0.89	1.00

Conversion factors of per m² of Melamine MDF 25mm

Table 34 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1.37	1.00	1.34	1.00	1.34	1.00
GWP-fossil	kg CO2 eq.	1.31	1.00	1.34	1.00	1.34	1.00
GWP-biogenic	kg CO2 eq.	1.34	1.00	1.00	1.00	1.34	1.00
GWP-luluc	kg CO2 eq.	1.30	1.00	1.34	1.00	1.34	1.00
ODP	kg CFC 11 eq.	1.34	1.00	1.34	1.00	1.34	1.00
AP	mol H+ eq.	1.46	1.00	1.34	1.00	1.34	1.00
EP - F	kg P eq.	1.14	1.00	1.34	1.00	1.34	1.00
EP - M	kg N eq.	1.50	1.00	1.34	1.00	1.34	1.00
EP - T	mol N eq.	1.46	1.00	1.34	1.00	1.34	1.00
POCP	kg NMVOC eq.	1.52	1.00	1.34	1.00	1.34	1.00
ADP	kg Sb eq.	1.34	1.00	1.34	1.00	1.34	1.00
ADPF	MJ	1.31	1.00	1.34	1.00	1.34	1.00
WDP	m3 eq. deprived	1.29	1.00	1.34	1.00	1.34	1.00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 35 | Conversion Factors for Resource use per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A2:2019

Indicator	A1-A3	C1	C2	C3	C4	D
PERE	1.35	1.00	1.34	1.00	1.34	1.34
PERM	1.34	1.00	1.00	1.34	1.00	1.00
PERT	1.34	1.00	1.34	1.34	1.34	1.34
PENRE	1.32	1.00	1.34	1.00	1.34	1.31
PENRM	1.28	1.00	1.00	1.31	1.00	1.00
PENRT	1.31	1.00	1.34	1.31	1.34	1.31
SM	1.35	1.00	1.00	1.00	1.00	1.00
RSF	1.35	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.32	1.00	1.34	1.00	1.34	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 36 | Conversion Factors for Waste generated per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	1.35	1.00	1.00	1.00	1.00	1.00
Non-hazardous waste disposed	1.35	1.00	1.00	1.00	1.34	1.00
Radioactive waste disposed/stored	1.35	1.00	1.00	1.00	1.00	1.00

Table 37 | Conversion Factors for Output flows per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	1.38	1.00	1.00	1.00	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00

Table 38 | Conversion Factors for Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
GWP-GHG	1.32	1.00	1.34	1.00	1.34	1.00
Particulate matter	1.28	1.00	1.34	1.00	1.34	1.00
Ionising radiation - human health**	1.28	1.00	1.34	1.00	1.34	1.00
Ecotoxicity – freshwater*	1.28	1.00	1.34	1.00	1.34	1.00
Human toxicity potential - cancer effects*	1.23	1.00	1.34	1.00	1.34	1.00
Human toxicity potential - non cancer effects*	1.33	1.00	1.34	1.00	1.34	1.00
Soil quality*	1.15	1.00	1.34	1.00	1.34	1.00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage					

Table 39 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 25mm product in accordance with EN15804+A1 2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	1.31	1.00	1.34	1.00	1.34	1.00
Ozone layer depletion	1.34	1.00	1.34	1.00	1.34	1.00
Acidification potential	1.46	1.00	1.34	1.00	1.34	1.00
Eutrophication potential	1.36	1.00	1.34	1.00	1.34	1.00
Photochemical ozone creation potential	1.35	1.00	1.34	1.00	1.34	1.00
Abiotic depletion potential for non-fossil resources	1.34	1.00	1.34	1.00	1.34	1.00
Abiotic depletion potential for fossil resources	1.35	1.00	1.00	1.00	1.34	1.00

Conversion factors of per m² of Melamine MDF 30mm

Table 40 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A2:2019)

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1.64	1.00	1.60	1.00	1.61	1.00
GWP-fossil	kg CO2 eq.	1.58	1.00	1.60	1.00	1.60	1.00
GWP-biogenic	kg CO2 eq.	1.61	1.00	1.00	1.00	1.61	1.00
GWP-luluc	kg CO2 eq.	1.53	1.00	1.60	1.00	1.60	1.00
ODP	kg CFC 11 eq.	1.61	1.00	1.60	1.00	1.60	1.00
AP	mol H+ eq.	1.87	1.00	1.60	1.00	1.60	1.00
EP - F	kg P eq.	1.25	1.00	1.60	1.00	1.60	1.00
EP - M	kg N eq.	1.96	1.00	1.60	1.00	1.60	1.00
EP - T	mol N eq.	1.87	1.00	1.60	1.00	1.60	1.00
POCP	kg NMVOC eq.	2.00	1.00	1.60	1.00	1.60	1.00
ADP	kg Sb eq.	1.61	1.00	1.60	1.00	1.60	1.00
ADPF	MJ	1.56	1.00	1.60	1.00	1.60	1.00
WDP	m3 eq. deprived	1.52	1.00	1.60	1.00	1.60	1.00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;						

Table 41 | Conversion Factors for Resource use per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A2:2019

Indicator	A1-A3	C1	C2	C3	C4	D
PERE	1.62	1.00	1.60	1.00	1.60	1.61
PERM	1.60	1.00	1.00	1.61	1.00	1.00
PERT	1.61	1.00	1.60	1.61	1.60	1.61
PENRE	1.58	1.00	1.60	1.00	1.60	1.55
PENRM	1.49	1.00	1.00	1.55	1.00	1.00
PENRT	1.56	1.00	1.60	1.55	1.60	1.55
SM	1.62	1.00	1.00	1.00	1.00	1.00
RSF	1.62	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.56	1.00	1.60	1.00	1.60	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; 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 42 | Conversion Factors for Waste generated per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	1.62	1.00	1.00	1.00	1.00	1.00
Non-hazardous waste disposed	1.62	1.00	1.00	1.00	1.60	1.00
Radioactive waste disposed/stored	1.62	1.00	1.00	1.00	1.00	1.00

Table 43 | Conversion Factors for Output flows per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	1.66	1.00	1.00	1.00	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00

Table 44 | Conversion Factors for Additional environmental impacts per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A2:2019)

Indicator	A1-A3	C1	C2	C3	C4	D
GWP-GHG	1.58	1.00	1.60	1.00	1.60	1.00
Particulate matter	1.51	1.00	1.60	1.00	1.60	1.00
Ionising radiation - human health**	1.49	1.00	1.60	1.00	1.60	1.00
Ecotoxicity – freshwater*	1.50	1.00	1.60	1.00	1.60	1.00
Human toxicity potential - cancer effects*	1.41	1.00	1.60	1.00	1.60	1.00
Human toxicity potential - non cancer effects*	1.59	1.00	1.60	1.00	1.60	1.00
Soil quality*	1.26	1.00	1.60	1.00	1.60	1.00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage					

Table 45 | Conversion Factors for Environmental impacts per 1 m² of NZ Panels Melamine MDF 30mm product in accordance with EN15804+A1 2019)

Indicator	A1-A3	C1	C2	C3	C4	D
Global warming potential (GWP100)	1.58	1.00	1.60	1.00	1.60	1.00
Ozone layer depletion	1.61	1.00	1.60	1.00	1.60	1.00
Acidification potential	1.88	1.00	1.60	1.00	1.60	1.00
Eutrophication potential	1.66	1.00	1.60	1.00	1.60	1.00
Photochemical ozone creation potential	1.65	1.00	1.60	1.00	1.60	1.00
Abiotic depletion potential for non-fossil resources	1.61	1.00	1.60	1.00	1.60	1.00
Abiotic depletion potential for fossil resources	1.62	1.00	1.00	1.00	1.60	1.00

References

ALCAS, A. L. (2023). Australian Life Cycle Inventory (AusLCI) – v2.44. www.auslci.com.au

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

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

EPD International (2024). General Programme Instructions for the International EPD System, version 5.0, dated 2021-03-29. www.environdec.com.

c-PCR-006 (EN 16485:2014), v 1.0.0 - Wood and wood-based products for use in construction.

EPD International. (2024). PCR 2019:14, version 1.3.4 Construction Products. www.environdec.com.

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

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

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

The ecoinvent database version 3.10; https://ecoinvent.org/ecoinvent-v3-10/

One Click. (2023). Biogenic Carbon. https://oneclicklca.zendesk.com/hc/en-us/articles/360015036640-Biogenic-Carbon.