



ASH

MASSLAM

Laminated timber from Australian Sustainable Hardwoods

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO14025:2006 and EN15804+A2:2019/AC:2021 for:
MASSLAM laminated timber
from Australian Sustainable Hardwoods

Programme:	The International EPD® System, www.environdec.com
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EPD of multiple products, based on a representative product result. The products covered in the EPD are MASSLAM SL33, MASSLAM SL35, MASSLAM 38, and MASSLAM 45.

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

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Australian Sustainable Hardwoods (ASH) is an Australian timber manufacturer and with over 30 years' experience, sits at the forefront of hardwood innovation. ASH's philosophy centres around optimising timber usage, emphasising sustainability and maximising efficiency whilst remaining dedicated to compliance, safety and quality.

Driving innovation in construction, ASH have a history of developing new markets while manufacturing to the highest standards possible, by utilising contemporary and streamlined automation technology, innovative glue and coating systems.

ASH processes the equivalent of 120 000 m³ of sawlogs into timber feedstock per annum. This combined feedstock is used to supply ASH's 13 manufacturing lines which include mass timber, engineered flooring, finger-jointing, moulding, laminating, deep-splitting and set length docking.

The operation is based in Heyfield, Victoria across two sites and directly employs over 200 people. ASH produce a vast amount of hardwood products including mass timber solutions, engineered and solid timber flooring, components for windows, doors and staircases, external profiles, cladding, lining, moulding, architraves, benchtop, panels and more. These products are distributed throughout Australia and the world.

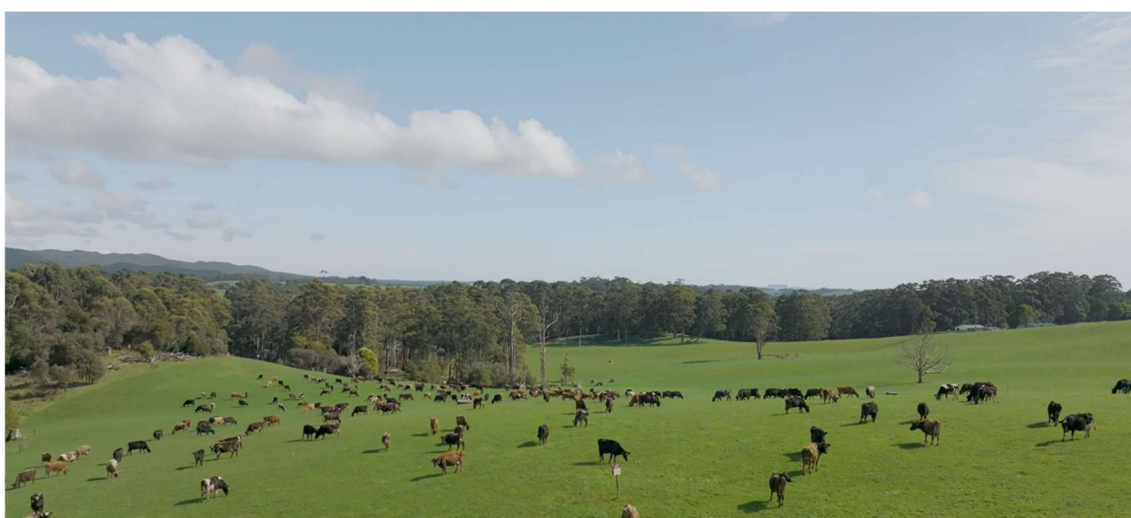


ASH is third-party audited for Australian Forest Standard (AFS), the Program for the Endorsement of Forest Certification Schemes (PEFC), the Environmental System ISO14001.

MASSLAM products are recognised under the Responsible Wood Certification Scheme. Responsible Wood is the Australian National Governing Body for PEFC, the world's largest forest certification system.



Nosswick timber plantation, Tasmania



Gunningham timber plantation, Tasmania

ASH Manufacturing Facilities

Decades of experience means we know what to look for in quality timber and cultivate the best conditions for it. Our process has been designed to get the most from harvest and maximise efficiency and quality in a safe manner. ASH's location in the Victorian regional town of Heyfield is not by chance. It was carefully selected in a dry belt on flat ground that naturally allows the right amount of sun and air flow to slowly equalise timber until it is ready for kiln drying.

Power for each kiln is created when burning dry sawdust – eliminating the need for fossil fuels or other non-renewable fuels for energy. Once inside the kiln, the timber is computer-monitored to regulate temperature, humidity and air circulation. The technology only allows the drying process to stop once the timber has reached the optimum moisture content of 10%.

At 10% moisture content, timber has completed most of its shrinking and is ready to be straight line cut (a process unique to ASH) to maximise efficiency for customers and eliminate the need for them to straighten on site. An ultrasound scanner is then used to search for internal defects and the timber is graded. The resulting product being the most stable, straight, well graded and dried timber possible.



MASSLAM Manufacturing

ASH has produced glue-laminated timber (GLT) products since 1996. The MASSLAM line extends on this experience by utilising advanced automated finger jointing and laminating equipment. We operate some of the largest and most efficient glulam CNC machines in the world. These include the new generation Hundegger K2i, Hundegger RobotMax, Hundegger RobotDrive and Hundegger Speedcut 3.

These machines can process sections up to 1 300 x 610 mm with millimetre accuracy in one automated process. The K2i has over 160 tools and 6-axis machining. Tools available include saws, chain saws, routers and drills – to name a few. The specific tools and machining strategies are chosen to optimise the processing time, increasing throughput.

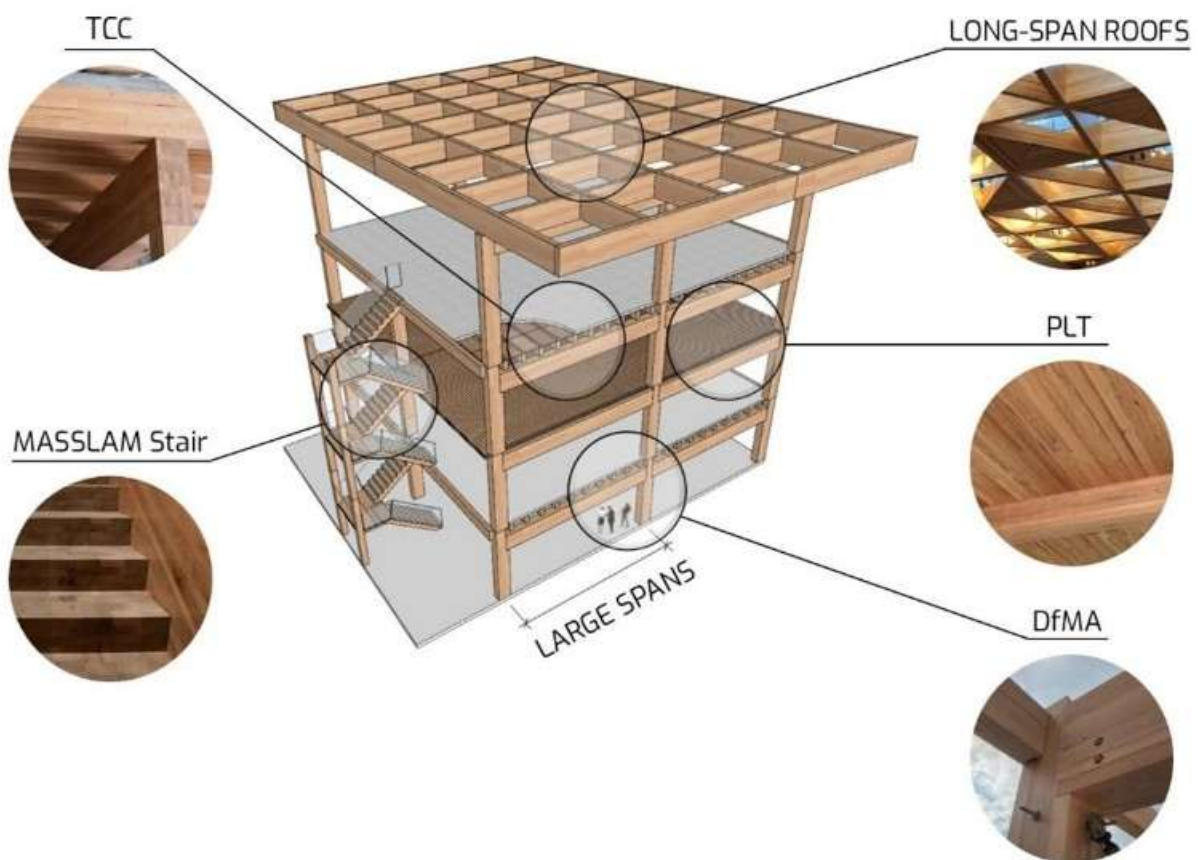


Heyfield production facility

Mass timber is made up of laminated layers of solid wood that are used in commercial and domestic structures. Our MASSLAM range is a high-quality building material that can be manufactured to suit each individual project specifications and needs by our expert engineering and production team.

MASSLAM can be used in applications such as:

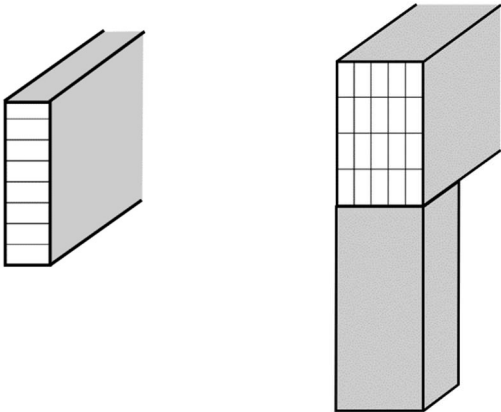
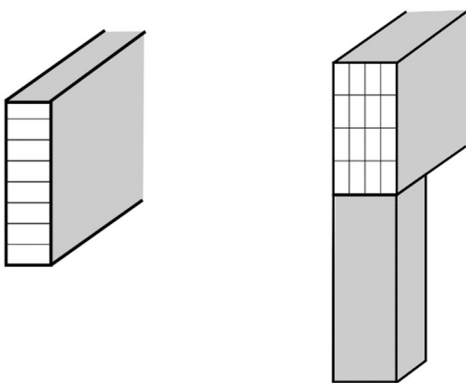
- a. Columns
- b. Beams
- c. Timber-concrete composite (TCC) floors
- d. Parallel-laminated timber (PLT) panels
- e. Stairs



The EPD is of multiple products, based on a representative product. EPD covers MASSLAM GLT untreated and treated products, in four product ranges: MASSLAM SL33, MASSLAM SL35, MASSLAM 38 and MASSLAM 45.

MASSLAM SL33 and MASSLAM 38 ranges of untreated product have a density of 600 kg/m³ and are identical per m³ (the same ratio of resin and timber per m³). MASSLAM SL35 and MASSLAM 45 ranges of untreated product have density of 650kg/m³ and are identical per m³ (the same ratio of resin and timber per m³)

MASSLAM SL33 and MASSLAM 38 ranges of treated product have the same composition as MASSLAM SL33 and MASSLAM 38 untreated products with an addition of a H3 water-based non-copper Azole + permethrin wood treatment solution to kiln dried timber. MASSLAM SL35 and MASSLAM 45 ranges of treated product have the same composition as MASSLAM SL35 and MASSLAM 45 untreated products with an addition of a H3 water-based non-copper Azole + permethrin wood treatment solution to kiln dried timber. The representative product, MASSLAM SL35 / MASSLAM 45 untreated, was chosen based on the higher density and higher production volume (90% of total production volume) compared to MASSLAM SL33 / MASSLAM 38.

MASSLAM SL33 MASSLAM 38		MASSLAM SL35 MASSLAM 45	
			
Plantation Oak (600kg/m ³)		Tasmanian Oak (650kg/m ³)	
Glue-Laminated Timber commonly used for:	Glue-Laminated Timber commonly used for:	Glue-Laminated Timber commonly used for:	Glue-Laminated Timber commonly used for:
<ul style="list-style-type: none"> - Purlins - Narrow members 	<ul style="list-style-type: none"> - Columns - Beams 	<ul style="list-style-type: none"> - Purlins 	<ul style="list-style-type: none"> - Columns - Beams

Classification

MASSLAM GLT products are made at ASH's Heyfield plant. Data was collected for all MASSLAM GLT products from the Heyfield plant, therefore the EPD is fully representative of ASH MASSLAM GLT production.

The UN CPC and ANZSIC codes applicable to MASSLAM GLT products in this EPD are shown in Table 1.

Table 1: Industry classification

Product	Classification	Code	Category
MASSLAM GLT Glue-Laminated Timber (GLT)	UN CPC Ver.2.1	31102	Wood sawn or chipped lengthwise, sliced or peeled, of thickness exceeding 6 mm, of non-coniferous wood
	ANZSIC 2006	1411	Log sawmilling
		1413	Timber re-sawing and dressing

Declared Unit

The Declared Unit for the EPD is 1 m³ (one cubic meter) of MASSLAM GLT product, at an estimated moisture content of 10% (dry basis) and an average density of 650 kg/m³, plus its packaging, at the factory gate.

Product packaging consists of plastic wrap (LDPE) with plastic straps (PP) and labels.

Product Composition

All wood products included in this EPD are made from the timber of Tasmanian Oak comprising of three eucalyptus species: Eucalyptus regnans, Eucalyptus delegatensis and Eucalyptus obliqua. All timber is sourced from publicly managed native forests. These forests are managed for multiple uses including sustainable wood production in Tasmania.

Preservative Treatments

All MASSLAM GLT products are available in untreated and treated form. Where product, requires to be treated a H3 water based non copper Azole + permethrin wood treatment solution to kiln dried timber is used. Timber treatment has been modelled based on available LCAFE datasets. Results of this EPD are based on a representative product, which is untreated MASSLAM SL35 / MASSLAM 45.

The content declaration for this EPD of multiple products is based on a representative product MASSLAM SL35 / MASSLAM 45 untreated.

Table 2: Content declaration for one cubic meter of product.

Product Components	Weight, kg/kg	Weight, %	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/declared unit
Kiln dried hardwood timber	641	98.60%	0%	98.60%	256
Polyurethane	9.18	1.41%	0%	0.0%	0
Treatment – Water Based Azole	0	0.0%	0%	0.0%	0
Total	650	100%	0%	98.60%	256

Table 3: Content declaration of Packaging for one cubic meter of product.

Packaging Materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/declared unit
LDPE wrap	2.05	0.32%	0
PP strapping	0.237	0.04%	0
Paper (labels)	0.0724	0.01	0.0362
Total	2.36	0.36%	0.0362

Products declared within this EPD do not knowingly contain materials identified in the European Chemicals Agency's Candidate List of Substances of Very High Concern (contaminants may be present below 0.1%, (European Union, 2024).

This EPD has a cradle-to-gate scope with options, Module C1-C4 and Module D (A1-A3 + C + D). The options include end-of-life processing (Module C1-C4) and the re-use, recovery and recycling potential (Module D).

Other life cycle stages (Module A4-A5, B1-B7) are dependent on particular scenarios and best modelled. At the building level, therefore these modules have not been declared.

Table 4: Modules included in the scope of the EPD

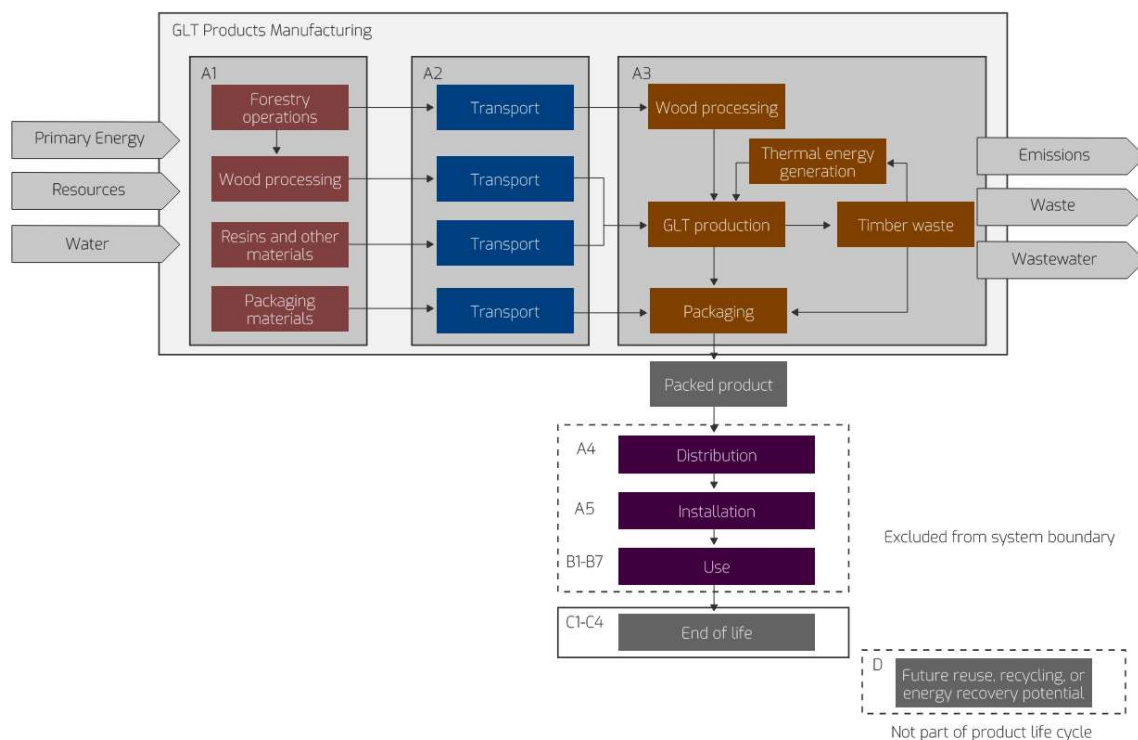
	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport of raw materials	Manufacturing	Transport to customer	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to waste processing	Waste processing	Disposal	Benefits and loads beyond the system boundary
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU	AU	AU										AU	AU	AU	AU	AU
Specific Data	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation: Products	0.03%					-	-	-	-	-	-	-	-	-	-	-	-
Variation: Sites	0.0%					-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD; ND = Module not declared (such a declaration shall not be regarded as an indicator result of zero)

Specific data includes GWP-GHG impacts related to the manufacturing processes (primarily electricity and thermal energy from biomass) and raw materials transport.

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.

MASSLAM system boundary



Product Stage (Modules A1-A3)

For MASSLAM GLT timber products in this EPD, the production stage includes the forestry, log transport from Tasmania to Hayfield site, log storage, sawmilling, kiln drying, planing and glulam production stages. The impacts include the production and use of fuels, thermal energy and electricity, production of auxiliary materials and packaging materials, and waste treatment of production wastes.

A1-A3 results include the 'balancing-out reporting' of the biogenic CO₂, PERM and PENRM of packaging released in module A5. This was done according to Annex 3 of PCR 2019:14 v1.3.3 (EPD International, 2024).

Module A1 (raw material supply)

Includes the source of wood logs, production of resins and other materials, generation and transmission of electricity in Victoria, Australia.

Module A2 (transport)

Includes the transportation of wood logs from suppliers to Heyfield site, via trucks and ship from Tasmania. Truck transport of resin and other materials used in the product manufacturing. The truck transport capacity utilisation of 50% and the ship transport capacity utilisation of 90% were used.

Module A3 (manufacturing)

Manufacturing of MASSLAM GLT includes all production steps (log storage, sawmilling, kiln drying, planing and glulam manufacturing), including the production of ancillary materials and the recycling and landfilling of manufacturing waste. It also includes on-site generation of thermal energy from biomass.

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

End of Life (Module C)

When the product reaches its end-of-life, MASSLAM GLT is removed from the building and may end up recycled, re-used, combusted to produce energy or landfilled. The end-of-life stage (Modules C1-C4) is modelled based on the published Australian construction timber waste data where the product is assumed to be partially disposed (59%), recycled (36%) and remaining (5%) is combusted to produce energy DCCEEW (2022).

Under EN 158054+A2, the carbon sequestration of timber has a net neutral impact over the whole life cycle because all sequestered carbon is released at the end-of-life stage. This means that assumptions of the decomposition of wood products and various end-of-life scenarios all have the same effect in terms of biogenic carbon.

Modules C1 (deconstruction/demolition)

Includes dismantling the MASSLAM GLT product after use. Dismantling includes use of a diesel fuelled excavator.

Modules C2 (transport to end-of-life)

Includes transport of waste MASSLAM GLT product to landfill, recycling or energy generation plant after demolition of the building where it was used. The estimated transport distance by truck is 50 km, with a truck capacity utilisation of 61%.

Module C3 (waste processing)

Energy recovery (use of secondary fuel)

Five percent of MASSLAM GLT product is assumed to be used for energy recovery. This option includes shredding (module C3) and combustion with the recovered thermal energy assumed to replace thermal energy from natural gas (module D) in line with EN16485:2014 (Section 6.3.4.5). Note that other options may be in use within Australia, including replacement of coal, replacement of electricity, and replacement of both electricity and thermal energy (via co-generation).

Recycling

Thirty six percent of MASSLAM GLT product is assumed to be recycled. Timber may be recycled in many different ways. This scenario considers shredding and effectively downcycling into wood chip. Wood waste is chipped (module C3) and assigned credits relative to the avoided production of virgin wood chip as a co-product from sawmilling (module D).

The European Union guidance on PEF and ratio/factor for R2 has not been used as it is more accurate to use Australian values published by Australian Government (DCCEEW, 2022). The assumed R2 value is 0.36 with quality of the recycled material set to 1 (ratio QR_{out}/Q_{Sub}).

The CO₂ sequestered and energy content of the wood are assumed to leave the system boundary at module C3 so that future products systems can also claim these without double-counting (EN 16485:2014, Section 6.3.4.2).

Modules C4 (disposal)

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

The DOCf = 0% for hardwood timber. This value is based on bioreactor laboratory research by (Ximenes, et al., 2013) and (Wang, et al., 2011) on blackbutt timber, one of the dominant hardwood species in Australia. In accordance with EN 15804+A2 (CEN, 2019), any remaining biogenic carbon not degraded is treated as an emission of biogenic CO₂ to the air.

The impacts associated with the landfill are declared in module C4. No landfill gas is generated due to DOCf being 0%.

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 CO₂ to the air.

The emission of biogenic CO₂ 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.

Refer to the Additional Environmental Information section for information on environmental impacts associated with 100% re-use of MASSLAM SL35 / MASSLAM 45 untreated product.

Table 5: End of life scenarios for products

Process	1 m ³
Excavator	Equivalent of 1 m ³ of MASSLAM GLT product
Recovery system specified by type	36% for recycling
	5% for energy recovery
Disposal specified by type	59% for landfill
Re-use	0% for re-use
Assumptions for scenario development	<p>C1 - Demolishing with an Excavator (100kW)- Fuel consumption is calculated at 0.172 kg diesel input per tonne of material.</p> <p>C2 - 50 km of transport by truck, 61% capacity utilisation</p> <p>C3 - 0.00228 MJ of diesel energy required to process 1 kg of woodchip.</p>

Upstream data

Specific data was used for all manufacturing processes up to the factory gate, including sawn milling, planing, kiln-drying and glulam production. Specific data for ASH operations at Heyfield site was collected for the 12-month period between 2022-01-01 - 2022-12-31. No changes to production technology have occurred since the data collection period and hence the data continues to be representative of current practice.

Forestry data used in the modelling if this EPD comes from the previous LCI work done on Hardwood Forestry for FWPA by thinkstep-anz (FWPA, 2022). The data is regionally applicable to Tasmanian forestry activities.

LCA Software and database

Sphera Solutions LCA for Experts (LCAFE) software version 10.8 was used together with Sphera Managed LCA Content database version 2023.2 (Sphera 2023) for all the data in the background system. Most datasets have a reference year between 2019 and 2024 and all fall within the 10-year limit allowable for generic data under EN 15804.

Electricity

MASSLAM GLT product manufacturing site at Heyfield, Victoria uses two sources of electricity. Glulam production uses 79% of total electricity use, which is supplied by 100% photovoltaic electricity purchased by ASH from generation covered under Large Generation Certificates.

All other manufacturing processes on the ASH's Heyfield site (sawn milling, planing and kiln-drying) use electricity supplied by Victorian grid mix. These processes use 21% of total electricity consumed in product manufacturing.

The emission factor for the 100% photovoltaic electricity for the GWP-GHG indicator is 0.0231 kg CO₂e/kWh (based on EF3.1) using Australian specific LCAFE datasets.

Victorian grid mix is modelled using the residual electricity mix on the market.

The composition of the residual electricity grid mix of Victoria is modelled in LCA FE based on published data for the financial year 2021-07-01 to 2022-06-30 (Australian Government, 2023). The Victorian residual electricity mix is made up of lignite (85.1%), photovoltaic (5.41%), and natural gas (3.25%). Of the remaining electricity, 3.02% is imported from Tasmania, 2.22% is imported from Southern Australia, and 0.96% is imported from New South Wales.

Onsite consumption (6.98%), and the low voltage (<1kV) grid's transmission and distribution losses (5.24%) are calculated based on data from the Australian Government Department of Climate Change, Energy, the Environment and Water (Australian Government, 2023).

The emission factor for the Victoria residual grid mix for the GWP-GHG indicator is 1.46 kg CO₂e/kWh (based on EF3.1).

Thermal energy for the kiln is generated onsite by the combustion of wood residues produced by the Heyfield site (by-product of dry shavings from planing).

Thermal energy, other than from biomass, and transport fuels have been modelled using the Australian average (Sphera 2023).

Representative Product

This EPD of multiple products, is based on MASSLAM SL35 / MASSLAM 45 untreated product, which was chosen based on the higher density and higher production volume compared to MASSLAM SL33 / MASSLAM 38.

Cut Off Criteria

Environmental impact relating to personally, infrastructure, and production equipment not directly consumed in the process are excluded from the system boundary as per PCR section 7.5.4.

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

All other reported data were incorporated and modelled using the best available life cycle inventory data.

Allocation

Process inputs, energy, water and waste in product manufacture were allocated on a mass basis. Where subdivision of processes was not possible, allocation rules listed in PCR chapter 4.5 have been applied.

By-product of planning is dry shavings. As difference in economic value of the co-product is high (>25% as per EN15804, Section 6.4.3.2), allocation by economic value has been applied.

End-of-life allocation follows the requirements of EN 15804:2017+A2:2019 Section 6.4.3.3 and generally follows the polluter pays principle.

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

- Table 6 contains the core environmental impact indicators in accordance with EN 15804:2012+A2:2019 describing the potential environmental impacts of the product.
- Table 7 shows the life cycle inventory indicators for resource use.
- Table 8 displays the life cycle inventory indicators for waste and other outputs.
- Table 9 provides additional environmental impact indicators in accordance with EN 15804:2012+A2:2019.
- Table 10 displays biogenic carbon content indicators.
- Table 11 contains results for environmental impact indicators in accordance with the EN 15804:2012+A1:2013 to aid backward comparability.

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

The use of primary energy is separated into energy used as raw material and energy used as energy carrier as per option C in Annex 3 in the PCT (EPD International, 2023) Energy indicators (MJ) are always given as net calorific value.

For MASSLAM GLT, the following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.
- Exported electrical energy (EEE) is zero since there is none produced.
- Exported thermal energy (EET) is zero since there is none produced.

Table 6: EN15804+A2 Core Environmental Impact Indicators

Impact category	Abbreviation	Unit
Climate change – total	GWP-total	kg CO ₂ -eq.
Climate change – fossil	GWP-fossil	kg CO ₂ -eq.
Climate change – biogenic	GWP-biogenic	kg CO ₂ -eq.
Climate change – land use and land use change	GWP-luluc	kg CO ₂ -eq.
Ozone depletion	ODP	kg CFC11-eq.
Acidification	AP	Mole of H ⁺ eq.
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.
Eutrophication aquatic marine	EP-marine	kg N eq.
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.
Photochemical ozone formation	POFP	kg NMVOC eq.
Depletion of abiotic resources – minerals and metals ^{1,2}	ADP-m&m	kg Sb-eq.
Depletion of abiotic resources – fossil fuels ¹	ADP-fossil	MJ
Water use ¹	WDP	m ³ world equiv.

¹The 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.

²The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Table 7: Life cycle inventory indicators on use of resources

Indicator	Abbreviation	Unit
Renewable primary energy as energy carrier	PERE	MJ
Renewable primary energy resources as material utilization	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Non-renewable primary energy as energy carrier	PENRE	MJ
Non-renewable primary energy as material utilization	PENRM	MJ
Total use of non-renewable primary energy resources	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Use of net fresh water	FW	m ³

Table 8: Life cycle inventory indicators on waste categories and output flows

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

Table 9: EN15804+A2 Additional Environmental Impact Indicators

Indicator	Abbreviation	Unit
GWP-GHG ¹	GWP-GHG ¹	kg CO ₂ eq.
GWP-GHG (IPCC AR5) ²	GWP-GHG (IPCC AR5) ²	kg CO ₂ eq.
Respiratory inorganics	PM	Disease incidences
Ionising radiation - human health ³	IRP ³	kBq U235 eq.
Ecotoxicity - freshwater	ETP-fw	CTUe
Human toxicity, cancer ⁴	HTP-c ⁴	CTUh
Human toxicity, non-cancer ⁴	HTP-nc ⁴	CTUh
Land use related impacts / soil quality ⁴	SQP ⁴	Pt

¹This indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero. It has been included in the EPD following the PCR.

²GWP-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.

³This 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.

⁴The 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.

Table 10: Biogenic carbon content indicators

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

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

Table 11: EN15804+A1 Environmental Impact Indicators

Indicator	Abbreviation	Unit
Climate change	GWP (A1)	kg CO ₂ -eq.
Ozone depletion potential	ODP (A1)	kg CFC11-eq.
Acidification potential of land and water	AP (A1)	kg SO ₂ -eq.
Eutrophication potential	EP (A1)	kg PO ₄ 3-- eq.
Photochemical ozone creation	POCP (A1)	Kg eEthane eq
Depletion abiotic resources - minerals & metals	ADPE (A1)	kg Sb-eq.
Depletion abiotic resources - fossil fuels	ADPF (A1)	MJ

Results for 1 m³ of MASSLAM SL35 / MASSLAM 45 untreated product plus its packaging at the factory gate.

EN15804+A2 - Environmental indicators								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
Climate change - total	GWP-total	kg CO ₂ -eq.	-7.48E+02	4.13E-01	2.66E+00	4.53E+02	6.79E+02	-1.01E+02
Climate change - fossil	GWP-fossil	kg CO ₂ -eq.	3.42E+02	4.13E-01	2.66E+00	2.62E+00	3.13E+01	-1.07E+02
Climate change - biogenic	GWP-biogenic	kg CO ₂ -eq.	-1.09E+03	4.81E-04	3.04E-03	4.50E+02	6.48E+02	5.44E+00
Climate change - land use and land use change	GWP-luluc	kg CO ₂ -eq.	9.74E-03	5.35E-06	3.49E-05	6.08E-05	2.24E-02	-1.29E-03
Ozone Depletion	ODP	kg CFC 11-eq.	2.70E-08	3.48E-14	2.27E-13	5.88E-14	5.25E-11	-7.88E-12
Acidification	AP	Mole of H ⁺ eq.	2.47E+00	2.05E-03	9.39E-03	2.32E-02	1.14E-01	-5.66E-01
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.	1.72E-04	6.70E-08	4.37E-07	4.70E-07	2.58E-05	-2.03E-05
Eutrophication aquatic marine	EP-marine	kg N eq.	1.07E+00	1.01E-03	4.44E-03	1.15E-02	3.24E-02	-2.64E-01
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.	1.17E+01	1.10E-02	4.90E-02	1.26E-01	3.57E-01	-2.89E+00
Photochemical ozone formation	POCP	kg NMVOC eq.	3.29E+00	2.81E-03	9.00E-03	3.18E-02	9.17E-02	-7.99E-01
Depletion of abiotic resources- minerals and metals ^{1,2}	ADPE ^{1,2}	kg Sb-eq.	6.06E-05	1.49E-09	9.74E-09	8.44E-09	8.50E-07	-8.15E-07
Depletion of abiotic resources - fossil fuels ¹	ADPF ¹	MJ	4.24E+03	5.59E+00	3.64E+01	3.50E+01	4.57E+02	-1.46E+03
Water use ¹	WDP ¹	m ³ world equiv.	4.36E+01	1.65E-03	1.07E-02	4.37E-03	3.32E+00	-6.67E+00

Results for 1 m³ of MASSLAM SL35 / MASSLAM 45 untreated product plus its packaging at the factory gate.

EN15804+A2 - Additional environmental indicators								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	GWP-GHG ¹	kg CO ₂ eq.	3.48E+02	4.13E-01	2.66E+00	2.62E+00	3.14E+01	-1.08E+02
GWP-GHG (IPCC AR5) ²	GWP-GHG (IPCC AR5) ²	kg CO ₂ eq.	3.47E+02	4.13E-01	2.66E+00	2.62E+00	3.14E+01	-1.08E+02
Respiratory inorganics	PM	Disease incidences	3.25E-05	2.39E-08	6.34E-08	5.70E-07	9.29E-07	-6.23E-06
Ionising radiation - human health ³	IRP ³	kBq U235 eq.	7.82E-01	1.02E-04	6.63E-04	1.23E-04	2.85E-01	-4.55E-02
Ecotoxicity - freshwater	ETP-fw	CTUe	1.73E+03	2.43E+00	1.58E+01	8.25E+00	2.46E+02	-5.07E+02
Human toxicity, cancer ⁴	HTP-c ⁴	CTUh	1.81E-07	3.99E-11	2.60E-10	1.71E-09	1.70E-08	-5.81E-08
Human toxicity, non-cancer ⁴	HTP-nc ⁴	CTUh	1.16E-05	8.55E-10	5.53E-09	3.06E-09	1.58E-06	-5.18E-06
Land use related impacts / soil quality ⁴	SQP ⁴	Pt	5.11E+03	1.03E-02	6.70E-02	5.16E-02	3.29E+01	-1.28E+03

Inventory indicators - Resource use								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	PERE	MJ	8.21E+03	2.03E-02	1.32E-01	3.66E-02	6.23E+01	4.00E+01
Renewable primary energy resources as material utilization	PERM	MJ	1.25E+04	0.00E+00	0.00E+00	-5.11E+03	0.00E+00	0.00E+00
Total use of renewable primary energy resources	PERT	MJ	2.07E+04	2.03E-02	1.32E-01	-5.11E+03	6.23E+01	4.00E+01
Non-renewable primary energy as energy carrier	PENRE	MJ	4.07E+03	5.59E+00	3.65E+01	3.50E+01	4.57E+02	-1.46E+03
Non-renewable primary energy as material utilization	PENRM	MJ	1.71E+02	0.00E+00	0.00E+00	-7.00E+01	0.00E+00	6.15E+01
Total use of non-renewable primary energy resources	PENRT	MJ	4.24E+03	5.59E+00	3.65E+01	-3.51E+01	4.57E+02	-1.40E+03
Use of secondary material	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E+02
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.24E+02
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.54E+00
Use of net fresh water	FW	m ³	6.84E-01	3.27E-05	2.13E-04	8.52E-05	1.13E-01	-8.67E-02

Results for 1 m³ of MASSLAM SL35 / MASSLAM 45 untreated product plus its packaging at the factory gate.

Inventory indicators - Waste material and output flow								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	HWD	kg	1.53E-06	4.04E-12	2.64E-11	2.21E-11	2.03E-08	-4.47E-08
Non-hazardous waste disposed	NHWD	kg	2.41E+01	1.21E-04	7.87E-04	4.03E-04	3.84E+02	-1.24E+00
Radioactive waste disposed	RWD	kg	7.31E-03	8.13E-07	5.31E-06	1.17E-06	2.69E-03	-3.40E-04
Components for re-use	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	9.66E-02	0.00E+00	0.00E+00	2.37E+02	0.00E+00	0.00E+00
Materials for energy recovery	MER	kg	0.00E+00	0.00E+00	0.00E+00	3.29E+01	0.00E+00	0.00E+00
Exported electrical energy	EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Inventory indicators - Biogenic carbon content								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
Biogenic carbon content - product	BCC-prod	kg	3.00E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content - packaging	BCC-pack	kg	3.17E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

EN15804+A1

EN15804+A1 - Environmental Indicators								
Environmental impact	Abb.	Unit	A1-A3	C1	C2	C3	C4	D
Climate change	GWP (A1)	kg CO ₂ eq.	-7.51E+02	4.12E-01	2.65E+00	4.53E+02	6.79E+02	-1.01E+02
Ozone depletion potential	ODP (A1)	kg CFC 11-eq.	3.18E-08	4.10E-14	2.68E-13	6.93E-14	6.18E-11	-9.27E-12
Acidification potential of land and water	AP (A1)	kg SO ₂ eq.	1.77E+00	1.42E-03	6.50E-03	1.61E-02	8.96E-02	-3.97E-01
Eutrophication potential	EP (A1)	kg PO ₄ ³⁻ eq.	3.62E-01	3.38E-04	1.51E-03	3.86E-03	1.13E-02	-8.88E-02
Photochemical ozone creation	POCP (A1)	kg Ethene eq.	2.78E-01	1.35E-04	-2.14E-03	1.44E-03	4.87E-03	-6.05E-02
Depletion abiotic resources - minerals & metals	ADPE (A1)	kg Sb eq.	6.07E-05	1.50E-09	9.77E-09	8.44E-09	8.66E-07	-8.16E-07
Depletion abiotic resources - fossil fuels	ADPF (A1)	MJ	4.19E+03	5.57E+00	3.63E+01	3.49E+01	4.48E+02	-1.46E+03

Variation

The maximum variation of GWP-GHG results within the product group is 0.03%. The variation is based on additional impact for treated MASSLAM SL35 / MASSLAM 45 due to use of H3 water based non copper Azole + permethrin wood treatment solution to kiln dried timber.

Additional Environmental Information

This additional information provides results for an alternative MASSLAM SL35 / MASSLAM 45 untreated end-of-life scenario.

In this scenario the product is assumed to be removed from a building manually and re-used with no further processing (i.e. direct re-use). Only one re-use cycle is considered. The second life is assumed to be the same (or very similar) to the first, meaning that a credit is given for production of 1 m³ of timber in module D. The CO₂ sequestered, and energy content of the wood are assumed to leave the system boundary at module C3 so the future product systems can also claim these without double-counting in line with EN 16485:2014 (section 6.3.4.2). Any further processing, waste or transport would need to be modelled and included separately.

Under EN 158054+A2, the carbon sequestration of timber has a net neutral impact over the whole life cycle because all sequestered carbon is released at the end of life stage. This means that assumptions of the decomposition of wood products and various end-of-life scenarios all have the same effect in terms of biogenic carbon.

End of life scenarios for products

Process	1 m ³
Removal from building	Equivalent of 1 m ³ of MASSLAM GLT product
Recovery system specified by type	0% for recycling
	0% for energy recovery
Disposal specified by type	0% for landfill
Re-use	100% for re-use
Assumptions for scenario development	C1 – no impacts C2 - 50 km of transport by truck to the place of re-use. 61% capacity utilisation. C3 – no impact apart from the ‘artificial release’ of biogenic carbon stored in the product so the biogenic carbon can be ‘accounted’ for in the subsequent life cycle.

Results for 1 m3 of MASSLAM SL35 / MASSLAM 45 untreated product plus its packaging at the factory gate.

Results for product with an alternative end-of-life scenario, where product is removed from the building manually and re-used with no further processing. Only one re-use cycle is considered.

EN15804+A2 - Environmental indicators								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
Climate change - total	GWP-total	kg CO ₂ -eq.	-7.48E+02	0.00E+00	2.66E+00	1.10E+03	0.00E+00	-3.42E+02
Climate change - fossil	GWP-fossil	kg CO ₂ -eq.	3.42E+02	0.00E+00	2.66E+00	0.00E+00	0.00E+00	-3.42E+02
Climate change - biogenic	GWP-biogenic	kg CO ₂ -eq.	-1.09E+03	0.00E+00	3.04E-03	1.10E+03	0.00E+00	0.00E+00
Climate change - land use and land use change	GWP-luluc	kg CO ₂ -eq.	9.74E-03	0.00E+00	3.49E-05	0.00E+00	0.00E+00	-9.74E-03

EN15804+A2 - Additional environmental indicators								
Indicator	Abbr.	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	GWP-GHG ¹	kg CO ₂ eq.	3.48E+02	0.00E+00	2.66E+00	0.00E+00	0.00E+00	-3.48E+02
GWP-GHG (IPCC AR5) ²	GWP-GHG (IPCC AR5) ²	kg CO ₂ eq.	3.47E+02	0.00E+00	2.66E+00	0.00E+00	0.00E+00	-3.47E+02

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

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

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

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Reference Year for Data

2022-01-01 to 2022-12-31

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Product Category Rules (PCR)

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

PCR:

PCR 2019.14 Construction Products, version 1.3.4 (published on 2024-04-30, valid until 2025-06-20)

C-PCR-006 Wood and wood-based products for use in construction (EN16485:2014), (published on 2019-12-20)

PCR review was conducted by:

The Technical Committee of the International EPD® System.

See www.environdec.com for a list of members.

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Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

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Verifier approved by:

EPD Australasia

Procedure for follow-up of data during
EPD validity involved third-party verifier

No