

# Environmental Product Declaration



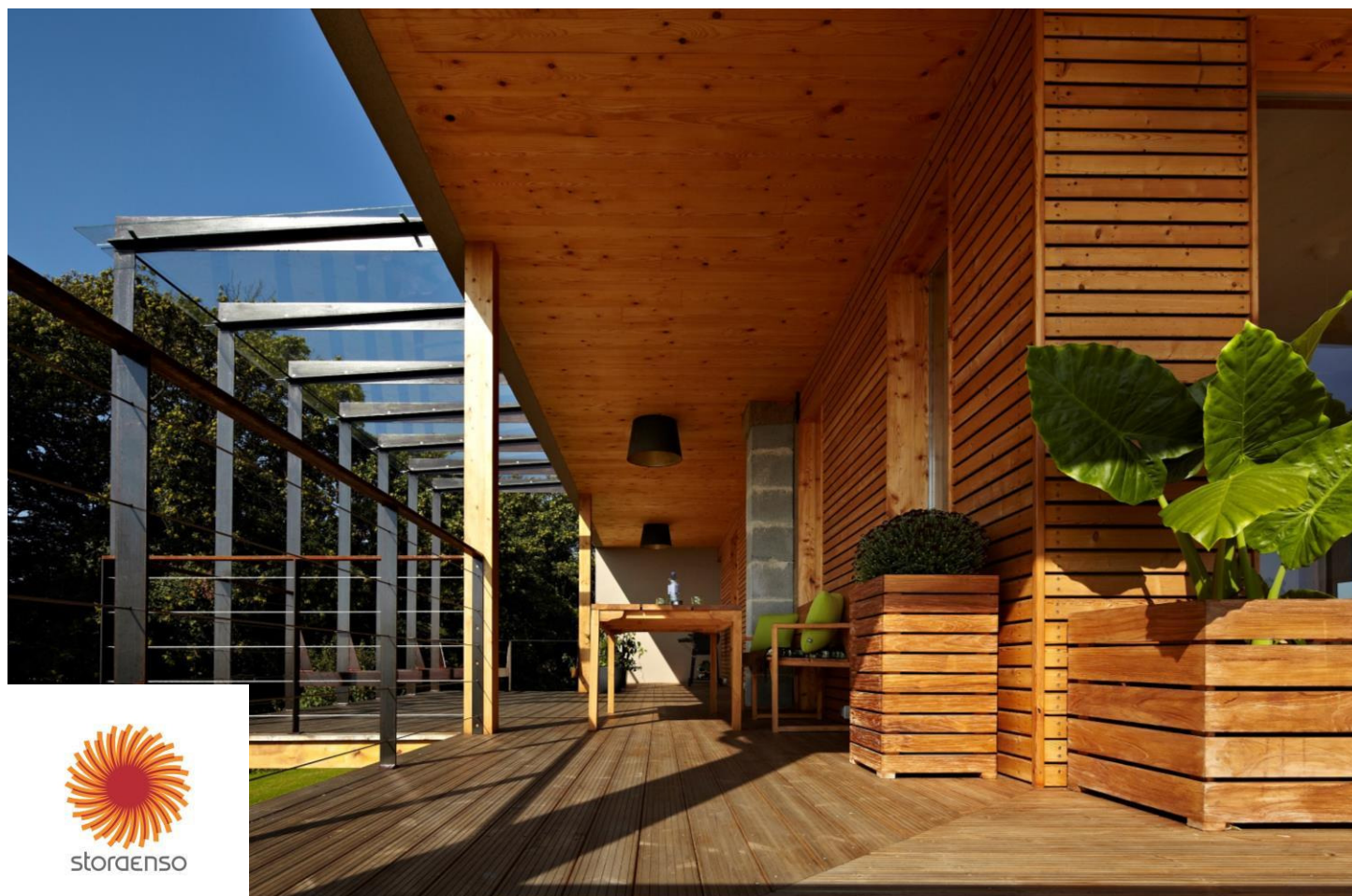
In accordance with ISO 14025 and EN 15804 for:

***ThermoWood***<sup>®</sup>

by

***Stora Enso***

Programme:	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	S-P-02155
ECO Platform registration number:	00001286
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Valid until:	2026-02-11



## Company information

### Owner of the EPD:

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Description of the organisation: Stora Enso is a leading provider of renewable solutions in packaging, biomaterials, wood and paper to global markets. Our customers include the packaging, joinery and construction industries as well as publishers, printing houses and paper merchants. Our aim is to replace non-renewable materials by innovating and developing new products and services based on wood and other renewable materials. Our focus is on fibre-based packaging, plantation-based pulp, innovations in biomaterials, and sustainable building solutions.

Stora Enso's Wood Products division is a market-leading provider of innovative wood-based products for construction and interior usages. Our product range covers all areas of urban construction including massive wood elements, wood components, engineered wood products and pellets. All our mills run an integrated management system, which is certified in accordance with Chain of Custody (FSC® and/or PEFC™), quality management (ISO 9001), environmental management (ISO 14001), health and safety (ISO 45001), and energy management (ISO 50001) requirements.

Name and location of production site: Stora Enso Wood Products, Launkalne Sawmill, Latvia

## Product information

Product name: ThermoWood® by Stora Enso

Product identification: ThermoWood® is produced according to the ITWA guidelines and audited via 3th party on yearly base. Just members of the ITWA ([www.thermowood.fi](http://www.thermowood.fi)) are allowed to use the brand ThermoWood®.

### Product description:

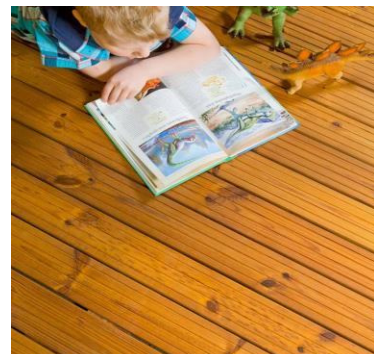
Stora Enso ThermoWood® is a thermo-treated wood produced using completely natural methods - heat and steam. The thermal treatment improves the wood's properties, opening up a wide range of applications for use outdoors or indoors.

### Use applications:

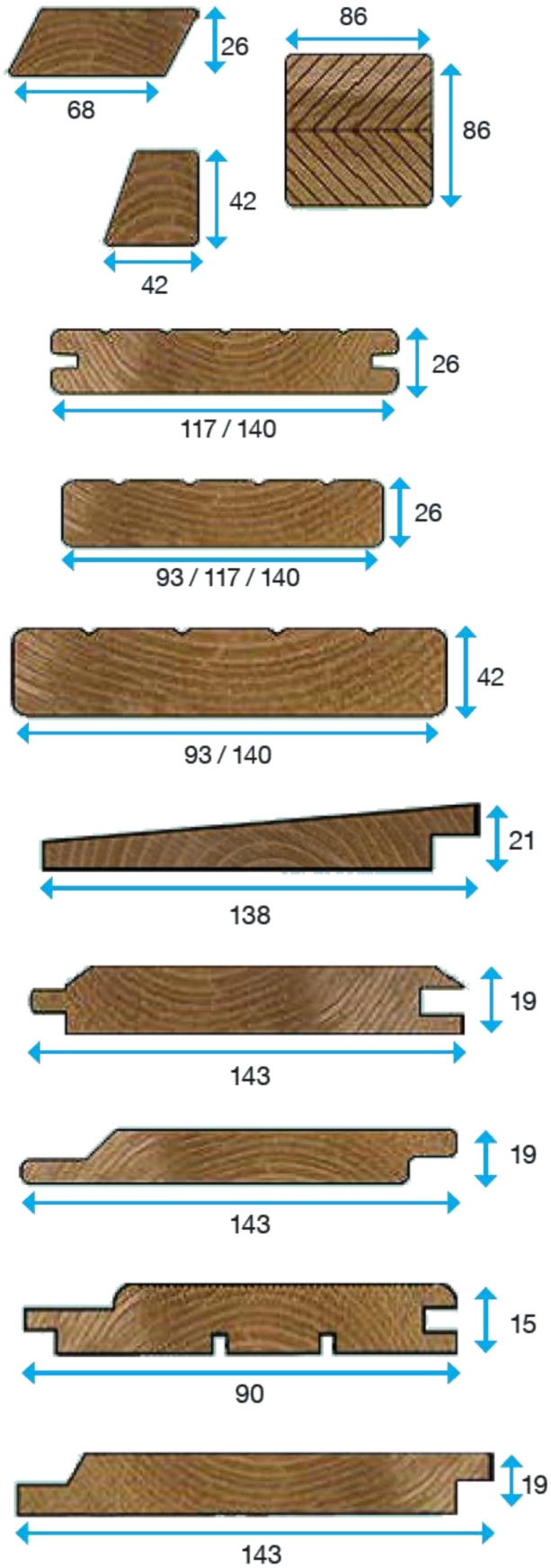
Thermowood® uses a patented production process and is a registered trademark that may only be used by licensed companies that are members of the International ThermoWood® Association.

The raw material for ThermoWood® comes from premium-quality pine and spruce from responsibly managed forests. Since no harmful chemicals are added during the treatment process, ThermoWood® contains only renewable substances.

Geographical origin: Latvia



Product examples:



## Technical information

Properties	Definition								
Use	Cladding and decking								
Standard dimensions*	<table border="1"> <thead> <tr> <th>Rough</th> <th>Planed</th> </tr> </thead> <tbody> <tr> <td>25x100/x125/x150</td> <td>19x92/x117/x142</td> </tr> <tr> <td>32x100/x125/x150</td> <td>26x92/x117/x142</td> </tr> <tr> <td>50x100/x125/x150</td> <td>42x92/x117/x142</td> </tr> </tbody> </table>	Rough	Planed	25x100/x125/x150	19x92/x117/x142	32x100/x125/x150	26x92/x117/x142	50x100/x125/x150	42x92/x117/x142
Rough	Planed								
25x100/x125/x150	19x92/x117/x142								
32x100/x125/x150	26x92/x117/x142								
50x100/x125/x150	42x92/x117/x142								
Wood species	Spruce ( <i>Picea abies</i> ), Pine ( <i>Pinus sylvestris</i> )								
Moisture content	6% ± 2% when dispatched from the mill								
Density	Mean density 430 kg/m <sup>3</sup>								
Heat treatment classes	ITWA standardizes heat treatment classes Thermo-D and Thermo-S								
Use class	Thermo-D products are suitable for use class 3 (EN335). Use class 3 is defined as "Situation in which the woodbased product is above ground and exposed to the weather (particular rain)".								
Durability class	Thermo-D products reach durability class 2 (EN350)								
Dimensional stability	Greatly reduced tendencies to warp, swell or shrink in different humidity conditions. Equilibrium moisture balance may be decreased to less than 40-50% compared to untreated timber.								
Thermal properties	Thermal conductivity is reduced by 20-25% compared with normal kiln dried softwood								
Resistance to fire	Fire class D, Thermowood can be treated with commercially available fire retardant to obtain a higher fire rating								

\* Non-standard dimensions possible, subject to enquiry, see examples above

## Biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per declared unit)
Biogenic carbon content in product	744 kg CO <sub>2</sub> eq. / m <sup>3</sup> = 202,9 kg C / m <sup>3</sup>
Biogenic carbon content in accompanying packaging	0 kg CO <sub>2</sub> eq. / m <sup>3</sup> = 0 kg C / m <sup>3</sup>
1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

## Product composition

Materials / chemical substances	kg	%	Notes
Wood ( <i>Picea abies</i> & <i>Pinus sylvestris</i> )	430	100	Water content 4,65% ± 0,9%
TOTAL	430	100	

The product does not contain any substances or products that are listed in the "Candidate List of Substances of Very High Concern for Authorisation".

## LCA information

Declared unit: 1 m<sup>3</sup> of Thermowood® with a moisture content of 6%

Reference Service Life (RSL): The RSL is understood as the period of time until the Thermowood® is replaced, rebuild, renovated or restored. Wood products can reach over 100 years' service life in service classes 1 and 2.

Time representativeness: Data for the study was collected from Stora Enso Wood Products mills and represents the year 2018. This data includes raw material, transport distances, fuels, energy consumption, packaging, produced sawn timber, by-products and waste. Data from ecoinvent 3.5 has been used for generic data. The allocation is performed according to EN15804. Physical, economic and energy allocations have been used.

Database used: Ecoinvent 3.5 (August 2018)

LCA software used: SimaPro 9.0

Description of system boundaries: cradle to gate with modules C1–C4 and module D

More information: Standards EN 15804:2012 + A2:2019, EN 16485:2014 and PCR 2019:14 from The International EPD® System provide the core product category rules for the assessment. Biogenic carbon content of wood is calculated in line with EN 16449:2014 standard.

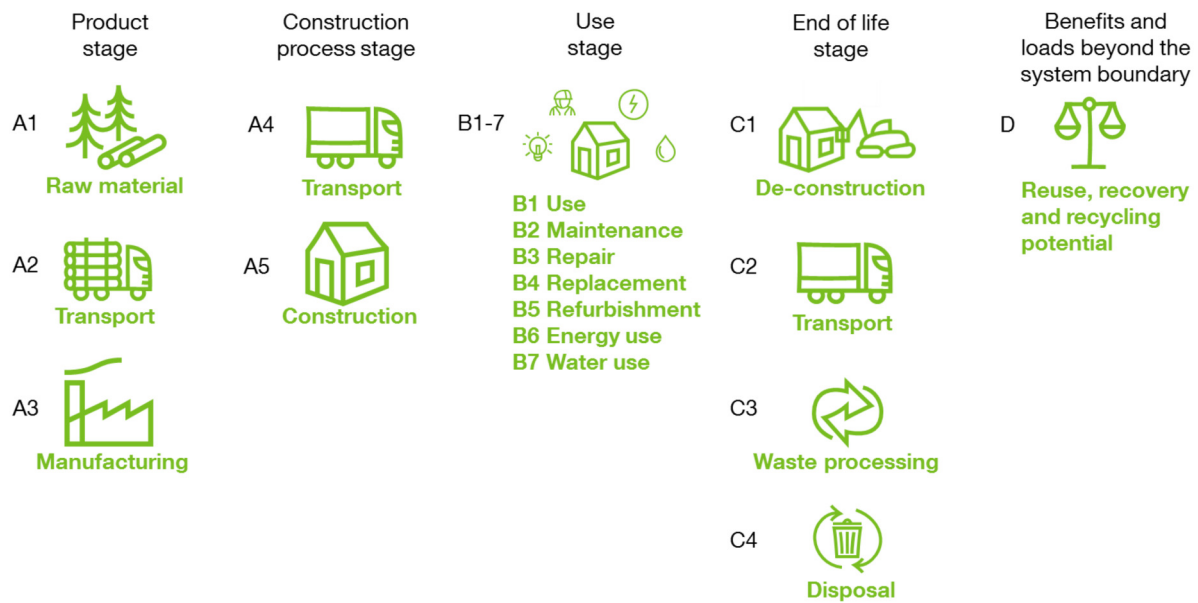
Target group: business to business & business to consumers

Cut-Off Rule: 1%. This rule is based on the assumption that the input flows do not have a major impact on the environmental impacts as a whole.

### System boundary:

Production			Con- struction		Use							End of Life				Loads & Benefits
Raw material	Transport supply	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy	Operational water	Deconstruction	Transport	Waste treatment	Disposal	Reuse / Recovery / Recycling
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
x = included			NR = module not relevant				ND = Module not declared									

The analyzed system is the complete life cycle of 1 m<sup>3</sup> Thermowood® to be used as products for interior and exterior uses. All life cycle stages according to EN 15804:2012 standard are included in the LCA, assuming that there is no maintenance needed over the reference service life.

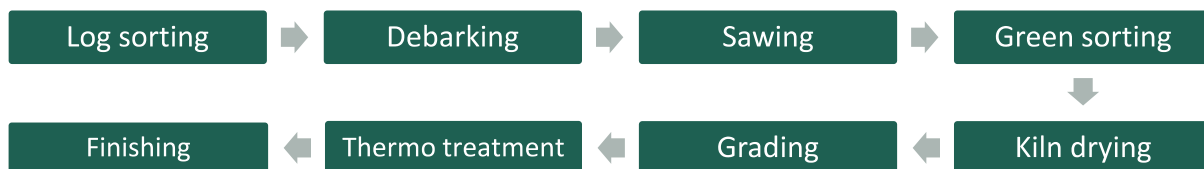


Product stage:

**A1:** This stage covers the extraction and processing of raw materials, such as forestry operations as well as glue production. All Stora Enso's wood raw material is sourced through a third-party certified wood traceability system. Stora Enso traceability system is certified according to FSC® and PEFC™ Chain of Custody systems.<sup>1</sup>

**A2:** This stage covers the transportation of the raw materials to the mill and the fuels needed for internal transportation. The wood supply operations cover procurement of softwood from Austria and Sweden. Purchased logs are spruce and pine logs transported with trucks and train.

**A3:** This stage covers the production of ThermoWood® and by-products. Generation of electricity or heat from primary energy resources are counted. Also packaging materials and the treatment of waste not leaving the factory with the product are counted.



Construction process stage:

**A4:** This stage shows additional information such as average figures from the transportation to the construction sites. There are no environmental impacts reported in this EPD, since there are multiple applications and usages possible. Specific transport information can be given on request.

**A5:** Construction process includes such packaging waste, which relates to the delivered product and construction of the product. There are no environmental impacts reported in this EPD, since there are multiple applications and usages possible.

Use stage:

**B1-B7:** There are no environmental impacts expected in the use phase, and at least no harmful substances are released to air, water or ground during the use of the product.

<sup>1</sup> FSC trademark license nr. C125195

End of life scenarios:

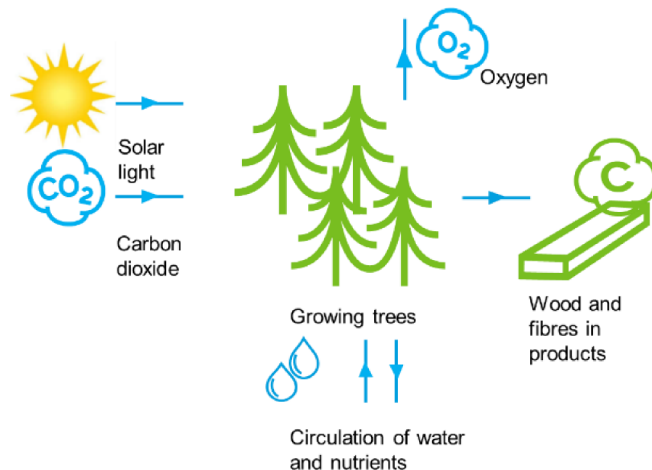
Three alternative scenarios have been developed for the end of life stage.

- ❖ **Recycling:** ThermoWood® chipping for recycling. C1: demolition of the building, C2: transportation to the sorting 50 km, C3: preparing for recycling, C4: chips to recycling, D: recovery of wood chips, substituting virgin material
- ❖ **Incineration:** ThermoWood® incineration for energy recovery C1: demolition of the building, C2: transportation to the sorting 50 km, C3: preparing for incineration, C4: chips to incineration (75% efficiency), D: substitution of natural gas in heat production
- ❖ **Landfilling:** ThermoWood® is landfilled. C1: demolition of the building, C2: transportation to the sorting 50 km, C3: preparing for landfilling, C4: landfilling process, D: the methane uptake from landfill partly substitutes natural gas in heat production

Carbon sequestration and storage:

The sequestration of carbon dioxide (CO<sub>2</sub>) is unique to renewable materials. Biogenic carbon content of a renewable material is an outcome of the CO<sub>2</sub> that has effectively been removed from the atmosphere by photosynthesis of growing trees and other plants, and turned into sugars (carbon) and oxygen. The quantity of atmospheric CO<sub>2</sub> has thus been reduced. The longer the CO<sub>2</sub> is not in the atmosphere but stays stored in a material, the greater the environmental benefit.

Biogenic carbon of wood is calculated according to the EN 16485 and 16449 standards. Half of the dry mass of wood is carbon. Each kg of stored biogenic carbon is equal to ~3.67 kg of CO<sub>2</sub>, which is effectively removed from the atmosphere. In case of sawn timber the biogenic carbon content is -744 kg CO<sub>2</sub> eq./m<sup>3</sup>. Biogenic carbon enters the product system in forest (module A1) and for calculation purpose it is assumed to leave latest from the product system in the end-of-life stage (module C). This assumption can be made when wood is sourced from sustainably managed forest.



**Sustainable wood**

Stora Enso practises and promotes economically, socially, and environmentally sustainable forest management. The two most significant forest certification systems recognised by Stora Enso are run by the Forest Stewardship Council (FSC®) <sup>1</sup> and the Programme for the Endorsement of Forest Certification (PEFC™).

**Storing carbon**

Trees absorb carbon dioxide and remove carbon from the atmosphere while growing. Wood products store the captured carbon. This helps reverse the greenhouse effect. Total carbon storage in the products are increased by re-using and recycling of products. Finally, when biogenic carbon is released back to atmosphere, growing trees will absorb carbon dioxide again.

**Recycling**

Wood is recyclable and a good resource for new fibre-based products or energy generation to substitute fossil materials and energy. Collection schemes and recycling rates depend on waste legislation, consumer behaviour, point of consumption, local collection system and infrastructure. EU target for building demolition waste recycling is 70% in 2020.



## Environmental performance – product / construction stage

### Potential environmental impact – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	A1	A2	A3	TOTAL A1-A3
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	8,42E+00	1,30E+01	5,67E+01	7,81E+01
	Biogenic *	kg CO <sub>2</sub> eq.	-7,44E+02*	5,31E-03	1,10E-01	-7,44E+02*
	Land use and land transformation	kg CO <sub>2</sub> eq.	2,18E-01	3,54E-03	3,24E-02	2,54E-01
	TOTAL *	kg CO <sub>2</sub> eq.	-7,35E+02*	1,30E+01	5,68E+01	-6,66E+02*
Ozone depletion potential (ODP)		kg CFC 11 eq.	1,71E-06	5,38E-06	8,31E-06	1,54E-05
Acidification potential (AP)		mol H <sup>+</sup> eq.	4,85E-02	5,65E-02	1,33E-01	2,38E-01
Eutrophication potential (EP)	freshwater	kg PO <sub>4</sub> eq.	9,67E-04	1,13E-03	2,63E-03	4,73E-03
	marine	kg N eq.	1,73E-02	9,79E-03	5,10E-02	7,80E-02
	terrestrial	mol N eq.	1,87E-01	1,09E-01	5,55E-01	8,51E-01
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	8,12E-02	4,32E-02	1,62E-01	2,87E-01
Abiotic depletion potential – Elements **		kg Sb eq.	1,42E-05	2,29E-05	1,64E-05	5,35E-05
Abiotic depletion potential – Fossil resources **		MJ, net calorific value	1,16E+02	3,41E+02	9,14E+02	1,37E+03
Water scarcity potential **		m <sup>3</sup> eq.	1,25E+00	2,11E+00	-9,95E-01	2,36E+00

### Use of resources - 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	A1	A2	A3	TOTAL A1-A3
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,69E+00	2,51E+00	1,04E+03	1,05E+03
	Used as raw materials	MJ, net calorific value	7,64E+03	0,00E+00	0,00E+00	7,64E+03
	TOTAL	MJ, net calorific value	7,64E+03	2,51E+00	1,04E+03	8,68E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1,21E+02	3,45E+02	9,26E+02	1,39E+03
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	1,21E+02	3,45E+02	9,26E+02	1,39E+03
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m <sup>3</sup>	2,28E-01	0,00E+00	0,00E+00	2,28E-01

### Waste production - 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	A1	A2	A3	TOTAL A1-A3
Hazardous waste disposed	kg	0,00E+00	0,00E+00	1,53E-02	1,53E-02
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	6,50E-01	6,50E-01
Radioactive waste disposed	kg	3,15E-07	9,59E-07	3,47E-07	1,62E-06

### Output flow - 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	A1	A2	A3	TOTAL A1-A3
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	4,16E-01	4,16E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00

\* biogenic carbon content in wood -744 kg CO<sub>2</sub>-eq.

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

\*\*\* The range is between the sawmills that has the lowest and the highest impact





## Environmental performance – End of Life “Recycling”

### Potential environmental impact – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	5,05E+00	0,00E+00	-5,25E+01
	Biogenic *	kg CO <sub>2</sub> eq.	5,69E-08	6,35E-04	7,44E+02*	0,00E+00	-7,45E+02*
	Land use and land transformation	kg CO <sub>2</sub> eq.	2,74E-08	4,78E-04	4,29E-04	0,00E+00	-2,94E-01
	TOTAL *	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	7,49E+02*	0,00E+00	-7,97E+02*
Ozone depletion potential (ODP)		kg CFC 11 eq.	7,30E-11	4,55E-07	1,14E-06	0,00E+00	-6,76E-06
Acidification potential (AP)		mol H <sup>+</sup> eq.	3,39E-06	5,88E-03	5,29E-02	0,00E+00	-4,23E-01
Eutrophication potential (EP)	freshwater	kg PO <sub>4</sub> eq.	1,48E-08	1,50E-04	2,31E-04	0,00E+00	-2,44E-02
	marine	kg N eq.	1,47E-06	1,24E-03	2,30E-02	0,00E+00	-8,05E-02
	terrestrial	mol N eq.	1,61E-05	1,38E-02	2,52E-01	0,00E+00	-1,28E+00
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	4,43E-06	5,40E-03	6,92E-02	0,00E+00	-3,48E-01
Abiotic depletion potential – Elements **		kg Sb eq.	1,08E-10	3,54E-06	1,69E-06	0,00E+00	-2,34E-04
Abiotic depletion potential – Fossil resources **		MJ, net calorific value	4,63E-03	2,97E+01	7,23E+01	0,00E+00	-8,57E+02
Water scarcity potential **		m <sup>3</sup> eq.	2,52E-05	2,24E-01	3,93E-01	0,00E+00	-5,80E+01

### Use of resources – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2,71E-05	3,19E-01	4,23E-01	0,00E+00	-3,81E+03
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	-7,64E+03	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	2,71E-05	3,19E-01	-7,64E+03	0,00E+00	-3,81E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,67E-03	3,02E+01	7,30E+01	0,00E+00	-1,04E+03
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	4,67E-03	3,02E+01	7,30E+01	0,00E+00	-1,04E+03
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m <sup>3</sup>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

### Waste production – 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	1,30E-11	8,17E-08	2,02E-07	0,00E+00	-1,49E-06

### Output flows – 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	4,30E+02	0,00E+00	-4,30E+02
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

\* biogenic carbon content in wood -744 kg CO<sub>2</sub>-eq.

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

## Environmental performance – End of Life “Incineration”

### Potential environmental impact – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	1,93E+01	0,00E+00	-3,79E+02
	Biogenic *	kg CO <sub>2</sub> eq.	5,69E-08	6,35E-04	7,44E+02*	0,00E+00	-3,17E-02*
	Land use and land transformation	kg CO <sub>2</sub> eq.	2,74E-08	4,78E-04	1,27E-02	0,00E+00	-1,33E-03
	TOTAL *	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	7,63E+02*	0,00E+00	-3,79E+02*
Ozone depletion potential (ODP)		kg CFC 11 eq.	7,30E-11	4,55E-07	2,36E-06	0,00E+00	-5,37E-05
Acidification potential (AP)		mol H <sup>+</sup> eq.	3,39E-06	5,88E-03	1,68E-01	0,00E+00	-1,53E-01
Eutrophication potential (EP)	freshwater	kg PO <sub>4</sub> eq.	1,48E-08	1,50E-04	7,02E-03	0,00E+00	1,37E-03
	marine	kg N eq.	1,47E-06	1,24E-03	6,90E-02	0,00E+00	-1,66E-02
	terrestrial	mol N eq.	1,61E-05	1,38E-02	7,15E-01	0,00E+00	-2,42E-01
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	4,43E-06	5,40E-03	1,83E-01	0,00E+00	-1,42E-01
Abiotic depletion potential – Elements **		kg Sb eq.	1,08E-10	3,54E-06	2,10E-05	0,00E+00	3,60E-06
Abiotic depletion potential – Fossil resources **		MJ, net calorific value	4,63E-03	2,97E+01	2,20E+02	0,00E+00	-6,13E+03
Water scarcity potential **		m <sup>3</sup> eq.	2,52E-05	2,24E-01	-2,78E+00	0,00E+00	-3,55E+00

### Use of resources – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2,71E-05	3,19E-01	1,16E+01	0,00E+00	-7,22E+00
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	-7,64E+03	0,00E+00	-7,64E+03
	TOTAL	MJ, net calorific value	2,71E-05	3,19E-01	-7,63E+03	0,00E+00	-7,65E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,67E-03	3,02E+01	2,42E+02	0,00E+00	-6,14E+03
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	4,67E-03	3,02E+01	2,42E+02	0,00E+00	-6,14E+03
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	7,64E+03	0,00E+00	-7,64E+03
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m <sup>3</sup>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

### Waste production – 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	1,30E-11	8,17E-08	4,43E-07	0,00E+00	-1,08E-06

### Output flows - 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	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	4,30E+02	0,00E+00	-4,30E+02
Exported energy	MJ	0,00E+00	0,00E+00	7,64E+03	0,00E+00	-7,64E+03

\* biogenic carbon content in wood -744 kg CO<sub>2</sub>-eq.

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

## Environmental performance – End of Life “Landfill”

### Potential environmental impact – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	0,00E+00	8,53E+00	-3,54E+00
	Biogenic *	kg CO <sub>2</sub> eq.	5,69E-08	6,35E-04	0,00E+00	1,78E+03*	-5,48E-04*
	Land use and land transformation	kg CO <sub>2</sub> eq.	2,74E-08	4,78E-04	0,00E+00	1,05E-03	-1,29E-04
	TOTAL *	kg CO <sub>2</sub> eq.	3,23E-04	1,82E+00	0,00E+00	1,79E+03*	-3,54E+00*
Ozone depletion potential (ODP)		kg CFC 11 eq.	7,30E-11	4,55E-07	0,00E+00	2,48E-06	-5,00E-07
Acidification potential (AP)		mol H <sup>+</sup> eq.	3,39E-06	5,88E-03	0,00E+00	8,50E-02	-2,90E-03
Eutrophication potential (EP)	freshwater	kg PO <sub>4</sub> eq.	1,48E-08	1,50E-04	0,00E+00	9,64E-04	-5,14E-05
	marine	kg N eq.	1,47E-06	1,24E-03	0,00E+00	1,79E-01	-7,69E-04
	terrestrial	mol N eq.	1,61E-05	1,38E-02	0,00E+00	3,82E-01	-8,59E-03
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	4,43E-06	5,40E-03	0,00E+00	4,14E-01	-2,93E-03
Abiotic depletion potential – Elements **		kg Sb eq.	1,08E-10	3,54E-06	0,00E+00	6,68E-06	-1,85E-07
Abiotic depletion potential – Fossil resources **		MJ, net calorific value	4,63E-03	2,97E+01	0,00E+00	1,65E+02	-5,65E+01
Water scarcity potential **		m <sup>3</sup> eq.	2,52E-05	2,24E-01	0,00E+00	9,88E-01	-8,80E-03

### Use of resources – 1m<sup>3</sup> Thermowood®

INDICATOR		UNIT	C1	C2	C3	C4	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2,71E-05	3,19E-01	0,00E+00	3,51E+00	-1,69E-01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	-7,64E+03	6,76E+01
	TOTAL	MJ, net calorific value	2,71E-05	3,19E-01	0,00E+00	-7,63E+03	6,74E+01
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,67E-03	3,02E+01	0,00E+00	1,72E+02	-5,68E+01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	4,67E-03	3,02E+01	0,00E+00	1,72E+02	-5,68E+01
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	6,76E+01	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m <sup>3</sup>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

### Waste production – 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	4,30E+02	0,00E+00
Radioactive waste disposed	kg	1,30E-11	8,17E-08	0,00E+00	4,64E-07	-1,42E-08

### Output flows – 1m<sup>3</sup> Thermowood®

INDICATOR	UNIT	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	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
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	6,76E+01	-6,76E+01

\* biogenic carbon content in wood -744 kg CO<sub>2</sub>-eq.

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

## Additional required impact indicator acc. PCR 2019:14

This indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product. This indicator support comparability with EPDs based on the previous version of EN 15804 (EN 15804:2012+A1:2013).

### Environmental performance – product / construction stage

INDICATOR	UNIT	A1	A2	A3	TOTAL A1-A3
GWP-GHG (acc. IPCC 2013)	kg CO <sub>2</sub> eq.	8,41E+00	1,28E+01	5,66E+01	7,77E+01

### Environmental performance – Recycling at the End-of-Life

INDICATOR	UNIT	C1	C2	C3	C4	D
GWP-GHG (acc. IPCC 2013)	kg CO <sub>2</sub> eq.	3,16E-04	1,81E+00	4,93E+00	0,00E+00	-5,11E+01

### Environmental performance – Incineration at the End-of-Life

INDICATOR	UNIT	C1	C2	C3	C4	D
GWP-GHG (acc. IPCC 2013)	kg CO <sub>2</sub> eq.	3,16E-04	1,81E+00	3,31E+00	0,00E+00	-3,90E+02

### Environmental performance – Landfill at the End-of-Life

INDICATOR	UNIT	C1	C2	C3	C4	D
GWP-GHG (acc. IPCC 2013)	kg CO <sub>2</sub> eq.	3,16E-04	1,81E+00	0,00E+00	8,56E+02	-3,50E+00

*Please note: Contrary to the results shown in the previous tables, the results for the GWP-GHG were calculated with a newer version of the LCA software (SimaPro 9.1) and a newer version of the background database (ecoinvent 3.6) These changes mean that the results due to updated datasets are not same anymore but almost equal to previous calculations with former software and database version.*

## Additional environmental impact indicators

Information about additional environmental impact indicators for each module is declared in “Environmental Product Declaration. Thermowood by Stora Enso – ANNEX A” and available on request:

INDICATOR	Particulate matter emissions	Ionising radiation, human health ***	Ecotoxicity (freshwater) **	Human toxicity, cancer effects **	Human toxicity, non- cancer effects **	Land use related impacts / soil quality **
UNIT	Disease incidence	kBq U235 eq.	CTUe	CTUe	CTUe	dimensionless

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

\*\*\* This 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.

## Environmental impact indicators acc. EN15804:2012 + A1:2013

Information about environmental impact for all modules as required in the former EN15804:2012 + A1:2013 are published in “Environmental Product Declaration. Thermowood by Stora Enso – ANNEX B” and available on request. This document should allow comparability between EPDs during the transition phase of the amendments to the “Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products” standards.

## Programme-related information and verification

<b>Programme:</b>	The International EPD® System  EPD International AB Box 210 60 SE-100 31 Stockholm Sweden  <a href="http://www.environdec.com">www.environdec.com</a> <a href="mailto:info@environdec.com">info@environdec.com</a>
<b>EPD registration number:</b>	S-P-02155
<b>Published:</b>	03-08-2020
<b>Revision:</b>	10-02-2021
<b>Valid until:</b>	11-02-2026
<b>Reference year for data:</b>	2018
<b>Geographical scope:</b>	Latvia
<b>Product category rules:</b>	PCR 2019:14, v.1.0 Construction products C-PCR-006 (to PCR 2019:14) Wood and wood-based products for use in construction
<b>UN CPC code:</b>	316 – Builders' joinery and carpentry of wood

<b>Independent third-party verification of the declaration and data, according to ISO 14025:2006:</b>	<input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
<b>LCA study conducted by:</b>	Stora Enso – Division Wood Products
<b>Third party verifier:</b>	Dr. Andrew Norton, Renuables Ltd.
<b>Approved by:</b>	The International EPD® System
<b>Procedure for follow-up of data during EPD validity involves third party verifier:</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

## References

General Programme Instructions of the International EPD® System. Version 3.01.  
C-PCR-006 (to PCR 2019:14). Wood and wood-based products for use in construction. Version 2019-12-20.

## Standards

EN 15804:2012 + A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

EN 16485:2014 Round and sawn timber. Environmental product declarations. Product category rules for wood and wood-based products for use in construction

EN 16449:2014 Wood and wood-based products. Calculation of the biogenic carbon content of wood and conversion to carbon dioxide

EN 15942:2012 Sustainability of construction works - Environmental product declarations - Communication format business-to-business

ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.

ISO 14044:2006 Environmental management. Life Cycle Assessment. Requirements and guidelines.

## Tools and databases

SimaPro 9.0 – LCA software by PRé Sustainability <http://simapro.com/>  
Ecoinvent 3.5 database. <http://www.ecoinvent.org/>

## Detailed product information



**Thermowood inspiration**  
[storaenso.com/thermowood](http://storaenso.com/thermowood)

## EPD owner and LCA author

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