

Owner: Frøslev Træ A/S  
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3<sup>rd</sup> PARTY VERIFIED

**EPD**

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**Owner of declaration**  
Frøslev Træ A/S  
Jens P. L. Petersens Vej 1, 6330  
Padborg  
VAT no. 14248331



**Issued:**  
27-01-2023

**Valid to:**  
27-01-2028

**Programme**  
EPD Danmark  
[www.epddanmark.dk](http://www.epddanmark.dk)



- Industry EPD
- Product EPD

**Declared product**  
Embla® ThermoWood®

Number of declared datasets/product variations: 1

**Production site**  
Jens P. L. Petersens Vej 1, 6330, Padborg, Denmark  
Wind electricity is used in A3 (production)

**Product use**  
Wood product for outdoor use as cladding and decking boards.

**Declared/ functional unit**  
1 m³ of Embla® ThermoWood® in various dimensions

**Year of production site data (A3)**  
April to October, 2022

**EPD version**  
2. version: Essential characteristics of product updated

**Basis of calculation**  
This EPD is developed in accordance with the European standard EN 15804+A2.

**Comparability**  
EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

**Validity**  
This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

**Use**  
The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

- EPD type**
- Cradle-to-gate with modules C1-C4 and D
  - Cradle-to-gate with options, modules C1-C4 and D
  - Cradle-to-grave and module D
  - Cradle-to-gate
  - Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier:  Ninkie Bendtsen

Martha Katrine Sørensen  
EPD Danmark

Life cycle stages and modules (MND = module not declared)																
Product			Construction process		Use							End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
<b>X</b>	<b>X</b>	<b>X</b>	MND	MND	MND	MND	MND	MND	MND	MND	MND	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# Product information

## Product description

The main product components are shown in the table below.

Material	Weight-% of declared product
Wood	94-95
Water	5-6

The wood species are pine and spruce.

A thermal modification of the wood provides better dimensional stability, less water penetration and improved durability against fungal attack. The product is for outdoor use as cladding and decking boards.

## Product packaging:

The only sales and transport packaging used is small quantities of wood joists and a recycled plastic band.

Packaging	Weight (kg)
Polyester band	0,16

## Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of Embla® ThermoWood® from the production site located in Padborg. Product specific data are primarily based on average values collected in a measuring period from april to october 2022. Background data are based on published EPD's and on GaBi database version 2022.1 and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

## Picture of product(s)

## Hazardous substances

The product does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

## Essential characteristics

The product is ITWA certified to class Thermo-D (212 °C): exterior applications, UC3 (EN 335), DC2 (EN 350) and has a reaction to fire classification of D-s1, d0.

Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

<https://www.froeslev.dk/da/vores-trae/Froeslev-Embla-ThermoWood/>

## Reference Service Life (RSL)

An RSL of 60 years is defined based on a normal use of the products.



## LCA background

### Declared unit

The LCI and LCIA results in this EPD relates to one cubic meter of Embla® ThermoWood®:

Name	Value	Unit
Declared unit	1	m <sup>3</sup>
Density	400 - 450	kg/m <sup>3</sup>
Conversion factor to 1 kg.	0.002	-

### Functional unit

Not defined

### PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and EN 16485.

### Guarantee of Origin – certificates

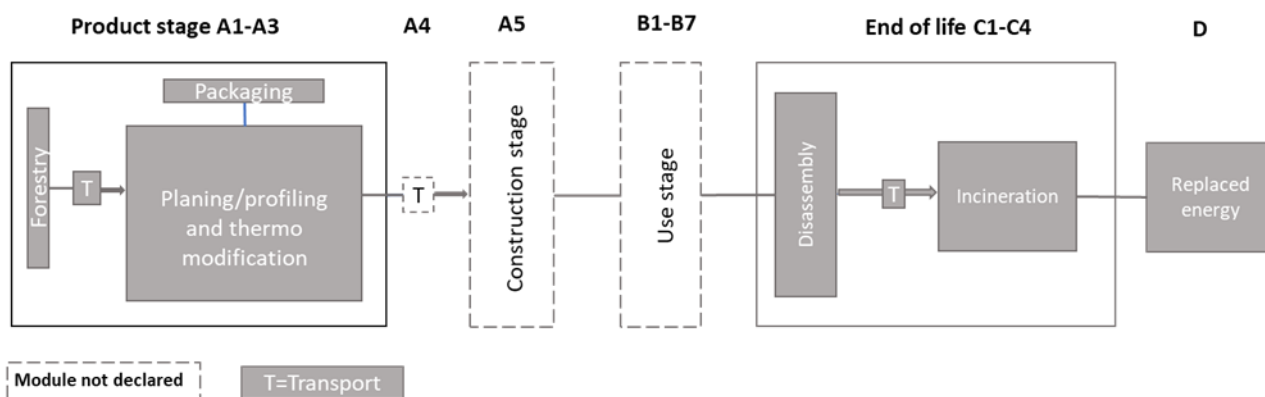
Foreground system:

The product is produced using Danish wind electricity covered by GO in production.

Background system:

Upstream and downstream processes are modelled using the electricity sources, which the applied datasets are based on. This information is rarely specified in the background documentation of the Sphera and eco-invent datasets. However, it is typically based on national electricity grid mix.

### Flowdiagram



### System boundary

This EPD is based on a cradle-to-gate with modules C1-C4 and D LCA, in which 100 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

#### **Product stage (A1-A3) includes:**

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

At the production site the wood is planed/profiled and thermo modified to improve the wood characteristics. Finally, the wood is packed for shipping.

#### **End of Life (C1-C4) includes:**

The end of life scenario is for Denmark. The calculations are based on a transport distance of 100 km to waste processing.

The end-of-life scenario for treatment of the products after the end of their useful life is by incineration with energy recovery. This is a common treatment method in Denmark, although the products can also be recycled and recycling is also a common treatment method for wood waste.

There is no waste to landfill in module C4.

#### **Re-use, recovery and recycling potential (D) includes:**

This module includes net impacts and benefits from avoided Danish average electricity production and thermal energy recovery.

# LCA results

ENVIRONMENTAL IMPACTS PER M <sup>3</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO2 eq.]	-4,65E+02	0,00E+00	2,54E+00	7,50E+02	0,00E+00	-3,58E+02
GWP-fossil	[kg CO2 eq.]	2,72E+02	0,00E+00	2,50E+00	1,23E+01	0,00E+00	-3,58E+02
GWP-biogenic*	[kg CO2 eq.]	-7,36E+02	0,00E+00	2,66E-02	7,38E+02	0,00E+00	-3,96E-01
GWP-luluc*	[kg CO2 eq.]	6,98E-01	0,00E+00	1,40E-02	2,57E-03	0,00E+00	-3,01E-02
ODP	[kg CFC 11 eq.]	7,55E-06	0,00E+00	1,50E-13	6,22E-11	0,00E+00	-1,33E-09
AP*	[mol H+ eq.]	1,20E+00	0,00E+00	8,12E-03	1,39E-01	0,00E+00	-2,70E-01
EP-freshwater	[kg P eq.]	5,97E-03	0,00E+00	7,49E-06	2,22E-05	0,00E+00	-4,35E-04
EP-marine*	[kg N eq.]	5,47E-01	0,00E+00	3,76E-03	3,49E-02	0,00E+00	-1,04E-01
EP-terrestrial*	[mol N eq.]	6,05E+00	0,00E+00	4,19E-02	5,97E-01	0,00E+00	-1,10E+00
POCP*	[kg NMVOC eq.]	1,43E+00	0,00E+00	7,34E-03	9,25E-02	0,00E+00	-2,81E-01
ADPm <sup>1*</sup>	[kg Sb eq.]	4,43E-04	0,00E+00	2,10E-07	1,91E-06	0,00E+00	-4,10E-05
ADPf <sup>1</sup>	[MJ]	4,50E+03	0,00E+00	3,36E+01	1,53E+02	0,00E+00	-5,59E+03
WDP <sup>1</sup>	[m3 world eq. deprived]	1,11E+01	0,00E+00	2,25E-02	7,57E+01	0,00E+00	-7,09E+00
Caption	GWP-total = Globale Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.						
Disclaimer	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						

Additional environmental impacts are not declared (ND), because values are not available for module A1.

ADDITIONAL ENVIRONMENTAL IMPACTS PER M <sup>3</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PM	[Disease incidence]	ND	ND	ND	ND	ND	ND
IRP <sup>2</sup>	[kBq U235 eq.]	ND	ND	ND	ND	ND	ND
ETP-fw <sup>1</sup>	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c <sup>1</sup>	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc <sup>1</sup>	[CTUh]	ND	ND	ND	ND	ND	ND
SQP <sup>1</sup>	-	ND	ND	ND	ND	ND	ND
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)						
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.						
Disclaimers	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						
	<sup>2</sup> 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.						

RESOURCE USE PER M <sup>3</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6,26E+03	0,00E+00	1,91E+00	6,63E+01	0,00E+00	-1,93E+03
PERM	[MJ]	7,48E+03	0,00E+00	0,00E+00	-7,48E+03	0,00E+00	0,00E+00
PERT	[MJ]	1,37E+04	0,00E+00	1,91E+00	-7,41E+03	0,00E+00	-1,93E+03
PENRE	[MJ]	4,52E+03	0,00E+00	3,36E+01	1,53E+02	0,00E+00	-5,59E+03
PENRM	[MJ]	2,91E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	4,55E+03	0,00E+00	3,36E+01	1,53E+02	0,00E+00	-5,59E+03
SM	[kg]	2,66E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m <sup>3</sup> ]	1,16E+00	0,00E+00	2,16E-03	1,78E+00	0,00E+00	-6,89E-01
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water						
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.						

WASTE CATEGORIES AND OUTPUT FLOWS PER M <sup>3</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	5,76E-02	5,76E-02	3,71E-09	2,16E-07	0,00E+00	1,61E-10
NHWD	[kg]	9,67E+00	8,86E+00	1,10E-01	7,04E-01	0,00E+00	4,82E-03
RWD	[kg]	4,38E-03	2,78E-03	9,58E-04	6,46E-04	0,00E+00	4,14E-05

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,99E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	9,84E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	1,03E+03	0,00E+00	0,00E+00
EET	[MJ]	1,13E+01	0,00E+00	0,00E+00	4,56E+03	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Eksporteret elektrisk energi; EET = Eksporteret termisk energi						
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.						

BIOGENIC CARBON CONTENT PER M <sup>3</sup>		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	201
Biogenic carbon content in accompanying packaging	[kg C]	0
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

## Additional information

### LCA interpretation

The majority of environmental impacts occur in the product stage (A1-A3). Here the energy needed for the thermo treatment process as well as the raw wood input and transportation to Denmark is decisive.

The biogenic carbon in the wood is in balance across the life cycle, as carbon incorporated in the wood is released again, when the wood is incinerated. The benefits of using the wood for energy production in incineration plants are material, because the wood replaces other sources of electricity and heat.

### Technical information on scenarios

#### Installation (A5)

Scenario information	Value	Unit
Plastic packaging for incineration	0.16	kg

#### End of life (C1-C4)

Scenario information	Value	Unit
Collected with mixed waste	425	kg
For energy recovery	425	kg

#### Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Electricity recovered	1033	MJ
Thermal energy recovered	4563	MJ



**Indoor air**

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.*

**Soil and water**

*The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.*

## References

<b>Publisher</b>	 <a href="http://www.epddanmark.dk">www.epddanmark.dk</a>
<b>Programme operator</b>	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup <a href="http://www.teknologisk.dk">www.teknologisk.dk</a>
<b>LCA-practitioner</b>	 FORCE Technology Applied Environmental Assessment Park Allé 345 DK-2605 Brøndby <a href="https://forcetechnology.com/da">https://forcetechnology.com/da</a>
<b>LCA software / background data</b>	GaBi ts incl. database version 2022.1 + Ecoinvent 3.8
<b>3<sup>rd</sup> party verifier</b>	Ninkie Bendtsen NIRAS A/S Sortemosevej 19 3450 Allerød

### General programme instructions

General Programme Instructions, version 2.0, spring 2020  
[www.epddanmark.dk](http://www.epddanmark.dk)

### EN 15804

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

### EN 16485

DS/EN 16485:2014 – "Round and sawn timber – Environmental Product Declarations – Product category rules for wood and wood-based products for use in construction"

### EN 15942

DS/EN 15942:2011 – "Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

### EPD: S-P-02537

EPD: S-P:02537:2021 – “Swedish sawn dried timber of spruce and pine”

**EPD: RTS\_82\_20**

EPD: RTS\_82\_20:2020 – “EPD of Finnish sawn and planed timber”

**ISO 14025**

DS/EN ISO 14025:2010 – “ Environmental labels and declarations – Type III environmental declarations – Principles and procedures”

**ISO 14040**

DS/EN ISO 14040:2008 – “ Environmental management – Life cycle assessment – Principles and framework”

**ISO 14044**

DS/EN ISO 14044:2008 – “ Environmental management – Life cycle assessment – Requirements and guidelines”