

Owner: Hørning Parket A/S  
No.: MD-24131-EN  
Issued: 08-10-2024  
Valid to: 08-10-2029

3<sup>rd</sup> PARTY VERIFIED

**EPD**

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**Owner of Declaration**  
Hørning Parket A/S  
Christiansmindevej 12  
8660 Skanderborg, Denmark  
CVR-nr.: 33965362



**Issued:**  
08-10-2024

**Valid to:**  
08-10-2029

**Basis of calculation**  
This EPD is developed in accordance with the European standard EN 15804:2012+A2:2019.

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



**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.

- Industry EPD
- Product EPD

**Validity**  
This EPD has been verified in accordance with ISO 14025:2010 and is valid for 5 years from the date of issue.

- Declared Products:**
- End Grain Floor, Spruce, 15-22 mm thickness (Untreated)
  - End Grain Floor, Pine, 15-22 mm thickness (Untreated)
  - End Grain Floor, Larch, 15-22 mm thickness (Untreated)

**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.

The EPD covers tree softwood species – spruce, pine and larch. The moisture content of the products is 8% ±2%

Number of declared datasets/product variations: 3

- 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

**Production Site:**  
Production site of Skanderborg in Denmark

- Use of Guarantees of Origin:**
- No certificates used
  - Electricity covered by GoO
  - Biogas covered by GoO

CEN standard EN 15804:2012+A2:2019 serves as the core PCR

Independent verification of the declaration and data, according to ISO 14025:2010

internal       external

Third party verifier:

Linda Højbye  
Life Cycle Assessment Consulting

**Product Use:**  
Solid wood flooring that is ready to be installed in accordance with the instructions of Hørning Parket A/S. The wood is cut against the grain, resulting in an extremely durable floor, which is particularly recommended for spaces subject to heavy loads. The floor is untreated and therefore requires surface treatment during installation (A5). The floor is intended for indoor use.

Martha Katrine Sørensen  
EPD Danmark

**Declared Unit:**  
1 m<sup>2</sup> of solid wood flooring ready for installation

**Year of data:**  
2021

**EPD Version:**  
[1], October 2024

**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 products assessed in this study are solid wooden floors, which is ready to be installed in accordance with the instructions of Hørning Parket A/S. [LCA Results](#) are listed for untreated floors without surface treatment and can be scaled according to the relevant thickness as detailed in [Additional Information](#) (See Table 20) Data sheets for the declared products (untreated) can be found here:

- [End Grain Floor, 15-22 mm thickness \(Untreated\)](#)

The main product components are shown in the table below. Materials account for 100% of the mass of the declared product.

Material	Weight-% of product
Solid wood (Untreated)	100%
<b>Total</b>	<b>100%</b>

Table 1: Mass distribution of declared products

The product packaging is shown in the table below. Materials account for 100% of the mass of the product packaging for all declared products.

Material	Weight-% of packaging
EUR Pallet (reusable)	40.5%
Cardboard	42.5%
Packaging film	17.0%
<b>Total</b>	<b>100%</b>

Table 2: Mass distribution of product packaging for the declared products

At factory gate the product packaging for the declared products at 15 mm thickness has a biogenic carbon content of 0.1 kg C/m<sup>2</sup>, equivalent to 0.367 kg CO<sub>2</sub>-eq C/m<sup>2</sup>, set to be released during installation (A5), which has not been declared in this EPD. As with all other results, biogenic carbon contents should be scaled according to the relevant floor thickness.

## Representativity:

This declaration, including data collection and the modelled foreground system including results, represents the production of the declared products by Hørning Parket A/S in Skanderborg, Denmark, which is also the representative geographical area. Product specific data are based on average values collected at the production site for the year 2021.

Background data are based on ecoinvent 3.9.1 (Released 12-2022) and complies with the EN 15804:2012 +A2:2019, Section 6.3.8.2, by being less than 10 years old. Generally, the background datasets used are of acceptable quality with a reference year of 2021 in line with release of the database. Almost all datasets are locally and/or regionally representative (e.g. Denmark or Europe), and electricity is country specific. In processes deemed particularly important (i.e. sawmill), the electricity mix has been modified to reflect local production conditions.

## Hazardous Substances:

The declared products by Hørning Parket A/S, do not contain any substances listed in the "Candidate List of Substances of Very High Concern for Authorization"

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

## Essential Characteristics:

Hørning Parket A/S' products are generally CE certified in accordance with the EC declaration regarding wooden floors for indoor usage EN 14342:2013.

*Thermal conductivity, [W/m<sup>2</sup>K]:*

- 0.14 W/m<sup>2</sup>K

*Thermal resistance, [m<sup>2</sup> °K/W]:*

- 15 mm - 0.107 m<sup>2</sup> °K/W
- 22 mm - 0.157 m<sup>2</sup> °K/W

Further technical information can be obtained by contacting the manufacturer, Hørning Parket A/S, or on their website:

- <https://www.horningfloor.dk/>

## Reference Service Life (RSL):

No reference service life (RSL) is declared since the scope of this EPD is cradle-to-gate with modules C1-C4 and D. As a result, the construction stage (A4-A5) and the use stage (B1-B7) of the declared products are not included in the scope of the study.



**Picture of Products:**



Figure 1: Spruce



Figure 2: Larch

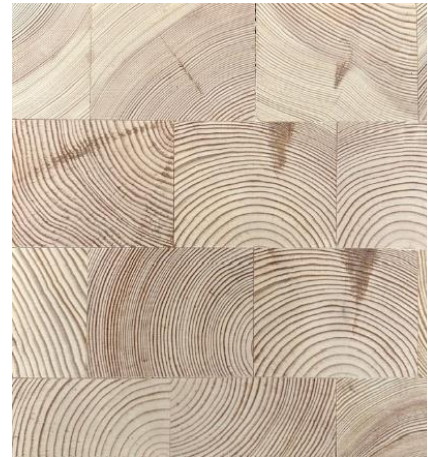


Figure 3: Pine

## LCA Background

**Declared unit (DU):**

The declared unit of this EPD is: *1 m<sup>2</sup> of solid wooden floor ready for installation*. The declared products include three varieties of wood species (spruce, pine and larch) at the lowest options for floor thickness with the option of scaling results. The properties of each product variation are presented in Table 3.

Product	Thickness (mm)	Total mass* (kg)	Conversion factor to 1 kg	Scaling factor	Density (kg/m <sup>3</sup> )
End Grain Floor, Spruce	15	6.08	0.16	1.00	465
	22	8.91	0.11	1.47	
End Grain Floor, Pine	15	7.38	0.14	1.00	529
	22	10.82	0.09	1.47	
End Grain Floor, Larch	15	7.96	0.13	1.00	637
	22	11.67	0.09	1.47	

Table 3: Product properties and scaling factor for each declared product. \* = Excluding product packaging

The scaling factor can be applied to adjust results to the desired thickness within the appropriate range (15-22 mm). Please refer to [Additional Information](#) for further guidance concerning scaling factors. The total weight per declared unit (1 m<sup>2</sup>) is calculated based on the measurements of the various floor components. Table 20 provides an overview of all relevant scaling factors.

**Product Category Rules (PCR):**

This EPD is developed according to the core rules for the product category of construction products in EN 15804:2012+A2:2019 (2019-11-04), and cPCR EN 16485:2014 (2014-05-02) concerning wood and wood-based products for use in construction.

**Energy Modelling Principles:**

The declared products are not manufactured using guarantees of origin (GOs) for the energy consumption at the facilities of Hørning Parket A/S in Skanderborg (A3). The declared products are covered by [FSC/PEFC-certifications](#).

**Foreground System:** The production at Hørning Parket A/S (A3) is modelled based on site-specific data for the year 2021. The electricity consumption is modelled as a residual mix in Denmark. The applied mix of district heating is modelled based on an environmental declaration provided by the local supplier, Skanderborg-Hørning Fjernvarme (2021).

The remaining activities in the foreground system (i.e. sawmill activities) are likewise modelled with residual mixes representing the individual countries (e.g. DE and PL) pertaining to the specific value chain. Table 4 provides an overview

of the relevant emission factors concerning electricity and heat.

Dataset	EF 3.1	Unit
<a href="#">Residual grid mix, DK, ref. year 2022</a>	6.28E-01	kg CO <sub>2e</sub> /kWh
<a href="#">Residual grid mix, DE, ref. year 2022</a>	6.91E-01	kg CO <sub>2e</sub> /kWh
<a href="#">Residual grid mix, PL, ref. year 2022</a>	1.08E+00	kg CO <sub>2e</sub> /kWh
<a href="#">District Heat, Skanderborg-Hørning, ref. year 2021</a>	2.07E-02	kg CO <sub>2e</sub> /MJ

**Table 4: GWP-total for relevant datasets concerning energy**

**Background System:** The database, ecoinvent 3.9.1 (published in 12-2022) is utilized for the background system. As a result, both upstream- and downstream activities are based on average supply mixes for the specific country or region depending on the given dataset.

**Allocation Principles:**

As prescribed by the core PCR, EN 15804:2012 +A2:2019, material flows carrying specific inherent properties i.e. energy content or elementary composition (e.g. biogenic carbon content), shall always be allocated reflecting the physical flow, irrespective of the allocation chosen for the process. Consequently, all by-products from sawmill activities resulting in material flows (e.g. boards and sawdust) are attributed the burdens of the forestry activities and transport from forests to the sawmill by mass allocation, which has required modifications to the applied generic datasets. The generic LCI values for energy consumption at the sawmill, which has been assigned by economic allocation, has been conserved according to EN 16485:2014, Section 6.4.3.2.

Concerning the activities at Hørning Parket A/S' facilities (A3), electricity, district heating, diesel and propane (for forklifts) are used as energy sources. Due to the disparity between processing of locally produced and pre-manufactured products, economic allocation is applied to the energy consumption on the site. Consequently, the share of gross profit is used as an allocation key since the difference in profit represents the additional energy and work that has gone into drying, splitting, and planning, compared to the pre-manufactured products. Electricity is the main source for the operation of the facilities, whereas heat is used for both drying planks and maintaining a comfortable working environment. Hørning Parket A/S uses water for both sanitary

purposes and for the process of maintaining the humidity of all solid wooden floors in storage.

**System Boundary:**

This study is cradle-to-gate with modules C1-C4 and D, in which 100 weight-% has been accounted for. The general rules for the exclusion of inputs and outputs follows the requirements specified in EN 15804:2012+A2:2019, Section 6.3.6, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of renewable and non-renewable primary energy usage and mass for unit processes. In addition, particular care has been taken to include materials and flows known to have the potential to cause significant emissions into air, water and soil related to the environmental indicators assessed in this study. In this respect, conservative assumptions in combination with plausibility considerations and expert judgement has been used to demonstrate compliance with this criterion.

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

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.

All the floor products in this study consist of solid wood, that has been cut against the grain, resulting in an extremely durable floor, which is recommended for spaces subject to heavy loads. The production process (A1-A3) covers forestry and sawmill activities for solid wood as well as assembly before the product is subject to transportation and storage at Hørning Parket A/S. It should be recognized that due to the scope of this EPD, surface treatment during installation (A5) and maintenance (B2) is not accounted for within the results.

**End-of-Life Stage (C1-C4):**

The deconstruction of the products covered by this study is assumed to be done manually, and thus does not require any processes with an environmental impact. The declared products are assumed to be transported from the demolition site to a waste facility where they are shredded. After this, the wood chips are transported to a

municipal plant where they are incinerated for energy recovery. 100% of the product is processed with energy recovery through municipal incineration. As specified in the cPCR, EN 16485:2014, Section 6.3.4.5, page 18, the default attribution of end-of-life processes of wood and wood-based products does not include landfilling (C4) after energy recovery.

**Re-use, Recovery, & Recycling Potential (D):**  
All of the materials used in the production and maintenance of pallets have potential benefits

and load beyond the system boundary. Primarily this consists of the waste wood, which is sent for energy recovery through municipal incineration with fly ash extraction. Electricity generated through the waste incineration at the CHP plant is assumed to replace the average Danish electricity mix, while thermal energy is utilized as district heating, which has been substituted as an average technological composition for the year 2021 based on data from The Danish Energy Agency (2021).

**Technical Flowchart:**

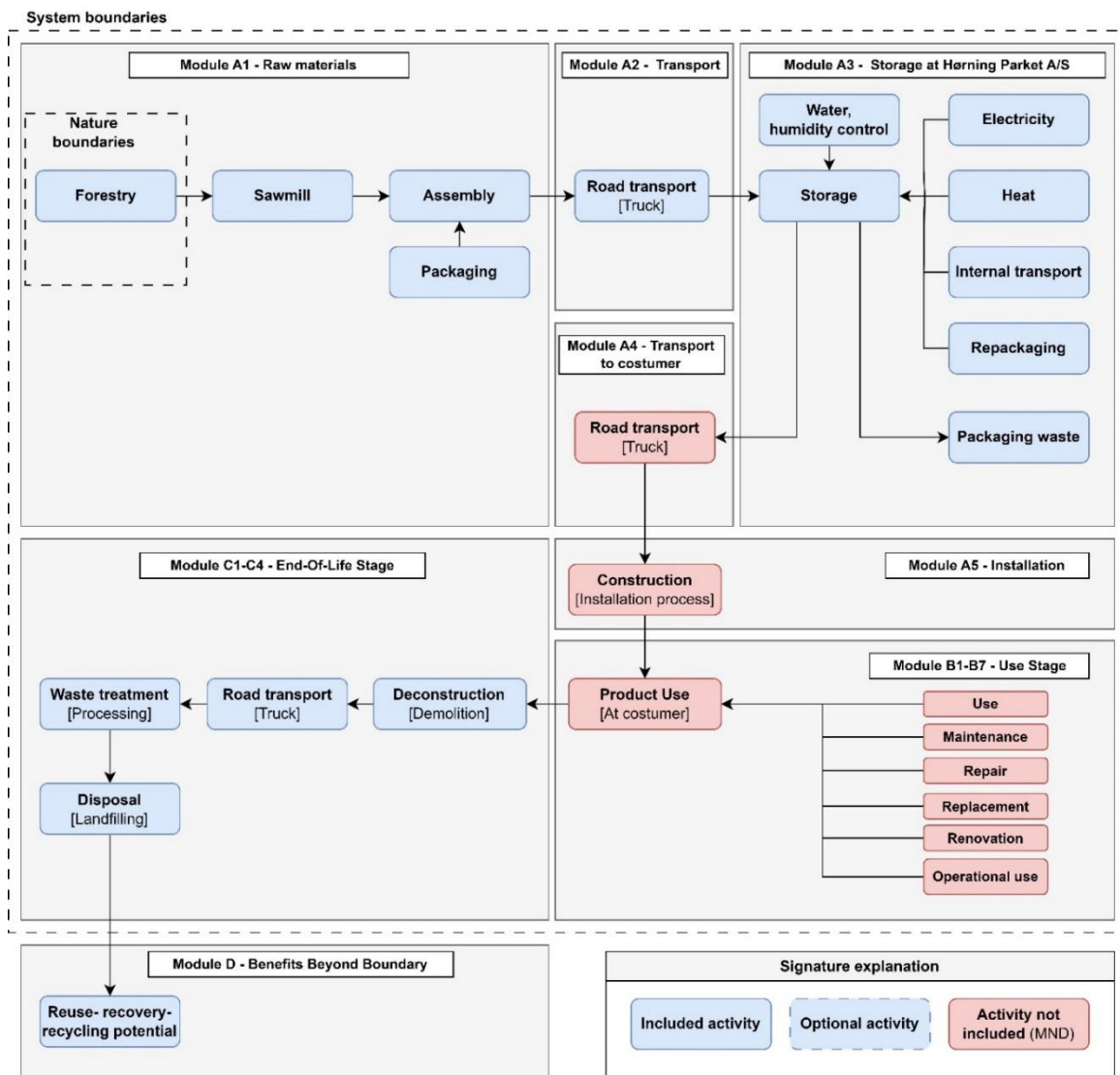


Figure 4: Life cycle of the declared products illustrated as a flowchart

# LCA Results

Due to the multiple declared products covered by this EPD, a series of results for each product are presented. It should be recognized, that the results of the LCA are relative expressions and do not indicate the endpoints of environmental impacts, exceeding of thresholds, safety margins, or risks associated with the declared products. The results for each of the declared products can be found on the following pages:

- **Page 7-8:** [End Grain Floor, Spruce, 15 mm thickness \(Untreated\)](#)
- **Page 9-10:** [End Grain Floor, Pine, 15 mm thickness \(Untreated\)](#)
- **Page 11-12:** [End Grain Floor, Larch, 15 mm thickness \(Untreated\)](#)

## End Grain Floor, Spruce, 15 mm thickness (Untreated):

End Grain Floor, Spruce, 15 mm thickness (Untreated) ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	-8.81E+00	0.00E+00	1.27E-01	1.20E+01	0.00E+00	-2.12E+00
GWP-fossil	[kg CO <sub>2</sub> eq.]	3.03E+00	0.00E+00	1.27E-01	1.22E-01	0.00E+00	-1.98E+00
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-1.18E+01	0.00E+00	9.05E-05	1.18E+01	0.00E+00	-1.27E-01
GWP-luluc	[kg CO <sub>2</sub> eq.]	1.45E-02	0.00E+00	4.81E-05	1.13E-04	0.00E+00	-5.41E-03
ODP	[kg CFC 11 eq.]	6.08E-08	0.00E+00	2.79E-09	2.80E-09	0.00E+00	-5.70E-08
AP	[mol H <sup>+</sup> eq.]	1.65E-02	0.00E+00	4.03E-04	1.21E-03	0.00E+00	-9.33E-03
EP-freshwater	[kg PO <sub>4</sub> eq.]	9.65E-04	0.00E+00	7.58E-06	5.77E-05	0.00E+00	-1.27E-03
EP-marine	[kg N eq.]	4.53E-03	0.00E+00	1.43E-04	6.16E-04	0.00E+00	-2.35E-03
EP-terrestrial	[mol N eq.]	4.88E-02	0.00E+00	1.51E-03	5.95E-03	0.00E+00	-3.07E-02
POCP	[kg NMVOC eq.]	1.86E-02	0.00E+00	6.20E-04	1.51E-03	0.00E+00	-6.78E-03
ADPm <sup>1</sup>	[kg Sb eq.]	5.66E-06	0.00E+00	3.09E-07	3.51E-07	0.00E+00	-1.00E-05
ADPf <sup>1</sup>	[MJ]	4.19E+01	0.00E+00	1.81E+00	1.24E+00	0.00E+00	-3.11E+01
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	3.60E-01	0.00E+00	6.55E-03	1.95E-02	0.00E+00	-2.82E-01
Caption	GWP-total = Global 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						
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.						

Table 5: Core environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Spruce, 15 mm thickness (Untreated)

End Grain Floor, Spruce, 15 mm thickness (Untreated) ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PM	[Disease incidence]	4.92E-07	0.00E+00	1.00E-08	1.26E-08	0.00E+00	-8.10E-08
IRP <sup>2</sup>	[kBq U235 eq.]	1.87E-01	0.00E+00	2.48E-03	1.26E-02	0.00E+00	-5.51E-01
ETP-fw <sup>1</sup>	[CTUe]	1.54E+01	0.00E+00	8.89E-01	9.08E-01	0.00E+00	-6.82E+00
HTP-c <sup>1</sup>	[CTUh]	1.74E-09	0.00E+00	4.59E-11	1.58E-10	0.00E+00	-1.00E-09
HTP-nc <sup>1</sup>	[CTUh]	3.46E-08	0.00E+00	1.17E-09	9.43E-10	0.00E+00	-2.90E-08
SQP	-	5.89E+02	0.00E+00	1.09E+00	8.81E-01	0.00E+00	-8.86E+01
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						
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.						
	<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.						

Table 6: Additional environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Spruce, 15 mm thickness (Untreated)



End Grain Floor, Spruce, 15 mm thickness (Untreated) RESOURCE USE PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6.43E+00	0.00E+00	2.65E-02	5.09E-01	0.00E+00	-3.80E+01
PERM	[MJ]	1.22E+02	0.00E+00	0.00E+00	-1.22E+02	0.00E+00	0.00E+00
PERT	[MJ]	1.28E+02	0.00E+00	2.65E-02	-1.22E+02	0.00E+00	-3.80E+01
PENRE	[MJ]	4.19E+01	0.00E+00	1.81E+00	1.24E+00	0.00E+00	-3.11E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	4.19E+01	0.00E+00	1.81E+00	1.24E+00	0.00E+00	-3.11E+01
SM	[kg]	0.00E+00	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> ]	5.13E-02	0.00E+00	2.41E-04	2.35E-03	0.00E+00	-5.32E-02
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						

Table 7: Resource use for 1 m<sup>2</sup> of End Grain Floor, Spruce, 15 mm thickness (Untreated)

End Grain Floor, Spruce, 15 mm thickness (Untreated) WASTE CATEGORIES AND OUTPUT FLOWS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.64E-04	0.00E+00	1.15E-05	1.66E-05	0.00E+00	-6.80E-05
NHWD	[kg]	1.72E+00	0.00E+00	9.03E-02	5.07E-02	0.00E+00	-1.70E-01
RWD	[kg]	4.71E-05	0.00E+00	6.04E-07	2.97E-06	0.00E+00	-1.30E-04

CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	5.37E-03	0.00E+00	0.00E+00	1.51E+01	0.00E+00	0.00E+00
EET	[MJ]	7.21E-03	0.00E+00	0.00E+00	5.67E+01	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; EE = Exported energy						

Table 8: End-of-life (waste categories and output flows) for 1 m<sup>2</sup> of End Grain Floor, Spruce, 15 mm thickness (Untreated)

End Grain Floor, Spruce, 15 mm thickness (Untreated) BIOGENIC CARBON CONTENT PER 1 m <sup>2</sup>		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	3.23E+00
Biogenic carbon content in accompanying packaging	[kg C]	1.00E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

Table 9: Biogenic carbon content at factory gate for 1 m<sup>2</sup> of End Grain Floor, Spruce, 15 mm thickness (Untreated)



**End Grain Floor, Pine, 15 mm thickness (Untreated):**

End Grain Floor, Pine, 15 mm thickness (Untreated) ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	-1.03E+01	0.00E+00	1.45E-01	1.36E+01	0.00E+00	-2.41E+00
GWP-fossil	[kg CO <sub>2</sub> eq.]	3.20E+00	0.00E+00	1.45E-01	1.39E-01	0.00E+00	-2.26E+00
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-1.35E+01	0.00E+00	1.03E-04	1.35E+01	0.00E+00	-1.45E-01
GWP-luluc	[kg CO <sub>2</sub> eq.]	1.43E-02	0.00E+00	5.48E-05	1.29E-04	0.00E+00	-6.15E-03
ODP	[kg CFC 11 eq.]	6.45E-08	0.00E+00	3.18E-09	3.19E-09	0.00E+00	-6.50E-08
AP	[mol H <sup>+</sup> eq.]	1.72E-02	0.00E+00	4.59E-04	1.37E-03	0.00E+00	-1.06E-02
EP-freshwater	[kg PO <sub>4</sub> eq.]	9.75E-04	0.00E+00	8.62E-06	6.57E-05	0.00E+00	-1.45E-03
EP-marine	[kg N eq.]	4.78E-03	0.00E+00	1.63E-04	7.01E-04	0.00E+00	-2.68E-03
EP-terrestrial	[mol N eq.]	5.16E-02	0.00E+00	1.72E-03	6.77E-03	0.00E+00	-3.50E-02
POCP	[kg NMVOC eq.]	1.96E-02	0.00E+00	7.06E-04	1.71E-03	0.00E+00	-7.71E-03
ADPm <sup>1</sup>	[kg Sb eq.]	5.95E-06	0.00E+00	3.52E-07	3.99E-07	0.00E+00	-1.20E-05
ADPf <sup>1</sup>	[MJ]	4.44E+01	0.00E+00	2.06E+00	1.41E+00	0.00E+00	-3.54E+01
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	3.78E-01	0.00E+00	7.45E-03	2.22E-02	0.00E+00	-3.21E-01
Caption	GWP-total = Global 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						
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.						

**Table 10: Core environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Pine, 15 mm thickness (Untreated)**

End Grain Floor, Pine, 15 mm thickness (Untreated) ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PM	[Disease incidence]	5.13E-07	0.00E+00	1.14E-08	1.44E-08	0.00E+00	-9.20E-08
IRP <sup>2</sup>	[kBq U235 eq.]	1.93E-01	0.00E+00	2.82E-03	1.43E-02	0.00E+00	-6.27E-01
ETP-fw <sup>1</sup>	[CTUe]	1.66E+01	0.00E+00	1.01E+00	1.03E+00	0.00E+00	-7.76E+00
HTP-c <sup>1</sup>	[CTUh]	1.79E-09	0.00E+00	5.22E-11	1.80E-10	0.00E+00	-1.20E-09
HTP-nc <sup>1</sup>	[CTUh]	3.62E-08	0.00E+00	1.33E-09	1.07E-09	0.00E+00	-3.40E-08
SQP	-	8.82E+02	0.00E+00	1.25E+00	1.00E+00	0.00E+00	-1.01E+02
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						
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.						
	<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.						

**Table 11: Additional environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Pine, 15 mm thickness (Untreated)**

End Grain Floor, Pine, 15 mm thickness (Untreated) RESOURCE USE PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6.48E+00	0.00E+00	3.02E-02	5.79E-01	0.00E+00	-4.32E+01
PERM	[MJ]	1.39E+02	0.00E+00	0.00E+00	-1.39E+02	0.00E+00	0.00E+00
PERT	[MJ]	1.45E+02	0.00E+00	3.02E-02	-1.38E+02	0.00E+00	-4.32E+01
PENRE	[MJ]	4.44E+01	0.00E+00	2.06E+00	1.41E+00	0.00E+00	-3.53E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	4.44E+01	0.00E+00	2.06E+00	1.41E+00	0.00E+00	-3.53E+01
SM	[kg]	0.00E+00	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> ]	5.19E-02	0.00E+00	2.75E-04	2.68E-03	0.00E+00	-6.06E-02
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						

Table 12: Resource use for 1 m<sup>2</sup> of End Grain Floor, Pine, 15 mm thickness (Untreated)

End Grain Floor, Pine, 15 mm thickness (Untreated) WASTE CATEGORIES AND OUTPUT FLOWS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.80E-04	0.00E+00	1.31E-05	1.89E-05	0.00E+00	-7.70E-05
NHWD	[kg]	1.91E+00	0.00E+00	1.03E-01	5.77E-02	0.00E+00	-1.93E-01
RWD	[kg]	4.84E-05	0.00E+00	6.87E-07	3.38E-06	0.00E+00	-1.50E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	5.37E-03	0.00E+00	0.00E+00	1.72E+01	0.00E+00	0.00E+00
EET	[MJ]	7.21E-03	0.00E+00	0.00E+00	6.45E+01	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; EE = Exported energy						

Table 13: End-of-life (waste categories and output flows) for 1 m<sup>2</sup> of End Grain Floor, Pine, 15 mm thickness (Untreated)

End Grain Floor, Pine, 15 mm thickness (Untreated) BIOGENIC CARBON CONTENT PER 1 m <sup>2</sup>		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	3.67E+00
Biogenic carbon content in accompanying packaging	[kg C]	1.00E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

Table 14: Biogenic carbon content at factory gate for 1 m<sup>2</sup> of End Grain Floor, Pine, 15 mm thickness (Untreated)

**End Grain Floor, Larch, 15 mm thickness (Untreated):**

End Grain Floor, Larch, 15 mm thickness (Untreated) ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	-1.28E+01	0.00E+00	1.75E-01	1.64E+01	0.00E+00	-2.90E+00
GWP-fossil	[kg CO <sub>2</sub> eq.]	3.45E+00	0.00E+00	1.74E-01	1.67E-01	0.00E+00	-2.72E+00
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-1.62E+01	0.00E+00	1.24E-04	1.62E+01	0.00E+00	-1.75E-01
GWP-luluc	[kg CO <sub>2</sub> eq.]	1.44E-02	0.00E+00	6.59E-05	1.55E-04	0.00E+00	-7.41E-03
ODP	[kg CFC 11 eq.]	6.99E-08	0.00E+00	3.83E-09	3.84E-09	0.00E+00	-7.80E-08
AP	[mol H <sup>+</sup> eq.]	1.80E-02	0.00E+00	5.53E-04	1.65E-03	0.00E+00	-1.28E-02
EP-freshwater	[kg PO <sub>4</sub> eq.]	9.89E-04	0.00E+00	1.04E-05	7.91E-05	0.00E+00	-1.74E-03
EP-marine	[kg N eq.]	5.07E-03	0.00E+00	1.96E-04	8.44E-04	0.00E+00	-3.22E-03
EP-terrestrial	[mol N eq.]	5.46E-02	0.00E+00	2.07E-03	8.15E-03	0.00E+00	-4.21E-02
POCP	[kg NMVOC eq.]	2.09E-02	0.00E+00	8.50E-04	2.06E-03	0.00E+00	-9.29E-03
ADPm <sup>1</sup>	[kg Sb eq.]	6.34E-06	0.00E+00	4.23E-07	4.81E-07	0.00E+00	-1.40E-05
ADPF <sup>1</sup>	[MJ]	4.80E+01	0.00E+00	2.48E+00	1.70E+00	0.00E+00	-4.26E+01
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	3.93E-01	0.00E+00	8.97E-03	2.67E-02	0.00E+00	-3.86E-01
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						
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.						

**Table 15: Core environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Larch, 15 mm thickness (Untreated)**

End Grain Floor, Larch, 15 mm thickness (Untreated) ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PM	[Disease incidence]	5.39E-07	0.00E+00	1.38E-08	1.73E-08	0.00E+00	-1.10E-07
IRP <sup>2</sup>	[kBq U235 eq.]	1.97E-01	0.00E+00	3.40E-03	1.73E-02	0.00E+00	-7.55E-01
ETP-fw <sup>1</sup>	[CTUe]	1.83E+01	0.00E+00	1.22E+00	1.24E+00	0.00E+00	-9.35E+00
HTP-c <sup>1</sup>	[CTUh]	1.86E-09	0.00E+00	6.29E-11	2.17E-10	0.00E+00	-1.40E-09
HTP-nc <sup>1</sup>	[CTUh]	3.87E-08	0.00E+00	1.60E-09	1.29E-09	0.00E+00	-4.00E-08
SQP	-	8.85E+02	0.00E+00	1.50E+00	1.21E+00	0.00E+00	-1.21E+02
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						
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.						
	<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.						

**Table 16: Additional environmental impact indicators for 1 m<sup>2</sup> of End Grain Floor, Larch, 15 mm thickness (Untreated)**

End Grain Floor, Larch, 15 mm thickness (Untreated)							
RESOURCE USE PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6.51E+00	0.00E+00	3.63E-02	6.97E-01	0.00E+00	-5.20E+01
PERM	[MJ]	1.67E+02	0.00E+00	0.00E+00	-1.67E+02	0.00E+00	0.00E+00
PERT	[MJ]	1.74E+02	0.00E+00	3.63E-02	-1.67E+02	0.00E+00	-5.20E+01
PENRE	[MJ]	4.80E+01	0.00E+00	2.48E+00	1.70E+00	0.00E+00	-4.26E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	4.80E+01	0.00E+00	2.48E+00	1.70E+00	0.00E+00	-4.26E+01
SM	[kg]	0.00E+00	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> ]	5.24E-02	0.00E+00	3.31E-04	3.23E-03	0.00E+00	-7.29E-02
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						

Table 17: Resource use for 1 m<sup>2</sup> of End Grain Floor, Larch, 15 mm thickness (Untreated)

End Grain Floor, Larch, 15 mm thickness (Untreated)							
WASTE CATEGORIES AND OUTPUT FLOWS PER 1 m <sup>2</sup>							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.02E-04	0.00E+00	1.57E-05	2.27E-05	0.00E+00	-9.30E-05
NHWD	[kg]	2.24E+00	0.00E+00	1.24E-01	6.95E-02	0.00E+00	-2.32E-01
RWD	[kg]	4.95E-05	0.00E+00	8.28E-07	4.07E-06	0.00E+00	-1.77E-04

CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	5.37E-03	0.00E+00	0.00E+00	2.07E+01	0.00E+00	0.00E+00
EET	[MJ]	7.21E-03	0.00E+00	0.00E+00	7.77E+01	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; EE = Exported energy						

Table 18: End-of-life (waste categories and output flows) for 1 m<sup>2</sup> of End Grain Floor, Larch, 15 mm thickness (Untreated)

End Grain Floor, Larch, 15 mm thickness (Untreated)		
BIOGENIC CARBON CONTENT PER 1 m <sup>2</sup>		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	4.42E+00
Biogenic carbon content in accompanying packaging	[kg C]	1.00E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

Table 19: Biogenic carbon content at factory gate for 1 m<sup>2</sup> of End Grain Floor, Larch, 15 mm thickness (Untreated)



## Additional Information

### Interpretation:

The [LCA results](#) for the declared products indicate, that the majority of environmental impacts are associated with raw material supply (A1) particularly due to sawmill activities. In this respect, the electricity consumption associated with production is considered the most significant contributor within the product system. Additionally, diesel consumption associated with forestry and transport has a notable impact within the product system during the production stage (A1-A3). It should be noted, that for the global warming potential (GWP), the uptake of biogenic carbon in Module A1 is equal to the release of biogenic carbon during the end-of-life stage (C1-C4) due to the mass balance approach (MBA) applied in the model. Module D is seen to counteract environmental impact throughout all impact categories by ≈20%. This can largely be attributed to the fact, that the declared products have a high calorific value since they exclusively consist of wood. In this regard, municipal incineration implies the export of a relatively high quantity of energy (i.e. electricity and district heat), which in turn provides value to the subsequent product systems by substitution of energy elsewhere.

### Scaling Factors:

Scaling factors are simply calculated by dividing the desired thickness by thickness of the default dataset (15 mm). See the following example for calculating the scaling factor for the 22 mm variation of the declared product. Scaling factors should only be utilized within the declared range of the product i.e. 15-22 mm.

$$\frac{22 \text{ mm}}{15 \text{ mm}} = 1.467 \quad (\text{Eq. 1})$$

When applying scaling factor to adjust the floor thickness, the results of a specific module should be calculated using the following linear equation:

$$y = a * x \quad (\text{Eq. 2})$$

Where...

**y** = the impact results of the solid wooden floor at a given thickness.

**a** = the impact of the untreated floor at the default thickness as listed in the [LCA results](#), which are displayed in Table 5 – Table 19

**x** = the scaling factor for adjusting the thickness of the solid wooden floor (See Table 20) if it deviates from the default dataset at 15 mm.

Table 20 lists all available scaling factors for the declared products.

Scaling Factors	15 mm	16 mm	17 mm	18 mm	19 mm	20 mm	21 mm	22 mm
End Grain Floor, spruce	1.000	1.067	1.133	1.200	1.267	1.333	1.400	1.467
End Grain Floor, pine	1.000	1.067	1.133	1.200	1.267	1.333	1.400	1.467
End Grain Floor, larch	1.000	1.067	1.133	1.200	1.267	1.333	1.400	1.467

**Table 20: Applicable scaling factors for the declared product within the available range of floor thickness**

**Technical Information on Scenarios:**

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

Scenario information	Unit	Value
For reuse	%	0
For recycling	%	0
For incineration	%	100
For final disposal	%	0
Assumptions for scenario development	As appropriate	N/A

**Table 21: Scenario information for the end-of-life stage (C1-C4)**

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

Scenario information	Unit	Value
Electricity	%	20%
Heat	%	75%
Loss	%	5%

**Table 22: Scenario information for reuse, recovery, and recycling potential (D)**

**Indoor air**

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.*

Certificates for indoor Air Comfort can be found at Hørning Parket's webpage <https://www.horningfloor.dk/miljoe/>

**Soil and water**

*The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.*

## References

<p><b>Publisher</b></p>	<p> epddanmark</p> <p><a href="http://www.epddanmark.dk">www.epddanmark.dk</a> Template version 2024.1</p>
<p><b>Program Operator</b></p>	<p> <b>DANISH TECHNOLOGICAL INSTITUTE</b></p> <p>Danish Technological Institute Buildings &amp; Environment Gregersensvej DK-2630 Taastrup <a href="http://www.teknologisk.dk">www.teknologisk.dk</a></p>
<p><b>LCA-practitioner</b></p>	<p> <b>NIRAS</b></p> <p>NIRAS A/S Østre Havnegade 12 9000 Aalborg, Denmark <a href="http://www.niras.dk">www.niras.dk</a></p> <p>LCA Practitioner: Jesper Jakobsen QA: Asbjørn Uldbjerg Bundgaard</p>
<p><b>LCA software / Background data</b></p>	<p>SimaPro 9.6 / ecoinvent 3.9.1</p>
<p><b>3<sup>rd</sup> party verifier</b></p>	<p>Linda Høibye Life Cycle Assessment Consulting</p>

**General Programme Instructions**

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

**ecoinvent 3.9.1**

<https://ecoinvent.org/>

**The Danish Energy Agency (2021)**

[Energy Statistics 2021 - Data, Tables, Statistics and Maps](#)

**Skanderborg-Hørning Fjernvarme (2021)**

[Fjernvarmedeklaration, 2021](#)

**PR-22043-EN**

Project Report fort Solid Wooden Floors, NIRAS A/S (Version 3, October 2024)

**EN 15804:2012+A2:2019**

Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

**EN 14342:2013**

Wood flooring - Characteristics, evaluation of conformity and marking.

**EN 16449:2014**

Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide

**EN 16485:2014**

Round and sawn timber – Environmental Product Declarations – Product category rules for wood and wood-based products for use in construction

**CEN/TC 16970**

Sustainability of construction works – Guidance for the implementation of EN 15804

**ISO 14025:2010**

Environmental labels and declarations – Type III environmental declarations – Principles and procedures

**ISO 14040:2008**

Environmental management – Life cycle assessment – Principles and framework

**ISO 14044:2008**

Environmental management – Life cycle assessment – Requirements and guidelines