

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2



Owner of the declaration:
Cross Timber Systems SIA

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3794-2722-EN

Registration number:
NEPD-3794-2722-EN

Issue date: 10.10.2022
Valid to: 10.10.2027

Product name

Cross laminated timber

Manufacturer



The Norwegian
EPD Foundation

General information

Product:

1 m³ of cross laminated timber panel

Program Operator:

The Norwegian EPD Foundation
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Declaration Number:

NEPD- 3794-2722-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019
NPCR 015 2021 Part B for Wood and Wood-Based Products (A2-2019 edit) v4 071021

NPCR Part A for Construction products and services ver2 260421

Statements:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:

1 m³ of cross laminated timber panel as defined by the manufacturer.

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal external

Sign



Elisabet Amat

Independent verifier approved by EPD Norway

Owner of the declaration:

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Manufacturer:

Cross Timber Systems SIA
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Place of production:

Aviacijas street 18, Jelgava, LV-3004, Latvia

Management system:

ISO 9001, ISO 14001 and PEFC ST 2002

Organisation no:

LV50103516701

Issue date:

10.10.2022

Valid to:

10.10.2027

Year of study:

2021

Comparability:

EPDs from other programmes than EPD Norge may not be comparable.

The EPD has been worked out by:

Bureau Veritas Latvia



Approved (Manager of EPD Norway)

Product

Product description:

Cross laminated timber (CLT) is an engineered wood panel with an odd number of softwood layers placed on top of each other at 90° and bonded together under pressure using formaldehyde free polyurethane adhesives to form structural panels with exceptional strength, dimensional stability and rigidity. Wood panels are available in different panel thicknesses depending on structural requirements.

Product specification:

The product composition is wood and polyurethane adhesive.

Products materials	KG	%
Wood (dry)	408,99	87,0
Moisture	55,77	11,9
PU adhesive	5,24	1,1
TOTAL	470,00	100,0
Packaging materials	KG	%
Wood (dry)	8,27	75,4
Moisture	1,13	10,3
Polyethylene	1,58	14,4
TOTAL	10,98	100,0

Technical data:

- Length – ≤14 m, Width – ≤3.15 m, Thickness – 60-260 mm;
- Weight (with packaging) 480,98 kg;
- Density 470 kg/m³;
- Reference service life 60 years;
- Tensile strength 0.12 MPa.

Market:

Denmark, Norway, Sweden, Finland & Benelux countries

Reference service life, product:

60 years according to PCR

LCA: Calculation rules

Declared unit:

For the declared unit is taken as the NPCR 015:2019 Part B for wood and wood-based products version 4.0 071021 foresees: “The declared unit shall only be used for products where the functional unit is not specified in this PCR”. Therefore the declared unit is “1 m3 of cross laminated timber panel” as defined by manufacturer.

Data quality:

The production data are from 2021, the database data are from 2013 – 2021 i.e. no data is older than 10 years. Database used is mainly Ecoinvent 3.8. The LCA software used is SimaPro 9.3.

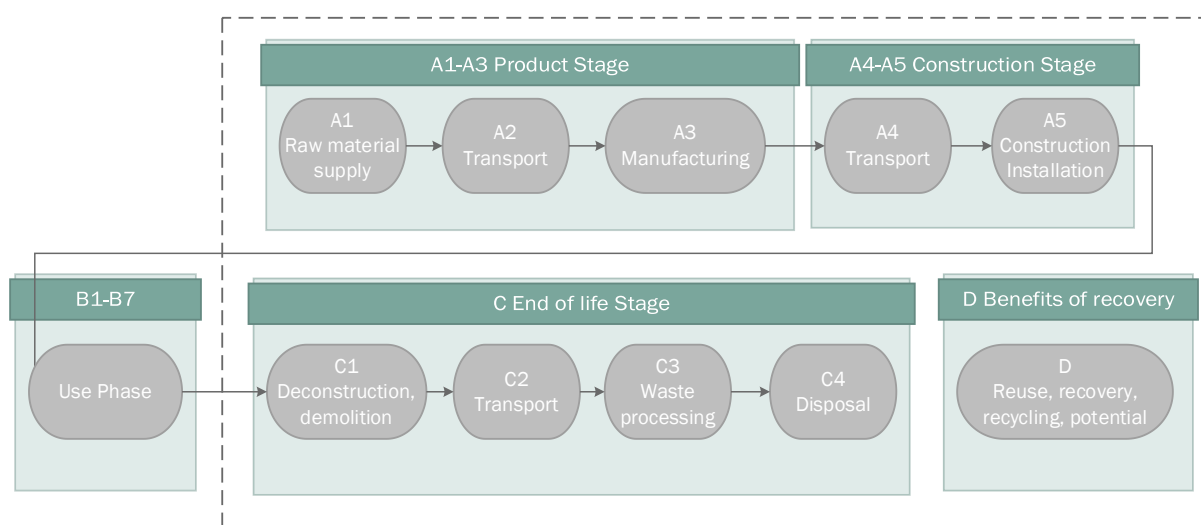
Allocation:

General allocation principles were applied according to ISO 14044:2006 4.3.4 and in line with the provisions of EN 15804:2012+A2. There is no need to allocate data on incoming flow of energy, raw materials and complementary materials for manufacturing module – all data collected is purposed for one single product – CLT panel. The product (CLT panel) is produced only in a manufacturing plant mentioned above.

All process is allocated only to CLT, making it the most conservative scenario. Economic allocation would be based on 0,04% share for manufacturing process cut-offs and by-products, therefore all proceses, emissions and consumption of resources has been allocated only to the product itself.

System boundary:

LCA is made in “Cradle-to-gate with options”. All major materials, production energy use and waste are included for product stages A1, A2, A3, A4, A5, C1, C2, C3, C4, and D. All life cycle impacts are included, see flowchart below. The following information describes the scenarios in the different modules of the EPD. It must be noted that, all major raw materials and all the essential energy are included.



Cut-off criteria:

All materials were accounted for in the LCA according to the data provided. There are no missing data for processes in the system boundaries. All the materials and processes, which are accounted for by the company for the relevant manufacturing process are included in the LCI. No manufacturing processes were excluded.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Product stage (A1, A2, A3)

- **Raw material supply (A1)**

In module A1 extraction and processing of raw materials and generation of electricity and heat from primary energy resources for the production of these raw materials. The materials needed for the production of a 1 m³ of cross laminated timber panel are: sawnwood, PU adhesive and packaging material (PE film).

- **Transport of raw materials (A2)**

In Module A2 transport type and furthest distance from the location of raw material supplier of a specific type to production site in Jelgava, Latvia is included according to the data provided by the manufacturer and reported below:

- furthest distance of all potential sources (289 km) is considered for transportation of sawnwood;
- distance of 1474 km for adhesives and organic solvent;
- distance of 957 km for packaging film.

- **Manufacturing (A3)**

The manufacturing of the product in module A3 includes several stages of wood processing such as stacking, cutting, gluing, pressing, CNC work and packing of the final product. No postproduction treatment (painting, varnishing etc.) is necessary. CLT panels are produced only in one plant. The materials that make up the final product's packaging are wood spacers and polyethylene (PE) film. Types of waste, created in the manufacturing processes, are related to the packaging of the incoming materials (PU adhesive, sawnwood, organic solvent). Package waste is collected at the gate of the manufacturer by the waste treatment company and sent for disposal.

Transport from production place to assembly/user (A4)

Module A4 contains the scenarios defined by manufacturer and includes transportation from production site in Latvia, Jelgava to customers:

- 40% trade towards Norway/Oslo with 735 km distance for road transport and 274 km for sea transport;
- 20% trade to Benelux countries (Belgium, Netherlands and Luxembourg) with 675 km distance for road transport and 719 km for sea transport;
- 40% trade to Scandinavian countries (Sweden, Denmark and Finland) with 861 km for road transport and 414 km for sea transport.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Oslo, Norway / destination 1					
Truck	45%	Lorry, 16-32t, EURO6	735	0,0431 l/tkm	31,69
Boat	60%	Sea ferry	274	0,0298 l/tkm	8,16
Belgium, Netherlands, Luxemburg / destination 2					
Truck	45%	Lorry, 16-32t, EURO6	675	0,0431 l/tkm	29,10
Boat	60%	Sea ferry	719	0,0298 l/tkm	21,42
Sweden, Denmark, Finland, destination 3					
Truck	45%	Lorry, 16-32t, EURO6	861	0,0431 l/tkm	37,12
Boat	60%	Sea ferry	414	0,0298 l/tkm	12,33

Assembly (A5)

	Unit	Value
Auxiliary	m ³	0
Water consumption	m ³	0
Electricity consumption	kWh	0
Other energy carriers	MJ	39,11
Material loss	kg	0
Output materials from waste treatment	kg	10,98
Dust in the air	kg	0

Module A5 includes high load factor machine operation's diesel consumption for CLT panel installation in a building. Packaging waste (PE film and wood spacers) are also included in this module. 92% share of wooden spacers is included in this module as avoided impact, other 8% - as landfilled waste.

End of Life (C1, C3, C4)

- Demolition (C1)

C1 deconstruction module includes only waste wood generated (CLT panel itself) after disassembling the product. No additional data on energy consumption or necessary materials provided, therefore data is acquired from SimaPro database - construction machine operation process with high load factor (for deconstruction) has been added to Module C1 and time consumption per ton of the product has been applied in similar manner as for Module A5.

- Waste processing (C3)

For Waste processing module C3 Municipal incineration of the waste wood with energy recovery and Landfilling are considered as per Municipal solid waste treatment in EU27 countries (Ecoinvent 3.8).

- Disposal (C4)

All sales are included in this module as a part of Europe market's approach and is proportionally divided afterwards between 8% of the waste flow that goes to Landfill and 92% of the waste flow that ends up in Incineration plant (module C3). Incineration with energy recovery also covers the final waste flow, i.e. landfilling of ashes, as per PCR Part B.

Type	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0
Recycling	kg	0
Energy recovery	kg	432,4
To landfill	kg	37,6

It is assumed that at this stage 92% of CLT panel waste is incinerated with energy recovery and 8% is disposed of at landfill.

Transport to waste processing (C2)

Based on activities included in C3 module, transportation to Waste processing (C3) and Disposal (C4), the distance 150 km (EU) and 300 km (non-EU) has been considered from the construction site to the waste processing plant (Municipal waste collection service by 21 metric ton lorry). A conservative distances has been chosen because incineration has to be done only in specific waste plants that should have approvals and permits for this purpose. It is considered that such facilities are less common.

Benefits and loads beyond the system boundaries (D)

As for module D all energy recovered from waste wood incineration has been calculated based on average specific data for Scandinavian countries – 3.49 MJ of electricity and 1,74 MJ of heat per 1 kg of incinerated waste wood. PE film is partially (41%) recycled. Recycled percentage of PE film is presented in EPD with benefits to environmental impact.

LCA: Results

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-1,0E+03	2,8E+01	6,8E+01	7,1E+01	2,2E+01	4,3E+02	8,6E+01	6,4E+02	6,5E+00	-1,9E+02
GWP-fossil	kg CO2 eq.	9,9E+01	2,8E+01	6,6E+01	7,1E+01	2,2E+01	2,8E+01	8,6E+01	4,8E+00	1,6E-01	-1,7E+02
GWP-biogenic	kg CO2 eq.	-1,1E+03	9,0E-03	2,1E+00	2,1E-02	1,2E-01	4,0E+02	2,3E-02	6,3E+02	5,9E+00	-1,8E+01
GWP-luluc	kg CO2 eq.	1,3E+00	2,3E-04	7,0E-02	7,4E-04	5,0E-04	1,2E-03	1,6E-03	5,8E-04	3,9E-06	-3,3E-01
ODP	kg CFC11 eq.	1,4E-05	6,7E-06	1,1E-05	1,6E-05	4,5E-06	5,7E-06	1,9E-05	2,9E-07	3,5E-08	-8,4E-06
AP	mol H+ eq.	7,5E-01	5,6E-02	3,9E-01	8,2E-01	8,6E-02	1,6E-01	5,4E-01	6,3E-02	1,7E-03	-9,7E-01
EP-freshwater	kg P eq.	4,2E-02	1,2E-04	9,0E-03	3,0E-04	1,3E-04	2,3E-03	3,3E-04	2,4E-03	2,8E-04	-1,7E-01
EP-marine	kg N eq.	2,7E-01	9,4E-03	6,4E-02	2,0E-01	3,2E-02	1,4E-01	2,2E-01	3,5E-02	1,3E-02	-1,9E-01
EP-terrestrial	mol N eq.	2,7E+00	1,0E-01	6,9E-01	2,2E+00	3,5E-01	7,3E-01	2,4E+00	3,4E-01	8,3E-03	-1,7E+00
POCP	kg NMVOC eq.	1,0E+00	3,7E-02	2,1E-01	5,7E-01	9,9E-02	2,1E-01	8,6E-01	8,0E-02	3,9E-03	-5,0E-01
ADP-min. & met.	kg Sb eq.	2,1E-04	1,2E-06	8,2E-07	2,4E-06	1,0E-06	2,7E-06	3,6E-06	2,5E-06	8,1E-09	-1,1E-05
ADP-fossil	MJ	1,8E+03	4,0E+02	1,1E+03	9,8E+02	2,8E+02	3,7E+02	1,2E+03	3,7E+01	2,2E+00	-3,6E+03
WDP	m3	3,9E+01	-6,7E-02	7,3E+00	-1,7E-01	7,4E-02	-3,1E+00	1,2E-01	-5,5E+00	5,5E-04	-4,0E+01

GWP-total: Global Warming Potential; **GWP-fossil:** Global Warming Potential fossil fuels; **GWP-biogenic:** Global Warming Potential biogenic; **GWP-LULUC:** Global Warming Potential land use and land use change; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease inc.	4,0E-05	1,9E-06	3,4E-06	3,9E-06	1,1E-06	2,4E-06	1,2E-05	6,0E-07	4,6E-08	-1,4E-05
IRP	kBq U-235 eq	1,9E+01	1,8E+00	8,4E+00	4,3E+00	1,2E+00	1,6E+00	5,2E+00	3,6E-02	9,6E-03	-9,7E+01
ETP-fw	CTUe	4,3E+03	1,6E+02	4,7E+02	3,8E+02	9,4E+01	2,0E+02	3,9E+02	5,9E+01	1,6E+00	-2,7E+03
HTP-c	CTUh	3,4E-07	2,1E-09	4,9E-08	7,1E-09	9,2E-09	1,0E-07	4,2E-09	1,2E-08	1,6E-11	-4,4E-08
HTP-nc	CTUh	5,2E-06	2,5E-07	2,9E-07	5,2E-07	6,9E-08	1,1E-06	3,6E-07	8,7E-07	9,2E-09	-3,4E-06
SQP	Pt	1,2E+05	1,1E+00	3,9E+02	2,6E+00	1,2E+00	4,9E+01	3,1E+00	3,2E+00	9,2E+00	-3,9E+03

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
ILCD type / level 3	Potential Human exposure efficiency relative to U235 (IRP)	1
	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
Potential Soil quality index (SQP)	2	
<p>Disclaimer 1 – 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.</p>		
<p>Disclaimer 2 – 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 experienced with the indicator</p>		

Resource use

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	9,7E+01	4,6E-01	1,5E+02	1,1E+00	3,4E-01	7,8E-01	1,1E+00	2,6E-01	2,6E-03	-5,2E+02
RPEM	MJ	2,2E+04	1,5E-01	9,2E+01	3,6E-01	1,2E-01	2,6E-01	4,0E-01	1,5E-01	8,9E-04	-1,2E+03
TPE	MJ	2,2E+04	6,2E-01	2,4E+02	1,4E+00	4,5E-01	1,0E+00	1,5E+00	4,1E-01	3,5E-03	-1,7E+03
NRPE	MJ	1,8E+03	4,0E+02	1,1E+03	9,8E+02	2,8E+02	3,7E+02	1,2E+03	3,7E+01	2,2E+00	-3,6E+03
NRPM	MJ	1,4E+00	1,7E-04	6,3E-03	1,3E-03	1,6E-03	2,9E-03	6,1E-03	1,9E-03	1,2E-05	-2,2E-01
TRPE	MJ	1,8E+03	4,0E+02	1,1E+03	9,8E+02	2,8E+02	3,7E+02	1,2E+03	3,7E+01	2,2E+00	-3,6E+03
SM	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
RSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NRSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
W	m ³	1,3E+00	1,0E-03	3,5E-01	2,7E-03	4,6E-03	-5,7E-02	1,5E-02	-1,1E-01	3,5E-05	-3,0E+00

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life – Waste

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HW	kg	3,2E-03	1,1E-03	1,0E-03	2,0E-03	7,3E-04	9,3E-04	3,1E-03	5,0E-05	5,7E-06	-1,1E-03
NHW	kg	2,2E+00	1,7E-02	2,2E+02	4,2E-02	9,1E+00	1,4E+02	5,2E-02	2,2E+00	1,3E-04	-5,8E+00
RW	kg	8,7E-03	2,9E-03	4,6E-03	7,0E-03	2,0E-03	2,5E-03	8,4E-03	2,6E-05	1,6E-05	-2,6E-02

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
CR	kg	0,0E+00	0,0E+00	9,4E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
MR	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	6,5E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
MER	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
EEE	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,5E+03
ETE	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	7,7E+02

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	3,1E+01
Biogenic carbon content in the accompanying packaging	kg C	0

The carbon and its energy content stored in packaging materials is less than 5% and therefore according to EN 15804 direct balanced out in the environmental indicator result

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

National production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

National electricity grid	Unit	Value
Latvian electricity grid (from Ecoinvent 3.8.)	kg CO2 -eq/kWh	0,154

Additional environmental impact indicators required in NPCR Part A for construction products

EP-freshwater is also declared in different units - PO4 eq.

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
EP-freshwater*	kg PO ₄ eq.	1,3E-01	3,5E-04	2,7E-02	9,0E-04	3,9E-04	7,0E-03	1,0E-03	7,2E-03	8,6E-04	-5,1E-01

EP-freshwater* Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq.

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context of Swedish public procurement legislation.

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO2 eq.	1,0E+02	2,8E+01	6,6E+01	7,1E+01	2,2E+01	8,6E+01	3,0E+01	4,8E+00	6,1E-01	-1,8E+02

GWP-IOBC global warming potential calculated according to the principle of instantaneous oxidation.

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskriften, Annex III), see table.

Indoor environment





The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

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
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
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LCA software SimaPro 9.3	

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