

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025, ISO 21930 and EN 15804+A2



HOLMEN

A specific EPD for
Planed timber made of spruce and pine, u 16%

HOLMEN

Owner of the declaration:
Holmen Wood Products AB
Kroksjöns Sågverk
www.holmen.com

Program holder and publisher
The Norwegian EPD Foundation

Declaration number:
NEPD-4006-2856-EN

Product category /PCR:
Wood and wood-based products

Issue date: 06.12.2022
Valid to: 06.12.2027

EPD Software:

This EPD is based on IVL EPD Generator for the Sawmill products (NEPDT26) and follow the approved background database verification approach.

The Norwegian
EPD Foundation



General information

Product:

Planed timber made of spruce and pine, u 16%

Program Operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 23 08 80 00
Email: post@epd-norge.no

Declaration Number:

NEPD-4006-2856-EN

This declaration is based on Product

Category Rules:

CEN Standard EN 15804 A2 serves as core PCR
and PCR Part B for wood and wood-based products
for use in construction (NPCR 015 version 3.0,
10.04.2019).

Statement of liability:

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:

—

Declared unit with option:

1 m³ planed timber
A1-A5, B1-B7, C1-C4 and D

Functional unit:

—

Verification:

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

☐ Internal ☒ External

Third party verifier:



Linda Høibye, Life Cycle Assessment Consulting
Independent verifier approved by EPD Norway

Owner of the declaration and manufacturer:

Holmen Wood Products
Contact person: Marit Bohlin
Phone: 065028000
Email: marit.bohlin@holmen.com

Place of production:

Kroksjön
Sweden

Management system:

ISO 14001, FSC, PEFC

Organisation no:

556099-0672

Issue date:

06.12.2022

Valid to:

06.12.2027

Year of study:

2021

Comparability:

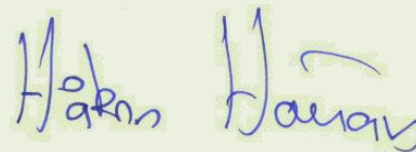
EPD of construction products may not be
comparable if they not comply with EN
15804 and seen in a building context.

The EPD has been worked out by:

Martin Erlandsson, IVL



Approved by:



Håkon Hauan
(Managing Director EPD Norway)

Product

Product description:

Planned timber is used for structural purposes, cladding and as component in wood based products. The average moisture ratio of the declared products is 16 % (EN 14298). On request, timber with a different moisture content can be delivered.

Product specification:

Planned timber is produced in different size and the declared product is representative for the average planned timber produced by the sawmill and a mix of pine and spruce. Difference on GWP-Fossil A1-3 caused by a mix of tree species is less than 4% compared to individual specie.

Materials, product	kg/m ³	%
Spruce/whitewood	234	48%
Pine/redwood	256	52%
Sum	489	100%
Packaging materials	kg/m ³	%
Wood	0.01	6%
Polyethene folio	0.08	80%
Nylon strap	0.01	14%
Steel strip	0	0%
Cardboard	0	0%
Sum	0.10	100%

Technical data:

Planned timber is delivered according to qualities and sizes specified by demands on different markets. For the European market, the European EN standards and the Swedish publication 'Appearance grading of softwoods – European spruces, firs, pines, Douglas fir and larches are typically applicable'.

The raw dry mass for spruce is 384 kg/m³ and 420 kg/m³ for pine as Swedish averages and used here to calculate biogenic carbon content and the delivery density including water according to the current moisture content.

Market:

Main markets are Sweden and Northern Europe.

Reference service life:

Reference service life is normally the same as the building when not exposed for weathering, which is typically set to 50 or 60 years.



Use QR code for **fact sheet** on sawn timber.

LCA: Calculation rules

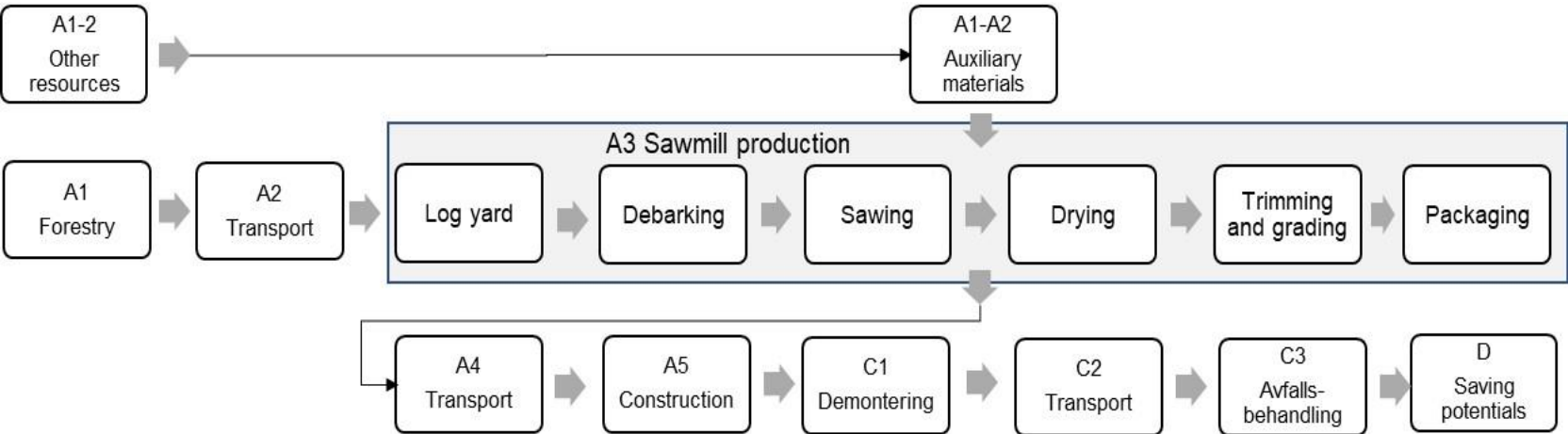
Declared unit:

1 m3 planned timber

System boundary:

Flow chart for the production (A3) are shown below, while the rest of the modules are shown on page 5. Module A4 to D is further explained in the scenario section.

Figure 1 Manufacturing and transport to a customer and the remaing lifecycle.



Data quality:

The sawmill process and transport use specific LCA data and national representative figures is used for the forestry. Generic upstream data for energy wares and small amount of auxiliary materials are mainly from Gabi (age 2017-2022).

Allocation:

The allocation is made in accordance with the provisions of EN15804. All impact from the planning of boards are allocated to the main product. The shaving are sold and only attributed to its upstream impact from its previously processes. The sawmill and its multiple co-products are allocated based on their different economic values, except the drying process that is attributed to the intermediate product on physical premises. The economic value of the different parts of the input round timber are attributed using the market value of its final products/co-products. A conservative approach is used for transport of round timber to the sawmill based on economic allocation factors (module A2). A conservative economic allocation approach is used for forestry products, where no impact is allocated to the tops and branches (GROT), except forestry operations aimed for GROT (forwarding and shipping). Forestry land use (LANCA) is assessed based on national characterisation factors for Sweden (Horn et al 2021).

Cut-off criteria:

All major raw materials and all the essential energy used are included. All production process are included, hence the few limited cut off that occurs (<<1%) related to packaging materials that is not substituted in module D. This cut-off rule does not apply for hazardous materials and substances. Inherent biogenic carbon and stored energy in packaging material is balanced out directly.

Calculation of biogenic carbon content:

Sequestration (module A1) and emissions of biogenic carbon are calculated according to EN16485:2014/EN15804+A2, where the net biogenic carbon cycle A to C is zero (i.e. carbon dioxide neutral). In this EPD, the amount of biogenic carbon stored in the product (module A3) is reported additionally (according to EN 15804 A2) as biogenic carbon stored in the product (see table 'Resource use'). For biogenic carbon in all other modules after A3, the carbon in the products is assigned to the module where the emission occurs in order to support the modularity principle in EN15804, so the net result is zero. Biogenic carbon and energy stored in packaging materials (less than 5 weight-%) are directly balanced out and therefore not visible in the environmental indicator result.

LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)

Type	Loaf factor, % (90+0%)	Type of vehicle	Distance km	Fuel	Value
Semi-trailer	0.45	TT/AT 28-34 + 34-40t	100	0.027 l/tkm	2.7

A4: The transportation is reported as 100 km and shall be used as factor to estimate the actual distance to the specific object.

Assembly (A5)

	Unit	Value
Material loss	%	5
Crane, electricity consumption	kWh	2.9E-02
Front loader, diesel	kWh	2.8E-01

A5: At the construction site, 4 minutes of work with front loader is assumed

Use (B1)

	Unit	Value
MND		

Maintenance (B2)/Repair (B3)

	Unit	Value
MND		

The declared product is not assumed to be exposed for wether and for that reason no mainatance is needed during the service life.

Replacement (B4)/Refurbishment (B5)

	Unit	Value
MND		

Operational energy (B6) and water consumption (B7)

	Unit	Value
MND		

No operational energy used during service life.

End of Life (C1, C3, C4)*

	Unit	Value
C1: Demolision machine (diesel)	kWh	0.51
C3: To material reuse	kg	0
C3: To material recycling	kg	0
C3: To energy recovery	kg	462
C3: Wood chipping (diesel)	kWh	2.8
C4: To landfill	kg	0

Energy need for demolition (C1) and chipping (C3) of the wooden discard products is found in according to Erlandsson et el (2015). The scenario accounts for 100%* energy recovery and end of waste is reached in C3. No statistics exist in Sweden on recycling of demolition wood but will likely be at least 90%.

Transport to waste processing (C2)*

Type	Load factor, % (90+0%)	Type of vehicle	Distance km	Fuel	Value
Large lorry/truck	45%	TT/AT 14-20+20-28t	35	0.037	1.3

*C2: Assumed tranport from demolition site to local waste treatment site, from where it is then sold.

The transport assume empty return.

Benefits and loads beyond the system boundaries (D)*

	Unit	Value
Chipped CLT that substitute fuel in a district heating plant	kg, DM	421
Chipped discard product that substitute average used fuel in a district heating plant	MJ	-8077

D: The chipped product is assumed to be used as fuel in a district heating and then replaces the average energy mix.

* If less recycling rate than 100% is asked for shall the result from module C and D be multiplied by such factor that takes the actual number into account. 100% is used here to support the modular approach of using these figures on the buildings level.

Additional technical information

No additional information given.

LCA: Results

The LCA results are presented for the declared unit defined on page 2 of the EPD document. EN 15804 exists in two versions and version 2 is the latest.

System boundaries: **X**=included, **MND**= module not declared, **MNR**=module not relevant.

Product stage			Construction process stage		Use stage							End of life stage				Beyond the system boundary
Raw materials	Transport	Manufacturing	Transport	Construction, installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery
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
SE	SE	SE	SE	SE	—	—	—	—	—	—	—	SE	SE	SE	SE	SE

Core environmental impact, version A2 — mandatory indicators

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ e	-7.20E+02	3.12E+00	2.31E+00	1.78E-01	2.06E+00	7.72E+02	0.00E+00	-5.86E+02
GWP-fossil	kg CO ₂ e	2.92E+01	4.34E+00	1.62E+00	1.28E-01	1.48E+00	7.00E-01	0.00E+00	-1.00E+02
GWP-biogenic	kg CO ₂ e	-7.44E+02	1.23E+00	1.03E+00	4.97E-02	5.75E-01	7.71E+02	0.00E+00	-4.86E+02
GWP-LULUC	kg CO ₂ e	1.52E-01	4.48E-08	7.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-01
GWP-IOBC/GHG ¹⁾	kg CO ₂ e	2.76E+01	3.03E+00	1.53E+00	1.22E-01	1.42E+00	6.70E-01	0.00E+00	-9.42E+01
ODP	kg CFC11 eq.	2.90E-07	4.48E-08	1.68E-08	1.81E-09	2.10E-08	9.92E-09	0.00E+00	-1.02E-06
AP	mol H ⁺ eq.	3.87E-01	3.15E-02	2.09E-02	1.27E-03	1.48E-02	6.97E-03	0.00E+00	-7.91E-01
EP-freshwater	kg P eq.	2.04E-03	1.22E-04	1.08E-04	4.94E-06	5.73E-05	2.71E-05	0.00E+00	1.48E-03
EP-marine	kg N eq.	1.75E-01	1.66E-02	9.60E-03	6.73E-04	7.79E-03	3.68E-03	0.00E+00	-8.80E-02
EP-terrestrial	mol N eq.	1.64E+00	1.61E-01	9.00E-02	6.51E-03	7.54E-02	3.57E-02	0.00E+00	-1.48E+00
POCP	kg NMVOC eq.	2.64E-01	2.33E-02	1.43E-02	9.40E-04	1.09E-02	5.15E-03	0.00E+00	2.40E-01
ADP-m&m 2)	kg NMVOC eq.	8.95E-02	1.28E-06	4.48E-03	5.16E-08	5.98E-07	2.83E-07	0.00E+00	-1.25E+03
ADP-fossil 2)	kg NMVOC eq.	6.85E+02	5.09E+01	3.68E+01	2.06E+00	2.38E+01	1.13E+01	0.00E+00	9.23E+03
WDP	kg NMVOC eq.	1.36E+01	3.44E-02	6.84E-01	1.39E-03	1.61E-02	7.62E-03	0.00E+00	6.69E+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; **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

Note 1 – This additional indicators **GWP-GHG/IOBC** is also referred to as **GWP-GHG** in context of Swedish and Finnish legislation .
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

Additional environmental impact, version A2 — addition of non-mandatory indicators with poor reliability ^{1) 2)}

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
PM ²⁾	Disease incidence	4.27E-03	7.34E-04	2.50E-04	2.97E-05	3.44E-04	1.62E-04	0.00E+00	-5.26E+01
IRP ¹⁾	kBq U235 eq	1.24E+01	7.90E-02	6.26E-01	3.19E-03	3.70E-02	1.75E-02	0.00E+00	3.96E+02
ETP-fw ²⁾	CTUe	2.42E+02	3.05E+00	1.22E+01	1.23E-01	1.43E+00	6.76E-01	0.00E+00	4.69E+03
HTP-c ²⁾	CTUh	3.89E-07	6.37E-08	2.26E-08	2.58E-09	2.98E-08	1.41E-08	0.00E+00	-1.97E-01
HTP-nc ²⁾	CTUh	1.30E-05	2.01E-06	7.50E-07	8.11E-08	9.39E-07	4.44E-07	0.00E+00	-2.39E+00
SQP ²⁾	Dimensionless	7.21E+03	1.81E+01	3.62E+02	7.32E-01	8.48E+00	4.01E+00	0.00E+00	3.05E+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

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.
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

Environmental impact, version A1

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
GWP-TOT	kg CO ₂ e	-7.43E+02	3.12E+00	1.56E+00	1.26E-01	1.46E+00	7.72E+02	0.00E+00	-1.02E+02
GWP-IOBC*	kg CO ₂ e	2.82E+01	3.12E+00	1.56E+00	1.26E-01	1.46E+00	6.89E-01	0.00E+00	-1.02E+02
ODP	kg CFC11 e	2.96E-07	4.48E-08	1.71E-08	1.81E-09	2.10E-08	9.91E-09	0.00E+00	-1.02E-06
POCP**	kg C ₂ H ₄ e	6.30E-03	-6.06E-03	-1.58E-05	-2.45E-04	-2.84E-03	-1.34E-03	0.00E+00	-7.50E-02
AP	kg SO ₂ e	6.42E+00	2.07E-02	3.22E-01	8.37E-04	9.69E-03	4.58E-03	0.00E+00	-6.61E-01
EP	kg PO ₄ ³⁻ e	6.30E-03	-6.06E-03	2.87E-01	2.98E-04	3.45E-03	1.63E-03	0.00E+00	-2.93E-02
ADPM	kg Sb e	1.48E-02	1.28E-06	7.41E-04	5.16E-08	5.98E-07	2.83E-07	0.00E+00	7.40E-05
ADPE	MJ	3.35E+02	4.66E+01	1.91E+01	1.88E+00	2.18E+01	1.03E+01	0.00E+00	-2.28E+02

**LCI origin from GaBi database separates NOx into NO and NO₂, in combination with the applied characterization model with a marginal approach for

GWP Global warming potential; **ODP** Depletion potential of the stratospheric ozone layer; **POCP** Formation potential of tropospheric photochemical oxidants; **AP** Acidification potential of land and water; **EP** Eutrophication potential; **ADPM** Abiotic depletion potential for non fossil resources; **ADPE** Abiotic depletion potential for fossil resources.

* Also referred as **GWP-GHG** in context to eg Swedish and Finish legislation.

Resource use, version A1+2 — mandatory indicators

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	1.06E+04	1.20E+01	5.31E+02	4.87E-01	5.63E+00	2.66E+00	0.00E+00	3.96E+03
RPEM	MJ	7.97E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.97E+03	0.00E+00	0.00E+00
TPE	MJ	1.86E+04	1.20E+01	5.31E+02	4.87E-01	5.63E+00	-7.97E+03	0.00E+00	3.96E+03
NRPE	MJ	6.85E+02	5.09E+01	3.68E+01	2.06E+00	2.38E+01	1.13E+01	0.00E+00	7.38E+03
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	6.85E+02	5.09E+01	3.68E+01	2.06E+00	2.38E+01	1.13E+01	0.00E+00	7.38E+03
SM	kg	0.00E+00	0.00E+00	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	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	0.00E+00	-1.92E+03
W	m ³	6.36E+00	9.24E-01	3.64E-01	3.74E-02	4.32E-01	2.04E-01	0.00E+00	-7.12E+01

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.

Energy stored as material in the packaging materials is direct balanced out in the module it arrise and stored in the product is balanced out

End of life — Waste, version A1+2 — mandatory indicators

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
HW	kg	1.81E-02	2.28E-06	9.06E-04	9.23E-08	1.07E-06	5.05E-07	0.00E+00	2.17E-06
NHW	kg	4.23E+00	1.40E-02	2.12E-01	5.64E-04	6.53E-03	3.09E-03	0.00E+00	-8.36E-01
RW	kg	1.04E-01	5.93E-05	5.18E-03	2.40E-06	2.78E-05	1.31E-05	0.00E+00	3.18E+00

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

End of life — Output flow, version A1+2 — mandatory indicators

Parameter	Unit	A1-3	A4	A5	C1	C2	C3	C4	D
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	3.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	2.35E-03	9.67E-02	1.17E-04	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	3.02E-02	0.00E+00	1.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	Amount	Unit
Biogenic carbon content in product	210	kg C
Biogenic carbon content in the accompanying packaging	0	kg C

44/12 is the ratio between the molecular mass of CO2 and C molecules.

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

Additional Norwegian requirements

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

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

Data source	Amount	Unit
Energywares Gabi and end energymix ENSTO-E 2016	0.042	kg CO ₂ e/kWh

Dangerous substances

- ☒ 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 (Avfallsforskiten, Annex III), see table beow.

Name	CAS no.	Amount
—	—	—

Indoor environment

Not relevant

Carbon footprint

Carbon footprint according to ISO 14067 has not been worked out for the product.

Bibliography

ISO 14025:2006	Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
ISO 14044:2006+A1:2017+A2:2020	Environmental management - Life cycle assessment - Requirements and guidelines.
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	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web www.epd-norge.no
	Owner of the declaration Holmen Wood Products Kroksjön	Phone: +46 (0) 650 28 000 web www.holmen.com
	Author of the Life Cycle Assessment Martin Erlandsson IVL Swedish Environmental Res. Inst.	Phone: +46 (0) 10-788 65 00 web www.ivl.se
	ECO Platform ECO Platform ECO Portal	+46 (0) 10-788 65 00 web www.eco-platform.org web ECO Portal

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