

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804



epd-norge.no
The Norwegian EPD Foundation

Owner of the declaration	Norwegian Wood Industry Federation
Publisher	The Norwegian EPD Foundation
Declaration number	NEPD-309-179-EN
Issue date	09.03.2015
Valid to	09.03.2020

Solid softwood panelling for interior use

Product

Norwegian Wood Industry Federation
Owner of the declaration

Treindustrien



Photo: Per Skogstad (Treteknisk)

General information

Product

Solid softwood panelling for interior use

Program holder

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

Declaration number:

NEPD-309-179-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serve as core PCR
NPCR015 rev.1 (2013/08)

Declared unit:

Production of 1 m² planed softwood panelling with an
dimension of 14 x 120 mm.

Declared unit with option:

1 m² of planed softwood panelling with an reference service
life of 60 years.

Functional unit:

The EPD has been worked out by:

Lars G. F. Tellnes
Norwegian Institute of Wood Technology

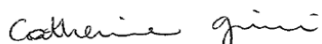
 **Treteknisk** 

Verification:

Independent verification of data, other environmental
information and EPD has been carried out in accordance
with ISO14025, 8.1.3 and 8.1.4

externally ☒

internally ☐



Catherine Grini, M.Sc.
(Independent verifier approved by EPD Norway)

Owner of the declaration

Norwegian Wood Industry Federation
Contact person: Espen Tuveng
Phone: +47 97 68 07 20
e-mail: espen.tuveng@trelast.no

Manufacturer

The declaration is valid for the members of Norwegian
Wood Industry Federation, for updated members list:
<http://www.treindustrien.no/>

Place of production:

Norway

Management system:

Most producers have chain-of-custody certification for
sustainable forestry according to PEFC ST 2002:2010.
Updated list available at: www.pefcregs.info

Org. No:

980 308 952

Issue date

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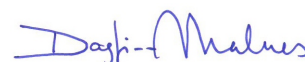
Comparability:

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

Year of study:

2014

Approved



Dagfinn Malnes
Managing Director of EPD-Norway

Declared unit:

Production of 1 m² planed softwood panelling with an dimension of 14 x 120 mm.

Key environmental indicators	Unit	Cradle to gate A1 - A3	Transport *****	Module A4
Global warming	kg CO ₂ -eqv	-10 ⁺	0,05	0,2
Energy use	MJ	54	0,84	2,8
Dangerous substances	*	-	-	-
Share of renewable energy used	%	76	1	1
Share of renewable materials	%	99,5	-	-

⁺ Includes sequestration of 10,78 kg carbon dioxide during wood growth

* The product contains no substances from the REACH Candidate list or the Norwegian priority list

***** Transport from production site to central warehouse in Norway

Product

Product description:

Solid softwood panelling is produced by planed softwood of the members of the Norwegian Wood Industry Federation for use as a construction material. The raw material is Nordic sawn timber. Panelling is usually planed on the same site as the sawmill. Panelling is used to cover wall and ceiling in rooms with normal indoor climate.

Technical data:

Panelling of spruce have an basic density of 360 kg/m^3 and pine about 420 kg/m^3 . The moisture is about 12% relative to dry.

Solid softwood panelling is produced according to SN/TS 3183:2008.

Product specification

In the calculations panelling of pine is used with an dimension of $14 \times 120 \text{ mm}$ and consists of $0,014 \text{ m}^3$ of wood.

Market:

Norway

Materials	kg	%
Planed softwood	6,58	99,8
Plastic packaging	0,01	0,2
Total	6,59	100

Reference service life:

The reference service life is the same as for the construction and is usually set to 60 years.

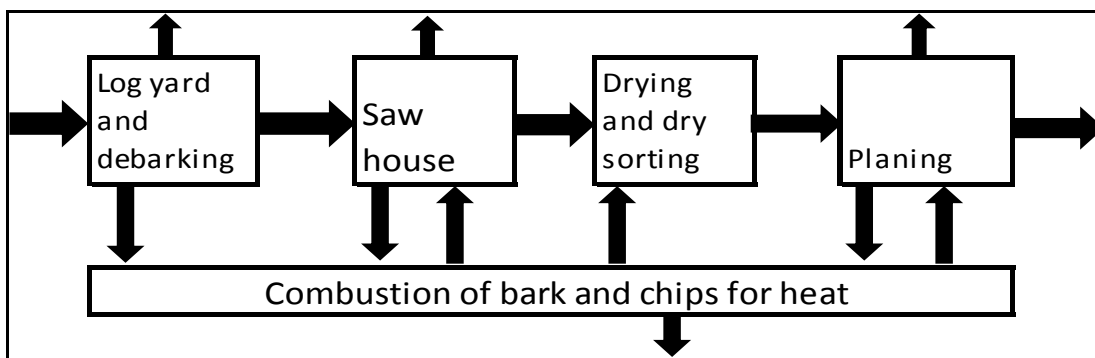
LCA: Calculation rules

Declared unit with option:

1 m² of planed softwood panelling with an reference service life of 60 years.

System boundary:

Flow chart for the production (A3) of planed timber is shown below, while the rest of the modules are shown on page 5. Modul D is calculated with energy substitution and is further explained in the scenarios section.



Data quality:

Data for the production of planed wood is collected from a representative selection of member companies and weighted to an average. These are representative for 2013 and includes volume balances, economic allocation, transport distances, energy use and packaging. Otherwise generic data is collected from Ecoinvent v2.2 (2010) and ELCD 3.0 (2013).

Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

Allocation:

The allocation is performed according to the EN 15804:2012. In the production chain of wood this is economic allocation since the value of the by-products are relatively low. The economic values are collected from Norwegian sawmills.

Calculation of biogenic carbon content:

Sequestration and emissions of biogenic carbon is calculated according to EN16485:2014. This approach is based on the modularity principle in EN15804:2012 that states that all environmental impacts are declared in the life cycle where they appear. The amount of carbon dioxide is calculated according to NS-EN 16449:2014 with a basic density of 420 kg/m^3 , this is calculated to be 660 kg CO_2 per m³ and $10,78 \text{ kg CO}_2$ per declared unit.

LCA: Scenarios and additional technical information

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

The transport of panelling to building site is mainly with lorry and is either directly from production or through a builders merchant. In some cases it is also transported by boat, but that has not been included in the normal scenario.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	62,5	Lorry, 16-32t	100	l/tkm	
Bil	75	Lorry, >32t	100	l/tkm	

It is assumed 5% wastage during installation and a electricity consumption of 1 MJ.

In a normal scenario is it assumed that the softwood panelling does not need maintenance or repair. Under certain use scenario this can be relevant and by an assessment based on this EPD that should be considered depending on the actual application.

Installation in the building (A5)

	Unit	Value
Auxiliary	kg	
Water consumption	m ³	
Electricity consumption	MJ	1
Other energy carriers	MJ	
Material loss	kg	0
Output materials from waste treatment	kg	
Dust in the air	kg	

The product does not require any operationl energy or water consumption.

Maintenance (B2)/Repair (B3)

	Unit	Value
Maintenance cycle*	År	
Auxiliary	kg	
Other resources	kg	
Water consumption	m ³	
Electricity consumption	kWh	
Other energy carriers	MJ	
Material loss	kg	

In a normal scenario it is assumed not to be a need for replacement or any change during refurbishment. In an assessment one should take into consideration whether this is relevant for the actual application.

Operational energy (B6) and water consumption (B7)

	Unit	Value
Water consumption	m ³	
Electricity consumption	kWh	
Other energy carriers	MJ	
Power output of equipment	kW	

Replacement (B4)/Refurbishment (B5)

	Unit	Value
Replacement cycle*	år	60
Electricity consumption	kWh	
Replacement of worn parts		

* Number or RSL (Reference Service Life)

The transport of wood waste is based on average distance in 2007 in Norway and is at 85 km. It is further estimated that 46% are further transported to Sweden for treatment. It is estimated that 67% of this is on truck, 9% by rail and 24% is by boat, the transport distances to Sweden were assumed.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	50	Lorry, 20-28t	85	0,05 l/tkm	
Truck	75	Lorry, >32t	200	0,026 l/tkm	
Railway		Freight train	400	0,239 MJ/tkm	
Boat	71	Barge	800	0,011 l/tkm	

Benefits beyond the life cycle is calculated on the exported energy and the substitution of conventional energy production and fuels. For the share recovered in Norway, this is substitution of Norwegian el-mix, district heating mix and different types of industrial fuels. For the share exported to Sweden generic data from ELCD 3.0 is used.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Substitution of biofuel	kg	1,6
Substitution of electric energy	MJ	7,8
Substitution of thermal energy	MJ	27,4

Softwood panelling can be sorted as clean or mixed wood waste. The scenario for further treatment is based on the Norwegian waste accounts in 2011. It is assumed that energy recovery, incineration and landfill are relevant for the wood.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction waste	kg	7
Reuse	kg	
Recycling	kg	
Energy recovery	kg	6,0
Incineration without energy recovery	kg	0,5
To landfill	kg	0,1

LCA: Results

The results for global warming in A1-A3 gives large contribution of the sequestration of 10,78 kg carbon dioxide during wood growth, while the same amount gives an large contribution when emitted during waste treatment in C3 and C4.

The uncertainty of the results are estimated to be approx. 10-20 % in relative standard deviation of GWP, POCP, AP, EP and ADPE, while ODP have approx. 25 % and ADPM approx. 40 %. The high uncertainties of the ODP and ADPM are caused by high uncertainties of database data. The difference between production sites are not found to have a large influence on the uncertainty of the results.

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

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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	X	X	X	X	X	X	X	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
GWP	kg CO ₂ -eqv	-1,00E+01	1,78E-01	1,42E-01	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ODP	kg CFC11-eqv	9,23E-08	2,87E-08	2,04E-08	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
POCP	kg C ₂ H ₄ -eqv	3,71E-04	2,25E-05	3,84E-05	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
AP	kg SO ₂ -eqv	5,74E-03	6,93E-04	8,90E-04	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP	kg PO ₄ ³⁻ -eqv	1,26E-03	1,42E-04	1,96E-04	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADPM	kg Sb-eqv	1,59E-06	5,10E-07	3,07E-07	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADPE	MJ	1,09E+01	2,66E+00	2,06E+00	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Environmental impact

Parameter	Unit	B6	B7	C1	C2	C3	C4		D
GWP	kg CO ₂ -ekv	0,00E+00	0,00E+00	1,64E-04	1,82E-01	9,90E+00	9,84E-01		-2,59E+00
ODP	kg CFC11-ekv	0,00E+00	0,00E+00	1,46E-11	2,78E-08	8,91E-09	9,72E-10		-2,36E-07
POCP	kg C ₂ H ₄ -ekv	0,00E+00	0,00E+00	1,94E-08	3,12E-05	5,93E-05	6,10E-06		-7,29E-04
AP	kg SO ₂ -ekv	0,00E+00	0,00E+00	3,81E-07	9,83E-04	1,49E-03	1,08E-04		-1,45E-02
EP	kg PO ₄ ³⁻ -ekv	0,00E+00	0,00E+00	7,92E-08	2,12E-04	3,75E-04	2,95E-05		-7,85E-04
ADPM	kg Sb-ekv	0,00E+00	0,00E+00	4,97E-10	3,96E-07	8,02E-08	7,26E-09		-4,63E-07
ADPE	MJ	0,00E+00	0,00E+00	2,19E-03	2,67E+00	1,25E+00	1,06E-01		-3,68E+00

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

Resource use

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
RPEE	MJ	4,10E+01	3,78E-02	7,24E+00	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RPEM	MJ	1,12E+02	INA	1,12E-01	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	1,53E+02	3,78E-02	7,35E+00	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRPE	MJ	1,26E+01	2,80E+00	2,22E+00	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRPM	MJ	INA	INA	INA	MNA	INA	INA	INA	INA
TRPE	MJ	1,26E+01	2,80E+00	2,22E+00	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
SM	kg	INA	INA	INA	MNA	INA	INA	INA	INA
RSF	MJ	INA	INA	INA	MNA	INA	INA	INA	INA
NRSF	MJ	INA	INA	INA	MNA	INA	INA	INA	INA
W	m ³	4,52E+00	2,21E-01	3,67E-01	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Resource use

Parameter	Unit	B6	B7	C1	C2	C3	C4		D
RPEE	MJ	0,00E+00	0,00E+00	1,46E-02	3,88E-02	9,57E+01	7,36E+00		-4,46E+01
RPEM	MJ	0,00E+00	0,00E+00	INA	INA	-1,02E+02	-7,82E+00		INA
TPE	MJ	0,00E+00	0,00E+00	1,46E-02	3,88E-02	-5,96E+00	-4,59E-01		-4,46E+01
NRPE	MJ	0,00E+00	0,00E+00	2,86E-03	2,81E+00	1,32E+00	1,09E-01		-3,53E+01
NRPM	MJ	INA	INA	INA	INA	INA	INA		INA
TRPE	MJ	0,00E+00	0,00E+00	2,86E-03	2,81E+00	1,32E+00	1,09E-01		-3,53E+01
SM	kg	INA	INA	INA	INA	INA	INA		INA
RSF	MJ	INA	INA	INA	INA	INA	INA		INA
NRSF	MJ	INA	INA	INA	INA	INA	INA		INA
W	m ³	0,00E+00	0,00E+00	5,18E-03	2,26E-01	2,38E-01	1,19E-02		-3,93E+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

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
HW	kg	6,31E-04	7,09E-05	1,54E-03	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NHW	kg	1,66E-01	2,00E-02	2,87E-02	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RW	kg	2,60E-05	2,31E-06	2,82E-06	MNA	0,00E+00	0,00E+00	0,00E+00	0,00E+00

End of life - Waste

Parameter	Unit	B6	B7	C1	C2	C3	C4		D
HW	kg	0,00E+00	0,00E+00	8,39E-08	5,65E-05	2,75E-02	1,93E-03		-5,86E-04
NHW	kg	0,00E+00	0,00E+00	1,37E-04	1,87E-02	6,11E-02	1,36E-01		-1,05E-01
RW	kg	0,00E+00	0,00E+00	1,32E-08	2,51E-06	2,92E-06	1,13E-07		-1,30E-05

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

End of life - Output flow

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
CR	kg	INA	INA	INA	MNA	INA	INA	INA	INA
MR	kg	INA	INA	1,00E-02	MNA	INA	INA	INA	INA
MER	kg	INA	INA	7,78E-02	MNA	INA	INA	INA	INA
EEE	MJ	INA	INA	3,83E-01	MNA	INA	INA	INA	INA
ETE	MJ	INA	INA	1,31E+00	MNA	INA	INA	INA	INA

End of life - Output flow

Parameter	Unit	B6	B7	C1	C2	C3	C4		D
CR	kg	INA	INA	INA	INA	INA	INA		INA
MR	kg	INA	INA	INA	INA	INA	INA		INA
MER	kg	INA	INA	INA	INA	1,56E+00	INA		-1,63E+00
EEE	MJ	INA	INA	INA	INA	7,42E+00	INA		-7,79E+00
ETE	MJ	INA	INA	INA	INA	2,61E+01	INA		-2,74E+01

INA = Indicator not assessed

MNA = Module not assessed

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

Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3}$ = 0,009

Additional Norwegian requirements

Electricity

Norwegian consumption mix at medium voltage is used at the production site and is calculated based on the average for 2008-2010, but also adjusted to be the same as emission factors published by EPD-Norge.

Greenhouse gas emissions: 0,012 kg CO₂ - eqv/MJ

Dangerous substances

None of the following substances have been added to the product: Substances on the REACH Candidate list of substances of very high concern or substances (of 16.10.2014) on the Norwegian Priority list (of 11.11.2013) or substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations.

Transport

Transport from production site to central warehouse in Norway is: 50 km

The scenario of transport from production site is not realistic, but is calculated as a requirement from EPD-Norge.

Indoor environment

Not tested. It is normal to regard untreated wood as safe for the indoor environment

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2006	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
Tellnes, L.G.F.	<i>LCA-report for Norwegian Wood Industries Association. Report nr. 380034-1 from Norwegian Institute of Wood technology, Oslo, Norway.</i>
NPCR015 rev1 08/2013	<i>Product category rules for wood and wood-based materials for use in construction</i>
Ecoinvent v2.2	<i>Swiss Centre of Life Cycle Inventories. www.ecoinvent.ch</i>
ELCD 3.0	<i>European reference Life-Cycle Database. Http://eplca.jrc.ec.europa.eu/</i>
NS-EN 16449:2014	<i>Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide</i>
NS-EN 16485:2014	<i>Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction</i>
SN/TS 3183:2008	<i>Solid softwood panelling for interior use</i>

 epd-norge.no The Norwegian EPD Foundation	Program holder and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: +47 23 08 82 92 e-mail: post@epd-norge.no web: www.epd-norge.no
	Owner of the declaration Norwegian Wood Industry Federation P.O. Box 5487 Majorstuen, N-0305 Oslo Norway	Phone: +47 976 02 543 Fax: - e-mail: trelast@trelast.no web: www.treindustrien.no
	Author of the Life Cycle Assessment Lars G. F. Tellnes P.O. Box 113 Blindern, 0314 Oslo Norway	Phone: +47 98 85 33 33 Fax: - e-mail: firmapost@treteknisk.no web: www.treteknisk.no