

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Moelven Industrier ASA
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2546-1284-EN
Publication number:	NEPD-2546-1284-EN
ECO Platform registration number:	-
Issue date:	23.11.2020
Valid to:	23.11.2025

Sawn dried timber of spruce (*Picea abies*) or pine (*Pinus sylvestris*)

Moelven Industrier ASA

www.epd-norge.no



General information

Product:

Sawn dried timber of spruce (*Picea abies*) or pine (*Pinus sylvestris*)

Program holder:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo
Tlf: +47 977 22 020
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Declaration number:

NEPD-2546-1284-EN

ECO Platform registration number:

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR
NPCR015 version 3.0 - Part B for wood and wood-based
products for use in construction (04/2019).

Declaration of responsibility:

The owner of the declaration shall be responsible for the
underlying information and evidence. EPD Norway shall not
be responsible with regard to manufacturer information, life
cycle data and evidence.

Declared unit:

Manufacturing of 1m³ sawn wood from spruce or pine

Declared unit with option:

Manufacturing of 1m³ sawn wood from spruce or pine and
waste treated at end-of-life.

Functional unit:

Owner of the declaration:

Moelven Industrier ASA
Contact: Customer center Moelven Wood AS
Tlf: +47 63 95 97 50
e-mail: post.wood@moelven.no

Manufacturer:

Moelven Wood

Place of production:

This EPD is valid for the production units mentioned in
certificate: PEFC Certificate number: 1700162, PEFC
Certificate No: 2018-SKM-PEFC-248, FSC Certificate Code:
SCS-COC-003149, FSC Certificate DNV-COC-000538.
Data are collected from the following production units:
Moelven Edanesågen, Moelven Van Severen, Moelven
Soknabruket, Moelven Valåsen.

Management system:

PEFC Certificate number: 1700162-02
PEFC Certificate No: 2018-SKM-PEFC-248
FSC Certificate Code: SCS-COC-003149
FSC Certificate DNV-COC-000538

Org. no.:

914 348 803

Issue date:

23.11.2020

Valid to:

23.11.2025

Year of study:

2020

Comparability:

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

The EPD has been worked out by:

Vegard Ruttenborg
Norwegian Institute of Wood Technology

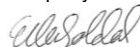



Verification:

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

internal external

Third party verifier:



Ellen Soldal, PhD

(Independent verifier approved by EPD Norway)

Approved



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Sawn dried timber of spruce or pine is produced from Nordic raw materials. The timber are sawn and dried products in various dimensions. The products are largely delivered to own, integrated planing mills, but also to free-standing planing mills. The products can be delivered strength-graded from C14 to C30.

Product specification:

There is a big variation in the density of the wood. The calculations are based on the technical specification for pine with a dry weight of 435 kg / m³ and moisture relative to dry weight of 17%.

Materials	kg	%
Wood, dry weight	435.00	85.47 %
Water content, in wood	73.95	14.53 %
Total, product	508.95	100.00 %
Wood packaging	1.64	
Plastic packaging	0.73	
Total, with packaging	511.31	

Technical data:

Sawn dried timber of spruce and pine have a dry weight of 375 kg/m³ spruce and 435 kg/m³ pine. The humidity is between 12 and 20%, depending on the area of use. In addition, the wooden structure plays a major role in dry weight. Sawn dried timber are produced in accordance with NS-EN-1: 1999 + A1 and strength-sorted construction timber in accordance with NS-EN 14081.

Market:

Primarily Norway and Sweden.

Reference service life:

The product is a raw materials and therefore reference service life is excluded.

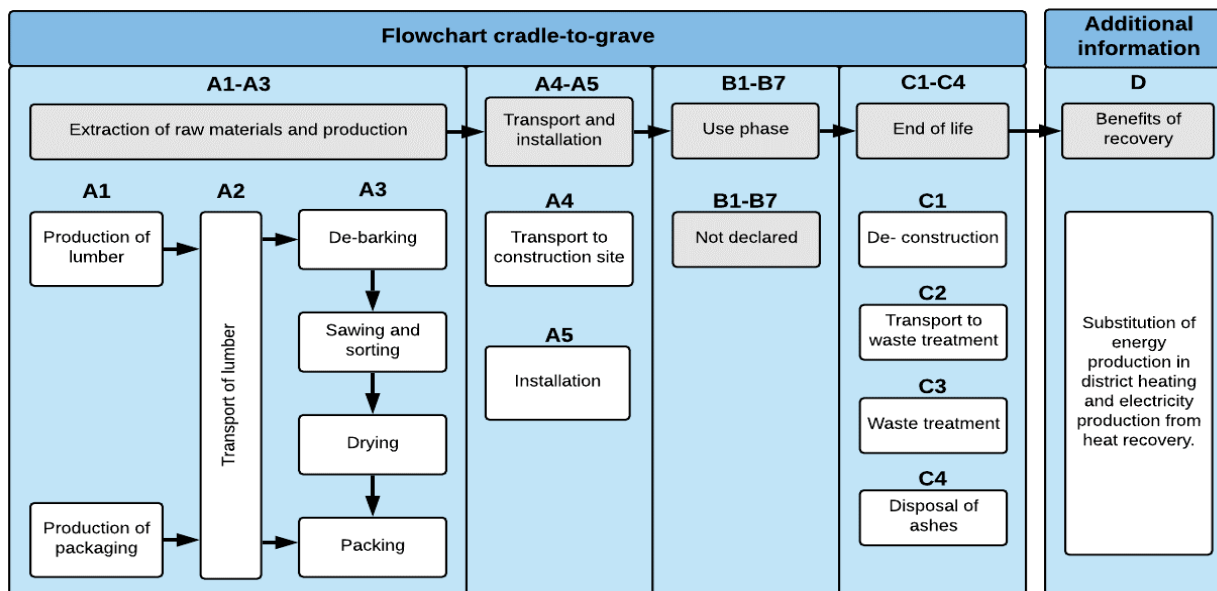
LCA: Calculation rules

Declared unit with option:

Manufacturing of 1m³ sawn wood from spruce or pine

System boundary:

A flow chart with the system boundaries are shown below. Module D is calculated with energy substitution and is explained in more detail under the scenarios.



Data quality:

Production data was collected in 2019 and are representative for 2018. The data for forestry are based on Timmermann and Dibdiokova (2013). The production of district heating is based on Statistics Norway (2018a,b,c). Remaining data are based on Ecoinvent v3.0-v3.5, where all upstream data is from Ecoinvent v3.5. The system model for the Ecoinvent processes is "Allocation cut-off by classification". Modelling and calculations have been performed with Simapro version 9.0.0.48.

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. These cut-off rule does not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy, water and waste production are sub-divided when possible and allocated with economic allocation when the difference in revenue is high. Effects of primary production of recycled materials are allocated to the main product in which the material was used. Economic allocation between saw logs and pulp wood for transport and logging activities is used in forestry.

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 which states that all environmental aspects and impacts are declared in the life cycle where they appear. The calculation of biogenic carbon content and conversion to carbon dioxide is done according to NS-EN 16449:2014. Net contribution to GWP from biogenic carbon by each module is shown on page 8. The timber originates from sustainable forestry and has PEFC certified traceability.

LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)

A large proportion of the finished product is raw material for own further processing. A small proportion is therefore driven to other industrial customers. Transport is exclusively on large trucks, primarily Euro 6.

Type	Capacity utilisation (incl. return) (%)	Type of vehicle	Distance km	Fuel/Energy consumption pr tkm	Fuel/Energy consumption pr km
Truck	60 %	EURO6, >32 tonn	50	0.023 t/km	0.31 /km

Assembly (A5)

Only waste management of packaging is assumed. Other activities are not relevant as the declared unit is an industrial product.

End of Life (C1, C3, C4)

It is estimated that 1 MJ of energy consumption for disassembly at the end of its service life. Wood is treated as pure wood (1141) in accordance with NS 9431: 2011 and is treated with energy recovery.

	Unit	Value
Auxiliary	kg	
Water consumption	m ³	
Electricity consumption	MJ	
Other energy carriers	MJ	
Material loss	kg	
Output materials from waste treatment	kg	2.36
Dust in the air	kg	

	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction waste	kg	509.0
Reuse	kg	
Recycling	kg	
Energy recovery	kg	509.0
To landfill	kg	

Transport to waste processing (C2)

The transport of wood waste is based on average distance for Norway in 2007 and was 85 km (Raadal et al., 2009).

Type	Capacity utilisation incl. return (%)	Type of vehicle	Distance km	Fuel/Energy consumption pr tkm	Fuel/Energy consumption pr km
Truck	44 %	Unspecified	85	0.03 l/tkm	0.28 l/km

Benefits and loads beyond the system boundaries (D)

The benefits from exported energy from energy recovery is calculated with substitution of Norwegian electricity market mix on medium voltage and Norwegian district heating mix. The energy exported and the district heating mix is representative for the year 2017.

	Unit	Value
Substitution of electricity	MJ	699
Substitution of district heating	MJ	4809
Substitution of raw materials	kg	0

LCA: Results

Global warming potential in A1-A3 includes uptake of 797 kg CO₂ through photosynthesis which is bound as carbon in the wood in the product. The same amount of CO₂ is emitted again when the wood is burned in module C3. In addition, 2,4 kg of carbon is bound in the wooden packaging in A1-A3. This is released again by incineration of the packaging in module A5. The net contribution from biogenic carbon in each module is shown on page 8.

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

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
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	
X	X	X	X	X	MID	MID	MID	MID	MID	MID	MID	X	X	X	X	

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ -ekv	-7.38E+02	2.07E+00	2.40E+00	0.00E+00	5.43E+00	8.04E+02	4.00E-02	-3.40E+01
ODP	kg CFC11-ekv	1.12E-05	4.24E-07	0.00E+00	0.00E+00	1.02E-06	5.17E-07	1.56E-08	-3.77E-06
POCP	kg C ₂ H ₄ -ekv	2.09E-02	3.23E-04	0.00E+00	0.00E+00	8.92E-04	2.13E-03	1.19E-05	-1.85E-02
AP	kg SO ₂ -ekv	2.92E-01	5.32E-03	0.00E+00	0.00E+00	1.77E-02	6.08E-02	2.72E-04	-1.88E-01
EP	kg PO ₄ ³⁻ -ekv	7.06E-02	1.12E-03	0.00E+00	0.00E+00	2.92E-03	2.08E-02	4.92E-05	-5.02E-02
ADPM	kg Sb-ekv	1.96E-04	4.81E-06	0.00E+00	0.00E+00	1.50E-05	9.46E-06	5.57E-08	-1.39E-04
ADPE	MJ	9.28E+02	3.39E+01	0.00E+00	0.00E+00	8.88E+01	5.81E+01	1.51E+00	-4.56E+02

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	C1	C2	C3	C4	D
RPEE	MJ	1.94E+03	6.15E-01	0.00E+00	0.00E+00	9.09E-01	8.35E+03	2.36E-02	-2.94E+03
RPEM	MJ	6.98E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.35E+03	0.00E+00	0.00E+00
TPE	MJ	8.92E+03	6.15E-01	0.00E+00	0.00E+00	9.09E-01	1.67E+00	2.36E-02	-2.94E+03
NRPE	MJ	1.10E+03	3.50E+01	0.00E+00	0.00E+00	9.02E+01	6.05E+01	1.55E+00	-5.60E+02
NRPM	MJ	3.30E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	1.13E+03	3.50E+01	0.00E+00	0.00E+00	9.02E+01	6.05E+01	1.55E+00	-5.60E+02
SM	kg	2.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	5.27E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.12E+03
NRSF	MJ	3.52E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.41E+03
W	m ³	2.20E+00	8.27E-03	0.00E+00	0.00E+00	1.47E-02	1.08E-01	1.84E-03	-1.18E+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

End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	2.40E-01	1.85E-05	0.00E+00	0.00E+00	6.26E-03	4.75E-02	5.56E+00	-2.27E-01
NHW	kg	4.38E+01	3.20E+00	0.00E+00	0.00E+00	5.35E+00	1.24E+00	6.93E-01	-1.15E+01
RW	kg	7.84E-03	2.45E-04	0.00E+00	0.00E+00	5.74E-04	1.48E-04	9.01E-06	-2.51E-03

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

End of life - Output flow

Parameter	Unit	A1-A3	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	3.42E-01	0.00E+00	7.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	1.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	5.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.99E+02	0.00E+00	-6.99E+02
ETE	MJ	5.06E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.81E+03	0.00E+00	-4.81E+03

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

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

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

Data source	Amount	Unit
Ecoinvent v3.5 (August 2018) - Norway	31.0	gram CO ₂ -eqv/kWh
Ecoinvent v3.5 (August 2018) - Sweden	48.0	gram CO ₂ -eqv/kWh

Hazardous substances

- The product contains no substances from REACH Candidate List or the Norwegian Priority List
- The product contains substances below 0.1% by weight on the REACH Candidate List
- The product contains substances from REACH Candidate List or the Norwegian Priority List, see table under Specific Norwegian requirements.
- The product does not contain any substances on the REACH Candidate List or the Norwegian Priority List. The product can be characterized as hazardous waste (according to the Waste Shift, Appendix III), see table under Specific Norwegian requirements.

Transport

Transport from production site to a construction site according to scenario A4: 50 km

Indoor environment

Not relevant.

Sustainable forestry

The PEFC and FSC certificates documenting sustainable forestry are not valid for the entire period of validity of the EPD and must therefore be updated for the EPD to be valid for the entire period. (PEFC 2018; 2019; FSC 2019; 2020).

Carbon footprint

To increase the transparency of the climate impacts, the GWP indicator has been divided into sub-indicators:




- GWP-IOBC Climate impacts calculated according to instant oxidation principle
- GWP-BC Climate impacts calculated from the net impacts of sequestration and emission of biogenic carbon

Climate impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO ₂ -eqv	6.17E+01	2.07E+00	0.00E+00	0.00E+00	5.43E+00	6.79E+00	4.00E-02	-3.40E+01
GWP-BC	kg CO ₂ -eqv	-8.00E+02	0.00E+00	2.40E+00	0.00E+00	0.00E+00	7.98E+02	0.00E+00	0.00E+00
GWP	kg CO ₂ -eqv	-7.38E+02	2.07E+00	2.40E+00	0.00E+00	5.43E+00	8.04E+02	4.00E-02	-3.40E+01

Bibliography

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FSC (2020)	FSC mixed; FSC Controlled Wood. Certificate Code: SCS-COC-003149
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
NPCR 015 version 3.0	Product category rules. Part B for wood and wood-based products for use in construction (04/2019)
NS-EN 16449:2014	Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
NS-EN ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006)
NS-EN 16485:2014	Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction
NS-EN 15804:2012+A1:2013	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
NS 9431:2011	Classification of waste
NS-EN 14081-1:2005+A1:2011	Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements
NS-EN 1611-1:1999+A1	Skurlast - Sortering av bartrevirke etter utseende - Del 1: Gran, edelgran, furu, Douglas-gran og lerk (innbefattet endringsblad A1:2002)
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