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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	InnTre Kjeldstad AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-3273-1927-EN
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Issue date:	17.12.2021
Valid to:	17.12.2026

CU impregnated sawn wood of class AB

InnTre Kjeldstad AS

www.epd-norge.no

General information

Product:
CU impregnated sawn wood of class AB

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Manufacturer:
InnTre Kjeldstad AS

Declaration number:
NEPD-3273-1927-EN

Place of production:
Norway: Steinkjer, Selbu og Støren

ECO Platform registration number:

Management system:
PEFC ST 2002:2013
FSC® Chain of custody

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).

Org. no.:
986 044 019

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.

Issue date:
17.12.2021

Valid to:
17.12.2026

Declared unit:

Year of study:
2021

Declared unit with option:
1m^3 CU impregnated sawn wood of pine

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

Functional unit:

The EPD has been worked out by:
Vegard Ruttenborg — Norwegian Institute of Wood Technology
Johann Kristian Næss — Treteknisk

Verification:

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

☐ internal ☑ external

Third party verifier:
VESTLANDSFORSKING
Fredrik Moltu Johnsen, Vestlandsforsking
(Independent verifier approved by EPD Norway)

Approved
Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:
CU impregnated sawn wood of class AB. The product product are pressure impregnated with Wolmanit CX-8. The wood raw material is pine (pinus sylvestris) from nordic origin. Cu impregnated sawn wood from InnTre Kjeldstad can be delivered as cladding, lath, balcony rack, weather board/bar, structural timber and decking.

Technical data:
Pine wood has a density of 545,8 kg/m³ at 25% moisture content relative to dry mass.

Production of decking follows SN/TS 3188, structural timber follows NS-EN 14081. Cladding are produced according to NS-EN 14915 and SN/TS 3186. In addition applies NS/EN 14519 for cladding with tongue and groove and NS-EN 15146 for cladding without tongue and groove. InnTre Kjeldstad are a member of Norsk Impregneringskontroll.

Product specification:
All dimmensions of the product are represented by cubic metre in this life cycle assesment. A multiplication factor of 0,01844 m³/m² can be used for cladding.

Market:
Primarily Norway, but the product are also exported within Europe.

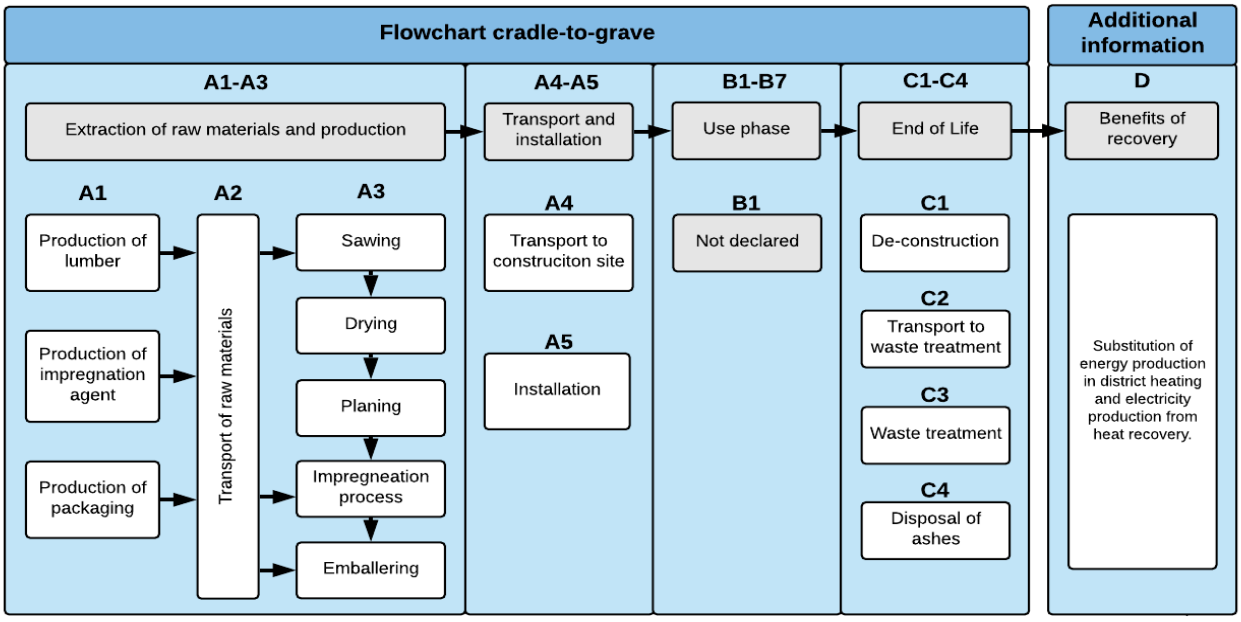
Materialer	kg	%
Wood, dry mass	436,63	79,3 %
Water in wood	109,16	19,8 %
Impregnation CX-8	4,50	0,8 %
Sum produkt	**550,28**	**100,0 %**
Plastemballasje	0,064	
Sum med emballasje	**550,35**	

Reference service life:
The reference service life for CU impregnated sawn wood of class AB are 60 years, except for horizontal exterior use (e.g. decking). The actual durability of the product are dependant on climatic conditions and wear. In this analysis the reference service life are not relevant as the use stage is not declared.

LCA: Calculation rules

Declared unit with option:
1m3 CU impregnated sawn wood of 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:
Reference year for the production data is 2017, but the collection period as well updates of the data lasted until 2021. The data for forestry are based on Timmermann and Dibdiokova (2013) and the transport of sawlogs are based on data gathered directly from norwegian actors in 2020, using a biofuel share of 7% (NS-EN 590). The production of district heating is based on data from Statistics Norway (2021a,b,c). Production of swedish sawn wood are based on a published EPD by Swedish Wood (EPD International, 2018). Data for the impregnation agent are specific and taken from a previous EPD- project. The remaining data are based on Ecoinvent v3.0-v3.7, where all upstream data is from Ecoinvent v3.6 and v3.7. The system model for the Ecoivent processes is "Allocation cut-off by classification". Modelling and calculations have been performed with Simapro version 9.2.0.2.

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. the sum of excluded material and energy - flows does not exceed 5% per module. 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.

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 and FSC 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)

It is assumed a transport to construction site of 80 km, where 50 km takes place on a large truck, 30 km on a medium-sized truck. This is considered a conservative scenario for transport to construction sites in Norway from InnTre Kjeldstad's facilities, as these are located close to retailers.

Type	Capacity utilisation (incl. return) (%)	Type of vehicle	Distance km	Fuel/Energy consumption pr tkm	Fuel/Energy consumption pr km
Truck	53 %	Euro 5, >32 tonn	50	0,023 l/tkm	0,31 l/km
Truck	26 %	Euro 5, 16-32 tonn	30	0,045 l/tkm	0,25 l/km

Assembly (A5)
It is assumed some loss of the material during installation which are modeled in A5, this wastage is calculated as 5% of the results for A1-A4. Furthermore, consumption of 1 MJ of electricity per cubic meter of timber is assumed during the construction phase. Waste management of all packaging that arise from the product on construction site is also included. Consumption of fasteners and necessary tools for installation depends on the intended use and is not included.

End of Life (C1, C3, C4)
Waste from copper-impregnated wood is classified as treated wood (1142) in NS 9431: 2011, but in cases of doubt, the product can be treated as CCA-impregnated wood (7098). The product are utilized for energy recovery (0007) in incineation facilities with approved technology. Quantities are given for one declared unit.

	Unit	Value
Water consumption	m^3	
Electricity consumption	MJ	1,00
Other energy carriers	MJ	
Material loss	kg	27,51
Output materials from waste treatment	kg	0,07
Dust in the air	kg	

	Unit	Value
Hazardous waste	kg	
Collected as mixed construction waste	kg	550,28
Reuse	kg	
Recycling	kg	
Energy recovery	kg	550,28
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
Truck	44 %	Unspecified	85	0,045

Benefits and loads beyond the system boundaries (D)
The benefit from exported energy from municipal waste facilities is calculated by substituting the Norwegian electricity mix and the Norwegian district heating mix. Data for the electricity mix is the same as used in A1-A3 and district heating mix is based on production in 2019.

	Unit	Value
Substitution of electricity	MJ	925,3
Substitution of district heating	MJ	6292,3
Substitution of raw materials	kg	0

LCA: Results

Results for the product are shown below: The declared unit with option is "1m^3 CU impregnated sawn wood of pine". Included modules is A1-A5, C1-C4 and D.

Global warming potential in A1-A3 includes the uptake of 800.5 kg CO_2 / m^3, calculated according to NS-EN 16449: 2014 at 25% humidity relative to dry mass in the wood. The same amount of CO_2 is released during incineration in module C3. The net contribution biogenic CO_2 for each module is shown on page 7.

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	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO_2 -ekv	-7,27E+02	5,20E+00	4,99E+00	6,36E-03	5,95E+00	8,16E+02	4,88E-02	-4,40E+01
ODP	kg CFC11-ekv	9,24E-06	9,68E-07	5,92E-07	2,19E-10	1,10E-06	5,14E-07	1,77E-08	-4,30E-06
POCP	kg C_2H_4 -ekv	2,67E-02	6,95E-04	1,52E-03	9,87E-07	8,02E-04	2,15E-03	1,35E-05	-2,59E-02
AP	kg SO_2 -ekv	3,97E-01	1,69E-02	2,47E-02	2,11E-05	1,92E-02	6,14E-02	3,25E-04	-2,49E-01
EP	kg PO_4^{3-}-ekv	1,21E-01	2,75E-03	7,41E-03	3,81E-06	3,12E-03	2,08E-02	5,86E-05	-6,78E-02
ADPM	kg Sb-ekv	1,42E-03	1,17E-04	8,68E-05	8,64E-07	1,50E-04	3,17E-05	5,95E-07	-1,13E-03
ADPE	MJ	1,04E+03	7,88E+01	6,52E+01	4,10E-02	8,98E+01	9,28E+01	1,63E+00	-5,24E+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	2,66E+03	1,06E+00	5,53E+02	1,16E+00	1,28E+00	8,38E+03	2,97E-02	-3,97E+03
RPEM	MJ	8,38E+03	0,00E+00	8,28E-02	0,00E+00	0,00E+00	-8,38E+03	0,00E+00	0,00E+00
TPE	MJ	1,10E+04	1,06E+00	5,54E+02	1,16E+00	1,28E+00	2,65E+00	2,97E-02	-3,97E+03
NRPE	MJ	1,05E+03	8,04E+01	6,60E+01	8,64E-02	9,17E+01	9,49E+01	1,67E+00	-6,17E+02
NRPM	MJ	5,52E+01	0,00E+00	7,78E-01	0,00E+00	0,00E+00	-3,96E+01	0,00E+00	0,00E+00
TRPE	MJ	1,10E+03	8,04E+01	6,68E+01	8,64E-02	9,17E+01	5,53E+01	1,67E+00	-6,17E+02
SM	kg	1,78E-01	0,00E+00	8,88E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	1,84E-02	0,00E+00	2,25E-02	0,00E+00	0,00E+00	4,32E-01	0,00E+00	-2,60E+03
NRSF	MJ	1,17E-02	0,00E+00	1,50E-02	0,00E+00	0,00E+00	2,88E-01	0,00E+00	-1,65E+03
W	m^3	3,73E+00	8,80E-03	2,02E-01	8,59E-03	1,04E-02	1,18E-01	2,13E-03	-1,43E+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	4,54E-01	4,25E-03	3,62E-01	5,86E-05	4,95E-03	4,84E-02	6,73E+00	-3,59E-01
NHW	kg	3,37E+01	5,37E+00	2,37E+00	7,02E-03	5,88E+00	1,45E+00	7,79E-01	-1,73E+01
RW	kg	5,46E-03	5,49E-04	3,40E-04	8,06E-07	6,24E-04	1,39E-04	1,01E-05	-2,58E-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	7,46E-01	0,00E+00	1,04E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	1,37E-01	0,00E+00	6,86E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	3,98E-01	0,00E+00	4,41E+01	0,00E+00	0,00E+00	8,82E+02	0,00E+00	-9,25E+02
ETE	MJ	4,22E+00	0,00E+00	3,00E+02	0,00E+00	0,00E+00	5,99E+03	0,00E+00	-6,29E+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 = $9,0*10^{-3}$ = 0,009

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase
Norwegian production mix with imports on low voltage (including the production of transmission lines and losses in grid) is applied for electricity in the manufacturing process (A3).

Data source	Amount	Unit
Ecoinvent v3.7 (desember 2020) - Norge	23,0	gram CO_2-ekv./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.

The product contains boric acid below the limit value to inform of specific amount.

Transport
Transport from production site to a construction site according to scenario A4: 80 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 2019; FSC 2019).

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	7,35E+01	5,20E+00	4,99E+00	6,36E-03	5,95E+00	1,51E+01	4,88E-02	-4,40E+01
GWP-BC	kg CO_2 -eqv	-8,00E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,00E+02	0,00E+00	0,00E+00
GWP	kg CO_2 -eqv	-7,27E+02	5,20E+00	4,99E+00	6,36E-03	5,95E+00	8,16E+02	4,88E-02	-4,40E+01

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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*
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NS-EN 14915:2013+A1:2017	*Solid wood panelling and cladding - Characteristics, requirements and marking*
NS-EN 14519:2005	*Solid softwood panelling and cladding - Machined profiles with tongue and groove*
NS-EN 15146:2006	*Solid softwood panelling and cladding - Machined profiles without tongue and groove*
NS-EN 590:2013+A1:2017	*Automotive fuels - Diesel - Requirements and test methods*
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