

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Woodfab avd. Hamar - Takstol



Woodfab
/OPTIMERA/

The Norwegian EPD Foundation

Owner of the declaration:

Optimera AS

Product:

Woodfab avd. Hamar - Takstol

Declared unit:

1 pcs

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 015:2021 Part B for wood and wood-based products for use in construction

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-6643-5884-EN

Registration number:

NEPD-6643-5884-EN

Issue date: 21.05.2024

Valid to: 21.05.2029

EPD software:

LCAno EPD generator ID: 245811

General information

Product

Woodfab avd. Hamar - Takstol

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Declaration number:

NEPD-6643-5884-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 015:2021 Part B for wood and wood-based products for use in
construction

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 information, life cycle assessment data and
evidences.

Declared unit:

1 pcs Woodfab avd. Hamar - Takstol

Declared unit (cradle to gate) with option:

A1-A3,A4,A5,C1,C2,C3,C4,D

Functional unit:

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information
and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4.
Verification of each EPD is made according to EPD-Norway's
guidelines for verification and approval requiring that tools are i)
integrated into the company's environmental management system, ii)
the procedures for use of the EPD tool are approved by EPD-Norway,
and iii) the process is reviewed annually by an independent third
party verifier. See Appendix G of EPD-Norway's General Programme
Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data
and test-EPD in accordance with EPDNorway's procedures and
guidelines for verification and approval of EPD tools.

Third party verifier:

Michael M. Jenssen, Asplan Viak AS

(no signature required)

Owner of the declaration:

Optimera AS
Contact person: Ingrid Kalstad
Phone: +47 22 16 88 00
e-mail: ingrid.kalstad@optimera.no

Manufacturer:

Optimera AS
Østre Aker vei 260
0976 Oslo, Norway

Place of production:

Optimera Byggsystemer AS, Hamar
Narmovegen 455
2323 Ingeberg, Norway

Management system:

Organisation no:

967 013 056

Issue date:

21.05.2024

Valid to:

21.05.2029

Year of study:

2023

Comparability:

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

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03,
developed by LCA.no. The EPD tool is integrated in the company's
management system, and has been approved by EPD Norway.
NEPDT64

Developer of EPD: Rawand Mohamed

Reviewer of company-specific input data and EPD: Kjetil Støbbakk

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

Prefabrikkerte takstoler av trevirke med spikerplater produseres ved at innkjøpt høvellast kappes og settes sammen med innpressede spikerplater i stål. Anvendes i bygninger som takstoler, vegger og gulv, rammer, sammensatte bjelker og gitterdragere, samt som forskaling av betongkonstruksjoner.

Product specification

Beregningene gjelder for 1 stk takstol med 0,115 m³ C30 konstruksjonsvirke og 16 stk spikerplater. Den deklarerte enheten inneholder mengder av trevirke og stål som er bestemt i PCR og ikke innhold i et spesifikt produkt. Formler for omregning av GWP-IOBC resultater til andre mengder trevirke og stål finnes på side 6.

Materials	kg	%
Metal - Steel	3,52	5,99
Wood	55,20	94,01
Total	58,72	100,00

Packaging	kg	%
Packaging - Steel straps	0,20	100,00
Total incl. packaging	58,92	100,00

Technical data:

Konstruksjonsvirke av gran med kvalitet C30 har en densitet på 480 kg/m³ ved 17 % fuktighet.

Konstruksjonsvirket produseres i henhold til NS-EN 14081. Takstoler produseres i henhold til NS-EN 14250 og er underlagt produksjonskontroll for å oppfylle lovpålagt krav om CE-merking.

Market:

Norden, scenarier i LCA er beregnet basert på bruk i Norge.

Reference service life, product

Referanselevetid er den samme som for byggverket, og som regel settes den til 60 år.

Reference service life, building

60 år

LCA: Calculation rules

Declared unit:

1 pcs Woodfab avd. Hamar - Takstol

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis. Allokering er gjort i henhold til bestemmelser i EN 15804. Inngående energi, vann, avfall og intertransport er delt opp i underprosesser og så allokert etter inntekt mellom hoved- og biproduktene. Påvirkning for primærproduksjonen av resirkulerte materialer er allokert til hovedproduktet der materialet ble brukt.

Data quality:

Specific data for the product composition are provided by the manufacturer. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other LCA databases. The data quality of the raw materials in A1 is presented in the table below.

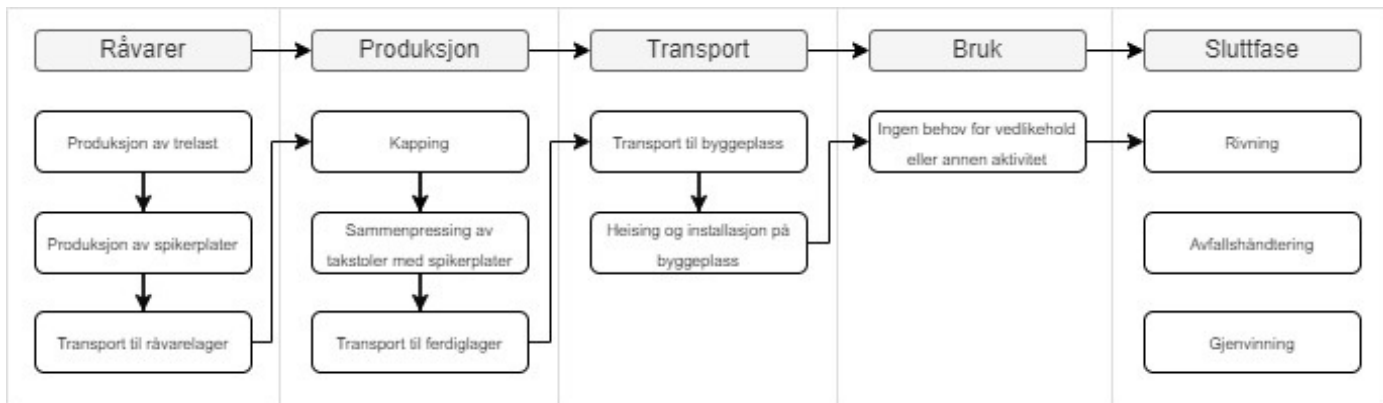
Materials	Source	Data quality	Year
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Steel straps	ecoinvent 3.6	Database	2019
Wood	ecoinvent 3.6	Database	2019

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	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

System boundary:

Flytskjema for livsløpet er vist under. Modul D er beregnet med energisubstitusjon og er nærmere forklart under scenarioene.



Additional technical information:














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)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Lastebil, 16-32 tonn, EURO 6 (kgkm)	36,7 %	300	0,043	l/tkm	12,90
Assembly (A5)					
	Unit	Value			
Electricity (MJ)	MJ/DU	0,12			
Waste, metal, average treatment (kg)	kg	0,20			
De-construction demolition (C1)					
	Unit	Value			
Electricity (MJ)	MJ/DU	0,12			
Transport to waste processing (C2)					
	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Lastebil, 16-32 tonn, EURO 6 (kgkm)	36,7 %	85	0,043	l/tkm	3,66
Waste processing (C3)					
	Unit	Value			
Materials to recycling (kg)	kg	3,52			
Waste treatment per kg Wood, incineration with fly ash extraction (kg)	kg	55,20			
Disposal (C4)					
	Unit	Value			
Landfilling of ashes from incineration of Wood, process per kg ashes and residues - C4 (kg)	kg	0,63			
Benefits and loads beyond the system boundaries (D)					
	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	38,39			
Substitution of primary steel with net scrap (kg)	kg	1,28			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	580,77			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	-5,84E+01	2,89E+00	3,61E-03	7,77E-04	8,19E-01	8,50E+01	2,73E-02	-4,90E+00	
 GWP-fossil	kg CO ₂ -eq	2,69E+01	2,89E+00	3,59E-03	7,53E-04	8,18E-01	6,76E-01	2,73E-02	-4,78E+00	
 GWP-biogenic	kg CO ₂ -eq	-8,53E+01	1,20E-03	2,20E-05	2,08E-05	3,39E-04	8,43E+01	1,48E-05	-7,73E-03	
 GWP-luluc	kg CO ₂ -eq	9,07E-02	1,03E-03	4,10E-06	3,11E-06	2,91E-04	1,03E-04	4,41E-06	-1,17E-01	
 ODP	kg CFC11 -eq	3,87E-06	6,54E-07	6,96E-10	5,20E-11	1,85E-07	5,64E-08	3,23E-09	-2,45E-01	
 AP	mol H+ -eq	1,82E-01	8,30E-03	1,75E-05	5,89E-06	2,35E-03	8,64E-03	1,01E-04	-3,48E-02	
 EP-FreshWater	kg P -eq	9,83E-04	2,31E-05	7,64E-08	5,42E-08	6,54E-06	1,13E-05	3,63E-07	-3,86E-04	
 EP-Marine	kg N -eq	5,83E-02	1,64E-03	4,08E-06	6,47E-07	4,65E-04	4,15E-03	3,21E-05	-1,05E-02	
 EP-Terrestrial	mol N -eq	6,45E-01	1,84E-02	4,64E-05	8,42E-06	5,20E-03	4,40E-02	3,64E-04	-1,13E-01	
 POCP	kg NMVOC -eq	1,89E-01	7,04E-03	1,39E-05	2,26E-06	1,99E-03	1,08E-02	1,01E-04	-3,41E-02	
 ADP-minerals&metals ¹	kg Sb-eq	1,80E-02	7,98E-05	1,33E-07	5,62E-08	2,26E-05	2,73E-06	1,70E-07	-5,79E-05	
 ADP-fossil ¹	MJ	3,63E+02	4,37E+01	5,30E-02	1,03E-02	1,24E+01	5,39E+00	2,69E-01	-6,00E+01	
 WDP ¹	m ³	1,08E+03	4,22E+01	1,83E+00	1,79E+00	1,20E+01	1,31E+01	2,50E+00	-5,26E+02	

GWP-total = Global Warming Potential total; 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 marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

¹Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. 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

Remarks to environmental impacts

Globalt oppvarmingspotensial (GWP-total og GWP-biogenic) i A1-A3 inkluderer opptak av 733,31 kg CO₂ per m³ trevirke. Emballasjen utgjør 0.79 kg CO₂ per kg.

Mengden CO₂ slippes ut igjen ved forbrenning av trevirket i modul C3.

Omregningsfaktorer for andre mengder tre og stål er gitt under med utgangspunkt i GWP-IOBC:

A1-A3: kg CO₂ -eq = 5,40E+01 × m³ of wood + 3,72E+00 × kg of steel

A4: kg CO₂ -eq = 2,35E+01 × m³ of wood + 4,90E-02 × kg of steel

A5: kg CO₂ -eq = 6,75E-03 × m³ of wood







C1: kg CO₂ -eq = 6,75E-03 × m³ of wood

C2: kg CO₂ -eq = 6,67E+00 × m³ of wood + 1,39E-02 × kg of steel

C3: kg CO₂ -eq = 5,93E+00 × m³ of wood

C4: kg CO₂ -eq = 2,46E-01 × m³ of wood

D: kg CO₂ -eq = -2,99E+01 × m³ of wood + -6,01E-01 × kg of steel





Additional environmental impact indicators										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 PM	Disease incidence	4,83E-06	1,77E-07	2,39E-10	4,20E-11	5,01E-08	9,03E-08	1,32E-09	-1,80E-06	
 IRP ²	kgBq U235 -eq	1,59E+00	1,91E-01	3,73E-04	1,87E-04	5,41E-02	1,05E-02	1,25E-03	-3,03E-01	
 ETP-fw ¹	CTUe	7,23E+02	3,24E+01	7,83E-02	4,68E-02	9,17E+00	1,07E+01	4,51E-01	-3,41E+02	
 HTP-c ¹	CTUh	8,55E-08	0,00E+00	3,00E-12	2,00E-12	0,00E+00	1,93E-09	2,20E-11	-1,16E-08	
 HTP-nc ¹	CTUh	1,21E-06	3,54E-08	8,90E-11	5,30E-11	1,00E-08	9,52E-08	8,14E-10	-1,03E-07	
 SQP ¹	dimensionless	6,63E+04	3,05E+01	3,46E-02	5,18E-03	8,65E+00	8,00E-01	8,50E-01	-3,23E+02	

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed




1. 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
2. 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.

Resource use										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 PERE	MJ	1,06E+03	6,25E-01	1,34E-01	1,33E-01	1,77E-01	1,78E-01	1,43E-02	-2,98E+02	
 PERM	MJ	7,72E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,72E+02	0,00E+00	0,00E+00	
 PERT	MJ	1,83E+03	6,25E-01	1,34E-01	1,33E-01	1,77E-01	-7,72E+02	1,43E-02	-2,98E+02	
 PENRE	MJ	3,63E+02	4,37E+01	5,30E-02	1,03E-02	1,24E+01	5,39E+00	2,69E-01	-6,00E+01	
 PENRM	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	
 PENRT	MJ	3,73E+02	4,37E+01	5,30E-02	1,03E-02	1,24E+01	5,39E+00	2,69E-01	-6,00E+01	
 SM	kg	2,24E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 RSF	MJ	8,82E-01	2,24E-02	1,26E-04	1,05E-04	6,33E-03	4,15E-03	3,57E-04	-1,09E-03	
 NRSF	MJ	1,92E+00	7,99E-02	3,38E-04	2,61E-04	2,26E-02	0,00E+00	1,96E-01	-1,61E+01	
 FW	m ³	4,21E-01	4,67E-03	9,99E-04	9,95E-04	1,32E-03	1,12E-02	2,47E-04	-3,61E-01	

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = 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; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"






*INA Indicator Not Assessed

End of life - Waste										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 HWD	kg	2,43E-01	2,25E-03	6,60E-06	6,60E-06	6,38E-04	0,00E+00	4,61E-01	-9,60E-03	
 NHWD	kg	9,54E+00	2,12E+00	2,01E-01	7,92E-04	6,02E-01	0,00E+00	1,74E-01	-1,71E+00	
 RWD	kg	1,94E-03	2,97E-04	9,21E-08	9,21E-08	8,43E-05	0,00E+00	1,33E-06	-2,48E-04	

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Output flow										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 CRU	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	
 MFR	kg	1,48E-01	0,00E+00	2,00E-01	0,00E+00	0,00E+00	3,52E+00	0,00E+00	0,00E+00	
 MER	kg	1,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,52E+01	0,00E+00	0,00E+00	
 EEE	MJ	5,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,84E+01	0,00E+00	0,00E+00	
 EET	MJ	7,64E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,81E+02	0,00E+00	0,00E+00	

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	2,34E+01
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

Additional requirements

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

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).

Electricity mix	Source	Amount	Unit
Electricity (MJ)	ecoinvent 3.6	24,33	g CO ₂ -eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Ingen påverkan.






Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	2,05E+01	2,89E+00	3,61E-03	7,76E-04	8,19E-01	6,83E-01	2,82E-02	-5,55E+00

GWPIOBC: Global warming potential calculated according to the principle of instantaneous oxidation. 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 to Swedish public procurement legislation.

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 Environmental product declaration - Core rules for the product category of construction products.
 ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
 ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
 Iversen et al., (2018) eEPD v3.0 - Background information for EPD generator system. LCA.no report number 04.18.
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 NPCR Part A: Construction products and services. Ver. 2.0. March 2021, EPD-Norge.
 NPCR 015 Part B for Wood and wood-based products. Ver. 4.0 October 2021, EPD-Norge.

 epd-norway <small>Global Program Operator</small>	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 977 22 020 e-mail: post@epd-norge.no web: www.epd-norge.no
	Owner of the declaration: Optimera AS Østre Aker vei 260, 0976 Oslo	Phone: +47 22 16 88 00 e-mail: ingrid.kalstad@optimera.no web: https://www.optimera.no/
	Author of the Life Cycle Assessment LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	Developer of EPD generator LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal