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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:	Joint-Stock Company “Sokolsky DOK”
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
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Glued laminated timber for indoor use

Joint-Stock Company “Sokolsky DOK”

segezha group АО «С-ДОК»

www.epd-norge.no

General information

Product:
Glued laminated timber for indoor use

Owner of the declaration:
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Declaration number:
NEPD-1448-482-EN

Place of production:
Sokol, Russia

ECO Platform reference number:
-

Management system:
FSC SW-COC-004181 SW-CW-004181

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
NPCR 015 rev1 Wood and wood-based products for use in construction issue 30/08/2013

Organisation no:
52036415

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 manufacturerinformation, life cycle assessment data and evidences.

Issue date:
02.02.2018

Valid to:
02.02.2023

Declared unit:

Year of study:
2015

Declared unit with option:
1 m3 of glued laminated timber with packaging.

Comparability:
EPD of construction products may not be comparable if they do not comply with EN15804 and are seen in a building context

Functional unit:

The EPD has been worked out by:
Rustem Saitov

Verification:
The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

Third party verifier:
Marianne Kjendseth Wiik

Marianne Kjendseth Wiik, SINTEF
(Independent verifier approved by EPD Norway)

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:
Glulam (commonly "glued laminated timber") is an engineered wood product, manufactured from layers of parallel timber laminations. Pieces of sawn timber are graded for strength, before being glued together under pressure. Individual laminates can be end-jointed by the process of fingerjointing to produce long lengths. Glulam used in construction as an interior structural element to bear loads of a building.

Product specification:
Glulam typically has the dimensions L= 1200 cm, w=12 cm, h= 20 cm. As the product is for indoor use, no treatment is applied. Melamine urea formaldehyde resin with hardener is used.

Materials	kg	%
Pine and spruce timber	445,863	87,8
Water	53,504	10,5
MUF resin and hardener	5,754	1,1
LDPE packaging film	1,491	0,3
PET stripes	1,366	0,3
Corner protection	0,0074	0,001
Separators between blocs	0,0006	0,0001
Total	507,986	100

Technical data:
Average density of the product is 508 kg/m3 at u=12%. Technical standards: EN 14081:2005+A1:2011; DIN EN 14080; DIN 1052:2008.

Market:
Norway

Reference service life, product:
Similar to building's lifetime 50 years as long as the product is used in indoor applications.

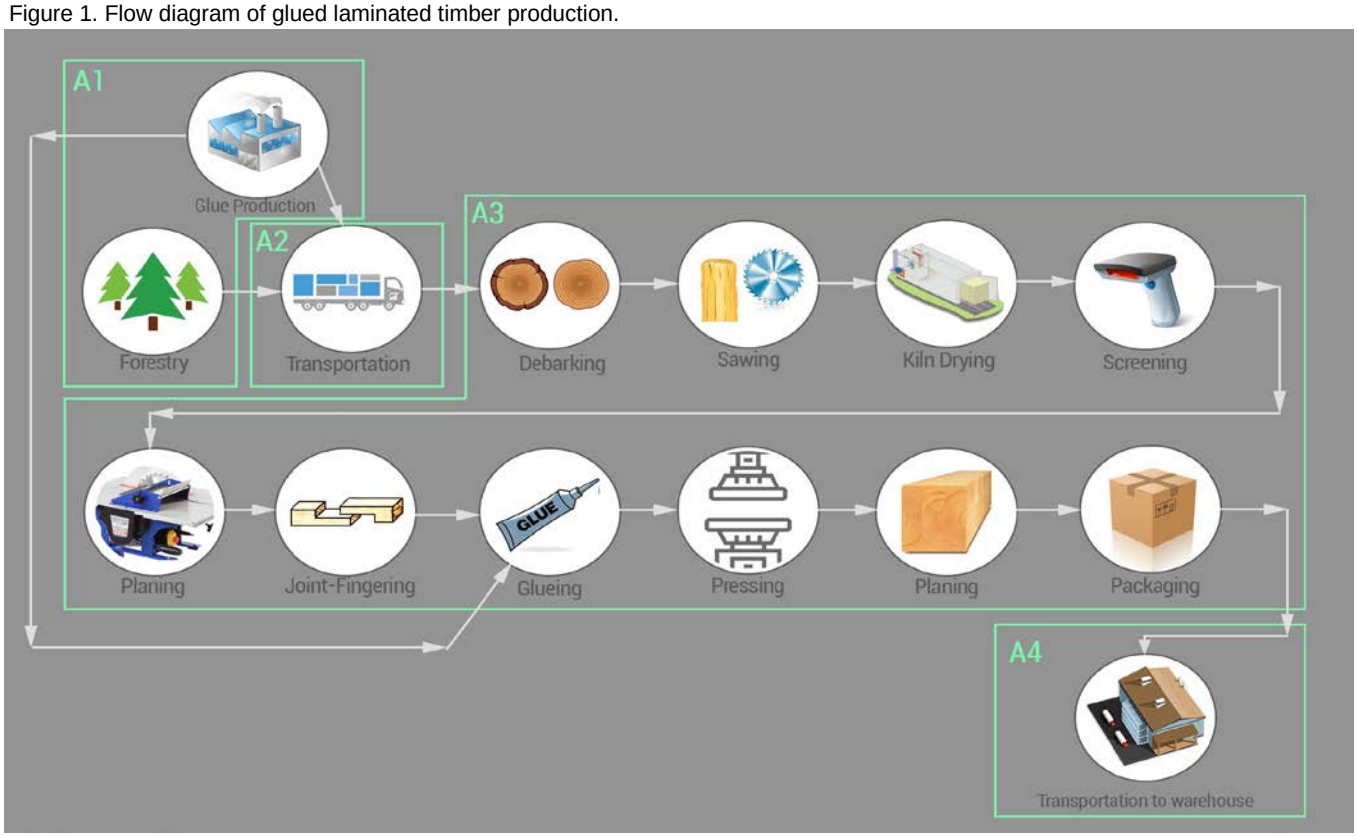
Reference service life, building:
Not applicable for declared unit.

LCA: Calculation rules

Declared unit:
1 m3 of glued laminated timber with packaging.

System boundary:
System boundaries incorporate activities of raw materials extraction (A1), its transportation (A2), manufacturing (A3) and transportation of the product to a warehouse (A4) thus constituting a "cradle to gate" approach.
Module D is not included in the scope of this assessment.

Figure 1. Flow diagram of glued laminated timber production.



Data quality:
Data for manufacturing and transport activities is technologically, temporally and geographically representative as it is sourced directly from the production site, and the values are annual average of the year of 2015. Information on raw materials extraction and minor data gaps were covered by generic figures from Ecoinvent v3.3 "Allocation cut-off by classification" 2016 and literature sources. Presented results were calculated with openlca v1.6.3, impact assesment methods by EUGEOS' 15804-IA database v2.1.

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 economic allocation since (a) wood processing is joint production, (b) revenue from the co-products have visible difference (>25%). Effects of primary production of recycled materials allocated to the main product in which the material was used.

Cut-off criteria:
All major raw materials and all the essential energy is included. The production process for raw materials and that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances with expection of of used lead acid battery flow which was excluded due to the absence of representative datasets in EcoInvent v3.3.

LCA: Scenarios and additional technical information

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

Transport from gate to central warehouse to Norway (A4) by road with two type of trucks for a total distance of 2075 km.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	53,27	Lorry, Euro5 engine	1037,5	0,03 l/tkm	33
Truck	53,27	Lorry, Euro6 engine	1037,5	0,03 l/tkm	33

Assembly (A5)

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

Use (B1)

	Unit	Value

Maintenance (B2)/Repair (B3)

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

Replacement (B4)/Refurbishment (B5)

	Unit	Value
Replacement cycle*		
Electricity consumption	kWh	
Replacement of worn parts	0	

* Number or RSL (Reference Service Life)

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	

End of Life (C1, C3, C4)

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

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck				l/tkm	
Railway				kWh/tkm	
Boat				l/tkm	

Benefits and loads beyond the system boundaries (D)

	Unit	Value

Additional technical information

Generic data for forestry activities in module A1 were adopted from Swedish dataset (Ecoinvent v.3.3, 2016), however physical allocation, carbon absroption and gross heating values are updated to represent real conditions in Russian forestry operations.

LCA: Results

LCA results are given for the declared unit with option defined as 1 m^3 of glued laminated timber for indoor use (glulam) with packaging and produced in Russia to be transported to a central warehouse in Norway.

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

Product stage			Assemby 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impact

Parameter	Unit	A1- A3	A4
GWP	kg CO_2 -eqv	-3,61E+03	9,26E+01
ODP	kg CFC11-eqv	5,06E-05	1,82E-05
POCP	kg C_2H_4 -eqv	2,02E-01	1,53E-02
AP	kg SO_2 -eqv	2,04E+00	2,85E-01
EP	kg PO_4^{3-}-eqv	3,15E-01	4,18E-02
ADPM	kg Sb-eqv	2,33E-03	5,60E-04
ADPE	MJ	5,85E+03	1,48E+03

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
RPEE	MJ	1,20E+03	2,15E+01
RPEM	MJ	4,61E+04	0,00E+00
TPE	MJ	4,73E+04	2,15E+01
NRPE	MJ	6,22E+03	1,59E+03
NRPM	MJ	0,00E+00	0,00E+00
TRPE	MJ	6,22E+03	1,59E+03
SM	kg	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00
W	m^3	4,70E+00	3,13E-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
HW	kg	4,50E+02	3,01E+01
NHW	kg	2,10E+02	1,27E+02
RW	kg	2,60E-02	1,04E-02

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

End of life - Output flow

Parameter	Unit	A1- A3	A4
CR	kg	INA	INA
MR	kg	INA	INA
MER	kg	INA	INA
EEE	MJ	INA	INA
ETE	MJ	INA	INA

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy; INA Indicator not assessed

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

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase
National production mix from import, low woltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess(A3).

Data source	Amount	Unit
Econinvent v3.3 (2016)	852,01	gram CO_2-eqv/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 (Avfallsforskiften, Annex III), see table.

Indoor environment
No tests have been carried out on the product concerning indoor climate.

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
GWP-IOBC	kg CO_2 -eqv	-4,18E+03	9,26E+01
GWP-BC	kg CO_2 -eqv	5,66E+02	0,00E+00
GWP	kg CO_2 -eqv	-3,61E+03	9,26E+01

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+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
1603EPD-01	*LCA Report for "Glued laminated timber for indoor use" product. Saitov, R.*
NPCR 015 rev1	*Wood and wood-based products for use in construction, issue 30/08/2013.*
EN 16449:2014	*Wood and wood-based products - Calculation of the biogenic carbon content of*
EN 16485:2014	*Round and sawn timber - Environmental Product Declarations - Product category*
EN 14080:2013	*Timber structures. Glued laminated timber and glued solid timber. Requirements*

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