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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:	Setra Tråvaror AB, Långshyttan
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	ÞÓÚÓÆÍÍ ÆÍÍ ÆÞ
Registration number:	ÞÓÚÓÆÍÍ ÆÍÍ ÆÞ
ECO Platform reference number:	
Issue date:	G 1 1 1 1
Valid to:	G 1 1 1 1

## Glulam beams and pillars

Setra

[www.epd-norge.no](http://www.epd-norge.no)



## General information

**Product:**

Glulam produced according to EN 14080:2013

**Program operator:**

The Norwegian EPD Foundation  
Post Box 5250 Majorstuen, 0303 Oslo  
Phone: +47 21 03 03 03  
e-mail: post@epd-norge.no

**Declaration number:**

POUØFI 1 GE 1 1 EP

**ECO Platform reference number:**

—

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804 serves as core PCR supplied with the PCR NPCR 015 rev1, EPD Norway.

**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:**

1m<sup>3</sup> glulam

**Declared unit with option:**

—

**Functional unit:**

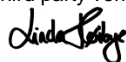
Not relevant

**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:



Linda Høiby, COWI

(Independent verifier approved by EPD Norway)

**Owner of the declaration:**

Setra Trävaror AB, Långshyttan  
Contact person: Mattias Sunesson  
Phone: +46 225 635 29  
e-mail: [Mattias.Sunesson@setragroup.com](mailto:Mattias.Sunesson@setragroup.com)

**Manufacturer:**

Setra Trävaror AB, Långshyttan  
Amungsvägen 17, 776 72 Långshyttan  
Phone: +46 225 635 00  
e-mail: [kundservice.langshyttan@setragroup.com](mailto:kundservice.langshyttan@setragroup.com)

**Place of production:**

Långshyttan, Sweden

**Management system:**

ISO 14001, ISO 9001, FSC, PEFC

**Organisation no:**

556035-2196

**Issue date:**

2018-06-01

**Valid to:**

2020-06-01

**Year of study:**

2018

**Comparability:**

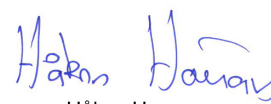
EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

**The EPD has been worked out by:**

Martin Erlandsson, IVL Swedish Env. Res. Institute



Approved



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

Glulam is used in construction works. Setra supplies sawn and processed wood products from responsibly managed forests. Glulam is 40-45 mm of lumber layers that are joined together through finger-jointing and gluing (MUF, melamin-urea-formaldehyde), to create a larger beams or pillars.

### Product specification:

The Swedish pine and spruce come from forests near our sawmills and planing mills. The lamellas are cut to the right dimension and dried to the correct moisture level. The lamellas are then sorted according to strength and are then finger jointed to specified length.

Materials	kg/m <sup>3</sup>	%
Spruce	430	99
MUF adhesive	<4,3	<1
Packaging materials	kg/m <sup>3</sup>	%
Straps, nylon	0,11	0,03
Clingwrap, polyethylene	1,1	0,3

### Technical data:

Density of the product is 434 kg/m<sup>3</sup>  
 Products are produced in according to EN 14080:2013  
 Moisture content of the product is approximately 12%  
 The lower heating value is 16.9 MJ/kg at 12% moisture content (and 19.2 MJ/kg at dry matter 0%).

### Market:

Europe

### Reference service life, product:

Equal to the building service life if not exposed to weather.

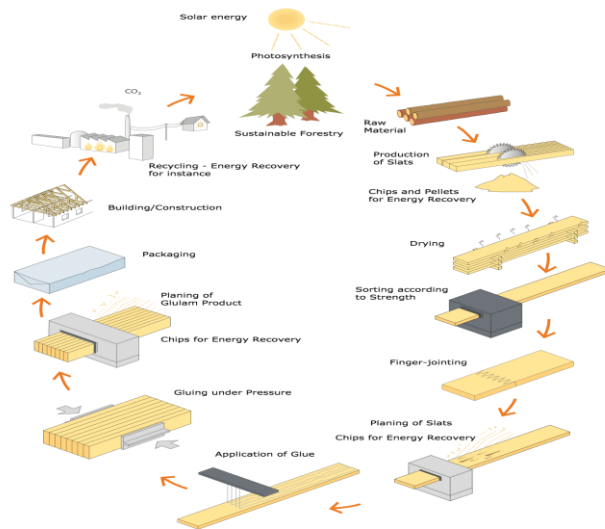
### Reference service life, building:

Equal to the building service life if not exposed to weather.

## LCA: Calculation rules

### Declared unit:

1 m<sup>3</sup> glulam made of spruce for beams or pillars including module A1-A4



### Data quality:

Average Swedish data valid for the forestry based on field measuring's (Brunberg 2013) and validated with current statistic are used. The data for the glulam productions origin from the Setra manufacturing site at Långshyttan and the year 2017. Setra purchases from three sawmills, two of which use spruce as raw material. Data from actual sawmills are used and are from 2017. A weighted average based on delivered sawn timber amounts are used in calculations. The energy use at the sawmills are increased to reflect the bought moisture content of the timber, according to Erlandsson (1996). Sawn timber is the main raw material for the glulam production together with the MUF adhesive (2016). Representative data for the adhesive is used based on specific manufacturing data and generic upstream data. Other upstream data is mainly based on Gabi database 2017 edition or ecoinvent 3.3 (2016). The new standard diesel on the Swedish market with a 20% reduced climate impact is not accounted for, why GWP is a conservative result.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. The first approach for allocation of environmental impact is mass allocation. However, when co-product with low value appears like in the saw mill an economical allocation is stipulated and therefore applied including at the glulam plant. All impact from the forestry is the consequently allocated to the round wood excluding the bark (and nothing to the by-product's). This generates a conservative impact for sawn timber as well as for glulam compared to a mass allocation.

### System boundary:

The scope of the study is cradle to gate A1-A3 and transportation to an average customer. The figure to the left describes the manufacturing process from the forestry to the glulam manufacturing site via the sawmill.

### Cut-off criteria:

All major raw materials and all the essential energy are 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.

### Calculation of biogenic carbon content:

The content of biogenic carbon stored in 1 m<sup>3</sup> glulam represents 704 kg CO<sub>2</sub>/m<sup>3</sup>, based on the fact that 50% of the dry matter of the wood is carbon. According to NPCR 015 rev 1 this biogenic content shall be reported as a negative value in A1-3. In this EPD are the emitted greenhouse gases affecting the global warming potential (GWP<sub>GHG</sub>) and the biogenic carbon GWP<sub>Bio</sub> reported separately, to be in line with Product Environmental Footprint (PEF) approach. When the discard wooden product is used as fuel or recycled material the same amount as the stored biogenic carbon will be released and generate a zero balance over the life cycle (i.e. carbon neutral).

## LCA: Scenarios and additional technical information

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

The average transport distance to a consumer is used for A4 and an average Euro 4 diesel truck-trailer using a 7 w-% bio-CO<sub>2</sub> diesel.

### Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	50	27 tonnes payload	170	0.020 l/tkm	3,4

## LCA: Results

The life cycle inventory scope and the resulting environmental performance of glulam is described in the tables below.

### 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

### Environmental impact

Parameter	Unit	A1-A3	A4
GWP <sub>Bio.+GHG</sub>	kg CO <sub>2</sub> -eqv	-660	4,3
<i>GWP Biogenic, biogenic carbon in the glulam given as CO<sub>2</sub></i>		-704	0
<i>GWP GHG, contributing to green house effect</i>		44	4,3
ODP	kg CFC11-eqv	5,3E-07	1,4E-12
POCP	kg C <sub>2</sub> H <sub>4</sub> -eqv	0,013	-0,006
AP	kg SO <sub>2</sub> -eqv	0,27	0,02
EP	kg PO <sub>4</sub> <sup>3-</sup> -eqv	0,061	0,004
ADPM	kg Sb-eqv	2,0E-05	3,4E-07
ADPE	MJ	649	58

\* Gabi database separate NO<sub>x</sub> to NO and NO<sub>2</sub>. This fact in combination with a marginal approached characterisation model that is based on a high polluted ambient air results in a negative characterisation factor for nitrogen monoxide.

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	1.707	2,9
RPEM	MJ	7.371	0
TPE	MJ	9.078	2,9
NRPE	MJ	829	59
NRPM	MJ	169	0
TRPE	MJ	998	59
SM	kg	0	0
RSF	MJ	0	0
NRSF	MJ	0	0
W	m <sup>3</sup>	0,50	0,0002

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	0,004	3,1E-06
NHW	kg	0,82	0,02
RW	kg	0,006	2,3E-06

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	— <sup>1)</sup>	0
MR	kg	— <sup>1)</sup>	0
MER	kg	— <sup>1)</sup>	0
EEE	MJ	0	0
ETE	MJ	0	0

1) Co-products are allocated in A1 to A3

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

Reading example:  $9.0 \text{ E-}03 = 9.0 \cdot 10^{-3} = 0.009$

## Additional Norwegian requirements

### Greenhouse gas emission 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).

Data source	Amount	Unit
GaBi Database 2017 Edition	0,043	kg CO <sub>2</sub> -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


The product meets the requirements for low emissions of formaldehyde class E1 according to EN 14080:2013.

### Carbon footprint

Separate carbon footprint has not been worked out for the product, but the EPD includes such information.

## Bibliography

ISO 14025:2010	<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+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
EN 14080:2013	<i>Timber structures. Glued laminated timber and glued solid timber. Requirements</i>
EN 15251:2007	<i>Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
ISO 9001:2015	<i>Quality management systems -- Requirements</i>
ISO 14001:2015	<i>Environmental management systems -- Requirements with guidance for use</i>
Erlandsson, Martin	<i>Methodology for Environmental Assessment of Wood-Based Product. Report No I 9608070, Trätekt Stockholm August 1996</i>
Erlandsson, Martin	<i>LCA for Setra glulam. IVL Swedish Environmental Institute, assignment report, October 2018.</i>
EPD Norway	<i>Wood and wood-based products for use in construction. Product-category rules NPCR 015 rev1, Issue date: 30.08.2013, Valid to 30.08.2018, EPD Norway</i>
Brunberg T 2103	<i>Fuel consumption in forest machines 2012 (in Swedish). Arbetsrapport från Skogforsk nr. 789–2013.</i>

 <b>epd-norge.no</b> The Norwegian EPD Foundation	<b>Program operator</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: +47 22 43 43 43 e-mail: <a href="mailto:post@epd-norge.no">post@epd-norge.no</a> web: <a href="http://www.epd-norge.no">www.epd-norge.no</a>
	<b>Publisher</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: +47 22 43 43 43 e-mail: <a href="mailto:post@epd-norge.no">post@epd-norge.no</a> web: <a href="http://www.epd-norge.no">www.epd-norge.no</a>
	<b>Owner of the declaration</b> Setra Trävaror AB, Långshyttan Amungsvägen 17 776 72 Långshyttan, Sweden	Phone: +46 225 635 00 e-mail: <a href="mailto:kundservice.langshyttan@setragroup.com">kundservice.langshyttan@setragroup.com</a> web: <a href="http://www.setragroup.com">www.setragroup.com</a>
	<b>Author of the life cycle assessment</b> Martin Erlandsson IVL Swedish Environmental Research Institute	Phone: +46 (0)10-788 65 00 e-mail: <a href="mailto:info@ivl.se">info@ivl.se</a> web: <a href="http://www.ivl.se">www.ivl.se</a>