Declaration of conformity

This statement verifies that the products listed below are in compliance with the EPD mentioned in this document.

Product type	STEICO LVL laminated veneer lumber
Product name	Junckers Blubat battens Junckers Unobat 45 battens Junckers Unobat 50 battens Junckers Unobat 62+ battens Junckers Duobat 120 battens Junckers Plain battens

Declaration number	EPD-STE-20190005-IBC1-EN
Issue date	08-02-2019
Valid to	07-02-2024

Signature:

_____

Pia Bidstrup Skytte
Product manager

ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

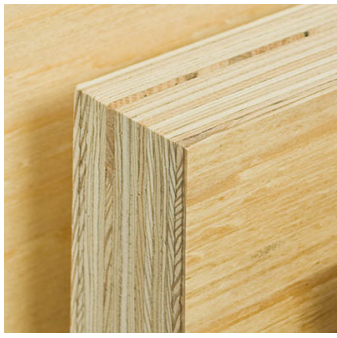
Owner of the Declaration	STEICO SE
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-STE-20190005-IBC1-EN
Issue date	08.02.2019
Valid to	07.02.2024

STEICO LVL laminated veneer lumber

STEICO SE

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com



1. General Information

STEICO SE	STEICO LVL Furnierschichtholz
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** STEICO SE Otto-Lilienthal-Ring 30 85622 Feldkirchen Deutschland
Declaration number EPD-STE-20190005-IBC1-EN	**Declared product / declared unit** STEICO LVL laminated veneer lumber This Declaration refers to 1 m³ STEICO LVL laminated veneer lumber.
This declaration is based on the product category rules: Solid wood products, 12.2018 (PCR checked and approved by the SVR)	**Scope:** This Declaration applies for STEICO LVL laminated veneer lumber which is manufactured in the following variants • STEICO LVL R • STEICO LVL RS • STEICO LVL RL • STEICO LVL X Manufacturing plant: STEICO Sp.z o.o. Ul. Mickiewicza 10 83-262 Czarna Woda Polen
Issue date 08.02.2019	The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
Valid to 07.02.2024	**Verification** The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	Matthias Schulz (Independent verifier appointed by SVR)
Dr. Alexander Röder (Managing Director IBU)	

2. Product

2.1 Product description / Product definition

STEICO LVL laminated veneer lumber as STEICO LVL R, STEICO LVL RS, STEICO LVL RL and STEICO LVL X variants are industrially manufactured products for supporting and non-supporting constructions. They comprise several layers of conifer veneers which are glued together. The natural imperfections in the wood, e.g. knots, are reduced by the production process to the individual veneer layer and distributed evenly across the cross-section, giving rise to an almost homogeneous cross-section of high strength and rigidity. When the veneers are dried, the result is a product with low wood moisture and practically no moisture gradients in the cross-section. In the case of STEICO LVL R, STEICO LVL RL and STEICO LVL RS, all veneer layers are glued together longitudinally. STEICO LVL X features some veneer layers glued together crosswise.
The STEICO LVL R, STEICO LVL RL and STEICO LVL RS products differ in terms of their rigidity and strength properties.

(EU) Directive No. 305/2011 applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The products require a declaration of performance taking consideration of the /EN 14374:2004-11/ and CE marking (certificate of constancy of performance /No. 0672-CPR-0592/ Material Testing Institute (MPA) at the University of Stuttgart).

Use of this product is subject to the respective national specifications at the place of use; in Germany, these are the state building codes and the technical construction specifications based on these guidelines, as well as the general type approval /Z-9.1-842/.

The following Declarations of Performance are available for the products:

/STEICO LVL R 03-0008-03/
/STEICO LVL RL 03-0010-03/
/STEICO LVL RS 03-0009-03/
/STEICO LVL X 03-0006-02/

2.2 Application

STEICO LVL laminated veneer lumber products are used as supporting and non-supporting components in the construction of buildings, bridges and formwork. The products are also used as supporting or non-supporting components in furniture construction, trade fair construction or property construction.

2.3 Technical Data

The technical data for STEICO LVL laminated veneer lumber in the STEICO LVL R, STEICO LVL RL, STEICO LVL RS and STEICO LVL X variants is available in the respectively valid declarations of Performance.

Construction data

Name	Value	Unit
Wood types by trading name acc. to /EN 1912/	Spruce and/or pine	-
Wood moisture on delivery	</= 12	%
Use of wood preservative (the wood preservative test description as per /DIN 68800-3/ must be indicated)	n.a.	-
Compressive strength parallel to grain	See DOP	N/mm²
Compressive strength perpendicular to grain, flatwise	See DOP	N/mm²
Tensile strength parallel to grain	See DOP	N/mm²
Tensile strength perpendicular to grain, flatwise	See DOP	N/mm²
Modulus of elasticity acc. to EN 1995	-	N/mm²
Shear strength	See DOP	N/mm²
Shear modulus	See DOP	N/mm²
Dimensional deviation	See EN 14374	N/mm²
Length (min. - max.)	</= 18	m
Width (min. - max.)	</= 2,5	m
Height (min. - max.)	</= 2,5	m
Density of supporting components acc. to /EN 338/ and/or DIN 1052; non-supporting components acc. to DIN 68364	550	kg/m³
Surface quality (possible characteristic forms should be indicated)	Peeled veneer	-
Hazard class acc. to /DIN 68800-3/	0/1/2	-
Thermal conductivity acc. to EN 12664	n.a.	W/(mK)
Specific thermal capacity	1600	kJ/kgK
Design value for thermal conductivity	0.13	W/(mK)
Air layer thickness equivalent to the water vapour diffusion acc. to EN ISO 12572	n.a.	m
Water vapour diffusion resistance factor acc. to /EN ISO 12572/	75/205	-
Release of formaldehyde acc. to /EN 717-1/	E1	-

DOP = Declaration of performance

The performance values of the respective STEICO LVL product correspond with the values in the respective declarations of performance in accordance with /EN 14374/

The corresponding declarations of performance can be found at www.steico.com.

2.4 Delivery status

The products are manufactured in various sizes.

Maximum width: 2,500 mm
Maximum thickness: 90 mm
Maximum length: 18,000 mm

2.5 Base materials / Ancillary materials

STEICO LVL products comprise approx. 3 mm thick spruce and/or pine conifer veneers which are glued together. Phenol resin adhesive (PF) is used exclusively for glueing the layers. The top-level scarf joint is glued using either a phenol resin adhesive (PF) or a melamine resin adhesive (MUF).

The percentage averages of ingredients per cubic metre of STEICO LVL established for the Environmental Product Declaration:

- Coniferous wood (spruce and/or pine): approx. 87.44%
- PF adhesive: approx. 4.5%
- MUF adhesive: approx. 0.03%
- Hot-melt adhesive: approx. 0.03%
- Water: approx. 8%

The products have an average density of 550 kg/m³ when manufactured from pine and/or spruce.

STEICO LVL contains substances on the /ECHA List of Candidates/ for including substances of very high concern in Annex XIV of the /REACH Directive/ (last revised: 27.06.2018) exceeding 0.1% by mass: no

STEICO LVL contains other CMR substances in categories 1A or 1B which are not on the /ECHA List of Candidates/ exceeding 0.1% by mass in at least one partial product: no

Biocide products were added to this STEICO LVL construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) /Ordinance on Biocide Products/ No. 528/2012): no

2.6 Manufacture

During the manufacture of STEICO LVL, the coniferous wood logs (pine, spruce) are debarked and heated through with hot water for the peeling process. The heated logs are peeled and the individual veneer layers are cut from one long veneer sheet. The veneer layers are dried in a continuous dryer before being sorted according to quality. On the spreading and pressing line, the individual veneer layers are laid

according to recipe and pressed to form a panel. After cooling, the panels are processed to the respective delivery format. Surface treatment is applied where necessary.

Production is certified to /ISO 9001/ via a Quality Management System.

2.7 Environment and health during manufacturing

Environmental protection:
According to current knowledge, there are no risks for water, air and soil when the products are used as designated.

Health protection:
According to current knowledge, no health risks are to be anticipated. With regard to formaldehyde, STEICO LVL laminated veneer lumber is low-emission thanks to its adhesive content, adhesive type, and structure (< 0.03 ppm).

2.8 Product processing/Installation

STEICO LVL can be processed using standard wood-processing machinery and tools.

The information concerning industrial safety must also be observed during processing/assembly.

2.9 Packaging

Foil, solid wood, laminated veneer lumber, hardboard panels and small quantities of other plastic are used for packing STEICO LVL.

2.10 Condition of use

Composition for the period of use complies with the base material composition in accordance with section 2.5. “Base materials / Auxiliaries”.
For each declared unit, approx. 881.7 kg carbon dioxide are bound per m² during use.

2.11 Environment and health during use

According to the present state of knowledge, general hazards for water, air and soil cannot arise when laminated veneer lumber is used as designated. Furthermore, no health risks can be anticipated when used as designated. With regard to formaldehyde, STEICO LVL is low-emission thanks to its adhesive type, adhesive content, and structure. STEICO LVL laminated veneer lumber displays formaldehyde emission values similar to those of natural wood (< 0.03 ppm).

2.12 Reference service life

Laminated veneer lumber has been in general use for more than 50 years. When used as designated, there is no known or anticipated limit to its durability. The service life of STEICO LVL laminated veneer lumber is therefore in line with the service life of the building when used as designated.

There are no known influences on ageing when the products are applied in accordance with the generally accepted rules of Technology.

2.13 Extraordinary effects

Fire
Reaction to fire class in accordance with /DIN EN 13501-1/

Fire protection

Name	Value
Building material class	D
Burning droplets	d0
Smoke gas development	s1

Water
When used as designated, no ingredients are washed out which could be hazardous to water.

Mechanical destruction
No possible environmental consequences are currently known in the event of unforeseen mechanical destruction.

2.14 Re-use phase

In the event of selective rebuilding after the end of the usage phase, STEICO LVL products can be easily reused.

If STEICO LVL cannot be reused, it is directed towards thermal recycling for generating process heat and electricity on account of its high calorific value of approx. 16 MJ/kg (with moisture of u=12%). During energetic recycling, the requirements outlined in the /Federal Immission Control Act (BImSchG)/ must be maintained: In accordance with Annex III to the /Waste Wood Act (AltholzV)/ on requirements on the use and disposal of waste wood /Waste Wood Act/ dated 15.08.2002, untreated STEICO LVL laminated veneer lumber is allocated to waste codes 030105 and 170201 in accordance with the /Ordinance on the List of Wastes (AVV)/.

2.15 Disposal

Waste wood may not be landfilled in accordance with §9 of the Waste Wood Act (/AltholzV/). Waste code in accordance with /AVV/ for foil packaging used by STEICO LVL: 150102 (packaging/plastic)

2.16 Further information

More detailed information can be found at www.steico.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit of the product under ecological review is one cubic metre of laminated veneer lumber taking consideration of the mix of adhesives used as outlined in 2.5 and a mass of 550 kg/m³ with wood moisture of 9.15%, which complies with a water content of approx. 8%. Adhesives account for 4.56%.

All details on adhesives used were calculated on the basis of specific data.

Declared unit

Name	Value	Unit
Declared unit	1	m^3
Density	550	kg/m³

Conversion factor to 1 kg	0.00181	-
Wood moisture on delivery	9.15	%
Adhesive content in relation to overall mass	4.56	%
Water content in relation to overall mass	8	%

3.2 System boundary

The Declaration complies with an EPD "from cradle to plant gate, with options". It includes the production stage, i.e. from provision of the raw materials through to production (*cradle to gate*, Modules A1 to A3), Module A5, and parts of the end-of-life stage (Modules C2 and C3). It also contains an analysis of the potential benefits and loads over and beyond the product's entire life cycle (Module D).

Module A1 analyses the provision of wood from forestry resources and the provision of adhesives. Transport of these substances is considered in Module A2. Module A3 comprises the provision of fuels, resources and electricity as well as the manufacturing processes on site. These essentially involve debarking, peeling, drying, adhesion, planing and profiling processes as well as packing the products. Module A5 exclusively covers the disposal of product packaging which includes the disposal of biogenic carbon and primary energy (PERM and PENRM).

Module C2 considers transport to the disposal company and Module C3 is concerned with preparing and sorting waste wood. In accordance with /EN 16485/, Module C3 also includes as outflows the CO2 equivalents of the carbon inherent in the wood product as well as the renewable and non-renewable primary energy (PERM and PENRM) contained in the product.

Module D analyses the thermal utilisation of the product at its end of life as well as the ensuing potential benefits and loads in the form of a system Extension.

3.3 Estimates and assumptions

As a general rule, all of the material and energy flows for the processes required by production are established on the basis of questionnaires. The emissions from incineration and other processes on site could only be estimated on the basis of literary references and are documented in detail in /S. Rüter, S. Diederichs: 2012/. All other data is based on average values.

The basis for the calculated application of fresh water resources is depicted by blue water consumption.

3.4 Cut-off criteria

No known material or energy flows were ignored, including those which fell below the limit of 1%. Accordingly, the total sum of input flows ignored is certainly less than 5% of the energy and mass applied. This also safeguards against the possibility of any material or energy flows being ignored which display a particular potential for significant influences in terms of the environmental indicators.

3.5 Background data

All background data was taken from the /GaBi professional data base 2018 edition/ and the “Ökobilanz-Basisdaten für Bauprodukte aus Holz” final report /S. Rüter, S. Diederichs: 2012/.

3.6 Data quality

The data surveyed was validated on the basis of mass and in accordance with plausibility criteria. With the exception of forest wood, the background data used for wood materials for material and energy purposes originates from 2008 to 2012. The provision of forest wood was taken from a 2008 publication which is essentially based on information from 1994 to 1997. All other information was taken from the /GaBi professional data base 2018 edition/. The overall data quality can be regarded as good.

3.7 Period under review

The plant data collected for modelling the primary system concerns 2016 as a reference period. All information is therefore based on averaged data for 12 consecutive months.

3.8 Allocation

The allocations comply with the specifications of the /EN 15804/ and /EN 16485/, and are explained in detail in /S. Rüter, S. Diederichs: 2012/. Essentially, the following system extensions and allocations were carried out:

General information

Flows of properties inherent to the material (biogenic carbon and primary energy contained therein) were allocated in accordance with physical causalities. All other allocations of associated co-products were carried out on an economic basis.

Module A1

- Forestry: All expenses in the upstream forest chain were allocated using economical allocation methods to logs and industrial wood on the basis of their prices.
- The provision of waste wood does not take consideration of expenses incurred during the previous life cycle.

Module A3

- Wood-processing industry: For associated co-products, expenses were allocated economically to primary products and residual materials on the basis of their Prices.
- Potential benefits resulting from the disposal of waste incurred during production (with the exception of wood-based materials) are considered on the basis of system expansions.
- The provision of waste wood does not take consideration of expenses incurred during the previous life cycle (as in Module A1).

Module D

- The system expansion process performed in Module D complies with an energetic recycling scenario for waste Wood.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

As a general rule, a comparison or an evaluation of EPD data is only possible if all of the data sets to be compared were created according to /EN 15804/ and the building context and/or the product-specific characteristics of performance are taken into account.

The LCA was conducted using version 8.7.0.18 of the /GaBi ts 2018/ software. All background data was taken from the /GaBi professional data base 2018 edition/ or literary sources. .

4. LCA: Scenarios and additional technical information

The scenarios on which the LCA is based are outlined in more detail below.

Construction installation process (A5)

Module A5 is declared but only contains details on disposal of the product packaging and no details on actual installation of the product in the building. The volume of packaging material incurred as waste material for thermal utilisation per declared unit in Module A5 and the ensuing exported energy are indicated below as technical scenario information.

Name	Value	Unit
Packaging wood for thermal waste processing	6.622	kg
Synthetic textiles for thermal waste processing	0.426	kg
Other plastics for thermal waste processing	2.09	kg
Total efficiency of thermal waste processing	38 – 44	%
Total exported electrical energy	28,588	MJ
Total exported thermal energy	59.473	MJ

A transport distance of 20 km is assumed for disposal of the product packaging. Total efficiency of waste incineration as well as the percentages of electricity and heat generation by means of heat and power combinations correspond with the allocated waste incineration process in the /GaBi professional data base 2018 edition/.

End of life (C1-C4)

Name	Value	Unit
Waste wood for energy recovery	550	kg
Redistribution transport distance for waste wood (Module C2)	20	km

A collection rate of 100% without losses incurred by crushing the material is assumed for the scenario of thermal utilisation.

Reuse, recovery and recycling potential (D), relevant scenario information

Name	Value	Unit
Electricity generated (per tonne of bone-dry waste wood)	968.37	kWh
Waste heat used (per tonne of bone-dry waste wood)	7053.19	MJ
Electricity generated (per net flow of declared unit)	478.24	kWh
Waste heat used (per net flow of declared unit)	3484.34	MJ

The product is recycled in the form of waste wood in the same composition as the declared unit at the end-of-life stage. Thermal recovery in a biomass power station with an overall degree of efficiency of 54.69% and electrical efficiency of 18.09% is assumed, whereby incineration of 1 tonne of bone-dry wood (mass value as bone dry, consideration of efficiency, yet ~18% wood moisture) generates approx. 968.37 kWh electricity and 7053.19 MJ useful heat. Converted to the net flow of the bone-dry wood percentage included in Module D and taking consideration of the percentage of adhesives in waste wood, 478.24 kWh electricity and 3484.34 MJ thermal energy are produced per declared unit in Module D. The exported energy substitutes fuels from fossil sources, whereby it is alleged that the thermal energy is generated from natural gas and the substituted electricity complies with the German power mix for 2018.

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m³ STEICO LVL

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
GWP	[kg CO_2-Eq.]	-8.29E+2	1.38E+1	2.84E+2	1.86E+1	6.40E-1	8.86E+2	-4.43E+2
ODP	[kg CFC11-Eq.]	2.53E-8	2.95E-13	1.87E-8	2.80E-13	1.77E-14	6.58E-12	-4.12E-10
AP	[kg SO_2-Eq.]	1.33E-1	5.58E-2	1.26E+0	2.94E-3	2.70E-3	6.81E-3	-4.55E-1
EP	[kg $(PO_4)^{3-}$-Eq.]	2.49E-2	1.43E-2	1.57E-1	4.44E-4	6.93E-4	1.11E-3	-7.15E-2
POCP	[kg ethene-Eq.]	2.17E-2	-2.37E-2	1.70E-1	1.33E-4	-1.12E-3	4.52E-4	-4.04E-2
ADPE	[kg Sb-Eq.]	9.78E-6	1.38E-6	3.68E-5	6.06E-7	5.31E-8	3.05E-6	-1.87E-4
ADPF	[MJ]	1.53E+3	1.83E+2	2.98E+3	4.81E+0	8.80E+0	4.33E+1	-6.38E+3

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 m³ STEICO LVL

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
PERE	[MJ]	3.23E+1	1.21E+1	5.79E+3	1.29E+2	4.87E-1	2.71E+1	-1.67E+3
PERM	[MJ]	9.27E+3	0.00E+0	1.28E+2	-1.28E+2	0.00E+0	-9.27E+3	0.00E+0
PERT	[MJ]	9.30E+3	1.21E+1	5.92E+3	9.50E-1	4.87E-1	-9.24E+3	-1.67E+3
PENRE	[MJ]	1.30E+3	1.83E+2	3.05E+3	9.60E+1	8.83E+0	5.78E+1	-7.16E+3
PENRM	[MJ]	2.51E+2	0.00E+0	9.06E+1	-9.06E+1	0.00E+0	-2.51E+2	0.00E+0
PENRT	[MJ]	1.55E+3	1.83E+2	3.14E+3	5.39E+0	8.83E+0	-1.93E+2	-7.16E+3
SM	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.27E+3
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.51E+2
FW	[m³]	8.03E-1	1.48E-2	2.53E+0	4.46E-2	8.98E-4	1.72E-2	1.15E+0

Caption: 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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m³ STEICO LVL

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
HWD	[kg]	1.44E-3	1.16E-5	1.54E-5	2.21E-8	5.11E-7	4.41E-8	-4.02E-6
NHWD	[kg]	1.71E-1	1.38E-2	4.68E+0	6.10E-1	7.40E-4	5.94E-2	3.82E+0
RWD	[kg]	7.32E-3	2.24E-4	2.85E-2	2.28E-4	1.21E-5	5.72E-3	-3.58E-1
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.50E+2	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	2.86E+1	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	5.95E+1	0.00E+0	0.00E+0	0.00E+0

Caption: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

6. LCA: Interpretation

The interpretation of results focuses on the production phase (Modules A1 to A3) as it is based on specific data provided by the company. The interpretation takes the form of a dominance analysis of the environmental impacts (GWP, ODP, AP, EP, POCP, ADPE, ADPF) and the use of renewable/non-renewable primary energy (PERE, PENRE).

Accordingly, the most significant factors for the respective categories are listed below.

6.1 Global Warming Potential (GWP)

When considering the GWP, the CO2 product system inputs and outputs inherent in wood require separate analysis. A total of approx. 1404 kg CO2 enters the

system in the form of carbon stored in the biomass, of which 511 kg CO2 are emitted within the framework of heat generation on site. Around 12 kg of CO2 bound in the form of the packaging material are emitted in Module A5. The volume of carbon ultimately stored in the laminated veneer lumber is extracted from the system again when recycled in the form of waste wood.

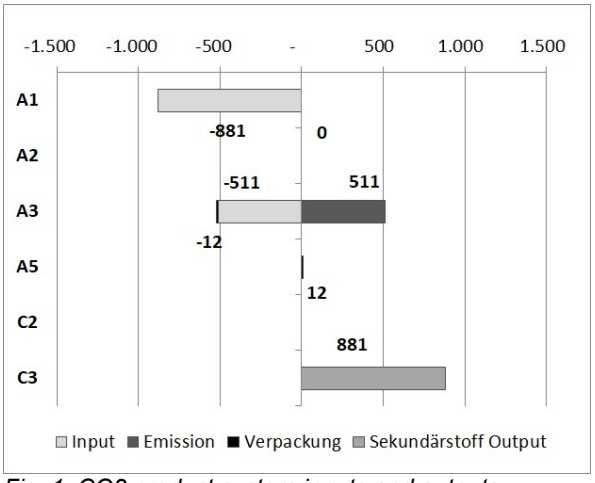


Fig. 1: CO2 product system inputs and outputs inherent in wood [kg CO2 equiv.]. The inverse indications suggested by inputs and outputs are in line with the LCO CO2 flow analysis in terms of the atmosphere.

14% of the analysed fossil greenhouse gases are accounted for by the provision of raw materials (entire Module A1), 4% by transporting the raw materials (entire Module A2), and 82% by the manufacturing process for laminated veneer lumber (entire Module A3). Electricity consumption in the plant (69%), heat generation there (10%) (both Module A3), and the provision of adhesives (10%) (Module A1) represent essential factors influencing fossil greenhouse gas emissions.

6.2 Ozone Depletion Potential (ODP)
58% of emissions with ozone depletion potential are incurred by the provision of adhesives (Module A1). Heat generation as part of Module A3 contributes 42% to ODP.

6.3 Acidification Potential (AP)
The combustion of wood and diesel are the sources of essential relevance for emissions representing a potential contribution towards the acidification potential. Heat generation on site accounting for a total of 27% and electricity consumption accounting for 58% contribute to the AP (both Module A3). Provision of the wood raw material and adhesives accounts for approx. 9% of emissions with acidification potential (entire Module A1).

6.4 Eutrophication Potential (EP)
9% of the entire EP is attributable to the processes in the upstream chains for the provision of wood as a raw material and a further 4% is accounted for by the provision of adhesives (both Module A1). Heat generation for the manufacturing process accounting for 41% and electricity consumption in the plant accounting for 33% contribute to the EP (both Module A3).

6.5 Photochemical Ozone Creation Potential (POCP)
The provision of the wood raw material accounts for a mere 7% and provision of adhesives for the product accounts for 6% of POCP contributions by the product (both Module A1). However, generation of heat required in the manufacturing process accounts for 24% and electricity consumption on site accounts for a further 34% of the entire POCP (both Module A3). A further 30% is caused by the drying process in the plant (Module A3). The negative values recorded for the POCP in Module A2 are attributable to the negative characterisation factor for nitrogen monoxide emissions in the EN 15804-conformant CML IA version (2001 - April 2013) in combination with the current /GaBi Professional data base 2018 edition/ truck transport process used for modelling log transport. They have a -14% influence on overall emissions.

6.6 Abiotic Depletion Potential non-fossil resources (ADPE)
The essential contributions to ADPE are represented by the electricity consumption in the plant (34%, Module A3), the resources used (39%, Module A3) and provision of the adhesives used (18%, Module A1).

6.7 Abiotic Depletion Potential fossil fuels (ADPF)
Provision of the processed adhesives accounts for 29% of the entire ADPF (Module A1). Other essential influences are represented by electricity consumption (51%) and heat generation (8%) during the manufacturing process (both Module A3).

6.8 Renewable Primary Energy as energy carrier (PERE)
The use of PERE is almost entirely accounted for by the manufacturing process with heat generation contributing 92% and electricity consumption contributing 7% (both Module A3).

6.9 Non-renewable Primary Energy as Energy carrier (PENRE)
The entire use of PENRE is distributed among heat generation (8%) and electricity consumption (52%) during the manufacturing process. Furthermore, approx. 29% of PENRE is accounted for by the provision of adhesives in Module A1.

6.10 Waste
Special waste is incurred almost exclusively (97%) during the provision of adhesives in Module A1.

7. Requisite evidence

7.1 Formaldehyde

The release of formaldehyde for STEICO-LVL laminated veneer lumber were measured in accordance with /EN 717-1/. According to the test report by the Entwicklungs- und Prüflabor Holztechnologie (EPH) Dresden, the measurement corresponded with an emission of 0.01 ppm /EPH Dresden, PB 2514432, 06.10.2014/.
The release of formaldehyde for STEICO LVL are regularly examined every 6 months within the framework of tests by the Qualitätsgemeinschaft Deutscher Fertigbau (QDF) for wood-based materials (/QDF positive list 2018-01, 03.05.2018/).

7.2 MDI

The adhesive system for STEICO LVL laminated veneer lumber does not include any MDI.

7.3 Testing for preliminary treatment of the materials used, measurement in accordance with the /Waste Wood Act/

No waste wood is used in the production of STEICO LVL. Within the framework of tests for the /QDF positive list/, STEICO LVL is tested for heavy metals every 6 months (/QDF/BDF, QDF positive list wood-based materials acc. to QDF Guideline A01/).

7.5 VOC emissions

Evidence of VOC in accordance with the AgBB scheme is available for STEICO LVL. Measurements were carried out by the EPH Dresden (/EPH Dresden, PB 2518422, 18.09.2018/).

AgBB Ergebnisüberblick (28 Tage)

Name	Value	Unit
TVOC (C6 - C16)	726	µg/m³
Sum SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	509	-
VOC without NIK	19	µg/m³
Carcinogenic Substances	0	µg/m³

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