ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

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-20190106-IBC1-EN
Issue date	13.11.2019
Valid to	12.11.2024

STEICOwall and STEICOjoist I-joist products
STEICO SE

Institut Bauen und Umwelt e.V.

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

ECO PLATFORM EPD EN 15804 VERIFIED

1. General Information

STEICO SE

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-STE-20190106-IBC1-EN

This declaration is based on the product category rules:
Prefabricated wood-based load bearing stressed skin panels, 12.2019
(PCR checked and approved by the SVR)

Issue date
13.11.2019

Valid to
12.11.2024

Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

STEICO joist/wall I-joist products

Owner of the declaration
STEICO SE
Otto-Lilienthal-Ring 30
85622 Feldkirchen
Germany

Declared product / declared unit
This Declaration refers to one running metre of STEICOwall / STEICOjoist I-joist product without web insulation.

Scope:
This Declaration applies for STEICOwall and STEICOjoist I-joist products which are manufactured in the following variants:

STEICOjoist

- STEICOjoist HB
- STEICOjoist OSB
- STEICOjoist LVL
- STEICOjoist LVL OSB

STEICOwall

- STEICOwall LVL HB
- STEICOwall LVL OSB
- STEICOwall HB
- STEICOwall OSB

Manufacturing plant
STEICO Sp. z o.o.
Ul. Przemyslowa 2
64-700 Czarnkow
Poland

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.

The EPD was created according to the specifications of *EN 15804+A1*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2010*
☐ internally ☒ externally

Dr.-Ing. Andreas Ciroth
(Independent verifier appointed by SVR)

2. Product

2.1 Product description/Product definition

STEICOwall and STEICOjoist I-joist products are industrially manufactured products for load-bearing and non load-bearing constructions where a thin high load-bearing hardboard (hard fibre joist) or OSB (oriented strand board) web connects two STEICO LVL R or solid timber flanges. The LVL (laminated veneer lumber) flanges comprise several layers of conifer veneer glued together. The natural wood defects, e.g. knots, are reduced to the individual veneer sheet during the production process and are distributed evenly across the cross-section during

layup. This produces an almost homogeneous cross-section of high strength and rigidity.
The STEICOwall and STEICOjoist I-joist products are identical in terms of manufacturing. They differ in terms of application depending on the type of load.

Directive (EU) No. 305/2011 (CPR) applies for placing the products on the market in the EU/EFTA (except Switzerland). STEICO I-joist products require a Declaration of Performance based on the /ETA-06/0238/ and CE marking (certificate of constancy of performance /No. 0672-CPR-0425/ Material Testing Institute (MPA) at the University of Stuttgart). The respective national regulations apply for usage.

2.2 Application

STEICO I-joist products are used as rafters, beams, wall studs, in facades or as spacers.

2.3 Technical Data

The technical data on the products within the scope of the EPD are listed below:

Bautechnische Daten

Name	Value	Unit
Thickness of the element (beam height)	160 - 500	mm
Moment capacity (Mk)	2.5 - 44.1	kN/m²
Water vapour diffusion resistance factor for solid timber flanges	50	-
Water vapour diffusion resistance factor for laminated veneer lumber flanges	200	
Water vapour diffusion resistance factor for hardboard web material	35	
Water vapour diffusion resistance factor for OSB web material	250	
Thermal conductivity of solid timber flanges	13	W/(mK)
Thermal conductivity of laminated veneer lumber flanges	0.13	W/(mK)
Thermal conductivity of hardboard web material	0.14	W/(mK)
Thermal conductivity of OSB web material	0.13	W/(mK)

The technical data for STEICOwall and STEICOjoist I-joist products can be found in the current Declarations of Performance.
The declared values for the respective STEICO joist I-joist products comply with the values in the respective Declarations of Performance in accordance with /ETA-06 / 0238/.
The following Declarations of Performance are available for STEICO I-joists:
/STEICOjoist: 04-0001-06/
/STEICOwall: 04-0002-06/
The current Declarations of Performance can be found at www.steico.com.

2.4 Delivery status

The products are manufactured in various sizes.
Maximum width LVL: 90 mm
Maximum thickness LVL: 39 mm
Maximum overall height: 500 mm
Minimum overall height: 160 m

2.5 Base materials/Ancillary materials

The LVL flanges for the STEICOwall and STEICOjoist I-joist products comprise layers of pine and/or spruce conifer veneer, approx. 3 mm thick and glued together. Solely phenol resin adhesive is used for glueing the veneer layers. The upper scarf joint is glued using either a phenol resin adhesive (PF) or a melamine resin adhesive (MUF). The web-to-flange joint is bonded with a melamine resin adhesive.
Quantity of ingredients in the STEICO joist I-joist products:

LVL flange

- 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 %

Hardboard web material

- Conifer (pine): approx. 92.70%
- PF adhesive: approx. 1.93%
- Ancillary materials: approx. 1.37%
- Water: approx. 4%

The webs are glued into the flange using an MUF adhesive accounting for approx. 0.64% of ingredients.
The LVL flange has an average density of 550 kg/m³ and the hard fibreboard flange has an average density of 900 kg/m³.
STEICO joist I-joist products contain 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 joist I-joist products contain 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 I-joist product or it has been treated with biocide products (this does not concern 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 flanges, conifer logs (pine, spruce) are debarked and heated with warm water for the peeling process. The warm logs are peeled and the peeled veneer ribbons are cut into individual veneer sheets. The veneer sheets are dried in a continuous dryer before being sorted according to quality. The individual veneer sheets are laid on the press line in accordance with the recipe and pressed to billets. The billets are cut into flanges and the flanges are glued together with the web material (hardboard or OSB). Solid timber can also be used as an alternative to STEICO LVL.
Production is certified to /ISO 9001/ via a Quality Management System

2.7 Environment and health during manufacturing

<u>Environmental protection:</u>
In accordance with the current state of knowledge, no

hazards can arise for water, air and soil when the products are used as designated.

Health protection:
In accordance with the current state of knowledge, no negative impacts on health are to be expected. With regard to formaldehyde, STEICOwall and STEICOjoist I-joist products are low-emission on account of their adhesive content, adhesive type and structure (< 0.03 ppm).

2.8 Product processing/Installation

STEICOwall and STEICOjoist I-joist products are processed using standard wood-processing machinery and tools.
The information concerning industrial safety must also be observed during processing/assembly.

2.9 Packaging

Foils, solid wood and small percentages of other plastics are used.

2.10 Condition of use

Composition for the period of use complies with the base material composition in accordance with section 2.5.
Approx. 1000.71 kg carbon dioxide are bound in the product per m3 during use.

2.11 Environment and health during use

In accordance with the current state of knowledge, no general hazards can arise for water, air and soil when laminated veneer lumber is used as designated. Furthermore, no negative impacts on health are to be expected when used as designated. With regard to formaldehyde, STEICO joist I-joist products are low-emission thanks to their adhesive type, adhesive content, and structure. STEICO joist I-joist products have formaldehyde emission values similar to those of natural wood (< 0.03 ppm).

2.12 Reference service life

I-joists have been in general use for more than 50 years. When used as designated, there is no known or expected limit to their durability. Therefore, when used as designated, the expected lifetime of STEICO I-joist products is within the lifetime of the building.

There are currently 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 /EN 13501-1/

Brandschutz

Name	Value
Fire class	D
Burning droplets	d0
Smoke development	s2

Water
When used as designated, no ingredients are washed out which can 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 deconstruction, STEICO I-joist products can be easily reused after expiry of the use phase.
If STEICOwall and STEICOjoist I-joist products cannot be reused, their high calorific value of approx. 16 MJ/kg (where moisture u = 12%) means that they are directed to thermal recycling for the generation of process heat and electricity. During energetic recycling, the requirements outlined in the /Federal Immission Control Act (/BlmSchG/)/ 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 and in the version dated 29.03.2017, untreated STEICO I-joists are 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 STEICOjoist and STEICOwall: 150102 (packaging/plastic).

2.16 Further information

More detailed information is available at www.steico.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit of the ecological life cycle assessment is one running metre (1 run. m.) joists taking consideration of the mix of semi-finished wood products and adhesives used in accordance with section 2.5 and a mass of 4.4 kg per running metre where wood moisture is equal to 7.38%, which corresponds with a water content of 6.9%. Adhesive content accounts for 4.98% and the density of the average product accounts for 619.47 kg/m³.
All information on semi-finished products and adhesives used was calculated on the basis of specific data. The life cycle assessment results refer to the average production of all joists during the period under review and can be scaled by mass to the respective product variants.

Declared unit

Name	Value	Unit
Declared unit	1	rm
bulk density	619.47	kg/m³
Conversion factor for 1 kg	0.227273	-
Wood moisture on delivery	7.38	%
Adhesive content in terms of overall mass	4.98	%
Water content in terms of overall mass	6.9	%

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 assesses the provision of semi-finished wood products 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. Essentially, these are bonding and cutting to size as well as packing the product. Module A5 exclusively covers the disposal of product packaging which includes the disposal of biogenic carbon and renewable and non-renewable 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 assesses thermal utilisation of the product at its end of life and the ensuing potential benefits and loads in the form of a system extension.

3.3 Estimates and assumptions
As a general rule, all material and energy flows for the processes required by production are established on the basis of questionnaires. Local emissions incurred by wood combustion and drying, as well as binding adhesives, could only be estimated on the basis of literary references and are documented in detail in /Rüter, Diederichs 2012/. All other data is based on average values.

The basis for calculating the fresh water resources used is represented by the definition of water consumption in accordance with /ISO 14046/.

3.4 Cut-off criteria
No known material or energy flows were ignored, not even those which fall below the 1% limit. The overall sum of input flows not considered is therefore less than 5% of the energy and mass used. Furthermore, this ensures that no material and energy flows were ignored which represent a particular potential for significant influences with regard to environmental indicators.

3.5 Background data
All background data was taken from the /GaBi 8/ and the "Ökobilanz-Basisdaten für Bauprodukte aus Holz" (basic LCA data for construction products made of wood) final report by /Rüter, 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 data was taken from the /GaBi 8/ data base. 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
General
As a general rule, flows of properties inherent in materials (biogenic carbon and primary energy contained therein) were allocated in accordance with physical causalities. All other allocations concerning associated co-productions were on an economical basis.

Module A1
- Forestry upstream chain as part of the provision of semi-finished wood products: all expenses associated with the forestry upstream chain were allocated via economic allocation factors to the log and industrial wood products based on their prices.

Module A3
- Wood-processing industry: in the case of associated co-productions, expenses were allocated economically to the main products and residual products on the basis of their prices.
- Potential benefits incurred by disposal of waste arising during production (with the exception of wood-based materials) are considered on the basis of system extensions.
- The provision of waste wood does not take consideration of expenses incurred during the previous life cycle.

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.

The used background database has to be mentioned. The LCA was carried out using /GaBi 8/ software, version 8.7.1.30. All background data was taken from the /GaBi 8/ data base or literary references.

4. LCA: Scenarios and additional technical information

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

Installation in the building (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 per running metre of product as waste for thermal utilisation in Module A5 and the ensuing exported energy are indicated in the following table as technical scenario information.

Name	Value	Unit
Packaging wood for thermal waste processing	0.066	kg
Plastic packaging for thermal waste processing	0.044	kg
Overall efficiency of thermal waste processing	38–44	%
Total exported electric energy	0.364	MJ
Total exported thermal energy	0.722	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 8/ data base.

End of life (C1-C4)

Name	Value	Unit
Waste wood for use as a secondary fuel	4.4	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 details

Name	Value	Unit
Electricity generated (per net flow of declared unit)	3.85	kWh
Waste heat utilised (per net flow of declared unit)	28.07	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, 3.85 kWh electricity and 28.07 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 2019.

5. LCA: Results

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

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 according to EN 15804+A1: 1 lfm STEICO joist/wall

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
GWP	[kg CO_2-Eq.]	-3.71E+0	1.22E-1	7.71E-1	2.12E-1	5.14E-3	7.13E+0	-3.47E+0
ODP	[kg CFC11-Eq.]	4.31E-10	2.04E-17	3.33E-12	7.25E-17	8.61E-19	1.28E-15	-8.62E-15
AP	[kg SO_2-Eq.]	1.24E-2	5.14E-4	2.62E-3	3.82E-5	2.17E-5	4.72E-5	-3.58E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	1.46E-3	1.31E-4	2.19E-4	4.78E-6	5.53E-6	7.67E-6	-5.68E-4
POCP	[kg ethene-Eq.]	1.85E-3	-2.12E-4	2.17E-4	1.59E-6	-8.96E-6	3.12E-6	-3.19E-4
ADPE	[kg Sb-Eq.]	6.46E-7	9.52E-9	6.76E-8	8.70E-9	4.02E-10	1.27E-8	-8.62E-7
ADPF	[MJ]	4.34E+1	1.67E+0	1.07E+1	6.15E-2	7.07E-2	2.97E-1	-5.10E+1

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 according to EN 15804+A1: 1 lfm STEICO joist/wall

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
PERE	[MJ]	3.34E+1	9.74E-2	1.71E+0	1.08E+0	4.11E-3	2.10E-1	-1.48E+1
PERM	[MJ]	7.47E+1	0.00E+0	1.06E+0	-1.06E+0	0.00E+0	-7.47E+1	0.00E+0
PERT	[MJ]	1.08E+2	9.74E-2	2.78E+0	1.33E-2	4.11E-3	-7.45E+1	-1.48E+1
PENRE	[MJ]	4.18E+1	1.68E+0	1.09E+1	1.64E+0	7.09E-2	3.90E-1	-5.63E+1
PENRM	[MJ]	2.19E+0	0.00E+0	1.57E+0	-1.57E+0	0.00E+0	-2.19E+0	0.00E+0
PENRT	[MJ]	4.40E+1	1.68E+0	1.25E+1	6.87E-2	7.09E-2	-1.80E+0	-5.63E+1
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]	2.33E-2	0.00E+0	2.03E-1	0.00E+0	0.00E+0	0.00E+0	7.45E+1
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.19E+0
FW	[m^3]	3.23E-2	1.65E-4	2.71E-3	5.12E-4	6.96E-6	1.13E-4	9.91E-3

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 according to EN 15804+A1: 1 lfm STEICO joist/wall

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
HWD	[kg]	2.20E-4	9.38E-8	6.63E-7	3.15E-10	3.96E-9	3.03E-10	-3.18E-8
NHWD	[kg]	3.15E-2	1.37E-4	5.70E-3	1.12E-2	5.77E-6	4.03E-4	3.61E-2
RWD	[kg]	2.60E-4	2.28E-6	9.98E-5	2.85E-6	9.62E-8	3.67E-5	-2.63E-3
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	4.40E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	3.64E-1	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	7.22E-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)

CO2 product system inputs and outputs inherent in wood require separate consideration in terms of GWP.

A total of approx. 10.08 kg CO2 per declared unit enters the system in the form of carbon stored in the biomass, of which 2.82 kg CO2 are already emitted in Module A1 within the framework of heat generation within the upstream chains (provision of semi-finished wood products). A further 0.06 kg CO2 leave the product system in Module A3 after wood combustion in the plant. Around 0.1 kg CO2 bound in the form of the packaging material are emitted in Module A5. The volume of carbon ultimately stored in the joists is extracted from the system again when recycled in the form of waste wood.

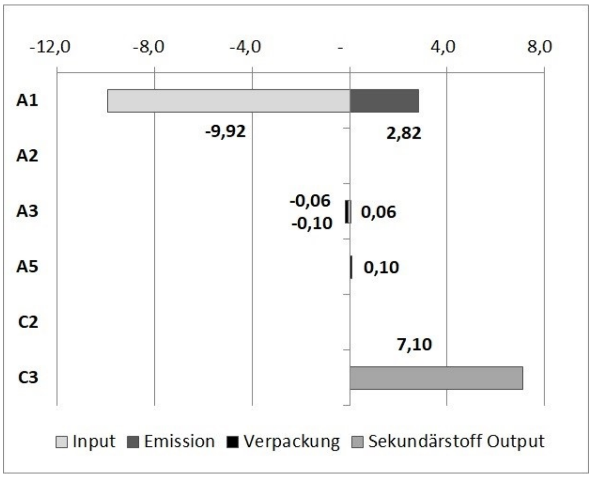

Fig. 1: CO2 product system inputs and outputs inherent in wood [kg CO2 eq.]. The view of the atmosphere is depicted which makes inputs appear as negative values and emissions as positive values.

77% of the analysed fossil greenhouse gases are accounted for by the provision of raw materials and semi-finished products (entire Module A1), 3% by transporting the raw materials and semi-finished products (entire Module A2), and 20% by the manufacturing process for joists (entire Module A3). What is decisive in Module A1 is above all the provision of laminated veneer lumber accounting for 39% and the provision of hardboard accounting for 31% of total GWP. Electricity consumption in the plant accounting for 14% is decisive in Module A3.

6.2 Ozone Depletion Potential (ODP)
ODP is incurred almost exclusively by the provision of semi-finished wood products in Module A1, primarily through hydrophobing processes and in-plant wood combustion, whereby approx. 51% is attributable to OSB production, 26% to HDF production and 21% to LVL production.

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. Apart from electricity consumption in the plant which accounts for 13% (Module A3), the AP is primarily caused by the provision of semi-finished wood products accounting for 80% (Module A1).

6.4 Eutrophication Potential (EP)
79% of the entire EP is attributable to the processes in the upstream chains for the provision of semi-finished wood products and a further 2% is accounted for by the provision of adhesives (both Module A1). Electricity consumption for the manufacturing process accounting for 41% and heat generation in the plant accounting for 33% contribute to the EP (both Module A3). Another 7% is attributable to transporting semi-finished wood products to the plant (Module A2).

6.5 Photochemical Ozone Creation Potential (POCP)
The positive POCP contributions are largely attributable to the provision of semi-finished wood products (Module A1). 44% of the entire POCP is accounted for by LVL production, 32% by HDF production and 23% by OSB production. In Module A3, electricity consumption contributes 7% to the POCP. 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 truck transport processes in the /GaBi 8/ data base used for modelling the transport processes. They have a -11% influence on overall emissions.

6.6 Abiotic Depletion Potential – non-fossil resources (ADPE)
The essential contributions to ADPE are made by the OSB upstream chain (50%, Module A1), the LVL upstream chain (27%, Module A1) and the HDF upstream chain (10%, Module A1). These contributions are attributable to product additives, the power mix used (Poland) and the cutting materials used. In Module A3, electricity consumption and product packaging each contribute about 4% to ADPE.

6.7 Abiotic Depletion Potential – fossil fuels (ADPF)
40% of the entire ADPF is accounted for by the LVL upstream chain, 27% by the HDF upstream chain and 9% by the OSB upstream chain (all Module A1). The main influences are represented by electricity consumption, heat supply from fossil fuels and provision of adhesives. In Module A3, electricity consumption in the plant accounting for 10% and the provision of product packaging accounting for 6% also represent further influencing factors on overall ADPF.

6.8 Renewable primary energy as energy carrier (PERE)
Accounting for 84%, the use of PERE is dominated by burning wood to generate heat within the framework of the provision of semi-finished wood products (Module A1). Furthermore, electricity consumption within the LVL upstream chain (7%, Module A1) and electricity consumption in the plant (3%, Module A3) also have an impact on the use of PERE.

6.9 Non-renewable primary energy as energy carrier (PENRE)
76% of the use of PENRE is attributable to the provision of semi-finished wood products (Module A1). 40% is accounted for by the LVL upstream chain, 26% by the HDF upstream chain and 9% by the OSB upstream chain. As the greatest influence in Module A3, electricity consumption in the plant causes approx. 10% of total use of PERE.

6.10 Waste
Special waste is incurred almost exclusively (> 99%) within the upstream chains for OSB and HDF production through the provision of product additives and adhesives.

7. Requisite evidence

7.1 Formaldehyd

The release of formaldehyde emissions for STEICO I-joists was measured in accordance with /EN 717-1/. According to test report /PB 2516060/ by the EPH Dresden, the measurement revealed emissions of 0.03 ppm.
Formaldehyde emissions for STEICO I-joists are examined every 6 months within the framework of tests by the Qualitätsgemeinschaft Deutscher Fertigbau (QDF) for wood-based materials (/QDF positive list/).

7.2 MDI

The adhesive system for STEICOjoist and STEICOwall I-joist products does not contain 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 joists. STEICOjoist or STEICOwall I-joist products are tested every 6 months for heavy metals within the framework of tests for the /QDF positive list/ (in accordance with /QDF Guideline A01/).

7.4 VOC-emissions

VOC evidence is available for STEICOjoist and STEICOwall I-joist products. Measurements were carried out by the EPH Dresden (/PB 2518367/).

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	481	µg/m³
Sum SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	1	-
VOC without NIK	6	µg/m³
Carcinogenic Substances	0	µg/m³

AgBB overview of results (3 days [µg/m³])

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

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	803	µg/m³
Total SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	2.2	-
VOC without NIK	39	µg/m³
Carcinogenic substances	0	µg/m³

8. References

/EN 12667/
DIN EN 12667:2001-01 – Wärmetechnisches Verhalten von Baustoffen und Bauprodukten – Bestimmung des Wärmedurchlasswiderstandes nach dem Verfahren mit dem Plattengerät und dem Wärmestrommessplatten-Gerät – Produkte mit hohem und mittleren Wärmedurchlasswiderstand**.**

/EN 16485/
EN 16485:2014-07, Round and sawn timber – Environmental Product Declarations – Product category rules for wood and wood-based products for use in construction.

/EN 717-1/
DIN EN 717-1:2005-01, Holzwerkstoffe – Bestimmung der Formaldehydabgabe – Teil 1: Formaldehydabgabe nach der Prüfkammer-Methode.

/EN 13501-1/
DIN EN 13501-1:2010-01, Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten – Teil 1: Klassifizierung mit den Ergebnissen aus den Prüfungen zum Brandverhalten von Bauprodukten.

/ISO 9001/
DIN EN ISO 9001:2015-11, Qualitätsmanagementsysteme – Anforderungen.

/ISO 14046/
DIN EN ISO 14046:2016-07, Umweltmanagement - Wasser-Fußabdruck - Grundsätze, Anforderungen und Leitlinien.

Weitere Quellen:

/AltholzV/
Altholzverordnung (AltholzV): Verordnung über Anforderungen an die Verwertung und Beseitigung von Altholz, 15.08.2002 (Stand: 29.03.2017)

/AVV/
Abfallverzeichnis-Verordnung (AVV) vom 10. Dezember 2001 (BGBl. I S. 3379), die zuletzt durch Artikel 2 der Verordnung vom 17. Juli 2017 (BGBl. I S. 2644) geändert worden ist. (Stand: 17.07.2017)

/BImSchG/
Bundes-Immissionsschutzgesetz (BImSchG): Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnliche Vorgänge, 2013.

/Biozidprodukteverordnung/ ((EU) Nr. 528/2012)
Verordnung (EU) Nr. 528/2012 des Europäischen Parlaments und des Rates über die Bereitstellung auf dem Markt und die Verwendung von Biozidprodukten, 22.05.2012.

/ECHA-Kandidatenliste/
Liste der für eine Zulassung in Frage kommenden besonders besorgniserregenden Stoffe (ECHA-Kandidatenliste), vom 27.06.2018. Veröffentlicht gemäß Artikel 59 Absatz 10 der /REACH-Verordnung/. Helsinki: European Chemicals Agency.

/ETA 06/0238/
Europäische Technische Bewertung ETA 06/0238 für STEICOjoist und STEICOwall, British Board of Agrément, 28.10.2019.

/GaBi 8/
GaBi 8.7. Software-System und Datenbank zur Ganzheitlichen Bilanzierung, Bersion 8.7.1.30. Stuttgart, Echterdingen: thinkstep AG, Servicepaket 37 [Zugriff am 17.05.2019].

/Nr. 0672-CPR-0425/
Zertifikat der Leistungsbeständigkeit STEICOjoist / STEICOwall, 24.10.2014. Stuttgart: MPA Universität Stuttgart.

/PB 2516060/
Prüfbericht Nr. 25116060/2018/04, 12.03.2018. Dresden: Entwicklungs- und Prüflabor Holztechnologie GmbH (EPH).

/PB 2518367/
Prüfbericht Nr. 2518367/1/1, 07.09.2018. Dresden: Entwicklungs- und Prüflabor Holztechnologie GmbH (EPH).

/QDF-Positivliste/
Holzwerkstoffe gemäß QDF-Anforderungen (2019/1), Bundesverband Deutscher Fertigbau e. V. (BDF), Qualitätsgemeinschaft Deutscher Fertigbau (QDF), (Stand: 08.01.2019).

/QDF-Richtlinie A-01/
QDF-Richtlinie A-01 Holzwerkstoffe - Anforderungen zur Aufnahme in die QDF-Positivliste, Bundesverband Deutscher Fertigbau e. V. (BDF), Qualitätsgemeinschaft Deutscher Fertigbau (QDF), (Stand: 12.10.2013).

/REACH-Verordnung/
Verordnung (EG) Nr. 1907/2006 des Europäischen Parlamentes und des Rates vom 18. Dezember 2006 zur Registrierung, Bewertung, Zulassung und Beschränkung chemischer Stoffe (REACH). Zuletzt geändert am 25.03.2014 (Stand: 27.06.2018).

/Rüter, Diederichs 2012/
Rüter, Sebastian; Diederichs, Stefan (2012): Ökobilanz-Basisdaten für Bauprodukte aus Holz: Abschlussbericht. Hamburg: Johann Heinrich von Thünen-Institut, Institut für Holztechnologie und Holzbiologie.

/STEICOjoist 04-0001-06/
STEICOjoist Leistungserklärung nach ETA-06 0238. Nr. 04-0001-06.

/STEICOwall 04-0002-06/
STEICOjoist Leistungserklärung nach ETA-06 0238. Nr. 04-0002-06.

Institut Bauen und Umwelt e.V., Berlin (Hrsg.): Erstellung von Umweltproduktdeklarationen (EPDs)

Allgemeine Programmanleitung
Für die EPD Erstellung beim Institut Bauen und Umwelt e.V. (IBU), 10/2015
www.ibu-epd.com

Publisher
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
Thünen-Institut für Holzforschung
Leuschnerstr. 91
21031 Hamburg
Germany

Tel +49(0)40 73962 - 619
Fax +49(0)40 73962 - 699
Mail holzundklima@thuenen.de
Web **www.thuenen.de**

Owner of the Declaration
STEICO SE
Otto-Lilienthal-Ring 30
85622 Feldkirchen
Germany

Tel +49 (0)89 991 551 0
Fax +49 (0)89 991 551 98
Mail info@steico.com
Web **www.steico.com**