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-20200174-IBA1-EN
Issue date	20.11.2020
Valid to	19.11.2025

STEICO wood fibre insulation boards manufactured in a wet process

STEICO SE

Institut Bauen und Umwelt e.V.

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

1. General Information

STEICO SE

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

Declaration number
EPD-STE-20200174-IBA1-EN

This declaration is based on the product category rules:
Wood based panels, 12.2018
(PCR checked and approved by the SVR)

Issue date
20.11.2020

Valid to
19.11.2025

Wood fibre insulation boards manufactured in a wet process

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

Declared product / declared unit
1 m³ wood fibre insulation

Scope:
This Declaration is an EPD depicting an average product of various product lines manufactured in a wet process in the following plant:

STEICO Sp. z o.o.
ul. Przemysłowa 2
64-700 Czarnków

The LCA calculation refers to a product with a gross density of 237.84 kg/m3.
The following insulation boards manufactured in a wet process were included in the formation of averages:

- STEICOfloor (160 kg/m³)
- STEICOinternal (160 kg/m³)
- STEICOtherm (160 kg/m³)
- STEICOtherm SD (160 kg/m³)
- STEICOisorel (230 kg/m³)
- STEICOprotect M (230 kg/m³)
- STEICOroof (230 kg/m³)
- STEICOspecial (240 kg/m³)
- STEICObase (250 kg/m³)
- STEICOunderfloor (250 kg/m³)
- STEICOduo (265 kg/m³)
- STEICOprotect H (265 kg/m³)
- STEICOuniversal (270 kg/m³)

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

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

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

Prof. Dr. Birgit Grahl
(Independent verifier)

2. Product

2.1 Product description/Product definition

This Declaration describes an average of STEICObase, STEICOduo, STEICOfloor, STEICOinternal, STEICOisorel, STEICOprotect H, STEICOprotect M, STEICOroof, STEICOspecial, STEICOtherm, STEICOtherm SD, STEICOunderfloor and STEICOuniversal wood fibre insulation materials manufactured in a wet process and weighted by production mass.

Directive (EU) No. 305/2011 (CPR) applies for placing the products on the market in the EU/EFTA (except Switzerland). The products require a Declaration of Performance taking consideration of *DIN EN 13171*, Thermal insulation products for buildings – Factory-made wood fibre (WF) products – Specifications, and CE marking.

Use is governed by the respective national regulations.

2.2 Application

STEICO wood fibre insulation is highly versatile and can be used for wall, roof and floor systems. Application areas range from internal ceilings and above rafters in roofs to all insulation applications in walls, insulating service zones and attic floors. Additionally, they can be used for airborne and impact sound insulation under parquet and laminate floors and directly plastered insulation elements for thermal insulation composite systems.

2.3 Technical Data

The following information refers to the STEICOprotect M product line as delivered. Information on other products referred to within the range of validity of this EPD is available at www.steico.com.

Technical construction data

Name	Value	Unit
Gross density	230	kg/m³
Bending strength acc. to EN 310	0.5	N/mm²
Bending elasticity module acc. to EN 310	110	N/mm²
Material moisture on delivery	5	%
Tensile strength perpendicular to the board surface	15	N/mm^2
Thermal conductivity	46	W/(mK)
Water vapour diffusion resistance factor	5	-
Formaldehyde emissions acc. to EN 717-1	<DL*	µg/m³
Specific thermal capacity c	2100	J/(kg*K)
Airflow resistance	100	(kPa*s)/m²
Compressive stress at 10% deformation acc. to EN 13171	100	N/mm²

**DL: Detection limit*

The product performance values comply with the Declaration of Performance in terms of its essential characteristics in accordance with *DIN EN 13171*, Thermal insulation products for buildings – Factory-made wood fibre (WF) products – Specifications.

2.4 Delivery status

The following dimensions refer to the product STEICOprotect M.

Board thickness: 80-100 mm
Format: 1325 x 600 mm, 2800 x 1250 mm, 2625 x 1175 mm

Information on other products referred to within the range of validity of this EPD is available at www.steico.com.

2.5 Base materials/Ancillary materials

The primary components of STEICO wood fibre insulating boards are wood fibres from conifers sourced from regional sustainable forestry. Apart from wood fibres, wood fibre insulation materials comprise binding agents and other additives. The proportions averaged from the various products for the Environmental Product Declaration are:

- Wood, primarily coniferous wood: approx. 91.3%
- Water: approx. 5%
- Adhesives: approx. 1.5%
- Hydrophobic agents: approx. 1.5%
- Ancillary materials: approx. 0.7%

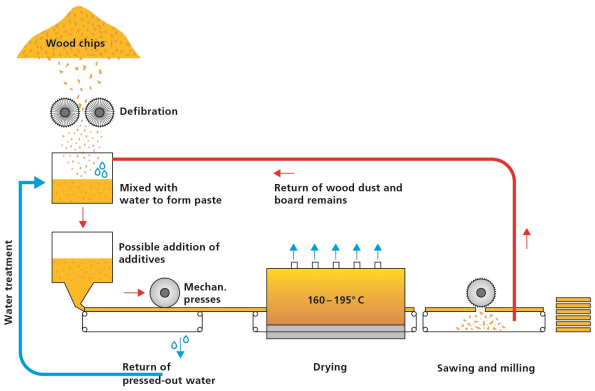
The product contains substances on the *ECHA List of Candidates* for including substances of very high concern in Annex XIV of the *REACH Directive* (last revised: 07.01.2019) exceeding 0.1% by mass: no

The product 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 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

The wet process for manufacturing STEICO wood fibre insulation boards comprises the following process steps:



- Processing of the raw timber to form wood chips
- Heating of the wood chips under steam pressure
- Defibration of the wood chips in the refiner
- Mixing the fibres with water to form a fibrous paste
- Possible addition of requisite additives (depending on product)

- Shaping the insulating board by pressing
- Cutting the insulating board to length
- Drying the boards (160 °C – 200 °C)
- Possibly glueing (depending on product)
- Cutting and profiling
- Stacking, packing

All residual materials incurred during production are directed to in-house energy recycling. A small percentage is redirected to production.

Quality assurance systems:

- Quality management system in accordance with *ISO 9001:2015*
- Environmental management system in accordance with *ISO 14001:2015*
- CE marking in accordance with *EN 13171*, MPA North Rhine-Westphalia, Germany
- FSC certificate *CU-COC-841217*
- PEFC certificate *CU-PEFC-841217*

2.7 Environment and health during manufacturing

Owing to the manufacturing conditions, no other health protection measures are required extending beyond the legally specified measures.

Environmental protection
Air: Waste air generated during production is cleaned in accordance with statutory specifications.

Water/Soil: No direct pollution of water or soil is caused by the production process. Waste water incurred during production is reprocessed internally.

2.8 Product processing/Installation

STEICO wood fibre insulation boards can be processed using conventional wood-processing tools (handsaw, insulation knife, circular and band saw etc.). Insofar as processing is carried out without dust extraction, the use of breathing protection measures is recommended.
Neither the processing nor the installation of STEICO wood fibre insulation materials leads to environmental pollution. No additional measures are necessary in terms of environmental protection.

2.9 Packaging

Polyethylene foil (PE), paper and cardboard as well as wood are used for packaging STEICO wood fibre insulation materials. All packing materials are recyclable if unmixed, and/or can be recovered as energy.

2.10 Condition of use

When used correctly and as designated, no material product changes are to be anticipated during the use phase.

2.11 Environment and health during use

Environment: When STEICO wood fibre insulation materials are used as designated, no hazard potential for water, air or soil is currently known *(Prüfbericht IBR).*

Health: When STEICO wood fibre insulation materials are installed correctly, no health risks or impairments are to be expected.
It is possible that small quantities of product substances may escape. No emissions of health relevance were determined.

In order to exceed the statutory limit values with regards to emissions, radioactivity, VOC etc., STEICO wood fibre insulation materials are tested externally (*Prüfbericht IBR*).

2.12 Reference service life

When used as designated, infinite durability of the STEICO insulating materials can be anticipated. Accordingly, the average service life of the product is equivalent to the service life of the building.
Under central European climate conditions, a service life of 50 years can be assumed as a conservative duration.

There are no known or anticipated influences on product ageing when the products are applied in accordance with the generally accepted rules of technology.

2.13 Extraordinary effects

Fire
Information in acc. with *DIN EN 13501-1*

Fire protection

Name	Value
Building material class	E
Burning droplets	-
Smoke production	-

Water
STEICO wood fibre insulation materials do not comprise any leachable components which are hazardous to water. Wood fibre insulation materials do not offer permanent resistance to standing water. Damaged areas must be replaced in part or extensively depending on the respective degree of damage incurred.

Mechanical destruction
The product is mechanically resistant (with regard to pressure and tensile load) depending on the insulation material used. Mechanical destruction does not have any negative impact on the environment.

2.14 Re-use phase

When dismantled without damage, STEICO wood fibre insulation materials may be reused for the same application after the end of utilisation, or may be reused in the same application spectrum in an alternative location.
Provided that the wood fibre insulation materials are not damaged, material recycling of the raw material does not present a problem (e.g. reintroduction to the production process).

2.15 Disposal

Insulation material residue without contamination (clippings and de-construction material) can be recycled in the production process. During thermal utilisation, STEICO wood fibre insulation materials achieve a calorific value of approx. 17.66 MJ per kg insulation material (product moisture = 4.8%) as

renewable energy carriers, e.g. for heating as biomass or in waste incineration plants. Process energy as well as electricity can be generated.
Waste code in accordance with the European Waste Catalogue (*EWC*): 030105/170201.

2.16 Further information

Detailed information on STEICOprotect M and other products offered by STEICO SE (processing, characteristic values, approvals) is available at www.steico.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m³ wood fibre insulation material with an average apparent density of 237.84 kg and 4.81% water. Additives account for 3.55%.
The gross density and contents of the declared unit were calculated via the average formation of wood fibre insulation boards manufactured in a wet process in the plant (excluding insulation materials containing bitumen) weighted by production mass. In accordance with 5.2.1c in *PCR Part A*, this concerns a “Declaration of an average product from a manufacturer's plant”.

Declared unit

Name	Value	Unit
Declared unit	1	m^3
Conversion factor to 1 kg	237.84	-
Mass reference	237.84	kg/m^3

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 burdens over and beyond the product's entire life cycle (Module D).

Module A1 comprises the provision of wood from forestry resources and the provision of additives. Transport of these substances is considered in Module A2. Module A3 includes the expenses associated with manufacturing the product, such as the provision of fuels, consumables and energy, as well as product packaging.
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 takes account of the thermal utilisation of the product at its end of life as well as the ensuing potential benefits and burdens in the form of a system extension.

3.3 Estimates and assumptions

In principle, all of the material and energy flows for the processes required by production are established on the basis of questionnaires.

3.4 Cut-off criteria

No known material or energy flows were ignored, including those 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 guarantees that no material or energy flows were ignored which display a particular potential for significant influences in terms of environmental indicators.

3.5 Background data

All background data was taken from the /GaBi Professional Database 2020 Edition/ and the “Ökobilanz-Basisdaten für Bauprodukte aus Holz” final report (/*S. Rüter, S. Diederichs:* 2012/).

3.6 Data quality

The primary data gleaned for 2019 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 Database 2020 Edition*. The overall data quality can be regarded as good.

3.7 Period under review

The data recorded for the primary system refers to 2019. Accordingly, all information is based on averaged data from 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

The product characteristics inherent in the material (biogenic carbon and the primary energy contained therein) are allocated in accordance with the physical criterion of mass.

Module A1

The processes in the upstream forestry chain concern associated co-productions of logs (primary product) and industrial wood (co-product). The corresponding expenses of this upstream chain were allocated on the basis of log and industrial wood prices. For the same reason, the expenses associated with sawn timber (primary product) and sawmill by-products (wood chips, co-product) were also allocated on the basis of their prices in the upstream sawmill chain.

Module A3

On the other hand, the products manufactured in the plant are not associated co-productions. In accordance with *EN 16485*, data which is only available for production as a whole is allocated to the products on the basis of the production volume (mass).
Energy generated from external disposal of waste incurred during production is credited to the system by

means of substitution processes, whereby it is assumed that the thermal energy would be generated from natural gas and the substituted electricity would correspond with the German power mix.
The credits achieved here account for significantly less than 1% of overall expenses.

Module D
The potential benefit through substitution of fossil fuels in the course of generating energy with thermal utilisation of the product packaging and the actual product at its end of life is analysed in Module D, whereby a system extension is applied for calculating the substitutions under the assumptions described above.

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 LCA was conducted using version 9.2 of the GaBi ts 2020 software.
All background data was taken from the *GaBi Professional Database 2020 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)
The information in Module A5 exclusively refers to the disposal of packaging materials. No information is provided on installation of the product. The volume of packaging materials incurred per declared unit in Module A5 and directed to thermal waste treatment as well as other details on the scenario are listed in the following table.

Name	Value	Unit
Solid wood (wood moisture = 40%) as packaging material for thermal waste treatment	18.96	kg
PE foil as packaging material for thermal waste treatment	1.04	kg
Paper as packaging material for thermal waste treatment	0.03	kg
Biogenic carbon contained in the solid wood share of packaging	6.77	kg
Total efficiency of thermal waste treatment	38-44	%
Total exported electrical energy	13.3	kWh
Total exported thermal energy	108.9	MJ

A transport distance of 20 km is assumed for disposal of the product packaging.

End of life (C1-C4)
A redistribution transport distance of 50 km is assumed in Module C2.

Name	Value	Unit
Energy recovery (waste wood)	23784	kg

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

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 generated (per tonne of bone-dry waste wood)	7053.19	MJ
Electricity generated (per net flow of declared unit)	176.89	kWh
Waste heat generated (per net flow of declared unit)	1273.30	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 54.54% and electrical efficiency of 18.04% 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, 176.89 kWh electricity and 1274.30 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.

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 m³ Holzfaserdämmstoff (Nassverfahren)

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
GWP	[kg CO_2-Eq.]	-3.81E+2	3.86E+0	2.63E+2	2.81E+1	7.16E-1	4.01E+2	-1.77E+2
ODP	[kg CFC11-Eq.]	6.88E-8	6.42E-16	7.28E-13	1.10E-14	1.19E-16	6.18E-16	-4.47E-12
AP	[kg SO_2-Eq.]	5.95E-2	1.62E-2	6.13E-1	4.81E-3	3.00E-3	1.69E-2	-1.57E-1
EP	[kg $(PO_4)^{3-}$-Eq.]	1.29E-2	4.07E-3	6.31E-2	9.89E-4	7.54E-4	3.65E-3	-2.67E-2
POCP	[kg ethene-Eq.]	9.08E-3	-6.80E-3	8.85E-2	2.42E-4	-1.26E-3	1.65E-3	-1.49E-2
ADPE	[kg Sb-Eq.]	2.78E-5	3.25E-7	2.03E-5	5.97E-7	6.03E-8	1.72E-7	-4.57E-5
ADPF	[MJ]	4.67E+2	5.33E+1	2.83E+3	8.90E+0	9.88E+0	2.50E+1	-2.58E+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 - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m³ Holzfaserdämmstoff (Nassverfahren)

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
PERE	[MJ]	5.55E+1	3.00E+0	5.32E+2	1.99E+0	5.56E-1	1.46E+0	-7.85E+2
PERM	[MJ]	4.20E+3	0.00E+0	2.61E+2	-2.61E+2	0.00E+0	-4.20E+3	0.00E+0
PERT	[MJ]	4.26E+3	3.00E+0	7.94E+2	-2.59E+2	5.56E-1	-4.20E+3	-7.85E+2
PENRE	[MJ]	4.76E+2	5.34E+1	2.87E+3	9.65E+0	9.91E+0	2.51E+1	-2.87E+3
PENRM	[MJ]	3.05E+2	0.00E+0	3.74E+1	-3.74E+1	0.00E+0	-3.05E+2	0.00E+0
PENRT	[MJ]	7.81E+2	5.34E+1	2.91E+3	-2.78E+1	9.91E+0	-2.80E+2	-2.87E+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	1.39E+3	0.00E+0	0.00E+0	0.00E+0	4.20E+3
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.05E+2
FW	[m³]	3.80E-1	3.47E-3	1.13E+0	8.98E-2	6.44E-4	1.31E-3	4.28E-1

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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m³ Holzfaserdämmstoff (Nassverfahren)

Parameter	Unit	A1	A2	A3	A5	C2	C3	D
HWD	[kg]	8.29E-4	2.49E-6	3.05E-6	3.07E-8	4.61E-7	9.38E-7	-1.49E-6
NHWD	[kg]	6.31E-1	8.18E-3	3.12E+0	4.88E-1	1.52E-3	4.40E-3	2.96E+0
RWD	[kg]	3.53E-3	6.61E-5	1.69E-2	2.97E-4	1.23E-5	2.64E-5	-1.14E-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	2.38E+2	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	4.78E+1	0.00E+0	0.00E+0	6.60E+2
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	1.09E+2	0.00E+0	0.00E+0	1.32E+3

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. 424.42 kg CO2 enters the system in the form of carbon stored in the biomass. Around 24.9 kg CO2 bound in the form of the packaging material is accounted for in Module A3 and released again in Module A5.
The volume of carbon accounting for around 399.5 kg CO equiv. ultimately stored in the wood fibre insulating material is extracted from the system again when recycled in the form of waste wood.

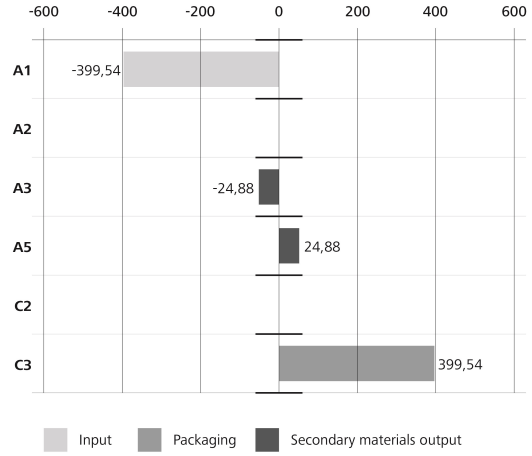


Fig. 2: CO2 product system inputs and outputs inherent in wood. The inverse indications suggested by inputs and outputs are in line with the LCO CO2 flow analysis in terms of the atmosphere.

6% of the analysed fossil greenhouse gases are accounted for by the provision of raw materials (entire Module A1), 1% by transporting the raw materials (entire Module A2), and 93% by the manufacturing process for the wood fibre insulation material (entire Module A3). Heat generation in the plant (43%) and the provision of electricity (40%) accounting for fossil greenhouse gas emissions represent essential influential factors.

6.2 Ozone Depletion Potential (ODP)

Practically all emissions with an ozone depletion potential are incurred by the provision of additives for the product.

6.3 Acidification Potential (AP)

Essentially, the generation of energy during the manufacturing process accounting for 89% (Module A3) and the provision of additives accounting for 5% (Module A1) are the most relevant sources for emissions contributing to the acidification potential.

6.4 Eutrophication Potential (EP)

32% of total EP is attributable to the provision of heat and a further 33% is accounted for by the provision of electricity during the manufacturing process (both Module A3). The provision of additives makes a 9% contribution to EP (Module A1).

6.5 Photochemical Ozone Creation Potential (POCP)

The primary POCP contributions (46%) are accounted for by energy generation during the manufacturing process (Module A3). The provision of wood raw materials (Module A1) accounts for a further 5% of total POCP. The negative values recorded for the POCP in Modules A2 and C2 are attributable to the negative characterisation factor for nitrogen monoxide emissions of the standard-conformant CML IA version (2001 – April 2013) in combination with the current /GaBi Professional database 2020 edition/ truck transport process used for modelling log transport.

6.6 Abiotic Depletion Potential non-Fossil Resources (ADPE)

The essential contributions to ADPE (57%) are incurred by the provision of additives for the product (Module A1). The consumables used also account for 17% of total ADPE (Module A3).

6.7 Abiotic Depletion Potential – fossil fuels (ADPF)

Provision of heat accounts for 43% of total ADPF (Module A3). A further 38% is attributable to electricity consumption (also Module A3) and the provision of additives for the product accounts for 12% (Module A1).

6.8 Renewable primary energy as energy carrier (PERE)

9% of the use of PERE can be allocated to the provision of raw materials (primarily additives) (Module A1). But most of total use (47%) is attributable to the packaging materials used and the renewable share of electricity consumption accounting for 39% (both Module A3).

6.9 Non-renewable primary energy as energy carrier (PERE)

The use of PENRE is distributed across the manufacturing process with 42% for heat generation and 38% for electricity consumption there (both Module A3), as well as the provision of product additives accounting for 13% (Module A1).

6.10 Waste

Special waste is incurred almost exclusively (99%) during the provision of additives in Module A1.

Range of results

The results for individual products listed under 2.1 differ from the average results in the Environmental Product Declaration. The following table contains the maximum deviations from the results from Chapter 5 for environmental impacts, energy use and fresh water requirements:

Parameter	Max. deviation [%]
GWP	+35/-41
ODP	+186/-99
AP	+21/-46
EP	+28/-48
POCP	+30/-72
ADPE	+112/-71
ADPF	+42/-46
PERE	+32/-38
PENRE	+42/-46

FW	+26/-43	Deviations are primarily attributable to the differences in product density and individual details concerning product composition.

7. Requisite evidence

7.1 Formaldehyde

STEICO wood fibre insulation boards manufactured in a wet process are produced without adhesives containing formaldehyde.
The formaldehyde emissions comply with those of natural wood and fall below the detection limit in accordance with testing to *EN 717-1*.Tests were carried out on the STEICOprotect M product at the Entwicklungs- und Prüflabor Holztechnologie in Dresden (*PB 2516060/2017/07*).

7.2 MDI

No binding agents containing isocyanate are used for the STEICO wood fibre insulation boards manufactured in a wet process.

7.3 Testing for pre-treatment of substances used

No waste wood is used as a material input in the production of STEICO wood fibre insulation boards manufactured in a wet process. Only untreated fresh wood (conifer) is used.

7.4 VOC emissions

Evidence of VOC is available for the STEICOunderfloor product with a gross density of 250 kg/m³ and manufactured in a wet process. The measurements were taken by MPA Eberswalde (*PB 31/15/2412/44*).

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

Name	Value	Unit
TVOC (C6 - C16)	200	µg/m³
Sum SVOC (C16 - C22)	< 0.005	µg/m³
R (dimensionless)	0.06	-
VOC without NIK	< 0.005	µg/m³
Carcinogenic Substances	< 1	µg/m³

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

Name	Value	Unit
TVOC (C6 - C16)	520	µg/m³
Sum SVOC (C16 - C22)	< 0.005	µg/m³
R (dimensionless)	0.93	-
VOC without NIK	< 0.005	µg/m³
Carcinogenic Substances	< 1	µg/m³

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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**