ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Holzwerk Gebr. Schneider GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HWS-20230343-IBA1-EN
Issue date	20.09.2023
Valid to	19.09.2028

best wood FLEX 50

Holzwerk Gebr. Schneider GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Holzwerk Gebr. Schneider GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-HWS-20230343-IBA1-EN

This declaration is based on the product category rules:

Wood-based panels, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

20.09.2023

Valid to

19.09.2028

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

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

best wood FLEX 50

Owner of the declaration

Holzwerk Gebr. Schneider GmbH
Kappel 28
88436 Eberhardzell
Germany

Declared product / declared unit

1 m³ wood fiber insulation mat FLEX 50 with a bulk density of 50 kg/m³.

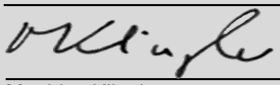
Scope:

This Environmental Product Declaration relates to the product best wood FLEX 50, which is produced by Holzwerk Gebr. Schneider GmbH at the Eberhardzell site (Germany).
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+A2. 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 14025:2011
☐ internally ☒ externally



Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Best wood SCHNEIDER wood fiber insulation mats FLEX 50 are board-shaped wood-based materials produced from wood fibers in accordance with *EN 13171*. During the manufacturing process, small quantities of bicomponent fibers and *natureplus*-compliant flame retardants are added to produce insulation mats. Single-layer insulation thicknesses up to and including 240 mm can be produced.

Regulation (EU) No. 305/2011(CPR) applies to the placing on the market of the products in the EU/EFTA (with the exception of Switzerland).
The product requires a declaration of performance in accordance with *DIN EN 13171:2015-04 - Thermal insulation products for buildings - Factory made wood fiber (WF) products - Specification (EN 13171:2012+A1:2015)* and CE marking.

The respective national regulations apply for use.

2.2 Application

FLEX 50 is an insulation for the cavity area of roofs and timber frame construction. Due to its good clamping effect, FLEX 50 is easy to process. Areas of application include insulation between rafters, infilling insulation of walls in timber frame and timber stud construction, insulation of wooden ceilings, insulation of top floor ceilings of a building, insulation of installation levels and insulation of ribbing on mineral substrates. Fields of application according to DIN 4108-10: DZ, DI-zk, WH, WI-zk & WTR

2.3 Technical Data

The technical construction data shown below is valid for the product best wood FLEX 50 insulation mat as delivered.

Bautechnische Daten

Name	Value	Unit
Gross density	50	kg/m^3
Material dampness at delivery	8 - 10	%
Thermal conductivity nach EN 13171	0.037	W/(mK)
Water vapour diffusion resistance factor	1 - 2	-
Brandverhalten nach EN 13501	E	-

Performance values of the product according to the declaration of performance with regard to its essential characteristics according to *DIN EN 13171:2015-04 - Thermal insulation products for buildings - Factory made wood fiber (WF) products - Specification (EN 13171:2012+A1:2015)*.

2.4 Delivery status

The best wood FLEX 50 insulation mat is supplied in thicknesses from 40 to 240 mm. The standard format is 565 x 1200 mm.
Special formats are available on request. The exact dimensions can be viewed at www.schneider-holz.com.

2.5 Base materials/Ancillary materials

Massebezogene Zusammensetzung

Name	Value	Unit
Wood fiber	91	%
Flame retardants	5	%
Bicomponent fibers	4	%

The declared product consists largely of the wood fibers responsible for the insulation. In addition, a flame retardant (based on phosphorus-containing compounds) and bicomponent fibers (bicofibers for short) are used to increase stability.

The product/product/at least one sub-product contains substances on the ECHA list of Substances of Very High Concern (SVHC) (date 14/03/2023) above 0.1% by mass: **no.**

The product/at least one part of the product contains substances on the ECHA list of Substances of Very High Concern (SVHC) (date 14/03/2023) above 0.1 mass %: **no.**

Biocidal products have been added to this construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): **no.**

2.6 Manufacture

The production cycle of the wood fiber insulation mat starts with the refiner, which is preceded by two stoves. Here, wood chips are first pre-digested without pressure and brought to temperature with the addition of steam. Water is removed from the raw material via the tamping screw and at the same time the material is conveyed into the pressurised stove.
Here, the fiber is completely digested and then fire retardants are added. The fibers are then dried in the flash tube dryer and separated in a cyclone. A small amount of bicofiber is added before the fiber cake is spread. These fibers are by-products from textile processing and are added in the factory. During processing, the sheath of the fiber melts slightly and forms a bond with the wood fiber, thereby supporting the wood fiber insulation mat. The finished product is produced by adding heat and moisture in the form of steam. Delivery and sale take place partly directly from production and partly from a warehouse via trucks directly to the customer.

2.7 Environment and health during manufacturing

The legal regulations regarding environmental and health protection during the manufacturing process are complied with. Legal limits are undercut.
In addition, employees are offered numerous health promoting measures outside of the production process.

The waste water produced during the production process is treated internally using an evaporation plant and recycled. This means that no production waste water is produced and the need for fresh water is also reduced.

The SCHNEIDER Group operates a certified energy management system in accordance with ISO 50001.

2.8 Product processing/Installation

All standard wood-cutting tools such as bench and table saws are suitable for cutting the wood fiber insulation boards to size. They can also be cut by hand. The dust which is generated when cutting wood fiber insulation boards, should be extracted by means of a vacuum extractor.
The processing and installation of wood fiber insulation mats do not cause any environmental pollution, so no special protective measures are required. Processing guidelines for best wood SCHNEIDER products are available at www.schneider-holz.com.

2.9 Packaging

The best wood FLEX 50 wood fiber insulation mats are stacked on wooden pallets, wrapped in polyethylene (PE) film and fitted with cardboard and cardboard edge protection. All packaging materials can be separated by type and are subsequently

recyclable and can be used for energy recovery.

2.10 Condition of use
If used as intended, no material changes in composition are to be expected during the use phase.

2.11 Environment and health during use
If wood fiber insulation mats are used as intended, no negative effects on the environment or health are to be expected.

2.12 Reference service life
If installed professionally and used as intended, no premature end to the durability of the insulation materials is known or to be expected. The average service life of the product is therefore of the same order of magnitude as the service life of the building. Under Central European climatic conditions, a conservatively estimated service life of 50 years can be assumed.

Influences on product ageing when used in accordance with the rules of technology are not known or expected.

2.13 Extraordinary effects
Fire
The fire behavior of the declared product is defined as follows:

Brandschutz

Name	Value
Fire behavior according to EN13501-1	E
Construction material class according to DIN 4102-1	B2

Water
n the event of unforeseen exposure of the product to water, e.g. flooding, no substances hazardous to water are washed out.

Mechanical destruction
No negative effects on the environment are to be expected in the event of unforeseen mechanical destruction.

2.14 Re-use phase
Material recycling of the wood fiber insulation mats, e.g. by returning them to the production process, is possible if the insulation material is dismantled according to type. Alternatively, the material can also be thermally recycled for energy recovery.

2.15 Disposal
In cases where the insulation mat is not recycled, it can be disposed of by means of thermal treatment.

Waste code according to the European Waste Catalogue (EWC waste code number): 030105 or 170201.

2.16 Further information
Further information and documents such as technical data sheets, certificates etc. are available at www.schneider-hollz.com.

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit for this Environmental Product Declaration is defined as 1 m³ in accordance with the specifications of the corresponding PCR: Wood-based materials. The bulk density of the product under consideration is 50 kg/m³.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^3
Mass reference	50	kg/m^3

3.2 System boundary
This EPD is a cradle-to-grave analysis and module D, it includes the following life cycle phases:

A1-A3 | Production stage
The production stage includes the production of all components of the declared product (wood fibers, bi-component fibers and flame retardants) as well as the packaging, including the respective upstream chains up to the extraction of raw materials. The transportation of the components and packaging materials to the production site is also taken into account. Within the plant boundaries, all expenses for the production of the insulation mats are taken into account, including the disposal of production waste.

A4-A5 | Construction stage
This stage includes the transportation of the insulation mats to the construction site (A4) as well as the expenses for installation in the building (A5). Module A5 also considers the production, transportation and disposal of offcuts. Furthermore the disposal of packaging waste is taken into account here.

B1-B7 | Utilisation stage
This stage deals with the utilisation phase of the product. However, if used properly, no environmentally relevant processes occur during the period of use.

C1-C4 | Disposal stage
The disposal stage includes dismantling (C1), which in this case was assumed to be a manual process with negligible environmental impacts. Furthermore, the transportation of the dismantled product, which is therefore waste, to the waste treatment plant (C2) and its thermal recovery (C3) are also taken into account. In this case, no environmentally relevant processes are included in C4.

D | Advantages and drawbacks outside the system boundary
The advantages of thermal recycling of offcuts and packaging waste (from A5) and of the product itself (from C3) are considered here.

3.3 Estimates and assumptions
No further assumptions and estimates were made that are not listed elsewhere in this EPD.

3.4 Cut-off criteria
All inputs and outputs for which data is available and which are expected to make a significant contribution are included in the LCA model. Only data with a contribution of less than 1% was cut off. The omission of this data is justified by the insignificance of the expected impact. This means that no processes, materials or emissions were neglected that are expected to make a significant contribution to the environmental impact of the products under consideration. It can be assumed that the data was recorded in full and that the total sum of the neglected input flows does not exceed 5% of the energy and mass input. Expenses for machinery and infrastructure were not taken into account

3.5 Background data

The modelling was carried out using Umberto LCA+ software on the basis of GaBi databases integrated into it. Background data comes from the GaBi Professional database (2021.2) *(GaBi A)*, GaBi Extension database XIIIb: ecoinvent 3.7.1 integrated (2021.2) *(GaBi B)* and GaBi Extension database XIV: Construction materials (2021.2) *(GaBi C)*.

3.6 Data quality

The data collection followed the principles described in ISO 14044. The foreground production data for 2020 was collected by Holzwerk Gebr. Schneider GmbH using internal company records.

When selecting the background data, attention was paid to the technological, geographical and time-related representativeness of the data basis.

3.7 Period under review

The foreground production data was collected for the year 2020. All values therefore represent an average over this period.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Germany

3.9 Allocation

General information

The material-inherent properties of the product (biogenic carbon and the primary energy it contains) are allocated according to the physical criterion of mass.

Module A1-A3

The upstream chains of the respective input materials are mapped using generic data sets. Allocation rules in these datasets can generally be found in the respective dataset documentation. The flows/loads from the forest and sawmill associated with the wood chips were modelled as standard using economic allocation.

According to the manufacturer, no other products (by-products) are created during the manufacture of the declared product, so an allocation is not necessary at this level.

Modules A5 & C3

The thermal recycling of the packaging waste and the offcut (A5) and the product itself (C3) takes place in a waste incineration plant (WIP). The associated loads are declared in the respective modules. The waste incineration plant is a multi-input process. The respective allocation takes place via the selected GaBi background datasets – details can be found in the respective dataset documentation.

Module D

Packaging waste and offcuts (during installation) as well as the declared product itself are thermally recycled. The associated benefits through the substitution of primary energy sources are presented in Module D. The breakdown into electrical and thermal energy can be found in the corresponding documentation of the GaBi dataset.

3.10 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.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon from the wood fibers and in the product packaging (wooden pallet and cardboard) was taken into account in A1–A3 as an inclusion and booked out again as part of disposal (A5 packaging or C3 product). 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

Information on the description of the biogenic carbon content at the site gate

Name	Value	Unit
Biogenic carbon content in product	20.69	kg C
Biogenic carbon content in accompanying packaging	0.07	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

The following technical information is the basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment if modules are not declared (MND).
Unless otherwise defined, the values in the following tables refer to the declared unit of 1 m³ (= 50 kg).

Transportation to construction site (A4)

Name	Value	Unit
Litres of fuel	33.5	l/100km
Transport distance	157	km
Capacity utilisation (including empty runs)	65	%
Gross density of products transported	50	kg/m^3
Capacity utilisation volume factor	1	-

Installation in the building (A5)

Name	Value	Unit
Auxiliary	0	kg
Water consumption	0	m^3
Other resources	0	kg
Electricity consumption	0.02	kWh
Other energy carriers	0	MJ
Material loss	0.5	kg
Wood packaging for them, recycling	0,09	kg
Paper packaging for them, recycling	0,09	kg
Plastic packaging (PE) for them, recycling	0,025	kg

End of life (C1–C4)

Name	Value	Unit
Collected as mixed construction waste	50	kg
Energy recovery	50	kg

A transportation distance of 200 km to the thermal treatment plant (with R1 > 65 %) is assumed. The collection rate is set at 100 %.

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

Name	Value	Unit
Energy recovery elec. from A5	1,97	MJ
Energy recovery therm. from A5	3,53	MJ
Energy recovery elec. from C3	136,96	MJ
Energy recovery therm. from C3	245,83	MJ

The efficiencies of thermal utilization are specified in the background data used for the waste incineration plant and vary slightly depending on the fuel. For the main component wood, these are 14.54 % (electrical) and 26.11 % (thermal), the overall efficiency is therefore 40.64 %.

5. LCA: Results

The results for 1 m³ of best wood FLEX 50 with a bulk density of 50 kg/m³ are shown below.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR 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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m³ Holzfaser-Dämmmatte (50 kg/m³)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	-5.03E+01	5.01E-01	7.21E-01	0	0	0	0	0	0	0	0	2.22E+00	8.25E+01	0	-3.15E+01
GWP-fossil	kg CO_2 eq	2.58E+01	4.97E-01	4.53E-01	0	0	0	0	0	0	0	0	2.21E+00	6.7E+00	0	-3.15E+01
GWP-biogenic	kg CO_2 eq	-7.61E+01	0	2.67E-01	0	0	0	0	0	0	0	0	0	7.58E+01	0	0
GWP-luluc	kg CO_2 eq	6.86E-02	4.07E-03	1.01E-03	0	0	0	0	0	0	0	0	1.82E-02	8.71E-04	0	-2.15E-02
ODP	kg CFC11 eq	9.88E-09	9.83E-17	9.88E-11	0	0	0	0	0	0	0	0	4.4E-16	1.2E-14	0	-3.54E-13
AP	mol H^+ eq	8.06E-02	5.36E-04	1.23E-03	0	0	0	0	0	0	0	0	1.18E-02	1.67E-02	0	-4.07E-02
EP-freshwater	kg P eq	3.69E-04	1.48E-06	3.84E-06	0	0	0	0	0	0	0	0	6.63E-06	1.67E-06	0	-4.07E-05
EP-marine	kg N eq	2.89E-02	1.73E-04	4.6E-04	0	0	0	0	0	0	0	0	5.72E-03	6.2E-03	0	-1.16E-02
EP-terrestrial	mol N eq	2.73E-01	2.05E-03	4.83E-03	0	0	0	0	0	0	0	0	6.34E-02	8.33E-02	0	-1.25E-01
POCP	kg NMVOC eq	7.62E-02	4.67E-04	1.16E-03	0	0	0	0	0	0	0	0	1.11E-02	1.65E-02	0	-3.27E-02
ADPE	kg Sb eq	7.39E-06	4.41E-08	8.22E-08	0	0	0	0	0	0	0	0	1.98E-07	1.86E-07	0	-5.18E-06
ADPF	MJ	4.32E+02	6.63E+00	5.24E+00	0	0	0	0	0	0	0	0	2.97E+01	2.04E+01	0	-5.46E+02
WDP	m^3 world eq deprived	3.73E+00	4.62E-03	1.74E-01	0	0	0	0	0	0	0	0	2.07E-02	9.51E+00	0	-2.35E+00

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; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m³ Holzfaser-Dämmmatte (50 kg/m³)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	3.96E+02	3.82E-01	1.46E+01	0	0	0	0	0	0	0	0	1.71E+00	7.93E+02	0	-1.21E+02
PERM	MJ	7.92E+02	0	-2.6E+00	0	0	0	0	0	0	0	0	0	-7.9E+02	0	0
PERT	MJ	1.19E+03	3.82E-01	1.2E+01	0	0	0	0	0	0	0	0	1.71E+00	3.85E+00	0	-1.21E+02
PENRE	MJ	3.57E+02	6.66E+00	6.46E+00	0	0	0	0	0	0	0	0	2.98E+01	9.49E+01	0	-5.46E+02
PENRM	MJ	7.57E+01	0	-1.22E+00	0	0	0	0	0	0	0	0	0	-7.45E+01	0	0
PENRT	MJ	4.32E+02	6.66E+00	5.24E+00	0	0	0	0	0	0	0	0	2.98E+01	2.05E+01	0	-5.46E+02
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.77E-01	4.37E-04	5.04E-03	0	0	0	0	0	0	0	0	1.96E-03	2.24E-01	0	-1.18E-01

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+A2: 1 m³ Holzfaser-Dämmmatte (50 kg/m³)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1.17E-06	3.51E-10	1.18E-08	0	0	0	0	0	0	0	0	1.57E-09	3.78E-09	0	-1.23E-07
NHWD	kg	4.82E-01	1.04E-03	1.7E-02	0	0	0	0	0	0	0	0	4.68E-03	6.48E-01	0	-2.55E-01
RWD	kg	1.63E-02	1.21E-05	2.01E-04	0	0	0	0	0	0	0	0	5.41E-05	1.1E-03	0	-3.89E-02

CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.97E+00	0	0	0	0	0	0	0	0	0	1.37E+02	0	0
EET	MJ	0	0	3.53E+00	0	0	0	0	0	0	0	0	0	2.46E+02	0	0

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; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m³ Holzfaser-Dämmmatte (50 kg/m³)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.51E-06	3.65E-09	1.7E-08	0	0	0	0	0	0	0	0	4.65E-08	7.35E-08	0	-3.51E-07
IR	kBq U235 eq	1.82E+00	1.77E-03	2.43E-02	0	0	0	0	0	0	0	0	7.91E-03	1.73E-01	0	-6.37E+00
ETP-fw	CTUe	1.94E+02	4.92E+00	2.48E+00	0	0	0	0	0	0	0	0	2.2E+01	8.62E+00	0	-1.12E+02
HTP-c	CTUh	8.31E-09	9.95E-11	1.01E-10	0	0	0	0	0	0	0	0	4.46E-10	5.89E-10	0	-5.18E-09
HTP-nc	CTUh	4.86E-07	5.15E-09	5.63E-09	0	0	0	0	0	0	0	0	2.45E-08	2.11E-08	0	-2.05E-07
SQP	SQP	1.94E+03	2.28E+00	1.96E+01	0	0	0	0	0	0	0	0	1.02E+01	5.42E+00	0	-8.34E+01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

PM = Potential occurrence of diseases due to particulate matter emissions; IR = Potential effect of human exposure to U235; ETP-fw = Potential toxicity comparison unit for ecosystems; HTP-c = Potential toxicity comparison unit for humans (carcinogenic effect); HTP-nc = Potential toxicity comparison unit for humans (non-carcinogenic effect); SQP = Potential soil quality index

Restriction notice 1 – applies to the indicator 'Potential effect of human exposure to U235'. This impact category mainly addresses the potential effect of low dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposure, nor to the disposal of radioactive waste in underground facilities. Potential ionizing radiation from soil, radon and some building materials is also not measured by this indicator.

Caveat 2 – applies to the indicators: 'Potential for depletion of abiotic resources - non-fossil resources', 'Potential for depletion of abiotic resources - fossil fuels', 'Water depletion potential (user)', 'Potential toxicity comparison unit for ecosystems', 'Potential toxicity comparison unit for humans - carcinogenic effect', 'Potential toxicity comparison unit for humans - non-carcinogenic effect', 'Potential soil quality index'.

The results of this environmental impact indicator must be used with caution, as the uncertainties in these results are high or because there is only limited experience with the indicator.

6. LCA: Interpretation

A closer look at the results presented in Chapter 5 shows that the manufacturing phase (A1-A3) has by far the greatest impact in almost all cases. One exception is the GWP-biogenic impact indicator, which is zero over the entire life cycle of the product under consideration if biogenic methane is neglected (which is quite common). The credits caused in A1–A3 (due to the CO2 absorption in the wood fibers used and the packaging) are offset during disposal (A5 and C3). As these values exceed those of the GWP-fossil, this effect is also visible in the GWP-total, where module C3 therefore also plays a significant role.

A detailed examination of modules A1–A3 shows that the energy used in production and the production of the bico fibers are the central influencing factors for almost all core indicators in the impact assessment.

Most of the life cycle inventory indicators are also mainly influenced by Module A1–A3. Module C3 also plays a major role for non-hazardous waste and fresh water consumption.

7. Requisite evidence

7.1 Formaldehyde
The adhesive system used does not contain formaldehyde. The corresponding verification is therefore not required.

7.2 MDI
The adhesive system used does not contain MDI. The corresponding verification is therefore not required.

7.3 Check for pre-treatment of the input materials
No waste wood is used in production. The corresponding verification is therefore not required.

. **7.4 VOC emissions**
The following VOC emissions were determined by the Bremer Umweltinstitut [Bremen Environment Institute] - analysis report number: L 3905 FM dated 08/06/2021. The indication 'n.n.' stands for not detectable, the measured value is therefore below the detection limit of 1 µg/m³

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

Name	Value	Unit
TVOC (C6 - C16)	199	µg/m³
Sum SVOC (C16 - C22)	2	µg/m³
R (dimensionless)	3.058	-
VOC without NIK	n.n.	µg/m³
Carcinogenic Substances	n.n.	µg/m³

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

Name	Value	Unit
TVOC (C6 - C16)	1613	µg/m³
Sum SVOC (C16 - C22)	n.n.	µg/m³
R (dimensionless)	8.4	-
VOC without NIK	1	µg/m³
Carcinogenic Substances	n.n.	µg/m³

8. References

Standards

DIN 4108-10
DIN 4108-10:2021-11, Thermal insulation and energy economy in buildings - Part 10: Application-related requirements for thermal insulation materials.

EN 13171
DIN EN 13171:2015-04, Thermal insulation products for buildings - Factory made wood fiber (WF) products - Specification.

EN 13501-1
DIN EN 13501-1:2019-05, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

EN 13986
DIN EN 13986:2015-06, Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking.

ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14040
DIN EN ISO 14040:2021-02, Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006 + Amd 1:2020).

ISO 14044
DIN EN ISO 14044:2021-02, Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006 + Amd 1:2017 + Amd 2:2020).

EN 15804
DIN EN 15804+A2+AC:2022-03, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

CEN/TR 15941
CEN/TR 15941:2010-03: Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data.

ISO 50001
DIN EN ISO 50001:2018-12, Energy management systems - Requirements with guidance for use.

Further sources

EWC
European Waste Catalog.

ECHA Candidate List
List of substances of very high concern for authorization (published in accordance with Article 59 (10) of the REACH Regulation).

GaBi A
GaBi Professional database (2021.2), Sphera Solutions GmbH, Leinfelden-Echterdingen.

GaBi B
GaBi ext. DB XIIIb - ecoinvent integrated v3.7.1 (2021.2), Sphera Solutions GmbH, Leinfelden-Echterdingen.

GaBi C
Extension database XIV: Construction materials (2021.2), Sphera Solutions GmbH, Leinfelden-Echterdingen.

IBU 2022
General instructions for the EPD program of Institut Bauen und Umwelt e.V., version 2.1, dated 01/10/2022.

PCR Part A
Product category rules for building-related products and services - Part A: Calculation rules for the life cycle assessment and requirements for the project report according to EN 15804+A2:2019, Version 1.3, dated 28/08/2022.

PCR: Wood-based materials
PCR guidance texts for building-related products and services - Part B: Requirements for the EPD for wood-based materials, Version 2, dated 31/05/2023.

Umberto
Umberto LCA + 10.0.3, iPoint-systems GmbH, Reutlingen.

Regulation (EU) No. 305/2011 (CPR)
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance.

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Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

IBO - Österreichisches Institut für Bauen und Ökologie GmbH
Alserbachstraße 5/8
1090 Wien
Austria

+43 13192005
ibo@ibo.at
www.ibo.at

Owner of the Declaration

Holzwerk Gebr. Schneider GmbH
Kappel 28
88436 Eberhardzell
Germany

+49 7355 9320 0
info@schneider-holz.com
www.schneider-holz.com