ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Etex Building Performance International
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ETE-20230129-IBA1-EN
Issue date	31/07/2023
Valid to	30/07/2028

SUPALUX®

Etex Building Performance International

Institut Bauen und Umwelt e.V.

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ECO PLATFORM EPD VERIFIED

Promat

1. General Information

Etex Building Performance International

Programme holder

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

Declaration number

EPD-ETE-20230129-IBA1-EN

This declaration is based on the product category rules:

Calcium silicate insulating materials, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

31/07/2023

Valid to

30/07/2028

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

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

SUPALUX®

Owner of the declaration

Etex Building Performance International
Rue Marcel Demonque 500
84915 Avignon Cedex 9
France

Declared product / declared unit

Production and installation of 1 m^2 SUPALUX® with a thickness of 12 mm. The EPD includes a conversion table to obtain the results for other thicknesses of the respective product. Therefore, a linear relationship between the thickness and the mass/environmental impact of the board is assumed.

Scope:

This EPD is representative and relevant for SUPALUX® boards produced by ETEX in Guangzhou (China) and installed in Europe. The data describing the direct inputs and outputs of the foreground processes are representative for ETEX production of the year 2021 in Guangzhou, China. 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

Vito D'Incognito,
(Independent verifier)

2. Product

2.1 Product description/Product definition

SUPALUX® is an A1 Non Combustible (EN13501-1) fire-protective calcium silicate board reinforced with selected fibres and fillers. SUPALUX® is off white in colour and has a smooth finish on one face with a sanded reverse face. SUPALUX® can be left undecorated or finished with paints, wallpapers or tiles.

SUPALUX® is resistant to the effects of moisture and will not physically deteriorate when used in damp or humid conditions. Performance characteristics are not degraded by age or moisture.

SUPALUX® is also produced as bevelled edge panels for suspended ceilings using a concealed grid system
For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *ETA 07/0176_2021-12-03* SUPALUX® and the CE-marking.

For the application and use the respective national provisions apply.

2.2 Application

Promat fire protection boards:

- Internal partitions
- Shaftwalls
- Ceilings, floors and roofs
- External and internal walls
- Service enclosures
- Protected zones
- Boiler backers
- Thatched roofs

In some applications the boards are installed on a substructure. Note that the substructure is not included in the scope of the EPD.

2.3 Technical Data

Constructional data

Name	Value	Unit
Gross density Nominal dry density	975	kg/m^3
Compressive strength EN826	9.3	N/mm^2
Tensile strength - transverse EN1607	2.15	N/mm^2
Tensile strength - longitudinal EN1608	4.11	N/mm^2
Flexural strength longitudinal EN12467	7	N/mm^2
Flexural strength transverse EN12467	10	N/mm^2
Modulus of elasticity - transverse EN12467	4000	N/mm^2
Modulus of elasticity - longitudinal EN12467	4100	N/mm^2
Thermal conductivity	0.242	W/(mK)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA 07/0176_2021-12-03* SUPALUX®

2.4 Delivery status

The products have a thickness of 6, 8, 9, 10, 12, 15, 20, 25.
The length and width are:
2440 x 1220
2500 x 1200
3000 x 1200
3000 x 1250
3048 x 1220

2.5 Base materials/Ancillary materials

The product is mainly composed of Cement, Sand, Slaked lime, Calcium silicate, Water and Fibres. It is formulated without inorganic fibres and does not contain formaldehyde.

2.6 Manufacture

All the raw materials are mixed in water and combined to form a thick slurry. The slurry is formed to a board on a forming drum, cut and stacked for curing. The board is autoclaved under saturated steam pressure and dried. Edges are trimmed and the reverse surface is sanded to the desired thickness. All material which is cut off or sanded away is fully recycled within the process.

2.7 Environment and health during manufacturing

Environmental, occupational health, safety and quality management at the Guangzhou plant are in accordance with the following standards:

- *ISO 14001;2015*
- *ISO 9001;2015*
- *ISO 45001:2018*

2.8 Product processing/Installation

The fire protective board is cut and machined using conventional woodworking equipment with cement-suitable blades. Fixing the boards will require appropriate means, which will depend upon the application and bearing structure. Boards can be installed using staples, screws, anchors or glue. In the EPD steel screws have been assumed.

2.9 Packaging

The products are transported and delivered on a wooden pallet and packed with cartons, steel angles, metal straps and a plastic cover foil.

2.10 Condition of use

No maintenance is required, under normal conditions of use. SUPALUX® is resistant to the effects of moisture, will not physically deteriorate when used in damp or humid conditions and can withstand temperatures up to 80°C and frequent temperature changes.

2.11 Environment and health during use

Under normal conditions of use, SUPALUX® do not cause any adverse health effects or release of volatile organic compounds (VOCs) into indoor air. No environmental impact on water, air or soil is expected.

2.12 Reference service life

The Promat fire protective boards are rather new products on the market and there is not yet extensive evidence regarding itsreference service life. However, based on the knowledge ofproduct experts and tests on 20 year old samples it is expectedthat upon conditionthat the product is used in accordance withthe recommendedinstallation guidelines, it is feasible toassume that this productlasts for 60 years.

2.13 Extraordinary effects

Fire

Information on the fire performance according to *EN 13501:1*.

Fire protection

Name	Value
Building material class	A1
Burning droplets	/
Smoke gas development	/

Water
All ingredients are firmly bound in the matrix. The boards are insensitive to moisture and no ingredients which could be hazardous to water are washed out in the event of extraordinary effects by water.

Mechanical destruction
In order to prevent any reduction of fire performance following unforeseeable mechanical destruction, all damage of the components needs to be repaired using materials specified by the ETA 07/0176. Besides the need for repair, the destruction will not have any significant environmental impact and no risks are expected to occur in terms of human health.

2.14 Re-use phase

Several possibilities exist for the boards after the end of life of the application in which they were used. If the boards are removed non-destructively by releasing the screws, the undamaged product can be re-used in accordance with the original purpose. If not contaminated with other building construction materials, the boards also allow being recycled by the manufacturer. For this EPD, both 100 % landfill and 100 % recycling have been calculated.

2.15 Disposal

Within the production process, generated waste is reused within the process. When after end-of-life reusing or recycling the boards as described in the previous paragraph is not practical, the boards can be disposed to a landfill. The waste code in accordance with the *European List of Waste* is 10 13 11.

2.16 Further information

https://www.promat.com/en-gb/construction/products-systems/products/boards/supalux/

3. LCA: Calculation rules

3.1 Declared Unit

Production and installation of 1 m^2 of SUPALUX® with a thickness of 12 mm

Declared unit

Name	Value	Unit
Gross density	1073	kg/m^3
Declared unit	12.9	kg
Reference thickness	12	mm
Conversion factor for 6 mm thick board	0.50	/
Conversion factor for 8 mm thick board	0.67	/
Conversion factor for 9 mm thick board	0.75	/
Conversion factor for 10 mm thick board	0.83	/
Conversion factor for 15 mm thick board	1.25	/
Conversion factor for 20 mm thick board	1.67	/
Conversion factor for 25 mm thick board	2.08	/

The results for other thicknesses can be obtained by multiplying the presented results by the corresponding adjustment factor as included in the table.

3.2 System boundary

Cradle-to-grave

3.3 Estimates and assumptions

3.4 Cut-off criteria

The following processes are considered below cut-off according to the rules as per the PCR, Part A:

- Transport of packaging of raw materials
- Infrastructure and land use of the factory
- NaCl for waste water treatment used during manufacturing, because of very low amounts
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic. Heating or cooling of the plants in order to ensure a comfortable indoor climate for the personnel for example is also neglected.

3.5 Background data

Ecoinvent 3.8 and Industry 2.0

3.6 Data quality

Company-specific data concern the data about the production of SUPALUX®. All required data about the production process have been delivered to Enperas by ETEX.

The composed datasets for this project are representative and relevant for SUPALUX® produced by ETEX in Guangzhou.

3.7 Period under review

The data collected by ETEX are based on data from the year 2021.

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: China

3.9 Allocation

No co-products are produced.

No secondary raw materials are used.

At ETEX's plant in Guangzhou, different types of calcium silicate boards are produced.

- For the energy consumption, no specific data per production step or product line was available. The production energy has been allocated to the individual product using the annual production volume of the product's materials (physical relationship, kg).
- Product data were available for the raw materials and production waste, so no allocation was needed for this.
- For the packaging of the final product, the quantities of packaging materials used per pallet were weighted and recalculated per kg of product on the pallet.

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. *Ecoinvent 3.8 and Industry 2.0* are used as background database

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The product contains biogenic carbon in the form of cellulose. Also, biogenic carbon is included in the coverage carton and wooden pallets used as packaging material.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0.173	kg C
Biogenic carbon content in accompanying packaging	0.27	kg C

Transport to the building site (A4)

The transport scenario selected for this EPD is based on the average transport distances from the production plant in Guangzhou to the installation sites in Europe based on the sales in the reference year 2021.

For those who would like to calculate the transport impacts for a specific project, CO_2 emissions for truck and container ship transport are provided in the table. For calculating the impacts caused by truck transport one needs to multiply the truck CO_2 emissions by the weight of the transported product in ton and by the distance in km by truck. For ship transport, the ship's CO_2 emissions should be used in the same way. Adding up the impacts calculated for truck and ship transport results in the impacts for the specific transportation scenario considered.

Name	Value	Unit
Litres of fuel	default value Ecoinvent datarecord	l/100km
Transport distance Transoceanic ship	19000	km
Transport distance Truck 16-32 t EURO6	300	km
Transport distance Truck 16-32 t EURO5	20	km
Capacity utilisation (including empty runs)	default value Ecoinvent data record	%
Gross density of products transported	default value Ecoinvent data record	kg/m^3
Capacity utilisation volume factor	default value Ecoinvent data record	-
Eg. Transport truck CO2 emissions	0.0862	kg CO2e / tkm
Eg. Transport freight container ship	0.0093	kg CO2e / tkm

Installation into the building (A5)

The fire protective board is cut and machined using conventional woodworking equipment with cement-suitable blades. Fixing the boards will require appropriate means, which will depend upon the application and bearing structure. Boards can be installed using staples, screws, anchors or glue. In the EPD steel screws have been assumed.

In some applications the boards are installed on a substructure. Note that the substructure is not included in the scope of the EPD.

Name	Value	Unit
Auxiliary Steel screws	0.02	kg
Electricity consumption	0.015	kWh
Material loss	5	%

Use or application of the installed product (B1) see section 2.12 "Use"

Carbonation

The SUPALUX® boards are permanently installed in the building and in properly designed situations and under normal conditions of use, do not require any repair, maintenance or replacement.

The only impact during the use phase is that of carbonation, where some CO_2 is adsorbed from the atmosphere over the life of the board. Depending on the application where the boards are used, the degree of carbonation will vary.

The carbonation was calculated to be as follows for the various use scenarios and reported in the B1 module as shown below,
- B1/1 - Outdoor sheltered from rain: -1.60 kg CO_2eq / 1 m²12 mm.
- B1/2 - Indoor without or with 'open' cover such as a paint: -0.85 kg CO_2eq / 1 m²12 mm.

Name	Value	Unit

Maintenance (B2)

In properly designed situations and under normal conditions of use no maintenance is required.

Name	Value	Unit

Repair (B3)

In properly designed situations and under normal conditions of use no repair is required.

Name	Value	Unit

Replacement (B4) / Refurbishment (B5)

In properly designed situations and under normal conditions of use no replacement/refurbishment is required.

Name	Value	Unit

The RSL of SUPALUX® is estimated at 60 years under strict application of the guidelines for handling, installation and maintenance.

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	60	a
Declared product properties (at the gate) and finishes	See paragraph 2.3	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	See ETA 07/0176	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	See ETA 07/0176	-

Operational energy use (B6) and Operational water use (B7)

Not relevant

Name	Value	Unit

End of life (C1-C4)

For this EPD, both 100 % recycling and 100 % landfill scenario have been calculated. Note that during the recycling process, the fibres will be sieved out and incinerated for energy recovery, the remaining part will be recycled as a replacement for limestone fillers

Name	Value	Unit
Collected as mixed construction waste	12.9	kg
Recycling (fibres are incinerated for energy recovery. Remaining part is recycled as limestone filler replacement)	12.9	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

In module D, the benefits and loads beyond the system boundaries are quantified.

For the 100 % landfill scenario, no benefits and loads have been considered in module D, apart from some minor benefits and loads regarding the recycling and energy recovery of packaging.

For the 100 % recycling scenario, benefits from energy recovery during incineration of the fibres is included, as partly avoided impact of electricity (average EU grid mix) and partly avoided impact of the production of heat from natural gas. Also, the benefits from recycling the remaining calcium silicate board is included as an avoided impact of the production of 100 % virgin limestone.

In addition, some minor benefits and loads regarding the recycling and energy recovery of packaging are allocated to module D.

Name	Value	Unit

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5. LCA: Results

As the product contains slaked lime Ca(OH)2 and cement carbonation happens during the use phase. The carbonation has been included in module B1/1 and B1/2, respectively for outdoor and indoor use.
For the end of life both 100 % recycling and 100% landfill have been calculated, in respective modules C2/1-D/1 and C2/2-D/2.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = 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	MNR	MNR	MNR	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m^2 SUPALUX®

Parameter	Unit	A1	A2	A3	A4	A5	B1/1	B1/2	B2	B6	B7	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
GWP-total	kg CO_2 eq	3.5E+00	8.71E-01	5.27E+00	3.14E+00	1.82E+00	-1.6E+00	-8.5E-01	0	0	0	3.84E-03	5.25E-01	1.08E-01	6.67E-01	2.89E-05	9.28E-06	7.09E-01	-6.88E-01	-5.22E-01
GWP-fossil	kg CO_2 eq	4.15E+00	8.69E-01	6.17E+00	3.14E+00	9.29E-01	-1.6E+00	-8.5E-01	0	0	0	3.81E-03	5.24E-01	1.08E-01	3.61E-02	2.86E-05	9.21E-06	7.82E-02	-3.1E-01	-1.45E-01
GWP-biogenic	kg CO_2 eq	-6.52E-01	4.08E-04	-8.99E-01	8.08E-04	8.87E-01	0	0	0	0	0	2.11E-05	1.88E-04	3.85E-05	6.31E-01	1.55E-07	2.04E-08	6.31E-01	-3.77E-01	-3.77E-01
GWP-luluc	kg CO_2 eq	2.19E-03	9.79E-04	2.55E-03	2.06E-03	5.73E-04	0	0	0	0	0	9E-06	2.1E-04	4.3E-05	6.17E-05	6.62E-08	9.89E-09	5.77E-05	-5.82E-04	-4.2E-04
ODP	kg CFC11 eq	1.96E-07	1.74E-07	3E-07	6.46E-07	8.51E-08	0	0	0	0	0	1.92E-10	1.22E-07	2.49E-08	4.77E-09	1.48E-12	2.28E-12	2.89E-08	-3.58E-08	-1.66E-08
AP	mol H^+ eq	1.06E-02	6.9E-03	2.77E-02	8.1E-02	7.36E-03	0	0	0	0	0	2.16E-05	1.49E-03	3.05E-04	3.36E-04	1.64E-07	6.45E-08	6.9E-04	-1.31E-03	-6.59E-04
EP-freshwater	kg P eq	5.51E-05	7.92E-06	1.22E-04	1.38E-05	1.72E-05	0	0	0	0	0	4.07E-07	3.74E-06	7.67E-07	2.69E-06	3E-09	2.79E-10	2.4E-06	-1.59E-05	-8.9E-06
EP-marine	kg N eq	2.67E-03	2.42E-03	5.45E-03	1.98E-02	1.73E-03	0	0	0	0	0	2.76E-06	2.96E-04	6.07E-05	1.06E-04	2.19E-08	1.97E-08	2.36E-04	-3.17E-04	-1.67E-04
EP-terrestrial	mol N eq	3.07E-02	2.67E-02	5.82E-02	2.21E-01	1.91E-02	0	0	0	0	0	3.18E-05	3.3E-03	6.76E-04	1.19E-03	2.51E-07	2.17E-07	2.6E-03	-3.6E-03	-1.86E-03
POCP	kg NMVOC eq	8.46E-03	7.18E-03	1.68E-02	5.77E-02	5.2E-03	0	0	0	0	0	8.74E-06	1.27E-03	2.6E-04	3.15E-04	7.02E-08	6.64E-08	7.4E-04	-1.17E-03	-6.87E-04
ADPE	kg Sb eq	8.36E-06	1.68E-06	7.32E-06	4.51E-06	4.43E-06	0	0	0	0	0	2.06E-08	1.42E-06	2.91E-07	1.62E-07	1.62E-10	2.65E-11	1.85E-07	-1E-06	-3.98E-07
ADPF	MJ	2.11E+01	1.2E+01	6.82E+01	4.18E+01	9.76E+00	0	0	0	0	0	8.06E-02	7.95E+00	1.63E+00	6.28E-01	5.99E-04	1.97E-04	2.23E+00	-5.49E+00	-2.43E+00
WDP	m^3 world eq deprived	7.59E-01	4.99E-02	6.48E-01	8.65E-02	1.3E-01	0	0	0	0	0	9.44E-04	2.42E-02	4.96E-03	1.07E-02	7.03E-06	-1.67E-06	1.05E-02	-1.46E-01	-1.04E-01

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 m^2 SUPALUX®

Parameter	Unit	A1	A2	A3	A4	A5	B1/1	B1/2	B2	B6	B7	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PERE	MJ	5.33E+00	1.83E-01	9.11E+00	3.54E-01	3.45E+00	0	0	0	0	0	1.6E-02	1.12E-01	2.29E-02	1.01E-01	1.18E-04	8.57E-06	1.15E-01	0	0
PERM	MJ	5.97E+00	0	8.76E+00	0	-5.52E+00	0	0	0	0	0	0	0	0	-5.5E+00	0	0	0	9.18E+00	3.68E+00
PERT	MJ	1.13E+01	1.83E-01	1.79E+01	3.54E-01	-2.07E+00	0	0	0	0	0	1.6E-02	1.12E-01	2.29E-02	-5.4E+00	1.18E-04	8.57E-06	1.15E-01	9.18E+00	3.68E+00
PENRE	MJ	2.43E+01	1.23E+01	8.73E+01	4.17E+01	1.16E+01	0	0	0	0	0	9.58E-02	7.99E+00	1.64E+00	7.39E-01	7.12E-04	2.08E-04	2.29E+00	0	0
PENRM	MJ	1.4E-01	0	5.07E-01	0	-3.31E-01	0	0	0	0	0	0	0	0	0	0	0	0	2.17E-01	2.17E-01
PENRT	MJ	2.45E+01	1.23E+01	8.78E+01	4.17E+01	1.12E+01	0	0	0	0	0	9.58E-02	7.99E+00	1.64E+00	7.39E-01	7.12E-04	2.08E-04	2.29E+00	2.17E-01	2.17E-01
SM	kg	0	0	0	0	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	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FW	m^3	1.41E-02	7.96E-04	1.09E-02	1.77E-03	2.75E-03	0	0	0	0	0	6.08E-05	5.84E-04	1.2E-04	6.35E-04	4.47E-07	-2.97E-08	2.4E-03	-2.15E-02	-2.81E-03

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 m^2 SUPALUX®

Parameter	Unit	A1	A2	A3	A4	A5	B1/1	B1/2	B2	B6	B7	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
HWD	kg	1.99E-05	3.03E-05	8.13E-05	5.71E-05	1.29E-05	0	0	0	0	0	6.13E-08	2.07E-05	4.25E-06	7.34E-07	4.91E-10	3.41E-10	2.45E-06	-1.1E-05	-7.04E-06
NHWD	kg	1.36E-01	3.78E-01	4.57E-01	6.4E-01	4.52E-01	0	0	0	0	0	2.95E-04	4.16E-01	8.54E-02	9.18E-03	2.33E-06	8.01E-04	1.29E+01	-2.2E-02	-1.29E-02
RWD	kg	9.78E-05	7.74E-05	1.07E-04	2.88E-04	3.98E-05	0	0	0	0	0	5.9E-07	5.37E-05	1.1E-05	4.18E-06	4.35E-09	1.23E-09	1.53E-05	-2.18E-05	-8.1E-06
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	2.87E-03	0	9.43E-01	0	0	0	0	0	0	0	0	1.29E+01	1.9E-02	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	4.31E-03	0	2.49E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	8.63E-03	0	4.99E-01	0	0	0	0	0	0	0	0	0	0	0	0	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 m^2 SUPALUX®

Parameter	Unit	A1	A2	A3	A4	A5	B1/1	B1/2	B2	B6	B7	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PM	Disease incidence	9.94E-08	4.96E-08	3.83E-07	1.33E-07	4.81E-08	0	0	0	0	0	5.97E-11	4.21E-08	8.64E-09	2.77E-09	5.46E-13	1.79E-12	1.34E-08	-2.2E-08	-1.5E-08
IR	kBq U235 eq	7.79E-02	4.97E-02	8.4E-02	1.8E-01	3.02E-02	0	0	0	0	0	7.15E-04	3.45E-02	7.08E-03	4.78E-03	5.26E-06	9.13E-07	1.14E-02	-2.45E-02	-8.33E-03
ETP-fw	CTUe	6.23E+01	1.03E+01	1.39E+02	2.75E+01	1.71E+01	0	0	0	0	0	5.1E-02	6.24E+00	1.28E+00	1.32E+00	3.97E-04	2.97E-04	1.28E+00	-3.95E+00	-2.59E+00
HTP-c	CTUh	8.05E-10	3.9E-10	3.57E-09	1.73E-09	3.22E-09	0	0	0	0	0	1.57E-12	2.01E-10	4.11E-11	1.53E-10	2E-14	1.79E-14	3.72E-11	-4.46E-11	2.33E-11
HTP-nc	CTUh	3.44E-08	8.06E-09	5.36E-08	2.09E-08	1E-08	0	0	0	0	0	5.01E-11	6.3E-09	1.29E-09	1.24E-09	3.91E-13	1.79E-13	7.53E-10	-1.32E-08	-1.19E-08
SQP	SQP	7.25E+01	8.14E+00	1.11E+02	1.17E+01	1.16E+01	0	0	0	0	0	1.46E-02	5.54E+00	1.14E+00	3.12E-01	3.92E-04	3.06E-04	4.21E+00	-4.2E+01	-4.09E+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

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

For SUPALUX® fire protective boards produced in China, the raw materials used in the formulation mix together with the manufacturing and the transport to installation have the highest contribution on all impact categories. Cement and hydrated lime are the most important raw materials in terms of environmental impact. With respect to manufacturing, it is the energy consumption from electricity and steam that contributes the most. The transport to installation is significant as the transport from China to Europe has been taken into account.

7. Requisite evidence

Not relevant for this product

8. References

Standards

EN 826
Determination of Compression Behavior of Thermal Insulation

Products

EN 1607
Thermal insulation products for building applications - determination of tensile strength perpendicular to faces

EN 1608
Thermal insulating products for building applications - Determination of tensile strength parallel to faces

EN 12467 Fibre-cement flat sheets - Product specification and test methods

EN15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN 16757
EN 16757:2017, Sustainability of construction works– Environmental product declarations – Product Category Rules for concrete and concrete elements

ISO 9001
ISO 9001:2015:Quality management systems — Requirements

ISO 14001
ISO 14001:2015: Environmental management systems — Requirements with guidance for use

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

ISO 14040
ISO 14040:2006: Environmental management – Life cycle assessment – Principles and framework.

ISO 14044
ISO 14044:2006: Environmental management – Life cycle assessment – Requirements and guidelines.

ISO 45001
ISO 45001:2018: Occupational health and safety management systems Requirements with guidance for use

PCR Part A
Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, Institut Bauen und Umwelt e.V., www.bauumwelt.com.

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Institut Bauen und Umwelt e.V, Berlin (pub.): PCR Guidance-Texts for Building-Related Products and Services From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) : Requirements on the EPD for Calcium silicate insulating materials

Further references

CPR
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IBU 2021. Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com

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