ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	**Etex Building Performance International**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PMT-20210155-IBC2-EN
Issue date	30/11/2021
Valid to	05/09/2026

PROMATECT®-100 / PROMATECT®-200 / PROMATECT®-250 / PROMAXON®-Typ A
Mineral bound light weight fire protective boards

Promat

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD EN 15804 VERIFIED

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1. General Information

Etex Building Performance NV

PROMATECT®-100/ PROMATECT®-200/ PROMATECT®-250/ PROMAXON®-Typ A

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
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Owner of the declaration
Etex Building Performance International
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F-84915 Avignon
France

Declaration number
EPD-PMT-20210155-IBC2-EN

Declared product / declared unit
The functional unit is 1 m² of PROMATECT®-100/200/250 and PROMAXON®-TYP A with a thickness of 15 mm.

This declaration is based on the product category rules:
Calcium silicate insulating materials, 11.2017
(PCR checked and approved by the SVR)

Scope:
The life cycle assessment is based on production data of PROMATECT®-100, PROMATECT®-200, PROMATECT®-250 and PROMAXON®- Typ A of the year 2019 at the production site Tisselt, Belgium.

Issue date
30/11/2021

Valid to
05/09/2026

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 14025:2010*
☐ 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.))

Vito D'Incognito
(Independent verifier)

2. Product

2.1 Product description/Product definition

PROMATECT®-100/200/250 and PROMAXON®-Typ A are fire protective calcium silicate boards, mineral bound with mineral fillers.
All boards are manufactured in the same plant, using the same production technology and similar raw materials though in different quantities.
The functional unit refers to a weighted average product based on the ratio of tons produced of all products in the reference year 2019.

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 products need a declaration of performance taking into consideration

- *ETA 06/0219*_2018-06-25_PROMATECT®-100;
- *ETA 07/0297*_2018-03-25_PROMATECT®-200;
- *ETA 08/0161*_2018-03-25_PROMATECT®-250;
- *ETA 06/0215*_2015-09-18_PROMAXON®-Typ A

and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

All boards are used in interior building applications where normal to high levels of fire resistance are required.
The boards are intended for the manufacture or cladding of building components, for filling aluminium/steel profiles and for fire protection of ducts.

2.3 Technical Data

Constructional data

Name	Value	Unit
Gross density 23°C, 50% RH; according to ETA 06/0219, ETA 06/0215, ETA 07/0297 and ETA 08/0161	680 - 970	kg/m³
Compressive strength according to EN 826	6.6	N/mm²
Tensile strength (perpendicular) according to EN 1607	0.043	N/mm²
Flexural strength according to EN 12467	>3	N/mm²
Thermal conductivity according to EN 12667	0.27	W/(mK)
Water vapour diffusion resistance factor according to EN 12572	3	-
Tensile strength (parallel) according to EN 1608	1.21	N/mm^2

Values are guidance values and do not reflect a statistical evaluation or guaranteed value.

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA 06/0219; ETA 07/0297; ETA 08/0161* and *ETA 06/0215*.

2.4 Delivery status

Fire protective calcium silicate boards are 1200 x 2500 mm and are delivered in various thicknesses :

- PROMATECT®-100 and PROMAXON®- Typ A : 8,10,12,15,18,20,25 mm
- PROMATECT®-200 and PROMATECT®-250: 12,15,18,20,25,30 mm

2.5 Base materials/Ancillary materials

Main raw materials used (in weight percentages):

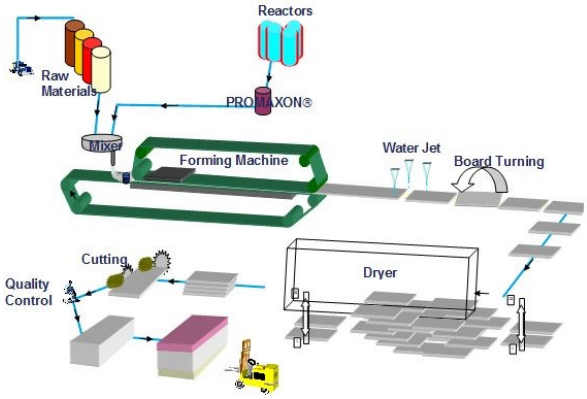
- sand: 5-20%
- lime: 2-15%
- calcium silicate: 2-15%
- gypsum: >50%
- fibres: <3%

Reaction is performed in an aqueous suspension.

This article contains substances listed in the *candidate list* (date: 19.01.2021) exceeding 0.1 percentage by mass: no.
This article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: 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 raw materials are mixed in water and blended in a reactor to form calcium silicate. This is combined in a mixer with the other raw materials to form a thick slurry. The slurry is formed to a board. Boards are dried and edges are trimmed. All material which is cut off is fully recycled within the production plant.



The quality management system of the company and the production facility are certified according to *ISO 9001*.

2.7 Environment and health during manufacturing

Promat commits to a clean, healthy and safe working environment for every person working in and for the company.
The company and the manufacturing site have an environment, health and safety management system which is *ISO 14001* and *ISO 45001* certified. The manufacturing plant adheres to the Belgium environmental and health and safety regulations.

2.8 Product processing/Installation

The fire protective board is cut and machined using conventional woodworking equipment.
Fixing the boards will require appropriate means, which will depend upon the application and bearing structure. Boards can be installed using screws or glues.
Industrial and environmental protection are assured through training and coaching staff on safety and environmental impacts. Dust levels are kept low by performing dust extraction. Noise is reduced by noise insulation on the machines and ear protection is provided for persons entering the production area. Regular measurements on noise and dust are performed and show conformity to the permitted levels.
All national, local and other applicable safety regulations are complied with.

2.9 Packaging

All fire protection boards are packed onto wooden pallets, wrapped with steel strapping tape and strengthened with cardboard corners.

2.10 Condition of use

After installation, the boards are 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. Boards do not encourage mould growth and are resistant to attacks by insects or vermin.

2.11 Environment and health during use
When the product is used as designed, the current state of knowledge indicates that there is no risk involved for the environment or health.

2.12 Reference service life
The service life according to the "Bundesinstitut für Bau-, Stadt- und Raumforschung" (*BBSR*) table is indicated to be ≥ 50 years.
The reference service life (RSL) is therefore estimated to be 50 years. This RSL corresponds to the period after which a building renovation is usually needed, independently of the actual lifetime of the product (which can be longer than 50 years).

2.13 Extraordinary effects

Fire
The boards have a reaction to fire classification A1 or non-combustible according to *EN13501-1.*

Fire protection

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

Water
The boards will not break when exposed to excessive amounts of water, e.g. in case of flooding. Since the raw materials used are of mineral origin, environmental or health risks are avoided. However, the biological and chemical oxygen demand could increase if some biodegradable components are dissolved in the 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 of the specific products. Besides the need for repair, the destruction will not have any significant environmental impact.

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 material, the boards also allow being recycled by the manufacturer.
Furthermore, the products referred to could be used as filler and bulk material in civil engineering.
For this EPD, a conservative worst-case scenario was chosen at the end of life stage and the product was sent for 100% to landfill.

2.15 Disposal
Within the production process, generated waste is re-used within the process.
When after end-of-life re-using or recycling the boards as described in the previous paragraph is not practical, the boards can be disposed to landfill without pre-treatment thanks to the largely mineral ingredients resulting in an inert matrix, The waste code in accordance with the *European List of Waste* is 170904.

2.16 Further information
Further information is available on the following web site :
https://www.promat.com

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit is 1 m² of PROMATECT®-100/200/250 and PROMAXON®-Typ A with a thickness of 15 mm.
The results for other thicknesses can be obtained by multiplying the presented results by the corresponding adjustment factor as included in the table.
The unit refers to a weighted average product based on the ratio of tons produced of all products in the reference year 2019.

Declared unit

Name	Value	Unit
Gross density	854	kg/m^3
Grammage	12.8	kg/m^2
Declared unit	1.00	m²
Conversion factor to 1 kg (divide results by this factor to obtain the results for 1 kg)	12.8	-
Adjustment factor to 1 ton (multiply results by this factor to obtain the results for 1 ton)	78.13	-
Adjustment factor to 1m² 8 mm (multiply results by this factor to obtain the results for 1m² 8 mm)	0.53	-
Adjustment factor to 1m² 10 mm (multiply results by this factor to obtain the results for 1m² 10 mm)	0.67	-
Adjustment factor to 1m² 12 mm (multiply results by this factor to obtain the results for 1m² 12 mm)	0.80	-
Adjustment factor to 1m² 18 mm (multiply results by this factor to obtain the results for 1m² 18 mm)	1.20	-
Adjustment factor to 1m² 20 mm (multiply results by this factor to obtain the results for 1m² 20 mm)	1.33	-
Adjustment factor to 1m² 25 mm (multiply results by this factor to obtain the results for 1m² 25 mm)	1.67	-
Adjustment factor to 1m² 30 mm (multiply results by this factor to obtain the results for 1m² 30 mm))	2.00	-

All boards declared in this EPD are produced at the Etex Building Performance production site in Tisselt using the same production technology and similar raw materials though in different quantities. The calculation of the weighted average recipe and grammage is based on the ratio of tons produced of PROMATECT®-100/-200/-250 and PROMAXON®-Typ A in 2019.

3.2 System boundary

Type of the EPD: cradle to grave.
The following life cycle stages and modules are included:

Production stage (A1-A3):

- pre-chains of the raw materials and their transportation to the manufacturing site
- energy consumption during production
- recycling and disposal of production wastes
- production of packaging

Construction stage (A4-A5):

- transportation of product to the construction site
- disposal of installation wastes
- incineration of packaging materials (potential benefits from energy substitution within the incineration process are declared in module D)

Use stage (B1-B7):

- efforts for the use of the product, maintenance and operational efforts
- modules B3, B4, B5 are declared as MNR (module not relevant) according to the IBU requirement. These modules are defined on building level in general

End-of-life stage (C1-C4):

- transport to disposal of the material
- landfill end-of-life scenario was considered

Loads and benefits beyond system boundary (D):

- loads and benefits from recycling of production waste and incineration of packaging waste

3.3 Estimates and assumptions

Most of the input and output influences of the Life Cycle Inventory Analysis could be depicted using corresponding data from the *GaBi* database.
Assumptions and approximations were applied in case of a lack of representative data.
There were no data records in the *GaBi* database available for the wooden pallets, they were approximated using the "Solid construction timber" dataset.
The waste water treatment of process water was approximated by datasets of municipal waste water treatment, which will result in an overestimation of impacts.
All assumptions and approximations were documented precisely.

3.4 Cut-off criteria

In the assessment, all utilised raw material, thermal energy and electric power were considered using *GaBi* datasets. Only the transport of packaging, production waste to recycling/disposal and of installation loss waste to recycling was cut-off in this study and one polymeric additive having no environmental relevance and used at less than 0.1%. Production of capital equipment, facilities and infrastructure required for the manufacture are outside the scope of the study and thus were not included.

3.5 Background data

Background data were sourced from *GaBi* 10 database version 2021.

3.6 Data quality

This study is mainly based on primary data collected directly from the manufacturing site and therefore data quality can be assumed to be very good.
The last update of the *GaBi* database used for the background data was February 2021.

3.7 Period under review

Data for the entire production period of 2019 were collected and used for this EPD.

3.8 Allocation

Allocation in background data
Specific information on allocation within the background data is given in the *GaBi documentation.*
Allocation in foreground data
The production process does not deliver any co-products. In modules A1 to A3, specific raw material and transport data were available, energy, waste and water could not be directly allocated to the product and were allocated via the production volume of the specific products.
Allocation for waste materials
The environmental burden of the incineration of packaging in the construction process stage is assigned to the system (A5); resulting credits for thermal and electrical energy are declared in module D.

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.

GaBi database version 2021.1 serves as background database for the calculation of the life cycle assessment.

4. LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon
The biogenic carbon content quantifies the amount of biogenic carbon in the construction product leaving the factory gate. It is declared separately for the product and for the accompanying packaging.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	0.014	kg C
Biogenic Carbon Content in accompanying packaging	0.27	kg C

Transport to the building site (A4)

For the transport from the factory gate to the building site, an average distance of 100km was assumed. This distance can be assumed to be representative of deliveries within Belgium.

Name	Value	Unit
Litres of fuel	0.027	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%
Gross density of products transported	854	kg/m^3

Installation into the building (A5)

Only waste treatment of installation loss and packaging is considered in this module.

Installation into the building (A5)

Name	Value	Unit
Material loss	0.64	kg
VOC in the air	0	kg

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

No efforts and releases of substances occur during the normal (i.e. anticipated) use phase.

Name	Value	Unit

Maintenance (B2)

No efforts occur during maintenance.

Name	Value	Unit
Maintenance cycle	0	Number/ RSL
Water consumption	0	m^3
Auxiliary	0	kg
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg

Repair (B3)

Name	Value	Unit
Information on the repair process	-	-
Information on the inspection process	-	-
Repair cycle	-	Number/ RSL
Water consumption	-	m^3
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg

Replacement (B4) / Refurbishment (B5)

Name	Value	Unit
Replacement cycle	-	Number/ RSL
Electricity consumption	-	kWh
Litres of fuel	-	l/100km
Replacement of worn parts	-	kg

Reference service life

Name	Value	Unit
Reference service life	-	a
Life Span (according to BBSR)	>=50	a
Life Span according to the manufacturer	-	a
Declared product properties (at the gate) and finishes	-	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	-	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	-	-
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	-	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	-	-
Usage conditions, e.g. frequency of use, mechanical exposure	-	-
Maintenance e.g. required frequency, type and quality and replacement of components	-	-

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

No efforts occur in modules B6 and B7.

Name	Value	Unit
Water consumption	0	m^3
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Equipment output	0	kW

End-of-life (C1-C4)

A conservative approach was used in this study. Although after end-of-life, scenarios where the boards are re-used or recycled are realistic, a scenario with 100% landfill was used.

Name	Value	Unit
Landfilling	12.8	kg

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

Although re-use and recycling of the boards at the end of life is possible, this is not yet a widely established practice. Therefore, no possible benefits of recycling or re-use of the boards were taken into account in this study. In module D, only the benefits from recycling of production waste and incineration of waste packaging were taken into account.

Name	Value	Unit
Exported electrical energy	1.65	MJ
Exported thermal energy	2.97	MJ

5. LCA: Results

The following tables depict the results of the indicators for the Life Cycle Assessment, use of resources and waste with reference to 1 m² of PROMATECT®-100, PROMATECT®-200, PROMATECT®-250 and PROMAXON®-Typ A with a thickness of 15 mm.

Disclaimer:

EP-freshwater: This indicator has been calculated as “kg P eq” as required in the characterization model *(EUTREND model*, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

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 m² 15mm PROMATECT®-100/200/250 and PROMAXON®-Typ A

Core Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1.46E+0	1.36E-1	3.94E+0	8.95E-2	1.43E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.53E-2	0.00E+0	1.89E-1	-4.07E-1
GWP-fossil	[kg CO_2-Eq.]	1.51E+0	1.35E-1	4.90E+0	8.88E-2	3.62E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.47E-2	0.00E+0	1.94E-1	-4.04E-1
GWP-biogenic	[kg CO_2-Eq.]	-4.82E-2	2.13E-5	-9.63E-1	-1.06E-4	1.07E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.01E-4	0.00E+0	-5.63E-3	-1.89E-3
GWP-luluc	[kg CO_2-Eq.]	1.19E-3	5.35E-4	1.02E-3	7.25E-4	2.14E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.92E-4	0.00E+0	5.69E-4	-2.67E-4
ODP	[kg CFC11-Eq.]	7.59E-10	2.01E-17	8.76E-13	1.75E-17	3.80E-11	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.67E-17	0.00E+0	7.52E-16	-4.31E-15
AP	[mol H^+-Eq.]	4.86E-3	3.11E-3	4.15E-3	9.44E-5	8.57E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.00E-5	0.00E+0	1.38E-3	-5.58E-4
EP-freshwater	[kg PO_4-Eq.]	1.14E-5	2.10E-7	1.65E-5	2.64E-7	1.46E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.51E-7	0.00E+0	3.25E-7	-5.05E-7
EP-marine	[kg N-Eq.]	1.21E-3	9.46E-4	1.82E-3	3.01E-5	2.77E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.87E-5	0.00E+0	3.58E-4	-1.54E-4
EP-terrestrial	[mol N-Eq.]	9.94E-3	1.04E-2	1.94E-2	3.58E-4	3.04E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.41E-4	0.00E+0	3.93E-3	-1.66E-3
POCP	[kg NMVOC-Eq.]	2.93E-3	2.67E-3	5.30E-3	8.19E-5	7.64E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.81E-5	0.00E+0	1.09E-3	-4.39E-4
ADPE	[kg Sb-Eq.]	5.50E-7	7.89E-9	6.22E-7	7.87E-9	6.27E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.50E-9	0.00E+0	1.83E-8	-6.34E-8
ADPF	[MJ]	1.75E+1	1.72E+0	8.06E+1	1.18E+0	5.44E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	0.00E+0	2.57E+0	-6.81E+0
WDP	[m^3 world-Eq deprived]	1.21E-1	7.13E-4	8.26E-1	8.24E-4	1.68E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.85E-4	0.00E+0	2.08E-2	-2.94E-2

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; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² 15mm PROMATECT®-100/200/250 and PROMAXON®-Typ A

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	4.56E+0	5.30E-2	7.45E+0	6.80E-2	1.17E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.49E-2	0.00E+0	7.82E-1	-1.49E+0
PERM	[MJ]	5.89E-1	0.00E+0	1.05E+1	0.00E+0	-1.04E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.36E-1	0.00E+0
PERT	[MJ]	5.15E+0	5.30E-2	1.79E+1	6.80E-2	1.23E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.49E-2	0.00E+0	3.46E-1	-1.49E+0
PENRE	[MJ]	1.75E+1	1.72E+0	8.06E+1	1.19E+0	5.47E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	0.00E+0	2.57E+0	-6.81E+0
PENRM	[MJ]	0.00E+0	0.00E+0	3.43E-2	0.00E+0	-3.43E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.75E+1	1.72E+0	8.06E+1	1.19E+0	5.44E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	0.00E+0	2.57E+0	-6.81E+0
SM	[kg]	1.38E+1	0.00E+0	0.00E+0	0.00E+0	6.92E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	3.87E-3	6.21E-5	2.26E-2	7.79E-5	4.18E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.43E-5	0.00E+0	6.34E-4	-1.49E-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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² 15mm PROMATECT®-100/200/250 and PROMAXON®-Typ A

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	9.12E-5	5.26E-11	3.11E-8	6.25E-11	4.56E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.96E-11	0.00E+0	2.73E-10	-1.50E-9
NHWD	[kg]	9.56E-2	2.22E-4	7.13E-1	1.86E-4	6.93E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.77E-4	0.00E+0	1.28E+1	-3.38E-3
RWD	[kg]	5.05E-4	2.53E-6	5.61E-4	2.15E-6	6.90E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.05E-6	0.00E+0	2.69E-5	-4.83E-4
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	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	8.94E-1	0.00E+0	5.51E-2	0.00E+0	0.00E+0	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	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	1.72E-4	0.00E+0	1.65E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	3.96E-4	0.00E+0	2.97E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	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; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m² 15mm PROMATECT®-100/200/250 and PROMAXON®-Typ A

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PM	[Disease Incidence]	5.82E-8	6.05E-8	1.68E-7	6.47E-10	1.61E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.17E-10	0.00E+0	1.71E-8	-5.00E-9
IRP	[kBq U235-Eq.]	5.30E-2	3.66E-4	6.95E-2	3.15E-4	8.54E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.00E-4	0.00E+0	2.83E-3	-7.93E-2
ETP-fw	[CTUe]	5.20E+0	1.26E+0	5.25E+0	8.77E-1	8.15E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.36E-1	0.00E+0	1.46E+0	-1.43E+0
HTP-c	[CTUh]	7.28E-10	2.45E-11	7.88E-10	1.77E-11	9.61E-11	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.69E-11	0.00E+0	2.16E-10	-8.99E-11
HTP-nc	[CTUh]	2.40E-8	1.39E-9	1.46E-8	9.21E-10	3.51E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.78E-10	0.00E+0	2.38E-8	-2.60E-9
SQP	[-]	2.50E+1	3.01E-1	2.01E+2	4.06E-1	1.15E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.87E-1	0.00E+0	5.19E-1	-1.02E+0

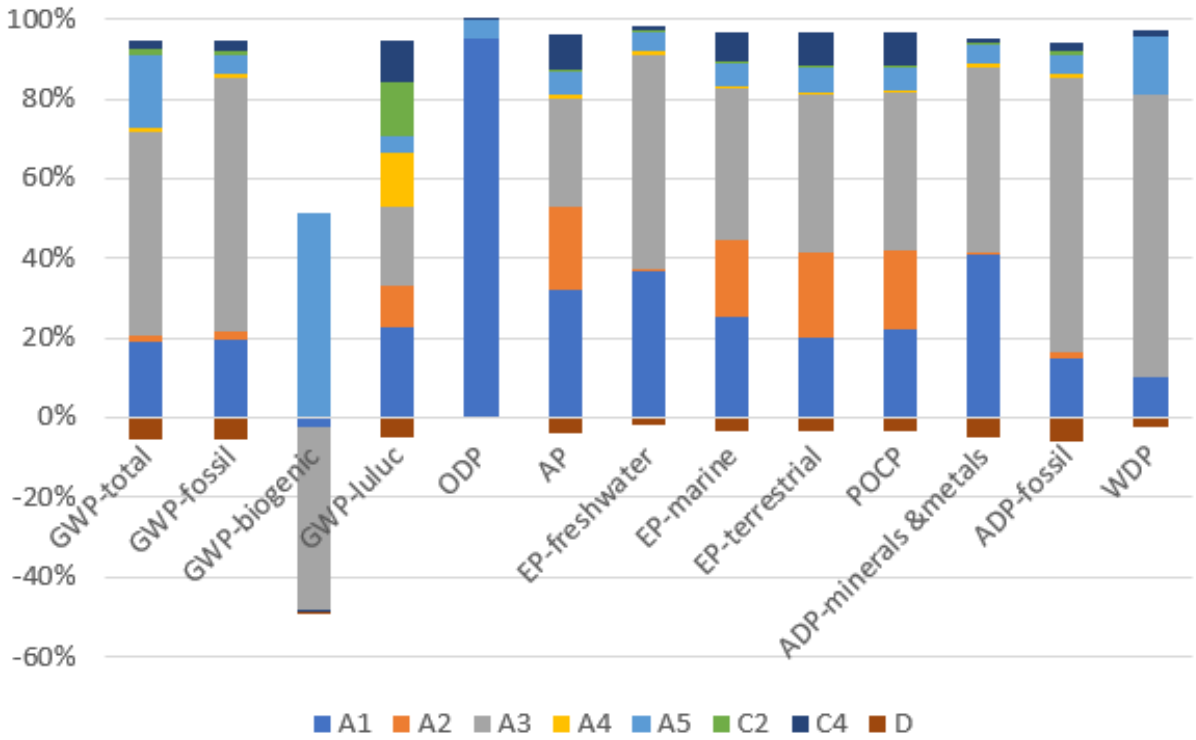
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from 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 or as there is limited experienced with the indicator.

6. LCA: Interpretation

The following graph provides information on the relative contributions of the declared modules to various environmental impact categories.



It can be observed that for nearly all the impact categories, the manufacturing (A3), mainly determined by the energy required for the production process, has a very important (25-50%) or the most important impact (>50%). Only in the impact category GWP-luluc, various phases contribute more equally and in ODP, the raw materials have the most important impact.
The pre-chains of the raw materials (A1) contribute less than 40% in most of the impact categories and are mainly linked to impacts caused by the lime and the fibres.
Transport of the raw materials to site (A2), has in some of the impact categories such as GWP luluc, AP, EP-marine/-terrestrial and POCP a fairly important impact (10-25%).
The transport of the product to the building site (A4), the installation loss and waste treatment of the packaging (A5) and the end-of-life modules (C2/C4) only contribute to a minor extent.
Since a weighted average product was declared, the variance of the LCIA results of this average product was compared to the impacts of the single product. It could be concluded that differences were relatively low and that the average environmental impacts show a high representativity. For example for GWP-total, the difference between the various products was less than 0.4kg CO2-eq and the difference percentage between the impact of the specific product and of the declared average is less than 4%.

7. Requisite evidence

7.1 Radioactivity measurements

Radioactivity measurements confirm that no other gamma emitters than those originating from natural radiation sources are contained. The measured radioactivity levels do not exceed the activity concentration indices as specified by Article 3 (Radiation Protection 112) for building products following the Council
Directive 96/29. Activity concentration index ≤ 2.
Date: 2 December 2011
Measuring agency: *SCK.CEN Laboratory* for Gammaspectrometry, Mol, Belgium
Protocol: Activity concentration index (ACI)

7.2 VOC emissions

VOC measurements confirmed compliance with the requirements of DIBt *DIBt-communication 4/2004* in combination with the NIK values from *AgBB* (March 2008) for use in the indoor environment. (values in the table below having "<" means that the measurements were below the quantification limit)

Name	Value	Unit
Total VOC after 28d (C6-C16) Limit : 1000	<5	µg/m³
R after 28d (c/NIK)	<1	-
Sum of VVOC after 28d (<n-C6)	<5	µg/m³
Sum of SVOC after 28d (>n-C16) Limit : 100	<5	µg/m³
Sum of cancerogenic Limit : 1	<1	µg/m³
Formaldehyd Limit : 120	<3	µg/m³
Acetaldehyd	<3	µg/m³

Date: 29 November 2011
Measuring agency: *Eurofins Product Testing A/S*, Galten, Denmark
Report number: G10210A

8. References

Standards

EN 826
EN 826: 1996: Thermal insulating products for building applications - Determination of compression behaviour

EN 1607
EN 1607: 1996: Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces

EN 1608
EN 1608: 1996: Thermal insulating products for building applications - Determination of tensile strength parallel to faces

EN 12467
EN 12467: 2004: Fibre-cement flat sheets - Product specification and test methods

EN 12667
EN 12667: 2001: Thermal performance of building materials and products- Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance.

EN 13501-1
EN 13501-1:2018, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

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

ISO 9001
UNI EN ISO 9001:2015 September 2015, Quality management systems - Requirements

ISO 12572
DIN EN ISO 12572:2001, Hygrothermal performance of building materials and products - Determination of water vapour transmission properties - Cup method

ISO 14001
UNI EN ISO 14001:2015, Environmental management systems - Requirements with guidance for use.

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

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

Further References

AgBB
Ausschuss zur gesundheitlichen Bewertung von Bauprodukten, AgBB (eng. German Committee for health-related evaluation of building products.

BBSR
BBSR table "Service lives of components for life cycle assessment according to Bewertungssystem Nachhaltiges Bauen (BNB)" Sustainable Building Information Portal by the Federal Ministry of Transport, Building and Urban Affairs (Bundesinstitut für Bau-,Stadt-und Raumforschung, BBSR). (https://www.nachhaltigesbauen.de/baustoff-undgebaeudedaten/nutzungsdauern-von-bauteilen.html)

Candidate list
Candidate List of substances of very high concern for Authorisation, published on ECHA website, latest version 19.01.2021. (https://echa.europa.eu/candidate-list-table).

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

DIBt-communication 4/2004
DIBt (Deutsches Institut für Bautechnik) approval guidelines for the health-related evaluation of indoor construction products-2004.

Directive 96/29
Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.

European List of Waste
2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council. (http://data.europa.eu/eli/dec/2014/955/oj)

ETA 06/0219
European technical approval of PROMATECT®-100 fire protective board.

ETA 07/0297
European technical approval of PROMATECT®-200 fire protective board.

ETA 08/0161
European technical approval of PROMATECT®-250 fire protective board.

ETA 06/0215
European technical approval of PROMAXON®-Tyo A fire protective board

Eurofins Product Testing A/S
Eurofins Product Testing A/S, Smedeskovvej 38, 8464 Galten, Denmark. Report number: G10210A; 2011.

GaBi
GaBi Software System and Database for Life Cycle Engineering, 1992-2021, Sphera Solutions GmbH,

Leinfelden-Echterdingen, with acknowledgement of LBP University of Stuttgart, program version GaBi 10; database version 2021.1.

GaBi documentation
GaBi dataset documentation for the software system and databases, LBP, University of Stuttgart and Sphera Solutions GmbH, Leinfelden-Echterdingen, 2021.
(http://www.gabi-software.com/support/gabi/gabi-database-2021-lci-documentation/)

IBU 2016
Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V. Version 1.1, Berlin: Institut Bauen und Umwelt e.V., 2016.
(http://www.ibu-epd)

Ordinance on Biocide Products
Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

PCR Part A
PCR Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report according to EN 15 804+A2:2019, Version 1.0, Institut Bauen und Umwelt e.V., 2020.

PCR Part B
Product Category Rules for Building Products, Part B : Requirements on the EPD for Calcium silicate insulating materials, version 1.6, 2017 www.bau-umwelt.de

REACH Regulation
Regulation (EU) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission
Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

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