ENVIRONMENTAL PRODUCT DECLARATION

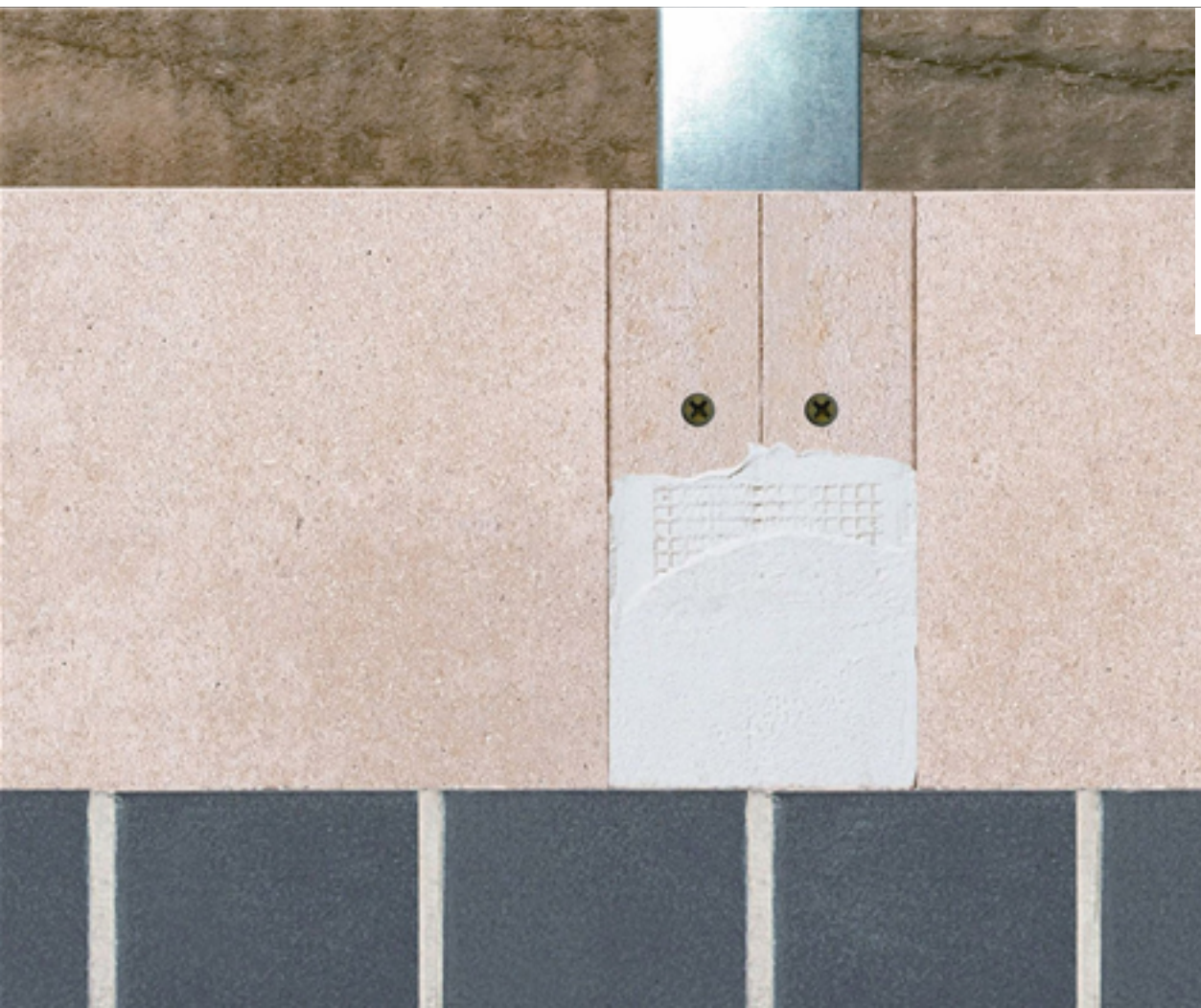
as per /ISO 14025/ and /EN 15804/

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-ETX-20190100-IBA1-EN
Issue date	08/01/2020
Valid to	07/01/2025

HYDROPANEL
Fibre cement drywall panels
Etex Building Performance International

Institut Bauen und Umwelt e.V.

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



1. General Information

Etex Building Performance International	Hydropanel Drywall Panel
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** Etex Building Performance International 500 rue Marcel Demonque 84915 Avignon Cedex 9 FRANCE
Declaration number EPD-ETX-20190100-IBA1-EN	**Declared product / declared unit** 1m² Hydropanel
This declaration is based on the product category rules: Fibre cement / Fibre concrete, 07.2014 (PCR checked and approved by the SVR)	**Scope:** The Environmental Product Declaration includes the environmental parameters for the Hydropanel drywall panels produced by Etex Building performance International. The result of the life cycle assessment provided in this EPD is based on a thickness of 9mm. This document refers to the structural panels manufactured in the Kapelle-op-den-Bos plant (Belgium). The production data used refers to the production year 2016. Based on plausible, transparent and comprehensible basic data, the Life Cycle Assessment fully represents the Etex products in question. In an annex to this EPD the LCA results for additional thicknesses (6 mm and 12 mm) are declared.
Issue date 08/01/2020	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.
Valid to 07/01/2025	**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 (President of Institut Bauen und Umwelt e.V.)	Dipl. Natw. ETH Sascha Iqbal (Independent verifier appointed by SVR)
Dr. Alexander Röder (Head of Board IBU)	

2. Product

2.1 Product description / Product definition

This Environmental Product Declaration refers to large-format structural panels comprising cellulose-reinforced fibre-cement panels. The products under review involve smooth panels made from steam-hardened fibre cement.

For the placing on the market of the product in the European Union / European Free Trade Association (EFTA) (with the exception of Switzerland) the /Construction Products Regulation/ applies. The product needs a declaration of performance taking into consideration /EN 12467/: Fibre-cement flat sheets - Product specification and test methods.

CE Declaration of Conformity in accordance with the specifications outlined in Annex ZA to /EN 12467/. General technical approval no. /Z-31.4-160/ of the "Deutsches Institut für Bautechnik" (DIBt).

External monitoring of the products with general technical approval by the Material Testing Institute of the state of Brandenburg/Berlin and the German Federal Institute for Materials Research and Testing (/BAM/).

For the application and the use, the respective national provisions apply.

2.2 Application

Hydropanel is a building board for interior areas exposed to high levels of humidity. It serves as a backer board for tiles and moisture-resistant top coat systems.

2.3 Technical Data

Sound insulation:

A sound insulation value of Rw = 54 dB is achieved in a reinforced steel partition wall system with metal profiles 50 mm in depth, cladding on both sides with 2 x 12 mm Hydropanel and the reinforced steel partition wall lined with 40 mm mineral wool infill.
Standard-related tests for CE marking via type testing in accordance with /EN 12467/.

Constructional data

Name	Value	Unit
Gross density dry, mean, +/- 10%	1180	kg/m^3
Compressive strength	38	N/mm^2
Modulus of elasticity perpendicular	>7.5	N/mm^2
Modulus of elasticity parallel	>8.5	N/mm²
Flexural strength perpendicular	>10.4	N/mm^2
Flexural strength parallel	>16.9	N/mm²
Tensile strength	6.3	N/mm^2
Water vapour diffusion resistance factor	84 (wet) - 143 (dry)	-
Moisture content at 23 °C, 80% humidity	6	M.-%
Coefficient of thermal expansion	<6.5	$10^{-6}K^{-1}$
Swelling (air-dry to water-saturated)	7	mm/m
Chemical resistance	similar to concrete C35/C45	-
Ageing resistance	similar to concrete C35/C45	-
Permanent temperature resistance	up to 100	°C
Thermal conductivity	0.19	W/(mK)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to /EN 12467/.

2.4 Delivery status

The Hydropanel is delivered with a maximum size of 3.100 mm x 1.500 mm in three strenghts of 6 mm, 9 mm and 12 mm and with a smooth surface.

2.5 Base materials / Ancillary materials

Base materials in % mass (dry mass)

- 25-45% Portland cement to /EN 197-1/, (CEM I 32.5 R and 42.5 R) (binding agent)
- 25-45% Quartz sand, mineral aggregates
- 1-15% Wollastonite
- 1-10% Cellulose fibres
- 1-10% Mica
- 1-10% Aluminium hydroxide

and water for mixing the cement: 0.24 m³/t fibre cement.
Cellulose-reinforced fibre cement products were introduced in 1980s as a safe replacement for the widely used asbestos cement products manufactured before that time.
Information that product does not contain substances listed in the Candidate List of substances of very high concern (/REACH Regulation/) exceeding 0.1%:
This product contains substances listed in the candidate list (date: 15.01.2019) exceeding 0.1 % by mass: **no**

This product contains other carcinogenic, mutagenic and toxic for reproduction (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 % 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

2.6 Manufacture

Large-format panels made of fibre cement are manufactured mainly in accordance with an automated winding process. The raw materials are treated with water to form a homogeneous mixture. Rotating screen cylinders are immersed in this fibre cement pulp which drains the mixture outwards.
The screen surface is coated with a thin fibre cement film which is conveyed onto an infinite transport belt from where it reaches a format roller to which an increasingly thick layer of fibre cement is applied. Once the requisite material thickness has been achieved, the still moist and malleable fibre cement layer (fibre cement fleece) is unravelled and detached from the format roller.
The fibre cement fleece is cut to length and any leftovers are returned to the production process with the result that no waste is incurred. The panels are then set aside for binding before stacking on pallets and steam-hardened in an autoclave for approx. 2 hours. The setting time lasts approx. 3 days.

Quality Management
The production facilities are TÜV-certified in accordance with /ISO 9001/.

2.7 Environment and health during manufacturing

During the entire manufacturing process, there are no other health protection measures extending beyond the legally specified industrial protection measures for commercial enterprises.

- Air: Any dust incurred is collected in filter systems and partially re-used. Emissions are significantly lower than the limit values specified by the TA Air.
- Water/Soil: Water incurred during manufacturing and plant cleaning is treated mechanically in waste water treatment systems on the plant site and re-used in the production process.
- Noise: The noise emissions into the environment by production equipment fall short of the permissible limit values.

The production facilities are certified in accordance with /ISO 14001/ and /OHSAS 18001/.

2.8 Product processing/Installation

Special low-dust equipment such as slow-running, carbide-tipped splitting saws or cutting burs are available for processing. Drill holes can be made using standard high-speed steel twist (HSS) drills. Additional products required for installing the products under review include: wood or metal substructures including the requisite anchoring and joining components as well as securing parts (screws, nails, staples). When

selecting any requisite constructive products, please ensure that they do not have a negative influence on the designated function of the construction products referred to.
The set of rules laid out by the employers' liability insurance associations shall apply.
When processing the products under review, conventional industrial protection measures must be observed in accordance with information supplied by the manufacturer. Please note that dust generated during processing can have an alkaline reaction (pH value: >10).
According to the present state of knowledge, hazards for water, air and soil can not arise when fibre cement is processed as designated.

2.9 Packaging
Cardboard boxes, wooden pallets and steel bands are used as packaging materials. The wooden pallets can be returned by the customer and reused several times.

2.10 Condition of use
Hydration of the cement and water mixture forms hardened cement paste (calcium silicate hydrate) with embedded fibres and fillers as well as micro air pores. The fibre-cement products comprise approx. 6% water (equilibrium moisture) and a proportion by volume of approx. 30% air (contained in the micro-pores).
After the binding agent has set and when used as designated, fibre cement products can be used for practically any applications. No maintenance or repair is required over the service life of the boards.

2.11 Environment and health during use
Environmental protection: According to the present state of knowledge, hazards for water, air and soil cannot arise when the products under review are processed as designated (see chapter 7).

Health protection: When the construction products are used as designated, no health hazards are known in connection with the base materials used and the performance thereof in the condition of use (see chapter 7).

2.12 Reference service life
When used in partition walls, the service life of Hydropanel is comparable with the reference service life (RSL) of plasterboard.
The service life according to the "Bundesinstitut für Bau-, Stadt- und Raumforschung" (/BBSR/) table is indicated to be > 50 years.

2.13 Extraordinary effects

Fire
Building materials class A2 as per /DIN 4102-1/, i.e. limited combustibility.

Building materials classification to /EN 13501-1/ A2,s1-d0, i.e. limited combustibility in accordance with Part A of the Building Rules List.

Development of smoke/smoke density: smoke development caused by burning the products in question (coating) is very low.

Combustion gases: the results in line with testing to /DIN 53436/ indicate that the gaseous emissions incurred when burning the panels in question are free of sulphur and chlorine compounds. The concentration of released hydrogen cyanide (HCN) is within a normal framework.

Changing the system condition (burning dripping/falling material): When surrounding construction materials are burned, the cellulose fibres bound in the cement gradually lose their strength: This does not represent any explosive potential with the result that fibre cement does not pose a risk in the event of a fire. Burning dripping/falling hydrophobic treatment or fibre cement do not occur.

Water
No ingredients are washed out which could be hazardous to water (see also “Eluate analysis” in Evidence). The pH value is alkaline (pH ≥ 10).

Mechanical destruction
Not of relevance

2.14 Re-use phase
De-construction: depending on the mounting system, the structural panels can be removed non-destructively by unscrewing or opening the studs.

Re-use / further use: if undamaged, de-constructed panels can be re-used as backer board or as foundation protection.

Re-use / Further use: when separated by type, fibre-cement products referred to can be re-ground and re-used as additives in the manufacture of fibre cement (material recycling). When sorted by type, the fibre-cement products in question are also suitable for further use as a filler and loose material in civil engineering, especially in road construction or for noise barriers (material recycling).

2.15 Disposal
Within the production process, most of the generated waste is immediately 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 class II.
The waste code in accordance with the /European Waste Index/ is 170904.

2.16 Further information
Further information is available on the following website: www.siniat.de.

3. LCA: Calculation rules

3.1 Declared Unit

This declaration refers to the production of 1m² Hydropanel (9mm, grammage 11.7 kg/m²) manufactured in Kapelle-op-den-Bos, Belgium.

Declared unit

Name	Value	Unit
Declared unit	1	m²
Gross density *	1290	kg/m³
Conversion factor to 1 t	0,0129	

* within range of 1180 kg/m³ +- 10%

3.2 System boundary

Type of EPD: Cradle-to-gate with options.
The following life cycle stages and modules are included:

Production stage (A1-A3):

- transportation and manufacturing of pre-products to the manufacturing site
- energy consumption and use of auxiliary materials during production
- disposal of production wastes
- production of packaging

Construction stage (A4-A5):

- transportation of product to the construction site
- energy consumption during the installation of products
- production of fixing- and finishing material
- disposal of installation wastes including emissions of biogenic CO_2 from cellulose
- disposal/incineration of packaging materials (potential benefits from energy substitution within the incineration process are declared in module D) including emissions of biogenic CO_2 from renewable packaging materials

Use stage (B1-B7):

- efforts for the use of the product, maintenance and operational efforts

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

- energy consumption for de-construction and demolition
- transportation to disposal
- waste processing and landfilling of product

3.3 Estimates and assumptions

No estimations or assumptions were made for the production stage. Information on assumptions for the scenarios in the life cycle of the product are described in chapter 4.

3.4 Cut-off criteria

All available data from production processes were considered, i.e., all pre-products used, thermal energy and electric power consumption as well as waste management processes using best available life cycle inventory (LCI) datasets. This includes input flows with a contribution of less than 1% of mass or energy. Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.

3.5 Background data

The /GaBi ts software/ was used to model the product life cycle. The basic data in the GaBi database is applied for energy, transportation, auxiliary products and preliminary products. The software was revised in 2018.
Hydropanel is produced in Belgium. Belgian datasets were used for the grid mixes. For other processes for which no Belgian datasets were available, European average datasets were used (EU-28).

3.6 Data quality

The overall data quality and quality of the data collection can be described as good. All relevant flows were considered. Methodological choices are consistent throughout the model.

3.7 Period under review

Etex provided production data based on an annual average of the year 2016.

3.8 Allocation

Production data refer to the declared product allocated from the overall production volume (m² virtually normalised to 5 mm thickness) in Kapelle-op-den-Bos, Belgium.
Specific information on allocation within the background data is given in the /GaBi documentation/ (http://www.gabi-software.com/international/support/gabi/gabi-database-2018-lci-documentation/).

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 ts serves as background database for the calculation of the life cycle assessment /GaBi ts software/

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4. LCA: Scenarios and additional technical information

Transport to the building site (A4)

Name	Value	Unit
Transport distance	600	km
Capacity utilisation (including empty runs)	61	%

Installation into the building (A5)

Name	Value	Unit
Auxiliary Steel screws	0.128	kg
Water consumption	0.000161	m^3
Other resources : Powder mix finisher	0.35	kg
Electricity consumption	0.02	kWh
Material loss	0.35	kg
Dust in the air *	0	kg
VOC in the air	0	kg

* See chapter 2.8 for details regarding prevention of dust emissions.

Use or application of the installed product (B1) see section 2.11 "Use"

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

Maintenance (B2)

No efforts occur during maintenance.

Name	Value	Unit
Water consumption	0	m^3
Auxiliary	0	kg
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Waste materials resulting from maintenance	0	kg

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

No efforts occur in modules B6 and B7. m^2

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

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste (incl. finisher and screws)	12.2	kg
Recycling	0.1	kg
Landfilling	12.1	kg

5. LCA: Results

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

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: 1 m² Hydropanel (9 mm)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	5.78E+0	4.44E-1	9.73E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.61E-3	3.83E-2	0.00E+0	1.56E+0	-1.96E-1
ODP	[kg CFC11-Eq.]	4.73E-12	1.21E-14	7.15E-11	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.83E-14	1.04E-15	0.00E+0	6.25E-14	3.85E-14
AP	[kg SO_2-Eq.]	1.51E-2	1.03E-3	2.32E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.44E-5	8.87E-5	0.00E+0	1.39E-3	-4.72E-4
EP	[kg $(PO_4)^{3-}$-Eq.]	2.29E-3	2.62E-4	3.48E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.29E-6	2.26E-5	0.00E+0	2.18E-3	-4.04E-5
POCP	[kg ethene-Eq.]	1.26E-3	-3.49E-4	2.64E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.53E-6	-3.01E-5	0.00E+0	4.25E-4	-6.06E-5
ADPE	[kg Sb-Eq.]	6.29E-6	3.63E-8	2.46E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.57E-9	3.13E-9	0.00E+0	8.54E-8	2.02E-8
ADPF	[MJ]	5.92E+1	6.01E+0	8.40E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.16E-2	5.19E-1	0.00E+0	3.48E+0	-1.55E+0

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 m² Hydropanel (9 mm)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.80E+1	3.33E-1	2.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.91E-2	2.87E-2	0.00E+0	3.84E-1	1.42E-1
PERM	[MJ]	1.00E+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	0.00E+0	0.00E+0
PERT	[MJ]	2.80E+1	3.33E-1	2.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.91E-2	2.87E-2	0.00E+0	3.84E-1	1.42E-1
PENRE	[MJ]	6.87E+1	6.04E+0	9.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.57E-1	5.21E-1	0.00E+0	3.61E+0	-1.46E+0
PENRM	[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
PENRT	[MJ]	6.87E+1	6.04E+0	9.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.57E-1	5.21E-1	0.00E+0	3.61E+0	-1.46E+0
SM	[kg]	3.07E-1	0.00E+0	9.19E-3	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
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
FW	[m^3]	2.57E-2	6.13E-4	5.20E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.05E-5	5.29E-5	0.00E+0	6.12E-4	6.89E-5

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Hydropanel (9 mm)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	2.87E-7	3.49E-7	1.72E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.37E-11	3.01E-8	0.00E+0	4.56E-8	-1.00E-9
NHWD	[kg]	4.66E-1	5.06E-4	3.75E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.11E-4	4.36E-5	0.00E+0	1.18E+1	3.45E-3
RWD	[kg]	3.76E-3	8.26E-6	4.50E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.60E-5	7.13E-7	0.00E+0	5.20E-5	3.49E-5
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
MFR	[kg]	0.00E+0	0.00E+0	2.03E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.00E-1	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
EEE	[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
EET	[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

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

6. LCA: Interpretation

Looking at the overall lifecycle, for most of the impact categories (except for ADPe, EP and ODP), the manufacturing (A1-A3) of Hydropanel contributes to the largest share (> ~ 50 %) to the environmental performance.

For ADPe, the use of the stainless steel screws in A5 contributes most significantly to the results. The EP is also strongly influenced by the landfilling of the cellulose-containing materials. The powder mix finisher contributes most significantly to the ODP of module A5.

Within modules A1-A3, the pre-chains of the raw material have the most important impact (contribution > 50%) followed by the energy consumption for the production. Transport to site (A2) has a negligible influence on the overall LCA results (contribution < 2.5%).

The re-emission of organic CO2 inherent in packaging materials (wooden pallets, cardboards) as well as in cellulose takes place in module A5, in which the packaging and the installation wastes are incinerated.

Interpretation of LCA-results in A1:
The LCA for Hydropanel is mainly determined by the pre-chains of the following raw materials: cement, cellulose and silica sand flour. The contribution per impact category varies within these raw materials. Cement is most important for GWP, POCP and ADPe, whereas cellulose has a significant impact on AP and EP. Compared to cement and cellulose, the contribution of silica sand is lower in all impact categories and only shows a relevant impact for ODP (contribution >25%).

7. Requisite evidence

7.1 Radioactivity

Radioactivity measurements confirm that no other gamma emitters than those originating from the natural radiation sources are contained. The measured radioactivity levels do not exceed the activity concentration indices as specified by the /Article 3 (Radiation Protection 112) for building products/ following the /Council Directive 96/29/.

/Report on Radioactivity/

7.2 Leaching

Leaching tests based on /EN 12457-2/ showed that no hazardous compounds were leached out.

/Report on Leaching/

7.3 VOC emissions

/Report on VOC emissions/

Process: Testing the product emissions in accordance with the "Ausschuss zur gesundheitlichen Bewertung von Bauprodukten" (/AgBB/) method

Results:

- Carcinogens were not detected after 3 and 28 days.
- At 5.6 µg/m³, the total VOC ("TVOC") after 3 days was below the limit of 10 mg/m³.
- At < 5 µg/m³, the total VOC ("TVOC") after 28 days was below the limit of 1 mg/m³.
- At < 5 µg/m³, total SVOC after 28 days was below the limit value of 0.1 mg/m³.
- At > 5 µg/m³, the VOC individual substances established after 28 days resulted in a rating value R below the maximum limit of 1.
- At < 5 µg/m³, total individual VOC substances without LCI value after 28 days were below the limit value of 0.1 mg/m³
- At < 3 µg/m³, the formaldehyde concentration after 28 days was below the limit of 120 µg/m³.

The Hydropanel product under review is suitable for use in interior applications in accordance with /AgBB/ "Health-related Evaluation Procedure for Volatile Organic Compounds Emissions (VOC and SVOC) from Construction Products" in the version dated May 2010.

8. References

/Article 3 (Radiation Protection 112) for building products/
Radiological Protection Principles concerning the Natural Radioactivity of Building Materials, published in 1999 by the Directorate-General Environment, Nuclear Safety and Civil Protection

/AgBB/
Ausschuss zur gesundheitlichen Bewertung von Bauprodukten, AgBB (*engl.* German Committee for Health-Related Evaluation of Building Products)

/BAM/
Material Testing Institute of the state of Brandenburg/Berlin and the German Federal Institute for Materials Research and Testing

/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-und-gebaeudedaten/nutzungsdauern-von-bauteilen.html

/Construction Products Regulation/
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

/Council 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 ionizing radiation

/DIN 4102-1/
DIN 4102-1:1998, Fire behaviour of building materials and elements - Classification of building materials - Requirements and testing

/DIN 53436/
DIN 53436-1:2015-12, Generation of thermal decomposition products from materials for their

analytic-toxicological testing - Part 1: Decomposition apparatus and determination of test temperature

/EN 12457-2/
NF EN 12457-2, December 2002, Characterization of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 2: one stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 4 mm (without or with size reduction)

/EN 12467/
NF EN 12467, November 2012, Fibre-cement flat sheets - Product specification and test methods

/EN 13501-1/
NF EN 13501-1+A1 February 2013, Fire classification of construction products and building elements - Part 1: classification using data from reaction to fire tests

/EN 197-1/
DIN EN 197-1:2011-11, Cement – Part 1: Composition, specifications and conformity criteria for common cement; German version EN 197-1:2011

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/European Waste Index/
European Waste Index provides an EU-wide common terminology for waste classification. The index is in the Commission Decision of 3 May 2000

/GaBi documentation/
GaBi 8.7 data set documentation for the software system and data bases, LBP, University of Stuttgart and thinkstep AG, Leinfelden-Echterdingen, 2018 (http://www.gabi-software.com/international/support/gabi/gabi-database-2018-lci-documentation)

/GaBi ts software/
GaBi Software-System and Database for Life Cycle Engineering, 1992-2018, thinkstep AG, Leinfelden-Echterdingen, with acknowledgement of LBP University of Stuttgart, program version 8.7

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

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

/OHSAS 18001/
OHSAS 18001:2007, Occupational Health and Safety Management Certification

/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 LCA and requirements on the Background Report, Version 1.7, Institut Bauen und Umwelt e.V., www.ibu-epd.com, 2018

/PCR Part B/
PCR Part B, Requirements on the EPD for Fibre cement / Fibre concrete, Version 1.6, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2017

/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

/Report on Radioactivity/
Date: 2 December 2011
Measuring agency: /SCK.CEN Laboratory for Gammaspectrometry/, Mol, Belgium
Protocol: Activity concentration index (ACI)[AR1]

/Report on Leaching/
Date: 26 June 2015
Measuring agency: /Eurofins Analyses pour l'Environnement/ France-Site de Saverne[AR2]

/Report on VOC emissions/
Date: 29.11.2011
Measuring agency: /Eurofins Product Testing A/S/ Smedeskovvej 38, 8464 Galten, Denmark;
Report no. G10208A

/SCK.CEN Laboratory for Gamma spectrometry/
SCK•CEN Research Center MolBoeretang 200
2400 Mol
België

/Z-31.4-160/
General technical approval no. Z-31.4-160 of the "Deutsches Institut für Bautechnik" (DIBt) for Eternit facade panels

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

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

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product

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