ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	James Hardie Europe GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-JAM-20240186-IBA1-EN
Issue date	15.08.2024
Valid to	14.08.2029

fermacell® Powerpanel TE

James Hardie Europe GmbH

Institut Bauen und Umwelt e.V.

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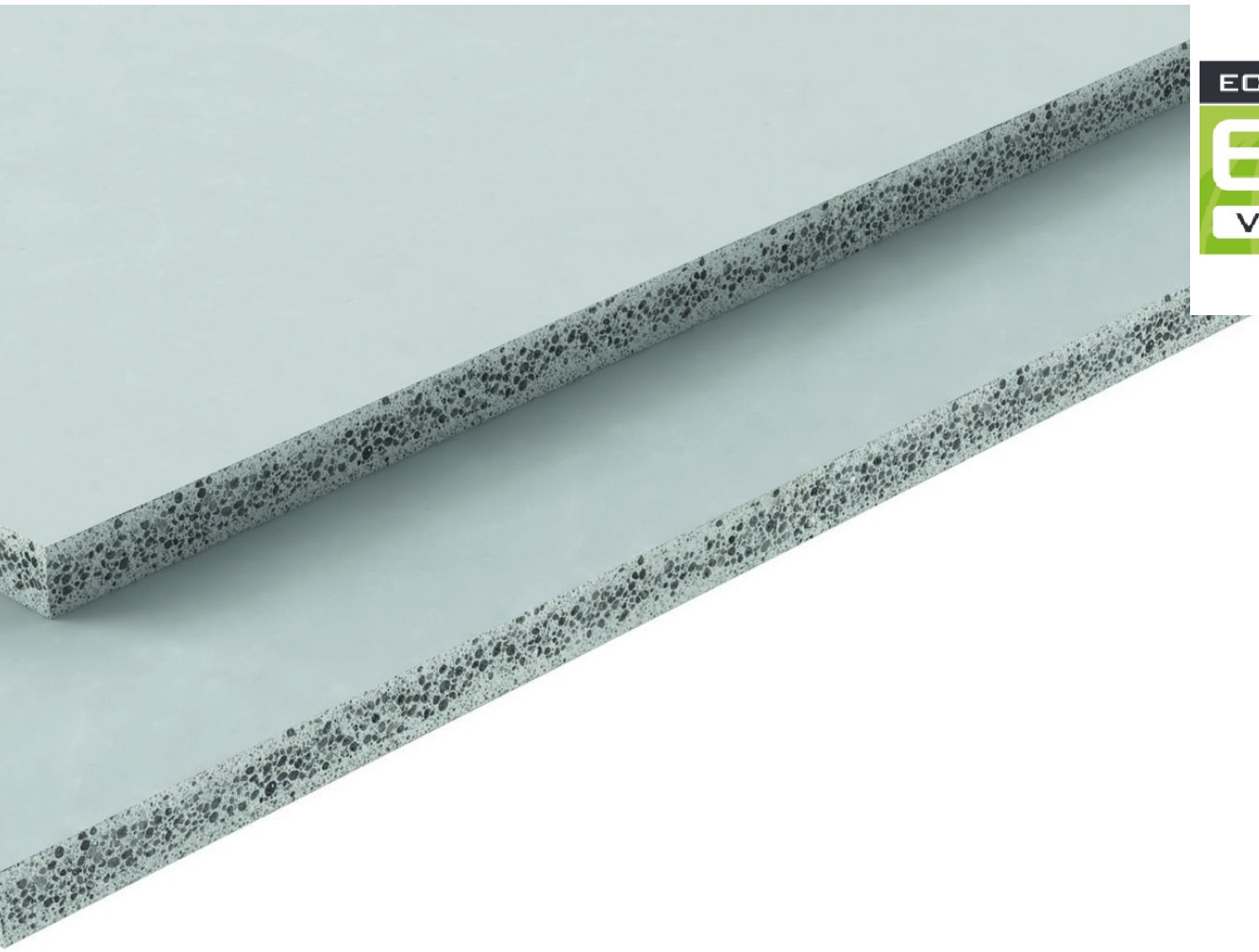


1. General Information

James Hardie Europe GmbH

Programme holder

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

Declaration number

EPD-JAM-20240186-IBA1-EN

This declaration is based on the product category rules:

Fibre cement / Fibre concrete, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

15.08.2024

Valid to

14.08.2029

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

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

fermacell® Powerpanel TE

Owner of the declaration

James Hardie Europe GmbH
Bennigsen-Platz 1
40474 Düsseldorf
Germany

Declared product / declared unit

1m^2 fermacell® Powerpanel TE

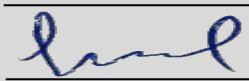
Scope:

This Environmental Product Declaration refers to the flooring element fermacell® Powerpanel TE consisting of 2 fermacell® Powerpanel H_2O boards glued together in an offset manner, manufactured by James Hardie Europe GmbH.This product is produced in the manufacturing plant in Calbe/Germany in which the production data for 2022 was recorded. The Life Cycle Assessment therefore fully represents the Powerpanel boards produced in Calbe by James Hardie Europe GmbH.
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



Dr.-Ing. Nikolay Minkov,
(Independent verifier)

2. Product

2.1 Product description/Product definition

fermacell® Powerpanel TE consist of fermacell® Powerpanel H_2O boards bonded together; special cement-bound, glassfibrereinforced lightweight concrete boards manufactured in a thickness of 12.5 mm with sandwich structure.

Placing on the market / Application rules

The placing on the market of the product in the EU / EFTA (with the exception of Switzerland) is governed by Regulation *(EU) No 305/2011 / CPR*. The product requires a declaration of performance taking into account the / European Technical Assessment No. *ETA-22/0549* and the CE marking. The declaration of performance has been prepared: fermacell® Powerpanel TE FC-0031.

For use, the respective national regulations apply.

2.2 Application

fermacell® Powerpanel TE are suitable for the efficient construction of floor structures in dry construction.

The respective national regulations apply to their use.

2.3 Technical Data

Performance values of the product according to the declaration of performance in relation to its essential characteristics in accordance with *ETA-22/0549* of 3 November 2022.

Constructional data

Name	Value	Unit
Thermal conductivity DIN EN 12667	0,17	W/(mK)
Water vapour diffusion resistance factor acc. to DIN V 4108-4, EN ISO 12572	56	-
Swelling (air-dry to water-saturated)	0.6	mm/m
Gross density DIN EN 12467	1000	kg/m^3
Flexural strength DIN EN 12467	>6	N/mm^2
Moisture content at 23 °C, 80% humidity at 20°C, 65%	5	M.-%
Coefficient of thermal expansion	0.01	$10^{-6}K^{-1}$
Chemical resistance acc. DIN EN 12467	A-D	-
Ageing resistance acc. DIN EN 12467	A-D	-
Permanent temperature resistance	105	°C

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA-22/0549*.

2.4 Delivery status

The fermacell® Powerpanel TE are manufactured in 1250 mm in length and 500 mm wide and in a thicknesses of 25 mm.

2.5 Base materials/Ancillary materials

Base materials- Weight as percentage

fermacell® Powerpanel TE consist of fermacell® Powerpanel H_2O boards which consist of the following components

Name	Value	Unit
Portland cement: binder	30-40	M-%
Fly ash: binder/ filler	15-30	M-%
Expanded clay: lightweight aggregates	24-45	M-%
Expanded glass: lightweight aggregates	5-10	M-%
Alkali-resistent glass fibre: reinforcement	0,5-2	M-%
Plasticisers, stabilising agents, air-entraining agents: Auxiliaries/ Additives	approx. 1	M-%

Additional additives such as flame retardants, softeners or biocides, are not used in the production of fermacell® Powerpanel TE boards.

This product/article/at least one partial article contains substances listed in the candidate list (date: 18.12.2006) exceeding 0.1 percentage by mass: **no**

This product/article/at least one partial article contains other 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 flooring element fermacell® Powerpanel TE consisting of 2 fermacell® Powerpanel H_2O boards glued together in an offset manner.

The production of the fermacell® Powerpanel H_2O takes place in a completely automated production process on a production line in layers "fresh in fresh" in steel moulds. In a first step, the lower cover layer is sprayed into the mould together with a glass fibre mesh. Immediately afterwards, the core layer is applied onto the fresh lower cover layer from a distributor station. In a final step, the upper, covering cover layer is sprayed onto a carrier film, and deposited together with a second glass fibre mesh on the core layer and rolled on.
The finished rough strand is then cut according to the mould size, the filled moulds are stacked separately and linger for several hours in a setting channel. In the demoulding station, the hardened boards are removed from the moulds, placed on stacking grids and dried in the drier to the delivery moisture. After the drying time, the boardss are trimmed by the edges, calibrated in thickness, palletized and packaged. The boards remain in stock until a maturation period has elapsed.
Finaly 2 boards are each glued offset by 50mm to the fermacell® Powerpanel TE element.
The manufacturing plant has been certified a quality management system according to *DIN EN ISO 9001: 2015* by TÜV Nord since 2010 and operates a system of factory production control oriented to the requirements of the European Technical Assessment and Product Safety Regulations. In addition to the incoming goods inspection and the permanent production monitoring, this includes the final inspection of the finished products.

2.7 Environment and health during manufacturing

During production of fermacell® Powerpanel TE, exclusively low-chromate (< 2ppm) cement is used in accordance with *RL 2003/53/EG* and the REACH Directive (*EC), Annex XVII, No. 1907/2006*. Excess process water or cleaning water is mechanically filtered in the process water circuit in order to separate cleaning residue. The cleaned water is added to the manufacturing process as service water.

Noise:

Sound protection analyses have established that all values communicated inside and outside the production facility are far below the requisite technical standards thanks to the sound protection measures taken.

Waste:

All types of waste such as scrap metal, waste oil, foils and plastic chips (packaging), wood (pallets) and paper are separated, stored and directed back into the recycling system.

2.8 Product processing/Installation

fermacell® Powerpanel TE cuttings are achieved using conventional rail-guided hand-held circular saws with suction, preferably as plunge-cut sawing. For precisely fitting and sharp-edged cuts, the use of carbide-tipped saw blades with alternating teeth is recommended. The dust content is reduced by the use of saw blades with a small number of teeth and at low speeds. The attachment is done by means of drywall screws or by means of commercial staples.

2.9 Packaging

fermacell® Powerpanel TE are packed lying on wooden pallets and supplied with cardboard edge protection and covered with foil. These packaging materials are separated and returned to the recycling circuit. The wooden pallets can be returned to the respective dealers.

2.10 Condition of use

Due to the stable crystalline calcium-silicate hydrate phase binding and achieved after curing solid structure emissions are normal for the intended use of the products described use, extremely low and are considered to be harmless to health. No risks are associated with water, air and soil if the products are used as intended. The natural ionizing radiation of fermacell® Powerpanel TE is extremely low and harmless to health hazards.

2.11 Environment and health during use

The "Low-emission product" certificate awarded by the eco-Institut in Cologne confirms that fermacell® Powerpanel TE comply with stringent health and ecological requirements. The Institut für Baubiologie in Rosenheim has tested fermacell® Powerpanel H_2O and their manufacturing process with regard to healthy living and environmental. Due to the outstanding test results, the "Tested and recommended by IBR" test seal was awarded.

2.12 Reference service life

A service life of at least 25 years has been confirmed by test scenarios for fermacell® Powerpanel TE. The practical service life can however be much longer. However, the indications given on the working life can not be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means of selecting the right products in relation to the expected economically reasonable working life of the works. The prerequisite for a long service life is that the necessary conditions for packaging, transport, storage, installation, use, maintenance and repair and maintenance have been met (please refer to www.fermacell.com).

2.13 Extraordinary effects

Fire

In accordance with the *96/603/EG* and *2000/605/EG* rulings by the European Commission, uncoated fermacell® Powerpanel TE are classified as Class A1, non-combustible building materials according to *DIN EN 13501-1*. In addition, they are also Class A1 non-combustible building materials according to *DIN 4102*.

Water

fermacell® Powerpanel TE display neutral reaction when exposed to water (e.g. flooding). No substances are washed out which could be hazardous to water.

Mechanical destruction

Not relevant.

2.14 Re-use phase

Cement-bound lightweight concrete boards can be easily deconstructed. They do not need to be treated as special waste when demolished / deconstructed. With regard to an efficient recycling process, care should be exercised in ensuring dismantling whereby waste is sorted into as many different categories as possible.

Reuse and further use

Cement-bound lightweight concrete boards usually outlast the service life of the buildings in which they are used. After deconstructing such buildings, the materials can therefore be prepared, classified, assessed (environmental compatibility, building material characteristic values, consistency) and reused. The waste incurred by these boards and any components manufactured from them can be recovered in building material recycling plants before being used as an aggregate for various applications. Unmixed residual materials can be taken by the manufacturers and re-used or recycled. This material can be used as aggregates in production. Building rubble and production rejects should be prepared mixed to ensure the consistent features of lightweight concrete products made from recycled material. The recycled material should comply with the natural requirements of the material standards for the raw material to be replaced. Furthermore, recycled material made from lightweight concrete can also be used for building roads and paths in construction class V.

2.15 Disposal

If in exceptional cases, materials cannot be directed to a building material recycling plant, the fermacell® Powerpanel TE can be disposed of at any building rubble landfill in accordance with the /waste key number 170101/ (concrete).

2.16 Further information

Further information on the products is available in the Download area on www.fermacell.com. Safety data sheets can be requested by calling 0800 5235665.

3. LCA: Calculation rules

3.1 Declared Unit

This declaration refers to 1m² of fermacell® Powerpanel TE produced by James Hardie Europe GmbH. Declared is a 25 mm fermacell® Powerpanel TE board with a grammage of 25 kg/m².

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m²
Grammage	25	kg/m^2
Layer thickness	0,025	m
Gross density	1000	kg/m^3
conversion factor to 1 kg	0.04	-

3.2 System boundary

Type of the EPD: cradle to gate with Options

The EPD considers module A1-A3, A4, A5, C1-C4 and D

Module A1 includes provision of all raw materials and pre-products (for example cement) and energy supply, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage.

Module A2 considers the transport of these raw materials to James Hardie's production site located in Germany via truck.

Module A3 considers the manufacturing of the product in James Hardie's production site including the provision of electricity and thermal energy from natural gas. The production of packaging materials is also included.Manufacturing losses are close to zero and thus not considered in the LCA.

Module A4 considers 100 km truck transport to site. The transport distance can be modified project specific if required by linear scaling.

Module A5 considers the treatment and disposal of packaging material. Credits for potential avoided burdens due to energy substitution of electricity and thermal energy generation are declared in module D.

Module C1 considers the dismantling of the product at EoL with an Excavator, 100 kW.

Module C2 accounts for a 50 km transport by truck.

Two scenarios are considered in the End-of-life; recycling (1) and landfilling (2).

Module C3 (Scenario 1) calculates the recycling processing efforts, in which the entire product is processed and a material credit for roadworks (gravel) is applied in module D. For C3/1 the results are '0'.

Module C4/1 (Scenario 2) considers landfilling of the product. For C4 the results are '0'.

Module D includes potential benefits for the thermal and electrical energy generated in module A5 due to packaging treatment and also the material credit due to the product processing in module C3. Avoided burdens have been calculated by the inversion of electricity grid mix and thermal energy from natural gas. The material credit is calculated by using a generic data set for gravel.

Module D/1 accounts for the avoided burdens for electricity grid mix and thermal energy from natural gas due to packaging incineration resulting from A5 only.

3.3 Estimates and assumptions

For electricity production the Residual Grid mix for Germany is accounted for within the LCA.

3.4 Cut-off criteria

All data from the production data collection, i.e. all raw materials used according to the recipe, their transport to the plant, the thermal and electrical energy used, packaging materials, all direct production waste and all available emission measurements were taken into account in the balance. In this way, material and energy flows with a share of less than one percent were also taken into account.
Machinery, equipment and infrastructure required for production were neglected and thus not considered.
The sum of the excluded material flows does not exceed 5% of mass, energy or environmental relevance.

3.5 Background data

The background data are taken from the *Sphera LCA FE* (former GaBi databases).

3.6 Data quality

All primary data are collected for the year 2022. All secondary data come from the *Sphera LCA FE* (GaBi) databases and are representative of the years 2018-2023. As the study intended to compare the product systems for the reference year, temporal representativeness is good.
The overall technological and geographical representativeness is also considered to be good.

3.7 Period under review

Primary production data were collected in James Hardie's production site in Calbe, based on the annual production volume 2022.

3.8 Geographic Representativeness

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

3.9 Allocation

The production process does not deliver any co-products. The data were collected product specific.
Fly ash, like all other power plant by-products, is allocated by market value.

All applied incineration processes (module A5) are displayed via a partial stream consideration for the combustion process, according to the specific composition of the incinerated material. For the waste incineration plant an R1-value of 0.6 is assumed.
Environmental burden of the incineration of packaging are assigned to the system (A5); resulting credits for thermal and electrical energy are declared in module D.
The credits for thermal and electrical energy are calculated via inversion of the life cycle inventory of average data.

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. The used background database is *Sphera LCA FE* (former GaBi database), CUP2023.1

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The product itself does not contain any biogenic carbon. Only the packaging (wooden pallets, paper) does contain it.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.25	kg C

Transport to the building site (A4)

This module considers 100 km truck transport to site (diesel driven). The transport distance can be modified project specific if required by linear scaling.

Name	Value	Unit
Litres of fuel	0.07	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Installation into the building (A5)

The following packaging materials come with the declared product and are incinerated after installation. Potential benefits due to the energy generation after incineration are assigned to module D.

Name	Value	Unit
wooden pallet	0.6	kg
paper	0.0078	kg
plastic foil	0.125	kg

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	25	kg
Recycling	25	kg
Landfilling	25	kg

Module D considers the benefits of packaging treatment (from Module A5) and material credit after waste processing (from Module C3).

Module D/1 considers the benefits of packaging treatment (from Module A5) only.

5. LCA: Results

The following table shows the results for 1m² fermacell® Powerpanel TE. The recycling scenario (EoL1) shows the corresponding results in C3, for C3/1 the results are '0'.
The landfill scenario (EoL2) shows the results in C4/1, for C4 the results are '0'.
Moreover, only packaging incineration ends up in potential benefits in D/1. Module D includes besides those benefits also the material credit due to recycling.

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

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² fermacell® Powerpanel TE

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
GWP-total	kg CO_2 eq	2.06E+01	2.15E-01	1.44E+00	1.53E-02	1.07E-01	6.51E-02	0	0	3.78E-01	-5.64E-01	-5.17E-01
GWP-fossil	kg CO_2 eq	2.15E+01	1.89E-01	3.32E-01	1.34E-02	9.45E-02	6.48E-02	0	0	3.76E-01	-5.61E-01	-5.12E-01
GWP-biogenic	kg CO_2 eq	-9.51E-01	2.46E-02	1.11E+00	1.77E-03	1.23E-02	9.91E-06	0	0	1.53E-03	-3.57E-03	-4.75E-03
GWP-luluc	kg CO_2 eq	7.57E-03	1.28E-03	7.93E-06	8.94E-05	6.4E-04	3.13E-04	0	0	1.17E-03	-2.55E-04	-4.78E-05
ODP	kg CFC11 eq	4.2E-11	3.75E-14	2.29E-13	2.62E-15	1.87E-14	1.95E-13	0	0	9.55E-13	-6.76E-12	-6.45E-12
AP	mol H^+ eq	4.58E-02	1.59E-04	2.43E-04	7.47E-05	7.93E-05	3.24E-04	0	0	2.66E-03	-7.7E-04	-5.22E-04
EP-freshwater	kg P eq	2.34E-05	4.99E-07	5.7E-08	3.49E-08	2.49E-07	1.69E-07	0	0	7.56E-07	-1.67E-06	-1.43E-06
EP-marine	kg N eq	9.01E-03	4.17E-05	6.8E-05	3.55E-05	2.08E-05	1.51E-04	0	0	6.88E-04	-2.8E-04	-1.93E-04
EP-terrestrial	mol N eq	9.72E-02	5.5E-04	1.16E-03	3.93E-04	2.75E-04	1.67E-03	0	0	7.57E-03	-3.01E-03	-2.04E-03
POCP	kg NMVOC eq	2.78E-02	1.28E-04	1.81E-04	9.95E-05	6.42E-05	4.08E-04	0	0	2.08E-03	-7.31E-04	-4.93E-04
ADPE	kg Sb eq	5.34E-07	1.52E-08	1.8E-09	1.06E-09	7.58E-09	6.92E-08	0	0	1.73E-08	-5.08E-08	-4.58E-08
ADPF	MJ	1.97E+02	2.9E+00	3.97E-01	2.03E-01	1.45E+00	1.25E+00	0	0	5E+00	-8.7E+00	-7.95E+00
WDP	m^3 world eq deprived	6.11E-01	1.11E-03	1.45E-01	7.78E-05	5.57E-04	1.13E-02	0	0	4.12E-02	-1.21E-02	-6.95E-03

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 fermacell® Powerpanel TE

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PERE	MJ	3.29E+01	1.88E-01	1.13E+01	1.31E-02	9.38E-02	1.37E-01	0	0	8.15E-01	-3.38E+00	-3.14E+00
PERM	MJ	1.12E+01	0	-1.12E+01	0	0	0	0	0	0	0	0
PERT	MJ	4.41E+01	1.88E-01	1.15E-01	1.31E-02	9.38E-02	1.37E-01	0	0	8.15E-01	-3.38E+00	-3.14E+00
PENRE	MJ	1.93E+02	2.9E+00	3.84E+00	2.03E-01	1.45E+00	1.25E+00	0	0	5E+00	-8.7E+00	-7.95E+00
PENRM	MJ	3.44E+00	0	-3.44E+00	0	0	0	0	0	0	0	0
PENRT	MJ	1.97E+02	2.9E+00	3.97E-01	2.03E-01	1.45E+00	1.25E+00	0	0	5E+00	-8.7E+00	-7.95E+00
SM	kg	5.28E+00	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	4.55E-02	1.71E-04	3.43E-03	1.19E-05	8.55E-05	3.29E-04	0	0	1.26E-03	-1.34E-03	-1.12E-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 m² fermacell® Powerpanel TE

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
HWD	kg	1.17E-08	7.78E-12	3.99E-12	5.44E-13	3.89E-12	0	0	0	1.09E-10	-4.18E-10	-4.37E-10

NHWD	kg	8.32E+00	4.23E-04	3.63E-02	2.96E-05	2.12E-04	3.49E-04	0	0	2.5E+01	-1.01E+00	-4.35E-03
RWD	kg	5.89E-03	3.04E-06	1.35E-05	2.12E-07	1.52E-06	1.02E-05	0	0	5.69E-05	-3.76E-04	-3.25E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	2.5E+01	0	0	0	0	0
EEE	MJ	0	0	1.94E+00	0	0	0	0	0	0	0	0
EET	MJ	0	0	4.23E+00	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 m² fermacell® Powerpanel TE

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PM	Disease incidence	5.76E-07	1.15E-09	1.55E-09	8.55E-10	5.77E-10	6.28E-09	0	0	3.28E-08	-1.83E-08	-3.81E-09
IR	kBq U235 eq	5.56E-01	3.13E-04	1.59E-03	2.19E-05	1.56E-04	1.07E-03	0	0	6.57E-03	-4.28E-02	-3.43E-02
ETP-fw	CTUe	7.28E+01	2.16E+00	1.87E-01	1.51E-01	1.08E+00	8.88E-01	0	0	2.73E+00	-1.81E+00	-1.4E+00
HTP-c	CTUh	8.47E-09	4.31E-11	1.24E-11	3.01E-12	2.15E-11	1.96E-11	0	0	4.2E-10	-1.3E-10	-9.8E-11
HTP-nc	CTUh	8.87E-07	2.12E-09	7.08E-10	1.75E-10	1.06E-09	9.81E-10	0	0	4.62E-08	-6.17E-09	-3.02E-09
SQP	SQP	2.07E+02	1.03E+00	1.22E-01	7.2E-02	5.15E-01	3.14E-01	0	0	1.21E+00	-2.43E+00	-2.18E+00

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

Life Cycle:
The manufacturing phase dominates the product system. In addition, the packaging treatment in module A5 has relevant environmental impacts where the credits accounted in module D cover the inversion of electricity grid mix and thermal energy from natural gas due to packaging treatment (A5). The impacts from the C4/2 scenario are comparatively higher than the results of the C3/1 scenario.

Product stage:
The main drivers of the LCA in most impact categories are the raw materials cement and expanded clay. Electrical and thermal energy consumption in the product manufacture is reflected with relevant contributions in most of the indicators. The biogenic carbon content in the wooden pallets is reflected by the higher negative contributions in GWP biogenic.

7. Requisite evidence

The product fermacell® Powerpanel TE was submitted to an ecological product examination of James Hardie Europe GmbH for the acquisition of the eco-INSTITUT- Label.
The requirements specified in the certification scheme and in the test criteria are met.
As a result of the successful ecological product examination the eco-INSTITUT- Label is awarded.
(Certification number ID 0609-13701-022)

7.1 Radioactivity
Assessment performed on the basis of:
- EU Commission "Radiation Protection 112" document
(MPA NRW, Test report No. 321000741)

Determination of Radioactivity

Name	Value	Unit
Radium-226	74 ± 3	Bq/kg
Radium-228	52 ± 2	Bq/kg
Thorium-228	51 ± 5	Bq/kg
Potassium-40	460 ± 50	Bq/kg

7.2 Leaching
Eluate analysis to DIN 38414, Part 4
(IBR, Expert Report No. 3022-1262)

Determination of the eluate

Name	Value	Unit
Arsenic (As)	< 0.005	mg/l
Cadmium (Cd)	< 0.001	mg/l
Cobalt	<0.002	mg/l
Copper (Cu)	< 0.002	mg/l
Chromium (Cr)	0,055	mg/l
Iron (Fe)	< 0.1	mg/l
Mercury (Hg)	< 0.001	mg/l
Manganese (Mn)	< 0.005	mg/l
Nickel (Ni)	< 0.005	mg/l
Lead (Pb)	0.001	mg/l
Antimony (Sb)	< 0.001	mg/l
Tin (Sn)	< 0.01	mg/l
Zinc (Zn)	< 0.005	mg/l

7.3 VOC emissions
Test procedure in line with the AgBB
(eco-Institut, Report No. 58338-A005-L and Report No. 58338-A005elL-G II)

AgBB overview of results (7 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	14	µg/m^3
Sum SVOC (C16 - C22)	<5	µg/m^3
R (dimensionless)	0.05	-
VOC without NIK	2	µg/m^3
Carcinogenic Substances	<1	µg/m^3

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

Name	Value	Unit
TVOC (C6 - C16)	17	µg/m^3
Carcinogenic Substances	<1	µg/m^3

8. References

Standards

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

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

Further References

Sphera LCA FE (former GaBi ts)
Sphera LCA for Experts, LCA FE, software-system and databases, Managed LCA content MLC (former GaBi database), University of Stuttgart and Sphera Solutions GmbH, 2023
CUP Version: 2023.1., MLC data set documentation under https://sphera.com/product-sustainability-gabi-data-search/ (December 2023).

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

PCR A
PCR-Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, Institut Bauen und Umwelt e.V., version 1.3, 2021

PCR B
PCR– Part B: Requirements of the EPD for Fibre Cement / Fibre Concrete, version 8, Institut Bauen und Umwelt e.V., 2023

96/603/EG und /2000/605/EG
2000/605/EG: Commission Decision of 26 September 2000 amending Decision 96/603/EC establishing the list of products belonging to Classes A "No contribution to fire" provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products.

RL 2003/53/EG
Directive 2003/53/EC of the European Parliament and of the Council of 18 June 2003 amending for the 26th time Council Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations (nonylphenol, nonylphenol ethoxylate and cement)

REACH-Verordnung (EG)
REGULATION (EC) 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.

(EU) Nr. 305/2011 (CPR)
REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL.

EAD 210024-00-0504
EOTA: EUROPEAN ASSESSMENT DOCUMENT: CEMENT-BONDED BOARD, January 2018

EAD 190013-00-0502
EOTA: EUROPEAN ASSESSMENT DOCUMENT: THERMAL AND SOUND INSULATING DRY SCREED SYSTEMS WITH PREFABRICATED FLOORING ELEMENTS, May 2018

ETA-07/0087
ETA-07/ 0087. European Technical Assessment of 22 October 2020.

ETA-22/0549
ETA-22/0549. European Technical Assessment of 3 November 2022.

DIN EN 319
DIN EN 319. Particleboards and fibreboards; determination of tensile strength perpendicular to the plane of the board; German version EN 319:1993/(EU) Nr. 305/2011 (CPR)/ REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL.

DIN EN 789
DIN EN 789. Timber structures - Test methods - Determination of mechanical properties of wood based panels; German version EN 789:2004

DIN 4102
DIN 4102-1:1998-05Fire performance of building materials and components - Part 1: Building Materials; Terms, Requirements and Tests.

DIN 4108-4:2016– draft
DIN 4108-4:2016 – draft, Thermal insulation and energy economy in buildings - Part 4: Hygrothermal design values

DIN EN ISO 9001:2015
DIN EN ISO 9001:2015, Quality management systems - Requirements (ISO 9001:2015); German and Englisch version EN ISO 9001:201

DIN EN 12467
DIN EN 12467: Fibre-cement flat sheets - Product specification and test methods; German version EN 12467:2012

DIN ISO 12572
Hygrothermal performance of building materials and products - Determination of water vapour transmission properties - Cup method (ISO 12572:2016); German version EN ISO 12572:2016

DIN EN 12667
DIN EN 12667 Building materials - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products with high and medium thermal resistance. German version EN 12667:2001

DIN EN 13501-2
DIN EN 13501-2. Fire classification of construction products and building elements- Part 2: Classification using data from fire resistance tests, excluding Ventilation services. German version EN 13501-2:2008

eco Institut Institut
eco Institut GmbH: Test report no. 58338-A005-L, Fermacell Powerpanel H2O, emission analyses VOC, Cologne, 2023

IBR Rosenheim
Institut für Baubiologie Rosenheim GmbH, report nos. 3022-1262 based on the "Tested and recommended by IBR" test stamp, including radioactivity and eluate analysis, Rosenheim, 2022

MPA NRW.
Materialprüfungsamt Nordrhein-Westfalen: Test report no. 321000741, Fermacell Powerpanel H2O, Determination of natural radioactivity, Dortmund, 2024

Waste codes directory
Ordinance on the European Waste Catalog (Waste Catalog Ordinance - AVV of 10 December 2001, BGBl. I, p.3379, last amended by Article 1 of the Ordinance to Implement the amended Hazardous Waste Criteria of 4 March 2016, BGBl. I p. 382)

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