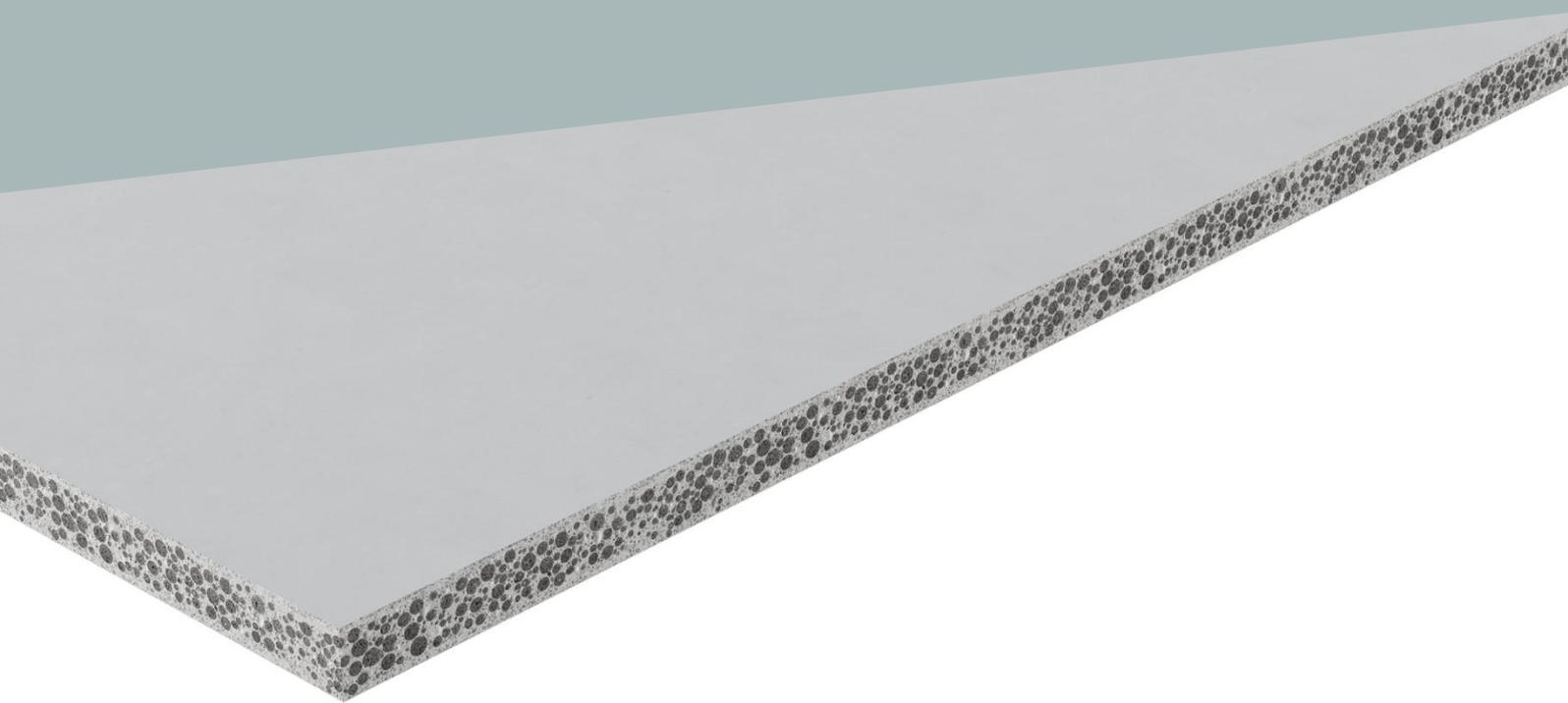


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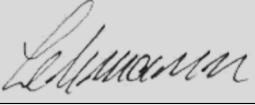
3<sup>rd</sup> PARTY VERIFIED

# EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



## General Information

<p><b>Fermacell GmbH</b></p> <p><b>Programme holder</b> IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <p><b>Declaration number</b> EPD-FER-20170211-CAC1-EN</p> <p><b>This declaration is based on the product category rules:</b> Fibre cement / Fibre concrete, 07.2014 (PCR checked and approved by the SVR)</p> <p><b>Issue date</b> 09.04.2018</p> <p><b>Valid to</b> 08.04.2023</p> <p></p> <p>Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)</p> <p></p> <p>Dr.-Ing. Burkhard Lehmann (Managing Director IBU)</p>	<p><b>FERMACELL Powerpanel HD</b></p> <p><b>Owner of the declaration</b> Fermacell GmbH Düsseldorfer Landstraße 395 D-47259 Duisburg</p> <p><b>Declared product / declared unit</b> 1 m<sup>2</sup> Fermacell Powerpanel HD</p> <p><b>Scope:</b> This document refers to the manufacture of Fermacell Powerpanel HD by Fermacell GmbH. This product is produced in the manufacturing plant in Calbe in which the production data for 2016 was recorded. The Life Cycle Assessment therefore fully represents the Powerpanel boards produced in Calbe by Fermacell GmbH.</p> <p>The owner of the declaration shall be liable for the underlying information and evidence; IBU shall not be liable with respect to manufacturer information, Life Cycle Assessment data and evidence.</p> <p><b>Verification</b></p> <table border="1"> <tr> <td colspan="2">The /EN 15804/ standard serves as the core PCR.</td> </tr> <tr> <td colspan="2">Independent verification of the declaration and data according to /ISO 14025:2010/</td> </tr> <tr> <td><input type="checkbox"/> internally</td> <td><input checked="" type="checkbox"/> externally</td> </tr> </table> <p></p> <p>Dr.-Ing. Andreas Ciroth (Independent verifier appointed by the SVR)</p>	The /EN 15804/ standard serves as the core PCR.		Independent verification of the declaration and data according to /ISO 14025:2010/		<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally
The /EN 15804/ standard serves as the core PCR.							
Independent verification of the declaration and data according to /ISO 14025:2010/							
<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally						

## Product

### Product description / Product definition

FERMACELL Powerpanel HD are cement-bound, glassfibre-reinforced lightweight concrete boards manufactured in a thickness of 15 mm with a sandwich structure, i.e. they comprise surface layer and core material components.

### 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-13/0609/ and the CE marking. The declaration of performance has been prepared: FERMACELL Powerpanel HD FC-0006. For use, the respective national regulations apply.

### Delivery status

The boards can be up to 3010 mm in length and up to 1250 mm wide.

### Manufacture

The production of the FERMACELL Powerpanel HD takes place in a fully-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 glassfibre segments cut from a continuous strand. 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, deposited 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 before lingering 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 until they achieve delivery moisture. After the drying time, the boards are trimmed at the edges, calibrated in thickness, palletised and packaged. The boards remain in stock until a maturation period has elapsed.

The manufacturing plant has been certified to 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 incoming goods inspection and permanent production monitoring, this also includes final inspection of the finished products.

### Environment and health during manufacturing

During production of FERMACELL Powerpanel HD, exclusively low-chromate (< 2ppm) cement is used in accordance with /RL 2003/53/EC/ 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.

**Product processing / Installation**

FERMACELL Powerpanel HD 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.

**Packaging**

FERMACELL Powerpanel HD 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. Wooden pallets can be returned to the respective dealers.

**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, are 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 ionising radiation of FERMACELL Powerpanel HD is extremely low and harmless to health.

**Environment and health during use**

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

**Extraordinary effects**

**Fire:**

FERMACELL Powerpanel HD are classified as Class A1, non-combustible building materials according to /DIN EN 13501-1/ and /DIN 4102-1/.

**Water:**

FERMACELL Powerpanel HD 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

**Reuse phase**

FERMACELL Powerpanel HD boards can be easily deconstructed. They can be treated as normal 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.

FERMACELL Powerpanel HD 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 back by the manufacturers and reused 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.

**Disposal**

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

**Further information**

Further information on the products is available in the Download area on [www.fermacell.de](http://www.fermacell.de). Safety data sheets can be requested by calling 0800 5235665.

**Application**

FERMACELL Powerpanel HD boards are used as construction panels for non-bearing interior partition walls, for lining components in interior and exterior applications, as plaster base boards for facades as well as for suspended ceilings. FERMACELL Powerpanel HD boards are particularly suitable for exterior use in timber panel construction as direct panelling, for static use as bearing/reinforcing wooden wall partitions and as exterior wall panels for external wall connections in wooden frame constructions. They perform supporting and reinforcing functions and can be used directly as plaster base boards. Due to their good fire protection characteristics, they can also be used for close surrounding property.

## Technical Data

### FERMACELL Powerpanel HD

Name	Value	Unit
Thermal conductivity /DIN EN 12667/	0.3	W/(mK)
Water vapour diffusion resistance factor acc. to /DIN V 4108-4/, /EN ISO 12572/	37	-
Swelling (air-dry to water-saturated) Swelling (60% change in humidity)	1	mm/m
Sound absorption coefficient: not relevant	-	%
Gross density /DIN EN 12467/	950	kg/m <sup>3</sup>
Compressive strength /DIN EN 789/	6	N/mm <sup>2</sup>
Tensile strength /DIN EN 319/	0.4	N/mm <sup>2</sup>
Flexural strength /DIN EN 12467/	2.7	N/mm <sup>2</sup>
Modulus of elasticity /DIN EN 12467/	4200	N/mm <sup>2</sup>
Moisture content at 23 °C, 80%; humidity at 20 °C, 65%	7	M.-%
Coefficient of thermal expansion	0.01	10 <sup>-6</sup> K <sup>-1</sup>
Chemical resistance, Category of use acc. to /EN 12467/	A-D	-
Ageing resistance, Category of use acc. to /EN 12467/	A-D	-

Permanent temperature resistance	105	°C
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### Base materials / Ancillary materials

Base materials	Weight as percentage
Portland cement	30-40
Fly ash	15-30
Expanded clay	25-45
Expanded glass	5-10
Alkali-resistant glassfibre	0.5-3
Auxiliaries/ Additives	approx. 1%
Hydrophobic agents, plasticisers, stabilising agents, air-entraining agents	
Additional additives such as flame retardants, softeners or biocides are not used in the production of FERMACELL Powerpanel boards	

### Reference service life

A service life of 50 years has been assumed for FERMACELL Powerpanel HD, provided that the requisite conditions for packaging, transport, storage, installation, use, maintenance and repair have been met. 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 anticipated economically reasonable working life of the works.

## LCA: Calculation rules

### Declared unit

This Declaration refers to the manufacture of 1m<sup>2</sup> of FERMACELL Powerpanel HD by Fermacell GmbH. The 15 mm FERMACELL Powerpanel HD board has a grammage of 14.3 kg/m<sup>2</sup>. The average was based on the annual production volume for 2016 at the Calbe plant. The background data is taken from the /GaBi ts/ data bases.

### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Conversion factor to 1 kg	0.07	-
Gross density	950	kg/m <sup>3</sup>

### System boundary

Type of EPD: Cradle to plant gate

In detail, the following processes were included in the product stage **A1-A3** of board production:

- Manufacture of preliminary products (cement, expanded glass, glassfibre etc.)
- Transport of raw materials and preliminary products to the plant
- Manufacturing process in the factory including energy costs, production of auxiliary materials, disposal of waste material and consideration of emissions incurred
- Production of packaging

### 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 and/or product-specific characteristics of performance are taken into account.

## LCA: Scenarios and additional technical information

### Installation in the building (A5)

The following packaging material is incurred on the building site:  
Polyethylene foil: 0.47 g/m<sup>2</sup>

Wooden pallets: 399 g/m<sup>2</sup>  
Paper/Cardboard: 0.28 g/m<sup>2</sup>  
PET tape: 1.44 g/m<sup>2</sup>



The disposal of packaging materials in A5 is not declared.

The CO<sub>2</sub> integration in the natural packaging materials (wooden pallets / cardboard) is also not included in A1-A3.

## LCA: Results

The following tables depict the results of the indicators of the estimated impact, use of resources as well as waste and other output flows based on 1 m<sup>2</sup> Fermacell Powerpanel HD, manufactured by Fermacell GmbH. The estimated impact results only represent relative statements. They do not enable any deductions to be made as regards the end points of the impact categories, exceeding threshold values, safety levels or risks.

### 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 or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

### RESULTS OF THE LCA – ENVIRONMENTAL IMPACT: 1 m<sup>2</sup> Fermacell Powerpanel HD (14.25 kg/m<sup>2</sup>; approx. 15 mm thickness)

Parameter	Unit	A1-A3
Global warming potential	[kg CO <sub>2</sub> equiv.]	10.71
Depletion potential of the stratospheric ozone layer	[kg CFC11 equiv.]	3.82E-11
Acidification potential of land and water	[kg SO <sub>2</sub> equiv.]	2.89E-2
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> equiv.]	3.48E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene equiv.]	2.16E-3
Abiotic depletion potential for non-fossil resources	[kg Sb equiv.]	2.75E-5
Abiotic depletion potential for fossil resources	[MJ]	101.20

### RESULTS OF THE LCA – RESOURCE USE: 1 m<sup>2</sup> Fermacell Powerpanel HD (14.25 kg/m<sup>2</sup>; approx. 15 mm thickness)

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	16.62
Renewable primary energy resources as material utilisation	[MJ]	4.79
Total use of renewable primary energy resources	[MJ]	21.41
Non-renewable primary energy as energy carrier	[MJ]	107.44
Non-renewable primary energy as material utilisation	[MJ]	0.06
Total use of non-renewable primary energy resources	[MJ]	107.50
Use of secondary material	[kg]	4.26
Use of renewable secondary fuels	[MJ]	0.00
Use of non-renewable secondary fuels	[MJ]	0.00
Use of net fresh water	[m <sup>3</sup> ]	2.34E-2

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m<sup>2</sup> Fermacell Powerpanel HD (14.25 kg/m<sup>2</sup>; approx. 15 mm thickness)

Parameter	Unit	A1-A3
Hazardous waste for disposal	[kg]	1.24E-4
Non-hazardous waste for disposal	[kg]	3.97E+0
Radioactive waste for disposal	[kg]	2.49E-3
Components for reuse	[kg]	0.00
Materials for recycling	[kg]	0.40
Materials for energy recovery	[kg]	0.00
Exported electrical energy	[MJ]	0.00
Exported thermal energy	[MJ]	0.00

## References

### /GaBi ts/

GaBi 8 dataset documentation for the software system and data bases, LBP (University of Stuttgart) and thinkstep AG, Leinfelden-Echterdingen, 2017 (<http://www.gabi-software.com/deutsch/databases/gabi-databases/>)

### /(EU) No. 305/2011 (CPR)/

(EU) No. 305/2011 (CPR): Construction Products Regulation

### /ETA-13/0609/

ETA-13/0609: European Technical Assessment of 26.06.2013

### /DIN EN ISO 9001:2015/

DIN EN ISO 9001:2015: Quality management systems – Requirements (ISO 9001:2015); trilingual version EN ISO 9001:2015

### /RL 2003/53/EC/

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 Directive (EC)/**

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, Commission Regulation (EC) No. 1488/94, Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

**/96/603/EC and /2000/605/EC/**

2000/605/EC: 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

**/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

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DIN 4102-1:1998-05: Fire performance of building materials and components – Part 1: Building Materials; Terms, requirements and tests

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**/IBR Rosenheim/**

Institut für Baubiologie Rosenheim GmbH, report no. 3016-805 based on the "Tested and recommended by IBR" test stamp, including radioactivity and eluate analysis, Rosenheim, 2016

**/eco Institut/**

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**/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 4108-4:2016 – Draft/**

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

**/DIN ISO 12572/**

DIN ISO 12572: Determination of water vapour transmission properties – Cup method (ISO 12572:2001); German version EN ISO 12572:2001

**/DIN EN 12467/**

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

**/DIN EN 789/**

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

**/DIN EN 319/**

DIN EN 319: Particleboards and fibreboards; determination of tensile strength perpendicular to the plane of the board

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Preparation of Environmental product Declarations (EPDs)

**/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 Declarations – Core rules for the product category of construction products

**PCR A**

PCR Product Category Rules for building-related products and services – Part A: Calculation rules for the Life Cycle Assessment and Requirements on the project report; version 1.6, Institut Bauen und Umwelt e.V., www.ibu-epd.com, www.ibu-epd.com, 2017

**PCR B**

PCR Product Category Rules for building-related products and services – Part B: requirements on the EPD for Fibre cement / Fibre concrete; version 1.0, Institut Bauen und Umwelt e.V., www.ibu-epd.com, 04/2014



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