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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration:	Fermacell GmbH
Program operator:	Institut Bauen und Umwelt e.V. (IBU)
Publisher:	The Norwegian EPD Foundation
Declaration number:	EPD-FER-20160218-CAD1-EN
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Valid to:	11.12.2021

Gypsum Fibreboard

Fermacell GmbH

Hunton Fiber AS

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HUNTON

General Information

Fermacell GmbH

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-FER-20160218-CAD1-EN

This Declaration is based on the Product Category Rules:
Plasterboard, 07.2014
(PCR tested and approved by the SVR)

Issue date
12/12/2016

Valid to
11/12/2021

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

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(Managing Director IBU)

Gypsum Fibreboard

Owner of the Declaration
Fermacell GmbH
Düsseldorfer Landstraße 395
47259 Duisburg

Declared product / Declared unit
1 m² Fermacell gypsum fibreboard

Scope:
This Environmental Product Declaration refers to coated gypsum fibreboard manufactured by Fermacell GmbH.

Specific data from 4 Fermacell plants (Germany: Münchehof, Sieglingen, Wijchen and Orejo/Spain) was averaged as a data basis. The LCA comprises the recovery of raw materials and energy, raw material transport and the actual manufacturing phase for coated gypsum fibreboard. Product reviewed: 1 m² of an average gypsum fibreboard (coated) with an average density of 1.18 t/m³.

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.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Dr.-Ing. Wolfram Trinius
(Independent verifier appointed by SVR)

Product

Product description / Product definition
FERMACELL gypsum fibreboards (coated) are special structural panels made of plaster and cellulose fibres. Directive (EU) No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The product requires a Declaration of Performance taking consideration of the European Technical Approval /ETA-03/0050/ and CE marking.

Application
FERMACELL gypsum fibreboards are used for cladding and lining components.
Use is governed by the respective national regulations.

Technical Data
The product's performance values correspond with the Declaration of Performance in terms of its essential properties in accordance with /ETA 03/0050/, including:

Constructional data

Name	Value	Unit
Gross density	1180	kg/m³
Thermal conductivity (dry)	0.32	W/(mK)
Water vapour diffusion resistance factor	13	-
Moisture content at 20 °C, 65% humidity	1.3	M.-%

Base materials / Ancillary materials

Raw materials:
- Beta-hemihydrate: 80 – 85% (approx. 18% from returns)
- Cellulose fibres: 15 – 20%

Ancillary materials / Additives:
- Retarders: < 0.2%
- Accelerators: 2 – 4%

Coating agents: total approx. 90-110 g/m² (on both sides)
Packaging materials (PE shrink film, reusable wooden pallets) are used as ancillary materials. No other additives are used.

Material definitions:

Beta-hemihydrate: Beta-hemihydrate ($CaSO_4$ *1/2 H_2O) arises when burning gypsum ($CaSO_4$ * 2 H_2O) under a normal atmosphere and at temperatures of 130 to 170 °C by removing the water of crystallisation. Gypsum or calcium sulphate is a mineral in the hydrated sulphates class. Gypsum occurs in nature and can also be manufactured industrially, e.g. via flue gas desulphurisation while burning coal.

Furthermore, production residue (grinding dust, trimmings or even customer returns) is used to produce beta-hemihydrate by calcining in the returns plant. Returns account for an average share of approx. 18%. Returns do not contain any other building materials, e.g. building rubble.

Cellulose fibres: Cellulose fibres are manufactured by recycling waste paper. The waste paper is pre-crushed in a special crushing machine before defibring in a fibre mill.

Retarders: Beta-hemihydrate sets immediately after the press and is adjusted accordingly. Various fruit acids (e.g. citric acid $C_6H_8O_7$) and modified protein hydrolisate (e.g. Retardan) can be used as retarders. Nowadays, citric acid is manufactured using a transgenic variant of “Aspergillus niger”.

Accelerators: Grinding dust from production (i.e. calcium sulphate) is used as an accelerator.

Coating agents: The coating agent has the task of binding the dust while providing a slightly water-resistant impregnation of the surface. The coating agent involves an aqueous solution including a biological hydrocolloid made from renewable plant seeds.

Reference service life
Building product life cycles are dependent on the respective building design, use and maintenance.

LCA: Calculation rules

Declared Unit
This core EPD refers to the manufacture of 1 m² FERMACELL gypsum fibreboard.

Declared unit

Name	Value	Unit
Declared unit	1	m²
Unit area	14,75	kg/m²
Conversion factor to 1 kg	0.068	-

System boundary
The selected system boundaries comprise manufacture of the product, including the extraction of raw materials through to the ready-packaged product at the plant gate (cradle-to-gate).

The review framework comprises the following details:
- Raw material supply
- Energy supply
- Transporting and packaging the raw materials and primary products
- Manufacture (energy, waste, emissions)

Use is not included in the calculation on account of the multiple application and construction possibilities. Disposal of the product under review is not sufficiently quantifiable on account of its long service life and is therefore not included in the analysis.

On the input side, all material flows integrated in the system and greater than 1% of its entire mass or contributing more than 1% to the primary energy consumption are taken into consideration. On the output side, all material flows are recorded which leave the system and whose environmental effects are greater than 1% of all effects in a category taken into consideration.

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.
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LCA: Scenarios and additional technical information

Not of relevance for this cradle-to-gate EPD

LCA: Results

The environmental impacts associated with 1 m² average gypsum fibreboard with a unit weight of 14.75 kg/m², manufactured by FERMACELL GmbH, are outlined below. The following tables depict the results of the indicators of the estimated impact, use of resources, waste and other output flows. Modules marked "x" as per /EN 15804/ are addressed here.

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² fermacell gypsum fibreboard

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2-Eq.]	1.14E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.95E-11
Acidification potential of land and water	[kg SO_2-Eq.]	1.74E-3
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	2.99E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	6.75E-5
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.11E-4
Abiotic depletion potential for fossil resources	[MJ]	1.64E+1

RESULTS OF THE LCA - RESOURCE USE: 1 m² fermacell gypsum fibreboard

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	3.57E+0
Renewable primary energy resources as material utilization	[MJ]	8.62E-3
Total use of renewable primary energy resources	[MJ]	3.58E+0
Non-renewable primary energy as energy carrier	[MJ]	1.74E+1
Non-renewable primary energy as material utilization	[MJ]	1.29E-3
Total use of non-renewable primary energy resources	[MJ]	1.74E+1
Use of secondary material	[kg]	3.64E+0
Use of renewable secondary fuels	[MJ]	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0
Use of net fresh water	[m³]	6.97E-3

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² fermacell gypsum fibreboard

Parameter	Unit	A1-A3
Hazardous waste disposed	[kg]	1.47E-7
Non-hazardous waste disposed	[kg]	2.35E-2
Radioactive waste disposed	[kg]	4.18E-4
Components for re-use	[kg]	0.00E+0
Materials for recycling	[kg]	0.00E+0
Materials for energy recovery	[kg]	0.00E+0
Exported electrical energy	[MJ]	0.00E+0
Exported thermal energy	[MJ]	0.00E+0

References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin(pub.): Generation of Environmental Product Declarations (EPDs);
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 Declarations — Core rules for the product category of construction products

PCR 2014, Part B:
Institut Bauen und Umwelt e.V., Product Category Rules for Building Products, Part B: Requirements on the EPD for plasterboard, 2014-07

ETA 03/0050
Deutsches Institut für Bautechnik (DIBt), European Technical Approval FERMACELL gypsum fibreboard, 2013-06

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ANNEX 1

ANNEX 1: Self declaration from EPD owner

Specific Norwegian requirements

1 Applied electricity data set used in the manufacturing phase

The electricity mix for the electricity used in manufacturing (A3) is the electricity grid mix

<CO_2 eqv/MJ> 0,0664 kg/MJ

2 Content of dangerous substances

- ☒ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- ☐ The product contains substances that are less than 0.1% by weight given by the REACH Candidate or the Norwegian priority list.
- ☐ The product contains dangerous substances more than 0.1% by weight given in the REACH candidate list or the Norwegian Priority List, concentrations is given in the EPD:

Dangerous substances from the REACH candidate list or the Norwegian Priority List	CAS No.	Quantity (concentration, wt%/FU(DU)).
Substance 1		
Substance n		

3 Transport from the place of manufacture to a central warehouse

Transport distance, and CO_2-eqv./DU from transport of the product from factory gate to central warehouse in Oslo shall be given. The following table shall be included in the EPD:

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use	Unit	Value (l/t)	Kg CO2-eqv./DU
Boat							
Truck	100	Truck 23,4 t, EURO5	1140	300	l/tkm		
Railway							
Rail							
Air							
Total							

4 Impact on the indoor environment

☒ Indoor air emission testing has been performed; specify test method and reference; M1, EMICODE EC1+

☐ No test has being performed

☐ Not relevant; specify _____