

# Environmental Product Declaration



In accordance with ISO 14025, ISO 21930 and EN 15804 for:

## **Gyproc Protect® F – Fireboard**

### **Saint-Gobain Gyproc AS**

Programme operator:	The Norwegian EPD Foundation, <a href="http://www.epd-norge.no">www.epd-norge.no</a>
Publisher:	The International EPD® System (EPD International), <a href="http://www.environdec.com">www.environdec.com</a>
Registration numbers:	NEPD-1264-406-EN; S-P-01034
ECO EPD ref. number:	00000492
Issue date:	2017-02-24
Validity date:	2022-02-24



## General information

**Product:**

Gyproc Protect® F – Fireboard

**Program operator:**

The Norwegian EPD Foundation  
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**Declaration number:**

NEPD-1264-406-EN

**ECO Platform reference number:**

00000492

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804 serves as core PCR  
NPCR 010 rev1 Building boards (12 2013)

**Statement of liability:**

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

**Declared unit:**

1 m<sup>2</sup> of manufactured plasterboard

**Declared unit with option:****Functional unit:**

1 m<sup>2</sup> of installed Gyproc Protect® F – Fireboard, with a reference service life of 60 years

**Verification:**

The CEN Norm EN 15804 serves as the core PCR.  
Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☒ external

Third party verifier:



Martin Erlandsson IVL (Independent verifier approved by EPD Norway) and Håkan Strippel IVL

**Owner of the declaration:**

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**Manufacturer:**

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**Place of production:**

Fredrikstad, Norway

**Management system:**

ISO 14001, ISO 9001  
ISO 50001, OHSAS 18001

**Organisation no:**

NO 951699403

**Issue date:**

24.02.2017

**Valid to:**

24.02.2022

**Year of study:**

2015

**Comparability:**


EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

**The EPD has been worked out by:**

James Cobb, Central SHEAR, Saint Gobain Gyproc



Approved



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

Gyproc Protect F is a 15,4 mm thick plasterboard primarily used in interior building applications where normal to high levels of fire resistance is required and for protection to structural steel. It can be used in light weight building systems of 1-3 layers on steel or timber framing where normal structural strength and sound insulation are specified. Gyproc Protect F provides significantly improved fire protection properties compared to a standard gypsum board. It shrinks less during a fire and sustains its basic properties better due to a thicker core reinforced with glass fibres, minerals and other additives for dimensional stability and improved core cohesion at high temperatures. It is available in 900 mm (GFE 15) and 1200 mm width (GF 15) for interior solutions.

### Product specification:

Materials	kg	%
Stucco	9.884	78%
Paper liner	0.346	3%
Other additives	1.148	9%
Water	1.322	10%
Total	12.7	100%

### Technical data:

The weight of the declared unit is 12.7 kg, with a thickness of 15.4 mm

For more information from the product data sheet, see [www.gyproc.no](http://www.gyproc.no)

### Market:

Norway

### Reference service life, product:

60 years

### Reference service life, building:

60 years

## LCA: Calculation rules

### Functional unit:

1 m<sup>2</sup> of installed Gyproc Protect® F – Fireboard, with a reference service life of 60 years

### System boundary:

Figure 1 (below) is a flow diagram illustrating the system boundary from A1 - C4. Module D has not been modelled in this EPD

Figure 1 - Flow diagram of the life cycle stages from raw material extraction (A1) through to end-of-life



### Data quality:

Product specific data was collected at the Fredrikstad plant in Norway in 2015. The data has been modelled using the TEAM software. Background data used is from CML 3.9. Ecoinvent v2.2 data is used having been adapted for use in TEAM by Ecobilan

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

The module A4 refers to transport from the manufacturer all the way through delivery to the construction site. As the product is sold in Norway, Sweden, Denmark and Finland, a weighted average has been applied for transport distances.

### Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/tkm)
Truck	77	26000 kg capacity	108	l/tkm	30
Boat	77	Freight ship	1103	l/tkm	30

The module A5 refers to installation of the functional unit of the product into the building using the auxilliary materials below

### Assembly (A5)

	Unit	Value
Screws	per m <sup>2</sup>	8
Jointing tape	m per m <sup>2</sup>	1.23
Jointing compound	kg/m <sup>2</sup>	0.33
Material loss	%	5

B1 - B7 - all modules in this phase have been assessed, but it is assumed that no maintenance, repair, replacement or refurbishment of the product will be necessary during the reference service life. Therefore, no impacts are associated with this stage.

### Use phase (B1 - B5)

	Unit	Value
B1 - use		0
B2 - maintenance	kg	0
B3 - repair	kg	0
B4 - Replacement	m <sup>3</sup>	0
B5 - Refurbishment	kWh	0

### Operational energy (B6) and water consumption (B7)

	Unit	Value
Not relevant		

The end-of-life stage includes C1, de-construction, demolition, C2, transport to waste processing, C3, waste processing for reuse, recovery and/or recycling, C4, disposal, including provision and all transport, provision of all materials, products and related energy and water for reuse.

### End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	%	0
Collected as mixed construction waste	%	0
Reuse	%	0
Recycling	%	58
Energy recovery	%	2
To landfill	%	40

### Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/tkm)
Truck	77	26000 kg capacity	32	l/tkm	30

## LCA: Results

has been used as the impact model. Specific data has been supplied by the plant, and generic data come from the DEAM and Ecoinvent databases.

All emissions to air, water, and soil, and all materials and energy used have been included, with the exception of long-term emissions (>100 years).

### System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	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	X	X	X	MNR	MNR	X	X	X	X	MND

### Environmental impact

Parameter	Unit	A1 - A3	A4	A5	C1	C2	C3	C4
GWP	kg CO <sub>2</sub> -eqv	2.60E+00	3.40E-01	2.50E-01	4.20E-02	3.20E-02	1.30E-01	0
ODP	kg CFC11-eqv	1.30E-07	6.40E-08	1.90E-08	5.20E-09	2.30E-08	3.10E-08	0
POCP	kg C <sub>2</sub> H <sub>4</sub> -eqv	9.40E-04	2.10E-04	1.00E-04	9.30E-05	1.40E-05	5.40E-05	0
AP	kg SO <sub>2</sub> -eqv	7.40E-03	4.70E-03	1.00E-03	3.20E-04	1.90E-04	7.00E-04	0
EP	kg PO <sub>4</sub> <sup>3-</sup> -eqv	1.30E-03	2.00E-04	1.50E-04	7.50E-05	4.80E-05	8.50E-05	1.20E-04
ADPM	kg Sb-eqv	1.30E-06	2.00E-11	7.50E-08	6.60E-09	7.00E-12	2.00E-09	0
ADPE	MJ	4.90E+01	4.30E+00	4.80E+01	5.80E-01	4.00E-01	2.10E+00	0

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

## Resource use

Parameter	Unit	A1 - A3	A4	A5	C1	C2	C3	C4
RPEE	MJ	5.40E+00	2.00E-03	3.40E-01	2.40E-03	2.10E-04	1.50E-01	0
RPEM	MJ	-	-	-	-	-	-	-
TPE	MJ	5.40E+00	2.00E-03	3.40E-01	2.40E-03	2.10E-04	1.50E-01	0
NRPE	MJ	4.20E+01	4.20E+00	4.30E+00	5.80E-01	4.00E-01	2.20E+00	0
NRPM	MJ	-	-	-	-	-	-	-
TRPE	MJ	4.20E+01	4.20E+00	4.30E+00	5.80E-01	4.00E-01	2.20E+00	0
SM	kg	3.10E+00	0	1.70E-01	0	0	0	0
RSF	MJ	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-
W	m <sup>3</sup>	1.30E-02	1.20E-04	1.50E-03	7.80E-05	3.80E-05	2.30E-04	0

"-" means indicates indicator not assessed (INA)

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

## End of life - Waste

Parameter	Unit	A1 - A3	A4	A5	C1	C2	C3	C4
HW	kg	5.30E-02	2.60E-05	3.00E-03	0	9.10E-06	1.60E-05	0
NHW	kg	9.00E-02	2.30E-04	9.50E-01	0	4.50E-05	2.50E+00	2.50E+00
RW	kg	5.40E-05	1.80E-05	7.10E-06	0	6.40E-06	1.60E-05	0

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

## End of life - Output flow

Parameter	Unit	A1 - A3	A4	A5	C1	C2	C3	C4
CR	kg	-	-	-	-	-	-	-
MR	kg	5.20E-02	6.30E-07	1.30E-01	0	2.30E-07	4.80E-05	0
MER	kg	-	-	-	-	-	-	-
EEE	MJ	3.30E-08	6.20E-10	2.10E-05	0	2.20E-10	3.50E-15	0
ETE	MJ	-	-	-	-	-	-	-

"-" means indicates indicator not assessed (INA)

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 =  $9,0 \times 10^{-3} = 0,009$



## Additional Norwegian requirements

### Greenhouse gas emission from the use of electricity in the manufacturing phase

The electricity mix used for these calculations was a dataset from Ecoinvent v2.2 and was specific to Norway. The dataset includes import, production of transmission lines, direct emissions and losses in the grid.

Data source	Amount	Unit
Ecoinvent v3 (june 2014)	23.31	g CO <sub>2</sub> -eqv/kWh

### Dangerous substances

- ☒ The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- ☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- ☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforsikten, Annex III), see table.

### Indoor environment



The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E.

### Carbon footprint

Carbon footprint has not been worked out for the product.

## Bibliography

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
ISO 14001: 2004	<i>Environmental Management Systems - requirements with guidance for use</i>
ISO 50001: 2011	<i>Energy Management - requirements with guidance for use</i>
EN 520: 2009	<i>Gypsum plasterboards - Definitions, requirements and test methods</i>
Ecoinvent	Ecoinvent v3.1 Database 2014
The Norwegian EPD Foundation	NPCR 010 rev 1 - Building Boards, 2013
Gyproc, Central SHEAR	LCI/LCA report exemplified by Gyproc® Normal – Standard Plasterboard Project Report

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