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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Saint-Gobain Gyproc AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1265-407-EN
Registration number:	NEPD-1265-407-EN
ECO Platform reference number:	00000493
Issue date:	24.02.2017
Valid to:	24.02.2022

Gyproc ROBUST® – Hard Plasterboard

Saint-Gobain Gyproc AS

www.epd-norge.no

General information

Product:
Gyproc ROBUST® – Hard Plasterboard

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Declaration number:
NEPD-1265-407-EN

Place of production:
Fredrikstad, Norway

ECO Platform reference number:
00000493

Management system:
ISO 14001, ISO 9001
ISO 50001, OHSAS 18001

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
NPCR 010 rev1 Building boards (12 2013)

Organisation no:
NO 951699403

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.

Issue date:
24.02.2017

Valid to:
24.02.2022

Declared unit:
1 m² of manufactured plasterboard

Year of study:
2015

Declared unit with option:

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

Functional unit:
1 m² of installed Gyproc ROBUST® – Hard Plasterboard, with a reference service life of 60 years

The EPD has been worked out by:
James Cobb, Central SHEAR, Saint Gobain Gyproc

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 Stripple IVL

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:
Gyproc Robust is a 12,5 mm thick plasterboard with glass-fibre armed core primarily used for interiors as cladding for internal walls and ceilings and can be used in all types of buildings. Suitable for most applications where normal fire, structural and acoustic levels are specified, but is normally used in construction where walls are exposed to larger impacts and abrasion than normal, as in children's rooms, hallways, nurseries and schools. The plasterboards have tapered long edges and short edges sawn straight. It is available in 900 mm (GRE 13) and 1200 mm width (GR 13).

Technical data:
The weight of the declared unit is 11.7 kg, with a thickness of 12.5 mm

For more information from the product data sheet, see www.gyproc.no

Product specification:

Materials	kg	%
Stucco	9.505	81%
Paper liner	0.446	4%
Other additives	0.144	1%
Water	1.605	14%
Total	11.7	100%

Market:
Norway, Sweden, Denmark and Finland

Reference service life, product:
60 years. This 60 year value is the amount of time that we recommend our products last for without refurbishment, and corresponds to standard building design life

Reference service life, building:
60 years

LCA: Calculation rules

Functional unit:
1 m² of installed Gyproc ROBUST® – Hard Plasterboard, 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. Biogenic carbon has not been included in the system boundary.

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 v 2.2 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. The transport distances are representative of delivery to Norway only, and represents the average journey of a delivery a product to a construction site.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	77	26000 kg capacity	246	0.01	3
Boat	77	Freight ship	1135	<0.01	3

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^2	8
Jointing tape	m per m^2	1.23
Jointing compound	kg/m^2	0.33
Material loss	%	5

B1 - B7 - all modules in this phase have been assessed, but it is assumed that no maintainance, 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 - maintainance	kg	0
B3 - repair	kg	0
B4 - Replacement	m^3	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. The present scenario has been established via contact with relevant stakeholders.

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/t)
Truck	77	26000 kg capacity	32	0.09	3

LCA: Results

MNA (Module Not Assessed). Where a dash is present in the results table, the indicator has not been assessed. All results are per functional unit, which is 1 m² of installed Gyproc® Normal – Standard Plasterboard, with a reference service life of 60 years. CML 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			Assemby 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	B1 - B5	C1	C2	C3	C4
GWP	kg CO_2 -eqv	2.30E+00	4.30E-01	2.40E-01	0.00E+00	3.80E-02	3.00E-02	1.20E-01	0.00E+00
ODP	kg CFC11-eqv	9.40E-08	1.30E-07	2.10E-08	0.00E+00	4.80E-09	2.10E-08	2.80E-08	0.00E+00
POCP	kg C_2H_4 -eqv	8.40E-04	2.50E-04	9.40E-05	0.00E+00	8.60E-05	1.30E-05	4.90E-05	0.00E+00
AP	kg SO_2 -eqv	5.40E-03	5.10E-03	9.50E-04	0.00E+00	3.00E-04	1.80E-04	6.50E-04	0.00E+00
EP	kg PO_4^{3-}-eqv	9.90E-04	3.40E-04	1.40E-04	0.00E+00	6.90E-05	4.40E-05	7.80E-05	1.10E-04
ADPM	kg Sb-eqv	4.60E-07	4.20E-11	3.00E-08	0.00E+00	6.10E-09	6.50E-12	1.80E-09	0.00E+00
ADPE	MJ	4.40E+01	5.40E+00	5.00E+00	0.00E+00	5.30E-01	3.70E-01	1.90E+00	0.00E+00

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	B1 - B5	C1	C2	C3	C4
RPEE	MJ	4.80E+00	2.60E-03	3.30E-01	0.00E+00	2.20E-03	2.00E-04	1.40E-01	0.00E+00
RPEM	MJ	8.60E+00	-	-	-	-	-	-	-
TPE	MJ	1.34E+01	2.60E-03	3.30E-01	0.00E+00	2.20E-03	2.00E-04	1.40E-01	0.00E+00
NRPE	MJ	3.80E+01	5.30E+00	4.10E+01	0.00E+00	5.40E-01	3.70E-01	2.00E+00	0.00E+00
NRPM	MJ	6.20E+00	-	-	-	-	-	-	-
TRPE	MJ	4.42E+01	5.30E+00	4.10E+01	0.00E+00	5.40E-01	3.70E-01	2.00E+00	0.00E+00
SM	kg	3.00E+00	0.00E+00	1.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	-	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-	-
W	m^3	1.20E-02	2.40E-04	1.40E-03	0.00E+00	7.20E-05	3.50E-05	2.10E-04	0.00E+00

"-" 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	B1 - B5	C1	C2	C3	C4
HW	kg	4.30E-02	5.40E-05	2.50E-03	0.00E+00	0.00E+00	8.30E-06	1.50E-05	0.00E+00
NHW	kg	8.10E-02	3.70E-04	8.50E-01	0.00E+00	0.00E+00	4.20E-05	2.30E+00	2.30E+00
RW	kg	4.20E-05	3.80E-05	7.30E-06	0.00E+00	0.00E+00	5.90E-06	1.40E-05	0.00E+00

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

End of life - Output flow

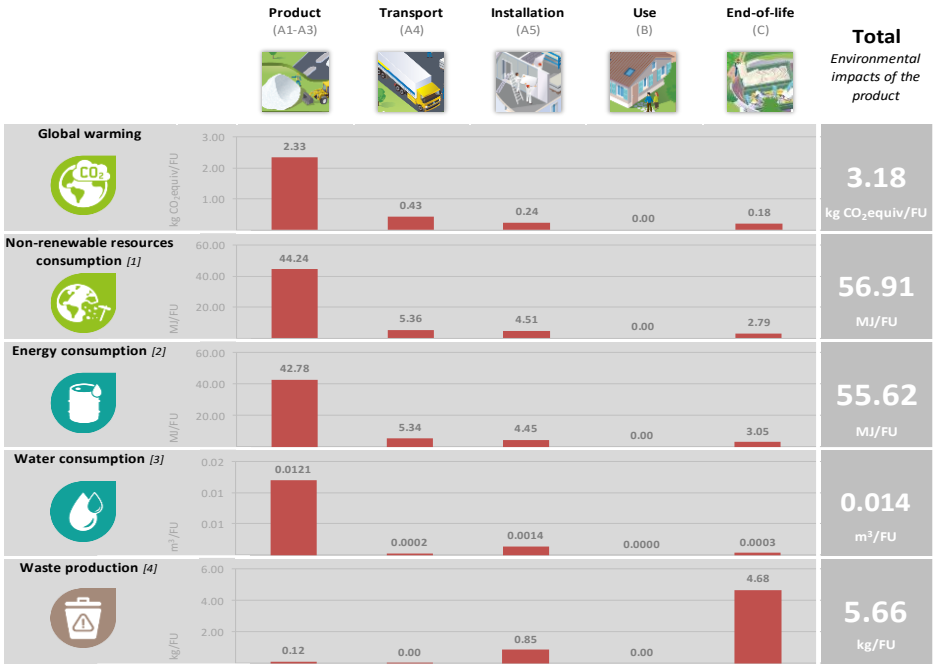
Parameter	Unit	A1 - A3	A4	A5	B1 - B5	C1	C2	C3	C4
CR	kg	-	-	-	-	-	-	-	-
MR	kg	5.80E-02	1.30E-06	1.30E-01	0.00E+00	0.00E+00	2.10E-07	7.10E+00	0.00E+00
MER	kg	-	-	-	-	-	-	-	-
EEE	MJ	4.10E-08	1.30E-09	2.10E-05	0.00E+00	0.00E+00	2.00E-10	1.80E-15	0.00E+00
ETE	MJ	-	-	-	-	-	-	-	-

"-" 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 = $9,0*10^{-3}$ = 0,009

Figure 2: A summary graph illustrating the impact of 1 m2 of product (FU)



Additional Norwegian requirements

Greenhous 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
Econinvent v2.2 (june 2010)	19.8	g CO_2-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 (Avfallsforskiften, 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	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14044:2006	*Environmental management - Life cycle assessment - Requirements and guidelines*
EN 15804:2012+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
ISO 14001: 2004	*Environmental Management Systems - requirements with guidance for use*
ISO 50001: 2011	*Energy Management - requirements with guidance for use*
EN 520: 2009	*Gypsum plasterboards - Definitions, requirements and test methods*
Ecoinvent	Ecoinvent v2.2 Database
The Norwegian EPD Foundation	NPCR 010 rev 1 - Building Boards, 2013
Gyproc, Central SHEAR	LCI/LCA report exemplefied by Gyproc® Normal – Standard Plasterboard Project Report

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