epd-norge
The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Saint-Gobain Byggevarer
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-3369-1995-EN
Registration number:	NEPD-3369-1995-EN
ECO Platform reference number:	-
Issue date:	02.03.2022
Valid to:	02.03.2027

Glasroc® X– Sheathing Board

Saint-Gobain Byggevarer AS Gyproc

www.epd-norge.no

General information

Product

Glasroc® X– Sheathing Board

Program operator

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303
Oslo Phone: +47 23 08 80 00
E-mail: post@epd-norge.no
Web: www.epd-norge.no

Declaration number

NEPD-3369-1995-EN

ECO Platform reference number

This declaration is based on Product Category Rules

CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
The Product Category Rules, NPCR 010:2019 Part B for Building boards.

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 m² of manufacture plasterboard

Functional unit

1 m² of installed Glasroc® X – Sheathing Board, with a reference service life of 60 years

Verification

Independent verification of calculation data and other environmental information and test of the computer program was carried out by Martin Erlandsson

CEN Standard EN 15804:2012+A2:2019 serves as core PCR. Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☐ external

Third party verifier: sign

Martin Erlandsson IVL (Independent verifier approved by EPD Norway)

Owner of the declaration

Saint-Gobain Byggevarer AS Gyproc

Contact person: Gravnås, Stian
Phone: +47 908 84 762
E-mail: stian.gravnas@saint-gobain.com

Manufacture

Saint-Gobain Byggevarer AS Gyproc

Place of production

Fredrikstad, Norway

Management system

NS-EN ISO 9001, NS-EN ISO 14001
NS-EN ISO 45001, NS-EN ISO 50001

Org. No.

NO 940 198 178

Issue date: 02.03.2022

Valid to: 02.03.2027

Year of study

2020

Comparability

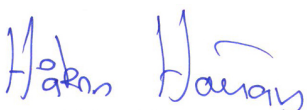
EPD of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019 and seen in a building context.

The EPD has been worked out by

The EPD has been worked by the use of EPD tool, GaBi, version 9.2 by Saint-Gobain LCA central team and by Eva Hellgren.

Company-specific data has been verified by Sandra Perez Jimenez, Saint-Gobain central LCA team.

Approved



Håkon Hauan
Managing Director of EPD-Norway

Product description

Product description and use:

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m^2 of gypsum plasterboard.

Glasroc® X – Sheathing Board is a 9.5 mm thick plasterboard with a weight of 7.9 kg for sheathing applications where wind proofing, high air tightness and low vapor resistance is required. The highly inorganic composition of this board, along with several additives, allows it to be more resistant to moisture and mold, providing a safer solution than conventional plasterboards. The board has an impregnated fiberglass-reinforced gypsum core and is coated with a hydrophobic fiberglass mat. The hydrophobic fiberglass mat provides excellent protection against moisture and mold as well as enhanced protection against UV radiation.

Glasroc® X– Sheathing Board is 9.5 mm thick and available in 900 mm (GXUE 9) and 1200 (GXU 9) width.

Description of the main components and/or materials for 1 m^2 of product for the calculation of the EPD®:

PARAMETER	VALUE (expressed per declared unit)
Quantity for 1 m^2 of product	7,9 kg
Thickness	9,5 mm
Surfacing	Glass fiber mat: 0,72 kg/m^2
Packaging for the transportation and distribution	Culls 0,026 kg/kg PE film 0,0007 kg/kg
Product used for the Installation	Screws: 0,0104 kg/ m^2

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0,1% of the weight of the product.

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

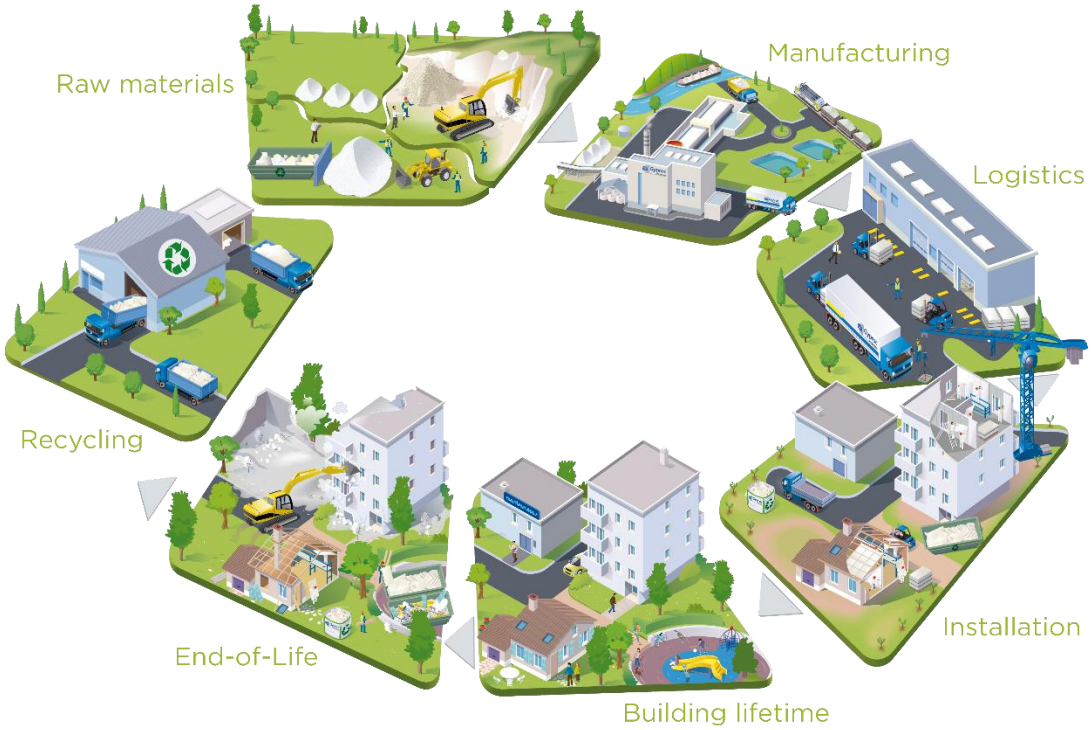
LCA calculation information

EPD TYPE	Cradle to grave and module D
FUNCTIONAL UNIT	1 m^2 of installed Glasroc® X – Sheathing Board, with a reference service life of 60 years
SYSTEM BOUNDARIES	Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	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.
CUT-OFF RULES	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
ALLOCATIONS	Production data, recycling, energy and waste data have been calculated on a mass basis.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope includes: Norway Data included is collected from one production site Fredrikstad, Norway Data collected for the year 2020 Background data: Ecoinvent 3.6 and GaBi ts 9.2
PRODUCT CPC CODE	37530 Articles of plaster or of composition based on plaster

According to EN 15804, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programs.

Life cycle stages

Flow diagram of the Life Cycle



Product stage, A1-A3

Description of the stage: the product stage of plaster products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

A1, raw material supply.
This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process.

A2, transport to the manufacturer.
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations of each raw material.

A3, manufacturing.
This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

Object	Value	Data quality
A3 data quality of electricity and CO_2 emission kg CO_2 eq. / kWh	0,05	The emission of Swedish electricity is based on Thinkstep 2018 database and Guarantee of Origin certificate.

The LCA calculation has been made taking into account the fact that during the manufacturing process it is used 100% renewable electricity. This 100% renewable electricity bought is evidenced by Guarantee of Origin certificates (GOs) from LOS, valid for the period chosen in the calculation (2020).

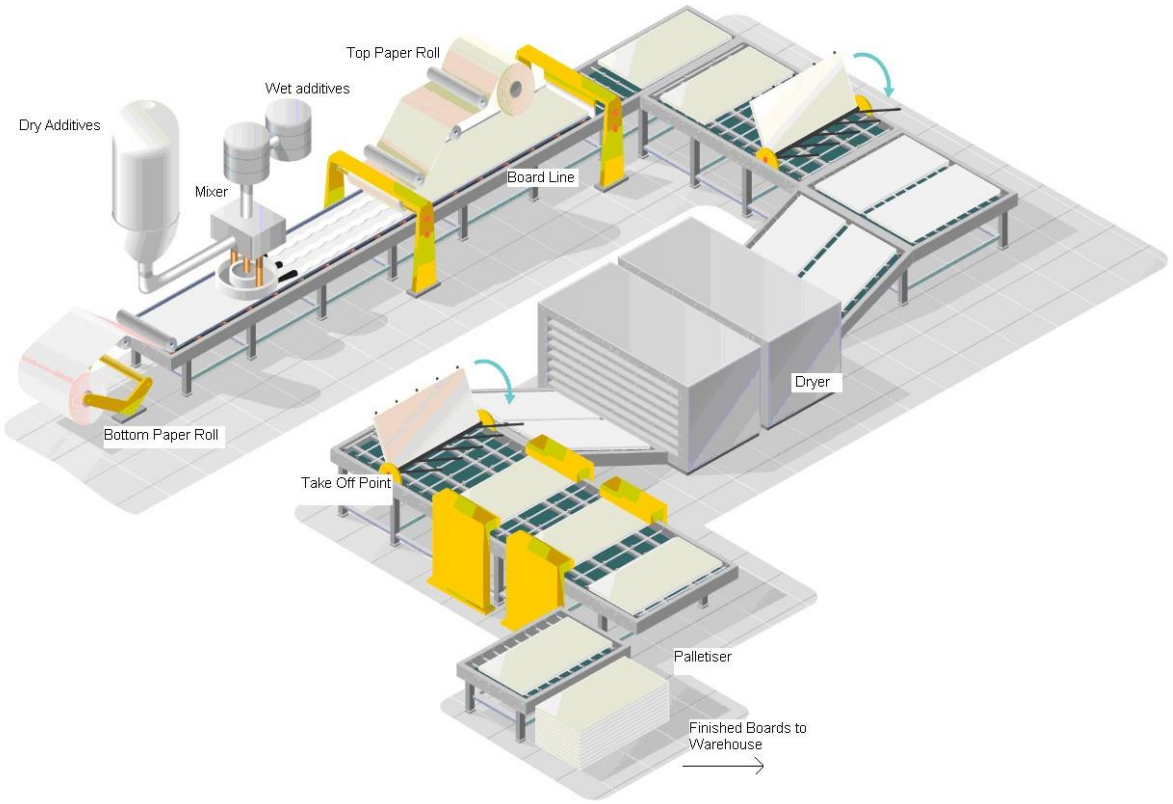


Figure 1: Manufacturing process flow diagram

Manufacturing in detail:

The initial materials are homogenously mixed to form a gypsum slurry that is spread via multiple hose outlets onto a paper liner on a moving conveyor belt. A second paper liner is fed onto the production line from above to form the plasterboard. The plasterboard continues along the production line where it is finished, dried, and cut to size.

Construction process stage, A4-A5

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building

A4, transport to the building site.

This module includes transport from the production gate to the building site. (Representative as average for the Norwegian market). Influence of transport to others countries (Denmark, Finland and Sweden) is shown at page 13.

Transport is calculated on the basis of a scenario with the parameters described in the following table.

PARAMETER	VALUE (expressed per functional unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Long distance truck, maximum load weight of 27 t and consumption of 0,38 liters per km
Distance	300 km
Capacity utilisation (including empty returns)	85% (30% empty returns)
Bulk density of transported products	855 kg/m^3
Volume capacity utilisation factor	1

A5, installation into the building.
The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

PARAMETER	VALUE (expressed per functional unit)
Ancillary materials for installation (specified by materials)	Screws 8 units /m^2 board
Water use	0,165 liters/m^2
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Plasterboard: 0,45 kg (5%) Gypsum culls: 0,08 kg
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	Plasterboard: 0,45 kg (5%) to landfill Screws: 0,005 kg to landfill Gypsum culls: 0,156 kg/m^2 to landfill PE film: 0,006 kg/m^2 Wooden pallet: 0,1302 kg/m^2
Direct emissions to ambient air, soil and water	None

Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage, related to the building fabric includes:

B1, use or application of the installed product;
B2, maintenance;
B3, repair;
B4, replacement;
B5, refurbishment;
B6, operational energy use
B7, operational water use

Description of scenarios and additional technical information:
The product has a reference service life of 60 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Therefore, it has no impact at this stage.

End-of-life stage C1-C4

Description of the stage: This stage includes the next modules:

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 use.

Description of the scenarios and additional technical information for the end-of-life:

PARAMETER	VALUE (expressed per functional unit)
Collection process specified by type	45% collected separately for recycling and 55% collected with mixed deconstruction and demolition waste to landfill
Recovery system specified by type	3,56 kg recycled
Disposal specified by type	4,36 kg
Assumptions for scenario development (e.g. transportation)	Gypsum board waste is transported 360 km by truck from deconstruction/demolition sites to recycling plant and 20 km by truck to landfill

Reuse/recovery/recycling potential, D

An end of life recycling 45% (55% of wastes are landfilled) has been assumed using local demolition waste data and adjusted considering the recyclability of the product.

LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Specific data has been supplied by the plant, and generic data come from GABI and Ecoinvent databases.
All emissions to air, water, and soil, and all materials and energy used have been included.

LCA data results are detailed on the following tables and they refer to a functional unit of is 1 m^2 of installed Glasroc® X – Sheathing Board, with a reference service life of 60 years

Description of the system boundary (X = Included in LCA, MNA = Module Not Assessed)

PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
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	X	X	X	X	X	X	X

Environmental Impacts

	Environmental indicators	Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change [kg CO_2 eq.]	2,11E+00	1,14E-01	1,81E-01	0	0	0	0	0	0	0	3,60E-02	6,70E-02	4,00E-03	5,80E-02	-6,00E-03
	Climate Change (fossil) [kg CO_2 eq.]	2,09E+00	1,13E-01	1,80E-01	0	0	0	0	0	0	0	3,60E-02	6,70E-02	4,00E-03	5,80E-02	-6,00E-03
	Climate Change (biogenic) [kg CO_2 eq.]	8,99E-03	0,00E+00	3,49E-04	0	0	0	0	0	0	0	4,76E-05	0,00E+00	4,00E-05	-2,25E-06	-1,35E-05
	Climate Change (land use change) [kg CO_2 eq.]	3,04E-03	9,24E-04	2,54E-04	0	0	0	0	0	0	0	7,93E-07	5,44E-04	2,88E-05	3,51E-05	-1,77E-05
	Ozone depletion [kg CFC-11 eq.]	6,75E-08	1,37E-17	5,43E-09	0	0	0	0	0	0	0	3,84E-18	8,35E-18	7,43E-12	1,54E-08	-7,24E-17
	Acidification terrestrial and freshwater [Mole of H+ eq.]	8,00E-03	6,52E-04	6,24E-04	0	0	0	0	0	0	0	1,06E-04	3,84E-04	3,99E-05	1,43E-01	-3,95E-05
	Eutrophication freshwater [kg P eq.]	6,96E-05	3,47E-07	1,16E-05	0	0	0	0	0	0	0	7,97E-09	2,04E-07	2,61E-07	1,38E-05	-1,60E-08
	Eutrophication marine [kg N eq.]	2,11E-03	3,15E-04	1,00E-03	0	0	0	0	0	0	0	1,98E-05	1,86E-04	1,39E-05	1,51E-04	-1,84E-05
	Eutrophication terrestrial [Mole of N eq.]	2,30E-02	3,00E-03	2,00E-03	0	0	0	0	0	0	0	2,16E-04	2,00E-03	1,23E-04	2,00E-03	-2,09E-04
	Photochemical ozone formation - human health [kg NMVOC eq.]	1,70E-02	5,94E-04	1,00E-03	0	0	0	0	0	0	0	6,21E-05	3,51E-04	3,33E-05	9,00E-03	-5,16E-05
	Resource use, mineral and metals [kg Sb eq.]	5,85E-06	8,18E-09	2,24E-06	0	0	0	0	0	0	0	9,42E-10	4,86E-09	2,02E-09	5,37E-07	-1,13E-09
	Resource use, energy carriers [MJ]	3,46E+01	1,52E+00	2,35E+00	0	0	0	0	0	0	0	4,41E-01	8,95E-01	4,20E-02	1,31E+00	-7,30E-02
	Water scarcity [m^3 world equiv.]	3,96E-01	1,00E-03	3,70E-02	0	0	0	0	0	0	0	7,48E-05	6,04E-04	2,00E-03	5,50E-02	-1,21E-04

Resources Use

		Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
	Resources Use indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Use of renewable primary energy (PERE) [MJ]	5,38E+00	8,50E-02	3,51E-01	0	0	0	0	0	0	0	2,00E-03	5,00E-02	3,17E-01	4,40E-02	-1,90E-02
	Primary energy resources used as raw materials (PERM) [MJ]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Total use of renewable primary energy resources (PERT) [MJ]	5,38E+00	8,50E-02	3,51E-01	0	0	0	0	0	0	0	2,00E-03	5,00E-02	3,17E-01	4,40E-02	-1,90E-02
	Use of non-renewable primary energy (PENRE) [MJ]	1,00E+01	1,52E+00	1,13E+00	0	0	0	0	0	0	0	4,41E-01	8,96E-01	4,40E-02	1,31E+00	-7,30E-02
	Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	2,46E+01	0,00E+00	1,23E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Total use of non-renewable primary energy resources (PENRT) [MJ]	3,46E+01	1,52E+00	2,36E+00	0	0	0	0	0	0	0	4,41E-01	8,96E-01	4,40E-02	1,31E+00	-7,30E-02
	Input of secondary material (SM) [kg]	1,09E+00	0,00E+00	5,40E-02	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Use of renewable secondary fuels (RSF) [MJ]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Use of non-renewable secondary fuels (NRSF) [MJ]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Use of net fresh water (FW) [m^3]	1,01E-02	9,88E-05	9,63E-04	0	0	0	0	0	0	0	2,74E-06	5,84E-05	8,03E-05	1,00E-03	-1,25E-05

*For this study, both the product and its packaging are reported in the indicators "Use of renewable primary energy resources used as raw materials" ("PERM") and "Use of non-renewable primary energy resources used as raw materials" ("PENRM"). PERM and PENRM are reported as negative values were materials are recycled or recovered, but not when landfilled.

Waste Category & Output flows

	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
Waste Category & Output Flows	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	1,59E-07	7,07E-08	1,36E-08	0	0	0	0	0	0	0	4,47E-11	4,17E-08	6,87E-10	0,00E+00	-1,39E-09
Non-hazardous waste disposed (NHWD) [kg]	1,73E-02	2,33E-04	1,00E-03	0	0	0	0	0	0	0	1,09E-04	1,37E-04	1,29E-04	0,00E+00	-3,04E-05
Radioactive waste disposed (RWD) [kg]	4,64E-05	1,88E-06	1,13E-05	0	0	0	0	0	0	0	5,06E-07	1,14E-06	2,62E-07	0,00E+00	-2,56E-06
Components for re-use (CRU) [kg]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for Recycling (MFR) [kg]	2,20E-02	0,00E+00	1,00E-03	0	0	0	0	0	0	0	0,00E+00	0,00E+00	3,63E+00	0,00E+00	0,00E+00
Material for Energy Recovery (MER) [kg]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy (EEE) [MJ]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (EET) [MJ]	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

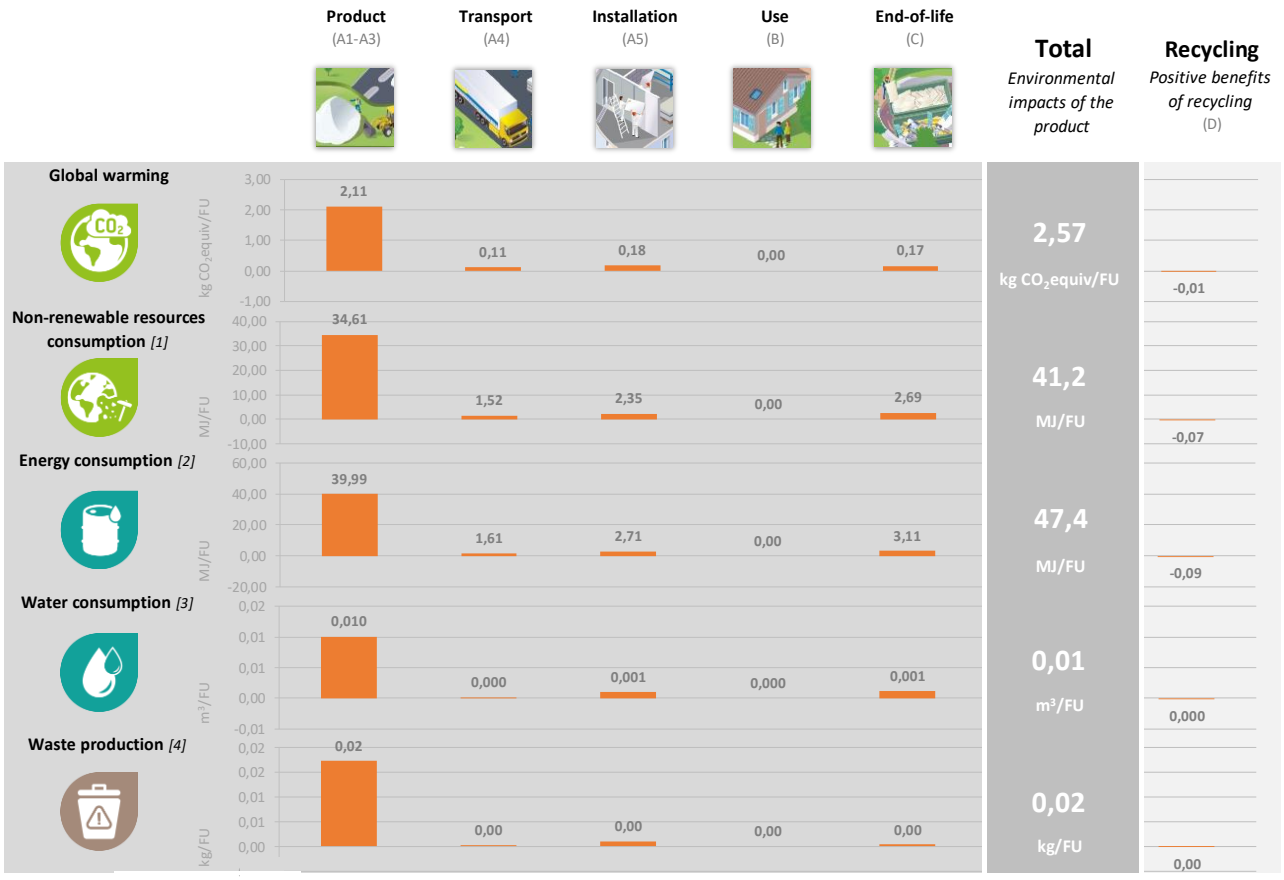
		Product stage
	Biogenic Carbon Content	A1 / A2 / A3
	Biogenic carbon content in product [kg]	3,03E-04
	Biogenic carbon content in packaging [kg]	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 (approx. 3,67) kg CO_2.

There is no biogenic carbon in the packaging since the boards are stored on gypsum culls.

LCA results interpretation

The following figure refers to a functional unit of 1 m² of installed Glasroc® X – Sheathing Board, with a reference service life of 60 years.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

The product stage (A1-A3) is responsible for over 50% of gypsum plasterboard in its lifetime for climate change, ozone depletion, freshwater, marine and terrestrial eutrophication, resource use; energy carriers and mineral and metals, photochemical ozone formation and water scarcity. The main source of impact during the product stage occurs in A3 (manufacturing) due to plasterboard production is an intensive process requiring a lot of energy and raw materials. Relevant impacts (over 50%) can be seen in stage C4 (disposal), due to wastes disposed in landfill. The impacts are reflected in terrestrial and freshwater acidification.

Module D declares the environmental benefits from reusable products, recyclable materials or energy recovery. In this analysis, the benefits come from the use of recycled gypsum as raw material and the use of gypsum culls that are basically scraps from the process that recovered and reused as part of the packaging material.

Classification of disclaimers to the declaration of core and additional environmental impact indicators

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules. V1.1, 2020/09/14, the environmental impacts are declared and reported using the parameters and units shown here below. Baseline characterization factors are from the ILCD and available at: https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

Table 1: Parameters describing the environmental impacts

PARAMETER	UNIT EXPRESSED PER FUNCTIONAL UNIT	ILCD TYPE / DISCLAIMER
Global warming potential total, (GWP)	kg CO2 eq.	Type 1 / None
Depletion potential of the stratospheric ozone layer, ODP	kg CFC 11 eq.	Type 1 / None
Acidification potential of land and water, AP	mol H+ eq.	Type 2 / None
Eutrophication aquatic freshwater (EP-freshwater)	kg P eq.[1]	Type 2 / None
Eutrophication aquatic freshwater (EP-freshwater)	kg $(PO_4)^{3-}$ eq.	Type 2 / None
Eutrophication aquatic marine, (EP-marine)	kg N eq.	Type 2 / None
Eutrophication terrestrial, (EP-terrestrial)	mol N eq.	Type 2 / None
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq.	Type 2 / None
Abiotic Depletion Potential (ADP-elements) for non-fossil resources	kg Sb eq.	Type 3 / 2
Abiotic Depletion Potential (ADP-fossil fuels for fossil resources	MJ, net calorific value	Type 3 / 2
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	m^3 world eq. deprived	Type 3 / 2

The optional environmental impact categories are the following:

[1] Results expressed in kg of PO_4^{3-}, may be obtained by multiplying results of "kg P eq." x 3,07

PARAMETER	PARAMETER UNIT EXPRESSED PER FUNCTIONAL UNIT	**ILCD TYPE / DISCLAIMER**
Respiratory inorganics	Disease incidences	Type 1 / None
Ionizing radiation - human health	kBq U235 eq.	Type 2 / 1
Ecotoxicity freshwater	CTUe	Type 3 / 2
Cancer human health effects	CTUh	Type 3 / 2
Non-cancer human health effects	CTUh	Type 3 / 2
Land Use	Pt	

Disclaimer 1 – 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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

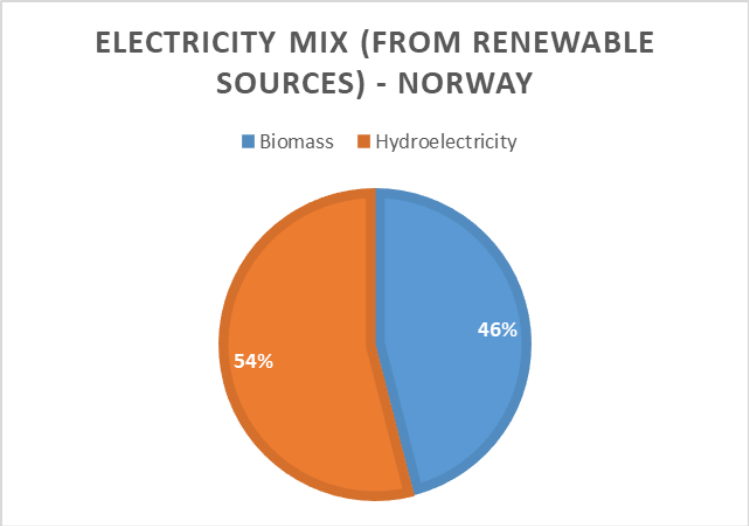
Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Additional Norwegian requirements:

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in Norway
Geographical representativeness description	**Split of energy sources in Norway** - Biomass: 46% - Hydroelectricity 54%
Reference year	2020
Type of data set	Cradle to gate from Thinkstep
Source	Gabi database from International Energy Agency -2013 Guarantee of Origin certificates (GOs) - 2020

Object	Value	Data quality
A3 data quality of electricity and CO_2 emission kg CO_2 eq. / kWh	0,05	The emission of Norwegian electricity is based on Thinkstep 2018 database and Guarantee of Origin certificate.



Influence of transportation to other countries

The results of stage A4 (transportation of product) in the table of this EPD refer to transportation in Norway. This product is also delivered to the countries in the table below. In order to adapt the impact of transportation in the A4 column, figures from the current EPD shall be multiply by the multiplication factors below.

Country	Average distance	Multiplication factor
Norway	300 km (truck)	1,0
Denmark	600 km (truck)	2,0
Finland	800 km (truck) + 400 km (ship)	3,1
Sweden	500 km (truck)	1,7

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 contains 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, see table.

Indoor environment

The product meets the requirements for low emissions M1 according to M1 Protocol of November 2017.

Carbon footprint

Carbon footprint	Product stage	Construction stage		End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
GWP [kg CO2 eq.]	2,10E+00	1,13E-01	1,80E-01	3,60E-02	6,70E-02	4,04E-03	5,80E-02	-6,01E-03
GWP-IOBC [kg CO2 eq.]	2,09E+00	1,13E-01	1,80E-01	3,60E-02	6,70E-02	4,00E-03	5,80E-02	-6,00E-03
GWP-BC [kg CO2 eq.]	8,99E-03	0,00E+00	3,49E-04	4,76E-05	0,00E+00	4,00E-05	-2,25E-06	-1,35E-05

Note : The columns with values for the stages B1 –B5 were excluded since all the values are equal to zero (0 kgCO_2 eq.)

Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of 1 m^2 of installed Glasroc® X – Sheathing Board, with a reference service life of 60 years according to EN 15804:2012 +A1.

	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Global Warming Potential (GWP) [kg CO_2 eq.]	2,04E+00	1,12E-01	1,70E-01	0	0	0	0	0	0	0	3,60E-02	6,60E-02	4,00E-03	5,60E-02	-5,00E-03
Ozone depletion (ODP) [kg R11 eq.]	6,02E-08	1,83E-17	4,76E-09	0	0	0	0	0	0	0	5,11E-18	1,11E-17	6,36E-12	1,25E-08	-9,65E-17
Acidification potential (AP) [kg R11 eq.]	7,00E-03	4,46E-04	5,95E-04	0	0	0	0	0	0	0	8,83E-05	2,63E-04	4,49E-05	1,87E-01	-2,74E-05
Eutrophication potential (EP) [kg Phosphate eq.]	1,09E-03	1,12E-04	5,00E-03	0	0	0	0	0	0	0	7,03E-06	6,60E-05	8,07E-06	1,26E-04	-6,85E-06
Photochemical ozone creation [kg Ethene eq.]	2,31E-03	1,54E-05	1,32E-04	0	0	0	0	0	0	0	6,48E-06	9,12E-06	4,99E-06	3,03E-05	-2,69E-06
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	2,46E-04	9,24E-09	1,43E-05	0	0	0	0	0	0	0	9,90E-10	5,49E-09	2,31E-09	5,44E-07	-9,14E-05
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	3,43E+01	1,52E+00	2,29E+00	0	0	0	0	0	0	0	4,40E-01	8,93E-01	4,30E-02	1,24E+00	-6,70E-02

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epd-norge The Norwegian EPD Foundation	**Program operator and Publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: e-mail: web	+47 23 08 80 00 post@epd-norge.no www.epd-norge.no
Gyproc SAINT-GOBAIN	**Owner of the declaration** Saint-Gobain Byggevarer AS Gyproc Habornveien 59, 1630 Gamle Fredrikstad Norway	Phone: e-mail: web	+47 908 84 762 stian.gravnas@saint-gobain.com www.glava.no
SAINT-GOBAIN	**Author of the Life Cycle Assessment** Sandra Péres Jiménez Saint-Gobain, Central Marketing & Development	Phone: e-mail:	+33 07 88 98 17 54 Sandra.Perez-Jimenez@saint-gobain.com