epd-norway
Global Program Operator

gyproc
SAINT-GOBAIN

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019

Glasroc® X Klima - Sheating Board

Program operator:	The Norwegian EPD Foundation
Product Category Rule:	NPCR 010:2022 Part B for building boards (v.4)
Declaration number:	NEPD-7159-6553-EN
Registration number:	NEPD-7159-6553-EN
Issue date:	26.07.2024
Valid to:	26.07.2029
Owner of declaration:	Saint-Gobain Byggevarer AS, Gyproc

EPD VERIFIED

ECO PLATFORM EPD VERIFIED

SAINT-GOBAIN

General information

Product name
Glasroc® X Klima
(GXU 9 Klima, GXUE 9 Klima)

Program operator
The Norwegian EPD Foundation,
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Declaration number:
NEPD-7159-6553-EN

ECO Platform reference number

Product Category Rules:
Core PCR: EN 15804:2012+A2:2019
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 evidence.

Declared unit
1 m^2 of manufactured plasterboard

Functional unit
1 m^2 of installed Glasroc® X Klima with a reference service life of 60 years

Verification
Independent verification of calculation data, environmental data, and test of 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 has been done according to ISO 14025:2010

Martin Erlandsson, IVL
Independent verifier approved by EPD-Norge

☐ Internal ☒ External

Owner of the declaration
Saint-Gobain Byggevarer AS, Gyproc

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Manufacturer: Saint-Gobain Byggevarer AS, Gyproc

Place of production: Fredrikstad, Norway

Geographical use: Norway and other Nordic countries

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

Organization number: NO 940 198 178

Issue date: 26.07.2024
Valid to: 26.07.2029

Year of study: 2023 + 2024

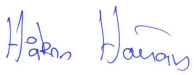
Comparability
EPD of construction products may not be comparable if they don't comply with EN 15804:2012+A2:2019 and seen in a building context, see also EN 15942.

The EPD has been worked out by
Malin Dalborg (Saint-Gobain Nordic) and Saint-Gobain LCA central team using GaBi version 10.6

Malin Dalborg

Company-specific data has been verified by Simen Kandola and Malin Dalborg Saint-Gobain Byggevarer AS, Gyproc

Approved by



Håkon Hauan
Managing Director of EPD-Norge

Product information

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1m2 of installed gypsum board Glasroc® X Klima with a weight of 7,9 kg/m2.

Glasroc® X Klima – 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.

Thickness: 9,5 mm
Width: 1200 mm (GXU 9 Klima) and 900 mm (GXUE 9 Klima)
For more information: www.gyproc.no/produkter/glasroc-x-klima-gxu-9-klima

To calculate the result for 1 kg of Glasroc® X Klima, divide the result with the weight of the plasterboard: 7,9 kg/m (conversion factor 1/7,9 = 0,127)

Technical data

Parameter	Value / Description
EN Classification	GM-H1 (EN 15283-1:2008+A1:2009)
Reaction to fire	A1 (EN 13501-1:2002)
Water vapour resistance factor, μ	< 0,10 (EN 10456:2007)
Thermal conductivity	0,25 W/mK (EN 10456:2007)

Product specification

Product components	Value / Description
Weight of 1 m² plasterboard	7,9 kg
Thickness	9,5 mm
Surfacing	Fiberglass mat: 0,36 kg/m2
Packaging material	Gypsum Culls: 0,022 kg/kg PE film: 0,001 kg/kg Paper label: 0,000009 kg/kg
Products used for installation	Screws*

*Screws are not included in the LCA according to the PCR Part B for building boards, hence not included in the result of this EPD.

Market

Glasroc® X Klima is manufactured and sold in Norway. It can also be distributed and sold in other countries like Sweden, Finland and Denmark as Glasroc® X Storm Klima.

Reference Service Life (RSL), product

60 years. When installed correct, the product is assumed to have at least the same RSL as the building.

Reference Service Life (RSL), building

60 years.

LCA calculation information

Parameter	Value / Description
Type of EPD	Cradle to grave and module D
Functional unit	1 m² of installed board with a weight of 7,9 kg/m² and an expected average service life of 60 years. Note that the declared product and therefor the functional unit do not include any upper surface material like paint or likewise and therefore not potentially add as part of maintenance (B2).
System boundaries	Cradle to grave + Module D = A + B + C +D
Cut-off rules	All raw materials and additives and all energy has been included. The following has been excluded: Flows related to human activities such as employee transport The construction of plants, production of machines and transportation systems
Allocations	Allocation criteria are based on mass. The polluter pays principle as well as the modularity principle have been followed.
Geographical coverage and time period	Scope: Norway Data is collected from one production site Fredrikstad located in Norway The EPD is based on 12 month data from June 2023 – May 2024
Data quality	The data was collected from the specific manufacturing site Fredrikstad, using measurements, internal records and reporting documents. The manufacturing process at Fredrikstad has been fully electrified since March 2023. All measured from June 1th 2023 – May 31th 2024.
Background data source	Databases GaBi 2022 and ecoinvent v.3.8
Software	GaBi 10.6
Product CPC code	37530, Articles of plaster or of composition based on plaster

LCA scope

The following stages and modules have been included for this product.

	PRODUCT STAGE			CONSTRUC-TION 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
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

(X=included. MND=module not declared)

Life cycle stages

A1-A3, Product stage

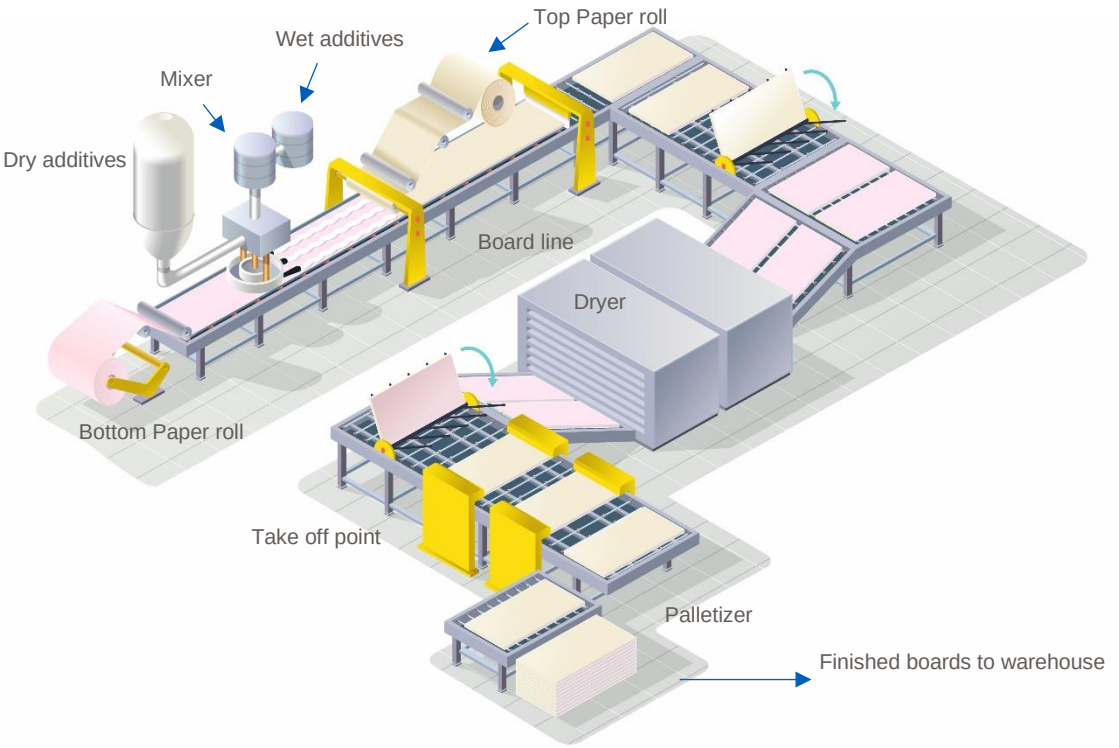
A1, Raw materials supply
This module includes the extraction and transformation of raw materials and packaging.

A2, Transport to the manufacturer
This module includes the transportation (truck, boat and rail) of raw materials and packaging to the manufacturing site. Calculations have been based on specific distances provided by the logistic department.

A3, Manufacturing
This module includes the manufacturing of products and the processing of any waste arising during the manufacturing process.
During the manufacturing process, 100% renewable electricity bought with Guarantee of Origin (GO) has been used. The amount of electricity purchases with GO's correspond to 100% of the electricity consumed at the manufacturing site, leaving 0% to be covered by Norwegian National grid mix.

Parameter	Consumption covered (%)	Value, GWP total	Description
Electricity mix (Go's)	100%	0,00621 kg CO_2 eq. / kWh	100% Hydro power - Dataset Gabi EU-28: Electricity from hydro power and Guarantee of Origin certificate
Electricity mix (national mix)	0%	0,0329 kg CO_2 eq. / kWh	Dataset Gabi NO: Electricity grid mix

Manufacturing process flow diagram



Manufacturing in detail:
The raw 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.

A4-A5, Construction process stage

A4, Transport to the building site

This module includes the transport from the manufacturing site to the building site. Transport is calculated based on a scenario with the parameters described in the following table.

Parameter	Value / Description
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Freight truck, maximum load weight of 30 t, real load of 22 t and consumption of 0.38 liters per km
Distance	300 km
Capacity utilization (including empty returns)	56% (30% empty returns)
Bulk density of transported products*	832 kg/m^3
Volume capacity utilization factor	< 1

A5, Installation in the building

This module includes the installation materials and the management and processing of waste generated during the installation. The parameters are presented in the following table.

Parameter	Value / Description
Ancillary materials for installation (specified by materials)	None
Water used during installation	0 liters/m^2
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	0,0 MJ/m^2 electricity
Scrap rate at installation	5% for plasterboard and for ancillary materials 100% for packaging
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Plasterboard: 0,39 kg (100% recycling) Gypsum culls: 0,022 kg (100% landfill) PE film: 0,001 kg (50/50% incineration with/without recovery) Paper label: 0,000009 kg (50/50% incineration with/without recovery)
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: 0,39 kg (100% recycling) PE film: 0,0005 kg (incineration w. recovery), 0,0005 kg (incineration no recovery) Paper label: 0,000005 kg (incineration w. recovery), 0,000005 kg (incineration no recovery) Gypsum culls: 0 kg (recycling), 0,022 kg (landfill)
Direct emissions to ambient air, soil, and water	None

The transport of packaging and product is modelled like transport in C2.

B1-B7, Use stage (excluding potential savings)

Description of the stage: The use stage is divided into the following modules:

- B1, Use
- B2, Maintenance
- B3, Repair
- B4, Replacement
- B5, Refurbishment
- B6, Operational energy use
- B7, Operational water use

The product has a reference service life of 60 years. It is assumed 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.

C1-C4, End of Life Stage

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

- C1, Deconstruction, demolition: The de-construction and/or dismantling of the product is considered part of the demolition of the entire building, but a small amount of energy has been located to the studied product.
- 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

Two End-of-life scenarios have been declared for the plasterboard and paperliner: 100% recycling and 100% landfill.

Parameter	Value / Description
Energy for de-construction/demolition	0,05 MJ/$m^{2.}$ The de-construction of the product is considered to be part of the demolition of the entire building
Collection process specified by type	**Plasterboard and paper liner:** • Scenario 1: 100% recycling • Scenario 2: 100% landfill **Both scenarios:** Other deconstruction waste is 100% collected with mixed deconstruction and demolition waste for landfill
Recovery system specified by type	Scenario 1: 7,9 kg is recycled Scenario 2: 0 kg is recycled
Disposal specified by type	Scenario 1: 0 kg to landfill Scenario 2: 7,9 kg to landfill
Assumptions for scenario development (e.g. transportation)	Freight truck, maximum load weight of 27.9 t, real load of 24 t and consumption of 0.38 liters per km Distance to recycling facilities: 300 km Distance to landfill: 50 km Distance to incineration facilities: 50 km

D, Reuse/recovery/recycling potential

Module D considers the benefits and loads beyond the system boundary resulting from recycling and energy recovery processes.
Module D includes:

- the benefits and loads from the net flows of recycled gypsum and paper liner leaving the product system and substituting primary materials
- the benefits from the net flows of energy related to packaging sent to incineration with energy recovery and substituting steam and electricity production

LCA results

As specified in EN 15804:2012+A2:2019 and the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors from the ILCD EF 3.0. 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.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

All figures refer to a declared unit of 1m^2 of installed gypsum board Glasroc® X Klima with a weight of 7,9 kg/m^2 and a useful life of 60 years. It has been manufactured in Fredrikstad, Norway.

Electricity
The main result presented is calculated with national electricity grid mix.
An additional set of results based on GO's can be found in "Additional Information".

Transport to other countries
Information and conversion factors for transport to other countries can be found under "Additional Information".

Environmental Impacts - National electricity grid mix

Environmental indicators		PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
		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
	Climate Change (total) [kg CO_2 eq.][(a)]	1,97E+00	1,46E-01	4,65E-01	0	0	0	0	0	0	0
	Climate Change (fossil) [kg CO_2 eq.]	1,96E+00	1,44E-01	1,68E-01	0	0	0	0	0	0	0
	Climate Change (biogenic) [kg CO_2 eq.]	1,17E-02	1,85E-03	2,96E-01	0	0	0	0	0	0	0
	Climate Change (land use change) [kg CO_2 eq.]	7,45E-04	8,08E-04	1,22E-04	0	0	0	0	0	0	0
	Ozone depletion [kg CFC-11 eq.]	1,37E-07	8,69E-15	7,34E-09	0	0	0	0	0	0	0
	Acidification terrestrial and freshwater [Mole of H+ eq.]	8,82E-03	1,81E-04	5,69E-04	0	0	0	0	0	0	0
	Eutrophication freshwater [kg P eq.]	7,06E-05	4,33E-07	9,53E-06	0	0	0	0	0	0	0
	Eutrophication marine [kg N eq.]	2,85E-03	6,58E-05	2,15E-04	0	0	0	0	0	0	0
	Eutrophication terrestrial [Mole of N eq.]	2,68E-02	7,66E-04	1,79E-03	0	0	0	0	0	0	0
	Photochemical ozone formation - human health [kg NMVOC eq.]	7,72E-03	1,60E-04	6,06E-04	0	0	0	0	0	0	0
	Resource use, mineral and metals [kg Sb eq.][1]	5,22E-06	1,21E-08	2,80E-07	0	0	0	0	0	0	0
	Resource use, energy carriers [MJ][1]	3,78E+01	1,94E+00	2,40E+00	0	0	0	0	0	0	0
	Water deprivation potential [m³ world equiv.][1]	1,03E+00	1,30E-03	9,15E-02	0	0	0	0	0	0	0

[1] 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
[(a)] The total global warming potential (GWP-total) is the sum of GWP fossil. GWP biogenic and GWP land use change

Environmental Impacts - National electricity grid mix

Environmental indicators		100% recycling					100% landfill				
		END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
		C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change (total) [kg CO_2 eq.][(a)]	3,27E-02	1,44E-01	2,80E-02	6,64E-03	2,09E-02	3,27E-02	2,48E-02	0,00E+00	4,88E-02	-1,87E-02
	Climate Change (fossil) [kg CO_2 eq.]	3,27E-02	1,41E-01	2,69E-02	5,07E-03	2,09E-02	3,27E-02	2,44E-02	0,00E+00	4,67E-02	-1,86E-02
	Climate Change (biogenic) [kg CO_2 eq.]	4,43E-05	1,82E-03	1,08E-03	1,56E-03	2,47E-05	4,43E-05	3,14E-04	0,00E+00	2,10E-03	-1,60E-05
	Climate Change (land use change) [kg CO_2 eq.]	3,46E-06	7,96E-04	1,24E-05	1,46E-05	-4,73E-06	3,46E-06	1,37E-04	0,00E+00	5,47E-05	-1,40E-05
	Ozone depletion [kg CFC-11 eq.]	6,99E-09	8,55E-15	6,00E-09	1,88E-17	-9,74E-10	6,99E-09	1,48E-15	0,00E+00	1,68E-08	-9,75E-10
	Acidification terrestrial and freshwater [Mole of H+ eq.]	3,40E-04	1,76E-04	1,66E-04	3,64E-05	6,60E-05	3,40E-04	3,03E-05	0,00E+00	4,28E-04	-7,22E-05
	Eutrophication freshwater [kg P eq.]	1,01E-06	4,26E-07	2,81E-06	8,71E-09	-3,18E-06	1,01E-06	7,35E-08	0,00E+00	3,82E-06	-3,23E-06
	Eutrophication marine [kg N eq.]	1,51E-04	6,33E-05	5,98E-05	9,36E-06	2,24E-05	1,51E-04	1,09E-05	0,00E+00	1,46E-04	-1,50E-05
	Eutrophication terrestrial [Mole of N eq.]	1,65E-03	7,39E-04	6,53E-04	1,03E-04	2,30E-04	1,65E-03	1,27E-04	0,00E+00	1,59E-03	-1,54E-04
	Photochemical ozone formation - human health [kg NMVOC eq.]	4,53E-04	1,55E-04	1,85E-04	2,83E-05	6,78E-05	4,53E-04	2,68E-05	0,00E+00	4,62E-04	-4,46E-05
	Resource use, mineral and metals [kg Sb eq.][2]	1,68E-08	1,19E-08	1,89E-07	4,55E-10	-2,02E-09	1,68E-08	2,06E-09	0,00E+00	9,54E-08	-1,11E-08
	Resource use, energy carriers [MJ][1]	4,47E-01	1,91E+00	4,98E-01	6,65E-02	3,58E-01	4,47E-01	3,29E-01	0,00E+00	1,23E+00	-3,02E-01
	Water deprivation potential [m^3 world equiv.][1]	1,10E-03	1,28E-03	1,68E-02	5,31E-04	3,01E-03	1,10E-03	2,21E-04	0,00E+00	5,40E-02	-3,21E-03

[2] 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

[(a)] The total global warming potential (GWP-total) is the sum of GWP fossil. GWP biogenic and GWP land use change

Resources Use - National electricity grid mix

Resources Use indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
	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
Use of renewable primary energy (PERE) [MJ]	2,67E+01	1,10E-01	1,48E+00	0	0	0	0	0	0	0
Use of renewable primary energy resources used as raw materials (PERM) [MJ] *	7,16E-03	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2,67E+01	1,10E-01	1,48E+00	0	0	0	0	0	0	0
Use of non-renewable primary energy (PENRE) [MJ]	3,76E+01	1,94E+00	2,39E+00	0	0	0	0	0	0	0
Non-renewable primary energy resources used as raw materials (PENRM) [MJ] *	5,66E-01	0	-1,46E-01	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	3,82E+01	1,94E+00	2,24E+00	0	0	0	0	0	0	0
Input of secondary material (SM) [kg]	1,26E+00	0	6,43E-02	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	2,164E-25	0	1,107E-26	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	2,542E-24	0	1,301E-25	0	0	0	0	0	0	0
Use of net fresh water (FW) [m^3]	5,96E-02	1,25E-04	3,96E-03	0	0	0	0	0	0	0

* 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 when materials are recycled or recovered, but not when landfilled.

Resources Use - National electricity grid mix

Resources Use indicators	100% recycling					100% landfill				
	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	2,53E-03	1,08E-01	1,07E-01	8,71E-03	9,59E-02	2,53E-03	1,87E-02	0	1,88E-02	-3,52E-02
Use of renewable primary energy resources used as raw materials (PERM) [MJ] *	0	0	-2,09E-01	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2,53E-03	1,08E-01	-1,02E-01	8,71E-03	9,59E-02	2,53E-03	1,87E-02	0	1,88E-02	-3,52E-02
Use of non-renewable primary energy (PENRE) [MJ]	4,47E-01	1,91E+00	4,98E-01	6,65E-02	3,59E-01	4,47E-01	3,30E-01	0	1,23E+00	-3,02E-01
Non-renewable primary energy resources used as raw materials (PENRM) [MJ] *	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	4,47E-01	1,91E+00	4,83E-01	6,65E-02	3,59E-01	4,47E-01	3,30E-01	0	1,23E+00	-3,02E-01
Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m^3]	2,56E-05	1,23E-04	3,91E-04	1,68E-05	1,51E-04	2,56E-05	2,12E-05	0	1,26E-03	-9,33E-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 when materials are recycled or recovered, but not when landfilled.

Waste Category & Output flows - National electricity grid mix

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
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
Hazardous waste disposed (HWD) [kg]	4,44E-06	9,30E-12	2,84E-07	0	0	0	0	0	0	0
Non-hazardous waste disposed (NHWD) [kg]	3,40E-01	2,78E-04	1,62E-01	0	0	0	0	0	0	0
Radioactive waste disposed (RWD) [kg]	4,36E-04	2,39E-06	1,10E-05	0	0	0	0	0	0	0
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	2,15E-02	0	3,96E-01	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	2,94E-02	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	5,22E-02	0	0	0	0	0	0	0

Waste Category & Output flows - National electricity grid mix

Waste Category & Output Flows		100% recycling					100% landfill				
		END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
		C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Hazardous waste disposed (HWD) [kg]	1,23E-06	9,16E-12	1,09E-06	1,01E-09	-1,25E-07	1,23E-06	1,58E-12	0	1,76E-06	-1,26E-07
	Non-hazardous waste disposed (NHWD) [kg]	2,56E-03	2,74E-04	2,93E-02	3,35E-01	-5,22E-03	2,56E-03	4,73E-05	0	8,24E+00	-5,50E-03
	Radioactive waste disposed (RWD) [kg]	3,10E-06	2,36E-06	3,99E-06	7,57E-07	6,56E-05	3,10E-06	4,06E-07	0	8,37E-06	-1,57E-05
	Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0
	Materials for Recycling (MFR) [kg]	0	0	7,90E+00	0	0	0	0	0	0	0
	Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0
	Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0
	Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Biogenic Carbon Content at factory gate	Value (express per FU)
Biogenic carbon content in product [kg C]	5,48E-04
Biogenic carbon content in packaging [kg C]	3,16E-05

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

The biogenic carbon content in product mainly comes from maize starch, dextrose and paper liner.
The biogenic carbon content in the packaging is very low, and it mainly comes from the paper label.

Additional Norwegian requirements

Electricity information

The table below presents the information for the physical national grid mix:

Type of information	Description
Location	Electricity purchased by Saint-Gobain Construction Products Norway.
Share of electricity covered by Guarantee of Origin	0% of the energy consumption is covered by the GO
Energy sources for electricity	Share of energy sources: Hydro 95,19% Wind 2,64% Natural gas 1,76% Waste 0,23% Hard coal 0,12% Fuel oil 0,02% Biomass 0,01% Biogas 0,01%
Type of dataset	Cradle to gate from Gabi and ecoinvent databases
Source	Dataset Gabi NO: Electricity grid mix
CO_2 emission kg CO_2 eq. / kWh	0,0329 kg of CO_2 eq/kWh - Climate Change - total indicator

The table below presents the information for the renewable electricity based on Guarantee of Origin certificates (GOs):

Type of information	Description
Location	Electricity purchased by Saint-Gobain Construction Products Norway.
Share of electricity covered by Guarantee of Origin	100% of the energy consumption is covered by the GO
Energy sources for electricity	Share of energy sources: 100% Hydro power
Type of dataset	Cradle to gate from Gabi and ecoinvent databases
Source	Dataset Gabi EU-28: Electricity from hydro power
CO_2 emission kg CO_2 eq. / kWh	0,00621 kg of CO_2 eq/kWh - Climate Change - total indicator

Additional impact indicator (GWP-IOBC / GWP-GHG)

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
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
With National Electricity Grid Mix															
GWP-IOBC* / GWP-GHG* [kg CO_2 eq.]	1,96E+00	1,45E-01	5,18E-01	0	0	0	0	0	0	0	**100% recycling**				
											3,27E-02	1,43E-01	2,70E-02	5,10E-03	2,09E-02
											100% landfill				
											3,27E-02	2,46E-02	0	4,68E-02	-1,87E-02
With Electricity purchased with Guarantee of Origin															
GWP-IOBC* / GWP-GHG* [kg CO_2 eq.]	1,82E+00	1,45E-01	5,10E-01	0	0	0	0	0	0	0	**100% recycling**				
											3,27E-02	1,43E-01	2,70E-02	5,10E-03	2,09E-02
											100% landfill				
											3,27E-02	2,46E-02	0	4,68E-02	-1,87E-02

*The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

Hazardous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

Indoor environment

Glasroc® X Klima has no label.

Carbon footprint

The GWP-IOBC value can be found on page 17.

Additional Information

Transport to other countries

The results of stage A4 presented in the tables above refers to Norway. As the product is exported to other countries, conversion factors for each country have been provided.
To get the impact for transport to these countries, the A4 figures shall be multiplied with the relevant factor.

Country	Transport and distance	Factor
Norway	Truck (300 km)	1,0
Denmark	Truck (600 km)	2,0
Finland	Truck (800 km), Ship (400 km)	2,9
Sweden	Truck (500 km)	1,7

Environmental Impacts – 100 % renewable electricity with GO's

Environmental indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
	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
Climate Change (total) [kg CO_2 eq.][(a)]	1,83E+00	1,46E-01	4,58E-01	0	0	0	0	0	0	0
Climate Change (fossil) [kg CO_2 eq.]	1,82E+00	1,44E-01	1,61E-01	0	0	0	0	0	0	0
Climate Change (biogenic) [kg CO_2 eq.]	1,14E-02	1,85E-03	2,96E-01	0	0	0	0	0	0	0
Climate Change (land use change) [kg CO_2 eq.]	7,32E-04	8,08E-04	1,21E-04	0	0	0	0	0	0	0
Ozone depletion [kg CFC-11 eq.]	1,37E-07	8,69E-15	7,34E-09	0	0	0	0	0	0	0
Acidification terrestrial and freshwater [Mole of H+ eq.]	8,73E-03	1,81E-04	5,64E-04	0	0	0	0	0	0	0
Eutrophication freshwater [kg P eq.]	7,02E-05	4,33E-07	9,51E-06	0	0	0	0	0	0	0
Eutrophication marine [kg N eq.]	2,82E-03	6,58E-05	2,14E-04	0	0	0	0	0	0	0
Eutrophication terrestrial [Mole of N eq.]	2,65E-02	7,66E-04	1,78E-03	0	0	0	0	0	0	0
Photochemical ozone formation - human health [kg NMVOC eq.]	7,64E-03	1,60E-04	6,01E-04	0	0	0	0	0	0	0
Resource use, mineral and metals [kg Sb eq.][3]	5,22E-06	1,21E-08	2,80E-07	0	0	0	0	0	0	0
Resource use, energy carriers [MJ][1]	3,58E+01	1,94E+00	2,30E+00	0	0	0	0	0	0	0
Water deprivation potential [m^3 world equiv.][1]	1,17E+00	1,30E-03	9,88E-02	0	0	0	0	0	0	0

[3] 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
[(a)] The total global warming potential (GWP-total) is the sum of GWP fossil. GWP biogenic and GWP land use change

Environmental Impacts – 100 % renewable electricity with GO's

Environmental indicators		100% recycling					100% landfill				
		END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
		C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change (total) [kg CO_2 eq.][(a)]	3,27E-02	1,44E-01	2,80E-02	6,64E-03	2,09E-02	3,27E-02	2,48E-02	0,00E+00	4,88E-02	-1,87E-02
	Climate Change (fossil) [kg CO_2 eq.]	3,27E-02	1,41E-01	2,69E-02	5,07E-03	2,09E-02	3,27E-02	2,44E-02	0,00E+00	4,67E-02	-1,86E-02
	Climate Change (biogenic) [kg CO_2 eq.]	4,43E-05	1,82E-03	1,08E-03	1,56E-03	2,47E-05	4,43E-05	3,14E-04	0,00E+00	2,10E-03	-1,60E-05
	Climate Change (land use change) [kg CO_2 eq.]	3,46E-06	7,96E-04	1,24E-05	1,46E-05	-4,73E-06	3,46E-06	1,37E-04	0,00E+00	5,47E-05	-1,40E-05
	Ozone depletion [kg CFC-11 eq.]	6,99E-09	8,55E-15	6,00E-09	1,88E-17	-9,74E-10	6,99E-09	1,48E-15	0,00E+00	1,68E-08	-9,75E-10
	Acidification terrestrial and freshwater [Mole of H+ eq.]	3,40E-04	1,76E-04	1,66E-04	3,64E-05	6,60E-05	3,40E-04	3,03E-05	0,00E+00	4,28E-04	-7,22E-05
	Eutrophication freshwater [kg P eq.]	1,01E-06	4,26E-07	2,81E-06	8,71E-09	-3,18E-06	1,01E-06	7,35E-08	0,00E+00	3,82E-06	-3,23E-06
	Eutrophication marine [kg N eq.]	1,51E-04	6,33E-05	5,98E-05	9,36E-06	2,24E-05	1,51E-04	1,09E-05	0,00E+00	1,46E-04	-1,50E-05
	Eutrophication terrestrial [Mole of N eq.]	1,65E-03	7,39E-04	6,53E-04	1,03E-04	2,30E-04	1,65E-03	1,27E-04	0,00E+00	1,59E-03	-1,54E-04
	Photochemical ozone formation - human health [kg NMVOC eq.]	4,53E-04	1,55E-04	1,85E-04	2,83E-05	6,78E-05	4,53E-04	2,68E-05	0,00E+00	4,62E-04	-4,46E-05
	Resource use, mineral and metals [kg Sb eq.][4]	1,68E-08	1,19E-08	1,89E-07	4,55E-10	-2,02E-09	1,68E-08	2,06E-09	0,00E+00	9,54E-08	-1,11E-08
	Resource use, energy carriers [MJ][1]	4,47E-01	1,91E+00	4,98E-01	6,65E-02	3,58E-01	4,47E-01	3,29E-01	0,00E+00	1,23E+00	-3,02E-01
	Water deprivation potential [m³ world equiv.][1]	1,10E-03	1,28E-03	1,68E-02	5,31E-04	3,01E-03	1,10E-03	2,21E-04	0,00E+00	5,40E-02	-3,21E-03

[4] 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
[(a)] The total global warming potential (GWP-total) is the sum of GWP fossil. GWP biogenic and GWP land use change

Resources Use – 100 % renewable electricity with GO's

Resources Use indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
	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
Use of renewable primary energy (PERE) [MJ]	2,53E+01	1,10E-01	1,41E+00	0	0	0	0	0	0	0
Use of renewable primary energy resources used as raw materials (PERM) [MJ] *	7,16E-03	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2,53E+01	1,10E-01	1,41E+00	0	0	0	0	0	0	0
Use of non-renewable primary energy (PENRE) [MJ]	3,57E+01	1,94E+00	2,29E+00	0	0	0	0	0	0	0
Non-renewable primary energy resources used as raw materials (PENRM) [MJ] *	5,66E-01	0	-1,46E-01	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	3,63E+01	1,94E+00	2,14E+00	0	0	0	0	0	0	0
Input of secondary material (SM) [kg]	1,26E+00	0	6,43E-02	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	2,164E-25	0	1,107E-26	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	2,542E-24	0	1,301E-25	0	0	0	0	0	0	0
Use of net fresh water (FW) [m^3]	2,75E-02	1,25E-04	2,31E-03	0	0	0	0	0	0	0

* 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 when materials are recycled or recovered, but not when landfilled.

Resources Use – 100 % renewable electricity with GO's

Resources Use indicators	100% recycling					100% landfill				
	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	2,53E-03	1,08E-01	1,07E-01	8,71E-03	9,59E-02	2,53E-03	1,87E-02	0	1,88E-02	-3,52E-02
Use of renewable primary energy resources used as raw materials (PERM) [MJ] *	0	0	-2,09E-01	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2,53E-03	1,08E-01	-1,02E-01	8,71E-03	9,59E-02	2,53E-03	1,87E-02	0	1,88E-02	-3,52E-02
Use of non-renewable primary energy (PENRE) [MJ]	4,47E-01	1,91E+00	4,98E-01	6,65E-02	3,59E-01	4,47E-01	3,30E-01	0	1,23E+00	-3,02E-01
Non-renewable primary energy resources used as raw materials (PENRM) [MJ] *	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	4,47E-01	1,91E+00	4,83E-01	6,65E-02	3,59E-01	4,47E-01	3,30E-01	0	1,23E+00	-3,02E-01
Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m^3]	2,56E-05	1,23E-04	3,91E-04	1,68E-05	1,51E-04	2,56E-05	2,12E-05	0	1,26E-03	-9,33E-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 when materials are recycled or recovered, but not when landfilled.

Waste Category & Output flows - 100 % renewable electricity with GO’s

Waste Category & Output Flows	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE						
	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
Hazardous waste disposed (HWD) [kg]	4,44E-06	9,30E-12	2,84E-07	0	0	0	0	0	0	0
Non-hazardous waste disposed (NHWD) [kg]	3,36E-01	2,78E-04	1,61E-01	0	0	0	0	0	0	0
Radioactive waste disposed (RWD) [kg]	9,46E-05	2,39E-06	-6,42E-06	0	0	0	0	0	0	0
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	2,15E-02	0	3,96E-01	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	2,94E-02	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	5,22E-02	0	0	0	0	0	0	0

Waste Category & Output flows - 100% renewable electricity with GO's

Waste Category & Output Flows	100% recycling					100% landfill				
	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING	END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	1,23E-06	9,16E-12	1,09E-06	1,01E-09	-1,25E-07	1,23E-06	1,58E-12	0	1,76E-06	-1,26E-07
Non-hazardous waste disposed (NHWD) [kg]	2,56E-03	2,74E-04	2,93E-02	3,35E-01	-5,22E-03	2,56E-03	4,73E-05	0	8,24E+00	-5,50E-03
Radioactive waste disposed (RWD) [kg]	3,10E-06	2,36E-06	3,99E-06	7,57E-07	6,56E-05	3,10E-06	4,06E-07	0	8,37E-06	-1,57E-05
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	0	0	7,90E+00	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0

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