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Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

Prospective EPD - Foam Glass Aggregate, Glasopor 10-60e

Glasopor

Owner of the declaration:
Glasopor AS

Product name:
Glasopor 10-60e

Declared unit:
1m³

Product category /PCR:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR, NPCR 018:2022 Part B for natural stone products, aggregates and fillers

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-15251-18674

Registration number:
NEPD-15251-18674

Issue date:
20.03.2026

Valid to:
20.03.2027

General information

Product:
Glasopor 10-60e

Program operator:
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Declaration number:
NEPD-15251-18674

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR, NPCR 018:2022 Part B for natural stone products, aggregates and fillers

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

Declared unit:
1m^3

Declared unit with option:
A1-A3,A4,A5,C1,C2,C3,C4,D

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external X

Mie Vold, LCA.no AS

Independent verifier approved by EPD-Global

Owner of the declaration:
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Manufacturer:
Glasopor AS
Lienga 6, 1414 Trollåsen, Norway

e-mail: info@glasopor.no

Place of production:
Onsøy Stasjon 15, 1615 Fredrikstad, Norway

Management system:
ISO 9001, ISO 14001, ISO 45001, ISO 50001

Organisation no:
884344662

Issue date:
20.03.2026

Valid to:
20.03.2027

Period of study:
01/10/2025 - 31/10/2025

Comparability:
EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

The EPD has been worked out by:
Developer of the EPD: Emily Lainpelto

Tool: One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044.

Approved

Manager of EPD-Global

Product

Product description:

Foam glass aggregate is a pumice like aggregate that is used by the infrastructure and construction industries as a lightweight fill material. Foam glass aggregate is manufactured from waste glass cullets, and a foaming agent (typically silicon carbide). Foam glass production prevents landfilling of "reject glass generated at glass recycling plants. Any organic matter impurities in the raw material combusts in the production process, therefore there is no organic matter in the foam glass product. Foam glass is non-flammable and has good water conductivity properties. Thanks to its foamed cell structure, foam glass aggregate provides excellent thermal insulation. The foam glass aggregate's flexible settling properties and angle of repose ensure a robust substructure on the worksite.

Glasopor AS produces foam glass aggregate at its production facilities in Onsøy and Skjåk, Norway. The company produces lightweight foam glass aggregate made from recycled glass. Glasopor AS is part of the Foamit Corporation, which has four production sites in the Nordic countries. The sites process recycled glass to produce foam glass aggregate as well as glass cullet, powder, and sand for industrial purposes.

Product Variants

This EPD considers foam glass Glasopor 10-60e (loose dry bulk density 180 kg/m^3) produced in Glasopor AS production facility in Onsøy, Norway. This EPD covers foam glass production from electric kiln lines.

The product is produced in two separate types of kiln lines, electric and gas, within the same manufacturing facility in Onsøy, Norway. Due to each type of kiln line having significantly different environmental performance the manufacturer reports the output as two commercial product variants: *Glasopor 10–60* and *Glasopor 10–60e*.

These two variants are distributed as separate products based on the company's internal accounting and production allocation between the two types of kiln lines. Both variants are technically identical, and the distinction reflects only the environmental impacts associated with each type of kiln lines.

Additional Information:

This Environmental Product Declaration is published as a preliminary EPD (pEPD).

The declaration is based on current production data; recent improvements and modifications have been implemented in the production process. These changes have not yet been in effect for a sufficiently long period to provide representative annual average data.

As a result, the underlying life cycle assessment reflects the best available data at the time of publication, but the long-term performance of the improved

production process cannot yet be fully verified. Once sufficient operational data has been collected and the process performance has stabilized, the declaration will be updated and published as a full EPD.

Product specification:

Glasopor 10-60 loose dry bulk density 180 kg/m^3

Materials	Weight, %
Waste glass / Reject glass / Recycled glass	98-99
Silicon Carbide	0-2
Calcium carbonate compound	0-1
Kaolin	0-1
Glass Fibre	0-1

Technical data:

EN 13055-2 Lightweight aggregates - Part 2: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications

Product features	Performance level
Grain form	Pieces of uneven shape and size
Grain size	10-60 mm
Loose bulk density (EN 1097-3)	180 kg/m^3
Dry density (compr. factor 1.15 –1.2)	<225 (up to) kg/m^3
Grain density prd (NS-EN 1097-6)	380 kg/m^3
Resistance to crushing (at 20% compr.)	0.77 MPa
Volume stability 50 years	0.1%
Volume change by compression	15-25%
Composition	Expanded SiO_2
Thermal conductivity (dry) Thermal conductivity (wet)	0.097 W/mK 0.107 W/mK
Freeze-thaw resistance (EN 13055-2)	0.2%

Market:

Europe

Reference service life, product:

Not applicable

Reference service life, building:

-

Additional technical information

-

LCA: Calculation rules

Declared unit:

1m^3

Cut-off criteria:

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

Allocation:

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

- Manufacturing energy used in drying and milling of the raw material waste glass has been allocated to this product based on mass of dried and milled raw material utilized in this production site.
- The silicon carbide used as additive to induce foaming of the raw material in the manufacturing process is a by-product of silicon carbide manufacturing. Economic allocation has been used to determine the impact from silicon carbide production is allocated to this product.

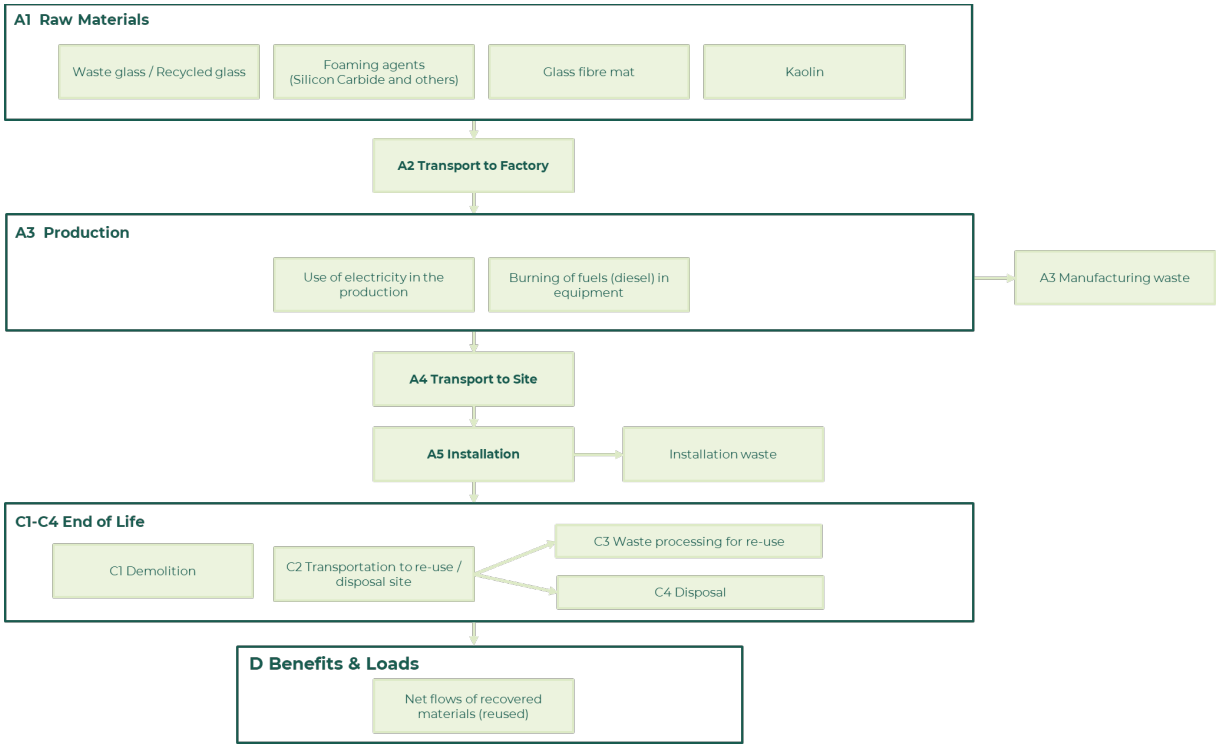
Data quality:

Data collection for production, transport, and packaging was conducted using time and site-specific information. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1

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

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
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	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:



LCA: Scenarios and additional technical information

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

Transport from production place to assembly/user (A4)

Transport from production place to assembly/user (A4)	Capacity utilisation (incl. return) [%]	Distance [km]	Fuel/Energy consumption	Unit	Value
Truck, > 32 tonnes, Euro 5 (km)	53,3	163,03	0,023	l/tkm	3,75

Assembly (A5)

	Unit	Value
Machine operation, diesel, >= 74.57 kW, steady-state	h	0,0036
Machine operation, diesel, < 18.64 kW, steady-state	h	0,0082
Material loss	kg	0

Use and Maintenance (B1-B7)

Product use and maintenance modules (B1-B7) have not been included in this EPD as there are no use phase emissions. Air, soil, and water impacts during the use phase have not been studied.

End of Life (C1, C3, C4)

	Unit	Value
Excavation, hydraulic digger	m3	1
Treatment of inert waste, inert material landfill	kg	9
Materials for re-use	kg	171

Transport to waste processing (C2)

Transport from production place to assembly/user (C2)	Capacity utilisation (incl. return) [%]	Distance [km]	Fuel/Energy consumption	Unit	Value
Truck, > 32 tonnes, Euro 5 (km)	53,3	50	0,023	l/tkm	1,15

Benefits and loads beyond the system boundaries (D)

Benefits and loads beyond the system boundaries (D)	Unit	Value
Net flows of recovered materials (reused)	kg	-6,67

Module D assesses the impact of the net flows of recovered materials (reused). Substitution is modelled using an avoided production using virgin material. Losses and quality aspects are considered.

LCA: Results

The result tables are given using a market based approach for foreground system (A3) More information about transparent reporting of electricity in the additional requirements section.

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - total	kg CO2 eq	6,46E+00	3,16E+00	3,59E-01	5,86E-01	9,69E-01	0,00E+00	5,62E-02	2,57E+00
GWP - fossil	kg CO2 eq	6,40E+00	3,16E+00	3,59E-01	5,86E-01	9,69E-01	0,00E+00	5,62E-02	2,56E+00
GWP - biogenic	kg CO2 eq	5,93E-02	7,15E-04	3,63E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP - luluc	kg CO2 eq	2,46E-03	1,41E-03	3,65E-05	6,60E-05	4,33E-04	0,00E+00	3,21E-05	1,50E-03
ODP	kg CFC11 eq	7,69E-08	4,66E-08	5,45E-09	1,24E-08	1,43E-08	0,00E+00	1,63E-09	7,02E-09
AP	molc H+ eq	3,99E-02	1,08E-02	1,64E-03	5,13E-03	3,30E-03	0,00E+00	3,98E-04	2,07E-02
EP- freshwater	kg P eq	5,96E-04	2,46E-04	1,03E-05	2,72E-05	7,54E-05	0,00E+00	4,62E-06	7,63E-04
EP -marine	kg N eq	1,13E-02	3,54E-03	7,17E-04	2,37E-03	1,09E-03	0,00E+00	1,52E-04	2,83E-03
EP - terrestrial	molc N eq	1,24E-01	3,85E-02	7,86E-03	2,59E-02	1,18E-02	0,00E+00	1,66E-03	3,02E-02
POCP	kg NMVOC eq	3,87E-02	1,59E-02	2,55E-03	7,80E-03	4,87E-03	0,00E+00	5,94E-04	8,86E-03
ADP-M&M[2]	kg Sb-Eq	1,80E-05	8,81E-06	1,28E-07	2,68E-07	2,70E-06	0,00E+00	8,93E-08	4,23E-06
ADP-fossil[2]	MJ	6,15E+01	4,58E+01	4,66E+00	7,60E+00	1,41E+01	0,00E+00	1,38E+00	2,25E+01
WDP[2]	m³	1,65E+02	2,26E-01	1,16E-02	2,76E-02	6,94E-02	0,00E+00	3,98E-03	2,00E-01

GWP-total: *Global Warming Potential;* ***GWP-fossil:*** *Global Warming Potential fossil fuels;* ***GWP-biogenic:*** *Global Warming Potential biogenic;* ***GWP-LULUC:*** *Global Warming Potential land use and land use change;* ***ODP:*** *Depletion potential of the stratospheric ozone layer;* ***AP:*** *Acidification potential, Accumulated Exceedance;* ***EP-freshwater:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential, Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential, deprivation weighted water consumption*

Reading example: 9.0 E-03 = $9.0*10^{-3} = 9.0*\frac{1}{10}*\frac{1}{10}*\frac{1}{10}=0.009$ 9.0 E+03 = $9.0*10^{3} = 9.0*10*10*10=9000$

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	4,64E-07	3,16E-07	2,39E-08	1,45E-07	9,70E-08	0,00E+00	9,07E-09	3,75E-07
IRP[1]	kBq U235 eq.	1,52E-01	3,99E-02	2,06E-03	5,15E-03	1,22E-02	0,00E+00	8,67E-04	3,85E-02
ETP-fw[2]	CTUe	3,65E+01	6,48E+00	2,57E-01	4,13E+00	1,99E+00	0,00E+00	1,16E-01	5,93E+00
HTP-c[2]	CTUh	8,76E-10	5,21E-10	2,37E-10	7,84E-11	1,60E-10	0,00E+00	1,04E-11	6,08E-10
HTP-nc[2]	CTUh	2,59E-08	2,97E-08	8,57E-10	1,12E-09	9,10E-09	0,00E+00	2,38E-10	2,05E-08
SQP[2]	Dimensionless	7,24E+00	4,62E+01	3,26E-01	4,91E-01	1,42E+01	0,00E+00	2,71E+00	1,84E+01

PM: *Particulate matter emissions;* ***IRP:*** *Ionising radiation, human health;* ***ETP-fw:*** *Ecotoxicity (freshwater);* ***ETP-c:*** *Human toxicity, cancer effects;* ***HTP-nc:*** *Human toxicity, non-cancer effects;* ***SQP:*** *Land use related impacts / soil quality*

[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.

[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

Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4,98E+02	6,28E-01	2,95E-02	7,22E-02	1,93E-01	0,00E+00	1,33E-02	3,15E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,98E+02	6,28E-01	2,95E-02	7,22E-02	1,93E-01	0,00E+00	1,33E-02	3,15E+00
PENRE	MJ	5,17E+01	4,58E+01	4,66E+00	7,60E+00	1,41E+01	0,00E+00	1,38E+00	2,25E+01
PENRM	MJ	9,84E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	6,16E+01	4,58E+01	4,66E+00	7,60E+00	1,41E+01	0,00E+00	1,38E+00	2,25E+01
SM	kg	1,78E+02	1,95E-02	1,93E-03	5,38E-03	5,98E-03	0,00E+00	3,47E-04	1,76E-02
RSF	MJ	1,49E-04	2,48E-04	5,06E-06	8,85E-06	7,60E-05	0,00E+00	7,18E-06	2,59E-03
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	3,84E+00	6,78E-03	3,08E-04	5,16E-04	2,08E-03	0,00E+00	1,43E-03	5,10E-03

PERE *Renewable primary energy resources used as energy carrier;* ***PERM*** *Renewable primary energy resources used as raw materials;* ***PERT*** *Total use of renewable primary energy resources;* ***PENRE*** *Nonrenewable primary energy resources used as energy carrier;* ***PENRM*** *Nonrenewable primary energy resources used as materials;* ***PENRT*** *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;* ***FW*** *Use of net fresh water.*

End of life – Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	2,38E-01	7,77E-02	5,18E-03	1,30E-02	2,38E-02	0,00E+00	1,52E-03	2,05E-01
NHWD	kg	6,51E+00	1,44E+00	7,07E-02	1,92E-01	4,41E-01	0,00E+00	3,48E-02	3,77E+00
RWD	kg	4,10E-05	9,77E-06	5,06E-07	1,27E-06	3,00E-06	0,00E+00	2,11E-07	9,32E-06

HWD *Hazardous waste disposed;* ***NHWD*** *Non-hazardous waste disposed;* ***RWD*** *Radioactive waste disposed.*

End of life – output flow

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,71E+02	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,71E+02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU *Components for reuse;* ***MFR*** *Materials for recycling;* ***MER*** *Materials for energy recovery;* ***EEE*** *Exported electric energy;* ***EET*** *Exported thermal energy.*

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	Not applicable

Note: 1 kg biogenic carbon is equivalent to 44/12 (approx. 3.67) kg CO_2

Additional requirements

Transparent reporting of energy.

The EPD provides in the main result tables environmental impact categories based on a market based approach.

The table below shows calculation of GWP-total for applied electricity for the manufacturing process (A3).

Energy source	Data source	Unit	GWP_{total} [kg CO_2 - eq/unit]	SUM [kg CO_2 - eq]
Electricity production, hydro, reservoir, alpine region, Norway	ecoinvent 3.11	kWh	0.0061	0.8

The electricity guarantee of origin utilized in this EPD is provided by Eneas Services AS and is hydro power used. Guarantee of origin is valid for 2025.

The EPD provides in the additional result tables environmental impact categories based on a locational based and market based (residual mix) approach. The information below is provided so EPD users are able to understand the effect of these methodological choices.

The table below shows calculation of GWP-total for energy resources used in the manufacturing process (A3) for each approach.

Energy source	Data source	Unit	GWP_{total} [kg CO_2 - eq/unit]	SUM [kg CO_2 - eq]
Location based approach				
Electricity Norway	IDEMAT	MJ	0.0077	3,6
Market based approach				
Electricity, Norway, residual mix, direct GWP only, 2024	One Click LCA	kWh	0.53	69,3

Additional environmental impact indicators required for construction products

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	6,40E+00	3,16E+00	3,59E-01	5,86E-01	9,69E-01	0,00E+00	5,62E-02	2,57E+00

GWP-IOBC *Global warming potential calculated according to the principle of instantaneous oxidation.*

Hazardous substances

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

Carbon footprint

While a carbon footprint analysis has not been conducted for the product separately, the results section does include an evaluation of Global Warming Potential (GWP) with such an analysis. The GWP total results presented in this EPD document represents the carbon footprint of the product studied.

Bibliography

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NS-EN 13055-2 Lightweight aggregates – Part 2: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications.

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