epd-norge.no
The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Glasopor AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1243-396-EN
Registration number:	NEPD-1243-396-EN
ECO Platform reference number:	-
Issue date:	31.01.2017
Valid to:	31.01.2022 (validity extended to 01.10.2022)

Glasopor 10-60 (Cellular glass aggregate)

Glasopor AS

www.epd-norge.no

General information

Product:
Glasopor 10-60 (Cellular glass aggregate)

Owner of the declaration:
Glasopor AS
Contact person: Svein Lund
Phone: 61 21 36 50 / 907 75 233
e-mail: svein.lund@glasopor.no

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

Manufacturer:
Glasopor AS
Haslevangen 14, 0579 Oslo
Phone: 23 17 39 80
e-mail: svein.lund@glasopor.no

Declaration number:
NEPD-1243-396-EN

Place of production:
Glasopor AS, Industrivegen 63, 2690 Skjåk

ECO Platform reference number:
-

Management system:
TI sertificate no 1261: NS-ISO 9001, NS-ISO 14001, NS-ISO 50001, OHSAS 18001

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
Requirements on the EPD for www.bau-umwelt.com
Lightweight aggregates / Bulk granulate v. 30.07.2014

Organisation no:
No 884 334 662

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 manufacturerinformation, life cycle assessment data and evidences.

Issue date:
31.01.2017

Valid to:
31.01.2022 (validity extended to 01.10.2022)

Declared unit:
A1-A3: 1 m^3 of Glasopor, bulk (180 kg/m^3) to factory gate

Year of study:
2016

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:

The EPD has been worked out by:
Mie Vold

Østfoldforskning

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:

sign

(Independent verifier approved by EPD Norway)

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Glasopor is a cellular glass aggregate made from recycled glass containers collected from households in Norway. After going through a glass sorting facility, the glass is milled to glass powder. After milling and mixing the glass is expanded 7-8 times in a kiln at temperatures of 900°C. The output of the kiln breaks by cooling into a granular material of 10-60 mm with dry bulk density of 180 kg/m3. The product can be used as thermal insulation and draining layer. It can also be used as light weight filling material.

Technical data:

Typical property	*Test method*	*Typical value*
Loose bulk density	NS-EN 1097-3	180 kg/m^3
Particle density	NS-EN 1097-6	380 kg/m^3
Thermal conductivity (dry)	NS-EN 12667	0,097 W/mK
Thermal conductivity (wet)	NS-EN 12667	0,107 W/mK

see: www.glasopor.no for more information

Product specification:

Glasopor produced from waste fraction in a facility for sorting of used glass for recycling.

Materials	Share of product, [%]	Amount, recycled material [%]
Glass, waste fraction from recycling	> 80 %	100 %
Silicon carbide, waste from Silicon industry	< 2 %	100 %

Market:

Norway

Reference service life, product:

Limited by the service life of the construction were the product is used.

Reference service life, building:

N/A

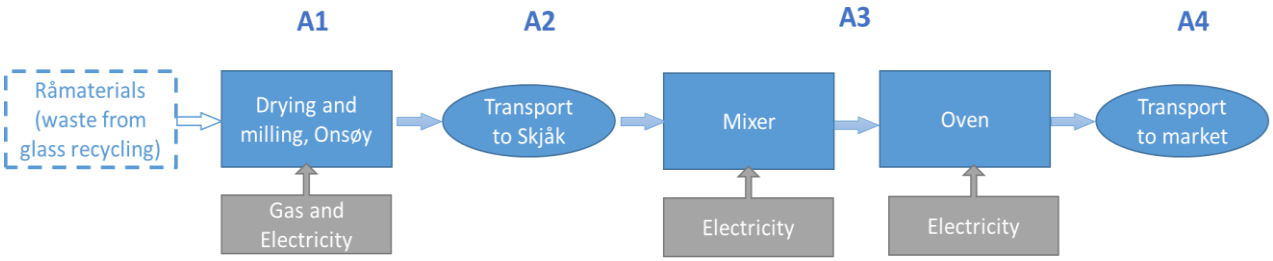
LCA: Calculation rules

Declared unit:

A1-A3: 1 m^3 of Glasopor, bulk (180 kg/m^3) to factory gate

System boundary:

The system boundary of the EPD follows the modular structure in line with EN 15804.
This section describes the modules which are contained within the scope of this study.
As the scope of the assessment is up to the point at which the foam glass aggregate is manufactured modules A1-A3 have been considered in this LCA.



Data quality:

Raw material	Data quality	Data Source and description	Age of data
Glass	Specific data	Waste fraction from glas recycling. Impacts from glass collection and sorting are allocated to recycled glass. Impacts from drying and milling of the waste fraction for Glasopor production are from Glasopor in Fredrikstad.	Energy use for drying is year average for 2015. Energy use for milling is based on nine months in 2016
Energy in Glasopor production			
Use	Estimated consumption	Impacts from Glasopor production are from Glasopor, Skjåk.	Energy use for milling is based on six months in 2016
Extraction, distribution and use, electricity	Data base	LCI for Norwegian Hydro Electricity, Ostfold Research	2012
Transport			
Distances	Spesific	Glasopor	2013
Extraction, infrastructure and combustion	Data base	EcoInvent 3.2, adjusted for 100% load from Fredrikstad to Skjåk (return is also allways full)	2013

Allocation:
The allocation is made in accordance with the provisions of EN 15804. All incoming energy and water and waste production in-house is allocated to Glasopor. 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.

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.

LCA: Scenarios and additional technical information

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	53 %	Lorry <32 tonne	50	0,02 l/tkm	1

Additional technical information
Glasopor AS is a supplier of insulation and ground fillings for all types of construction. The products are made of the waste fraction from recycled glass. The material has an indefinite service life and require no maintenance during use.

This product be re-excavated and used as filling for new contruction's service life.

The kilns are redesigned for electrical operation in May 2016. The company buys guarantees of origin for all electricity used both in Fredrikstad and in Skjåk.

Results

The results reflect the declared unit from cradle to factory gate (A1 to A3).

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impact

Parameter	Unit	A1	A2	A3	A1- A3	A4			
GWP	kg CO_2-eqv	2,27	3,70	1,00	6,96	0,79			
ODP	kg CFC11-eqv	2,00E-07	7,28E-07	8,02E-08	1,01E-06	1,56E-07			
POCP	kg C_2H_4-eqv	3,97E-04	6,04E-04	1,84E-04	1,19E-03	1,29E-04			
AP	kg SO_2-eqv	2,43E-04	1,32E-03	1,44E-03	3,01E-03	2,83E-04			
EP	kg PO_4^{3-}-eqv	6,87E-03	1,02E-02	5,10E-03	2,22E-02	2,19E-03			
ADPM	kg Sb-eqv	9,91E-07	7,10E-06	1,15E-05	1,96E-05	1,52E-06			
ADPE	MJ	40	59	7,80	107	12,55			

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

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

Resource use

Parameter	Unit	A1	A2	A3	A1-A3	A4			
RPEE	MJ	32	0,87	404	438	0,19			
RPEM	MJ	0,02	0,29	0,14	0,45	6,32E-02			
TPE	MJ	32	1,17	405	438	0,25			
NRPE	MJ	40	60	8,20	108	12,78			
NRPM	MJ	0	0	0,04	0,04	-			
TRPE	MJ	40	60	8,24	108	12,78			
SM	kg	180	0	0	180	-			
RSF	MJ	1,45E-05	0	1,83E-04	1,97E-04	-			
NRSF	MJ	-5,31E-07	0	-6,68E-06	-7,22E-06	-			
W	m^3	0,00E+00	0,00E+00	0,00E+00	0,00	-			

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

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

End of life - Waste

Parameter	Unit	A1	A2	A3	A1- A3	A4			
HW	kg	3,62E-05	3,45E-05	3,58E-03	3,65E-03	7,38E-06			
NHW	kg	6,09E-02	5,47E+00	2,81E-01	5,81E+00	1,17E+00			
RW	kg	INA	INA	INA	INA	INA			

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

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

End of life - Output flow

Parameter	Unit	A1	A2	A3	A1- A3	A4			
CR	kg	0	0	0	0	0			
MR	kg	1,19E-03	0,00E+00	2,36E-02	2,48E-02	0			
MER	kg	1,39E-05	0,00E+00	1,75E-04	1,89E-04	0			
EEE	MJ	0	0	0	0	0			
ETE	MJ	0	0	0	0	0			

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

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase
Glasopor AS buy guarantee of origine of electricity for both their production locations. Data from LCI from 11 Norwegian Hydro electricity Power stations, representing 4,5 % of the total Norwegian Hydro electricity use is therefore used for production in Skjåk and for drying/milling in Fredrikstad.

Data source	Amount	Unit
Østfoldforskning	5,8	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.

Name	CAS no.	Amount

Indoor environment
The product has no influence on indoor climate

Transport:
Transport from production site to central warehouse in Norway is 50 km

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*
Vold Mie, 2016	Livsløpsdata for Glasopor® fra Skjåk etter innføring av elektrisk produksjon ved fabrikken - Bakgrunnsdata for miljøvaredeklarasjon
www.bau-umwelt.com	PCR Guidance-Texts for Building-Related Products and Services. From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part.B: Requirements on the EPD for www.bau-umwelt.com Lightweight aggregates / Bulk granulate v. 30.07.2014

epd-norge.no The Norwegian EPD Foundation	**Program operator** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: e-mail: web	+47 23 08 82 92 post@epd-norge.no www.epd-norge.no
epd-norge.no The Norwegian EPD Foundation	**Publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: e-mail: web	+47 23 08 82 92 post@epd-norge.no www.epd-norge.no
Glasopor	**Owner of the declaration** Glasopor AS Svein Lund Haslevangen 14, 0579 Oslo	Phone: Fax e-mail: web	23 17 39 80 svein.lund@glasopor.no www.glasopor.no
Østfoldforskning	**Author of the Life Cycle Assessment** Østfoldforskning AS Mie Vold Stadion 4, 1671 Kråkerøy	Phone: Fax e-mail: web	414 69 800 +47 69 34 24 94 mie@ostfoldforskning.no www.ostfoldforskning.no