ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Pittsburgh Corning Europe NV
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PCE-20260416-IBA1-EN
Issue date	18.08.2026
Valid to	17.08.2031

FOAMGLAS® T4+

Pittsburgh Corning Europe NV

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com

ECO PLATFORM EPD VERIFIED

1. General Information

Pittsburgh Corning Europe NV

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-PCE-20260416-IBA1-EN

This declaration is based on the product category rules:

Mineral insulating materials, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

18.08.2026

Valid to

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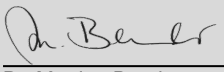
Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)



Dr. Martina Bender
(Managing Director Institut Bauen und Umwelt e.V.)

FOAMGLAS® T4+

Owner of the declaration

Pittsburgh Corning Europe NV
Albertkade 1
3980 Tessenderlo
Belgium

Declared product / declared unit

FOAMGLAS® T4+ cellular glass / declared unit 1 m³

Scope:

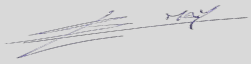
This EPD refers to the production of 1 m³ of FOAMGLAS® T4+ cellular glass manufactured in the two European sites from Pittsburgh Corning Europe NV:
- Tessenderlo (Belgium)
- Klášterec (Czech Republic)

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidence.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard is abbreviated as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internal ☒ external



Sr Lucas Berman,
(Independent verifier)

2. Product

2.1 Product description/Product definition

FOAMGLAS® T4+ is an insulation product for buildings made of cellular glass. It is applied to the desired dimensions in the form of slabs, panels, or other specific elements. FOAMGLAS® T4+ is an unfaced slab.
The product is declared with a nominal density of 110 kg/m³ (±15%) and is supplied in thicknesses of 40 mm to 200 mm.

For the placing on the market of the product FOAMGLAS® T4+ in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No.305/2011* (CPR) applies. The product declaration of performance (DOP) is taking into consideration *EN 13167:2015* Thermal insulation products for buildings – Factory made cellular glass (CG) products – Specification and the CE-marking.
For the application and use the respective national provisions apply.

2.2 Application

FOAMGLAS® T4+ is used for:

- Flat and pitched roofing systems including concrete, timber and metal substrates
- External walls and cavity insulation
- Internal insulation including floors, walls and soffits
- Below ground and perimeter insulation

2.3 Technical data

Technical data

Name	Value	Unit
Thermal conductivity (EN13167)	0.041	W/(mK)
Water vapour diffusion resistance factor	∞ (infinite)	-
Nominal density (EN1602 ±15%)	110	kg/m^3
Gross density (EN 1602)	112	kg/m^3
Compressive strength (EN 826)	≥ 0.6	N/mm^2

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13167:2012+A1:2015, Thermal insulation products for buildings - Factory made cellular glass(CG) products - Specification*

2.4 Delivery status

FOAMGLAS® T4+ is available in thicknesses from 40 to 200 mm and in the following dimensions 600 mm length x 450 mm width.

2.5 Base materials/auxiliary materials

FOAMGLAS® products are composed of the following constituents.

Name	Value	Unit
Glass oxides	99	%
Carbon dioxide	0.5	%
Carbon black	0.5	%

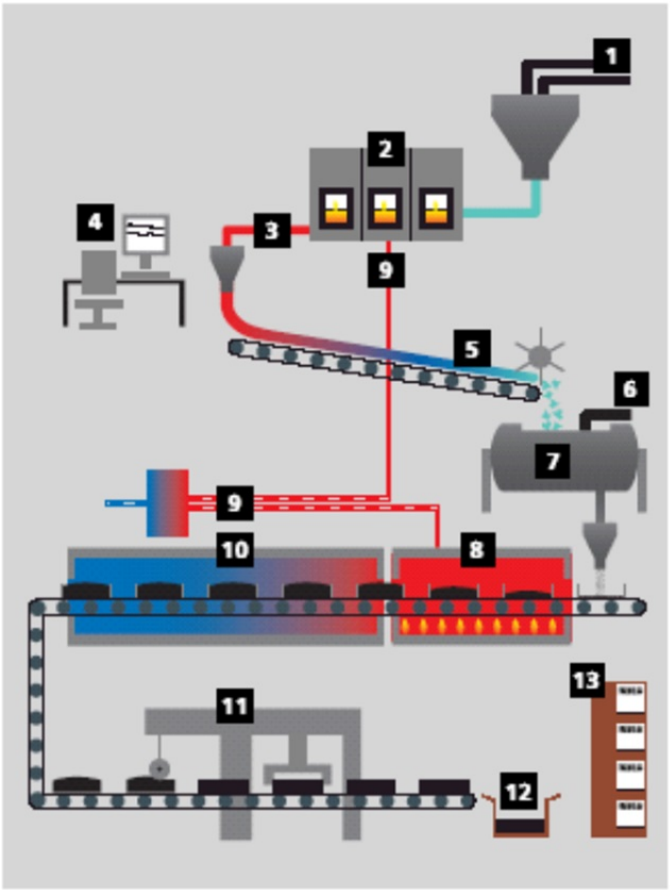
This product/article/at least one partial article contains substances listed in *the candidate list* (date: 21.01.2025) exceeding 0.1 percentage by mass: **no**

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on *the candidate list*, exceeding 0.1 percentage by mass: **no**

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No.528/2012*): **no**

2.6 Manufacture

All glass constituents (recycled glass and virgin materials) are melted in a furnace. Melted glass from the melter is then put in grinders to produce fine glass powder. In the grinding process, additives are added to ensure appropriate foaming process. This mix is then going through a foaming furnace where cellular glass is made by heating (sintering towards ca 850°C). The products move then to an annealing process where they are cooled down according to a precisely determined curve. Cellular glass is cut into rectangular blocks and if necessary, ground or cut to thinner sizes. The produced material is released, labelled, marked, and packed for commercialisation.



1. Mixing and batching of the raw materials: recycled glass, sand, sodium carbonate, feldspar, sodium sulfate, sodium nitrate, iron ore and FOAMGLAS®-scrap.
2. The melting furnace has a constant temperature of 1250°C.
3. Molten glass is drawn out of the furnace.
4. Control room for monitoring the production.
5. The glass is drawn off and falls onto the conveyor band where it cools down before entering the ball mill.
6. Addition of "carbon black".
7. Ball mill grinds all ingredients into a fine powder before putting them into stainless steel molds.
8. The filled molds pass through a cellulating oven (foaming furnace) with a temperature of 850°C. This is where the material gains its unique cell structure.
9. Energy recovery of heat

10. The FOAMGLAS® blocks pass through an annealing oven to allow carefully controlled cooling without thermal stress.
11. The blocks are cut to size and sorted by batch. Production waste returns into the process.
12. FOAMGLAS® slabs are then packaged, labelled and palletized.
13. Finished FOAMGLAS® products are stored and prepared for transport.

2.7 Environment and health during manufacturing

During the entire manufacturing process, no other health protection measures extending beyond the legally specified industrial protection measures for commercial enterprises are needed. Health and safety management is in accordance with EN ISO 45001.
The production sites are certified for:
- Quality management EN ISO 9001
- Environmental management EN ISO 14001
- Energy management EN ISO 50001

2.8 Product processing/Installation

Recommendations on product processing depend on the respective product and system and are outlined in the respective documentation and data sheets (available at www.foamglas.com).

The product does not contain any concentrations of substances known to be hazardous to health. Dust incurred during sawing is inert and non-crystalline.
Depending on requirements, FOAMGLAS® elements are applied dry or using mineral or bituminous adhesives.

The insulating slabs are staggered and butt-joined with or without glue. The professional liability associations' rules apply. When applying the products under review, conventional industrial protection measures must be observed in accordance with information supplied by the manufacturer.

According to the present state of knowledge, hazards for water, air and soil cannot arise if FOAMGLAS® is applied as designated.

2.9 Packaging

The product is packed on wooden pallets using cardboard elements and LDPE film. These packaging materials are disposed of at the construction site according to local practices (recycling and energy recovery).

2.10 Condition of use

Material composition does not alter during use. FOAMGLAS® products can be used practically indefinitely when used as designated. They are impervious to moisture, pests, acids and chemicals.

2.11 Environment and health during use

Ingredients: No particular features regarding the material composition for the period of use. In accordance with official emission measurements for indoor air, cellular glass is an insulating material which does not display VOC (volatile organic compounds) or carcinogenic emissions after 3 and 28 days (see section 7.2) according to the German Committee for the Health-Related Evaluation of Building Products (AgBB scheme).

2.12 Reference service life

The durability of FOAMGLAS cells was tested by FIW München, an independent 3rd-Party testing institute, determined by the use of compressive creep in accordance with EN 1606 providing insight on the ageing of the glass cells under compressive loads.
According to the report Levensduur van Bowproducten: method voor referentiewaarden on expected service lives from the Dutch Stichting Bouwresearch, SBR (now SBRCURnet), a service life of 100 years can be assumed for FOAMGLAS cellular glass.
The conditions under which this RSL is valid are as follows: if the product is installed according to the manufacturer's and supplier's guidelines.

2.13 Extraordinary effects

Fire

Unfaced FOAMGLAS® is classified as Euroclass A1 in accordance with *EN 13501-1*. Class A1 building products do not display any hazard potential regarding smoke development, flammability or burning drips.

Fire protection

Name	Value
Building material class	A1

Water

Thanks to its closed-cell structure, exposure to moisture cannot impair the insulating properties of FOAMGLAS®. Even when exposed to water over long periods of time (e.g. floods), the insulating material remains intact.

Mechanical destruction

FOAMGLAS® is extremely resilient in all respects, and there is no risk of mechanical destruction if used as designated. It does not represent any environmental hazards thanks to its mineral composition. See Material Safety Data Sheets for FOAMGLAS®.

2.14 Re-use phase

When sorted, the declared products can be re-ground and re-used as additives in the manufacture of FOAMGLAS® (material recycling). Otherwise sorted products - even those still bearing adhesive – are suitable for re-use as filling material for brick production, civil engineering, road construction or for sound barriers, for example (material recycling). Within the re-use of existing surface insulated with FOAMGLAS®, the existing layer can be topped with a new layer of FOAMGLAS®.

2.15 Disposal

Where the recycling options referred to above are not practical, cellular glass residue incurred on the construction site as well as residue from deconstruction can be easily deposited without preliminary treatment in Class I landfills thanks to their non-leaching mineral components.
The waste code number as per the List of Wastes Ordinance (*AVV/EWC*) for FOAMGLAS® (uncontaminated) is 17 06 04.

2.16 Further information

Further information on FOAMGLAS® insulating materials is available online on the manufacturer's website:
www.foamglas.com

3. LCA: Calculation rules

3.1 Declared unit

The declaration refers to the life cycle of 1 m³ FOAMGLAS® T4 +. The real gross density of the product is 112 kg/m³.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^3
Nominal density	110	kg/m^3
Gross density	112	kg/m^3

Note : Measured weighted average density for 2023 was 112 kg/m³, reference flow is based on the measured weighted average value to reflect production data.

3.2 System boundary

Type of EPD: **Cradle to Grave**.

The LCA addresses the life cycle stage of production, installation, end-of-life (EoL) and potential benefits beyond the system boundaries.
The product stage comprises of modules A1 (raw material supply), A2 (transport) and A3 (production), more specifically:
- A1 - Raw materials production
- A2 - Transporting the raw materials and preliminary materials to the plant
- A3 - Manufacturing process in the plant including direct emissions, upstream energy sourcing, production and transport of ancillary materials and packaging, water consumption , wastewater and production waste treatment

Construction stage comprises of module A4 (transport to construction site) and A5 (construction site), more specifically:
- A4 – Transport from production site to construction site
- A5 – Impact from construction site, including end-of-life of packaging, production, transport and end-of-life of 2 % losses occurring at construction site

Use stage (B1-B7) is part of the system boundaries but has a zero value, as the product does not require maintenance, refurbishment , replacement nor consumes energy or water during its use stage.

End of life stage comprises of C1 (Deconstruction), C2 (Transport to waste treatment), C3 (Waste treatment) and C4 (disposal). More specifically:
- C1 - takes into accounts the de-construction or demolition of the product before taking it for treatment/disposal through means of transportation
- C2 – covers transportation by truck until waste treatment facility
- C3 – covers waste processing in case of further recycling or reuse of the product
- C4 – reflects impacts from disposal in landfill

There are 3 EoL scenarios in the study: Landfill, Recycling and Reuse.
- Module D takes into account benefits and loads from packaging recycling from A5
- Module D1 takes into account benefits and loads from packaging recycling from A5, as well as benefits and loads beyond system boundaries for 100 % recycling in substitution of kaolin in the brick industry
- Module D2 takes into account benefits and loads from packaging recycling from A5, as well as benefits and loads beyond system boundaries for 100 % reuse in-situ, substituting new FOAMGLAS® T4+ products.

For the environmental impact, the use of green electricity was calculated taking into account the residual electricity mix for the remaining electricity. The proportion of the electricity demand covered by green electricity in the total electricity demand is 100 %.

3.3 Estimates and assumptions

- Weighted average production from the two production sites were considered for the calculation
- Real average densities were considered to accurately reflect the environmental impacts of the products

3.4 Cut-off criteria

In the assessment, no material or energy flows known to Pittsburgh Corning Europe have been omitted, i.e. all raw materials used, utilised thermal energy, electric power consumption and direct emissions were considered. Machinery, plants and infrastructure required in the manufacturing process were not considered.

In all cases, it is assumed that the cut-off criteria defined in *EN 15804+A2* are met. No material and energy flow with a share higher than 1 % (based on the total mass of the product) was neglected. The sum of the excluded material flows does not exceed 5 % of mass, energy or environmental relevance.

3.5 Background data

The LCA model was created using the software *LCA for Experts* version 10.9.3.0, developed by *Sphera*. The associated *Sphera* Managed LCA content database 2025.2 provided the life cycle inventory data for the raw and process materials obtained from the background system.
For soda ash, supplier-specific data published in EPD Turkey has been used.

3.6 Data quality

All background datasets were taken from the *Sphera* Managed LCA content database 2025.2. The background data used for the LCA is less than 10 years old and datasets contributing together to 80 % of any core environmental indicators are of overall good quality based on temporary, technical and geographical representativeness.

Pittsburgh Corning Europe NV supplied current primary production data for 2023, to ensure consistency with other EPDs published in other program operators in Europe. This data was examined for plausibility and is still considered fully representative of current manufacturing process. Primary data quality can be regarded as very good.

3.7 Period under review

The data in this LCA are based on primary data on production in 2023 supplied by Pittsburgh Corning Europe NV. The volumes of raw materials, energy, auxiliaries, and consumables used are considered as average annual values.

3.8 Geographic representativeness

Country or region in which the declared product system is manufactured, used or handled at the end of the product's life span: Europe

3.9 Allocation

Primary data from manufacturing sites were provided on a facility-wide basis and then allocated between the different FOAMGLAS® product ranges based on mass allocation.
No other coproducts are leaving the sites, and hence, no co-product allocation rules were applied.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to *EN 15804* and the building context and product-specific performance characteristics are taken into account. The background database used in this study is *Sphera* Managed LCA content database 2025.2.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	2.45	kg C

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

All the following technical scenario information is given for the declared unit (i.e. 1 m³ of FOAMGLAS® product).

Transport to the building site (A4)

Name	Value	Unit
Transport distance	400	km
Capacity utilisation (including empty runs)	18.7	%
Gross density of products transported	112	kg/m^3
Capacity utilisation volume factor	1	-

Installation into the building (A5)

Name	Value	Unit
Material loss	2.24	kg
Other substances following treatment on site (wood)	5.32	kg
Other substances following treatment on site (cardboard)	0.759	kg
Other substances following treatment on site (LDPE film)	1.24	kg

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	≥ 50	a
Life Span according to the manufacturer	100	a
Declared product properties (at the gate) and finishes	Conforming with EN 13167	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	According to the manufacturer's instructions	-
Maintenance e.g. required frequency, type and quality and replacement of components	No maintenance required	-

End of life (C1 - C4)

End-of-life is covered by three 100 % scenarios
- Baseline scenario: Landfilling
- Scenario 1: Recycling in brick production
- Scenario 2: Reuse in-situ

C1 - Deconstruction

Includes the use of a generic machine for deconstruction.

C2 - Transport
- C2 includes a waste collection as mixed construction waste and a transported by truck over a distance of 50 km.
- C2/1 includes a separate collection of wastes at deconstruction site with a transport by truck over a distance of 50 km to recycling.
- C2/2 is null as this scenario involves a reuse of the product in -situ, i.e. on the same construction site.

C3 - Waste processing
- C3 is null, as all the product is disposed in a landfill.
- C3/1 includes the crushing of FOAMGLAS® for further use as a raw material.
- C3/2 is null as the product is reused as is, without further processing.

C4 - Disposal
- C4 reflects impact from product disposal in an inert material landfill.
- C4/1 is null, as all the product is sent to recycling.
- C4/2 is null, as all the product is reused in-situ.

Name	Value	Unit
Landfilling scenario		
Collected as mixed construction waste	112	kg
Landfilling	112	kg
Recycling scenario		
Collected separately waste type	112	kg
Recycling	112	kg
Reuse in situ scenario		
No collection (reused in situ)		
Reuse	112	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

- D only includes benefits and loads from packaging end-of-life. Cellular glass is considered being landfilled and therefore has no impact in module D.
- D1 includes benefits and loads from packaging end-of-life, as well as benefits and loads from FOAMGLAS® recycling. These are calculated considering FOAMGLAS® is crushed and used in brick manufacturing, substituting 100 % virgin kaolin.
- D2 includes benefits and loads from packaging end-of-life, as well as benefits and loads from FOAMGLAS® reuse. These are calculated considering FOAMGLAS® is reused in-situ, substituting 100 % new FOAMGLAS® product.

5. LCA: Results

LCIA results have been calculated according to *EN15804+A2:2019+AC:2021*, using EF 3.1 methods.

Three end-of-life scenarios have been considered in the study:
- Landfilling in the end-of-life (C2, C3, C4, D)
- Recycling for further use in brick manufacturing (C2/1, C3/1, C4/1, D1)
- Reuse in-situ of FOAMGLAS products (C2/2, C3/2, C4/2, D2)

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m³ FOAMGLAS® T4+

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
GWP-total	kg CO_2 eq	1.43E+02	9.46E+00	1.3E+01	5.9E-02	7.2E-01	7.2E-01	0	0	3.05E-01	0	1.72E+00	0	0	-3.91E+00	-1.1E+01	-1.56E+02
GWP-fossil	kg CO_2 eq	1.51E+02	9.35E+00	3.67E+00	5.85E-02	7.11E-01	7.11E-01	0	0	3.08E-01	0	1.72E+00	0	0	-3.88E+00	-1.1E+01	-1.54E+02
GWP-biogenic	kg CO_2 eq	-8.27E+00	1.9E-02	9.34E+00	-9.26E-04	1.45E-03	1.45E-03	0	0	-4.99E-03	0	-5.56E-03	0	0	-2.86E-02	5.54E-02	-7.58E-01
GWP-luluc	kg CO_2 eq	1.26E+00	9.79E-02	3.67E-02	1.46E-03	7.48E-03	7.48E-03	0	0	2.65E-03	0	7.03E-03	0	0	-1.62E-03	-2.03E-02	-1.26E+00
ODP	kg CFC11 eq	9.98E-03	1.58E-12	2E-04	1.59E-14	1.21E-13	1.21E-13	0	0	6.05E-13	0	4.78E-12	0	0	-3.5E-11	-2.06E-08	-9.98E-03
AP	mol H^+ eq	2.51E-01	1.56E-02	2.39E-02	2.85E-04	1.68E-03	1.68E-03	0	0	1.56E-03	0	1.21E-02	0	0	-5.59E-03	-2.62E-02	-2.56E-01
EP-freshwater	kg P eq	9.61E-03	2.56E-05	2.85E-04	1.08E-07	1.96E-06	1.96E-06	0	0	7.71E-07	0	2.55E-06	0	0	-4.9E-06	-7.88E-05	-9.62E-03
EP-marine	kg N eq	1.03E-01	6.42E-03	8.13E-03	1.36E-04	7.47E-04	7.47E-04	0	0	7.26E-04	0	3.17E-03	0	0	-1.77E-03	-7.67E-03	-1.05E-01
EP-terrestrial	mol N eq	1.08E+00	6.88E-02	9.33E-02	1.49E-03	8.05E-03	8.05E-03	0	0	7.86E-03	0	3.46E-02	0	0	-1.94E-02	-8.41E-02	-1.1E+00
POCP	kg NMVOC eq	2.91E-01	1.41E-02	1.37E-02	3.78E-04	1.53E-03	1.53E-03	0	0	1.93E-03	0	9.49E-03	0	0	-5.82E-03	-2.34E-02	-2.97E-01
ADPE	kg Sb eq	1.47E-03	6.33E-07	3.11E-05	7.61E-09	4.83E-08	4.83E-08	0	0	3.13E-07	0	1.06E-07	0	0	-3.84E-07	-2.73E-06	-1.47E-03
ADPF	MJ	2.19E+03	1.22E+02	2.11E+01	7.37E-01	9.31E+00	9.31E+00	0	0	5.69E+00	0	2.25E+01	0	0	-8.06E+01	-2.08E+02	-2.27E+03
WDP	m^3 world eq deprived	9.5E+00	4.35E-02	1.04E+00	2.17E-04	3.32E-03	3.32E-03	0	0	5.47E-02	0	1.86E-01	0	0	-2.39E-01	-1.77E+00	-9.73E+00

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m³ FOAMGLAS® T4+

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PERE	MJ	1.69E+03	9.19E+00	2.16E+02	6.35E-02	7.02E-01	7.02E-01	0	0	5.58E-01	0	4.34E+00	0	0	-4.51E+01	-5.7E+01	-1.73E+03
PERM	MJ	9.34E+01	0	-9.34E+01	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1.78E+03	9.19E+00	1.22E+02	6.35E-02	7.02E-01	7.02E-01	0	0	5.58E-01	0	4.34E+00	0	0	-4.51E+01	-5.7E+01	-1.83E+03
PENRE	MJ	2.11E+03	1.22E+02	7.2E+01	7.37E-01	9.31E+00	9.31E+00	0	0	5.69E+00	0	4.86E+01	0	0	-8.06E+01	-2.08E+02	-2.19E+03
PENRM	MJ	7.76E+01	0	-5.15E+01	0	0	0	0	0	-2.61E+01	-2.61E+01	-2.61E+01	0	0	0	0	0
PENRT	MJ	2.19E+03	1.22E+02	2.05E+01	7.37E-01	9.31E+00	9.31E+00	0	0	-2.04E+01	-2.61E+01	2.25E+01	0	0	-8.06E+01	-2.08E+02	-2.27E+03

SM	kg	4.27E+01	0	8.55E-01	0	0	0	0	0	0	0	0	0	0	2.28E+00	1.15E+02	1.15E+02
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	3.9E+00	4.54E-03	1.18E-01	4.52E-05	3.47E-04	3.47E-04	0	0	1.49E-03	0	5.43E-03	0	0	-1.07E-02	-5.47E-02	-3.91E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:
1 m³ FOAMGLAS® T4+

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
HWD	kg	1.81E-02	4.89E-09	3.63E-04	3.84E-11	3.74E-10	3.74E-10	0	0	7.84E-10	0	4.92E-09	0	0	-3.54E-08	-4.51E-04	-1.81E-02
NHWD	kg	1.3E+01	1.7E-02	2.8E+00	1.09E-04	1.3E-03	1.3E-03	0	0	1.43E-03	0	1.12E+02	0	0	-3.01E-02	-5.63E-02	-1.3E+01
RWD	kg	7.61E-03	2.3E-04	3.76E-04	1.07E-06	1.76E-05	1.76E-05	0	0	7.21E-05	0	2.39E-04	0	0	-1.79E-03	-7.35E-03	-9.4E-03
CRU	kg	0	0	0	0	0	0	0	0	0	1.12E+02	0	0	0	0	0	0
MFR	kg	5.52E+01	0	4.02E+00	0	0	0	0	0	1.12E+02	0	0	0	0	0	0	0
MER	kg	0	0	4.27E+00	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	9.35E+00	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	2.2E+01	0	0	0	0	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m³ FOAMGLAS® T4+

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PM	Disease incidence	2.95E-06	1.41E-07	1.98E-07	3.35E-09	1.35E-08	1.35E-08	0	0	2.99E-08	0	1.51E-07	0	0	-7.55E-08	-3.06E-07	-3.02E-06
IR	kBq U235 eq	1.11E+00	3.3E-02	4.62E-02	1.05E-04	2.52E-03	2.52E-03	0	0	1.15E-02	0	2.65E-02	0	0	-2E-01	-1.06E+00	-1.31E+00
ETP-fw	CTUe	4.8E+02	1.59E+02	3.95E+01	8.15E-01	1.21E+01	1.21E+01	0	0	5.68E+00	0	1.74E+01	0	0	-3.17E+01	-4.72E+01	-5.12E+02
HTP-c	CTUh	6.04E-08	2.14E-09	3.08E-09	1.17E-11	1.63E-10	1.63E-10	0	0	9.06E-11	0	2.99E-10	0	0	-8.24E-10	-1.78E-09	-6.12E-08
HTP-nc	CTUh	1.31E-06	1.2E-07	1.44E-07	4.53E-10	9.13E-09	9.13E-09	0	0	3.76E-09	0	1.12E-08	0	0	-1.63E-08	-2.93E-08	-1.33E-06
SQP	SQP	1.26E+03	5.39E+01	1.98E+02	3.86E-01	4.12E+00	4.12E+00	0	0	1.61E+00	0	5.56E+00	0	0	-4.77E+01	-4.26E+01	-1.31E+03

PM = Potential incidence of disease due to PM emissions; IR = Potential human exposure efficiency relative to U235; ETP-fw = Potential comparative toxic unit for ecosystems; HTP-c = Potential comparative toxic unit for humans (carcinogenic); HTP-nc = Potential comparative toxic unit for humans (not carcinogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – carcinogenic”, “Potential comparative toxic unit for humans - not carcinogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

This EPD was created using a software tool.

6. LCA: Interpretation

Impacts from FOAMGLAS® production are mostly driven by the manufacturing stage (A3), contributing to 50 % to 80 % to total impacts for most indicators. Within A3, glass melting and foaming processes are main contributors to indicators linked to fossil fuel combustion such as climate change, ADP Fossil, acidification, photochemical oxidant formation, eutrophication marine and terrestrial, due to direct emissions of CO_2, NO_x and SO_x at the chimney. ADP mineral mostly reflects impacts from electrode production used by the electric melting furnaces. Production of raw materials (A1) generally comes as the second contribution to total impacts. Soda ash production comes as the main source of impacts for most of the indicators, while feldspar is the second main contributor.

7. Requisite evidence

VOC emissions
FOAMGLAS® T4+ is an insulating material which does not display VOC (volatile organic compounds) or carcinogenic emissions after 3 and 28 days according to the German Committee for the Health-Related Evaluation of Building Products (AgBB scheme). Tables below provide information from VOC emissions tests according to EN 16516.

AgBB VOC emissions testings have been performed on other FOAMGLAS® products having same chemical composition. These tests are therefore considered representative for FOAMGLAS® T4+.

Product tested: FOAMGLAS® T3+
Date: 31/01/2020
Measuring agency: Servaco Product Testing

Report number: ML02001-28R

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	< 5	µg/m^3
Sum SVOC (C16 - C22)	< 5	µg/m^3
VOC without NIK	< 5	µg/m^3
Carcinogenic Substances	< 1	µg/m^3

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	< 5	µg/m^3
Carcinogenic Substances	< 1	µg/m^3

8. References

STANDARDS

EN 826
EN 826:2013 - Thermal insulating products for building applications - Determination of compression behaviour

EN 1602
EN 1602:2013 - Thermal insulating products for building applications - Determination of the apparent density

EN 1606
EN 1606:2013 - Thermal insulating products for building applications. Determination of compressive creep

EN 13167
EN 13167:2012+A1:2015/prA2:2018 - Thermal insulation products for buildings - Factory made cellular glass (CG) products

EN 13501-1
EN 13501-1:2019 - Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 15804
EN 15804:2012+A2:2019/AC:2021 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

EN 16516
EN 16516+A1:2020 - Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air

ISO 9001
ISO 9001:2015 - Quality management systems — Requirements

ISO 10456
ISO 10456:2007+ AC:2009 - Building materials and products - Hygrothermal properties -Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007)(+ AC:2009)

ISO 14001
ISO 14001:2015 - Environmental management systems — Requirements with guidance for use

ISO 14025
ISO 14025:2006 - Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14044
ISO 14044:2006 - Environmental management — Life cycle assessment — Requirements and guidelines

ISO 45001
ISO 45001:2018 - Occupational health and safety management systems — Requirements with guidance for use

ISO 50001
ISO 50001:2018 - Energy management systems — Requirements with guidance for use

FURTHER REFERENCES

LCA For Expert
LCA for Experts Software System and Databse for Life Cycle Engineering, version 10.9.3.0, 1992-2024 © Sphera Solutions GmbH

IBU - General instructions
General instructions for the EPD programme of Institut Bauen und Umwelt e.V. (General Instructions for the IBU EPD programme), version 2.1, 1st October 2022, Institut Bauen und Umwelt, Berlin.

IBU - PCR Part A
Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.4, 15 April 2024, Institut Bauen und Umwelt, Berlin.

IBU – PCR Part B
Part B: Requirements on the EPD for Mineral insulating materials, version 12, 3 May 2026, Institut Bauen und Umwelt, Berlin.

AgBB
Ausschuss zur gesundheitlichen Bewertung von Bauprodukten (2018). Committee for Healthrelated Evaluation of Building Products. Requirements for the Indoor Air Quality in Buildings: Health-related Evaluation Procedure for Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building

Products

AVV/EWC
Abfallverzeichnis-Verordnung (AVV)/ European Waste Catalogue (EWC). Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

ECHA Candidate list
Candidate List of substances of very high concern for Authorisation in accordance with Article 59(10) of the REACH Regulation, September 2025, ECHA

Ordinance on Biocide Products
Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products

Construction Product Regulation (CPR)
Regulation (EU) No 305/2011 Of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

Natural soda ash EPD
Kazan soda Environmental Product Declaration - EPD Turkey - Registration number S-P-10666 - Published 16/02/2024 - https://epdturkey.org/service/detail/s-p-10666

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