ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

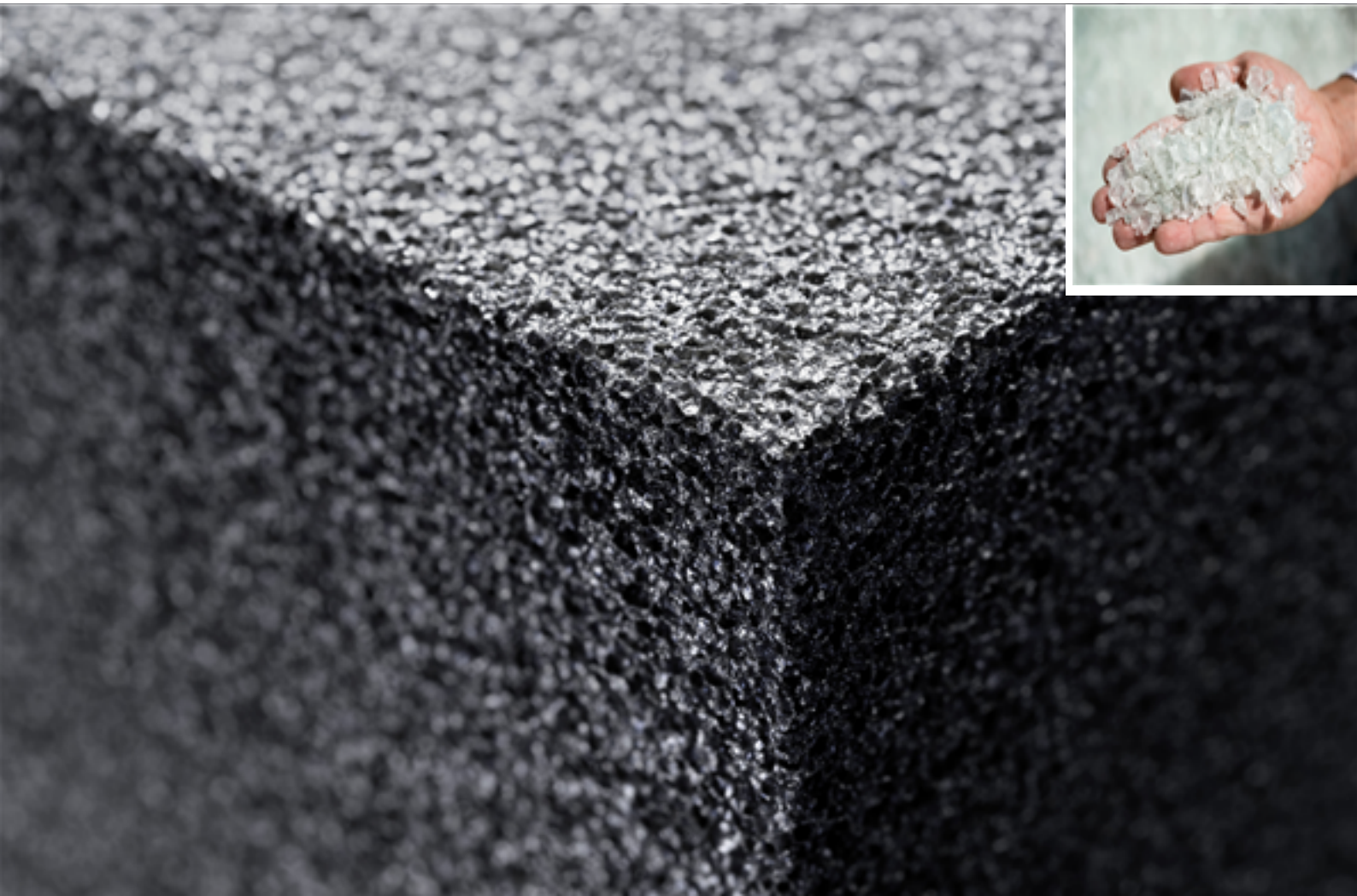
Owner of the Declaration	**Pittsburgh Corning Europe NV**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PCE-2013256-IAA1-EN
Issue date	16.06.2014
Valid to	15.06.2019

FOAMGLAS® T4+

Pittsburgh Corning Europe NV

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com



1. General Information

Pittsburgh Corning Europe NV

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-PCE-2013256-IAA1-EN

This Declaration is based on the Product Category Rules:
Mineral insulating materials, 07-2012
(PCR tested and approved by the independent expert committee)

Issue date
16.06.2014

Valid to
15.06.2019

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

FOAMGLAS® T4+

Owner of the Declaration
Pittsburgh Corning Europe NV
Albertkade 1
B-3980 Tessenderlo

Declared product / Declared unit
1 kg unclad, uncoated **FOAMGLAS® T4+ cellular glass insulation**

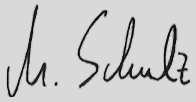
Scope:
This document refers to the production of 1 kg uncoated **FOAMGLAS® T4+** cellular glass manufactured in Belgium at the Tessenderlo production facility of Pittsburgh Corning Europe NV.

The holder of the Declaration is liable for the information and evidence on which it is based; liability by IBU with regard to manufacturer's information, LCA data and evidence is excluded.

This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-PCE-2013256-IAA1-DE. The verifier has no influence on the quality of the translation.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 evidences.

Verification

The CEN Norm EN 15804 serves as the core PCR
Independent verification of the declaration according to ISO 14025
☐ internally ☒ externally



Matthias Schulz
(Independent tester appointed by SVA)

2. Product

2.1 Product description

FOAMGLAS® is an insulating material made of glass for building construction and industrial installations. It is used to manufacture dimensionally-accurate slabs, boards, pipe shells, segments and other special elements.

FOAMGLAS® slabs and elements are largely manufactured from high-quality recycled glass (e.g. windscreens) and mineral base materials such as sand and without the use of binding agents. They display a closed-cell structure. This Declaration concerns the product:

FOAMGLAS® T4+ with a gross density of 117 kg/m³ (± 15%)

The products are supplied in thicknesses of 40 mm to 180 mm, e.g. as slabs with high compressive strength. Products manufactured by Pittsburgh Corning Europe NV are produced in the Tessenderlo plant (Belgium).

2.2 Application

FOAMGLAS® insulating material is used for the entire building envelope.

- All types of application in accordance with DIN 4108 or other local application guidelines for roofs, walls, ceilings, perimeters and other special applications
- Building equipment (air ducts, cold water systems, pipes)
- Technical insulation (insulation of pipes, containers, tanks and equipment)
- Fire protection (extra fire resistance for walls, connections and wall penetrations)

2.3 Technical Data

Product characteristics

Name	Value	Unit
Thermal conductivity (EN 13167)	0.041	W/(mK)

Water vapour diffusion resistance factor (EN ISO 10456)	∞	μ
Water vapor diffusion equivalent air layer thickness (at 1 m thickness)	40.000	m
Sound absorption coefficient	-	%
Gross density (EN 1602)	117	kg/m³
Compressive strength (EN 826)	600	N/mm²
Reaction to fire (EN 13501-1)	non-combustible A1	
Melting point (DIN 4102-17)	> 1.000	°C

2.4 Placing on the market / Application rules

Directive (EU) No. 305/2011 of 9 March 2011 applies for placing the product on the market in the EU/EFTA. The products require a Declaration of Performance taking consideration of the harmonised European standard DIN EN 13167:2013-03, Thermal insulation products for buildings – Factory-made cellular glass (CG) products – Specification, and CE marking.

Use is governed by the respective national guidelines; in Germany: the DIBt general building inspectorate approval for **FOAMGLAS® insulating materials** manufactured by Deutsche FOAMGLAS® GmbH, approval no. Z-23.15-1403 dated 17 January 2013 Pittsburgh Corning Europe NV.

2.5 Delivery status

FOAMGLAS® T4+ slabs are available in the following formats: 600 x 450 mm, 300 x 450 mm
Thickness: 40 – 180 mm
Gross density: 117 kg/m³
Other dimensions available on request

2.6 Base materials / Ancillary materials

Average composition of FOAMGLAS® T4+

Name	Value	Unit
Recycled glass	≥ 60	Mass - %
Feldspar	≤ 20	Mass - %
Sand	≤ 15	Mass - %
Soda (bicarbonate of soda)	≤ 10	Mass - %
Iron oxide	≤ 5	Mass - %
Sodium nitrate	≤ 1	Mass - %
Sodium sulphate	≤ 1	Mass - %
Carbon	≤ 1	Mass - %

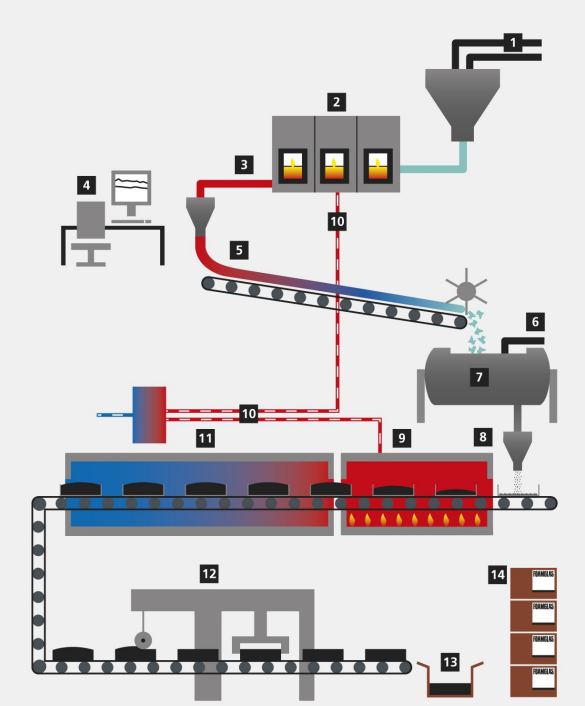
FOAMGLAS® comprises naturally occurring mineral raw materials. An auxiliary material is used for the process, e.g. aluminium hydroxide (≤1%).

2.7 Manufacture

A first step involves weighing, crushing and mixing the raw materials followed by melting at 1,250 °C in the electrode furnace. Using electrical energy for melting guarantees a homogeneous melt.
Once the melt has cooled, the glass is finely ground in ball mills with the aid of corundum cylinders. Part of the recycled glass used can be ground and foamed directly without necessarily being melted first. It is combined with the pretreated powder mixture and poured into foaming moulds made of stainless steel. The mixture then runs through a foaming process at 850 °C followed by a controlled cooling process. Stressless cooling is followed by cutting and packing.

Electricity requirements are fully guaranteed by purchasing a certified electricity mix from hydropower plants.

Production process:



FOAMGLAS® Manufacturing Process

1 Mixing and batching of the raw materials: Recycled glass, feldspar, sodium carbonate, iron oxide, manganese oxide, sodium sulphate, sodium nitrate.
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 into the ball mill.
6 Addition of "carbon black".
7 Ball mill grounds all ingredients into a fine powder before putting into stainless steel moulds.
8 The filled moulds 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 of them without thermal stress.
11 The blocks are cut to size and sorted by batch. Production waste is recycled.
12 FOAMGLAS® slabs are then packaged, labelled and palletized.
13 Finished FOAMGLAS® products are stored and prepared for transport.

Quality assurance:
CE marking and CEN Keymark in accordance with European specifications and/or internal and external monitoring in accordance with the local Building regulations. Rules List, Part B, approval no. Z23.15-1403

2.8 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
Health and safety management in accordance with BS OHSAS 18001:2007

Environmental protection during manufacturing:
Water/Soil: Water incurred during manufacturing and plant cleaning is treated mechanically in a waste water treatment system on the plant site and re-used in the production process. Waste water corresponds with the local specifications and the low Al2O3 suspended particles contained in the waste water support waste water cleaning.
Noise: The noise emissions into the environment by production equipment fall short of the permissible limit values.
The requirements in accordance with quality, environment and energy management are maintained: (DIN EN ISO 9001:2008-12, DIN EN ISO 14001:2009-11, DIN EN ISO 50001:2011-12).

2.9 Product processing/Installation

Recommendations on product application depend on the specific product and system and are outlined in the specification documentation and data sheets (available at www.foamglas.com).
The product does not contain any noteworthy concentrations of substances known to be hazardous to health. Dust incurred during sawing is inert and non-crystalline.
Depending on the specific 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 regulation of the employer`s liability insurance association applies.
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 current state of knowledge, hazards for water, air and soil can not arise when **FOAMGLAS®** is applied as designated.

2.10 Packaging

Re-usable wooden pallets, PE shrink foil and cardboard elements serve as packaging material. Packaging material (PE foil and cardboard) is disposed of on the building site. Thermal utilisation takes place.

2.11 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, frost, vermin, acid and chemicals.

2.12 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, **FOAMGLAS®** 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 Health-related Evaluation of Building Products (AgBB scheme) (emissions test as per DIN EN ISO 16000-6/9).

2.13 Reference service life

When used as designated, the service life of **FOAMGLAS® products** is unlimited in accordance with current scientific findings and merely limited by the service life of the components and/or building as a whole.
The closed-cell structure displayed by **FOAMGLAS®** prevents the insulation material from absorbing water. Insulation performance remains without restriction throughout the entire service life. The insulation products are impervious to moisture, frost, vermin, acid and chemicals.

2.14 Extraordinary effects

Fire
Fire
FOAMGLAS® is classified as Euro class A1 in accordance with EN 13501-1:2010-01 and building material class A1 as per DIN 4102-1:1998-05.
Class A1 building products do not display any hazard potential regarding smoke development, flammability or burning drips.

The melting temperature for **FOAMGLAS® insulating slabs** is above 1,000 °C and the maximum application limit temperature is approx. 430 °C.

Fire protection

Name	Value
Building material class / Euro class	A1
Burning droplets	No
Smoke gas development	No

Water
Thanks to its cellular structure, exposure to moisture can not impair the insulating features displayed by **FOAMGLAS®**. Even when exposed to water over long periods of time (e.g. floods), the insulating material remains intact. In accordance with the general building inspectorate approval (Z-23.5-103), **FOAMGLAS®** remains functional over the long term even when exposed to pressing water at an immersion depth of up to 12 metres. **FOAMGLAS®** does not represent an environmental hazard, even when exposed to water for longer periods of time (please refer to section 7.1 Eluate test).

Mechanical destruction

FOAMGLAS® is extremely resilient and there is no risk of mechanical destruction of used as designated. It does not represent any environmental hazards thanks to its mineral composition (see MSDS **FOAMGLAS®** and natureplus certificate).

Mechanical destruction
FOAMGLAS® ist in jeglicher Hinsicht äußerst belastbar und bei bestimmungsgemäßen Einsatz besteht keine Gefahr mechanischer Zerstörung. Es bestehen keinerlei Gefahren für die Umwelt aufgrund der mineralischen Zusammensetzung. (siehe MSDS **FOAMGLAS®** und natureplus Zertifikat).

2.15 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 still bearing adhesive – are suitable for re-use as filling material in civil engineering, road construction or for sound barriers (material recycling), for example.

2.16 Disposal
Where the recycling options referred to above are not practical, F**OAMGLAS®** residue incurred on the construction site as well as residue from de-construction can be easily deposited without preliminary treatment in Class I landfills thanks to their non-leaching mineral components. Packaging can be utilised thermally. The waste code number as per the List of Wastes Ordinance (/AVV/) for F**OAMGLAS®** (uncontaminated) is 17 06 04. In combination with bituminous waterproofing substances and adhesive, waste code number 17 09 04 is for unsorted waste.

2.17 Further information
Further information on **FOAMGLAS® insulating materials** is available online on the manufacturer's Website: www.foamglas.com.
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3. LCA: Calculation rules

3.1 Declared Unit
The Declaration refers to the life cycle of **1 kg FOAMGLAS® T4+**. The product's gross density is 117 kg/m³.
Transfer of the results to other gross densities is possible via linear scaling as the product involves unclad, uncoated cellular glass.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Gross density	117	kg/m³

3.2 System boundary
Type of EPD: cradle to gate
The LCA addresses the life cycle stage of production. The product stage comprises Modules A1 (Raw material supply), A2 (Transport) and A3 (Production). The following individual processes were included in the product stage **A1–A3** of production:

- Deployment processes concerning preliminary products and energy
- Transporting the raw materials and preliminary materials to the plant
- Manufacturing process in the plant including energetic expenses, disposal of residual materials and emissions
- Production of packaging

The packaging material volumes considered involve annual consumption / annual purchase volumes.

3.3 Estimates and assumptions
In the product system, external cullet or waste glass is used as a neutral preliminary product within the framework of the LCA. This recycled glass is regarded as a waste product and is therefore calculated as input without loads.

3.4 Cut-off criteria
All operating data was taken into consideration in the analysis. Processes whose entire contribution towards the final manufacturing result in terms of mass and less than 1% were ignored.
It can be assumed that the processes ignored would each have contributed less than 5% to the impact categories under review.
Machinery, plants and infrastructure required in the manufacturing process were not considered.

3.5 Background data
"**GaBi 6**" - the software system for comprehensive analysis (GaBi6) developed by PE INTERNATIONAL AG - was used for modelling the **FOAMGLAS®** life cycle. The data sets contained in the GaBi data base are documented in the online GaBi documentation (GaBi 6 Docu). The basic data in the GaBi data base was applied for energy, transport, preliminary products and auxiliaries. No data records from other data bases were used. The Life Cycle Assessment was drawn up for Belgium as a reference area. This means that apart from the production processes under these marginal conditions, the upstream stages also of relevance for Belgium such as provision of energy carriers were used. **Pittsburgh Corning Europe NV** procures electricity from Norwegian hydropower stations for which the hydropower mix for 2009 was applied.

3.6 Data quality
All of the background data sets of relevance for the LCA were taken from the **GaBi 6 software data base**. The background data used for the LCA was last revised less than 4 years ago.
Pittsburgh Corning Europe NV supplied current primary production data for 2013. This production data was examined for plausibility. According to the manufacturer, there is very good representativity of the declared product.
The corresponding data sets were available in the data base for al preliminary products used. The data quality can be regarded as very good.

3.7 Period under review
The data in this LCA is based on primary data on **FOAMGLAS® T4+** production in 2013 supplied by **Pittsburgh Corning Europe NV**. The volumes of raw materials, energy, auxiliaries and consumables used are considered as average annual values.

3.8 Allocation

The plastic waste incurred is burned in a waste incineration plant. It is modelled in an input-specific manner in the model, whereby any emissions incurred are taken consideration of in the model (Module A3). In line with its elementary composition and ensuing calorific values, credits for thermal utilisation are calculated in Module A3.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

As a general rule, a comparison or evaluation of EPD data is only possible when all of the data sets to be compared have been drawn up in accordance with EN 15804 and the building context and/or product-specific performance characteristics are taken into consideration.

4. LCA: Scenarios and additional technical information

Die Module A4, A5, B1-B7 und C1-C4, D werden in dieser Deklaration nicht berücksichtigt

5. LCA: Results

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

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg FOAMGLAS® T4+

Parameter	Unit	A1 - A3
Global warming potential	[kg CO_2-Eq.]	1.3E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.18E-10
Acidification potential of land and water	[kg SO_2-Eq.]	2.8E-3
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	3.5E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	2.4E-4
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	7.1E-6
Abiotic depletion potential for fossil resources	[MJ]	1.97E+1

RESULTS OF THE LCA - RESOURCE USE: 1 kg FOAMGLAS® T4+

Parameter	Unit	A1 - A3
Renewable primary energy as energy carrier	[MJ]	8.8E+0
Renewable primary energy resources as material utilization	[MJ]	0.0E+0
Total use of renewable primary energy resources	[MJ]	8.8E+1
Non renewable primary energy as energy carrier	[MJ]	2.0E+1
Non renewable primary energy as material utilization	[MJ]	0.0E+0
Total use of non renewable primary energy resources	[MJ]	2.0E+1
Use of secondary material	[kg]	4.9E-1
Use of renewable secondary fuels	[MJ]	0.0E+0
Use of non renewable secondary fuels	[MJ]	0.0E+0
Use of net fresh water	[m^3]	1.5E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 kg FOAMGLAS® T4+

Parameter	Unit	A1 - A3
Hazardous waste disposed	[kg]	3.5E-4
Non hazardous waste disposed	[kg]	4.5E-2
Radioactive waste disposed	[kg]	2.1E-4
Components for re-use	[kg]	0.0E+0
Materials for recycling	[kg]	0.0E+0
Materials for energy recovery	[kg]	0.0E+0
Exported electrical energy	[MJ]	0.0E+0
Exported thermal energy	[MJ]	0.0E+0

6. LCA: Interpretation

The greatest contribution to the **Global Warming Potential (GWP, 100 years)** is made by the production phase (approx. 70%) (Module A3), whereby approx. 65% is attributable to energy supply (of which 99% through thermal energy) [MBo1]. Production of preliminary products contributes approx. 30% to the GWP. Approx. 5% each is attributable to the actual production stage and production of the auxiliaries.
At 76%, the **Ozone Depletion Potential (ODP)** is dominated by the production phase with 72% attributable to the production of auxiliaries, especially aluminium hydroxide (99%). Approx. 24% of the ODP is accounted for by raw materials, especially iron oxide at 60%.
The **Acidification Potential (AP)** is characterised 62% by Module A1 (raw materials) and 32% by Module A3 (production). In terms of raw materials, sodium carbonate has the greatest influence at 30%. During the production of T4+, energy consumption accounts for 20% and the production of auxiliaries makes a contribution of 7%.
The greatest contribution (62%) to the **Eutrification Potential (EP)** is made by the provision of raw materials, especially sodium carbonate (approx. 65%). 32% of the entire EP is incurred during the production phase, whereby energy supply (98% through thermal energy) makes a contribution of 25%.
The **Photochemical Ozone Creation Potential (POCP)** is characterised 56% by Module A1 (raw materials) and 58% by Module A3 (production). In terms of raw materials, sodium carbonate has the greatest influence at 60%. During the production of T4+, energy consumption represents the primary influence at 80% (90% through thermal energy).

Sulphur dioxide, carbon monoxide and the group of NMVOC in particular contribute to the POCP. Transport leads to a credit in terms of POCP. This is because nitrogen monoxide emissions incurred during transport have a negative characterisation factor in the impact estimate as per CML 2001 – valid as at 2010 – with the result that not only the credits are negative for the creation of photo oxidants but also the loads. Despite the apparently paradox results that more transports would lead to an increased number of credits, the model does not contain any errors here. Methods other than the one selected (CML 2010) for estimating the impact of POCP (e.g. ReCiPe) have avoided negative characterisation factors in order to facilitate interpretation of the results and set the nitrogen monoxide characterisation factor at zero.
The **Abiotic Depletion Potential (ADP elementary)** is largely (93%) caused by Module A1 (raw materials), Approx. 50% is attributable to the production of sodium sulphate and 40% is accounted for by sodium carbonate.

The **Abiotic Depletion Potential (ADPF)** is primarily the result of the upstream chains in Module A3 (66%). Approx. 62% of the ADP fossil is caused by the use of energy (99% through thermal energy). Approx. 30% is attributable to production of the preliminary products.
The **Total primary energy requirements** are divided among non-renewable energy carriers (approx. 68%) and renewable energy (approx. 32%).
The **Total use of renewable primary energy sources (PERT)** is largely (94%) the result of using electrical energy during the production process. This is necessitated by Pittsburgh Corning Europe NV procuring electricity from hydropower.
When considering the **Total use of non-renewable primary energy sources (PENRT)**, the upstream chains associated with manufacturing preliminary products and the use of energy account for approx. 35% and 61%, respectively. Iron oxide, kaolin and sodium carbonate (each 30%) are manufactured using non-renewable energy sources. During the actual production stage, 99% of energy used is accounted for by natural gas (thermal energy).

7. Requisite evidence

FOAMGLAS® eluate test
Eidgenössische Materialprüfungs- und Forschungsanstalt EMPA
Eluate test report for FOAMGLAS® No.123544A
Result:
Where the recycling options referred to above are not practical, FOAMGLAS® residue incurred on the construction site as well as residue from de-construction can be easily deposited without preliminary treatment in Class I landfills thanks to their non-leaching mineral components.

FOAMGLAS® emission test
Process: Testing the product emissions in line with the AgBB/DIBt method (DIN EN ISO 16000-6/9)
(test report by Bremer Umweltinstitut H3989 FM, Part 1 dated March 2011 and Laboratoire EXCELL No. 2010-10-050-1 of May 2011)
Result:
In accordance with official emission measurements for indoor air, FOAMGLAS® is an insulating material which does not display VOC (volatile organic compounds) or carcinogenic emissions after 3 and 28 days according to the AgBB scheme.

8. References

Institut Bauen und Umwelt 2011: Institut Bauen und Umwelt e.V., Königswinter (pub.): Drawing up Environmental Product Declarations (EPDs)

General principles: General Principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2011-09; www.bau-umwelt.de

PCR 2012, Part A: Calculation rules for the LCA and requirements on the Background Report, Institut Bauen und Umwelt e.V., September 2012, www.bau-umwelt.de

PCR 2012, Part B: Guidelines for building-related products and services, Part B: Requirements on the EPD for PCR Mineral Insulating Materials, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, July 2012, version 1.1

GaBi 6: GaBi 6: Software and Data Base for Life Cycle Engineering, IKP [Institute for Polymer Testing and Polymer Science] University of Stuttgart and PE Europe AG, Leinfelden-Echterdingen, 2012

GaBi 6 2011B: GaBi 6: Documentation of GaBi 5 data sets from the data base for comprehensive analysis LBP, University of Stuttgart and PE International, 2011; http://documentation.gabi-software.com/

AgBB: Evaluation scheme for VOC from construction products; procedure for health-related evaluation of emissions of volatile organic compounds (VOC and SVOC) from construction products, valid as at July 2004

AVV: List of Wastes Ordinance dated 10 December 2011 (Federal Law Gazette IS.3379) last amended by Article 5, section 22 of the law of 24 February 2012 (BGBI.IS.212)

EU Directive 97/69: 1997-12:Directive 97/69/EC of the Commission on the 23rd adaptation of Directive 67/548/EEC by the Council for approximating the legal and administrative guidelines for classifying, packaging and marking hazardous substances in line with technical advances

Ordinance on Hazardous Substances (GefStoffV): 26 November 2010, ordinance governing protection from hazardous substances

TA Air: 24 July 2002; General administrative specification under federal pollution control law (Technical Guideline for Air Pollution Control – "TA Luft")

Product and safety data sheets for FOAMGLAS® insulation materials offered by Pittsburgh Corning Europe NV, available online at www.foamglas.com

DIN EN ISO 14001:2009-11, Environmental management systems – Requirements with guidance for use (ISO 14001:2004 + Cor. 1:2009); German and English versions EN ISO 14001:2004 + AC:2009

DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures; German and English versions EN ISO 14025:2011

DIN EN ISO 14040:2009-11, Environment Management – Life Cycle Assessment – Principles and Framework; German and English versions EN ISO 14044:2006

DIN EN ISO 14044:2006-10, Environment Management – Life Cycle Assessment – Requirements and Instructions; German and English versions EN ISO 14044:2006

DIN EN ISO 16000-6:2012-11, Indoor air – Part 6: Determination of volatile organic compounds indoors and in test chambers by sampling on Tenax TA®, thermal desorption and gas chromatography using MS or MS-FID (ISO 16000-6:2011)

DIN EN ISO 50001:2011-12, Energy management systems – Requirements with guidance for use (ISO 50001:2011). The general aim of this standard is to support organisations in establishing systems and processes necessary to improve their energy performance.

DIN EN ISO 9001:2008-12, Quality management systems – Requirements; trilingual version EN ISO9001:2008

DIN EN 826:1996-05, Thermal insulating products for building applications – Determination of compression behaviour; German version EN 826:1996

DIN EN13501-1: 2010-01, Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests; German version EN 13501-1:2007 + A1:2009

DIN EN 15804: 2012-04, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction; German version EN 15804:2012

DIN EN 13167:13167:2013-03, Thermal insulation products for buildings – Factory-made cellular glass (CG) products

DIN 1602:1997-01, Thermal insulating products for building applications – Determination of the apparent density; German version EN 1602:1996

DIN 4102-1:1998-05, Fire behaviour of building materials and building components – Part 1: Building materials; concepts, requirements and tests

DIN 4108-10:2008-06, Thermal insulation and energy economy in buildings – Part 10: Application-related requirements for thermal insulation materials – Factory-made products

DIN EN ISO 10456: 2010-05: Building materials and products – Hygrothermal properties – Tabulated design values and procedures for determining declared and design thermal values

DIN EN 12457-4:2003-01, Characterisation of waste – Leaching; Compliance test for leaching of granular waste materials and sludges – Part 4: One-stage batch test at a liquid-to-solid ratio of 10 l/kg for materials with particle size below 10 mm (with or without limited size reduction); German version EN 12457-4:2002

BS OHSAS 18001:2007 Occupational health and safety – Management systems – Requirements

Institut Bauen und Umwelt e.V., Berlin (pub.):

General principles
General Principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013-04

Product Category Rules for Building Products, Part A: Calculation rules for the Life Cycle Assessment and requirements on the background report, 2013-04

ISO 14025
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