

# Environmental Product Declaration

*in accordance with  
EN 15804+A2:2019, EN ISO 14025:2010  
independently verified by a third party*

## Clay masonry units

Energy +  
Comfort  
Classic Profi  
Classic  
AKU Profi  
AKU  
Miako

Multi-product EPD based on average results



# 1. General information

EPD Programme	National Environmental Labelling Programme of the Czech Republic (NPEZ)	 Ministerstvo životního prostředí
Address	Ministry of the Environment, Vršovická 1442/65, Prague 10, 100 10, Czech Republic	
Web	<a href="https://www.ekoznacka.cz/">https://www.ekoznacka.cz/</a>	
E-mail	info@mzp.gov.cz	
Product category rules (PCR)	EN 15804+A2 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.	

## Responsibility for PCR, LCA and independent third-party verification

Product Category Rules (PCR)	EN 15804+A2 serves as the core Product Category Rules (PCR)
Life Cycle Assessment (LCA)	Luboš Nobilis, Nesuchyně 12, 270 07, Czech Republic, nobilis.lubos@gmail.com
Third-party verification	<p>Independent verification of the declaration and data according to ISO 14025:</p> <p><input checked="" type="checkbox"/> EPD verified by an individual independent verifier</p> <p>Third-party verifier: Jan Weinzettel, Ph.D., <a href="http://www.fernconsulting.cz">http://www.fernconsulting.cz</a>, <a href="mailto:weinzettel@seznam.cz">weinzettel@seznam.cz</a></p> <hr/> <p>The procedure for follow-up of data during the validity of the EPD involves third-party verification: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For EPDs to be comparable, they shall be based on the same PCR (including the same version number) or fully aligned PCR versions; cover products with identical functions, technical performance and use; apply equivalent system boundaries and data descriptions; apply equivalent data quality requirements, data collection methods and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); contain equivalent content declarations; and be valid at the time of comparison. Further information on comparability is provided in EN 15804+A2 and ISO 14025. Wienerberger s.r.o. is the sole owner and bears responsibility for this EPD.

# Company information

Manufacturer	Wienerberger,s.r.o Company ID: 00015253 VST ID: CZ00015253
Production sites	3217 - Řepov, Řepov 255, 293 01, Mladá Boleslav, Czech Republic 3220 - Novosedly 365, 691 82 Novosedly na Moravě, Czech Republic 3222 - Týn nad Vltavou, K Jihotvaru 418, 375 01 Týn nad Vltavou, Czech Republic 3227 - Holice, 534 01 Holice, Czech Republic 3240 - Kostelec, 517 41 Kostelec nad Orlicí, 3241 - Jezernice, 751 31 Jezernice, Czech Republic 3276 - Šlapanice, Hřbitovní 1643, 664 51 Šlapanice u Brna, Czech Republic
Head office	Plachého 388/28 370 01 České Budějovice 1 Czech Republic
Contact	Tel.: +420 800 240 250 / +420 383 826 111 E-mail: <a href="mailto:info@wienerberger.cz">info@wienerberger.cz</a> Web: <a href="https://wienerberger.cz/">https://wienerberger.cz/</a>

Wienerberger s.r.o. is part of the Wienerberger AG Group. The company's registered office is located in České Budějovice, Plachého 388/28, postcode 370 01, Czech Republic. The company is registered in the Commercial Register maintained by the Regional Court in České Budějovice, Section C, File No. 27563, dated 29 December 1990.

**Wienerberger s.r.o. provides a comprehensive portfolio of sustainable solutions and services for construction and renovation.**

In the Czech market, the company's portfolio currently includes the Porotherm masonry system, Tondach clay roof tiles and roof accessories, Terca facing bricks and brick slips, Penter clay pavers, Semmelrock concrete products and Pipelife piping systems. Wienerberger s.r.o. is part of the international Wienerberger Group, the world's largest producer of clay bricks and a leading manufacturer of clay roof tiles in Europe. More information is available at [www.wienerberger.cz](http://www.wienerberger.cz).

This EPD covers clay masonry units and clay ceiling elements manufactured at the following production sites 3217 – Řepov, Řepov 255, 293 01 Mladá Boleslav, Czech Republic, 3220 – Novosedly, Novosedly 365, 691 82 Novosedly na Moravě, Czech Republic, 3222 – Týn nad Vltavou, K Jihotvaru 418, 375 01 Týn nad Vltavou, Czech Republic, 3227 – Holice, 534 01 Holice, Czech Republic, 3240 – Kostelec nad Orlicí, 517 41 Kostelec nad Orlicí, Czech Republic, 3241 – Jezernice, 751 31 Jezernice, Czech Republic, 3276 – Šlapanice, Hřbitovní 1643, 664 51 Šlapanice u Brna, Czech Republic.

## 2. Products

### 2.1 UN CPC code

UN CPC code: 3731 (Bricks, blocks, tiles and other ceramic goods of siliceous earths)

Geographical scope: Czech Republic

Time representativeness: 2023

### 2.2 Product description

Product names / Product ranges: products Energy+, Comfort, Classic Profi, Classic, AKU Profi, AKU and MIAKO, classified as *fired clay masonry units* under the mandatory documentation according to Regulation (EU) 2024/3110 of the European Parliament and of the Council.

Product description: Clay masonry units belong to the group of fired construction products based on clay. The broad product portfolio includes clay bricks suitable for single-leaf external walls, internal load-bearing and non-load-bearing walls, as well as acoustic walls. All included products are extruded clay masonry units intended for load-bearing and non-load-bearing applications.

### 2.3 Use

Clay masonry units are intended for external and internal load-bearing and non-load-bearing plastered walls and building elements, used in combination with masonry mortar, thin-layer mortar or masonry foam.

### 2.4 Technical data

Fired clay masonry units are manufactured and tested in accordance with EN 771-1.

Declared properties include dimensions, dimensional tolerance, flatness of bed surface, parallelism of bed surfaces, bulk density, compressive strength, bond strength, thermal conductivity, water vapour permeability, durability, content of active, soluble salts and reaction to fire.

One cubic metre of clay masonry units weighs between 650 kg and 1130 kg depending on the product type. Conversion factors for specific product types are provided in the supplementary information.

Further technical information is available at:

<https://www.wienerberger.cz/zdivo-porotherm/dokumenty.html>

### 2.5 Basic raw materials and auxiliary materials

Composition (%)***	Classic	Classic Profi	Energy +	Comfort	AKU	AKU Profi	MIAKO	Post-consumer recycled content (%)	Biogenic carbon content (kg C/DU)
Clay	77%	85%	99%	82%	59%	61%	47%	0	0
Slag	19%	5%	0%	7%	28%	26%	29%	0	0
Sand	4%	9%	0%	11%	8%	8%	24%	0	0
Ash	0%	1%	0%	0%	5%	5%	0%	0	0
Mineral wool	0%	0%	1%	0%	0%	0%	0%	0	0

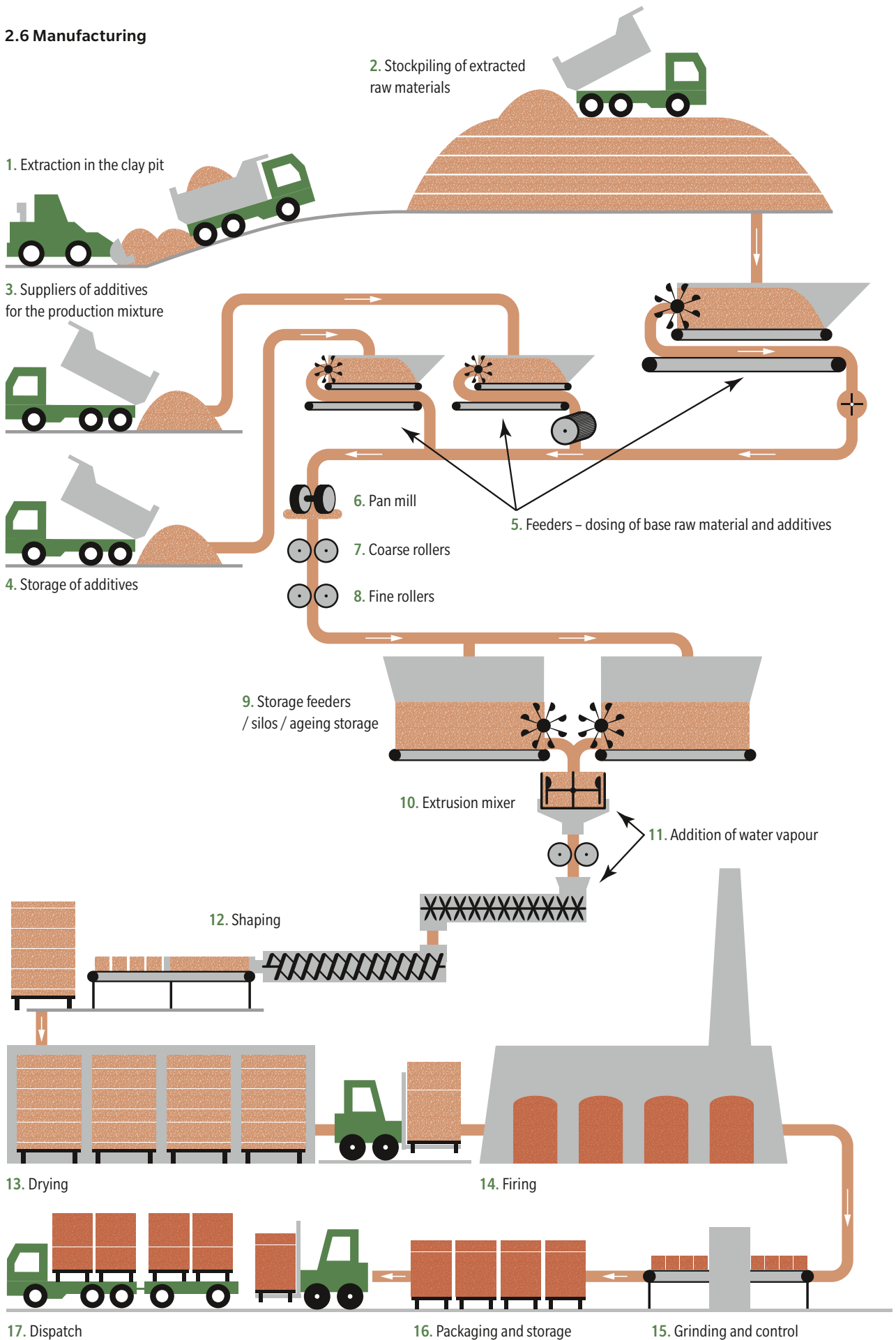
\* The composition includes the addition of brick grinding dust in the amount of approximately 1–3 %.

\*\* The percentage share of raw materials refers to the product after firing.

Packaging (kg/DU)	Classic	Classic Profi	Energy +	Comfort	AKU	AKU Profi	MIAKO	Mass (% relative to the product)	Mass of biogenic material (kg C/kg)
PET strapping	0.94	1.99	2.19	3.84	0.00	0.00	8.62	0.86	0
PE film	1.11	0.92	1.48	0.89	0.72	0.54	0.69	0.15	0
Wooden pallets	0.00	0.02	0.19	0.03	0.75	1.06	0.00	0.10	0.45

The product does not contain substances of very high concern.

2.6 Manufacturing





Clay pit of the production plant



Preparation of raw material



Dried semi-finished product



View of the production line



Jezernice plant

### 2.7 Environment and health during manufacturing

With regard to the manufacturing conditions, no special legislative or regulatory measures are required for the protection of health. Emissions from production are treated in accordance with legal requirements.

Emissions are significantly lower than the specified limit values.

Production does not generate wastewater.

Waste products generated during manufacturing are internally recycled.

### 2.8 Processing / installation of the product

Porotherm masonry units are masonry elements with a height of 249 mm, intended for laying using thin-layer mortar or masonry foam, or with a height of 238 mm in the case of masonry units with unground bed surfaces, intended for laying using mortar with an average thickness of 12 mm. The ends of the masonry units are provided with a tongue-and-groove system, which enables interlocking connection without the need to fill vertical joints with mortar.

The masonry units are intended for load-bearing and non-load-bearing masonry, both for thermally insulating external walls and for internal structures.

They are manufactured for wall thicknesses ranging from 80 mm to 500 mm.

### 2.9 Packaging

PET strapping, plastic film and paper labels are used for packaging. Clay masonry units are transported using wooden pallets, which are returnable and reusable.

### 2.10 Conditions of use

The composition of the brick is stated in Section 2.5 „Basic raw materials and auxiliary materials“. During the technical service life of the product, no change occurs in the composition of the brick or in the properties of the clay masonry unit. All fillers are combusted during the manufacturing process and the clay masonry unit is inert during the use phase (no emissions occur).

More details on the correct use of the products can be found in the Execution Guideline:

[https://www.wienerberger.cz/content/dam/wienerberger/czech-republic/marketing/documents-magazines/instructions-guidelines/CZ\\_Podklad\\_pro\\_provadeni.pdf](https://www.wienerberger.cz/content/dam/wienerberger/czech-republic/marketing/documents-magazines/instructions-guidelines/CZ_Podklad_pro_provadeni.pdf)

### 2.11 Environment and health during use

If the products are used as intended, no damage to health or the environment can be expected.

### 2.12 Reference service life

The technical service life of the products is 150 years when used correctly.

### 2.13 Extraordinary effects

Fire: Building material class according to EN 13501-1.

Water: No impact.

Mechanical destruction: In the event of mechanical destruction, no environmental or health impacts are expected.

### 2.14 Re-use phase

Re-use of clay masonry units occurs in various phases; waste from clay masonry units is reused in brick production as crushed chamotte added to the clay.

Unbroken demolition clay masonry units can be reused in new masonry.

Because masonry units do not release any harmful substances into air, soil or water, they can be used as aggregate in construction materials; due to water retention properties, the aggregate can be used in special soils for green roofs.

### 2.15 Disposal

Clay masonry units from Wienerberger comply with the European Waste Catalogue code 17 01 02. If they cannot be reused according to the above-mentioned procedures, they can be disposed of in landfills for inert material. They are not hazardous waste and no emissions to the environment can be expected.

### 2.16 Additional information

Further information is available at <https://wienerberger.cz>

## 3. LCA information

DECLARED UNIT	1,000 kg of non-installed fired clay bricks
SYSTEM BOUNDARY	Cradle to grave and Module D: Included life cycle stages A1–A3, A4–A5, B1–B7, C1–C4, D.
ASSUMPTIONS AND LIMITATIONS	The unit process of electrical energy is specific to purchased green electricity (source: hydropower). The results are based on the weighted mass average of the production of individual brick types at individual production plants.
EXCLUDED INPUTS	All inputs and outputs to the process (unit) for which data are available are included in the calculation. In the case of insufficient input data or cut-off data for the unit process, the cut-off criteria are set at 1% of primary energy consumption and 1% of the total mass inputs of this unit process.
DATA USED	Background data are not older than 10 years. All generic data used originate from the Ecoinvent database version 3.11.
DATA QUALITY	Specific data were used for all processes in the production plant. For upstream processes that are not directly influenced by the manufacturer, generic data from the Ecoinvent database version 3.11 were used.
TIME REPRESENTATIVENESS	The data used represent the reference year 2023.
ALLOCATION	All inputs and outputs were allocated on a mass basis according to the weighted average production of specific product types in individual production plants.
COMPARABILITY	Environmental Product Declarations from different programmes may not be comparable. Comparison or evaluation of data reported in the EPD is only possible if all compared data were determined in accordance with EN 15804+A2 and according to the same rules.
GEOGRAPHICAL SCOPE	The geographical scope of the EPD includes production and sales in the Czech Republic.

# Life cycle stages

## Product stage, A1 – A3

This product stage is divided into 3 modules: A1 (supply of raw materials), A2 (transport) and A3 (manufacturing). Aggregation of modules A1, A2 and A3 is permitted by ČSN EN 15804+A2. This option is applied in this EPD.

### • A1 – supply of raw materials

This module takes into account the extraction and processing of all raw materials and energy that occur before the actual manufacturing process. These are mainly clay and sand and by-products from other systems (fly ash, sawdust, paper sludge, etc.).

### • A2 – transport to the manufacturer and internal transport

The module includes transport (road) of input materials to the production plant, including extraction and internal transport of clay for brick production.

### • A3 – manufacturing

The module covers the production of fired bricks, which begins with mixing (dosing and grinding) of the input mixture of clay and other raw materials (sand, fly ash, slag, etc.). Subsequently, the mixture matures in the ageing storage, passes through the extrusion mixer and is pressed into the required shapes. This is followed by drying and firing into the final product. Products labelled “Profi” are ground. After quality control, the products are packaged and stored before distribution. Production of the used packaging is part of the module.

The manufacturing process also includes the combustion of natural gas and auxiliary input materials for production (sawdust, paper sludge), related to the manufacturing process.

For the reference period (2023) and the following year, 100% green electricity from a renewable source (hydropower) was purchased by the producer, which was taken into account in the analysed model. The (fossil) emission factor of this electricity source is 0.0014 kg CO<sub>2</sub>e/MJ. The manufacturer commits to purchasing electricity from renewable sources for the entire validity period of this EPD. In the event of a change in the source of electrical energy that would affect the LCA results, the EPD will be revised or invalidated accordingly.

## Construction stage, A4 – A5

### • A4 – transport to the construction site

This module includes transport from the gate of the production plant to the construction site.

Transport is calculated on the basis of a scenario with parameters described in the following table:

PARAMETER	UNIT (expressed per declared unit)
Type of fuel and consumption of the transport vehicle or type of transport vehicle used for transport, e.g. long-distance truck, ship, etc.	Average truck, tonnage 16–32 t, diesel, EURO 6
Distance	150 km
Bulk density of transported products	100 % full load trucks
Capacity utilisation factor	1 (default)

### • A5 – installation in the building

Clay masonry units are installed manually or robotically. In the module, manual installation without additional treatment is considered. The module therefore includes the generation of packaging waste (cardboard, wooden blocks and plastic films and straps).

It is assumed that packaging waste generated during installation is 100 % collected and recovered (energy recovery is assumed for plastics and wood, recycling for cardboard).

## Use stage, B1 – B7

The products do not include any inputs or outputs during the use stage; they are passive building elements.

### End-of-life stage, C1 – C4

The end-of-life stage is divided into the following modules:

- **C1 – Deconstruction**

Deconstruction with the use of heavy machinery for a duration of 5 min./DU is considered.

- **C2 – Transport of the end-of-life product**

Transport of waste to recovery and disposal, average distance 50 km.

- **C3 – Waste processing**

70 % recycling of the end-of-life product is considered. Recycling includes crushing of the end-of-life product, taking into account the consumption and emissions from fuel combustion (diesel) and emissions of particulate matter.

- **C4 – Disposal**

Landfilling of 30 % of the end-of-life product is considered.

### Benefits and loads beyond the product system boundary, D

Substitution of the corresponding amount of natural crushed aggregate is considered.

Declared modules, geographical scope, share of specific data and data variation (in the result of the GWP-GHG category):

	Product stage			Construction stage		Use stage	End-of-life stage				Benefits and loads beyond the system boundary
	Supply of raw materials	Transport	Manufacturing	Transport to construction site	Construction process - Installation	B1 Use B2 Maintenance B3 Repair B4 Replacement B5 Refurbishment B6 Operational energy use B7 Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Potential for reuse, recovery and recycling
<b>Modul</b>	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
<b>Declared modules</b>	X	X	X	X	X	X	X	X	X	X	X
<b>Geography</b>	EU	CZ	CZ	CZ	EU	EU	EU	EU	EU	EU	EU
<b>Specific data</b>	> 99 %		-	-	-	-	-	-	-	-	-
<b>Variation - products</b>	0 %		-	-	-	-	-	-	-	-	-
<b>Variation - production plants</b>	-21 % up to +20 %		-	-	-	-	-	-	-	-	-

Legend: X - declared

## 4. LCA results

In accordance with EN 15804+A2, environmental impacts are declared using the core characterisation factors of EC-JRC (reference package based on EF 3.1). Specific data are based on operational data and generic data originate from the Ecoinvent database.

The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks.

All emissions to air, water and soil and all materials and energy used have been included in the calculation.

Warning: It is not recommended to use the results of modules A1–A3 without taking into account the results of module C.

The LCA data results are presented in detail in the following tables and refer to the declared unit of 1,000 kg of Porotherm clay bricks with an assumed average service life of 150 years.

## Porotherm Classic

### CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Classic product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	2.57E+02	2.85E+01	1.13E+01	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	2.51E+02	2.85E+01	1.13E+01	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	2.97E+00	1.92E-02	5.99E-02	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.41E+00	9.48E-03	7.33E-05	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	1.10E-05	5.67E-07	4.16E-09	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H+ eq.	1.77E-01	5.93E-02	2.65E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	4.44E-03	1.93E-03	3.56E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	-8.94E-02*	1.43E-02	1.50E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	6.22E-01	1.54E-01	1.29E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	3.05E-01	9.86E-02	3.24E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	1.10E-04	9.26E-05	5.72E-07	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	2.74E+03	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	1.16E+02	2.26E+00	5.45E-01	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Classic product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	2.49E+02	2.82E+01	1.11E+01	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	2.73E-06	2.10E-06	1.41E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	2.40E-07	2.59E-07	3.39E-08	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	1.50E-08	2.02E-07	2.60E-09	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	9.89E+01	1.09E+02	2.26E+01	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	7.56E+02	2.42E+02	6.22E-01	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	1.36E+00	5.20E-01	4.41E-03	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of PoroTherm Classic product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	4.49E+02	6.88E+00	9.55E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	4.49E+02	6.88E+00	9.55E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	2.74E+03	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	4.01E+02	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	4.21E-02	1.86E-01	2.01E-03	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	4.17E-02	2.35E-03	6.55E-05	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	3.01E+00	5.57E-02	1.27E-02	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of PoroTherm Classic product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	1.73E+00	5.85E-01	1.94E-01	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	6.53E+01	1.24E+01	5.24E+00	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	3.31E-04	1.29E-04	1.11E-06	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of PoroTherm Classic product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## Porotherm Classic Profi

### CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Classic Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	2.42E+02	2.85E+01	4.88E+00	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	2.35E+02	2.85E+01	4.88E+00	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	4.55E+00	1.92E-02	3.77E-04	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.18E+00	9.48E-03	3.16E-05	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	8.41E-06	5.67E-07	1.80E-09	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H <sup>+</sup> eq.	1.14E-01	5.93E-02	1.11E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	3.36E-03	1.93E-03	1.53E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	-1.37E-01*	1.43E-02	6.33E-04	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	3.56E-01	1.54E-01	5.39E-03	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	1.97E-01	9.86E-02	1.35E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	8.16E-05	9.26E-05	2.43E-07	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	2.07E+03	4.01E+02	9.53E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	1.15E+02	2.26E+00	2.36E-01	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Classic Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	2.33E+02	2.82E+01	4.83E+00	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	1.20E-06	2.10E-06	5.74E-09	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	1.38E-07	2.59E-07	1.46E-08	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	1.14E-08	2.02E-07	1.12E-09	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	6.70E+01	1.09E+02	9.80E+00	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	1.21E+03	2.42E+02	2.68E-01	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	1.29E+00	5.20E-01	1.74E-03	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of Porotherm Classic Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	4.95E+02	6.88E+00	3.80E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	4.95E+02	6.88E+00	3.80E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	2.07E+03	4.01E+02	9.53E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	2.07E+03	4.01E+02	9.53E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	3.06E-01	1.86E-01	8.65E-04	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	4.08E-02	2.35E-03	2.84E-05	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	2.97E+00	5.57E-02	5.51E-03	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of Porotherm Classic Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	1.39E+00	5.85E-01	8.40E-02	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	7.31E+00	1.24E+01	2.27E+00	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	3.15E-04	1.29E-04	4.42E-07	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of Porotherm Classic Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## PoroTherm Energy+

## CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of PoroTherm Energy+ product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	2.57E+02	2.85E+01	2.22E+01	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	2.51E+02	2.85E+01	2.22E+01	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	2.91E+00	1.92E-02	1.92E-03	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.05E+00	9.48E-03	1.44E-04	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	9.26E-06	5.67E-07	8.17E-09	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H+ eq.	6.67E-01	5.93E-02	5.05E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	2.16E-02	1.93E-03	6.96E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	2.30E-02	1.43E-02	2.87E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	1.29E+00	1.54E-01	2.45E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	4.22E-01	9.86E-02	6.15E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	4.93E-04	9.26E-05	1.10E-06	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	2.79E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	1.22E+02	2.26E+00	1.07E+00	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

## ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of PoroTherm Energy+ product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	2.49E+02	2.82E+01	2.19E+01	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	6.11E-06	2.10E-06	2.61E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	6.46E-07	2.59E-07	6.64E-08	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	7.57E-08	2.02E-07	5.09E-09	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	4.71E+02	1.09E+02	4.45E+01	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	1.00E+03	2.42E+02	1.22E+00	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	3.36E+00	5.20E-01	7.90E-03	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of PoroTherm Energy+ product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	4.60E+02	6.88E+00	1.72E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	4.60E+02	6.88E+00	1.72E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	2.79E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	2.79E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	5.36E-01	1.86E-01	3.93E-03	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	6.97E-02	2.35E-03	1.29E-04	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	2.94E+00	5.57E-02	2.50E-02	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of PoroTherm Energy+ product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	6.45E+00	5.85E-01	3.82E-01	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	1.78E+02	1.24E+01	1.03E+01	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	8.23E-04	1.29E-04	2.01E-06	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of PoroTherm Energy+ product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## Porotherm Comfort

### CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Comfort product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	1.75E+02	2.85E+01	1.13E+01	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	1.68E+02	2.85E+01	1.13E+01	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	4.15E+00	1.92E-02	5.99E-02	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	2.52E+00	9.48E-03	7.33E-05	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	7.81E-06	5.67E-07	4.16E-09	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H <sup>+</sup> eq.	1.51E-01	5.93E-02	2.65E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	5.55E-03	1.93E-03	3.56E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	-1.43E-01*	1.43E-02	1.50E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	4.53E-01	1.54E-01	1.29E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	2.41E-01	9.86E-02	3.24E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	1.27E-04	9.26E-05	5.72E-07	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	2.14E+03	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	1.03E+02	2.26E+00	5.45E-01	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm Comfort product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	1.67E+02	2.82E+01	1.11E+01	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	2.25E-06	2.10E-06	1.41E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	2.01E-07	2.59E-07	3.39E-08	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	1.30E-08	2.02E-07	2.60E-09	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	1.45E+02	1.09E+02	2.26E+01	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	1.44E+03	2.42E+02	6.22E-01	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	1.85E+00	5.20E-01	4.41E-03	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of PoroTherm Comfort product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	4.53E+02	6.88E+00	9.55E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	4.53E+02	6.88E+00	9.55E-02	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	2.14E+03	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	2.14E+03	4.01E+02	2.21E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	3.54E-01	1.86E-01	2.01E-03	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	4.83E-02	2.35E-03	6.55E-05	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	2.50E+00	5.57E-02	1.27E-02	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of PoroTherm Comfort product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	1.95E+00	5.85E-01	1.94E-01	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	5.31E+01	1.24E+01	5.24E+00	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	4.57E-04	1.29E-04	1.11E-06	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of PoroTherm Comfort product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## Porotherm AKU

## CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm AKU product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	2.85E+02	2.85E+01	3.23E+00	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	2.76E+02	2.85E+01	1.74E+00	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	6.49E+00	1.92E-02	1.50E+00	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.33E+00	9.48E-03	1.89E-05	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	9.88E-06	5.67E-07	7.43E-10	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H+ eq.	1.67E-01	5.93E-02	2.52E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	-2.76E-03*	1.93E-03	1.15E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	-9.04E-01*	1.43E-02	1.26E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	5.45E-01	1.54E-01	1.36E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	3.26E-01	9.86E-02	3.27E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	1.63E-04	9.26E-05	3.83E-07	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	2.55E+03	4.01E+02	5.55E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	1.31E+02	2.26E+00	1.07E-01	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

## ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm AKU product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	2.75E+02	2.82E+01	1.72E+00	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	3.93E-06	2.10E-06	2.40E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	1.54E-07	2.59E-07	9.48E-09	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	3.89E-08	2.02E-07	7.72E-10	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	-8.78E+01	1.09E+02	3.82E+00	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	2.63E+03	2.42E+02	2.04E-01	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	4.67E-01	5.20E-01	1.06E-02	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of Porotherm AKU product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	7.60E+02	6.88E+00	2.13E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	7.60E+02	6.88E+00	2.13E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	2.55E+03	4.01E+02	5.55E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	2.55E+03	4.01E+02	5.55E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	1.33E+00	1.86E-01	7.72E-04	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	7.95E+00	2.35E-03	1.10E-05	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	3.26E+00	5.57E-02	2.64E-03	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of Porotherm AKU product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	1.91E+00	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	-3.82E+02	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	1.02E-04	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of Porotherm AKU product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## Porotherm AKU Profi

### CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm AKU Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	2.46E+02	2.85E+01	3.42E+00	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	2.39E+02	2.85E+01	1.30E+00	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	6.49E+00	1.92E-02	2.12E+00	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.63E-02	9.48E-03	1.93E-05	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	2.24E-07	5.67E-07	6.26E-10	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H <sup>+</sup> eq.	4.28E-02	5.93E-02	3.31E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	2.44E-03	1.93E-03	1.26E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	1.39E-02	1.43E-02	1.64E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	1.42E-01	1.54E-01	1.80E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	6.32E-02	9.86E-02	4.31E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	4.55E-05	9.26E-05	4.85E-07	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	1.64E+02	4.01E+02	5.60E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	4.40E+00	2.26E+00	9.63E-02	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm AKU Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucción	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	2.39E+02	2.82E+01	1.29E+00	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	1.07E-06	2.10E-06	3.27E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	8.69E-08	2.59E-07	9.96E-09	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	3.69E-08	2.02E-07	8.28E-10	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	4.23E+01	1.09E+02	3.09E+00	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	2.90E+03	2.42E+02	2.25E-01	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	7.68E-01	5.20E-01	1.46E-02	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of Porotherm AKU Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	5.55E+02	6.88E+00	2.93E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	5.55E+02	6.88E+00	2.93E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	1.64E+02	4.01E+02	5.60E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	1.64E+02	4.01E+02	5.60E-01	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	1.26E+00	1.86E-01	8.88E-04	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	1.13E+01	2.35E-03	8.85E-06	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	1.94E-01	5.57E-02	2.44E-03	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of Porotherm AKU Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	6.23E-01	5.85E-01	2.40E-02	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	3.28E+01	1.24E+01	6.60E-01	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	1.98E-04	1.29E-04	3.33E-06	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of Porotherm AKU Profi product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

## Porotherm MIAKO

### CORE ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm MIAKO product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – total (GWP-total)	kg CO <sub>2</sub> eq.	3.62E+02	2.85E+01	2.22E+01	0.00E+00	3.97E-01	9.51E+00	2.52E+00	1.77E+00	-4.82E+00
Global warming potential – fossil (GWP-fossil)	kg CO <sub>2</sub> eq.	3.61E+02	2.85E+01	2.22E+01	0.00E+00	3.97E-01	9.50E+00	2.52E+00	1.77E+00	-4.73E+00
Global warming potential – biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	3.80E-01	1.92E-02	1.92E-03	0.00E+00	4.25E-05	6.41E-03	2.72E-04	4.45E-03	-8.91E-02
Global warming potential – land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	3.41E-02	9.48E-03	1.44E-04	0.00E+00	3.42E-05	3.16E-03	2.19E-04	2.83E-04	-2.30E-03
Ozone depletion potential (ODP)	kg CFC11 eq.	1.33E-06	5.67E-07	8.17E-09	0.00E+00	6.02E-09	1.89E-07	3.85E-08	6.58E-08	-7.55E-08
Acidification potential (AP)	mol H+ eq.	2.10E-01	5.93E-02	5.05E-03	0.00E+00	2.08E-03	1.98E-02	2.27E-02	1.10E-02	-3.01E-02
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.	9.24E-03	1.93E-03	6.96E-05	0.00E+00	1.15E-05	6.43E-04	7.33E-05	8.02E-05	-6.43E-04
Eutrophication potential – marine (EP-marine)	kg N eq.	7.42E-02	1.43E-02	2.87E-03	0.00E+00	9.35E-04	4.75E-03	1.05E-02	4.70E-03	-9.85E-03
Eutrophication potential – terrestrial (EP-terrestrial)	mol N eq.	6.90E-01	1.54E-01	2.45E-02	0.00E+00	1.02E-02	5.13E-02	1.15E-01	5.14E-02	-1.23E-01
Photochemical ozone formation potential (POCP)	kg NMVOC eq.	3.04E-01	9.86E-02	6.15E-03	0.00E+00	3.29E-03	3.29E-02	3.44E-02	2.08E-02	-3.52E-02
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) <sup>1)</sup>	kg Sb eq.	2.00E-04	9.26E-05	1.10E-06	0.00E+00	1.37E-07	3.09E-05	8.77E-07	2.20E-06	-4.15E-05
Abiotic depletion potential for fossil resources (ADP-fossil) <sup>1)</sup>	MJ	1.14E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of net fresh water (FW) <sup>1)</sup>	m <sup>3</sup> world eq. deprived	2.33E-01	2.26E+00	1.07E+00	0.00E+00	1.51E-02	7.54E-01	9.66E-02	2.14E+00	-1.11E+01

**Note:** <sup>1)</sup> The estimated impact results are only relative statements and do not indicate endpoints of impact categories, exceedance of threshold values, safety margins or risks. The results of this environmental impact indicator shall be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.

\* The negative value of the result is caused by the operational use of sewage sludge, which reduces marine eutrophication.

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS per DU – 1,000 kg of Porotherm MIAKO product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstrucion	Transport	Waste processing	Disposal	Substitution of resources
Global warming potential – greenhouse gases (GWP-GHG) <sup>1)</sup>	kg CO <sub>2</sub> eq.	3.60E+02	2.82E+01	2.19E+01	0.00E+00	3.93E-01	9.40E+00	2.49E+00	1.75E+00	-4.68E+00
Particulate matter emissions (PM)	disease incidence	4.49E-06	2.10E-06	2.61E-08	0.00E+00	4.03E-08	6.99E-07	5.85E-06	2.78E-07	-6.68E-07
Human toxicity potential, non-carcinogenic (HTP-nc)*	CTUh	3.63E-07	2.59E-07	6.64E-08	0.00E+00	1.21E-09	8.65E-08	4.47E-09	6.80E-09	-5.73E-08
Human toxicity potential, carcinogenic (HTP-c)*	CTUh	1.03E-08	2.02E-07	5.09E-09	0.00E+00	1.90E-09	6.75E-08	9.84E-09	7.43E-09	-7.53E-08
Freshwater ecotoxicity potential (ETP-fw)	CTUe	3.44E+02	1.09E+02	4.45E+01	0.00E+00	7.32E-01	3.64E+01	4.67E+00	4.49E+00	-3.57E+01
Land use related impacts / soil quality (LU)*	dimensionless	2.46E+02	2.42E+02	1.22E+00	0.00E+00	3.60E-01	8.07E+01	2.31E+00	8.90E+01	-9.93E+01
Ionising radiation, human health (IRP)**	kBq U-235 eq.	2.32E+00	5.20E-01	7.90E-03	0.00E+00	2.30E-03	1.73E-01	1.47E-02	3.76E-02	-5.87E-01

**Note:** <sup>1)</sup> This indicator is identical to the impact category Global warming potential – total, however without taking into account biogenic carbon dioxide and carbon stored in the product.

\* **Statement:** The results of this environmental impact indicator shall be used with caution because the uncertainties of these results are high or because there is limited experience with the indicator.

\*\* **Statement:** This impact category mainly addresses the potential impact of low-dose ionising radiation on human health related to the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure, or from the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, or certain construction materials.

## PARAMETERS DESCRIBING RESOURCE USE per DU – 1,000 kg of Porotherm MIAKO product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ/DJ	3.23E+01	6.88E+00	1.72E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of renewable primary energy resources used as raw materials (PERM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ/DJ	3.23E+01	6.88E+00	1.72E-01	0.00E+00	3.15E-02	2.29E+00	2.01E-01	8.99E-01	-1.35E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ/DJ	1.14E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ/DJ	1.14E+03	4.01E+02	4.33E+00	0.00E+00	5.14E+00	1.34E+02	3.29E+01	4.40E+01	-6.80E+01
Use of secondary material (SM)	kg/DJ	3.39E-02	1.86E-01	3.93E-03	0.00E+00	2.14E-03	6.20E-02	1.37E-02	1.04E-02	-1.08E-01
Use of renewable secondary fuels (RSF)	MJ/DJ	6.82E-02	2.35E-03	1.29E-04	0.00E+00	5.59E-06	7.84E-04	3.57E-05	2.62E-04	-8.23E-04
Use of non-renewable secondary fuels (NRSF)	MJ/DJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	m <sup>3</sup> /DJ	1.74E-02	5.57E-02	2.50E-02	0.00E+00	3.68E-04	1.86E-02	2.36E-03	5.02E-02	-2.66E-01

## WASTE CATEGORIES per DU – 1,000 kg of Porotherm MIAKO product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Hazardous waste disposed (HWD)	kg	2.45E+00	5.85E-01	3.82E-01	0.00E+00	5.75E-03	1.95E-01	3.68E-02	3.33E-02	-2.91E-01
Non-hazardous waste disposed (NHWD)	kg	3.75E+02	1.24E+01	1.03E+01	0.00E+00	7.86E-02	4.12E+00	5.03E-01	7.99E-01	-4.91E+00
Radioactive waste disposed (RWD)	kg	5.82E-04	1.29E-04	2.01E-06	0.00E+00	5.65E-07	4.31E-05	3.62E-06	8.86E-06	-1.36E-04

## OUTPUT FLOWS per DU – 1,000 kg of Porotherm MIAKO product

Impact category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
		Manufacturing	Transport	Installation	Use	Deconstruction	Transport	Waste processing	Disposal	Substitution of resources
Components for reuse (CRU)	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	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	0.00E+00
Materials for energy recovery (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	0.00E+00
Exported electrical energy (EEE)	MJ based on net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00

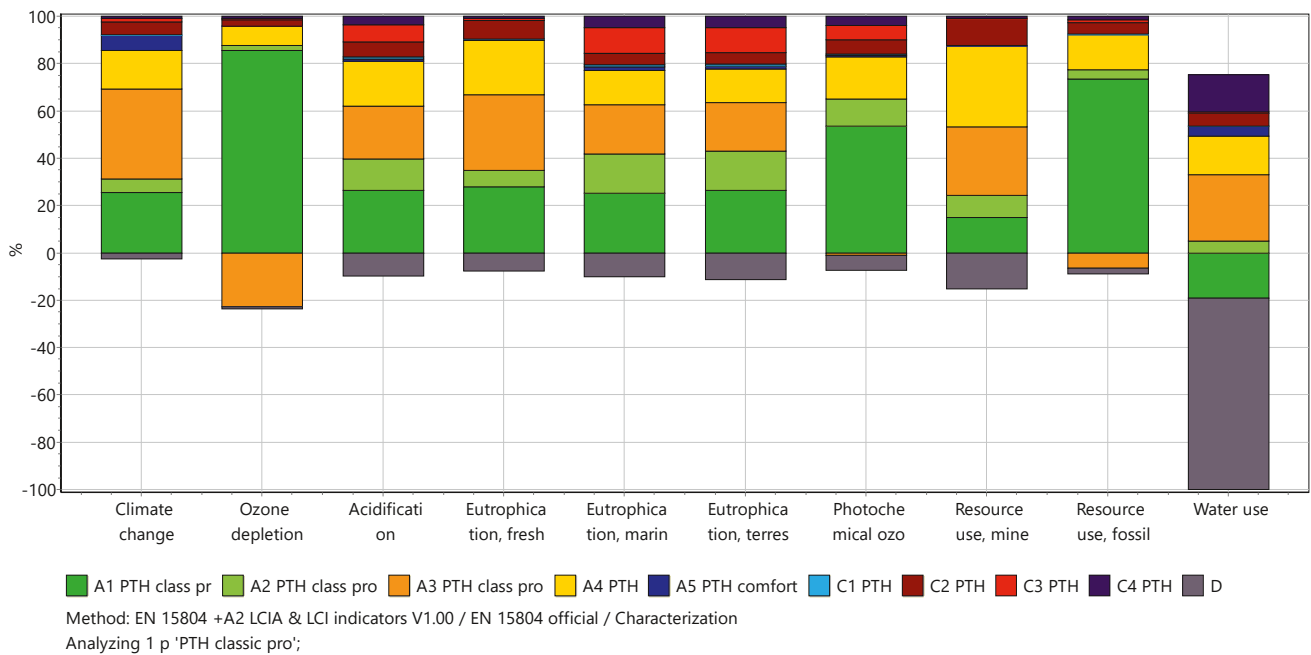
**BIOGENIC CARBON CONTENT**

Biogenic carbon content per 1,000 kg of clay bricks							
Product	Classic	Classic Profi	Energy+	Comfort	AKU	AKU Profi	MIAKO
Biogenic carbon content in the product	0	0	0	0	0	0	0
Biogenic carbon content in the associated packaging	0	0.009	0.009	0.014	0.477	0	0.045

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>.

# 5. Interpretation of LCA results

The following graph shows the distribution of the contribution of individual life cycle stages to the overall results (Porotherm Classic Profi product).



In most impact categories, the most significant stage is the extraction and processing of raw materials A1, representing 30–60 % of the total results. Within the impact category Climate change, the most significant unit processes are heat production from the combustion of natural gas and the release of bound emissions from the firing of clay (A3). Beyond the life cycle boundary in stage D, a potential compensation of up to 10 % of the total impacts (except for the Water use category) is applied due to the assumed use of recycled material as a substitute for primary aggregate.

The results of the Environmental Product Declaration (EPD) are based on updated life cycle data related to the reference year 2023. In comparison with previous EPDs based on data from the year 2018, some environmental indicators, particularly in the area of climate change and global warming potential (GWP), show higher values. This difference is largely caused by a change in the methodological approach to the calculation of process CO<sub>2</sub> emissions between the reference years 2018 and 2023.

The updated methodology for the calculation of process emissions was approved by the competent public authority and verified by an independent third party. The new approach more accurately reflects the chemical processes occurring during the production of fired ceramic products, particularly the release of CO<sub>2</sub> from carbonate components of raw materials during firing. For this reason, the results of EPDs with different reference years are not fully comparable, and the higher values in the current EPD do not reflect a deterioration of the actual environmental performance of production, but primarily increased accuracy and conservativeness of the calculation.

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Wienerberger s.r.o., Plachého 388/28, 370 01 České Budějovice 1  
T +420 800 240 250, E [info@wienerberger.cz](mailto:info@wienerberger.cz), [wienerberger.cz](http://wienerberger.cz)



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