ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Primus Ceramics, S.A.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PRI-20240525-CBD1-EN
Issue date	16.05.2025
Valid to	15.05.2030

Ceramic Tiles – BIII Group

Primus Ceramics (Taboeira)

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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General Information

Primus Ceramics (Taboeira)

Programme holder

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

Declaration number

EPD-PRI-20240525-CBD1-EN

This declaration is based on the product category rules:

Ceramic tiles and panels, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

16.05.2025

Valid to

15.05.2030

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

Florian Pronold
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Ceramic Tiles – BIII Group

Owner of the declaration

Primus Ceramics, S.A.
Rua João Gonçalves Neto 66
3811-801 Aveiro
Portugal

Declared product / declared unit

1 m^2 of interior surface of a house during the reference service life period of 50 years with ceramic wall tiles - Group BIII.

Scope:

The EPD applies to 1m² of ceramic wall tiles (Group BIII), produced by PRIMUS CERAMICS, in its facilities located in Taboeira - Aveiro - Portugal. The results presented correspond to an average EPD of the PRIMUS CERAMICS.

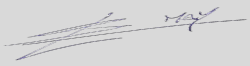
This Environmental Product Declaration is intended for business-to-business (B2B) communication and intends to provide valid and reliable information to potential product users (work owners, prescribers, architects, engineers, builders, etc.) on the environmental impacts of the production of ceramic tile (BIII).

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.

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

Verification

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



Sr Lucas Berman,
(Independent verifier)

Product

Product description/Product definition

Monoporosa is a material produced from clays and feldspars as the main raw materials, as well as carbonates, and is used to cover walls and interior surfaces.

The BIII wall tiles products developed by PRIMUS CERAMICS are diverse, depending on their application. These types of products are available on the market with a wide range of aesthetic and dimensional options, both in terms of visual effects and texture and colours.

This EPD refers to all ceramic products of group BIII according to the product definition in *EN 14411* produced by PRIMUS CERAMICS in its Taboeira facilities, corresponding to the average of the characteristics of all these products.

Founded in 1969, PRIMUS CERAMICS is a leading company in the ceramics industry, specializing in the production of small-format glazed ceramic tiles.
PRIMUS CERAMICS has strengthened its competitive position in the global market through business practices that focus on creating solutions to enhance urban heritage, prioritizing Total Quality, Environmental Responsibility, Efficiency, Innovation, and Excellence.
PRIMUS CERAMICS produces glazed ceramic tiles suitable for interior wall applications in both residential and public areas. The product portfolio is extensive, offering a wide range of aesthetic effects, various formats, a distinct colour palette, and a variety of surface finishes.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a Declaration of Performance taking into consideration *EN 14411:2012* Ceramic tiles — Definitions, classification, characteristics, evaluation of conformity and marking and the CE-marking.

For the application and use the respective national provisions apply.

Application

Ceramic tiles (BIII group) products are applied in interior wall coverings in buildings:

- residential,
- public,
- industrial.

Technical Data

The PRIMUS CERAMICS ceramic tiles (BIII group) comply with requirements of *EN 14411:2012* Group BIII GL (dry-pressed with water absortion E>10%) and *ISO 10545*.

For each product, the data provided in the Declaration of Performance applies.

Constructional data

Name	Value	Unit
Dimensional Tolerances (EN ISO 10545-2)	± 0.5	mm
Thickness (EN ISO 10545-2)	± 10	%
Straightness (EN ISO 10545-2)	± 0.3	%
Squareness (EN ISO 10545-2)	± 0.5	%
Flatness - Central Curvature (EN ISO 10545-2)	± 0.5 / - 0.3	%
Flatness - Lateral rotation (EN ISO 10545-2)	± 0.5 / - 0.3	%
Flatness - Diagonal arrow (EN ISO 10545-2)	± 0.5	%
Water absorption (EN ISO 10545-3)	14 - 20	%
Modulus of rupture (thicknesses < 7.5 mm) (EN ISO 10545-4)	≥ 15	N/mm^2
Modulus of rupture (thicknesses ≥ 7.5 mm) (EN ISO 10545-4)	≥ 12	N/mm^2
Breaking strength - thicknesses < 7.5 mm (EN ISO 10545-4)	≥ 200	N
Breaking strength - thicknesses ≥ 7.5 mm (EN ISO 10545-4)	≥ 600	N
Resistance to temperature differences (EN ISO 10545-9)	Resistant (by folder type)	--
Crasing resistance (EN ISO 10545-11)	Resistant	--
Resistance to chemicals (EN ISO 10545-13)	Min. Type GLB	--
Resistance to chemicals - pool additives (EN ISO 10545-13)	Min. Type GB	--
Stain resistance (EN ISO 10545-14)	Min. Class 3	
Release of lead and cadmium (EN ISO 10545-15)	-	--

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14411:2012* (Group BIII - GL), Ceramic tiles - Definition, classification, characteristics, assessment and verification of constancy of performance and marking.

Delivery status

The ceramic tiles are available in various sizes, ranging from 10x10cm to 30x60cm, and come in a wide range of colours, with matte or gloss finishes, and options for plain, bevelled, or textured surfaces

Base materials/Ancillary materials

The product is formed by the ceramic support (> 93% of the total weight) and the glaze used for decoration (< 7% of the total weight). The ceramic support is composed of clays, kaolins, feldspars, carbonates, sand and additives. Glaze is formed by feldspars, carbonates, borates, silicates, kaolin, zirconium oxides, clays, alumina, zinc oxides and other additives.

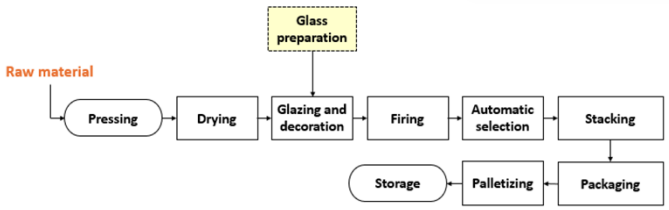
Name	Value	Unit
Ceramic support	> 93	%
Glaze (decoration)	< 7	%

The product contains substances according to the *ECHA* list of candidate substances of very high concern (SVCHC) for authorisation (dated 14/06/2023) above 0.1 mass %: no.

The product contains additional, category 1A or 1B, carcinogenic, mutagenic, reprotoxic (CMR) substances not included in *the candidate list*, above 0.1 mass percent in at least one partial product: no.

The construction product in question has added biocides or was treated with biocidal products (making it a treated good in the meaning of the *Biocidal Products Regulation (EU No 528/2012)*: no.

Production process
The production process of ceramic tiles includes several stages, from the reception and storage of raw materials, pressing, drying, glazing and decoration, high-temperature firing, inspection and control, stacking, packaging, and storage of the finished products.
The figure below shows the organizational chart of the production process.



The production of this product is continuous, meaning it is a production line where workstations are sequential, thus equivalent to the stages through which the pieces pass to be transformed. The production is fully automated, with exclusive interaction between the line and the operators for modifying equipment parameters to ensure proper functioning, and additional quality control to identify possible hidden defects.

The company is certified according to the *ISO 9001* standard (quality management system) and with products certified by *EN 14411*.

Packaging
The ceramic tiles produced by Primus are delivered in packages designed to protect the corners, edges and surface of the product, under normal conditions of transport and handling.
Product tiles are wrapped in film and laid in cardboard boxes, then placed in wooden pallets.
These packaging materials can be collected separately and recycled.
Pallets can either be re-used (Euro pallets) or recycled as wood.

Reference service life
The life cycle duration was based on product standard *EN 14411:2012* and annexe H of *EN 15804:2012+A2:2019/AC:2021*.
According to the PCR of this product, which is based on *EN 14411:2012*, the reference life of the product is estimated at 50 years (Table ZA.1.2). No repair, renewal or replacement is necessary during this lifetime.

LCA: Calculation rules

Declared Unit
1 m^2 of ceramic tiles.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	11.16	kg/m^2
conversion factor	0.0896	-
Layer thickness	0.0067	m

Products manufactured by PRIMUS CERAMICS have thicknesses ranging from 5.5 mm to 10 mm. The LCA values for the different thicknesses can be obtained by multiplying the values of this EPD by:

Thickness (mm)	Conversion factor
5.5	0.823
6	0.897
6.8	1.017
7.3	1.092
8	1.197
8.2	1.227
8.5	1.271
9	1.346
10	1.496

Data quality
The quality of the inventory data was assessed taking into account the criteria indicated in table E.2 (Data quality and criteria from the Product Environmental Footprint Category Rules) of *EN 15804:2012+A2:2019/AC:2021* and based on the recommendations of the PCR documents. The quality of the data was broadly classified between reasonable and good on a 5-level qualitative scale from very bad to very good, in line with the data quality requirements - temporal, geographical and technological.
The manufacturing process, raw materials, energy sources and the production unit are the same for all products so there is no variability in the production process and on the geographical representatively.
The only variation is in thickness, which affects the mass per unit area. More mass requires more raw materials and increases energy consumption during the firing process. Scaling is possible within the specified mass per unit area range (see table above). The variability of values in the different impact categories for the various material thicknesses shows values lower than 1.31 compared to the average.

System boundary
Type of the EPD: cradle to grave.

The boundary of the system under analysis covers all stages of the product life cycle (cradle-to-grave and module D), that is, this study follows a 'cradle-to-grave' approach, which includes the raw material extraction and processing, processing of secondary material input (A1), transportation to the manufacturer (A2) and manufacturing (A3), the stages of

transportation to the construction site (A4), construction and installation in the building (A5), the stages of use or application of the installed product (B1), of maintenance (B2), repair (B3), replacement (B4) and rehabilitation (B5), the stages that include the energy needs during the operational stage (B6) and the water need during the use stage (B7), the deconstruction/demolition stages (C1), transportation to waste processing (C2), waste processing for reuse, recovery and/or recycling (C3), and disposal (C4), and the reuse potential phase, recovery and/or recycling expressed in net impacts or benefits (D).

Cut-off criteria
According to point 6.3.5 of *EN 15804:2012+A2:2019/AC:2021*, the exclusion criterion or 'cut-off criteria' shall be 1 % of renewable and non- renewable primary energy usage and 1 % of the total mass input of that unit process. The total of neglected input flows per module, (…) shall be a maximum of 5 % of energy usage and mass.'
In the case of the modelling carried out, all known flows were included, since the company made all the information available. The following processes were not considered in this study:

- Environmental loads associated with the construction of industrial infrastructure and the manufacture of machinery and equipment;
- Environmental loads related to infrastructure (production and maintenance of vehicles and roads) for transporting of raw materials and auxiliary;
- Personnel-related activities (travel, furniture, office supplies);
- Research and development activities;
- Long-term emissions.

Geographic Representativeness
Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

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. The *Ecoinvent v3.9* background database has been used to calculate the EPD results.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
The product does not contain biogenic carbon.
Packaging material contains biogenic carbon that is accounted for in this section.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	7.33E-02	kg C

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

The following information refers to the declared modules and is the basis for calculations or can beused for further calculations. The indicated values refer to the declared unit.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	1390	km
Capacity utilisation (including empty runs)	36	%
Gross density of products transported	-	kg/m^3
Capacity utilisation volume factor	-	-

This scenario is based on *IBU PCR - Part B*.

Installation into the building (A5)

Name	Value	Unit
Auxiliary (cement mortar)	3.3	kg
Water consumption	0.0008	m^3
Material loss	0.335	kg
Wood pallets	0.298	kg
Paper waste	0.024	kg
Plastic waste	0.013	kg

This scenario is based on *IBU PCR - Part B*.

Use or application of the installed product (B1)

Name	Value	Unit

According to *IBU PCR - Part B* ceramic tiles are intrinsically inert and therefore do not have environmental impacts during their use to be addressed in module B1.

Maintenance (B2)

Name	Value	Unit
Information on maintenance	Cleaning 4 times a year (residential use)	-
Maintenance cycle	200	Number/RSL
Water consumption	0.02	m^3
Detergent consumprtion	4.00E-02	l

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies to the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list of service life by *BNB* is declared.

Reference service life

Name	Value	Unit
Reference service life (according to ISO 15686-1, -2, -7 and -8)	50	a

End of life (C1-C4)
C1 - Deconstruction/Demolition - In the context of a building's demolition, the impacts attributable to the removal of the product are insignificant and therefore can be neglected, according to *IBU PCR Part B*;

C2 - Transport of waste from their point of generation to its processing (waste treatment facility) and end-of-life location. The product's waste is transported by truck (30 km) for waste treatment;

C3 - Processing of waste for reuse, recovery and/or recycling. Recycling scenarios include the treatment of the ceramic material for later use as mineral/raw material. According to rules of IBU PCR Part A and IBU PCR Part B, it is divided into 3 sub-scenarios:

1. C3 - Recycling 100 %
2. C3/1 - Recycling 0 %
3. C3/2 - Recycling 70 %

C4 - Elimination. Landfill disposal scenarios used are divided in the 3 subscenarios:

1. C4 - Landfilling 0 %
2. C4/1 - Landfilling 100 %
3. C4/2 - Landfilling 30 %

Name	Value	Unit
C4: Waste for recycling	14.45	kg
C4 Waste for landfilling	0.00	kg
C4/1: Waste for recycling	0.00	kg
C4/1 Waste for landfilling	14.45	kg
C4/2: Waste for recycling	10.12	kg
C4/2 Waste for landfilling	4.33	kg

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

After the demolition/deconstruction stage, ceramic tiles can be crushed and then used in a range of different applications such as described in *EN 17160* and *IBU PCR - Part B*:

- recycled ceramic aggregates which can be integrated as a partial substitute of natural aggregate in hotmix asphalt (Silvestre et al., 2013);
- recycled ceramic aggregates can be used in the construction of landfills;
- recycled ceramic aggregates can be utilized in the construction of subbased courses on secondary roads.

In this case, the results for module D are declared for the 3 different scenarios of replacement of natural aggregates:

1. D - 100 %
2. D/1 - 0 %
3. D/2 - 70 %

Name	Value	Unit
D: 100% recycling	10.45	kg
D/1: 0% recycling	0.00	kg
D/2: 70% recycling	10.12	kg

LCA: Results

It should be noted that the results of the estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

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

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m^2 Ceramic Tiles (BIII group)

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
GWP-total	kg CO_2 eq	7.54E +00	2.32E +00	1.06E +00	0	6.01E-02	0	5E-02	9.19E-02	0	6.44E-02	0	1.31E-01	3.94E-02	-2.14E-02	0	-1.5E-02
GWP-fossil	kg CO_2 eq	7.72E +00	2.32E +00	8.57E-01	0	5.95E-02	0	5E-02	9.12E-02	0	6.38E-02	0	1.31E-01	3.94E-02	-2.02E-02	0	-1.42E-02
GWP-biogenic	kg CO_2 eq	-1.83E-01	7E-04	2.07E-01	0	5.21E-04	0	1.51E-05	6.93E-04	0	4.85E-04	0	1.24E-04	3.72E-05	-1.16E-03	0	-8.15E-04
GWP-luluc	kg CO_2 eq	7.02E-03	4.54E-05	3.32E-04	0	3.82E-05	0	9.79E-07	4.31E-05	0	3.01E-05	0	3.74E-05	1.12E-05	-5.25E-06	0	-3.67E-06
ODP	kg CFC11 eq	2.25E-07	5.01E-08	8.95E-09	0	4.63E-09	0	1.08E-09	1.51E-09	0	1.06E-09	0	2.26E-09	6.79E-10	-3.43E-10	0	-2.4E-10
AP	mol H^+ eq	1.67E-02	2.91E-03	2.31E-03	0	4.54E-04	0	6.29E-05	7.42E-04	0	5.19E-04	0	1.03E-03	3.1E-04	-1.61E-04	0	-1.13E-04
EP-freshwater	kg P eq	5.97E-05	1.82E-06	1.13E-05	0	1.74E-06	0	3.93E-08	1.6E-06	0	1.12E-06	0	1.73E-07	5.18E-08	-1.68E-07	0	-1.18E-07
EP-marine	kg N eq	5.07E-03	7.22E-04	6.4E-04	0	5.51E-05	0	1.56E-05	3.21E-04	0	2.24E-04	0	4.79E-04	1.44E-04	-7.17E-05	0	-5.02E-05
EP-terrestrial	mol N eq	5.33E-02	7.04E-03	6.91E-03	0	6.03E-04	0	1.52E-04	3.49E-03	0	2.44E-03	0	5.2E-03	1.56E-03	-7.83E-04	0	-5.48E-04
POCP	kg NMVOC eq	2.18E-02	5.42E-03	2.2E-03	0	2.55E-04	0	1.17E-04	1.04E-03	0	7.26E-04	0	1.55E-03	4.66E-04	-2.38E-04	0	-1.67E-04
ADPE	kg Sb eq	3.79E-05	7.96E-08	1.16E-06	0	2.72E-08	0	1.72E-09	3.98E-09	0	2.79E-09	0	5.44E-09	1.63E-09	-8.47E-09	0	-5.93E-09
ADPF	MJ	9.66E +01	3.08E +01	6.12E +00	0	2.07E +00	0	6.66E-01	1.35E +00	0	9.42E-01	0	1.74E +00	5.21E-01	-3.93E-01	0	-2.75E-01
WDP	m^3 world eq deprived	1.29E +00	2.82E-02	1.76E-01	0	8.66E-01	0	6.09E-04	4.87E-03	0	3.41E-03	0	2.27E-03	6.82E-04	-5.98E-03	0	-4.18E-03

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

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m^2 Ceramic Tiles (BIII group)

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PERE	MJ	1.01E +01	4.37E-02	1.08E +00	0	4.37E-02	0	9.42E-04	6.91E-02	0	4.84E-02	0	2.59E-02	7.77E-03	-1.6E-01	0	-1.12E-01
PERM	MJ	3.44E-01	0	2.19E-01	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1.05E +01	4.37E-02	1.3E+00	0	4.37E-02	0	9.42E-04	6.91E-02	0	4.84E-02	0	2.59E-02	7.77E-03	-1.6E-01	0	-1.12E-01
PENRE	MJ	1.07E +02	3.15E +01	7E+00	0	2.21E +00	0	6.8E-01	1.42E +00	0	9.94E-01	0	1.85E +00	5.54E-01	-4.58E-01	0	-3.21E-01
PENRM	MJ	3.53E-04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1.07E +02	3.15E +01	7E+00	0	2.21E +00	0	6.8E-01	1.42E +00	0	9.94E-01	0	1.85E +00	5.54E-01	-4.58E-01	0	-3.21E-01
SM	kg	3.65E-01	0	0	0	0	0	0	0	0	0	0	0	0	1.45E +01	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FW	m^3	3.36E-02	5.88E-04	4.17E-03	0	2.09E-02	0	1.27E-05	3.27E-04	0	2.29E-04	0	9.56E-05	2.87E-05	-3.87E-03	0	-2.71E-03

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

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:
1 m^2 Ceramic Tiles (BIII group)

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
HWD	kg	6.52E-04	7.86E-05	2.37E-05	0	1.1E-06	0	1.7E-06	2.6E-06	0	1.82E-06	0	1.15E-05	3.44E-06	-6.37E-07	0	-4.46E-07
NHWD	kg	3.82E-01	1.24E-03	5.91E-02	0	1.9E-03	0	2.68E-05	1.94E+00	0	1.36E+00	0	1.45E+01	4.33E+00	-5.23E-04	0	-3.66E-04
RWD	kg	7.1E-05	2.15E-04	2.34E-05	0	1.45E-06	0	4.64E-06	9.54E-06	0	6.68E-06	0	1.93E-07	5.78E-08	-4.02E-06	0	-2.82E-06
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	3.3E-01	0	3.06E-01	0	0	0	0	1.45E+01	0	1.01E+01	0	0	0	0	0	0
MER	kg	2.5E-03	0	3.63E-02	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	3.21E-01	0	3.8E+00	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m^2 Ceramic Tiles (BIII group)

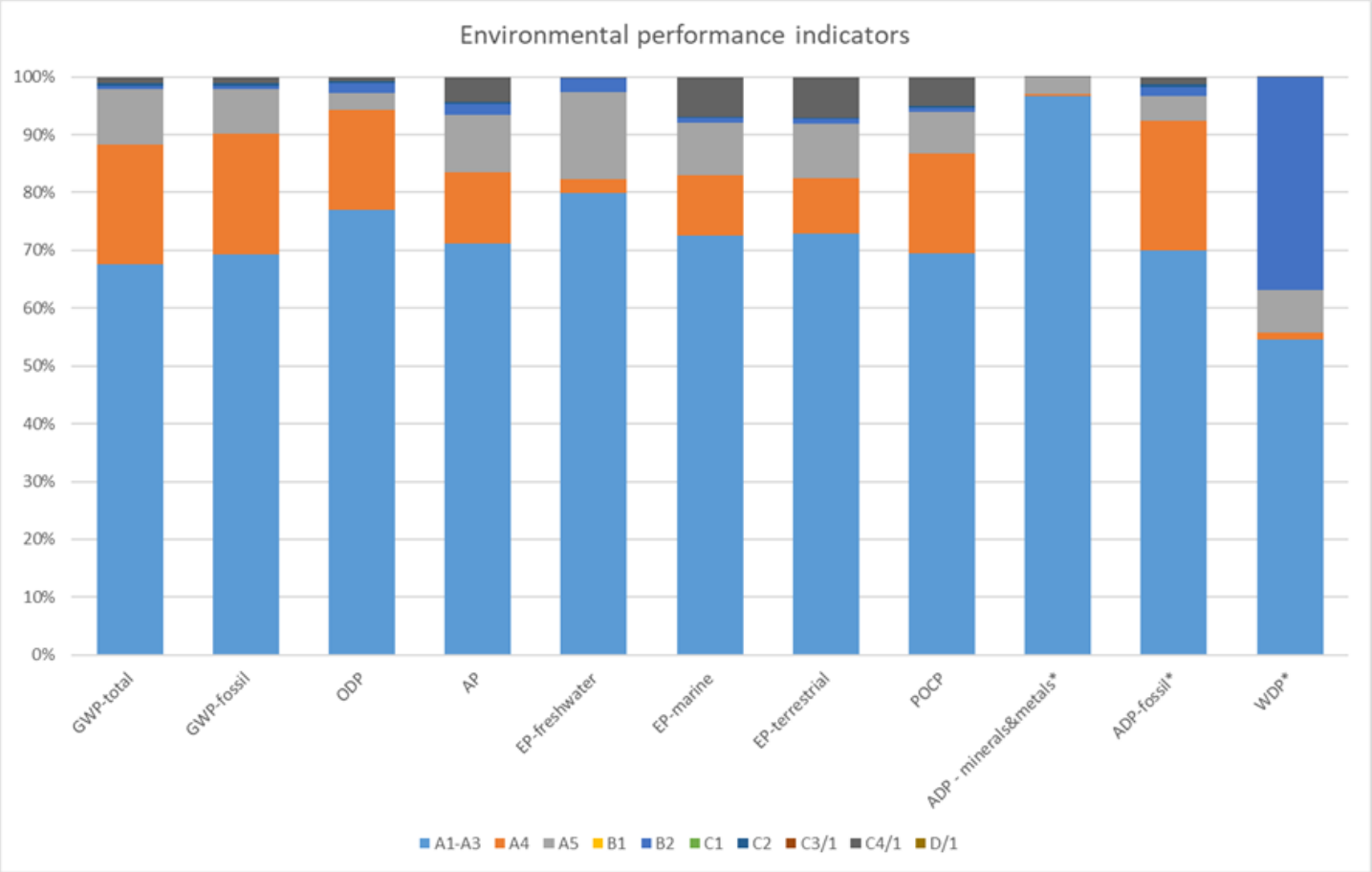
Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PM	Disease incidence	2.43E-07	1.39E-07	2.87E-08	0	4.3E-09	0	3.01E-09	1.26E-07	0	8.81E-08	0	1.35E-07	4.05E-08	-4.9E-09	0	-3.43E-09
IR	kBq U235 eq	9.13E-02	4.9E-03	1.96E-02	0	1.25E-03	0	1.06E-04	3.31E-03	0	2.32E-03	0	3.31E-04	9.94E-05	-3.7E-03	0	-2.59E-03
ETP-fw	CTUe	1.86E+01	1.37E+01	1.67E+00	0	1.43E-01	0	2.95E-01	5.02E-01	0	3.52E-01	0	8.46E-01	2.54E-01	-1.2E-01	0	-8.43E-02
HTP-c	CTUh	7.78E-10	1.44E-10	1.25E-10	0	9.85E-11	0	3.1E-12	8.19E-12	0	5.74E-12	0	1.27E-11	3.82E-12	-1.09E-11	0	-7.66E-12
HTP-nc	CTUh	2.13E-08	1.59E-08	3.28E-09	0	1.93E-09	0	3.44E-10	2.93E-10	0	2.05E-10	0	5.01E-10	1.5E-10	-7.18E-11	0	-5.03E-11
SQP	SQP	3.8E+01	5.85E-02	5.58E+00	0	8.98E-02	0	1.26E-03	3.84E-01	0	2.69E-01	0	6.12E-01	1.84E-01	-1.88E+00	0	-1.31E+00

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

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

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

LCA: Interpretation
As one can see, for the majority of the impact categories and indicators, the stage A1-A3 is the one that represents the majority of their impacts, followed by A4-A5 (less representative). Overall, in the cradle-to-gate, most impact categories are dominated by energy processes and emissions in the factory, followed by the main raw material consumption, and then the production of fuels, production of electricity and transport.



In terms of variability, the results are lower than 1.31 compared to the average.

Requisite evidence
The product's characteristics are evaluated in tests by accredited laboratories, in accordance with current standards, namely *EN 14411*.
Primary data of the factory was measured with meters, whose installation and management are under the guidance of national regulatory bodies. Ecoinvent v3.9 database was used for background data.
Ceramic is inert and therefore, during the use phase, it does not emit pollutants or substances harmful to the environment or health. For this reason and in accordance with the *IBU PCR - Part B*, no evidence is needed as it is not relevant for this product group.

References

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

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

ECHA
ECHA list of candidate substances of very high concern (SVCHC) for authorisation (dated 14/06/2023); https://echa.europa.eu/pt/candidate-list-table

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Ecoinvent database v.3.9.1 (2024). (www.ecoinvent.org)

EN ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

EN 14411
EN 14411:2012. Ceramic tiles. Definitions, classification, characteristics, evaluation of conformity and marking. Brussels, Belgium.

EN 15804
EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

IBU
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com.

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Project Report, Version 1.4, Berlin Institut Bauen und Umwelt e.V., (15.04.2024)

IBU PCR Part B
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EN ISO 9001:2015 - Quality management systems - Requirements

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ISO 10545-4
ISO 10545-4:2019. Ceramic tiles – Part 4: Determination of modulus of rupture and breaking strength

ISO 10545-5
ISO 10545-5:1996. Ceramic tiles - Part 5: Determination of impact resistance by measurement of coefficient of restitution

ISO 10545-9
ISO 10545-9:2013. Ceramic tiles – Part 9: Determination of resistance to thermal shock

ISO 10545-11
ISO 10545-11:1994. Ceramic tiles – Part 11: Determination of crazing resistance for glazed tiles

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ISO 10545-13:2016. Ceramic tiles – Part 13: Determination of chemical resistance

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ISO 10545-14:2015. Ceramic tiles – Part 14: Determination of resistance to stains

ISO 10545-15
ISO 10545-15:2021. Ceramic tiles – Part 15: Determination of lead and cadmium given off by tiles

ISO 13006
ISO 13006: 2012. Ceramic tiles - Definitions, classification, characteristics and marking, 2nd edn. International Organization for Standardization, USA

ISO 14040
ISO 14040:2006. Environmental management — Life cycle assessment — Principles and framework
ISO 14040:2006/Amd 1:2020. Environmental management — Life cycle assessment — Principles and framework — Amendment 1

ISO 14044
ISO 14044:2006. Environmental management — Life cycle assessment — Requirements and guidelines
ISO 14044:2006/Amd 1:2017. Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 1
ISO 14044:2006/Amd 2:2020. Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 2

SimaPro/ SimaPro LCA Software. Pré Consultants. The Netherlands. www.presustainability.com

The literature referred to in the Environmental Product Declaration must be listed in full.Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.

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