

GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental Product Declaration

UNE-EN ISO 14025:2010

UNE-EN 15804:2012+A2:2020

UNE-EN 17160:2019

AENOR

Ceramic tiles. Porcelain stoneware
tiles (Bla classification according
to UNE-EN 14411: 2016)

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The holder of this Declaration is responsible for its contents and for keeping the documentation that supports the data and statements included during the validity period.

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AENOR is a founding member of the ECO Platform, the European Association of Environmental Product Declaration verification programmes.

GlobalEPD UNE EN 17160:2019

The European standard UNE-EN 15804:2012+A2:2020 is used as the base for the PCRs

Independent verification of the declaration and data, according to the EN ISO 14025:2010 standard

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Internal

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External

Verification body

AENOR

Product certification body accredited by ENAC with accreditation No. 1/C-PR468

1 General information

1.1 The company

ROCERSA specialises in manufacturing enamelled porcelain tiles and is committed to protecting the environment. It guarantees the assessment, classification and certification of the sustainability of all its products, in compliance with the International standards ISO 14001 and ISO 14025, thus ensuring the environmental excellence of its products and services.

Currently, **ROCERSA** is committed to using cutting-edge technologies, with clear strategic objectives: “the continuous improvement of its processes to offer a top-quality service and end product to its customers”.

1.2 Scope of the Declaration

This Environmental Product Declaration includes environmental information on a group of products manufactured by a single manufacturer, **ROCERSA**, in a geographical and technological environment in Spain during 2020.

These results show the average environmental performance of the Bla porcelain stoneware tiles manufactured at ROCERSA's L'Alcora plant (Castellón), weighted according to the production volume. The scope of this Environmental Product Declaration (the EPD) is of the cradle to grave type, including module D.

1.3 Life cycle and conformity

This EPD has been developed and verified in compliance with the UNE-EN ISO 14025:2010 and UNE-EN 15804:2012+A2:2020 standards and the following Category Rule:

Descriptive title	Product category rules for ceramic tiles
Record code and version	UNE-EN 17160:2019
Issue date	November 2019
Conformity	UNE-EN 15804:2012+A2:2020
Programme	UNE-EN 15804:2012+A2:2020
Programme Administrator	AENOR

Table 1. PCR information

This Environmental Declaration includes the following life cycle stages:

Product stage	A1	Raw material supply	X
	A2	Transport to the factory	X
	A3	Manufacturing	X
Const.	A4	Transport to the site	X
	A5	Installation / construction	X
Use stage	B1	Use	NR
	B2	Maintenance	X
	B3	Repairs	NR
	B4	Replacement	NR
	B5	Restoration	NR
	B6	Operational energy use	NR
	B7	Operational water use	NR
End of life	C1	De-construction / demolition	NR
	C2	Transport	X
	C3	Waste treatment	X
	C4	Disposal	X
	D	Re-usage, recovery and/or recycling potential	X
X = Module included in the LCA; NR = Irrelevant module; MNE = Module not assessed			

Table 2. System limits. Information modules considered

This EPD may not be comparable to those developed by other programmes or meet the requirements in the reference documents.

Moreover, the EPDs may not be comparable if the source of the data differs (for example, databases), not all of the applicable information modules are included or they are not based on the same scenarios.

Construction products must be compared using the same features and at the building level (or architectural or engineering works), i.e., observing the performance of the product throughout its life cycle, as well as the specifications in Section 6.7.2 of the UNE-EN ISO 14025 standard.

1.4. Differences from previous versions of this EPD.

This EPD is modified to include ENAC accreditation.



Figure 1. Product installed

2 The product

2.1 Product identification

The ceramic tiles included in this study are classified in the Bla water absorption group (porcelain stoneware tiles), which is based on the UNE-EN 14411: 2016 standard (equivalent to the ISO 13006:2018 standard), i.e., dry pressed tiles with a water absorption of less than 0.5%. They are commonly known as porcelain stoneware tiles. Different models of porcelain stoneware tiles in different formats have been included in this study; in particular, the formats included in the scope of this EPD have: a thickness ranging from 7 mm to 20 mm; and a weight ranging from 15.79 kg/m² to 47.22 kg/m², the average weight of the product included in this declaration being 26.94 kg/m².

The annexes include the results of the formats included in the scope of this EPD, with the maximum and minimum values of the declared impacts.

The product CPC code is 37310.

2.2. Intended use of the product

The main recommended use for this product is as an indoor and outdoor paving and/or covering element on walls and façades. The product features are included in the technical datasheets, which can be requested from the manufacturer and which meet the requirements of the UNE-EN14411:2016 standard.

2.3. Product composition

Raw materials - support (98%): clay, sand, kaolinite, feldspar and deflocculant.

Raw materials - enamel (2%): borate, carbonate, quartz, feldspar, zinc oxide, zirconium, alumina and clay.

Substance/Component	Content	Units
Clay, sand, kaolinite, feldspar and deflocculant	98%	%
borate, carbonate, quartz, feldspar, kaolinite, silicate, zinc oxide, zirconium, alumina and clay.	2	%

Table 3. Product composition

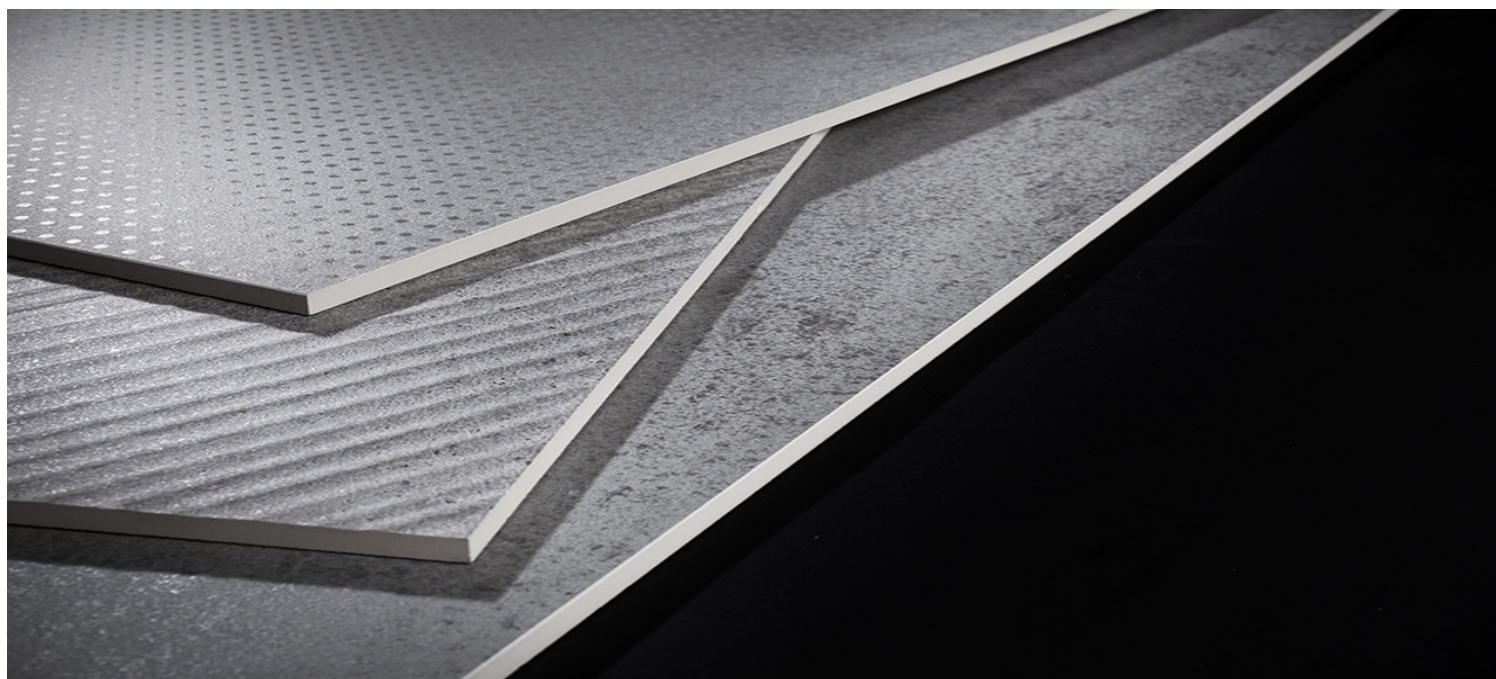
None of the elements of the end product are included in the **Candidate List of Substances of Very High Concern (SVHC)** for authorisation or are subject to other regulations.

2.4. Product features.

The table below shows the technical features of the ceramic coverings described in this EPD.

Table 4. Product features

DETERMINATION OF DIMENSIONS AND SURFACE QUALITY	TEST REGULATION		MODEL:
			COLOUR:
TYPE OF PRODUCT S/GROUP	EN 14411		Bla
INTENDED USE (SI-SE-PI-PE)			SISE
MECHANICAL TREATMENT (Rectified-bevelling-polishing)			To be defined for each specific reference.
GL/UGL			GL
WORK SIZE Length and width	ISO-10545-2	MMB-W(GAUGE): ±2.0 mm	MMB-W(GAUGE): ± 1.0 mm
			To be defined for each specific reference.
Thickness	ISO-10545-2	10.1 mm ± 0.5 mm	To be defined for each specific reference (± 0.5 mm)
Straightness of the sides	ISO-10545-2	± 1.5 mm	± 0.5 mm
Rectangularity	ISO-10545-2	± 2.0 mm	± 1.2 mm
Surface flatness	ISO-10545-2	CENTRAL: ± 2.0 mm	CENTRAL: [+ 1.4 mm. - 0.7 mm]
		SIDE: ± 2.0 mm	LONG SIDE: [+ 1.2 mm. - 0.5 mm] SHORT SIDE: [+ 0.7 mm. - 0.5 mm]
		WARPING: ± 2.0 mm	WARPING: ± 1.2 mm
PHYSICAL AND CHEMICAL CHARACTERISTICS	TEST REGULATION		MODEL:
			COLOUR:
Water absorption	ISO-10545-3	E ≤ 0.5%	E ≤ 0.5%
Breaking strength	ISO-10545-4	≥1300 N	≥2000 N
Modulus of rupture (flexural strength)	ISO-10545-4	≥35 N/mm ²	≥ 37 N/mm ²
Resistance to surface abrasion	ISO-10545-7	Declared value	It will be defined for each specific reference.
Resistance to thermal shock	ISO-10545-9	Met	Met
Crazing resistance	ISO-10545-11	Met	Met
Frost resistance	ISO-10545-12	Met	Met
Slip resistance. (Pendulum). Wet test.	UNE 41901:2017 EX	Declared value	To be defined for each specific reference.
Slip resistance. (Pendulum). Wet test.	BS 7976-2:2002	Declared value	To be defined for each specific reference.
Resistance to low concentrations of acids and bases Hydrochloric acid - Citric acid - Potassium hydroxide	ISO-10545-13	Declared value	minimum LB
Resistance to high concentrations of acids and bases Hydrochloric acid - Lactic acid - Potassium hydroxide	ISO-10545-13	Declared value	minimum HB
Resistance to domestic products and salts to swimming pools Ammonium chloride - Sodium hypochlorite	ISO-10545-13	min B	A
Resistance to stains: chrome / iodine / olive oil	ISO-10545-14	min 3	minimum class 4



3 Information about LCA

3.1. Life Cycle Analysis

The "Life Cycle Analysis of the porcelain product (Bla) manufactured by ROCERSA v2" on which this EPD is based was prepared with the information provided directly by the manufacturer (ROCERSA) on its Bla ceramic coverings, manufactured in 2020 in its only manufacturing plant, located in L'Alcora (Castellón).

The Life Cycle Analysis (LCA) on which this declaration is based was prepared in compliance with the ISO 14040 and ISO 14044 standards and document UNE-EN 17160:2019 Product category rules for ceramic tiles, in compliance with the UNE EN 15804:2012+A2:2020 standard.

The LCA was conducted using SimaPro 9.2.0.2 and with the Ecoinvent 3.7.1 database version (2020).

3.2. Functional or declared unit

The functional unit is defined as "coating 1 m2 of the surface (floors) of a home with Bla porcelain, for a 50-year period, and residential use".

3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building in which the product is used, provided that it is installed correctly, since this is a long-lasting product that does not require replacement. The product will have a 50-year service life.

3.4. Assignment criteria

This study includes more than 95% of all system mass and energy inputs and outputs.

The following data have been excluded:

- Diffuse atmospheric particle emissions generated during transport and storage of powdery raw materials.
- Non-regulated atmospheric polluting emissions, from sources channelled by combustion (drying by atomisation, drying pieces and firing).
- The waste generated throughout the service life of ceramic coverings used in other systems will be recycled and re-used according to the PCR. However, the loads associated with the waste recycling process and the benefits achieved through these processes will be included in module D.
- The production of some auxiliary consumables used to manufacture tiles: polishing bits, etc., which represent less than 0.01% of the total mass. Waste management was excluded.
- No waste management tasks or transport to dump sites are included with regards to manufacturing enamels.
- The production of machinery and industrial equipment.

3.5. Representativeness, quality and selection of data

The main information was provided directly by ROCERSA, on a manufacturing plant owned by the company. The secondary data were processed with the Ecoinvent 3.7.1 databases and modelled with Simapro 9.2.0.2. All information refers to a geographical scenario in Spain during the year 2020. The results presented are representative of Bla ceramic coverings, expressed as a weighted average of production.

3.6. Other calculation rules and hypotheses

The atomisation dryer includes the simultaneous heat and electricity generation system, using gas turbines and natural gas as the fuel, the combustion of which supplies hot gas directly to the drying stage. The electricity generated is used by part of the industrial plant, reducing its consumption and injecting the surplus into the grid for its sale and subsequent distribution. This study takes into account the electricity generated and injected into the grid as an offset load.

The impacts generated by the product have been studied, considering the product with the lowest impact (40x120, thickness 7 mm and 15.29 kg/m²) and the product with the highest impact (60x90, thickness 20 mm and 47.22 kg/m²).

The Coefficient of Variation was used to check the representativeness of the results measured, dividing the standard deviation by the arithmetic mean of the results of the three products, obtaining a variation coefficient of 53% for the results of the Global Warming impact category (GWP-total – kg CO₂ eq) of stage A1-A3.

No universal criteria have been established to indicate that a coefficient value is "low" or "high". However, in practice, values of less than 30% or 40% are low, between 30/40% and 80% are moderate, and values over 120% or 140% indicate a very high dispersion rate.



Figure 2. Product installed

4 System limits, scenarios and additional technical information

The life cycle modules of the product analysed were included.

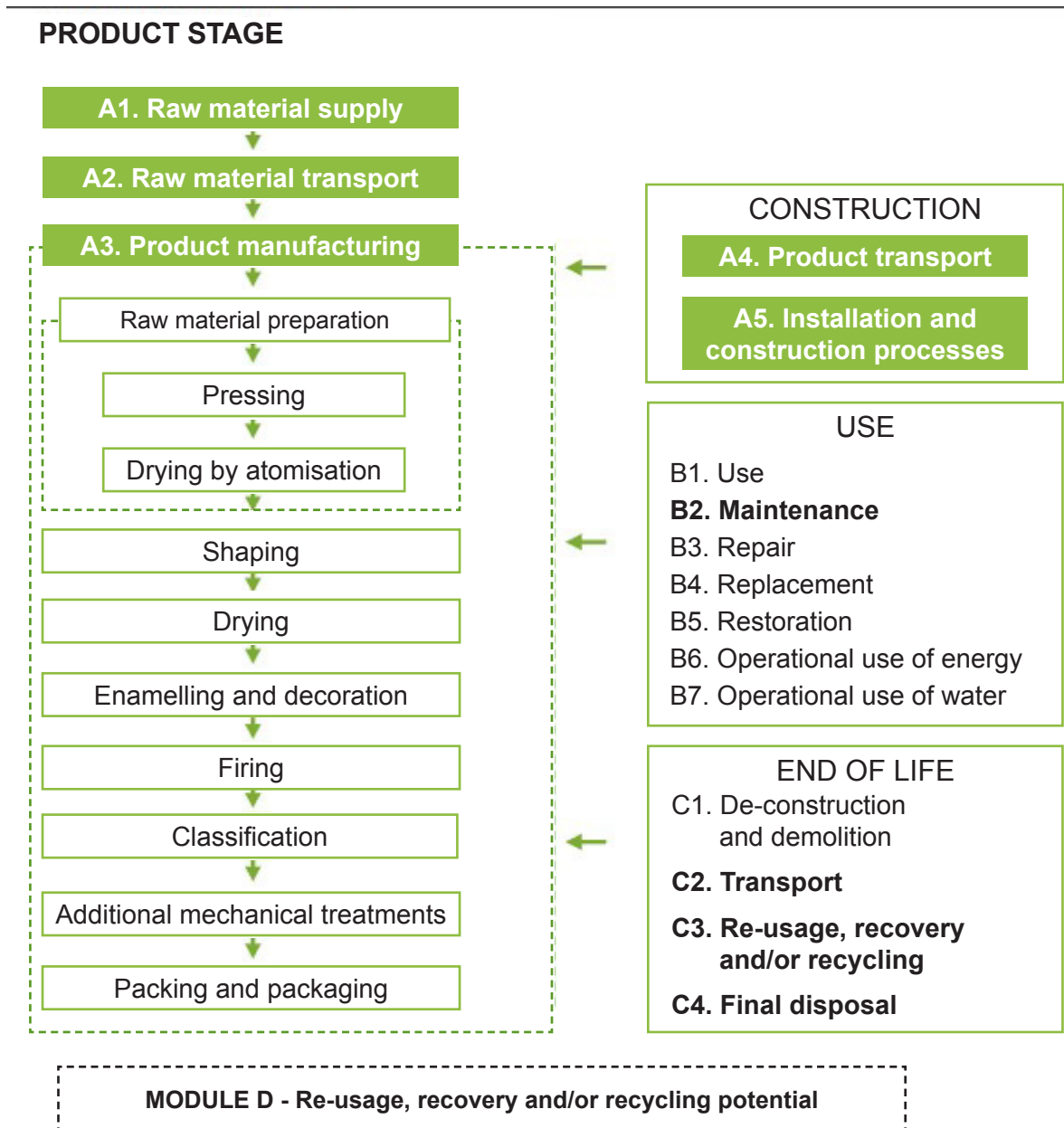


Figure 3. Limits of the system studied

4.1. Processes prior to manufacturing (upstream)

Raw materials (A1 and A2)

Bla Porcelain stoneware tiles are basically made up of clay, sand, kaolinite, feldspar and recycled ceramic materials. The raw materials used are sourced from different parts, according to their nature and properties. The raw materials sourced from outside Spain are transported by freighter to the port of Castellón, then on a 27-t truck to the plants, in compliance with the Euro 6 regulations. In the case of sea transport, a transoceanic freighter was chosen; the distance travelled by the freighter differs according to the source. All raw materials are transported in bulk, i.e., they require no packaging materials. In the case of enamel raw materials, the most common are quartz, kaolinite, feldspar, alkali substances, borate, zirconium, clay, roasted alumina, ceramic frit, pigments and additives, such as suspension stabilisers, anti-foaming agents or binders.

The raw materials are **prepared** (atomised clay) by different specialised companies, at a distance of less than 20 km. These plants store the raw materials received so they can be mixed later on.

Once the raw materials have been **mixed**, they will be subject to dry channel pressing and drying, to obtain the spray-dried granules.

The atomisation system supplier uses a heat and electricity cogeneration system, which is **installed** in the atomisation dryer. Cogeneration processes generate electricity from the residual heat of combustion through a system of steam turbines and alternators. All hot gases are used in the atomisation dryer and the electricity generated is partly used during production, reducing the consumption of electricity and injecting the surplus into the grid.

4.2 Product manufacturing

Module A3 - Description of the manufacturing processes, up to the factory entrance.

Once the spray-dried granules are manufactured, they are sent in bulk in a 27-t dump truck from the manufacturer's plants to ROCERSA's factory. After they arrive at the factory, the spray-dried granules are unloaded into the storage hoppers. A feeding system with conveyor belts controls the weight and moves the granules to the shaping stage.

The tiles are then shaped using dry unidirectional pressing methods. The shaped tiles are placed inside a continuous dryer to reduce their humidity, increasing their mechanical resistance by two or three, so they can be subsequently processed.

Tiles coming out of the dryer are coated with one or more coats of slip and enamel. Decoration materials are manufactured by specialised companies, in which part of the raw materials are subject to a fritting process (fusion of the raw materials and sudden cooling), obtaining insoluble glass.

Frits and all other raw materials are mainly mixed and fused with damp systems, and hoods and discs are applied to the resulting product with different techniques.

The firing stage is the most important stage of the ceramic tile manufacturing process, since the properties of the tiles are modified after they have been moulded and fired, producing a very hard material that is resistant to water and chemical products. Tiles are fired in single-structure roller kilns.

After firing, any additional mechanical treatments are carried out on the parts, as required to add the necessary characteristics. The most common treatments include polishing (increasing the brightness of the tile after abrasion) and grinding (mechanical treatment on the tile edge, so as to make invisible joints between tiles).

The tiles will be packaged with cardboard, pallets and polyethylene wrap after passing through quality control or classification. Pallets are stored in the plant's logistics area after they have been prepared.

Dry filters and sleeves are used to reduce atmospheric emissions in the different sources.

4.3 Construction process

Product transport (A4)

In accordance with the information obtained, the sales of the products analysed are grouped into 3 different geographical areas.

Scenarios applied for transport of the product to the place of installation		
Destination	Transport method	Percentage (%)
Spain	27-t truck	50
Europe	27-t truck	29
	Freighter	
Rest of the world	27-t truck	21
	Transoceanic freighter	
Total		100

Table 5. Product transport

Product installation and construction processes (A5).

The product can be installed after it is unpacked. White adhesive cement (CaSO₄) will be used during the installation process, according to the information gathered and with the purpose of applying such information in a real scenario. White adhesive cement is made up of a series of water activated binders, mineral loads and organic additives, which only need to be mixed with water or a liquid before use. They are made up of a mixture of white or grey cement, mineral loads of silicon and/or limestone materials and organic additives: water retainers, water-soluble polymers, rheological modifiers, fibres, etc.

Module A4 - Transport to the site

Table 6. Transport to the site

Scenario information	Unit (expressed as a functional unit per declared unit)
Type and consumption of fuel by vehicles, type of vehicles used during transport.	27-t truck, EURO VI: 2.13E-05 kg diesel oil/kgkm
Distance	Road transport: 781 km Sea transport: 1,654 km
Use of the capacity (including unloaded returns)	53% for road transport and 100% for sea transport.
Apparent density of transported products	2,055 kg/m ³
Net consumption of fresh water	0.2
Useful capacity factor (factor: = 1 or < 1 or ≥ 1 for products packaged in compressed or nested form)	

Module A5 - Installation.

Table 7. Installation

Scenario information	Unit (expressed as a functional unit per declared unit)
Auxiliary materials used during installation (specifying each material)	Mortar: 3.3 kg
Use of water	0.8 kg
Use of other resources	0 kg
Quantitative description of the type of energy (regional mix) and consumption during installation.	Not applicable
Material waste before treatment, generated during the installation of the product (classified by type).	Packaging waste: Cardboard: 1.39E-01 kg Plastic: 2.28E-02 kg Wood: 1.59E-01 kg
Materials disposed of (classified by type) after waste is treated at the building plot.	Cardboard - burning: 1.39E-01 kg Cardboard - recycling: 2.28E-02 kg Cardboard - dump site: 1.59E-01 kg Plastic - burning: 2.92E-02 kg Plastic - recycling: 3.45E-02 kg Plastic - dump site: 2.90E-02 kg Wood - burning: 4.76E-02 kg Wood recycling: 5.73E-02 kg Wood dump site: 5.38E-02 kg
Direct atmospheric, soil and water emissions	Not applicable

4.4 Use associated with the building's structure.

Use (B1)

After installation, the product does not require energy for its use, nor does it need maintenance after its commissioning, except for normal cleaning work. Therefore, only the environmental loads associated with product maintenance (module B2) are contemplated for the modules mentioned above.

According to ROCERSA, the reference service life of the product will be the same as that of the building in which it is installed (50 years), since it is a durable product that is hard to access and, therefore, not easy to replace provided it has been installed properly.

Maintenance (B2)

These surfaces are cleaned with a damp cloth. Cleaning agents can be used on surfaces with dirt or grease, such as detergent or bleach. This study considers water and disinfectant consumption in a residential use scenario, as described in the PCR: 0.134 ml of detergent are used once every two weeks and 0.1 l of water to clean 1 m² of the ceramic tiles on floors once a week.

Table 8. Use associated with the building's structure

Scenario information	Unit (expressed as a functional unit per declared unit)
B2 Maintenance	
Maintenance process	These surfaces are cleaned with a damp cloth. Cleaning agents can be used on surfaces with dirt or grease, such as detergent or bleach.
Maintenance cycle	1 per week with water and 1 every two weeks with water and detergent
Auxiliary materials used during maintenance	0.1 l water/cycle (weekly) 0.134 ml detergent/cycle (fortnightly)
Material waste generated during maintenance	No
Net consumption of fresh water	0.1 l water/cycle (weekly)
Materials received during maintenance, type of energy vector and quantity, if applicable and suitable.	Not applicable
B3 Repair	
Repair process	Not applicable
Inspection process	Not applicable
Repair cycle	Not applicable
Auxiliary materials	Not applicable
Material waste generated during repairs	Not applicable
Net consumption of fresh water.	Not applicable
Energy supplied during repairs, type of energy vector and quantity.	Not applicable

Scenario information	Unit (expressed as a functional unit per declared unit)
B4 Replacement	
Replacement cycle	Not applicable
Energy supplied during maintenance, type of energy vector and quantity, if applicable and appropriate	Not applicable
Replacement of worn parts after the end of the product life cycle, specifying each material	Not applicable
B5 Restoration	
Restoration process	Not applicable
Restoration cycle	Not applicable
Energy supplied during restoration, type of energy vector and quantity, if applicable and appropriate	Not applicable
Materials supplied for the restoration process, including auxiliary process materials.	Not applicable
Material waste generated during restoration work.	Not applicable
Other scenario development cases.	Not applicable

4.5 Use associated with the building.

Table 9. Use of energy and water associated with the building

Scenario information	Unit (expressed as a functional unit per declared unit)
Auxiliary materials, classified by type	Not applicable
Net consumption of fresh water	Not applicable
Type of energy vector, for example, natural gas, urban heating	Not applicable
Output power of the equipment	Not applicable
Features (for example, energy efficiency, emissions, variation of performance with use of capacity)	Not applicable
Other scenario development cases (for example, period of time and usage frequency, number of occupants)	Not applicable

4.6 End-of-life stage

The end-of-life stage includes the following modules.

De-construction and demolition (C1)

At the end of its service life, the product will be disposed of, either as part of building restoration work or during demolition work. Within the framework of the building demolition work, the impacts associated with removing the product are negligible.

Transport (C2)

The product waste is transported in 27-t trucks that comply with the Euro VI regulations, at a distance of 50 km to its destination. Only the Spanish market was taken into account to estimate the distance of 50 km from the demolished building to the nearest dump site, extrapolating the results to the entire ceramic product market.

Waste management for re-use, recovery and recycling (C3)

The end-of-life scenarios established in the PCRs have been studied, as shown in the table below.

Table 10. Scenarios for managing waste at the end of life

EOL scenario	proportion (%)	Distance (Km)
Recycling and re-use	70	50
Dump site	30	50

Source: RCP -Eurostat

Final disposal (C4)

The % of the product sent to the controlled dump site are shown on the table above.

Table 11. End of life

Parameter	Unit (expressed as a functional unit)
Collection process, specified by type	0 kg collected separately 26.94 kg collected, mixed with construction waste
Recovery system, specified by type	0 kg for re-use 18.86 kg for recycling 0 kg for energy recovery
Disposal, specified by type	8.08 kg for final disposal
Hypothesis for the development of scenarios (for example, transport)	The product waste is transported in 27-t trucks that comply with the Euro VI regulations. The maximum distance to the final disposal point and recycling plant will be 50 km. This includes the return trip of the truck (100% of return trips with the truck empty), according to the standard scenarios included in the PCRs

4.7 Benefits and loads beyond the system

This module takes into account the loads and benefits of the waste generated during the installation stage (tile packaging waste: cardboard, plastic and wood) and the waste generated at the end of the product's service life.

5 Declaration of environmental parameters of the LCA and ICV

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

Table 12. Potential environmental impacts. 1 m² of porcelain (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1.34 E+01	2.12 E+00	9.99 E-01	NR	4.97 E-01	NR	NR	1.94E-01	0.00 E+00	4.25E-02	-3.00 E-01
GWP-fossil	kg CO2 eq	1.36 E+01	2.12 E+00	8.80 E-01	NR	6.55 E-01	NR	NR	1.93E-01	0.00 E+00	4.24E-02	-2.95 E-01
GWP-bio-genic	kg CO2 eq	-2.44 E-01	1.15 E-03	1.19 E-01	NR	-2.12 E-01	NR	NR	1.24E-04	0.00 E+00	1.31E-04	-2.07 E-03
GWP-luluc	kg CO2 eq	1.16 E-02	3.40 E-04	3.49 E-04	NR	5.29 E-02	NR	NR	5.70E-06	0.00 E+00	1.15E-05	-2.34 E-03
ODP	kg CFC11 eq	2.93 E-06	4.48 E-07	4.01 E-08	NR	2.55 E-08	NR	NR	4.14E-08	0.00 E+00	1.75E-08	-2.30 E-08
AP	mol H+ eq	5.86 E-02	1.62 E-02	3.00 E-03	NR	4.02 E-03	NR	NR	2.95E-04	0.00 E+00	4.00E-04	-1.64 E-03
EP-fresh-water	kg PO4 eq	1.01 E-04	3.06 E-06	1.45 E-05	NR	4.05 E-05	NR	NR	1.78E-07	0.00 E+00	4.46E-07	-2.58 E-05
EP-marine	kg N eq	1.88 E-02	3.66 E-03	7.95 E-04	NR	2.09 E-03	NR	NR	3.50E-05	0.00 E+00	1.39E-04	-4.92 E-04
EP-terrestrial	mol N eq	2.06 E-01	4.07 E-02	8.95 E-03	NR	1.15 E-02	NR	NR	3.96E-04	0.00 E+00	1.53E-03	-4.97 E-03
POCP	Kg NMVOC eq	5.34 E-02	1.11 E-02	2.36 E-03	NR	3.95 E-03	NR	NR	1.64E-04	0.00 E+00	4.44E-04	-1.26 E-03
ADP-minerals& metals ²	kg Sb eq	2.58 E-05	7.54 E-07	2.32 E-06	NR	7.79 E-06	NR	NR	2.29E-08	0.00 E+00	9.48E-08	-1.69 E-06
ADP-fossil ²	MJ	2.48 E+02	2.77 E+01	5.13 E+00	NR	1.36 E+01	NR	NR	2.55E+00	0.00 E+00	1.19E+00	-5.0 4E+00
WDP ²	m3 depriv.	3.68 E+00	1.01 E-02	9.74 E-02	NR	1.21 E+01	NR	NR	1.95E-04	0.00 E+00	5.34E-02	-1.25 E+00

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

GWP - total: Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Global warming potential - biogenic; **GWP - luluc:** Global warming potential associated with the use and change of use of soils; **ODP:** Ozone depletion potential; **AP:** Cumulative excess acidification potential; **EP-freshwater:** Eutrophication potential, nutrient fraction reaching the final fresh water component; **EP-marine:** Eutrophication potential, nutrient fraction reaching the final seawater component; **EP-terrestrial:** Eutrophication potential, cumulative excess; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water depletion potential (user), weighted water deprivation consumption. **NR:** Not relevant

Table 13. Additional potential environmental impacts. 1 m² of porcelain (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PM	Incidence of diseases	3.21 E-07	2.20 E-07	2.52 E-08	NR	3.44 E-08	NR	NR	1.45 E-09	0.00 E+00	7.83 E-09	-2.08 E -08
IRP ¹	kBq U235 eq	7.51 E-01	5.71 E-01	1.21 E-01	NR	2.54 E-02	NR	NR	1.12 E-02	0.00 E+00	4.88E-03	-1.27 E -02
ETP-fw ²	CTUe	1.25 E+02	6.67 E+01	1.47 E+01	NR	2.56 E+01	NR	NR	1.31 E+00	0.00 E+00	7.47E-01	-6.45 E +00
HTP-c ²	CTUh	5.36 E-09	2.93 E-09	3.70 E-10	NR	1.77 E-09	NR	NR	1.04 E-11	0.00 E+00	2.22 E-11	-2.06 E -10
HTP-nc ²	CTUh	6.61 E-08	3.89 E-08	4.62 E-09	NR	1.51 E-08	NR	NR	3.08 E-10	0.00 E+00	4.63 E-10	-3.83 E -09
SQP ²	-	7.86 E+01	4.21 E+01	3.33 E+00	NR	1.99 E+01	NR	NR	2.95 E-01	0.00 E+00	2.50 E+00	-6.34 E +00

PM: Potential incidence of diseases due to particulate matter (PM) emissions; **IRP:** Efficiency of exposure of human potential related to U235; **ETP-fw:** Comparative potential of toxic units in ecosystems - fresh water; **HTP-c:** Comparative potential of toxic units in ecosystems - carcinogenic effects; **HTP-nc:** Comparative potential of toxic units in ecosystems - non-carcinogenic effects; **SQP:** Soil quality potential index; **NR:** Not relevant

Warning 1: This impact category deals primarily with the possible impacts of low doses of ionising radiation on human health throughout the nuclear fuel cycle. The effects of possible nuclear accidents or occupational exposure due to the elimination of radioactive waste in underground installations are not taken into account. Similarly, this parameter is not used to measure the ionising radiation potential of soils due to the presence of radon or other construction materials.

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

Table 14. Use of resources. 1 m² of porcelain (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	9.23 E+00	7.78 E-02	7.24 E-01	NR	6.03 E+00	NR	NR	4.97 E-03	0.00 E+00	9.57 E-03	-1.27 E+00
PERM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERT	MJ	9.23 E+00	7.78 E-02	7.24 E-01	NR	6.03 E+00	NR	NR	4.97 E-03	0.00 E+00	9.57 E-03	-1.27 E+00
PENRE	MJ	2.71 E+02	2.94 E+01	5.45 E+00	NR	1.47 E+01	NR	NR	2.70 E+00	0.00 E+00	1.26 E+00	-5.41 E+00
PERNRM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERNRT	MJ	2.71 E+02	2.94 E+01	5.45 E+00	NR	1.47 E+00	NR	NR	2.70 E+00	0.00 E+00	1.26 E+00	-5.41 E+00
SM	MJ	5.38 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
FW	m3	3.68 E+00	1.01 E-02	9.74 E-02	NR	1.21 E+01	NR	NR	1.95 E-04	0.00 E+00	5.34 E-02	-1.25 E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources as raw materials; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy; PENRE = Use of non-renewable primary energy, excluding non-renewable primary energy resources as raw materials; PERNRM = Use of non-renewable primary energy as raw materials; PERNRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of freshwater resources; NR: Not relevant

Table 15. Output flows and waste categories.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	kg	5.51 E-04	6.43 E-05	7.14 E-06	NR	7.92 E-06	NR	NR	6.79 E-06	0.00 E+00	1.75 E-06	-5.81 E-06
NHWD	kg	1.57 E+00	1.76 E-02	1.59 E-01	NR	8.13 E-02	NR	NR	5.71 E-04	0.00 E+00	8.08 E+00	-3.14 E-02
RWD	kg	6.81 E-04	1.98 E-04	2.10E-05	NR	2.15 E-05	NR	NR	1.83 E-05	0.00 E+00	7.81 E-06	-1.22 E-05
CRU	kg	0.00 E+00	0.00 E+00	0.00E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
MFR	kg	8.21 E+00	0.00 E+00	2.09 E-01	NR	0.00 E+00	NR	NR	0.00 E+00	1.89 E+01	0.00 E+00	0.00 E+00
MER	kg	0.00 E+00	0.00 E+00	8.84E-02	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
EEE	MJ	2.50 E+00	0.00E+00	5.25E-01	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

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; NR: Not relevant

Biogenic carbon content of the product - KgC	0.00E+00
Biogenic carbon content of the packaging - KgC	1.15E-01

6 Additional environmental information

During the manufacturing process, ceramic tiles are subject to heat treatments at temperatures exceeding 1000°C. At these temperatures, any organic compound present in the compositions breaks down, producing an inert end product that is free of volatile organic compounds that can be emitted in its use phase.

Ceramic tiles give off no compounds that can contaminate soils or water during use, since they are completely inert and undergo no physical, chemical or biological transformations, are not soluble or flammable, and do not react physically, chemically or in any other way. Likewise, they are not biodegradable, do not have a negative impact on other materials they come into contact with and do not pollute or harm human beings.

This product does not leach, so it supposes no risks to the quality of surface or groundwater.

The product does not contain the substances included in the Candidate List of Substances of Very High Concern for Authorisation of the European Chemicals Agency.

7. REFERENCES

[1] General rules of the GlobalEPD Programme. Revision 2. AENOR. February 2016

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[3] UNE-EN 15804:2012+A2:2020 Sustainability of construction works. Environmental product declarations. Core product category rules for construction products.

[4] UNE-EN ISO 14040. Environmental management. Life cycle assessment. Principles and framework. 2006.

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[6] ROCERSA Porcelain product life cycle analysis (Bla) v2. (Not published).

[7] Documentation for Duty Vehicle Processes in GaBi. Report version 1.0. February 2021.

[8] Handbook of Emission Factors for Road Transport (HBEFA). 2017).

[9] Annex_C_Annex C to the PEF-OEF Methods V2.1_May 2020.

[10] GHG inventory report 1990-2013. Annex 7. Spain. 2020.

ANNEX I Declaration of environmental parameters of the LCA and ICV for the MINIMUM environmental impact form

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

Table 16. Potential environmental impacts. 1 m2 of porcelain (Bla), lower impact. 40x120 and 7 mm thickness

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	7.84 E+00	1.24 E+00	9.99 E-01	NR	4.97 E-01	NR	3.39 E-01	1.13 E-01	0.00 E+00	2.49 E-02	-1.76 E-01
GWP-fossil	kg CO2 eq	7.97 E+00	1.24 E+00	8.80 E-01	NR	6.55 E-01	NR	3.39 E-01	1.13 E-01	0.00 E+00	2.49 E-02	-1.73 E-01
GWP-bio-genic	kg CO2 eq	-1.43 E-01	6.72 E-04	1.19 E-01	NR	-2.12 E-01	NR	2.17 E-04	7.24 E-05	0.00 E+00	7.70 E-05	-1.21 E-03
GWP-luluc	kg CO2 eq	6.81 E-03	2.00 E-04	3.49 E-04	NR	5.29 E-02	NR	9.98 E-06	3.34 E-06	0.00 E+00	6.75 E-06	-1.37 E-03
ODP	kg CFC11 eq	1.72 E-06	2.63 E-07	4.01 E-08	NR	2.55 E-08	NR	7.26 E-08	2.43 E-08	0.00 E+00	1.02 E-08	-1.35 E-08
AP	mol H+ eq	3.43 E-02	9.50 E-03	3.00 E-03	NR	4.02 E-03	NR	5.18 E-04	1.73 E-04	0.00 E+00	2.35 E-04	-9.64 E-04
EP-fresh-water	kg PO4 eq	5.93 E-05	1.79 E-06	1.45 E-05	NR	4.05 E-05	NR	3.11 E-07	1.04 E-07	0.00 E+00	2.62 E-07	-1.51 E-05
EP-marine	kg N eq	1.10 E-02	2.14 E-03	7.95 E-04	NR	2.09 E-03	NR	6.13 E-05	2.05 E-05	0.00 E+00	8.14 E-05	-2.88 E-04
EP-terrestrial	mol N eq	1.21 E-01	2.39 E-02	8.95 E-03	NR	1.15 E-02	NR	6.94 E-04	2.32 E-04	0.00 E+00	8.97 E-04	-2.91 E-03
POCP	Kg NMVOC eq	3.13 E-02	6.49 E-03	2.36 E-03	NR	3.95 E-03	NR	2.87 E-04	9.61 E-05	0.00 E+00	2.60 E-04	-7.37 E-04
ADP-minerals& metals ²	kg Sb eq	1.52 E-05	4.42 E-07	2.32 E-06	NR	7.79 E-06	NR	4.02 E-08	1.35 E-08	0.00 E+00	5.56 E-08	-9.93 E-07
ADP-fossil ²	MJ	1.45 E+02	1.62 E+01	5.13 E+00	NR	1.36 E+01	NR	4.46 E+00	1.49 E+00	0.00 E+00	6.96 E-01	-2.95 E+00
WDP ²	m3 depriv.	2.16 E+00	5.93 E-03	9.74 E-02	NR	1.21 E+01	NR	3.42 E-04	1.14 E-04	0.00 E+00	3.13 E-02	-7.34 E-01

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

GWP - total: Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Global warming potential - biogenic; **GWP - luluc:** Global warming potential associated with the use and change of use of soils; **ODP:** Ozone depletion potential; **AP:** Cumulative excess acidification potential; **EP-freshwater:** Eutrophication potential, nutrient fraction reaching the final fresh water component; **EP-marine:** Eutrophication potential, nutrient fraction reaching the final seawater component; **EP-terrestrial:** Eutrophication potential, cumulative excess; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water depletion potential (user), weighted water deprivation consumption. **NR:** Not relevant

Table 17. Additional environmental parameters. 1 m² of porcelain (Bla), lower impact. 40x120 and 7 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PM	Incidence of diseases	2.15 E-07	1.29 E-07	1.48 E-08	NR	3.44 E-08	NR	NR	8.48 E-10	0.00 E+00	4.59 E-09	-1.22 E-08
IRP ¹	kBq U235 eq	4.58 E-01	3.35 E-01	7.10 E-02	NR	2.54 E-02	NR	NR	6.54 E-03	0.00 E+00	2.86 E-03	-7.43 E-03
ETP-fw ²	CTUe	9.00 E+01	3.91 E+01	8.60 E+00	NR	2.56 E+01	NR	NR	7.65 E-01	0.00 E+00	4.38 E-01	-3.78 E+00
HTP-c ²	CTUh	3.98 E-09	1.72 E-09	2.17 E-10	NR	1.77 E-09	NR	NR	6.10 E-12	0.00 E+00	1.30 E-11	-1.21 E-10
HTP-nc ²	CTUh	4.77 E-08	2.28 E-08	2.71E-09	NR	1.51 E-08	NR	NR	1.80 E-10	0.00 E+00	2.71 E-10	-2.24 E-09
SQP ²	-	5.86 E+01	2.47 E+01	1.95 E+00	NR	1.99 E+01	NR	NR	1.73 E-01	0.00 E+00	1.46 E+00	-3.72 E+00

PM: Potential incidence of diseases due to particulate matter (PM) emissions; IRP: Efficiency of exposure of human potential related to U235; ETP-fw: Comparative potential of toxic units in ecosystems - fresh water; HTP-c: Comparative potential of toxic units in ecosystems - carcinogenic effects; HTP-nc: Comparative potential of toxic units in ecosystems - non-carcinogenic effects; SQP: Soil quality potential index; NR: Not relevant

Warning 1: This impact category primarily deals with the possible impacts of low doses of ionising radiation on human health throughout the nuclear fuel cycle. The effects of possible nuclear accidents or occupational exposure due to the elimination of radioactive waste in underground installations are not taken into account. Similarly, this parameter is not used to measure the ionising radiation potential of soils due to the presence of radon or other construction materials.

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

Table 18. Use of resources. 1 m2 of porcelain (Bla), lower impact. 40x120 and 7 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	5.41 E+00	4.56 E-02	7.24E-01	NR	6.03 E+00	NR	NR	2.91E-03	0.00 E+00	5.61 E-03	-7.46 E-01
PERM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERT	MJ	5.41 E+00	4.56 E-02	7.24 E-01	NR	6.03 E+00	NR	NR	2.91E-03	0.00 E+00	5.61 E-03	-7.46 E-01
PENRE	MJ	1.59 E+02	1.72 E+01	5.45 E+00	NR	1.47 E+01	NR	NR	1.58 E+00	0.00 E+00	7.39 E-01	-3.17 E+00
PERNRM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERNRT	MJ	1.59 E+02	1.72 E+01	5.45 E+00	NR	1.47 E+00	NR	NR	1.58 E+00	0.00 E+00	7.39 E-01	-3.17 E+00
SM	MJ	3.15 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
FW	m3	2.16 E+00	5.93 E-03	9.74 E-02	NR	1.21 E+01	NR	NR	1.14 E-04	0.00 E+00	3.13 E-02	-7.34 E-01

PERE = Use of renewable primary energy excluding renewable primary energy resources as raw materials; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy; PENRE = Use of non-renewable primary energy, excluding non-renewable primary energy resources as raw materials; PERNRM = Use of non-renewable primary energy as raw materials; PERNRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of freshwater resources; NR: Not relevant

Table 19. Output flows, waste categories and biogenic carbon content. 1 m2 of porcelain (Bla), lower impact. 40x120 and 7 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	kg	3.23 E-04	3.77 E-05	7.14 E-06	NR	7.92 E-06	NR	NR	3.98 E-06	0.00 E+00	1.03 E-06	-3.40 E-06
NHWD	kg	9.21E-01	1.03 E-02	1.59 E-01	NR	8.13 E-02	NR	NR	3.35 E-04	0.00 E+00	4.73 E+00	-1.84 E-02
RWD	kg	3.99E-04	1.16 E-04	2.10 E-05	NR	2.15 E-05	NR	NR	1.08 E-05	0.00 E+00	4.58 E-06	-7.14 E-06
CRU	kg	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
MFR	kg	4.81 E+00	0.00 E+00	2.09 E-01	NR	0.00 E+00	NR	NR	0.00 E+00	1.11 E+00	0.00 E+00	0.00 E+00
MER	kg	0.00 E+00	0.00 E+00	8.84 E-02	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
EEE	MJ	1.46 E+00	0.00 E+00	7.59 E-01	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

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; NR: Not relevant.

Biogenic carbon content of the product - KgC	0.00E+00
Biogenic carbon content of the packaging - KgC	1.15E-01

ANNEX II Declaration of environmental parameters of the LCA and ICV for the MINIMUM environmental impact format

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

Table 20. Additional potential impacts. 1 m² of porcelain (Bla), lower impact. 60x90 and 20 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	2.34 E+01	3.71 E+00	9.99 E-01	NR	4.97 E-01	NR	3.39 E-01	3.39 E-01	0.0 0 E+00	7.46 E-02	-5.25 E-01
GWP-fossil	kg CO ₂ eq	2.38 E+01	3.71 E+00	8.80 E-01	NR	6.55 E-01	NR	3.39 E-01	3.39 E-01	0.0 0 E+00	7.43 E-02	-5.17 E-01
GWP-bio-genic	kg CO ₂ eq	-4.27 E-01	2.01 E-03	1.19 E-01	NR	-2.12 E-01	NR	2.17 E-04	2.17 E-04	0.0 0 E+00	2.30 E-04	-3.63 E-03
GWP-luluc	kg CO ₂ eq	2.04 E-02	5.97 E-04	3.49 E-04	NR	5.29 E-02	NR	9.98 E-06	9.98 E-06	0.0 0 E+00	2.02 E-05	-4.10 E-03
ODP	kg CFC11 eq	5.14 E-06	7.85 E-07	4.01 E-08	NR	2.55 E-08	NR	7.26 E-08	7.26 E-08	0.0 0 E+00	3.06 E-08	-4.03 E-08
AP	mol H ⁺ eq	1.03 E-01	2.84 E-02	3.00 E-03	NR	4.02 E-03	NR	5.18 E-04	5.18 E-04	0.0 0 E+00	7.02 E-04	-2.88 E-03
EP-fresh-water	kg PO ₄ eq	1.77 E-04	5.37 E-06	1.45 E-05	NR	4.05 E-05	NR	3.11 E-07	3.11 E-07	0.0 0 E+00	7.83 E-07	-4.53 E-05
EP-marine	kg N eq	3.29 E-02	6.41 E-03	7.95 E-04	NR	2.09 E-03	NR	6.13 E-05	6.13 E-05	0.0 0 E+00	2.44 E-04	-8.62 E-04
EP-terres-trial	mol N eq	3.62 E-01	7.14 E-02	8.95 E-03	NR	1.15 E-02	NR	6.94 E-04	6.94 E-04	0.0 0 E+00	2.68 E-03	-8.71 E-03
POCP	kg NMVOC eq	9.36 E-02	1.94 E-02	2.36 E-03	NR	3.95 E-03	NR	2.87 E-04	2.87 E-04	0.0 0 E+00	7.78 E-04	-2.20 E-03
ADP-minerals& metals ²	kg Sb eq	4.53 E-05	1.32 E-06	2.32 E-06	NR	7.79 E-06	NR	4.02 E-08	4.02 E-08	0.0 0 E+00	1.66 E-07	-2.97 E-06
ADP-fossil ²	MJ	4.34 E+02	4.86 E+01	5.13 E+00	NR	1.36 E+01	NR	4.46 E+00	4.46 E+00	0.0 0 E+00	2.08 E+00	-8.84 E+00
WDP ²	m ³ depriv.	6.45 E+00	1.77 E-02	9.74 E-02	NR	1.21 E+01	NR	3.42 E-04	3.42 E-04	0.0 0 E+00	9.36 E-02	-2.19 E+00

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

GWP - total: Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Global warming potential - biogenic; **GWP - luluc :** Global warming potential associated with the use and change of use of soils; **ODP:** Ozone depletion potential; **AP:** Cumulative excess acidification potential; **EP-freshwater:** Eutrophication potential, nutrient fraction reaching the final fresh water component; **EP-marine:** Eutrophication potential, nutrient fraction reaching the final seawater component; **EP-terrestrial:** Eutrophication potential, cumulative excess; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water depletion potential (user), weighted water deprivation consumption. **NR:** Not relevant

Table 21. Additional environmental parameters. 1 m² of porcelain (Bla), lower impact. 60x90 and 20 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PM	Incidence of diseases	5.12 E-07	3.85 E-07	1.48 E-08	NR	3.44 E-08	NR	NR	2.54 E-09	0.00 E+00	1.37 E-08	-3.64 E-08
IRP ¹	kBq U235 eq	1.28 E+00	1.00 E+00	7.10 E-02	NR	2.54 E-02	NR	NR	1.96 E-02	0.00 E+00	8.55 E-03	-2.22 E-02
ETP-fw ²	CTUe	1.87 E+02	1.17 E+02	8.60 E+00	NR	2.56 E+01	NR	NR	2.29 E+00	0.00 E+00	1.31 E+00	-1.13 E+01
HTP-c ²	CTUh	7.88 E-09	5.14 E-09	2.17 E-10	NR	1.77 E-09	NR	NR	1.82 E-11	0.00 E+00	3.90 E-11	-3.61 E-10
HTP-nc ²	CTUh	9.95 E-08	6.83 E-08	2.71 E-09	NR	1.51 E-08	NR	NR	5.39 E-10	0.00 E+00	8.12 E-10	-6.71 E-09
SQP ²	-	1.15 E+02	7.39 E+01	1.95 E+00	NR	1.99 E+01	NR	NR	5.16 E-01	0.00 E+00	4.38 E+00	-1.11 E+01

PM: Potential incidence of diseases due to particulate matter (PM) emissions; IRP: Efficiency of exposure of human potential related to U235; ETP-fw: Comparative potential of toxic units in ecosystems - fresh water; HTP-c: Comparative potential of toxic units in ecosystems - carcinogenic effects; HTP-nc: Comparative potential of toxic units in ecosystems - non-carcinogenic effects; SQP: Soil quality potential index; NR: Not relevant

Warning 1: This impact category primarily deals with the possible impacts of low doses of ionising radiation on human health throughout the nuclear fuel cycle. The effects of possible nuclear accidents or occupational exposure due to the elimination of radioactive waste in underground installations are not taken into account. Similarly, this parameter is not used to measure the ionising radiation potential of soils due to the presence of radon or other construction materials.

Warning 2: The results of this environmental impact indicator must be used with caution, since they have high uncertainty levels and the experience with this parameter is limited.

Table 22. Use of resources. 1 m2 of porcelain (Bla), lower impact. 60x90 and 20 mm thickness

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	1.62 E+01	1.36 E-01	7.24 E-01	NR	6.03 E+00	NR	NR	8.71 E-03	0.00 E+00	1.68 E-02	-2.23 E+00
PERM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERT	MJ	1.62 E+01	1.36 E-01	7.24 E-01	NR	6.03 E+00	NR	NR	8.71 E-03	0.00 E+00	1.68 E-02	-2.23 E+00
PENRE	MJ	4.75 E+02	5.15 E+01	5.45 E+00	NR	1.47 E+01	NR	NR	4.74 E+00	0.00 E+00	2.21 E+00	-9.47 E+00
PERNRM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERNRT	MJ	4.75 E+02	5.15 E+01	5.45 E+00	NR	1.47 E+00	NR	NR	4.74 E+00	0.00 E+00	2.21 E+00	-9.47 E+00
SM	MJ	9.43 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
FW	m3	6.45 E+00	1.77 E-02	9.74 E-02	NR	1.21 E+01	NR	NR	3.42 E-04	0.00 E+00	9.36 E-02	-2.19 E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources as raw materials; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy; PENRE = Use of non-renewable primary energy, excluding non-renewable primary energy resources as raw materials; PERNRM = Use of non-renewable primary energy as raw materials; PERNRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of freshwater resources; NR: Not relevant

Table 23. Output flows, waste categories and biogenic carbon content. 1 m2 of porcelain (Bla), lower impact. 60x90 and 20 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	kg	9.66 E-04	1.13 E-04	7.14 E-06	NR	7.92 E-06	NR	NR	1.19 E-05	0.00 E+00	3.07 E-06	-1.02 E-05
NHWD	kg	2.75 E+00	3.08 E-02	1.59 E-01	NR	8.13 E-02	NR	NR	1.00 E-03	0.00 E+00	1.42 E+01	-5.50 E-02
RWD	kg	1.19 E-03	3.48 E-04	2.10 E-05	NR	2.15 E-05	NR	NR	3.22 E-05	0.00 E+00	1.37 E-05	-2.13 E-05
CRU	kg	0.00 E+00	0.00 E+00	0.00 E+00	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
MFR	kg	1.44 E+01	0.00 E+00	2.09 E-01	NR	0.00 E+00	NR	NR	0.00 E+00	3.31 E+01	0.00 E+00	0.00 E+00
MER	kg	0.00 E+00	0.00 E+00	8.84 E-02	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
EEE	MJ	4.37 E+00	0.00 E+00	7.59 E-01	NR	0.00 E+00	NR	NR	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

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; NR: Not relevant.

Biogenic carbon content of the product - KgC	0.00E+00
Biogenic carbon content of the packaging - KgC	1.15E-01

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