GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

AENOR

Environmental Product Declaration

EN ISO 14025:2010
EN 15804:2012+A2:2019
UNE-EN 17160:2019

Ceramic tiles, Porcelain tiles (BIa clasification according to EN 14411:2016)

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CERÁMICA RIBESALBES, S.A.

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.

UNE-EN 17160: 2019. Product Category Rules for Ceramic Tiles The European Standard EN 15804:2012+A2:2020 serves as the basis for PCR.
Independent verification of the declaration and data, according to the EN ISO 14025:2010 standard ☐Internal ☒External
Verification body AENOR Product certification body accredited by ENAC with accreditation No. 1/C-PR468

1. General information.

1.1. The company.

CERÁMICA RIBESALBES is a company specialized in the manufacture of ceramic tiles, committed to the Environment, which guarantees the evaluation, qualification and certification of sustainability of all its products, complying with the International Standard ISO 14001 and ISO 14025, thus ensuring the environmental excellence of its products and services.

1.2. Scope of the Declaration.

This Environmental Product Declaration includes environmental information on a group of products manufactured by a single manufacturer, CERÁMICA RIBESALBES, in a geographical and technological environment of Spain 2023.

The results shown present the environmental performance of the average BIa porcelain stoneware, produced at the CERÁMICA RIBESALBES plant in Onda (Castellón), weighted by production. The scope of this Environmental Product Declaration is “cradle to grave and module D”.

1.3. Life cycle and conformity.

This EPD has been developed and verified in accordance with UNE-EN ISO 14025:2010 and UNE-EN 15804:2012+A2:2020/AC:2021 “Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products”.

Table 1. Product category rules

Descriptive title	Product Category Rules for Ceramic Tiles
Record code and version	UNE-EN 17160:2019
Issue date	2019
Accordance	EN 15804:2012+A2:2020/AC:2021
Programme Administrator	AENOR

This Environmental Declaration includes the following life cycle stages:

Table 2. System boundaries. Information modules considered

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	X
	B2	Maintenance	X
	B3	Repairs	X
	B4	Replacement	X
	B5	Restoration	X
	B6	Operational energy use	X
	B7	Operational water use	X
End of life	C1	De-construction / demolition	X
	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

This EPD may not be comparable with those developed in other Programmes or based on different reference documents.

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

The comparison of construction products must be made on the same function, applying the same functional unit and at the building level (or architectural or engineering work), that is, including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 Standard.

2. The product.

2.1. Product identification

The ceramic tiles included in this declaration belong to the BIa water absorption group (porcelain stoneware), a classification based on the UNE-EN 14411: 2016 standard (equivalent to the ISO 13006:2018 standard), that is, dry-pressed tiles that have a water absorption of less than 0.5%. Their common name is porcelain stoneware. The porcelain stoneware tiles included in this study consist of different models with different formats; specifically, the formats considered within the scope of this EPD have: a thickness that varies between 8.5 mm and 10.6 mm; and weights that vary between 15 kg/m2 and 19.20 kg/m2, with the average weight of the product included in this declaration being 17.51 kg/m2.

The results of those formats included in the scope of this EPD that present the maximum and minimum values of the declared impacts can be found in the annexes.

The CPC code of the product is 37310.

2.2. Intended use of the product.

The main recommended use for this product is as floor paving and/or wall and facade cladding, both indoors and outdoors.

2.3. Product composition.

Raw materials for the support (98%): clay, sand, kaolin, feldspar and recycled ceramic materials.

Raw materials for the glaze (2%): borates, carbonates, quartz, feldspars, kaolins, silicates, zinc oxide, zirconium, alumina and clay.

Table 3. Product composition

Substance/Component	Content	Unit
Clay, sand, kaolin, feldspar and recycled ceramic materials	98	%
Borates, carbonates, quartz, feldspars, kaolin, silicates, zinc oxide, zirconium, alumina and clay	2	%

None of the components of the final product are included in the Candidate List of Substances of Very High Concern (SVHC) for authorisation or subject to any other regulation.

2.4. Product features.

The following table refers to the technical performance of the ceramic coatings included in this EPD.

Table 4. Product features

Characteristics	GP (Bla) Eb ≤ 0.5%
Dimensions	
Orthogonality	+/- 0.5%
Thickness	+/- 5%
Central curvature	+/- 0.5%
Lateral curvature	+/- 0.5%
Warpage	+/- 0.5%
Length and width	+/- 0.6%
Physical properties	
Water absorption	E ≤ 0.5%
Flexural strength	>35 Nw/mm²
Frost resistance	Resistant
Deep abrasion resistance	Depending on model
Abrasion resistance	Depending on model
Scratch resistance (MOHS)	Depending on model
Thermal expansion coefficient	$<6.0*10^{-6}$ °C
Thermal shock resistance	No damage
Breaking strength	>1300 N
Chemical resistance	
High concentration acids & alkalis	Min Class GHB
Low concentration acids & alkalis	Min Class GHB
Cleaning product resistance	Class GA
Additives for pool water	Min Class GHB
Stain resistance	Class 5

3. Information about LCA

3.1. Life Cycle Assessment

The study “Life Cycle Assessment of the Porcelain tile Product (Bla) of CERÁMICA RIBESALBES v0” on which this EPD is based has been prepared from data provided directly by the manufacturer CERÁMICA RIBESALBES of its Bla ceramic coverings, manufactured in 2023 in a single production centre, located in Onda (Castellón, Spain).

The life cycle assessment (LCA) on which this declaration is based has been carried out following the ISO 14040, ISO 14044 and UNE-EN 15804:2012+A2:2020/AC:2021 standards.

The LCA was carried out with the support of SimaPro 9.6.0.1 software and Ecoinvent database version 3.10 (2023).

3.2. Declared Unit.

The Declared Unit considered is “covering of 1 m2 of a surface (floor) of a home with Bla Porcelain tile, for 50 years, for 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 longlasting product that does not require replacement. The product will have a 50-year service life.

3.4. Allocation 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 primary data have been provided directly by the company CERÁMICA RIBESALBES corresponding to a production centre owned by it. The secondary data were processed with the Ecoinvent 3.10 databases and modelled with Simapro 9.6.0.1. All information refers to a geographical scenario in Spain during the year 2023. The results presented are representative of Bla ceramic coverings, expressed as a weighted average of production.

3.6. Other calculation rules and hypotheses.

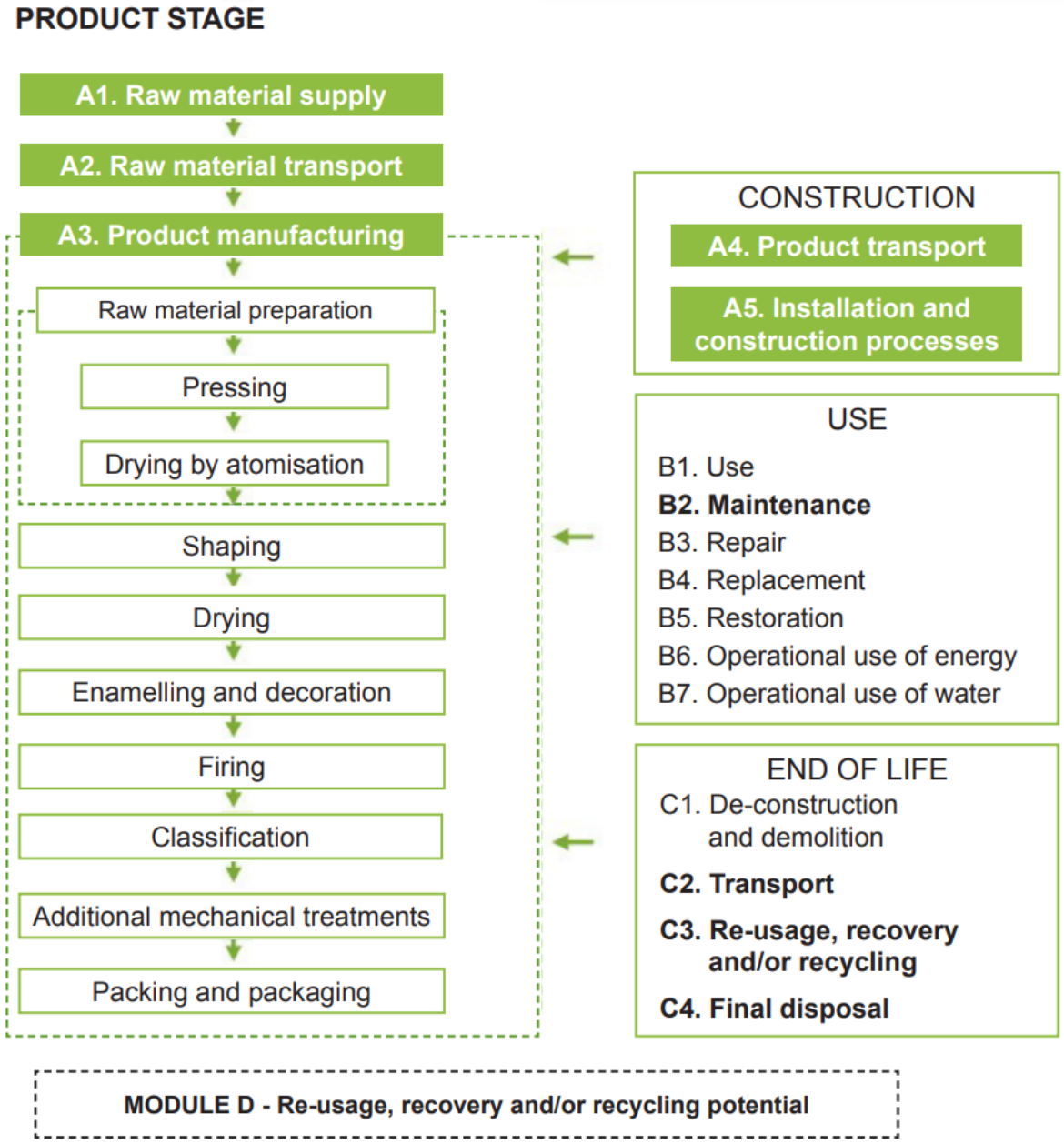
The impacts generated by the product with the lowest impact (15x17.3, thickness 8.5 mm and 15.00 kg/m2) and the product with the highest impact (21x25, thickness 10.6 mm and 19.20 kg/m2) have been studied.

To check the representativeness of the average results, the coefficient of variation has been calculated by dividing the standard deviation by the value of the arithmetic mean of the results of the three products, obtaining a coefficient of variation of 9.87% for the results of the Global Warming impact category (GWP-total – kg CO2 eq) of stage A1-A3.

There are no universal criteria for saying that a coefficient value is “low” or “high”, although in practice values below 30 or 40% are usually considered low, moderate values between these amounts and approximately 80%, and when they exceed 120 or 140% the dispersion is already considered to be quite high.

4. System boundaries, scenarios and additional technical information.

All the life cycle modules of the product analysed were included.



4.1. Pre-manufacturing processes (upstream).

Raw materials (A1 y A2).

BIa Porcelain tiles are basically made up of clay, sand, kaolin, 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 VI 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.

Once the spray-dried granule has been manufactured, it is sent in bulk in a 27 t dump truck from the manufacturer's plant to the CERÁMICA RIBESALBES factory. Once it reaches the factory, the spray-dried granule is unloaded into storage hoppers. Using a feeding system with conveyor belts with weight control, the granule is directed to the shaping stage.

The piece is then shaped by unidirectional dry pressing. The shaped pieces are introduced into a continuous dryer to reduce their humidity, thus doubling or tripling their mechanical strength, which allows their subsequent processing.

The pieces that have just left the dryer are covered with one or more layers of slip and enamel. The decorative materials are manufactured in specialised companies, where part of the raw materials are subjected to a fritting process (melting of the raw materials and sudden cooling) obtaining insoluble glass.

The frits and the rest of the raw materials are mixed and ground and are applied to the tile using different techniques, such as bells and discs.

Firing is the most important stage of the production process of ceramic tiles, since it is the moment in which the pieces, previously moulded, undergo a fundamental change in their properties, resulting in a hard material that is resistant to water and chemicals. The product is fired in single-layer roller kilns.

Once fired, additional mechanical treatments are applied to the pieces that require it, with the aim of giving it certain characteristics. The most common treatments are polishing (increasing the shine of the surface of the piece after subjecting it to an abrasion process) and grinding (mechanically treating the edges of the pieces so that there are no visible joints between the pieces when they are placed).

After passing the quality control processes, also called classification, the pieces are packed using cardboard, pallets and polyethylene. Once the pallet is formed, it is stored in the logistics area of the plant.

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.

Table 5. Product transport.

Table 5. Scenarios applied for transport of the product to the place of installation.		
Destination	Transport method	Percentage (%)
Spain	27-t truck	48
Europe	27-t truck	17
	Freighter	
Rest of the world	27-t truck	35
	Transoceanic freighter	
Total		100

Module A4 - Transport to the site.

Table 6. Transport to the site.

Scenario information	Unit (expressed per functional 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: 734 km Sea transport: 3,322 km
Use of the capacity (including unloaded returns)	53% for road transport and 100% for sea transport.
Apparent density of transported products	1.698 kg/m^3
Useful capacity factor (factor: = 1 or < 1 or ≥ 1 for products packaged in compressed or nested form)	0,2

Product installation and construction processes (A5).

Once the product is unpacked, it is installed. Based on the data obtained and in order to apply a real scenario, it has been established that the application of adhesive mortar (CaSO4) is required for the installation. Adhesive mortars are cementitious adhesives formed by a mixture of hydraulic binders, mineral fillers and organic additives, which only have to be mixed with water or liquid addition just before use. They are made up of a mixture of white or grey cement, mineral fillers of a siliceous and/or limestone nature and organic additives: water retainers, water-redispersible polymers, rheological modifiers, fibres, etc.

Module A5 - Installation

Table 7. Installation.

Scenario information	Unit (expressed per functional 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: 2,96E-01 kg Plastic: 1,78E-01 kg Wood: 1,88E-02 kg
Materials disposed of (classified by type) after waste is treated at the building plot.	Cardboard - incineration: 2,46-02 kg Cardboard - recycling: 2,50E-01 kg Cardboard - landfill: 2,10E-02 kg Plastic - incineration: 5,61E-02 kg Plastic - recycling: 6,63E-02 kg Plastic - landfill: 5,57E-02 kg Wood - incineration: 5,64E-03 kg Wood recycling: 6,78E-03 kg Wood landfill: 6,37E-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 CERÁMICA RIBESALBES, 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 is used once every two weeks, and 0.1 l of water is used to clean 1 m2 of ceramic floor tiles once a week.

Table 8. Use associated with the building's structure:

Scenario information	Unit (expressed per functional 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 time/week with water, and 1 time every two weeks with water and detergent
Auxiliary materials used during maintenance	0.1 l water/cycle (weekly) 0.134 ml detergent/ cycle (biweekly)
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
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 to the operation of the building.

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

Scenario information	Unit (expressed per functional unit)
Auxiliary materials, classified by type	Not applicable
Net consumption of fresh water	Not applicable
Type of energy vector, for example, natural gas,	Not applicable

Scenario information	Unit (expressed per functional unit)
urban heating	
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 regulation, 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 landfill, 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 End of Life waste management

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

Source: PCR –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 per functional unit)
Collection process, specified by type	0 kg collected separately
	17,51 kg collected, mixed with construction waste
Recovery system, specified by type	0 kg for re-use
	12,25 kg for recycling
	0 kg for energy recovery
Disposal, specified by type	5,25 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 boundaries

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. 1m² of Porcelain tile (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,02E+01	1,71E+00	1,06E+00	0,00E+00	6,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,34E-01	9,30E-03	3,29E-02	-1,81E-01
GWP-fossil	kg CO2 eq	1,03E+01	1,71E+00	1,00E+00	0,00E+00	8,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,34E-01	9,29E-03	3,29E-02	-2,87E-01
GWP-biogenic	kg CO2 eq	-1,07E-01	1,00E-04	5,75E-02	0,00E+00	-2,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,60E-05	3,61E-07	4,53E-06	1,11E-01
GWP-luluc	kg CO2 eq	7,96E-03	3,79E-04	3,08E-04	0,00E+00	5,17E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,91E-06	4,32E-06	1,69E-05	-4,09E-03
ODP	kg CFC11 eq	2,21E-07	3,25E-08	3,69E-09	0,00E+00	1,48E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,89E-09	8,76E-11	9,50E-10	-8,91E-09
AP	mol H+ eq	5,33E-02	1,97E-02	3,05E-03	0,00E+00	4,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,11E-04	6,39E-05	2,33E-04	-2,49E-03
EP-freshwater	kg P eq	1,13E-04	4,08E-06	1,40E-05	0,00E+00	4,36E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E-07	2,43E-07	3,23E-07	-6,50E-05
EP-marine	kg N eq	1,67E-02	4,97E-03	7,89E-04	0,00E+00	2,16E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,18E-05	2,09E-05	8,82E-05	-7,66E-04
EP-terrestrial	mol N eq	1,82E-01	5,53E-02	8,86E-03	0,00E+00	1,23E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,94E-04	2,29E-04	9,69E-04	-7,34E-03
POCP	Kg NMVOC eq	5,87E-02	1,69E-02	2,57E-03	0,00E+00	4,88E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-04	7,68E-05	3,47E-04	-2,18E-03
ADP-minerals& metals [2]	kg Sb eq	3,59E-05	7,44E-07	2,01E-06	0,00E+00	6,58E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,83E-08	1,75E-08	5,13E-08	-2,23E-06
ADP-fossil [2]	MJ	1,76E+02	2,31E+01	5,27E+00	0,00E+00	1,48E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,90E+00	1,09E-01	8,06E-01	-8,23E+00
WDP [2]	m³ depriv.	2,70E+00	3,14E-02	2,02E-01	0,00E+00	1,22E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,71E-03	2,89E-02	3,52E-02	-1,00E+00

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. 1m² of Porcelain tile (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	2,03E-07	2,88E-08	3,41E-08	0,00E+00	4,42E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,33E-09	1,52E-09	5,29E-09	-3,19E-08
IRP [1]	**kBq U235 eq**	3,90E-01	3,41E-03	6,53E-03	0,00E+00	2,47E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,53E-04	1,43E-04	1,99E-04	-1,41E-02
ETP-fw [2]	**CTUe**	2,37E+01	2,03E+00	1,81E+00	0,00E+00	1,78E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,09E-02	4,07E-02	1,10E-01	-3,57E+00
HTP-c [2]	**CTUh**	2,84E-08	3,61E-09	1,22E-09	0,00E+00	7,71E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,25E-10	8,49E-11	1,48E-10	-1,64E-09
HTP-nc [2]	**CTUh**	3,36E-08	3,07E-09	5,60E-09	0,00E+00	1,50E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,53E-10	5,20E-11	1,38E-10	-4,95E-09
SQP [2]	**-**	3,86E+01	1,39E+00	6,77E+00	0,00E+00	2,06E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,86E-02	1,84E-02	1,58E+00	-1,01E+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 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. 1m² of Porcelain tile (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	4,81E+00	1,14E-01	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,12E-03	1,74E-02	7,48E-03	-2,16E+00
PERM	MJ	2,75E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,56E+00	1,14E-01	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,12E-03	1,74E-02	7,48E-03	-2,16E+00
PENRE	MJ	1,92E+02	2,45E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,02E+00	1,16E-01	8,57E-01	-8,84E+00
PENRM	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,92E+02	2,45E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,02E+00	1,16E-01	8,57E-01	-8,84E+00
SM	kg	1,90E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	5,93E-02	1,02E-03	5,11E-03	0,00E+00	3,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,23E-05	6,98E-04	8,31E-04	-2,69E-02

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 nonrenewable 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. 1m^2 of Porcelain tile (Bla).

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,19E-03	1,43E-04	2,23E-05	0,00E+00	1,95E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,28E-05	5,05E-07	5,09E-06	-8,75E-05
NHWD	**kg**	1,64E+00	1,39E-02	1,42E-01	0,00E+00	5,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,86E-04	1,96E-04	5,25E+00	-2,69E-02
RWD	**kg**	2,57E-04	2,22E-06	4,19E-06	0,00E+00	1,76E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,70E-07	9,20E-08	1,25E-07	-1,02E-05
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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	**kg**	2,70E+00	0,00E+00	3,23E-01	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	1,23E+01	0,00E+00	0,00E+00
MER	**kg**	0,00E+00	0,00E+00	8,63E-02	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	0,00E+00	0,00E+00	0,00E+00
EE	**MJ**	0,00E+00	0,00E+00	8,78E-01	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	0,00E+00	0,00E+00	0,00E+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 product -- KgC	0,00E+00
Biogenic carbon content packaging - KgC	1,62E-01

6. Additional environmental information .

During the manufacturing process, ceramic tiles are subject to heat treatments at temperatures exceeding 1000ºC. 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 do not emit any compounds into the soil or water during their use stage, since it is a completely inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, nor does it react physically or 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 suposes 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.

The electricity mix has been calculated for the year 2023 according to CNMC data on the mix of marketing companies without Renewable Energy Guarantees of Origin (GoOs): 2.72E-01 $KgCO_2$ eq/kwh.

7. References

[1] General Instructions of the GlobalEPD Programme. Revision 3. 09-10-2023

[2] UNE-EN ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures (ISO 14025:2006).

[3] UNE-EN 15804:2012+A2:2020/AC:2021 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.

[5] UNE-EN ISO 14044. Environmental management. Life cycle assessment. Requirements and guidelines. 2006

[6] Life Cycle Assessment of the product Wall tile (BIII) by CERÁMICA RIBESALBES. December 2024. v1. (Unpublished).

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

[8] Handbook of Emission Factors for Road Transport (HBEFA). 4.2. 2022).

[9] Annex_C_Annex C to the PEF-OEF Methods V2.1_May2020.

ANNEXO 1. 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.

Tabla 16 . Potential environmental impacts. 1m² of Porcelain tile (Bla) , lower impact. 15X17,3 and 8,5 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	8,77E+00	1,47E+00	1,06E+00	0,00E+00	6,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E-01	7,97E-03	2,82E-02	-1,74E-01
GWP-fossil	kg CO2 eq	8,86E+00	1,47E+00	1,00E+00	0,00E+00	8,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E-01	7,96E-03	2,81E-02	-2,81E-01
GWP-biogenic	kg CO2 eq	-9,16E-02	8,57E-05	5,75E-02	0,00E+00	-2,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,08E-05	3,09E-07	3,88E-06	1,11E-01
GWP-luluc	kg CO2 eq	6,82E-03	3,25E-04	3,08E-04	0,00E+00	5,17E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,92E-06	3,70E-06	1,45E-05	-4,09E-03
ODP	kg CFC11 eq	1,89E-07	2,79E-08	3,69E-09	0,00E+00	1,48E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,48E-09	7,50E-11	8,14E-10	-8,85E-09
AP	mol H+ eq	4,57E-02	1,69E-02	3,05E-03	0,00E+00	4,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,81E-04	5,48E-05	1,99E-04	-2,45E-03
EP-freshwater	kg P eq	9,71E-05	3,50E-06	1,40E-05	0,00E+00	4,36E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,79E-07	2,08E-07	2,77E-07	-6,48E-05
EP-marine	kg N eq	1,43E-02	4,26E-03	7,89E-04	0,00E+00	2,16E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,29E-05	1,79E-05	7,55E-05	-7,53E-04
EP-terrestrial	mol N eq	1,56E-01	4,74E-02	8,86E-03	0,00E+00	1,23E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,95E-04	1,97E-04	8,30E-04	-7,20E-03
POCP	Kg NMVOC eq	5,02E-02	1,45E-02	2,57E-03	0,00E+00	4,88E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,58E-04	6,58E-05	2,97E-04	-2,14E-03
ADP-minerals& metals [2]	kg Sb eq	3,08E-05	6,38E-07	2,01E-06	0,00E+00	6,58E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,57E-08	1,50E-08	4,40E-08	-2,19E-06
ADP-fossil [2]	MJ	1,51E+02	1,97E+01	5,27E+00	0,00E+00	1,48E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,62E+00	9,32E-02	6,90E-01	-8,16E+00
WDP [2]	m³ depriv.	2,32E+00	2,69E-02	2,02E-01	0,00E+00	1,22E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,47E-03	2,48E-02	3,02E-02	-9,02E-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

Tabla 17. Additional environmental parameters. 1m² Porcelain tile (Bla) , lower impact. 15X17,3 and 8,5 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,74E-07	2,47E-08	3,41E-08	0,00E+00	4,42E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,14E-09	1,30E-09	4,53E-09	-3,11E-08
IRP [1]	**kBq U235 eq**	3,34E-01	2,92E-03	6,53E-03	0,00E+00	2,47E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,16E-04	1,22E-04	1,71E-04	-1,39E-02
ETP-fw [2]	**CTUe**	2,03E+01	1,74E+00	1,81E+00	0,00E+00	1,78E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,78E-02	3,49E-02	9,43E-02	-3,54E+00
HTP-c [2]	**CTUh**	2,44E-08	3,09E-09	1,22E-09	0,00E+00	7,71E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,07E-10	7,27E-11	1,27E-10	-1,59E-09
HTP-nc [2]	**CTUh**	2,88E-08	2,63E-09	5,60E-09	0,00E+00	1,50E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,31E-10	4,46E-11	1,18E-10	-4,90E-09
SQP [2]	**-**	3,31E+01	1,19E+00	6,77E+00	0,00E+00	2,06E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,45E-02	1,58E-02	1,36E+00	-9,98E+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 18. Use of resources. 1m² Porcelain tile (Bla) , lower impact. 15X17,3 and 8,5 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	3,73E+00	9,77E-02	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,10E-03	1,49E-02	6,41E-03	-2,16E+00
PERM	MJ	2,75E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,47E+00	9,77E-02	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,10E-03	1,49E-02	6,41E-03	-2,16E+00
PENRE	MJ	1,64E+02	2,10E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,73E+00	9,91E-02	7,34E-01	-8,75E+00
PENRM	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,64E+02	2,10E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,73E+00	9,91E-02	7,34E-01	-8,75E+00
SM	kg	1,63E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	5,08E-02	8,72E-04	5,11E-03	0,00E+00	3,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,33E-05	5,98E-04	7,12E-04	-2,45E-02

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 nonrenewable 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. (Bla) , lower impact. 15X17,3 and 8,5 mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,02E-03	1,23E-04	2,23E-05	0,00E+00	1,95E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,10E-05	4,33E-07	4,36E-06	-8,72E-05
NHWD	**kg**	1,40E+00	1,19E-02	1,42E-01	0,00E+00	5,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,45E-04	1,68E-04	4,50E+00	-2,62E-02
RWD	**kg**	2,20E-04	1,90E-06	4,19E-06	0,00E+00	1,76E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,45E-07	7,88E-08	1,07E-07	-1,01E-05
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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	**kg**	2,31E+00	0,00E+00	3,23E-01	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	1,05E+01	0,00E+00	0,00E+00
MER	**kg**	0,00E+00	0,00E+00	8,63E-02	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	0,00E+00	0,00E+00	0,00E+00
EE	**MJ**	0,00E+00	0,00E+00	8,78E-01	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	0,00E+00	0,00E+00	0,00E+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 product -- KgC	0,00E+00
Biogenic carbon content packaging - KgC	1,62E-01

ANNEX II Declaration of the environmental parameters of the LCA and the ICV for the MAXIMUM 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. Potential environmental impacts. 1m^2 Porcelain tile (Bla) maximum impact. 21x25 y 10,6mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,12E+01	1,88E+00	1,06E+00	0,00E+00	6,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,47E-01	1,02E-02	3,61E-02	-1,85E-01
GWP-fossil	kg CO2 eq	1,13E+01	1,88E+00	1,00E+00	0,00E+00	8,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,47E-01	1,02E-02	3,60E-02	-2,91E-01
GWP-biogenic	kg CO2 eq	-1,17E-01	1,10E-04	5,75E-02	0,00E+00	-2,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,95E-05	3,96E-07	4,97E-06	1,11E-01
GWP-luluc	kg CO2 eq	8,72E-03	4,16E-04	3,08E-04	0,00E+00	5,17E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,58E-06	4,73E-06	1,85E-05	-4,10E-03
ODP	kg CFC11 eq	2,42E-07	3,57E-08	3,69E-09	0,00E+00	1,48E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,17E-09	9,60E-11	1,04E-09	-8,95E-09
AP	mol H+ eq	5,84E-02	2,17E-02	3,05E-03	0,00E+00	4,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,32E-04	7,01E-05	2,55E-04	-2,52E-03
EP-freshwater	kg P eq	1,24E-04	4,47E-06	1,40E-05	0,00E+00	4,36E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,29E-07	2,67E-07	3,54E-07	-6,52E-05
EP-marine	kg N eq	1,83E-02	5,45E-03	7,89E-04	0,00E+00	2,16E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,77E-05	2,29E-05	9,67E-05	-7,74E-04
EP-terrestrial	mol N eq	2,00E-01	6,06E-02	8,86E-03	0,00E+00	1,23E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,61E-04	2,52E-04	1,06E-03	-7,44E-03
POCP	Kg NMVOC eq	6,43E-02	1,85E-02	2,57E-03	0,00E+00	4,88E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,58E-04	8,42E-05	3,80E-04	-2,21E-03
ADP-minerals& metals [2]	kg Sb eq	3,94E-05	8,16E-07	2,01E-06	0,00E+00	6,58E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,01E-08	1,92E-08	5,63E-08	-2,25E-06
ADP-fossil [2]	MJ	1,93E+02	2,53E+01	5,27E+00	0,00E+00	1,48E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,08E+00	1,19E-01	8,83E-01	-8,29E+00
WDP [2]	m^3 depriv.	2,96E+00	3,44E-02	2,02E-01	0,00E+00	1,22E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,88E-03	3,17E-02	3,86E-02	-1,07E+00

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. 1m^2 Porcelain tile (Bla) maximum impact. 21x25 y 10,6mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Incidence of diseases s	2,22E-07	3,16E-08	3,41E-08	0,00E+00	4,42E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,46E-09	1,66E-09	5,80E-09	-3,24E-08
IRP [1]	kBq U235 eq	4,28E-01	3,74E-03	6,53E-03	0,00E+00	2,47E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,77E-04	1,57E-04	2,18E-04	-1,42E-02
ETP-fw [2]	CTUe	2,60E+01	2,23E+00	1,81E+00	0,00E+00	1,78E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,96E-02	4,47E-02	1,21E-01	-3,59E+00
HTP-c [2]	CTUh	3,12E-08	3,96E-09	1,22E-09	0,00E+00	7,71E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,37E-10	9,31E-11	1,63E-10	-1,68E-09
HTP-nc [2]	CTUh	3,69E-08	3,37E-09	5,60E-09	0,00E+00	1,50E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,68E-10	5,71E-11	1,51E-10	-4,98E-09
SQP [2]	-	4,24E+01	1,52E+00	6,77E+00	0,00E+00	2,06E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,08E-01	2,02E-02	1,74E+00	-1,02E+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 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 22. Use of resources. 1m² Porcelain tile (BIa) maximum impact. 21x25 y 10,6mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	5,54E+00	1,25E-01	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,80E-03	1,91E-02	8,20E-03	-2,16E+00
PERM	**MJ**	2,75E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	**MJ**	8,28E+00	1,25E-01	7,74E-01	0,00E+00	6,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,80E-03	1,91E-02	8,20E-03	-2,16E+00
PENRE	**MJ**	2,10E+02	2,69E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,21E+00	1,27E-01	9,40E-01	-8,89E+00
PENRM	**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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	**MJ**	2,10E+02	2,69E+01	5,60E+00	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,21E+00	1,27E-01	9,40E-01	-8,89E+00
SM	**kg**	2,08E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	**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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	**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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	**m³**	6,50E-02	1,12E-03	5,11E-03	0,00E+00	3,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,83E-05	7,65E-04	9,11E-04	-2,84E-02

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 nonrenewable 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. 1m² Porcelain tile (Bla) maximum impact. 21x25 y 10,6mm thickness.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,30E-03	1,57E-04	2,23E-05	0,00E+00	1,95E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,40E-05	5,54E-07	5,58E-06	-8,78E-05
NHWD	**kg**	1,80E+00	1,52E-02	1,42E-01	0,00E+00	5,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,14E-04	2,15E-04	5,76E+00	-2,73E-02
RWD	**kg**	2,81E-04	2,44E-06	4,19E-06	0,00E+00	1,76E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,86E-07	1,01E-07	1,37E-07	-1,03E-05
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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	**kg**	2,96E+00	0,00E+00	3,23E-01	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	1,34E+01	0,00E+00	0,00E+00
MER	**kg**	0,00E+00	0,00E+00	8,63E-02	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	0,00E+00	0,00E+00	0,00E+00
EE	**MJ**	0,00E+00	0,00E+00	8,78E-01	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	0,00E+00	0,00E+00	0,00E+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 product -- KgC	0,00E+00
Biogenic carbon content packaging - KgC	1,62E-01

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