Environmental Product Declaration

In accordance with:
ISO 14025
UNE-EN 15804:2012+A2:2019 for:

GLAZED STONEWARE TILES

(BIIa classification based on EN 14411:2016)

of **KERABEN GRUPO, S.A.U**

IBERO

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1. Programme information

Programme:	The International EPD® System
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CEN standard EN 15804:2012+A2:2019 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products, version 1.1 C-PCR-002 Ceramic tiles (EN 17160:2019), version 2019-12-20
PCR review was conducted by: The Technical Committee of the International EPD®System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat. www.environdec.com/contact.
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Third party verifier: Accredited by: International EPD® System **Marcel Gómez Ferrer** **Marcel Gómez Consultoría Ambiental** (www.marcelgomez.com) Tlf 0034 630 64 35 93 Email: info@marcelgomez.com Approved by: The International EPD® System
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EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019. For further information about comparability, see EN 15804:2012+A2:2019 and ISO 14025

2. Company information

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Description of the organisation

KERABEN GRUPO, with more than 40 years of professional experience, is made up of a group of companies dedicated to the manufacture and marketing of ceramic products, special pieces and complementary activities. At Keraben Grupo we design and develop our products from the initial idea through to manufacture, using the latest ceramic technology and working meticulously and in detail on all aspects of the design, so that each piece has a unique graphic and texture.

Nowadays, Keraben is one of the world's leading ceramic groups. We produce a wide variety of wall and floor tiles in white paste, porcelain, porcelain stoneware, in different formats and styles. Our main objective is the creation of spaces with their own personality. To do this, we are committed to continuous improvement in all processes, for design, quality and proximity, values with which to guarantee the trust and satisfaction of customers, employees and suppliers.

Keraben Grupo, produces ceramic floor and wall tiles, which reach the market through its three main ceramic brands: Keraben, Metropol and Ibero. Our international growth has been based on two main pillars: an extensive and well-established distribution network and close collaboration with architects and interior designers. Nowadays, our products are available in over 120 countries.

Certification

Keraben Grupo has obtained the following certifications:

- ISO 9001: Quality Management System Registration number: ES-0256/1994 (Keraben Nules and Keraben L'Alcora's plants)

- ISO 14001: Environmental Management System Registration number S-2013/0361 (Keraben Nules)

- ISO 50001: Energy Management System. Registration number GE-2017/0023 (Keraben Nules)

- ISO 14064: Keraben calculates its carbon footprint since 2011 according to UNE EN ISO 14064.

Name and location of production sites

For the production of the glazed stoneware tiles included in this EPD, the following facilities are considered:

Cerámica Saloni
Carrer de l'Alcora, Km 17, 12130 Sant Joan de Moró, Castelló

3. Product information

Product name

Glazed stoneware tiles

UN CPC code

373 Refractory products and structural nonrefractory clay products

Product identification

The 3 ceramic sizes included in this EPD covers the ceramic tiles pertaining group BIIa (glazed stoneware tiles), classification based on EN 14411:2016 (equivalent to ISO13006:2018), this is their water absorption is between 3% and 6% and its forming is by pressing.

The glazed stoneware tiles included in the study cover different models with different formats. The thickness formats included in the scope of this EPD are from 8mm (16.9 kg/m^2) to 8.8mm (18.8 kg/m^2), with an average weight of 18.4kg/m^2.

Product technical features

The function of the product is to cover surfaces. In this study the environmental behaviour of the glazed stoneware tiles as indoor house surface covering has been assessed, however, the versatility of these pieces allows them to be installed in other places, such as offices, stores, hospitals, etc, in indoor and outdoor environments, as well as covering walls and other surfaces.

The product meets requirements defined by the EN 14411:2016 standard and ISO 13006 Annex J. Hereafter, a table with principal properties is presented.

Requirements			Values
Part 2	Lenght for non-rectified	Deviation W	± 2 mm
	Lenght for rectified		± 1 mm
	Thickness	Deviation W	± 0,5 mm
	Straightness of sides non-rectified		± 1,5 mm
	Straightness of sides rectified		± 0,8 mm
	Rectangularity non-rectified		± 2 mm
	Rectangularity rectified		± 1,5 mm
	Flatness central: non-rectified		± 2 mm
	Flatness central: rectified		± 1,8 mm
	Flatness side: non-rectified		± 2 mm
	Flatness side: rectified		± 1,8 mm
	Flatness: warpage non-rectified		± 2 mm
	Flatness: warpage rectified		± 1,8 mm
	Surface quality	95%	Complies
Part 3	Determination of water absorption, apparent porosity, apparent relative density and bulk density		3%<E_v≤6% (máx. 6.5%)
Part 4 Determination of modulus of rupture and breaking strength	Modulus of rupture > 7,5 mm		≥ 1000
	Breaking strength N/mm^2		≥ 22
Part 5	Determination of impact resistance by measurement of coefficient of restitution	Value informed	Resist
Part 6	Determination of resistance to deep abrasion for unglazed tiles		≤ 345 mm
Part 7[1]	Determination of resistance to surface abrasion for glazed tiles	Declarar clase y nº rev	PEI 3 (750 rev)
Part 8	Determination of linear thermal expansion	Value informed	Complies
Part 9	Determination of resistance to thermal shock		Complies
Part 10	Determination of moisture expansion	Value informed	Complies
Part 11	Determination of crazing resistance for glazed tiles		Complies
Part 12	Determination of frost resistance		Complies
Part 13 Determination of chemical resistance	Acids and bases low concentrations	Value informed	Mínimo B
	Acids and bases high concentrations	Value informed	Mínimo B
	Household products and swimming pools	Value informed	Mínimo A
Part 14 Determination of resistance to stains	GL Stains	Mín. 3	Mínimo 3
	UGL Stains	Value informed	Mínimo 3
Part 15[2]	Determination of lead and cadmium given off by glazed tiles	Value informed	NPD
Slipping	DIN 51130	Mín.R9	Complies
	ENV 12633	Mín. Class 1 (Class 3 Rd between 50 a 60)	Complies
	COF / DCOF	> 0,6 / > 0,4	Complies
	XP P05 010	Mín. PC6 Mín. PN12	Complies

4. LCA information

Functional unit / declared unit

To cover 1 m^2 of a surface (flooring) of a residential area for 50 years with glazed stoneware tiles (18.4kg/m^2 of weight).

Reference service life

The Reference Service Life (RSL) of the product is the same as that of the building where it is installed provided that it is installed correctly, as it is a durable product which does not require substitution. A Reference Service Life of 50 years has been considered.

Parameter	Result (expressed per functional unit)
Reference Service Life	Minimum 50 years
Declared product properties (on gate), coatings, etc.	Minimum values of the relevant characteristics according to Annex J of the EN 14411 standard. For more information request technical data sheets according to model.
Design parameters of the application (manufacturer's instructions), including references to good practices.	For more information request technical data sheets according to model.
Estimated quality of work, when installed according to the manufacturer's specifications	For more information request technical data sheets according to model.
Estimation of the quality of work, when installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc.	Minimum values of the relevant characteristics according to Annex J of the EN 14411 standard. For more information request technical data sheets according to model.
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	Minimum values of the relevant characteristics according to Annex J of the EN 14411 standard. For more information request technical data sheets according to model.
Conditions of use, e.g.: frequency of use, mechanical exposure, etc.	For more information request technical data sheets according to model.
Maintenance, e.g.: required frequency, type and quality and replacement of replaceable components	For more information request technical data sheets according to model.

Representativeness, quality and selection of data

The raw data has been directly provided by Keraben Grupo and this data corresponds to three production centres of the enterprise property. For the secondary data, the most updated GaBi ts databases have been used and modelled with GaBi version 10.5.1.128. All data belong to a geographical scenario of Spain 2020.

The results presented are representative of ceramic coverings, expressed as average values weighted by the production of the ceramic coverings pertaining BIIa group.

Time-related coverage

The manufacturer’s specific data represented a full year and were less than 5 years old. Specifically, the most recent stable data of the analysed product manufacturing plant were used (data relating to the year 2020).

Geographic coverage

Wherever possible, data were used relating to the country in which the process at issue was developed or, when this was not possible, regional or global data were applied.

Technological coverage

The data used reflected the technological reality of the system analysed.

Database(s) and LCA software used

- GaBi database: Database for Life Cycle Engineering. SpheraSolutions Upgrade 2021.2 Edition (February 21, 2021 - SP 40).
- GaBi v 10 software-system. SpheraSolutions. Compilation 10.5.1.128
- Ecoinvent v 3.7.1

Description of system boundaries

Cradle to grave and module D (A + B + C + D)

Allocation and cut-off rules

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non -renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data. The principle of modularity in the allocation of environmental loads, i.e. that they apply where they occur, and the "polluter pays" principle have been followed.

The excluded data are the following:

- Diffuse particle emissions to the atmosphere during the transportation and storage of powdery nature raw materials.
- Non-regulated channel emissions generated during combustion stages (spray drying, piece drying and firing).
- The recycling and reutilization of the residues generated during the life cycle of the ceramic coverings according to PCR. However, the recycling process of the residues and the benefits obtained from this recycled will be quantified in module D.
- Waste management and transport to landfill have not been included in glaze manufacturing.
- Machinery and industrial equipment production.
- Long-term emissions have not been considered.

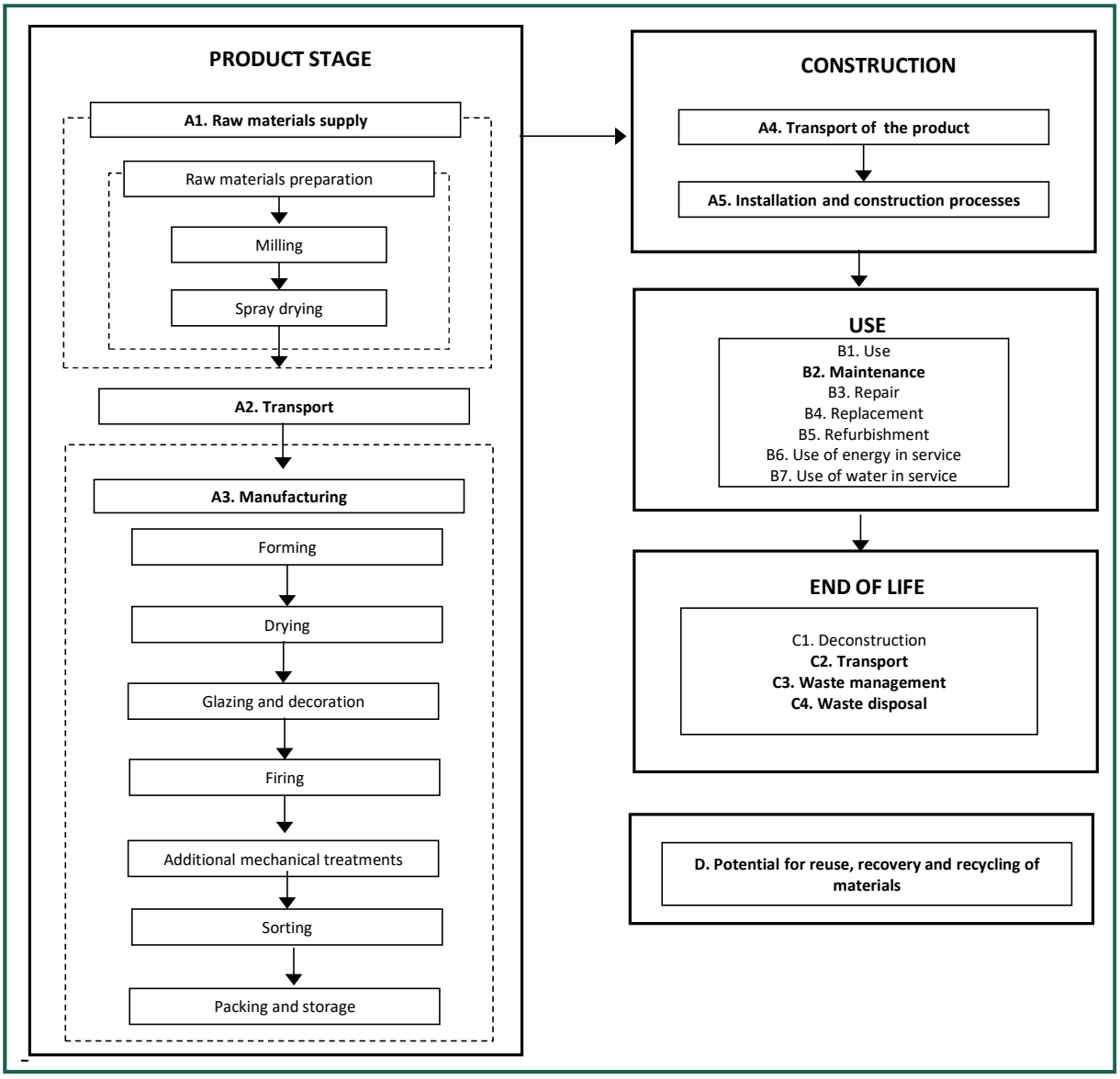
Furthermore, allocations have been made on a production-weighted average basis, both in mass and in m^2 of rated output.

Electric mix

Renewables: 6%; Nuclear: 39.3%; Fossil: 58.2%. *(Spanish Residual Mix 2020, CNMC)*

Climate impact of electricity production: 0.098kg CO_2 eq./MJ

System diagram



Environmental impact methodologies

The selected impact categories and flow indicators, the applied impact assessment methods and the characterisation factors used were those recommended by standard EN 15804:2012+A2:2019 included in the Environmental Footprint method. The applied characterisation factors were those available at the following Web link: https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml .

A1-A3 Product Stage

Raw materials supply and transport (A1 y A2)

The raw materials required for the ceramic tiles manufacturing are classified as: plastic raw materials and non-plastic or degreasing raw materials. Specifically, the raw materials included in the composition of the support are clays, feldspars and sands, as well as waste from the factory itself, which can be sludge or ceramic pieces generated before and after the firing stage, introduced in the grinding stage of the raw materials.

Regarding glaze raw materials, the most used in the formulation are the following ones: quartz, kaolin, alkaline feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits.

The ceramic frits are insoluble glasses, prepared in an external company by complete fusion of their original raw materials, called “frits”. It is estimated that around 35% of the raw materials used in the glaze applied on glazed stoneware tiles are submitted to fritting process.

The raw materials used have different origins according to their nature and properties. The raw materials coming from outside Spain are transported by freighter to the port of Castelló, and from there by truck to the production plants. For sea transport the freighter selected is a transoceanic one, whose distance traversed depends on the origin of each case, whereas for road transport a 27t truck which meets the Euro6 standard has been chosen. All raw materials are transported in bulk, that is, they do not require packaging material, except the decoration materials which are transported in a 17.3t payload truck, from the frits and glaze factory to Keraben Grupo plants.

The preparation of raw materials for the ceramic body of Keraben Grupo ceramic tiles is carried out in the factories of the spray-dried granule suppliers and in in the group's own plants. In this process, the proportion of raw materials is defined and their origin is adjusted to the characteristics of the production process and the final performance required.

The spray-dried granules are obtained by wet milling of the raw materials and subsequent spray drying. Keraben Grupo supplier companies have installed heat and power cogeneration systems in their spray dryers. All hot gases are used in the spray dryer and the electricity generated is partly used in the production process, thus reducing the electrical requirements of the grid, and partly sold to the grid.

Once the spray – dried granule has been obtained, it is transported to the manufacturing plants.

Manufacturing (A3)

This process and the following treatments applied to the tiles are carried out in Keraben Grupo facilities. The procedure is the following: the spry-dried powder is discharged in storage hoppers and with a feed system based in conveyor belts with weight control, this granule is sent to the forming stage by uniaxial dry pressing, carried out by hydraulic or oleodinamic presses. This is the most indicated method to control the pressing cycle.

The pieces formed are placed in a continuous dryer to reduce their humidity, duplicating or triplicating their mechanical resistance, which allows for their subsequent processing.

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, which are applied over the ceramic body through spraying and digital glaze techniques. This treatment is used to confer the product surface a series of technique and aesthetic features, as impermeability, ease of cleaning, brightness, colour, superficial texture, chemical and mechanical resistance.

Firing is the most important stage of the ceramic tiles production process, as it is when the pieces, previously shaped, experience a fundamental modification of their features, resulting in a tough, water and chemical resistant product. The ceramic pieces are subject to a single firing single-deck roller kiln.

Once the piece is fired, in some cases mechanical treatments such as polishing, cutting, etc. are applied to provide new effects. Polishing is controlled removal operation of the surface layer of ceramic pieces and is carried out to give them a bright surface and a high-quality aesthetic appearance. The cutting phase is necessary to transform the big pieces into the format requested by customers.

Once the quality controls are met, the classified pieces are packaged in primary cardboard packs and wood pallets. Finally, they are covered with film LDPE.

A4-A5 Construction Process Stage

A4 Transport

Product distribution is as follows: 29% in Spain, 37% in Europe and 34% to the rest of the world.

For road transport, a 27t truck classified Euro 6 has been considered (national transport and European, average distance of 300km and 1390km, respectively). For transcontinental transport, an average transoceanic freighter has been estimated (transport to the rest of the world, 6520km), as indicated in EN 17160.

Parameter	Result (expressed per functional unit)
Fuel type and consumption	According to the destinations in the distribution as described above: 0.27 l diesel (truck Euro 6, 27 t) 0.038l fueloil (freighter)
Distance	300 km national distribution: 29% 1390 km European distribution: 37% 6520 km rest of the world distribution: 34%
Capacity utilisation (including no-load return)	85% in truck 100% freighter
Bulk density of transported products	≈1800kg/m^3

A5 Product installation and construction process

Once the product is unpacked, it is installed. According to the PCRs for ceramic tiles, it has been established that the application of mortar is required for installation.

Glue mortars are cementitious adhesives consisting of a mixture of hydraulic binders, mineral fillers and organic additives, which only need to be mixed with water or liquid addition just before use. They consist of a mixture of white or grey cement, mineral fillers of siliceous and/or limestone nature and organic additives: water retaining agents, water re-dispersible polymers, rheology modifiers, fibres, etc.

The waste derived from the packaging of the pieces is managed separately according to the geographical location of the installation site. Otherwise, 3% of product losses have been considered at the installation stage.

Parameter	Result (expressed per functional unit)
Supplementary materials for installation	3.3 kg
Water use	0.8 l
Use of other resources	Not applicable
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Not applicable
Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)	Product losses: 552g Packaging wastes: - Cardboard: 143 g - Plastic: 38g - Wood: 626 g
Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route)	Product losses for recycling: 387g Product losses for final deposition:166g Cardboard for incinerating: 1g Cardboard for recycling: 142g Cardboard for final deposition: 0 g Plastic for incinerating: 4 g Plastic for recycling: 29g Plastic for final deposition:5 g Wood for incinerating: 152g Wood for recycling: 459g Wood for final deposition: 14 g
Direct emissions to ambient air, soil and water	Not applicable

B1-B7 Use Stage

B1 Use

Once installed, the tiles do not require any energy input for their use, nor do they require maintenance after installation, except for normal cleaning operations. For this reason, of all the aforementioned modules, only the environmental loads attributable to product maintenance (module B2) are considered.

B2 Maintenance

Cleaning is done with a damp cloth and, if the surface is dirty or greasy, cleaning agents such as detergents or bleaches can be used. In this study, water and disinfectant consumption has been considered for a floor covering installed in a residential scenario, i.e. cleaning once a week with water and once every two weeks with detergent during the 50-year life span.

Parameter	Result (expressed per functional unit)
Maintenance process	According to RCP for ceramic tiles (EN17160) residential floor cleaning scenario
Maintenance cycle	Washing once a week with water and once every two weeks with detergent.
Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)	Detergent: 1.34E-04 kg/m^2
Material wastage during maintenance (specify type)	Not applicable
Net tap water consumption	0.1 l/m^2
Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant	Not applicable

B3-B4-B5 – Repair, replacement and refurbishment

The tiles do not require repair, replacement or renovation

B6-B7 – Operational energy use and Operational water use

These modules are not relevant for ceramic tiles

C1-C4 End of Life Stage

C1 Deconstruction and demolition

At the end of its service life, the product will be removed, either as part of a building renovation or during demolition. In the context of the demolition of a building, the impacts attributable to the removal of the product are negligible.

C2 Transport

The product waste is transported in a heavy-duty truck (27 t) that complies with Euro 6 standards to be managed either by deposition in inert landfills or recycling. An average distance of 50km from the building site to the destination is considered. Also included is the return of the trucks (100% empty return).

C3 Waste management for reuse, recovery and recycling

It has been estimated that 70% of tiles are recycled and/or reused, as indicated in the PCR.

C4 Final disposal

It is estimated that 30% of the product is sent to controlled landfill after the end of its service life.

Parameter	Result (expressed per functional unit)
Collection process, specified by type	21.7 kg/m^2
Recovery system, specified by type	15.2 kg recycled as filler material
Disposal, specified by type	6.5 kg to controlled landfill
Assumptions for scenario development (e.g.: transport)	The product waste is transported in a heavy-duty truck (27 t) that complies with Euro 6 standards to be managed either by deposition in inert landfills or recycling. An average distance of 50km from the building site to the destination is considered. Also included is the return of the trucks (100% empty return).

Module D Potential environmental benefits and burdens of reuse, recovery and recycling activities

The environmental burdens and benefits of obtaining secondary material from waste generated at the manufacturing stage (waste such as cardboard, plastic and wood), at the installation stage (product losses, tile packaging waste: cardboard, plastic and wood) and at the end of life of the product have been considered.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational	Operational	De-construction	Transport	Waste	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	ES			EU													EU
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-9%/+5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-7/+5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

5. Content information

Product components		Weight (%)	Post-consumer material, weight-%	Renewable material, weight-%
CERAMIC'S BODY	Clay, feldspar, kaolin, sand, etc	94%	0%	0%
GLAZE	Borates, feldspar, clay, etc	6%		0%
INKS		0.3%		
	TOTAL	**100%**	**0%**	**0%**

The substances contained in the product listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" do not exceed 0.1% by weight of the product.

6. Biogenic carbon content

As required by standard EN 15804:2012+A2:2019, the carbon content of both the product and its packaging was separately declared. In the case of the product at issue, ceramic tiles, the tile components were inorganic, so that the biogenic carbon calculation did not apply.

In regard to the packaging used for tile distribution, its mass was less than 5% of the total product mass, so that the declaration of packaging biogenic carbon content was omitted. The mass percentage of the packaging used was declared for each type of studied tile in the following table.

Packaging materials	Weight, kg/m^2	Weight-% (versus the product)
Cardboard	0.143	0.7%
Plastic	0.038	0.2%
Wood	0.626	3%

7. Environmental Information

The results refer to 1 m^2 of a surface (flooring) of a residential area for 50 years with glazed stoneware tiles (18.4kg/m^2 average weight).

The results of the Life Cycle Impact Assessment are relative expressions and do not predict final impacts by category, threshold exceedances, safety margins or risks.

Potential environmental impact – mandatory indicators according to EN 15804:2012+A2:2019

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3-B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	8.85E+00	8.24E-01	1.17E+00	0	2.36E-01	0	0	1.03E-01	0	1.06E-01	-1.87E-01
GWP-fossil	kg CO_2 eq.	8.99E+00	8.39E-01	1.20E+00	0	3.09E-01	0	0	1.05E-01	0	1.08E-01	-1.93E-01
GWP-biogenic	kg CO_2 eq.	5.63E-02	-7.11E-04	5.48E-04	0	2.53E-03	0	0	-1.34E-04	0	1.13E-03	-3.92E-04
GWP-luluc	kg CO_2 eq.	4.24E-03	5.73E-03	8.98E-04	0	2.43E-05	0	0	8.62E-04	0	4.61E-04	-5.31E-04
GWP-total	kg CO_2 eq.	9.05E+00	8.44E-01	1.20E+00	0	3.12E-01	0	0	1.06E-01	0	1.09E-01	-1.94E-01
ODP	kg CFC 11 eq.	2.76E-08	1.04E-16	8.28E-10	0	1.11E-07	0	0	1.35E-17	0	6.10E-14	-3.96E-09
AP	mol H^+ eq.	1.36E-02	5.75E-03	2.34E-03	0	2.65E-03	0	0	8.51E-05	0	7.86E-04	-7.17E-04
EP-freshwater	kg P eq.	7.18E-05	2.11E-06	3.47E-06	0	6.63E-06	0	0	3.13E-07	0	2.26E-06	-1.74E-06
EP-freshwater	kg PO_4^{3-} eq.	2.20E-04	6.48E-06	1.06E-05	0	2.04E-05	0	0	9.61E-07	0	6.94E-06	-5.34E-06
EP-marine	kg N eq.	4.22E-03	1.53E-03	7.79E-04	0	2.95E-04	0	0	2.32E-05	0	2.17E-04	-2.14E-04

[1] The indicator includes all greenhouse gases included in GWP-total, excluding biogenic carbon dioxide and product biogenic carbon emissions. This indicator is equivalent to the GWP indicator defined in UNE-EN 15804:2012+A2:2019

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3-B7**	**C1**	**C2**	**C3**	**C4**	**D**
EP-terrestrial	mol N eq.	4.67E-02	1.70E-02	8.51E-03	0	1.08E-02	0	0	2.86E-04	0	2.31E-03	-2.33E-03
POCP	kg NMVOC eq.	1.27E-02	4.38E-03	2.24E-03	0	1.96E-03	0	0	7.94E-05	0	6.32E-04	-5.55E-04
ADP-min&met[2]	kg Sb eq.	5.76E-05	5.75E-08	1.77E-06	0	1.03E-08	0	0	8.02E-09	0	1.11E-08	-7.99E-08
ADP-fossil[2]	MJ	1.50E+02	1.10E+01	9.87E+00	0	1.58E+00	0	0	1.40E+00	0	1.42E+00	-2.03E+00
WDP	m^3	1.66E+00	6.29E-03	1.41E-01	0	1.72E+01	0	0	9.15E-04	0	8.13E-03	-5.07E-02
Acronyms	**GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential. Accumulated Exceedance; **EP-freshwater** = Eutrophication potential. Fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential. Fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential. Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential. deprivation-weighted water consumption											

[2] *The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Use of resources

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.18E+01	5.26E-01	1.90E+00	0	5.86E+00	0	0	7.82E-02	0	1.66E-01	-3.01E+00
PERM	MJ	6.45E+00	0	0	0	0	0	0	0	0	0	0
PERT	MJ	2.82E+01	5.26E-01	1.90E+00	0	5.86E+00	0	0	7.82E-02	0	1.66E-01	-3.01E+00
PENRE	MJ	1.50E+02	1.10E+01	9.87E+00	0	1.58E+00	0	0	1.40E+00	0	1.42E+00	-2.03E+00
PENRM	MJ	1.59E+00	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1.52E+02	1.10E+01	9.87E+00	0	1.58E+00	0	0	1.40E+00	0	1.42E+00	-2.03E+00
SM	kg	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	2.62E-02	6.05E-04	2.76E-03	0	2.22E-01	0	0	8.96E-05	0	2.70E-04	-2.32E-03
Acronyms	**PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used as raw materials; **PENRT** = Total use of non-renewable primary energy re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRS**F = Use of non-renewable secondary fuels; **FW** = Use of net fresh water											

Waste production and output flows

Waste production

Results per functional unit											
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3-B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.51E-03	4.83E-10	4.53E-05	0	4.40E-11	0	0	7.07E-11	0	2.25E-08	-3.34E-08
Non-hazardous waste disposed	kg	5.91E+00	1.56E-03	4.44E-01	0	6.29E-02	0	0	2.09E-04	0	6.58E+00	-1.72E-03
Radioactive waste disposed	kg	4.23E-03	1.32E-05	3.13E-04	0	1.94E-05	0	0	1.70E-06	0	1.94E-05	1.95E-04

Output flows

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3-B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	2.55E-02	0	6.64E-01	0	0	0	0	0	1.52E+01	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy. electricity	MJ	0	0	0	0	0	0	0	0	0	0	0
Exported energy. thermal	MJ	0	0	0	0	0	0	0	0	0	0	0

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