GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

AENOR
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Ceramic tiles. Tile (classification BIII according to UNE-EN 14411: 2016)

Environmental Product Declaration

EN ISO 14025:2010

EN 15804:2012+A1:2013

EN 17160:2019

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ARGENTA
We ♥ friendlytile

ARGENTA CERÁMICA, S.L.

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

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

EN 17160:2019 European Standard EN 15804:2012+A1:2013 serves as the basis for PCR
Independent verification of the Declaration and data, according to EN ISO 14025:2010 ☐ Internal ☑ **External**
Verification body AENOR Confía

1 General Information

1.1 The organization

Argenta Cerámica has been gradually developing its own identity, positioning itself worldwide in one of the priority places of the current ceramic scenario.

It all began in 1999 as an entrepreneurial adventure, young, dynamic and eager to develop a concept in ceramics different from the current one and close to people. With the #Friendlytile concept, a long-term project was born, where we want to share ideas and be closer to you. Talk about ceramics working from people and towards people, in a moment where brand values are humanized to give way to a more direct, lively and real communication.

1.2 Scope of the Declaration

This Environmental Product Declaration includes environmental information from a group of products manufactured by a single manufacturer, ARGENTA, in two adjacent production sites of its property located in Onda (Castellón), in a geographical and technological coverage of Spain 2019.

The results shown the environmental behavior of an average tile, weighted by production, as well as the environmental data of the tiles that have a minimum and a maximum impact, thus limiting the results obtained in the ACV. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

1.3 Lifecycle and compliance

This EPD has been developed and verified in accordance to UNE-EN ISO 14025:2010, EN 15804:2012+A1:2013 and EN 17160:2019 (Product category rules for ceramic tiles).

This Declaration may not be comparable to declarations developed in other programs or using different reference documents, especially when such declarations have not been developed and verified in accordance with UNE-EN 15804 +A1. Similarly, EPDs may not be comparable if the source of the data is different (e.g. databases), not all relevant information modules are included, or 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 building level (or architectural or engineering work), that is, including the behavior 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

9 commercial formats of the ceramic tiles included in this study belong to BIII group (tile), classification based on UNE-EN 14411:2016 (equivalent to ISO 13006:2018), that is, they have a water absorption greater than 10% and have been formed by pressing. Its common name is tile.

The tiles included in this study have different models with different formats. Specifically, the formats included within the scope of this EPD have a thickness that varies between 7.4 mm to 10.8mm, with an average weight of 15.5 kg / m2.

In the annexes, it can be found the results of the formats included in the scope of this EPD that shown the minimum and maximum environmental impact, corresponding to the formats 25x50cm of 7.4mm thickness and 40x120cm of 10.8mm thickness respectively. The CPC code of the product is 37310.

2.2 Product perfomance

The function of the product is to coat surfaces. In this study, the environmental performance of the stage of use of the tile as wall cladding inside a home, however, the versatility of these pieces allows them to be installed in other places, such as offices, shops, hospitals, etc.

2.3 Product composition

None of the constituents of the final product is included in the Candidate List of Substances of Very High Concern subject to Authorisation.

Table 1. Main components of the product

Substance		Content
SUPPORT	Clay, feldspars, sands, kaolin and ceramic waste (fireed and unfireed)	95%
DECORATION	Feldspars, carbonates, quartz, silicates, kaolins, zirconium oxides, clays, alumina, zinc oxide, etc.	5%

3 LCA Information

3.1 Life-cycle analysis

The Life Cycle Analysis (LCA) on which this EPD is based has been elaborated from data provided directly by the manufacturer ARGENTA CERÁMICA, S.A.

The life cycle assessment (LCA) on which this declaration is based has been carried out following ISO 14040 and ISO 14044 standards as well as PCRs for ceramic tiles (EN 17160).

The ACV has been carried out with the support of the GaBi software 10.0.0.71 (5) and with the database version 2020.1 (SP40.0) (6) (SpheraSolutions). The characterization factors used are those included in the EN 15804:2012+A1:2013.

3.2 Functional or declared unit

The functional unit considered is **"To cover 1 m2 of a surface (cladding) of a house for 50 years with tile".**

3.3 Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, since it is a long-lasting product and does not require substitution. It has been considered a reference service life of 50 years. (See Table 2).

Table 2 Reference service life

Parameter	Result (expressed by functional unit)
Reference lifespan	Minimum 50 years
Declared properties of the product (at door), finishes, etc.	Minimum values of the relevant characteristics according to Annex L of the UNE-EN 14411. For more information request technical data sheets according to model
Application design parameters (manufacturer's instructions), including references to good practice	For more information request technical data sheets according to model
Estimation of the of work, when installed according to the manufacturer's instructions	For more information request technical data sheets according to model.
Outdoor environment (for outdoor applications), e.g.. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature	Results of the values of the relevant characteristics according to Annex L of the UNE-EN 14411 standards. For more information, click-on technical data sheets according to model.
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	Results of the values of the relevant characteristics according to Annex L of the UNE-EN 14411 standards. For more information, request technical data sheets according to model.
Conditions of use, e.g. frequency of use, mechanical exposure	For more information, request technical data sheets according to model.
Maintenance, e.g.. frequency required, type and quality and replacement of replaceable components	For more information, request technical data sheets according to model.

3.4 Allocation and cutt-off criteria

In this cradle-to-grave analysis, a cut-off criterion of 1% has been applied for energy use (renewable and non-renewable) and 1% of the total mass in those unitary processes whose results are insufficient. In total, more than 95% of all matter and energy inputs and outputs the system have been included, excluding those data not available or not quantified.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of raw materials of a powdery nature.
- Atmospheric emissions of pollutants, not regulated, emitted from channeled focus of the combustion steps (spray drying, drying of parts and firing).
- The process of recycling and reuse of the waste generated throughout the life cycle of the ceramic coatings that will be part of another system, based on PCR. However, the waste recycling process and the benefits obtained from this recycling will be accounted in module D.
- The production of some auxiliary materials used in the production of tiles: polishing wheels, etc., representing less than 0.01% in total mass. The management of its waste has not been included either.
- For the manufacturers of atomizing and glazes, it has not been considered: the production of the auxiliary materials used; the management of the waste generated and its transfer to landfill. They represent a % less than the established cut-off rule.
- The production of machinery and industrial equipment due to the difficulty in inventing all the goods involved, and also because the LCA community considers that the environmental impact per unit of product is low in relation to the rest of the products that are included. In addition, the databases used do not include these processes, so their inclusion would require additional effort outside the scope of the study.
- Consumption of auxiliary materials and waste generated by suppliers of glaze and atomized powder.

3.5 Data representativeness, quality and selection

The primary data have been provided directly by the company ARGENTA corresponding to two production centers of its property. The secondary data, the GaBi ts 2020 databases have been used.1. (SP40.0) [6] and modeled with GaBi version 10.0.0.71 [5]. All data belong to a geographical coverage of Spain 2019.

The results presented are representative of ceramic coatings, expressed as a weighted average to produce ceramic coatings belonging to group BIII, limiting this average by the products they present the minimum and maximum environmental impact.

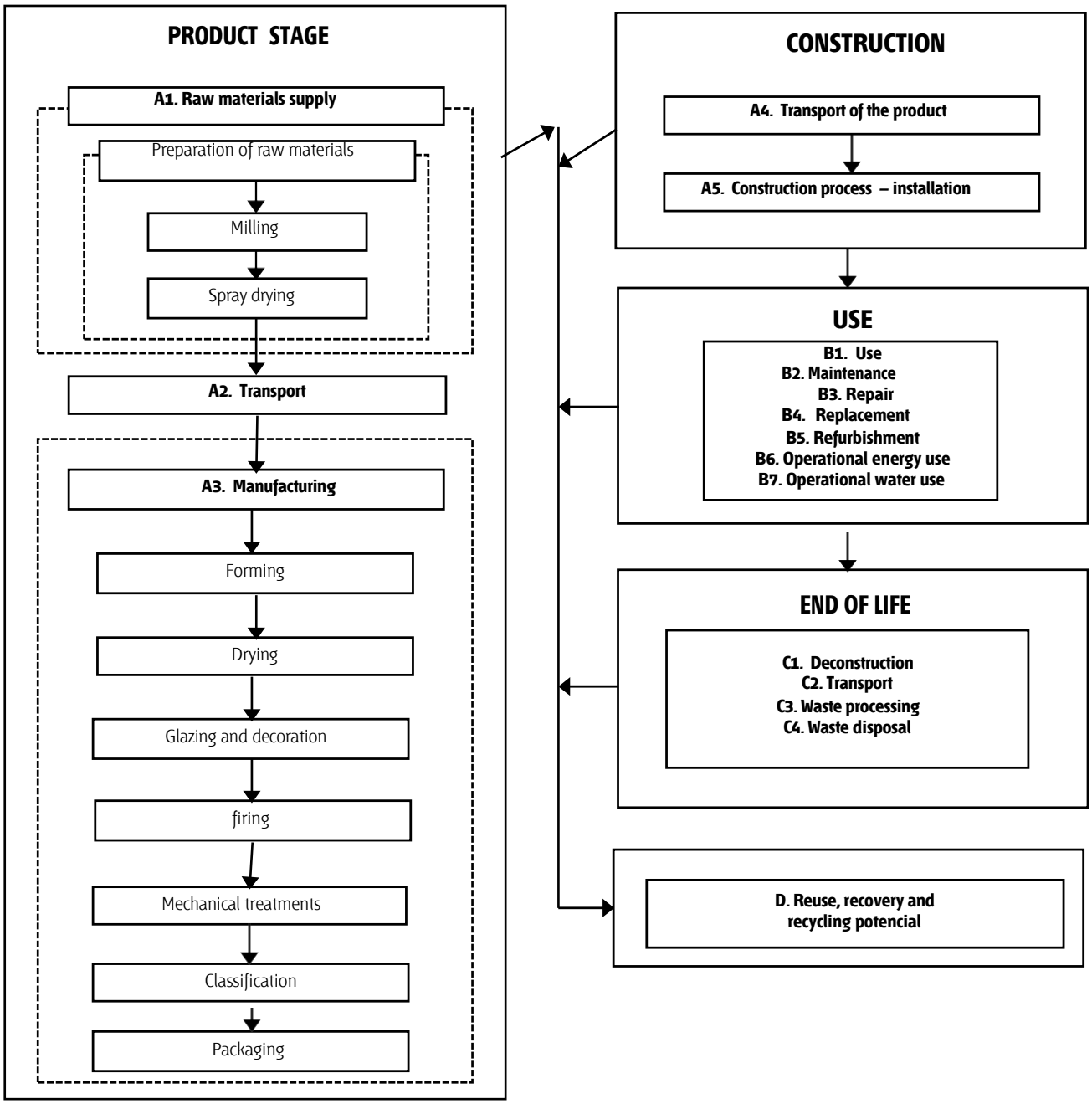
3.6 Other calculation rules and assumptions

The load assignments applied have been the necessary to be able to quantify the specific data for this type of ceramic tiles, as well as the necessary calculations to be able to assign the data associated with the products that have a minimum and maximum environmental impact.

4 System boundaries, scenarios, and additional technical information

All life cycle modules relevant to ceramic coatings according to PCR have been included.

Limits of the system a studied



The included modules are presented in the following table.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		STAGE OF USE							END-OF-LIFE STAGE				D
Extraction of raw materials	Transport	Manufacturing	Transport from factory door to the construction site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction Demolition	Transport	Waste processing	Disposal	Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	NO	X	NO	NO	NO	NO	NO	NO	X	X	X	X

*NR: Module No Relevant.

4.1 Upstream processes and product manufacturing

Raw materials *(A1 and A2)*

Raw materials necessary for the manufacture of ceramic tiles are classified as: plastic raw materials and non-plastic or degreasing raw materials. Specifically, the plastic materials included in the composition of the support are slabs, feldspars and sands, as well as waste from the factory itself, which can be sludge or pieces of raw or fireed pot, being introduced in the milling stage of the raw materials.

For the raw materials of the glazes, the most common used in the formulation are quartz, kaolin, borax, alkaline feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits.

Ceramic frits are insoluble glasses, previously prepared by complete fusion of their original raw materials, called "frits". It has been estimated on average that 67% of the raw materials used in the glazes applied to the tile sheets are subjected to the "friting" process for the tile.

The raw materials used have different origins, according to their nature and properties. Raw materials from outside Spain are transported by freighter to the port of Castellón, and from there by truck to the production plants of atomized powder. For transport by sea, a type of transoceanic freighter has been chosen, which distance traveled differs in each case depending on the origin, while for road transport a 27t cargo truck has been chosen that complies with the regulation's Euro 6. All raw materials are transported in bulk, i.e. they do not require packaging material, except for decorative materials which are transported in a 17.3 t payload truck directly from the frit and glaze factory to Argenta plants.

The preparation of raw materials for the support of ARGENTA ceramic tiles is carried out in the factories of the suppliers of atomized powder. In this process, the proportion of raw materials is defined and the origin of these are adjusted to the characteristics of the production process and the final performance required.

The atomized powder is obtained by wet grinding of raw materials and subsequent spray drying. Argenta's supplier companies have installed cogeneration systems for heat and electrical energy in the atomization dryers. All the hot gases are used in the spray dryer and the electrical energy generated, part is used in the production process thus reducing the electrical requirements of the network and part is sold to the grid.

4.2 Product manufacturing

Manufacturing (A3)

Once the atomized powder is obtained, it is transported to the forming plants. This process and the subsequent treatments applied to the tile are carried out in the same facilities of ARGENTA. The procedure is as follows: the atomized powder is discharged into storage hoppers and by means of a feeding system with conveyor belts with weighing control, the granule is directed to the stage of forming by unidirectional dry pressing, made with hydraulic or oleodynamic presses. This method is the most suitable to control the pressing cycle and thus be able to obtain large format pieces.

The conformed parts are introduced into a drying room to reduce their humidity, thus doubling or tripling their mechanical resistance, which allows their subsequent processing.

The fresh pieces from the dryer are coated with a thin or several layers of engobe and glaze and applied on the support using curtain techniques (bell). In addition, in some cases, the product is decorated using different types of applications, the majority being inkjet. This treatment is carried out to give on the surface of the fireed product a series of technical and aesthetic properties, such as waterproofness, ease of cleaning, shine, color, surface texture, chemical and mechanical resistance.

Cocking is the most important stage of the production process of ceramic tiles, since it is the moment in which the pieces, previously milled, undergo a fundamental modification in their properties, giving rise to a hard material, resistant to water and chemicals. The cocking of the ceramic pieces is carried out by monocoction in roller monostratum ovens.

After having passed the quality control processes, the classified parts are packed in a private cardboard container and packed on wooden pallets, coated with LDPE film and strapped to avoid cargo movement. On each pallet or on the top of the bulks are placed sheets coverings. On the other hand, in some formats are also used fix pall, side squares to avoid the displacement of the load on the pallet. In the loading of containers, raffia mattress is used, bags that are placed between the gaps between pallet and pallet to protect the load.

4.3 Construction process

Transport of the product (A4)

The product is distributed by 59% in Spain, 17% in Europe and 24% the rest of the world.

For road transport, a 27-t truck classified as Euro 6 has been considered. For trans-continent transport, an average transoceanic freighter has been estimated.

Table 3 Transport to the construction site

Stage of the construction process.	Transportation to the site
Parameter	Result (expressed as functional or declared unit)
Fuel type and consumption	According to destinations in the distribution above, the following are described: 0,1322l l diesel (Euro 6 truck of 27 t) 0,0220l fuel oil (freighter)
Distance	300 km national distribution: 59% 1390 km distribution rest Europe: 17% 6520 km distribution rest of the world: 24%
Capacity utilization (including empty return)	85% in trucks 100% freighter
Bulk density of transported products	415.4 kg/m3
Useful capacity factor (factor: =1 or < 1 or ≥ 1 for products that are packaged compressed or nested)	Not applicable

Product installation and construction process *(A5)*

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

Glue 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 its use. They are formed by a mixture of white or gray cement, mineral fillers of siliceous and/or limestone nature and organic additives: water retainers, redispersible polymers in water, rheological modifiers, fibers, etc.

The waste derived from the packaging of the pieces is managed separately according to the geographical location of the place of installation. On the other hand, 3% of product losses have been considered in the installation stage of the tiles.

Table 4 Installation of the product in the building.

TECHNICAL INFORMATION. Stage of the construction process. Installation in the building	
Parameter	**Result *(expressed by functional or declared unit)***
Material 1: Glue cement	3.3kg
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 on site before waste processing, generated by the installation of the product *(specifying type)*	Waste of ceramic parts: 466g Packaging waste: Cardboard: 119.8 g Plastic: 28.4 g Wood: 418.0 g
Output of materials *(specified by type)* as a result of waste processing on the building plot	Recycled ceramic parts: 326 g Ceramic parts to landfill: 140 g Incinerated cardboard : 2 g Recycled cardboard: 21 g Cardboard landfilled: 6 g Incinerated plastic: 2 g Recycled plastic: 21 g Landfilled plastic: 6 g Incinerated wood: 21 g Recycled wood: 333 g Wood landfilled : 64 g
Direct emissions to ambient air, soil and water	Not applicable

4.4 Use related to operation of the building

Usage (B1)

Once installed, the tile does not require any energy input for its use nor do they need maintenance after its commissioning, except for normal cleaning operations. For this reason, of all the modules mentioned above, only the environmental loads attributable to the maintenance of the product (module B2) are contemplated.

Maintenance (B2)

Cleaning is done with a damp cloth and, if the surface has dirt or grease, cleaning agents such as detergents or bleaches can be added. In the present study, the consumption of water and disinfectant for a wall covering installed in a residential use scenario has been considered, that is, cleaning every 3 months with water and detergent during the 50 years of useful life.

Table 5 Use linked the structure of the building.

TECHNICAL INFORMATION. Stage of use related to the building	
Parameter	**Result (expressed by functional or declared unit)**
B2 MAINTENANCE	
Maintenance process	According to PCR for ceramic tiles (UNE-EN 17160) residential scenario for wall cleaning
Maintenance cycle	Wash each month with water and detergent
Auxiliary materials for maintenance (E.g.cleaning products) (specifying each material)	Detergent: 1.34E-04 kg/m2
Waste of material during the maintenance (specifying the type)	Not applicable
Net consumption of running water	0.1 l/m2
Energy input during maintenance (E.g. suction cleaning), type of energy vector (e.g. electricity) and quantity, if applicable and relevant	Not applicable

4.5. End of life

Deconstruction and demolition (C1)

Once its useful life is over, the product will be removed, either as part of a rehabilitation of the building or during its demolition.

In the context of the demolition of a building, the impacts attributable to the uninstallation of the product are negligible.

Transport (C2)

The waste of the product is transported in a large tonnage truck (27 t) that complies with the Euro 6 standard to be managed, either by deposition in landfills of inerts, or recycled.

An average distance of 20km from the building site to the container and treatment plant (by truck) and 30km from the container or treatment plant to the final destination is considered.

It also includes the return trip of the trucks (100% empty return).

Waste processing for reuse, recovery and recycling (C3)

70% of tiles recycling and/or reusing is considered, as indicated in the PCRs.

Final disposal (C4)

It is considered that and 30% of the product is sent to landfill controlled after the end of its useful life.

Table 6. End of life

TECHNICAL INFORMATION. End of life	
Parameter	**Result (expressed by functional or declared unit)**
Collection process, specified by type	18.8 kg/m2
Recovery system, specified by type	13.2 kg recycled as filler material
Deletion, specific by type	5.6 kg to controlled landfill
Assumptions for development of scenario (e.g.. transport)	The waste of the product is transported in a large tonnage truck (27t) that complies with the Euro 6 standard to be managed, either by deposition in inert landfills, or recycled. An average distance of 20km from the building to the container and treatment plant (by truck) and 30km from the container or treatment plant to the final destination is considered. It also includes the return trip of the trucks (100% empty return)

4.6 Benefits and loads beyond the building system boundaries

Module D Benefits and potential environmental from reuse recovery y recycling activities

The environmental loads and benefits obtained of the secondary material from the waste generated at the manufacturing stage (waste such as cardboard, plastic and wood), at the installation stage (waste tiles, residues of the packaging of the tiles: cardboard, plastic and wood) and at the end of life of the product.

5 LCA and LCI enrironmental parameter declaration

The following tables include the data for the LCA and LCI parameters.

The results obtained are expressions and do not foreseen impacts in endpoint categories, the overcoming of some levels, safety margins or risks.

The results associated ceramic tiles that have the minimum and maximum environmental impact are presented in Annexes I and II

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	8,7	4.4E-01	9.9E-01	N.R.	2.7E-02	N.R.	N.R.	8.0E-02	0	8.2E-02	-2.3E-01
ODP	kg CFC11 eq	2.7E-09	7.0E-17	8.0E-11		1.8E-08			1.3E-17	0	8.4E-14	-3.1E-09
AP	kg SO2 eq	1.4E-02	2.5E-03	1.6E-03		1.9E-04			5.5E-05	0	4.8E-04	-7.8E-04
EP	kg (PO4)3- eq	2.1E-03	3.0E-04	3.0E-04		4.4E-05			9.5E-06	0	6.5E-05	-9.5E-05
POCP	kg ethylene eq	1.2E-03	1.6E-04	1.3E-04		6.3E-05			8.5E-06	0	3.8E-05	-7.5E-05
ADPE	kg Sb eq	5.0E-05	2.9E-08	1.5E-06		1.5E-09			5.9E-09	0	8.7E-09	-5.0E-08
ADPF	MJ	126,5	5,9	7,5		1.5E-01			1,1	0	1,1	-4,2

GWP = Global Warming Potential ; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Potential for depletion of abiotic resources for non-fossil resources; **ADPF** = Abiotic Resource Depletion Potential for Fossil Resources **N.R.** = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	21,5	2.8E-01	1,6	N.R.	7.0E-01	N.R.	N.R.	6.1E-02	0	1.3E-01	-3,1
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	21,5	2.8E-01	1,6		7.0E-01			6.1E-02	0	1.3E-01	-3,1
PENRE	MJ	135,9	5,9	8,2		1.7E-01			1,1	0	1,1	-4,6
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	135,9	5,9	8,2		1.7E-01			1,1	0	1,1	-4,6
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	1.9E-02	3.3E-04	2.1E-03		1.3E-02			7.1E-05	0	2.1E-04	-2.4E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **PERT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Total non-renewable primary energy use; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of running water resources. **N.R.** = Non-Relevant Modules

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.3E-07	3.2E-05		9.3E-11			5.1E-08	0	0	-2.6E-08
NHWD	medical history	2,9	8.6E-04	3.3E-01		3.8E-03			1.7E-04	0	5,1	-6.7E-04
RWD	medical history	2.7E-03	7.2E-06	2.3E-04		1.8E-06			1.3E-06	0	1.5E-05	8.0E-06
RAW	medical history	0	0	0	N.R	0	N.R	N.R	0	0	0	0
MFR	medical history	0	0	5.9E-01		0			0	11,9	0	-3.4E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

6 Additional environmental information

6.1 Indoor air emissions

Ceramic coatings, in their manufacturing process, undergo a thermal process that exceeds 1000 ºC. At these temperatures, any organic compound present in the compositions is decomposed, resulting in a final product that is free of volatile organic compounds that can be emitted in its use phase.

6.2 Release to soil and water

Ceramic coatings do not emit any compound to the soil or water in its stage of use, since it is a totally 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, it is not biodegradable, it does not adversely affect other materials which it comes into contact with in such a way as can cause pollution of the environment or harm human health. It is a product that does not leach so it does not supposed to be a risk to the quality surface or groundwater.

ANNEX I LCA and LCI environmental parameter statements for MINIMUM environmental impact format

This annex contains the parameters fo the references with minimum impact value for nthe global warming category, with a variation of more than 10% with respect to the family average.

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	7,3	4.0E-01	8.7E-01	N.R.	2.4E-02	N.R.	N.R	7.1E-02	0	7.3E-02	-2.0E-01
ODP	kg CFC11 eq	2.1E-09	6.2E-17	6.2E-11		1.6E-08			1.2E-17	0	7.5E-14	-2.7E-09
AP	kg SO2 eq	1.2E-02	2.3E-03	1.4E-03		1.7E-04			4.9E-05	0	4.3E-04	-7.0E-04
EP	kg (PO4)3- eq	1.8E-03	2.7E-04	2.6E-04		3.9E-05			8.5E-06	0	5.8E-05	-8.5E-05
POCP	kg ethylene eq	1.0E-03	1.5E-04	1.1E-04		5.6E-05			7.6E-06	0	3.4E-05	-6.7E-05
ADPE	kg Sb eq	3.2E-05	2.6E-08	9.9E-07		1.4E-09			5.2E-09	0	7.8E-09	-4.5E-08
ADPF	MJ	105,9	5,3	6,5		1.3E-01			9.7E-01	0	9.5E-01	-3,8

GWP = Global Warming Potential ; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Potential for abiotic resource depletion for non-fossil resources; **ADPF** = Potential for abiotic resource depletion for fossil resources. **N.R**. = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	17,6	2.5E-01	1,3	N.R	6.2E-01	N.R	N.R	5.5E-02	0	1.2E-01	-2,7
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	17,6	2.5E-01	1,3		6.2E-01			5.5E-02	0	1.2E-01	-2,7
PENRE	MJ	113,0	5,3	7,0		1.5E-01			9.7E-01	0	9.8E-01	-4,1
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	113,0	5,3	7,0		1.5E-01			9.7E-01	0	9.8E-01	-4,1
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	1.6E-02	3.0E-04	1.9E-03		1.2E-02			6.3E-05	0	1.9E-04	-2.2E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **LAWSUIT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-primary energy resources renewable used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Total use of non-renewable primary energy; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of water stream. **N.R.** = Modules No Relevant

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.1E-07	3.2E-05		8.3E-11			4.5E-08	0	0	-2.3E-08
NHWD	medical history	2,2	7.7E-04	2.8E-01		3.4E-03			1.5E-04	0	4,6	-6.0E-04
RWD	medical history	2.2E-03	6.5E-06	2.0E-04		1.6E-06			1.2E-06	0	1.3E-05	7.3E-06
RAW	medical history	0	0	0	N.R	0	N.R	N.R	0	0	0	0
MFR	medical history	0	0	5.3E-01		0			0	10,6	0	-3.1E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; MER = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

ANNEX II LCA and LCI environmental parameter for MAXIMUM environmental impact format

This annex contains the parameters for the references with maximum impact value for the global warning category, with a variation of more that 10% with respect to the family average.

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	10,9	5.5E-01	1,2	N.R.	3.4E-02	N.R.	N.R.	1.0E-01	0	1.0E-01	-2.8E-01
ODP	kg CFC11 eq	3.5E-09	8.7E-17	1.0E-10		2.2E-08			1.6E-17	0	1.1E-13	-3.9E-09
AP	kg SO2 eq	1.7E-02	3.2E-03	2.0E-03		2.4E-04			6.9E-05	0	6.0E-04	-9.8E-04
EP	kg (PO4)3- eq	2.4E-03	3.7E-04	3.7E-04		5.5E-05			1.2E-05	0	8.2E-05	-1.2E-04
POCP	kg ethylene eq	1.5E-03	2.0E-04	1.6E-04		7.8E-05			1.1E-05	0	4.8E-05	-9.4E-05
ADPE	kg Sb eq	6.8E-05	3.6E-08	2.1E-06		1.9E-09			7.3E-09	0	1.1E-08	-6.2E-08
ADPF	MJ	157,9	7,4	9,4		1.8E-01			1,4	0	1,3	-5,3

GWP = Global Warming Potential; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Abiotic resource depletion potential for non-fossil resources **ADPF** = Abiotic resource depletion potential for fossil resources. **N.R.** = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	27,2	3.5E-01	2,0	N.R	8.7E-01	N.R	N.R	7.6E-02	0	1.6E-01	-3,9
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	27,2	3.5E-01	2,0		8.7E-01			7.6E-02	0	1.6E-01	-3,9
PENRE	MJ	169,2	7,4	10,2		2.2E-01			1,4	0	1,4	-5,8
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	169,2	7,4	10,2		2.2E-01			1,4	0	1,4	-5,8
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	2.3E-02	4.1E-04	2.6E-03		1.7E-02			8.8E-05	0	2.6E-04	-3.0E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **LAWSUIT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-primary energy resources renewable used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Uso tnon-renewable primary energy; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of water stream. **N.R.** = Modules No Relevant

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.9E-07	3.2E-05	N.R.	1.2E-10	N.R.	N.R.	6.3E-08	0	0	-3.2E-08
NHWD	medical history	2,9	1.1E-03	3.9E-01		4.7E-03			2.1E-04	0	6,4	-8.4E-04
RWD	medical history	3.3E-03	9.0E-06	2.8E-04		2.3E-06			1.7E-06	0	1.9E-05	9.9E-06
RAW	medical history	0	0	0		0			0	0	0	0
MFR	medical history	0	0	7.4E-01		0			0	14,9	0	-4.3E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

References

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