EPD

CERTIFICATION

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RISE COLLECTION

FABRICACIÓN ESPAÑOLA SANITARIA. S.A.

Holder of Declaration:

FABRICACIÓN ESPAÑOLA SANITARIA. S.A.

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LCA Study:

Instituto de Tecnología Cerámica – (ITC-AICE)

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The EPD holder is responsible for the content of the Declaration. The holder is responsible for keeping the records and documents supporting the content of the Declaration.

1. GENERAL INFORMATION

1.1. The organization

FABRICACIÓN ESPAÑOLA SANITARIA. S.A. (from now on FABRESA) was founded in 1960, in Lucena del Cid (Castellón), with the intention of providing small-scale ceramics solutions. A few years ago, the company decided to take a new direction, implementing strategies for international expansion, and a system of product portfolio development which brings together current aesthetic trends and the needs of the market. In this system, the customer is our biggest asset.

All of this, together with the testing process conducted by the Institute for Ceramic Technology, ITC (the only accredited centre in Spain for this kind of testing) makes FABRESA's products competitive with the best ceramic products in the world.

The mainstay of our company's philosophy is a firm commitment to product quality and customer service.

Regarding the product, we study market needs so that we can adapt to them and anticipate changes in the market environment.

We base our service on our knowledge of our customers, and their trust in us. We consider our customers to be our "partners". For that reason, and framed within a process of continuous improvement, we value your opinion as a key element of our internal policy to ensure that quality and provide the "FABRESA Guarantee" as a seal of assurance.

1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information about a product aggrupation marked and manufactured by FABRESA, in the geographical and technological environment of Spain in the year 2019.

The results shown present the environmental behaviour of the ceramic coverings belonging the earthenware tiles, as well as the environmental data of the tiles which present a minimum and maximum impact, thus delimitating the results obtained in the LCA for the average product. The scope of this Environmental Product Declaration (from now on EPD) is from cradle-to-grave.

1.3. Life cycle and conformity

This EPD was drafted and verified in accordance with the ISO 14025:2006, EN 15804:2012+A1:2013 and EN 17160:2019. This EPD may not be comparable with those developed in other programs or under different reference documents; it may not be comparable with EPD that are not developed under EN 15804:2012+A1:2013 standard. In the same way, EPDs cannot be subject to comparison if the origin of the data is different (the databases, for example), if not all relevant information modules are included, or if they are not based on the same scenarios.

Comparison of construction products shall be based on the same function using the same functional unit at building level (or architectural or civil engineering works), i.e. including the performance of the product during the life cycle and the requirements stated in ISO 14025:2006 (PCR for ceramic tiles).

2. THE PRODUCT

2.1. Identification of the product

The ceramic tiles included in this EPD covers the ceramic tiles pertaining group BIII (earthenware tiles), classification based on EN 14411:2016 (equivalent to ISO13006:2018), this is their water absorption is higher than 10% and its forming is by pressing.

The earthenware tiles included in the study cover different models with different formats. The thickness formats included in the scope of this EPD are from 5.2mm to 7.5mm, with an average weight of 11.6kg/m^2.

The results of the formats included in the boundary of the present EDP are shown in the Annexes, they present the minimum and maximum environmental impact, and correspond with the 15x15 cm size of 5.2mm of thicknesses and 10x30 cm size of 7.5mm of thicknesses respectively.

The CPC code is 37310.

Intended use of the product

The function of the product is to cover surfaces. In this study the environmental behaviour of the earthenware tiles as indoor house surface covering (walls) 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 features are included in the technical datasheets which can be requested from the manufacturer, being them, the ones required by the EN 14411:2016 standard.

Figure 1 Installed product.

2.2. Composition of the product

None of the final product components are included in the Candidate List of Very Concerning Substances submitted to Authorisation.

Table 1 Main product components

Composition		Content
Ceramic body	Clay, unfired and fired ceramic scraps	89%
Decoration	Feldspars, carbonates, quartz, silicates, kaolin, zirconium oxides, clays, alumina, zinc oxide, etc.	11%

3. INFORMATION REGARDING THE LCA

3.1. LCA Study

The Life Cycle Assessment (from now on LCA) has been carried out using GaBi 10.0.0.71 [5] software and the data base version 2020.1. (SP40.0) [6] (SpheraSolutions). The characterization factors used are those included in EN 15804:2012+A1:2013 standard.

Figure 2 Installed product.

3.2. Functional Unit

The Functional Unit considered is "***To cover 1 m² of a surface (walls) of a residential area for 50 years with earthenware tiles***".

3.3. Reference Service Life (RSL)

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 (see Table 2).

Table 2 Reference Service Life

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 L 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 L 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 L 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.

3.4. Allocation and cut off criteria

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 excluded data are the following:

- Non-regulated channelled emissions generated during combustion stages (spray drying, 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.
- The production of machinery and industrial equipment due to the difficulty of inventorying 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 processes that are included. Furthermore, the databases used do not include these processes, so their inclusion would require an additional effort beyond the scope of the study. Likewise, waste generated in the maintenance of this machinery and equipment is also excluded due to the low impact they have.

3.5. Representativeness. quality and selection of data

The raw data has been directly provided by FABRESA, this data corresponds to one production centre of the enterprise property. For the secondary data, the most updated GaBi ts databases [6] have been used and modelled with GaBi version 10.0.0.71[5]. All data belong to a geographical scenario of Spain 2019.

The results presented are representative of ceramic coverings, expressed as average values weighted by the production of the ceramic coverings pertaining BIII group, delimiting it by the products which present the minimum and maximum environmental impact.

3.6. Other calculation rules and hypotheses

The load assignments applied have been the necessary ones to make it possible to quantify the specific data of covering tiles, as well as to carry out the necessary calculations to assign the associated data to the products which present a maximum and a minimum environmental impact.

4. SYSTEM BOUNDARIES. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

All the product stage modules relevant for the ceramic coverings according to the PCR have been included.

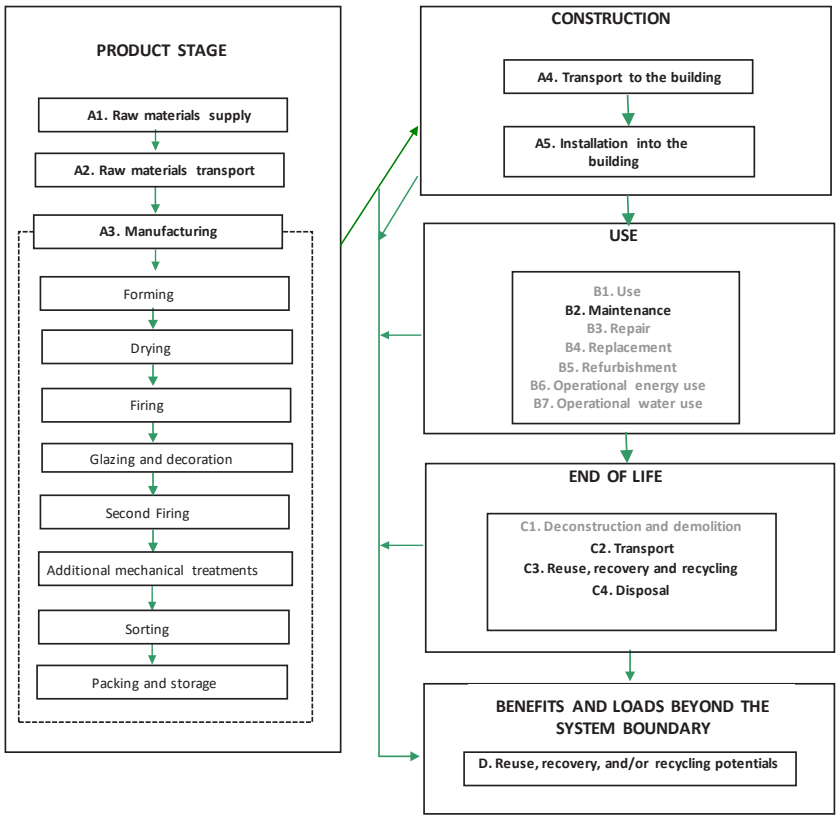

Figure 3 System boundaries

The modules included are presented in the following table.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				D
Raw materials extraction	Transport	Manufacturing	Transport from the factory gate to the construction site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Use of energy in service	Use of water in service	Deconstruction Demolition	Transport	Waste treatment	Disposal	Benefits and burdens beyond the system
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	NR	X	NR	NR	NR	NR	NR	NR	X	X	X	X

*NR: Not Relevant module

4.1. Processes that precede manufacturing (upstream)

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, 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 75% of the raw materials used in the glaze applied on earthenware 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 glaze 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 Euro 6 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 FABRESA’s plant.

In the case of the raw materials used in the ceramic body, these are only transported by road. choosing a 27t truck that complies with the Euro 6 standard.

4.2. Product Manufacturing

Manufacturing (A3)

The preparation of raw materials is carried out at FABRESA's facilities. The raw materials are supplied from their origin after having been subjected to treatments to eliminate metallic iron, sieved (separating coarse particles >15cm) and homogenised. Clays used in the composition are transported in dump trucks and unloaded and stored in opencast stockpiles at FABRESA's facilities. In these clay stockpiles, continuous movements are carried out with a shovel-truck to keep the material as homogeneous as possible.

The same shovel-truck is used to volumetrically dose each clay into a secondary stockpile. It is then broken up and spread out to form a thin layer on the surface of the opencast stockpile. This operation serves to reduce the size of the aggregates and to homogenise the mixture, while facilitating drying.

Once the desired granulometry has been obtained, clays are mixed with fired and unfired ceramic scraps using a pendulum mill (dry milling process) to obtain a homogeneous mixture of smaller particles.

Prior to the forming process, in granulators, the fine material obtained is moisturised while finer particles are agglomerated, thus reducing their percentage, increasing the bulk density of the powder and increasing its fluidity, which will greatly facilitate the subsequent pressing stage.

After the pressing stage, the formed pieces are introduced into a continuous dryer to reduce their humidity, thus doubling or tripling their mechanical resistance, which allows them to be processed further. In the drying process, the gases from the cooling zone of the furnaces are also used in order to reduce the consumption of natural gas in this stage of the process.

The pieces that have just left the dryer are sent to the kiln, where firing takes place. Firing is the most important stage in the production process of ceramic tiles, as it is the moment when the pieces, previously moulded, undergo a fundamental modification in their properties, giving rise to a hard material that is resistant to water and chemical products. The firing of the ceramic pieces at FABRESA is carried out by double firing in single-layer roller kilns.

After the firing clay process, those pieces are taken to the glazing lines, where different coatings are applied in various layers depending on the preferred finish. Subsequently, they pass through the tunnel dryers and are introduced into the second firing single-layer roller kiln, where the glaze is fired and the finished glazed tiles are ready.

After passing the quality control processes, the sorted parts are packed in primary cardboard packaging and packed on wooden pallets and covered with LDPE film.

4.3. Construction process

Transport (A4)

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.

Table 3 Transport to the site

Stage of the construction process. Transport to the construction site	
Parameter	**Result (expressed per functional unit)**
Fuel type and consumption	According to the destinations in the distribution as described above: 0.1884 l diesel (truck Euro 6 27 t payload) 0.0170 l fuel oil (freighter)
Distance	300 km national distribution: 22% 1390 km European distribution: 53% 6520 km rest of the world distribution: 25%
Capacity utilisation (including no-load return)	85% in truck 100% freighter
Bulk density of transported products	415.4 kg/m^3
Usable capacity factor (factor: =1 or < 1 or ≥ 1 for products that are packed compressed or nested)	Not applicable

Product installation and construction process (A5)

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.

Table 4 Installation of the product in the building

TECHNICAL INFORMATION. Stage of the construction process. Installation in the building	
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: 348g Packaging wastes: - Cardboard: 78.3 g - Plastic: 9.8g - Wood: 235 g
Output of materials (specified by type) as a result of waste treatment at the construction site, e.g., from waste collected for recycling. energy recovery. disposal (specified by route)	Product losses for recycling: 244g Product losses for final deposition: 104g Cardboard for incineratin:4 g Cardboard for recycling: 63g Cardboard for final deposition: 12 g Plastic for incinerating: 1 g Plastic for recycling: 6g Plastic for final deposition: 2g Wood for incinerating: 14 g

TECHNICAL INFORMATION. Stage of the construction process. Installation in the building	
Parameter	**Result (expressed per functional unit)**
	Wood for recycling: 184g Wood for final deposition: 36 g
Direct emissions to ambient air. soil and water	Not applicable

Figure 4 Installed product.

4.4. Use linked to the structure and performance of the building

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, only the environmental loads attributable to product maintenance (module B2) are considered.

Maintenance (B2)

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 wall covering installed in a residential scenario, i.e. cleaning once every three months with water and detergent during the 50-year life span.

Table 5 Use linked to the structure of the building

TECHNICAL INFORMATION. Stage of use relating to the building	
Parameter	**Result (expressed per functional unit)**
B2 MAINTENANCE	
Maintenance process	According to RCP for ceramic tiles (EN17160) residential wall cleaning scenario
Maintenance cycle	Washing once every three months with water and detergent

TECHNICAL INFORMATION. Stage of use relating to the building	
Parameter	**Result (expressed per functional unit)**
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

4.5. End of life

Deconstruction and demolition (C1)

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.

Transport (C2)

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 20km from the building site to the container and treatment plant (by truck) and 30km from the container or treatment plant to the destination is considered. Also included is the return of the trucks (100% empty return).

Waste management for reuse. recovery and recycling (C3)

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

Final disposal (C4)

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

Table 6 End of life

TECHNICAL INFORMATION. End of life	
Parameter	**Result (expressed per functional unit)**
Collection process, specified by type	14.9 kg/m^2
Recovery system, specified by type	10.4 kg recycled as filler material
Disposal, specified by type	4.5 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 20km from the building site to the container and treatment plant (by truck) and 30km from the container or treatment plant to the destination is considered. Also included is the return of the trucks (100% empty return)

4.6. Benefits and loads outside the boundaries of the building system

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.

Figure 5 Installed product.

5. DECLARATION OF LCA AND LCI ENVIRONMENTAL PARAMETERS

The following tables include the LCA and LCI parameter data.

The results associated with the tiles having the minimum and maximum environmental impact are presented in Annexes I and II.

Table 8. Parameters describing the environmental impacts

Parameters	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO_2 eq	6.8	6.2E-01	7.6E-01	N.R.	2.1E-02	N.R	N.R	7.9E-02	0	6.5E-02	-2.0E-01
ODP	kg CFC-11 eq	2.8E-09	9.8E-17	8.5E-11		1.4E-08			1.3E-17	0	6.6E-14	-1.4E-09
AP	kg SO_2 eq	1.3E-02	2.2E-03	1.3E-03		1.5E-04			5.6E-05	0	3.8E-04	-7.6E-04
EP	kg $(PO_4)^{3-}$ eq	2.2E-03	2.7E-04	2.4E-04		3.4E-05			9.9E-06	0	5.1E-05	-7.6E-05
POCP	kg ethylene eq	9.4E-04	1.6E-04	9.9E-05		4.9E-05			8.5E-06	0	3.0E-05	-7.5E-05
ADPE	kg Sb eq	5.6E-05	4.2E-08	1.7E-06		1.2E-09			5.8E-09	0	6.9E-09	-3.7E-08
ADPF	MJ	86.2	8.3	5.6		1.2E-01			1.1	0	8.3E-01	-4.3

GWP = Global warming potential; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Formation potential of tropospheric ozone photochemical oxidants; **ADPE** = Abiotic depletion potential for non-fossil resources; **ADPF** = Abiotic depletion potential for fossil resources; **N.R.:** Not Relevant module

Table 9. Parameters describing the resources used.

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	22.0	4.3E-01	1.4	N.R.	5.5E-01	N.R.	N.R.	6.0E-02	0	1.0E-01	-1.1
PERM	MJ	0	0	0		0			0	0	0	0
PERT	MJ	22.0	4.3E-01	1.4		5.5E-01			6.0E-02	0	1.0E-01	-1.1
PENRE	MJ	95.1	8.3	6.2		1.4E-01			1.1	0	8.7E-01	-4.7
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	95.1	8.3	6.2		1.4E-01			1.1	0	8.7E-01	-4.7
SM	kg	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	m^3	1.8E-02	4.9E-04	1.7E-03		1.0E-02			6.9E-05	0	1.7E-04	-2.2E-03

PERE = Use of renewable primary energy excluding renewable primary resources used as raw materials; **PERM** =Use of renewable primary energy resources used as raw materials; **PERT** =Total use of renewable primary energy; **PENRE** =Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** Use of non-renewable primary energy used as raw materials; **PENRT** = Total use of non-renewable primary energy; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water. **N.R.:** Not Relevant module

Table 10. Parameters describing output flows and residues categories.

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	kg	2.5E-06	3.5E-07	1.1E-07	N.R	7.3E-11	N.R	N.R	5.0E-08	0	0	-2.0E-08
NHWD	kg	4.7	1.2E-03	3.2E-01		3.0E-03			1.6E-04	0	4.0	-5.6E-04
RWD	kg	2.7E-03	1.0E-05	2.0E-04		1.4E-06			1.3E-06	0	1.2E-05	2.3E-05
CRU	kg	0	0	0		0			0	0	0	0
MFR	kg	3.3E-03	0	3.7E-01		0			0	9.3	0	0
MER	kg	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed **CRU** = Components for re-use; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Exported energy; **N.R.:** Not Relevant module

6. ADDITIONAL ENVIRONMENTAL INFORMATION

Indoor air emissions

In the ceramic covering manufacturing process, tiles are subjected to a thermal process above 1000°C. At these temperatures, any organic compound in the compositions decomposes, yielding an inert end-product free of any volatile organic compounds that might be released in the stage use.

Release to soil and water

Ceramic coverings release no compounds into the soil or water during their use stage, because a completely inert product is involved that undergoes no physical. Chemical, or biological transformations, is neither soluble nor combustible, and does not react physically or chemically or in any other way, is not biodegradable, and does not adversely affect to other materials with which it enters into contact such that it might produce environmental pollution or harm human health. It is a non-leaching product, so that it does not endanger the quality of surface water or groundwater.

REFERENCIAS

[1] EN 17160:2019 Product Category rules for ceramic tiles

[2] ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures

[3] EN 15804:2012+A1:2014 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products

[4] Estudio de Análisis de Ciclo de Vida de azulejo – FABRESA. Anexo I from report C202814 versión 1; March 2021.; Instituto de Tecnología Cerámica.

[5] GaBi v 10 software-system. SpheraSolutions. Compilation 10.0.0.71. More information: http://www.gabi-software.com

[6] GaBi database. Database for Life Cycle Engineering. SpheraSolutions Upgrade 2020 Edition (February 20. 2020 - SP 40). More information: http://www.gabi-software.com/spain/databases/

ANNEX I. Declaration of the environmental parameters of the LCA and LCI for the format with minimum impacts

Table I. 1 Parameters describing the environmental impacts

Parameters	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO_2 eq	5.7	5.2E-01	6.4E-01	N.R.	1.8E-02	N.R	N.R	6.6E-02	0	5.4E-02	-1.7E-01
ODP	kg CFC-11 eq	2.4E-09	8.3E-17	7.2E-11		1.2E-08			1.1E-17	0	5.5E-14	-1.2E-09
AP	kg SO_2 eq	1.2E-02	1.9E-03	1.1E-03		1.2E-04			4.7E-05	0	3.2E-04	-6.4E-04
EP	kg $(PO_4)^{3-}$ eq	2.0E-03	2.3E-04	2.0E-04		2.9E-05			8.3E-06	0	4.3E-05	-6.4E-05
POCP	kg ethylene eq	8.2E-04	1.3E-04	8.4E-05		4.1E-05			7.1E-06	0	2.5E-05	-6.3E-05
ADPE	kg Sb eq	4.6E-05	3.5E-08	1.4E-06		1.0E-09			4.8E-09	0	5.8E-09	-3.1E-08
ADPF	MJ	72.3	6.9	4.7		9.7E-02			8.9E-01	0	7.0E-01	-3.6

GWP = Global warming potential; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Formation potential of tropospheric ozone photochemical oxidants; **ADPE** = Abiotic depletion potential for non-fossil resources; **ADPF** = Abiotic depletion potential for fossil resources; **N.R.:** Not Relevant module

Table I. 2 Parameters describing the resources use.

Parameters	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	18.4	3.6E-01	1.2	N.R.	4.6E-01	N.R.	N.R.	5.0E-02	0	8.5E-02	-8.9E-01
PERM	MJ	0	0	0		0			0	0	0	0
PERT	MJ	18.4	3.6E-01	1.2		4.6E-01			5.0E-02	0	8.5E-02	-8.9E-01
PENRE	MJ	79.6	7.0	5.2		1.1E-01			8.9E-01	0	7.3E-01	-3.9
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	79.6	7.0	5.2		1.1E-01			8.9E-01	0	7.3E-01	-3.9
SM	kg	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	m^3	1.5E-02	4.1E-04	1.4E-03		8.7E-03			5.8E-05	0	1.4E-04	-1.9E-03

PERE = Use of renewable primary energy excluding renewable primary resources used as raw materials; **PERM** =Use of renewable primary energy resources used as raw materials; **PERT** =Total use of renewable primary energy; **PENRE** =Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** Use of non-renewable primary energy used as raw materials; **PENRT** = Total use of non-renewable primary energy; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water. **N.R.:** Not Relevant module

Table I. 3 Parameters describing output flows and residues categories

Parameters	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	kg	2.1E-06	2.9E-07	8.9E-08	N.R	6.1E-11	N.R	N.R	4.2E-08	0	0	-1.7E-08
NHWD	kg	3.9	1.0E-03	2.6E-01		2.5E-03			1.4E-04	0	3.4	-4.7E-04
RWD	kg	2.2E-03	8.5E-06	1.6E-04		1.2E-06			1.1E-06	0	9.9E-06	1.9E-05
CRU	kg	0	0	0		0			0	0	0	0
MFR	kg	2.8E-03	0	3.1E-01		0			0	7.8	0	0
MER	kg	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed **CRU** = Components for re-use; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Exported energy; **N.R.:** Not Relevant module

ANNEX II. Declaration of the environmental parameters of the LCA and LCI for the format with maximum impacts

Table II. 1 Parameters describing the environmental impacts

Parameters	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO_2 eq	7.8	7.1E-01	8.7E-01	N.R.	2.4E-02	N.R	N.R	9.0E-02	0	7.4E-02	-2.3E-01
ODP	kg CFC11 eq	3.2E-09	1.1E-16	9.6E-11		1.6E-08			1.5E-17	0	7.5E-14	-1.6E-09
AP	kg SO_2 eq	1.4E-02	2.6E-03	1.5E-03		1.7E-04			6.5E-05	0	4.4E-04	-8.7E-04
EP	kg $(PO_4)^{3-}$ eq	2.4E-03	3.1E-04	2.7E-04		4.0E-05			1.1E-05	0	5.9E-05	-8.7E-05
POCP	kg ethylene eq	1.0E-03	1.8E-04	1.1E-04		5.6E-05			9.8E-06	0	3.5E-05	-8.6E-05
ADPE	kg Sb eq	6.2E-05	4.9E-08	1.9E-06		1.4E-09			6.6E-09	0	7.9E-09	-4.2E-08
ADPF	MJ	98.7	9.5	6.4		1.3E-01			1.2	0	9.6E-01	-5.0

GWP = Global warming potential; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Formation potential of tropospheric ozone photochemical oxidants; **ADPE** = Abiotic depletion potential for non-fossil resources; **ADPF** = Abiotic depletion potential for fossil resources; **N.R.:** Not Relevant module

Table II. 2 Parameters describing the resources use.

Parameters	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	24.9	4.9E-01	1.6	N.R	6.3E-01	N.R.	N.R.	6.9E-02	0	1.2E-01	-1.2
PERM	MJ	0	0	0		0			0	0	0	0
PERT	MJ	24.9	4.9E-01	1.6		6.3E-01			6.9E-02	0	1.2E-01	-1.2
PENRE	MJ	108.8	9.5	7.0		1.6E-01			1.2	0	9.9E-01	-5.3
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	108.8	9.5	7.0		1.6E-01			1.2	0	9.9E-01	-5.3
SM	kg	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	m^3	2.0E-02	5.7E-04	2.0E-03		1.2E-02			8.0E-05	0	1.9E-04	-2.6E-03

PERE = Use of renewable primary energy excluding renewable primary resources used as raw materials; **PERM** =Use of renewable primary energy resources used as raw materials; **PERT** =Total use of renewable primary energy; **PENRE** =Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** Use of non-renewable primary energy used as raw materials; **PENRT** = Total use of non-renewable primary energy; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water. **N.R.:** Not Relevant module

Table II. 3 Parameters describing output flows and residues categories.

Parameter	Unidad	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	kg	2.8E-06	4.0E-07	1.2E-07	N.R	8.4E-11	N.R	N.R	5.7E-08	0	0	-2.3E-08
NHWD	kg	5.4	1.4E-03	3.6E-01		3.4E-03			1.9E-04	0	4.6	-6.4E-04
RWD	kg	3.0E-03	1.2E-05	2.2E-04		1.7E-06			1.5E-06	0	1.4E-05	2.7E-05
CRU	kg	0	0	0		0			0	0	0	0
MFR	kg	3.8E-03	0	4.3E-01		0			0	10.7	0	0
MER	kg	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed **CRU** = Components for re-use; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Exported energy; **N.R.:** Not Relevant module