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A VERIFIED ENVIRONMENTAL DECLARATION

Environmental Product Declaration

Porcelain Tiles

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PERONDA
CERAMICAS

CONTENTS

1 Información general

1.1. Identification and description of the organisations carrying out the declaration

This Environmental Product Declaration (EPD) has been developed by the Instituto de Tecnología Cerámica – (ITC-AICE) and Cyclus Vitae Solutions S.L, Cátedra UNESCO de Ciclo de Vida y Cambio Climático, commissioned, among other organizations, by:

• PERONDA CERÁMICAS S.A. Onda (Castellón). España

1.2. Identification of the product

This Environmental product declaration complies with ISO 14025 and ISO 21930, and describes the the environmental information based on a life cycle assessment of ceramic tiles of the BIa water absorption group (porcelain tiles), classified according to UNE-EN 14411:2013 (equivalent to ISO 13006:2012), manufactured by PERONDA CERÁMICAS S.A, considering the geographical and technical coverage of Spain during 2011.

1.3. Declared or functional unit

The declared functional unit is "1 m^2 of surface (floor) in a house during 50 years with porcelain tiles.

1.4. Name of the program

AENOR GlobalEPD Program
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1.5. Identification of the Product Category Rules (PCR)

Descriptive title of the PCR	Ceramic coverings
Panel that approved this PCR	CERAMIC COVERINGS
PCR registration date and code	2013-09-06 RCP-002-AENOR GlobalEPD
PCR version number	001
Public consultation period for the PCR	2013-05-07 to 2013-05-31
Approval date of the PCR	2013-09-06
PCR valid until	2018-09-05
Programme administrator	AENOR

1.6. Date of issue of the declaration and period of validity

This EPD was registered with code GlobalEPD 002-011 and issued on 2013-09-17, and will be valid for 5 years..

1.7. Information modules

This EPD refers to the environmental performance of porcelain tiles manufactured by PERONDA CERÁMICAS S.A. taking into account their entire life cycle and includes the following stages.

Product stage (A1, A2 and A3)

Raw materials supply (A1 and A2)

The body of porcelain tiles is composed mainly of clay, feldspar, sand and recovered ceramic material generated before and after the firing stage.

Raw materials have different sources according to their nature and properties. Raw materials from outside Spain are transported using cargo vessels to the port of Castellón and then transported by track to the factories. For the transport by sea a transoceanic freighter has been selected and the distance depends on the origin. All raw materials are transported in bulk, i.e. with no packing.

For the glaze, the most common raw materials are quartz, kaolin, alkaline feldspars, calcium carbonate, borates, zircon, clay, calcined alumina, ceramic frits, pigments, and additives such as suspending agents, deflocculants, or binders. As with the raw materials of the body, they have different sources and are transported in bulk with a transoceanic freighter.

Manufacturing (A3)

The preparation of raw materials is made in a specialized company located in L'Alcora. In this factory, after the reception of the different raw materials they are stored before preparing the mix.

Once the mix of the raw materials is made, it is grinded with a wet process and then dried to obtain an atomized granule.

The company that provides the atomized granule has a system of cogeneration for combined heat and electric power installed in the dryer by atomization. The cogeneration generates electricity using the residual heat produced by the combustion, using a system of gas turbines and alternators. All the hat gases are used in the spray drying and part of the electric power generated is used in the production process of the atomized, thus reducing the energy demand from the grid, and part is marketed to the electric network.

Once the atomized granule is manufactured, it is transported in bulk using a truck of 27 tons to the factory of PERONDA CERAMICAS, S.A.. When it arrives to the factory the atomized is unload in storage hoppers. Using a feeding system that uses belts with weight control, it is sent to the forming stage.

Then the forming of the piece is performed by unidirectional pressing with a dry process. The formed pieces are introduced to a dryer with a continuous process to reduce moisture, increase two or three times their mechanical resistance, thus allowing the downstream processing.

After the pieces are removed from the dryer, theirs are covered with one or several layers of glaze. The decoration materials are manufactured by specialized companies, where part of the raw materials are subjected to a process of fritted (fusion of the raw materials and sudden cooling), obtaining insoluble glasses called frit.

The frits and the rest of raw materials are mixed are milled with a wet process to obtained the glaze which is applied on the ceramic body using different techniques like bell-shaped glaze application and single or double-dish booth

The firing is the most important stage in the production process of the ceramic tiles, due to the materials previously formed have a fundamental change in the properties, obtaining a hard material, resistant to water and chemical products. The firing is made in a single-channel roller kiln..

After the quality control procedures, also known as sorting or classification, the pieces are packed using cardboard, pallets and polystyrene. Once the pallet is prepared, it is stored in the logistic area of the factory.

To reduce the atmospheric emission generated in different emission sources, the company has bag filters and wet filters; comprised by textile membranes permeable to gases that retains the dust, in the first case, and a water curtain using recycled water that sweep the particles of dust, in the second case.

Construction (A4 and A5)

Transport to the building site (A4)

19,5% of the product is distributed in Spain, 40% in Europa y 40,5% in the rest of the world.

Road transport was estimated based on a 27 t truck, EURO III class. Transcontinental transport was estimated based on an average transoceanic freighter. All models used are included in the database (GaBi 4.4).

Installations and construction processes (A5)

Once the product is unpacked it is installed. According to the gathered data and to obtain a real scenario, it has been established that installation requires a fast-setting mortar.

Fast-setting mortars are cementitious adhesives that consist of a mixture of hydraulic binders, mineral fillers and organic additives, which need to be mixed with water or a liquid addition just before use. These mortars consist of a mixture of grey or white cement, mineral fillers of a siliceous and/or limestone nature, and organic additives: water retainers, water redispersible polymers, rheological modifiers, fibres, etc.

Tile packaging waste -are separately handled; the disposal mode depends on the geographic location of the installation site.

Use of the product (B1 and B2)

Use (B1)

Once installed, the porcelain tile requires no energy input for use. Nor does it require any maintenance after installation, except normal cleaning operations. Consequently, of all the modules mentioned previously, only the environmental loads relating to product maintenance are considered (Module B2).

According to PERONDA CERAMICAS, S.A., the reference service life of the product is the same as that of the building where it is installed because, provided it is properly installed, it is a durable product that will not require replacing. The product is assumed to have a service life of 50 years.

Maintenance (B2)

Cleaning is performed with a moist cloth and, if the surface exhibits any dirt or grease, cleaning agents such as detergents or leaches can be added. The present study has considered water and disinfectant consumption in a residential use scenario: that is, 0,00019 kg detergent and 0,1 l water for washing 1 m^2 tiling once a week.

End of life (C1, C2, C3 y C4)

Deconstruction and demolition (C1)

When its service life has ended, the product is removed, either as part of building refurbishment or building demolition. In building demolition, the impacts assignable to product disassembly are negligible.

Transport (C2)

Product waste is transported in a truck that conforms to Euro III regulations, over a distance of 50 km to the waste destination. In order to estimate the 50 km between the demolished building and the nearest controlled landfill, only the Spanish market was considered, and the results were extrapolated to the entire ceramic market. In Spain, there are currently more than 80 authorized CDW (construction and demolition waste) landfills

Although these controlled landfills are more concentrated in certain regions, such as Catalonia (55%), Galicia (12%), and Andalusia (11%), the major Spanish cities are assumed to have a nearby facility of this type.

Waste processing for reuse, recovery, and/or recycling (C3)

According to the national RD 105/2008 and the Waste Framework Directive, as well as to the European Union agreements, 70% of the construction and demolition waste is assumed to go to reuse, recovery, and recycling.

Final disposal (C4)

30 % of the product is sent to a controlled landfill.

Benefits and loads beyond the system boundary from reuse, recovery, and/or recycling potentials (module D)

It is assumed that loads are avoided in manufacturing (such as cardboard, film, and wood waste), in product installation (such as cardboard, plastics, and wood packaging waste), and in product end-of-life.

1.8. Representativeness of the EPD

This Environmental Product Declaration contains environmental information on a group of products made by a single manufacturer, PERONDA CERÁMICAS S.A.

The results presented set out the average environmental performance, weighted by the production. The Annex to this document presents the environmental data on the tiles that exhibit a minimum and a maximum impact, thus delimiting the results obtained in the LCA.

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 EN ISO 14025, 6.7.2.

EPD from different type III program operators might be not directly comparable as the assumptions, scope and calculation rules might be different.

1.9. Where can further information on this EPD be obtained?

Further information can be found in the LCA report of the life cycle assessment study conducted for the ceramic tiles manufactured by PERONDA CERÁMICAS S.A. To access the report, please contact the producer at:

www.peronda.com // peronda@peronda.es

2 Product

2.1. Description of the product

This EPD covers the ceramic tiles from the water absorption group BIa *(porcelain tiles)*, the classification is based on EN 14411:2013 *(equivalent to ISO 13006:2012)*, the geographical and technical coverage of Spain with data from 2011.

The dimensions of the product included in the study are the following:

Formats of the porcelanic gres product marketed included in this EPD					
30,7x61,5	33x66	45,6x45,6	8x45,6	61,5x61,5	19,5x120
30,2x60,7	32x64	45x45	8x44	60x60	8x60
15x60,7	30x60	44x44	48x91	8x61,5	91,5x91,5
9,9x60,7	10,5x66	8x44	47x90	60,7x60,7	90,7x90,7
4,9x60,7	8x33	8x45,6	23x90	8x60,7	8x91,5
33x33	45,2x45,2	45,6x67,5	15,7x91	8x60	8x90,7
32x32	42,5x42,5 modular	15x67,5	15x90	61,5x121,5	45,6x45,6
16,5x33		7x67,5	7,5x45	60,7x120,7	44x44
16,5x16,5	8x45,2	44x66	8x45	60x120	8x44
8x33	44x44	22x66			

Figure 1. Product covered in the EPD

The annexes include the results for the formats included in the EPD with minimum and maximum environmental impact.

2.2. Application of the product

The intended use of the product is surface covering. This study evaluates the environmental performance of the use stage of the porcelain tiles in covering floors inside a home; however, the versatility of the ceramic also allows this type of ceramic tile to be used in other places such as offices, shops, hospitals, etc., both in indoor and outdoor environments, as for wall or other surfaces cladding.

The life cycle assessment *(LCA)* on which this declaration is based was performed according to standards ISO 14040 and ISO 14044 and the PCR document on ceramic coverings V.001, PCR nº 2 of AENOR GlobalEPD.

The Functional Unit is "1 m^2 of surface *(floor)* in a house during 50 years with ceramic tiles of porcelain tiles".

This LCA is of the "cradle-to-grave"; i.e. it includes the product manufacturing, construction, use, and end-of-life stages.

2.3. Product components

None of the end-product components are included in the Candidate List of substances of very high concern for authorization.

Body raw materials *(97%)*: clay, recycled fired and unfired ceramic material and deflocculants.

Glaze raw materials *(3%)*: feldspars, carbonates, quartz, borates, silicates, kaolins, zirconium oxides, clays, alumina, and zinc oxide.

3 Results of the life cycle assessment (LCA)

3.1. System boundaries. Information modules

The stages and information modules included in the scope of this Environmental Product Declaration are shown in the Figure below.

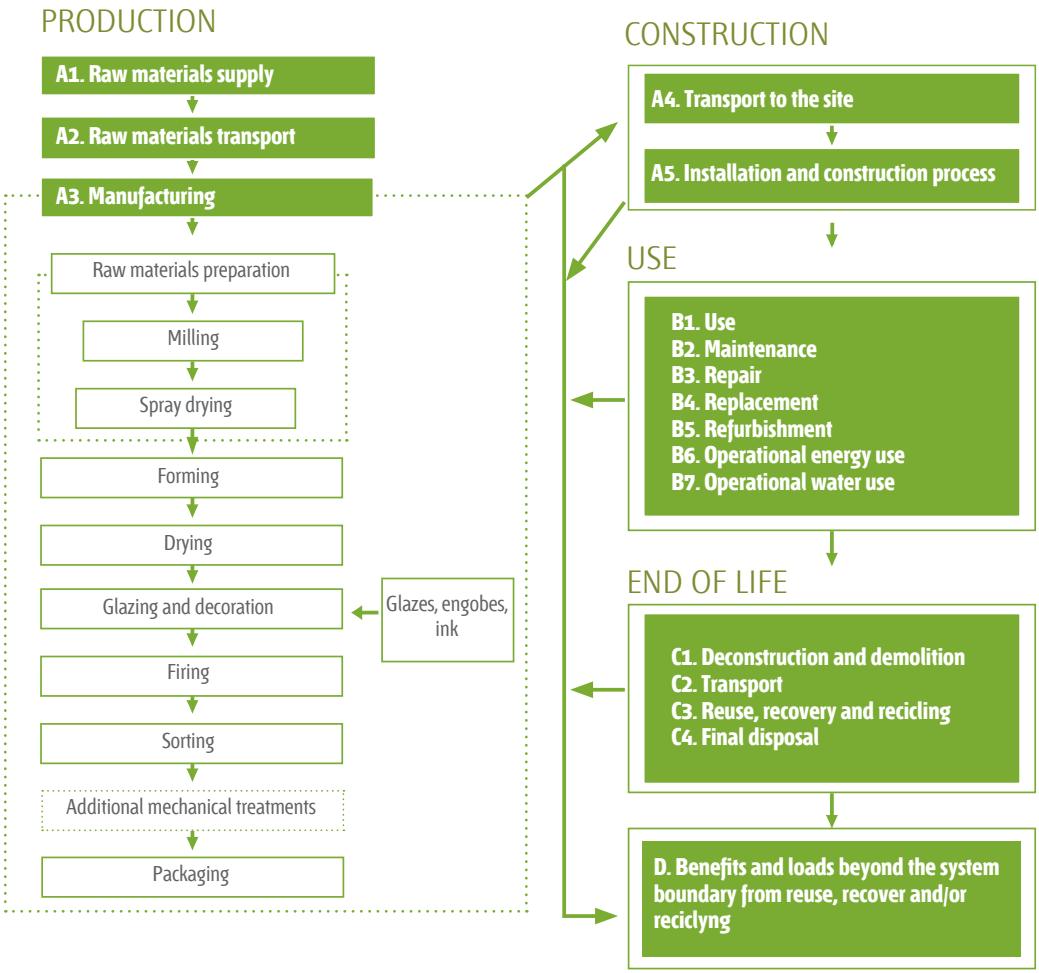

Figure 2. Stages and modules of information for the building assessment. Life cycle of the building

Information modules included in the EPD

3.2. Declaration of environmental parameters derived from LCA

The environmental parameters derived from the LCA for this product category are set out below.

3.2.1. Impact indicators

The following tables set out the averaged data of the assessed impact indicators. The values of the impacts for the tiles with minimum and maximum environmental impact are detailed in the Annexes I and II. The LCA was developed with the life cycle analysis software GABI 4.4 (PE International). The characterization factors used are the factors included in the CML-2001 method, after the review of November de 2009.

The modules of the life cycle not shown in the tables were considered not relevant from an environmental point of view, according to the PCR for ceramic coverings v.001, RCP nº2 from AENOR GlobalEPD.

			LIFE CYCLE STAGES										
			PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
IMPACT CATEGORY	PARAMETER	UNIT	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Global warming	Global warming potential	kg CO_2 equiv	11,0	1,2	5,2E-01		1,5E-01			1,9E-01	0	1,6E-01	-1,5E-01
Ozone depletion	Ozone depletion potential	kg CFC-11 equiv	6,9E-07	2,3E-09	9,4E-09		5,4E-08			3,8E-10	0	1,4E-09	-1,8E-08
Acidification for soil and water	Acidification potential of soil and water	kg SO2 equiv	3,8E-02	1,2E-02	5,0E-04		9,1E-04			9,5E-04	0	6,0E-04	8,8E-05
Eutrophication	Eutrophication potential	kg $(PO_4)^{3-}$ equiv	4,4E-03	1,7E-03	2,1E-04		1,6E-04			1,9E-04	0	8,9E-05	-3,3E-05
Photochemical ozone formation	Photochemical ozone formation potential	kg Ethene equiv	2,8E-03	9,3E-04	6,1E-05	N.R.	2,6E-04	N.R.	N.R.	1,1E-04	0	1,1E-04	1,3E-06
Depletion of abiotic resources - elements	Abiotic depletion potential for non fossil resources	kg Sb equiv	1,1E-04	2,7E-08	6,6E-05		2,2E-07			4,4E-09	0	1,0E-09	8,0E-09
Depletion of abiotic resources – fossil fuels	Abiotic depletion potential for fossil resources	MJ (net calorific value)	140,5	16,0	4,2		1,3			2,6	0	1,2	-1,2

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table 1. Parameters describing environmental impacts

3.2.2. Use of resources

The following table shows the averaged parameters that describe the use of resources. The values of the impacts for the dimensions with minimum and maximum environmental impact included in the scope of this Environmental Product Declaration are detailed in the Annex.

The modules of the life cycle not shown in the tables were considered not relevant from an environmental point of view, according to the PCR for ceramic coverings v.001, RCP nº2 from AENOR GlobalEPD.

		LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
PARAMETER	UNIT	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	18,7	2,9E-02	5,7E-02		2,1			4,8E-03	0	8,7E-02	3,4E-01
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0		0			0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	18,7	2,9E-02	5,7E-02		2,1			4,8E-03	0	8,7E-02	3,4E-01
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	MJ, net calorific value	209,4	16,3	5,3		2,0			2,6	0	1,3	-1,7
Use of non renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	209,4	16,3	5,3		2,0			2,6	0	1,3	-1,7
Use of secondary material	kg	0	0	0		0			0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Use of non renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Net use of fresh water	m³	7,1E-02	4,5E-04	9,7E-04		3,0E-01			7,7E-05	0	2,2E-03	-1,8E-02

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table 2. Parameters describing use of resources

3.2.3. Waste categories and output flow

The following table shows the parameters that describe waste categories and other output flows. The values of the impacts for the tiles with minimum and maximum environmental impact are detailed in the Annex.

The modules of the life cycle not shown in the tables were considered not relevant from an environmental point of view, according to the PCR for ceramic coverings v.001, RCP nº2 from AENOR GlobalEPD.

PARAMETER	UNIT	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,2E-02	0	2,2E-03	N.R.	1,8E-05	N.R.	N.R.	0	0	0	3,5E-05
Non hazardous waste disposed	kg	91,7	5,0E-02	6,8E-01		2,4E-02			8,4E-03	0	16,4	7,8
Radioactive waste disposed	kg	7,7E-03	2,9E-05	1,3E-04		3,7E-06			4,7E-06	0	0	2,2E-04

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table 3. Parameters describing waste categories

PARAMETER	UNIT	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Materials for recycling	kg	0	0	1,6E-01		0			0	18,9	0	0
Materials for energy recovery	kg	0	0	4,9E-02		0			0	0	0	-3,9E-03
Exported energy	MJ per energy carrier	0	0	0		0			0	0	0	0

A1. Materias Primas
A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table 4. Parameters describing other output flows

3.3. Scenarios and additional environmental information

A Modules A4-A5: Construction process stage

I Module A4: Transport to the building site

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
Fuel type and consumption	Litro de tipo de combustible, por tipo de vehículo o por distancia	0,38 l diesel oil (27 t truck) 0,06 l fuel oil (freighter)
Distance	km	19,4% in Spain (500 km) 40,1% to the rest of Europe (2.000 km) 40,4% to the rest of the world (10.000 km)
Capacity utilisation (including empty returns)	%	85% in trucks 100% freighter
Bulk density of the transported products	kg/m³	415,4 kg/m³
Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	0,2

Table 5. TECHNICAL INFORMATION. Construction process stage. Transport to the building site

II Module A5: Installation or construction

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
ANCILLARY MATERIALS FOR INSTALLATION		
Material 1: Cementitious adhesive	kg or other appropriate units	3,5 kg
Use of fresh water	m³	0,00088 m³
Use of other resources	kg	Not applicable
Quantitative description of energy type (regional mix) and consumption during the installation process	kWh or MJ	Not applicable
Wastage of materials on the construction site before waste processing, generated by the product's installation (specified by type)	kg	Packaging waste: Cardboard: 0,047 kg Plastics: 0,054 kg Wood: 0,4 kg
Output materials (specified by type) as a result of waste processing at the construction site	kg	Incineration of cardboard: 0,021 kg Recycled cardboard: 0,094 kg Landfill disposal of cardboard: 0,09 kg Incineration of plastics: 0,0025 kg Recycled plastics: 0,0022 kg Landfill disposal of plastics: 0,0071 kg Incineration of wood: 0,10 kg Recycled wood: 0,17 kg Landfill disposal of wood: 0,12 kg
Direct emissions to ambient air, soil, and water	kg	Not applicable

Table 6. TECHNICAL INFORMATION. Construction process stage. Installation or construction process

B Modules B1-B7: Use stage

I Use stage related to the building fabric

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
B2 MAINTENANCE		
Maintenance process	Description or source where description can be found	Washing once a week (residential use)
Maintenance cycle	Number per RSL or year	Not applicable
Ancillary materials for maintenance (e.g. cleaning agent) (specify materials)	kg/cycle	Detergent: 0,05 kg/life
Wastage material during maintenance (specify materials)	kg	Not applicable
Net fresh water consumption	m^3	0,26 m^3/life
Energy input during maintenance (e.g. vacuum cleaning), energy carrier type (e.g. electricity), and amount, if applicable and relevant	kWh	No aplica
B3 REPAIR		
Repair process	Description or source where description can be found	Not applicable
Inspection process	Description or source where description can be found	Not applicable
Repair cycle	Number per RSL or year	Not applicable
Ancillary materials (e.g. lubricant, specify materials)	kg or kg/cycle	Not applicable
Wastage material during repair (specify materials)	kg	Not applicable
Net fresh water consumption	m^3	Not applicable
Energy input during repair (e.g. crane activity), energy carrier type (e.g. electricity), and amount	kWh/RSL, kWh/cycle	Not applicable
B4 REPLACEMENT		
Replacement cycle	Number per RSL or year	Not applicable
Energy input during replacement (e.g. crane activity), energy carrier type (e.g. electricity), and amount, if applicable and relevant	kWh	Not applicable
Exchange of worn parts during the product's life cycle (e.g. zinc-galvanised steel sheet), specify materials	kg	Not applicable
B5 REFURBISHMENT		
Refurbishment process	Description or source where description can be found	Not applicable
Refurbishment cycle	Number per RSL or year	Not applicable
Energy input during refurbishment (e.g. crane activity), energy carrier type (e.g. electricity), and amount, if applicable and relevant	kWh	Not applicable
Material Material for refurbishment (e.g. bricks), including ancillary materials for the refurbishment process (e.g. lubricant, specify materials)	g or kg/cycle	Not applicable
Wastage material during refurbishment (specify materials)	kg	Not applicable
Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants)	Units as appropriate	Not applicable

Table 7. TECHNICAL INFORMATION. Use stage related with the building

II Reference service life

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
Reference service life	Years	50 years
Declared product properties (at the gate) and finishes, etc.	Units as appropriate	For detailed information please contact the manufacturer to obtain the technical data sheet for each model
Design application parameters (manufacturer's instructions), including the references to appropriate practices	Units as appropriate	Information included in the manufacturer's technical data sheet, for each model
Assumed quality of work, when installed in accordance with the manufacturer's instructions	Units as appropriate	Please contact the manufacturer to obtain the installation guidelines
Outdoor environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature	Units as appropriate	Values of the relevant characteristics according to standard UNE-EN 14411 Information included in the manufacturer's technical data sheet, for each model
Indoor environment (indoor applications), e.g. temperature, moisture, chemical exposure	Units as appropriate	Information included in the manufacturer's technical data sheet, for each model
Usage conditions, e.g. frequency of use, mechanical exposure	Units as appropriate	Information included in the manufacturer's technical data sheet, for each model
Maintenance, e.g. required frequency, type and quality and replacement of replaceable components	Units as appropriate	Please contact the manufacturer to obtain the maintenance guidelines

Table 8. TECHNICAL INFORMATION. Reference service life

III. B6 Energy use and B7 Water use

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
Ancillary materials, specified by materials	kg or other units as appropriate	No aplica
Net fresh water consumption	m^3	No aplica
Energy carrier type, e.g. electricity, natural gas, urban heating	kWh	No aplica
Equipment output power	kW	No aplica
Characteristic performances (e.g. energy efficiency, emissions, variation in output with capacity utilisation)	Units as appropriate	No aplica
Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants)	kg or other units as appropriate	No aplica

Table 9. TECHNICAL INFORMATION. Energy use and water use

C Modules C1-C4: End-of-life stage

PARAMETER	UNIT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)	RESULT (EXPRESSED PER FUNCTIONAL OR DECLARED UNIT)
Collection process specified by type	kg collected separately	0 kg
	kg collected with mixed construction waste	28,4 kg
Recovery system specified by type	kg for reuse	0 kg
	kg for recycling	19,8 kg
	kg for energy valorization	Not applicable
Disposal specified by type	kg product or material for disposal	8,5 kg to a controlled landfill
Assumptions for scenario development (e.g. transportation)	Units as appropriate	The product waste is transported in a large-tonnage truck (24 t) that meets Euro III standard. A distance of 50 km is assumed both to the final disposal site and to the recycling plant. A truck return trip (100% empty returns) is also included in accordance with the typical scenarios in the PCR V.001 for ceramic coverings

Table 10. TECHNICAL INFORMATION. Enf of life stage

3.4. Additional information on release of dangerous substances to air, soil, and water during the use stage

3.4.1. Indoor air emissions

In the ceramic tile 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 use stage.

3.4.2. Release into soil and water

Ceramic tiles 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 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.

4 Verification

Product Category Rules (PCR) are based on Standard UNE-EN 15804

Independent verification of the declaration and data in conformity with standard **EN ISO 14025:2010**

☐ **internal** ☑ **external**

Program manager and Third-party verifier:

AENOR

Program:

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

AENOR is a Founding member of the European Association ECO Platform.

Nota 1: This EPD may not be comparable to other EPDs developed in other programs.
Nota 2: Construction product EPDs may not be comparable to others if they do not comply with European Standard EN 15804.

ANNEX I Results of the LCA for the format with MAXIMUM ENVIRONMENTAL IMPACT

1. Impact indicactors

The data are included in the following table:

IMPACT CATEGORY	PARAMETER	UNIT	LIFE CYCLE STAGES										
			PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
			A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Global warming	Global warming potential	kg CO_2 equiv	13,5	1,4	5,2E-01		1,5E-01			2,1E-01	0	1,8E-01	-1,7E-01
Ozone depletion	Ozone depletion potential	kg CFC 11 equiv	9,5E-07	2,7E-09	9,4E-09		5,4E-08			4,2E-10	0	1,6E-09	-2,0E-08
Acidification for soil and water	Acidification potential of soil and water	kg SO_2 equiv	4,7E-02	1,4E-02	5,0E-04		9,1E-04			1,1E-03	0	6,8E-04	9,9E-05
Eutrophication	Eutrophication potential	kg $(PO_4)^3$ equiv	5,0E-03	1,9E-03	2,1E-04		1,6E-04			2,2E-04	0	9,9E-05	-3,7E-05
Photochemical ozone formation	Photochemical ozone formation potential	kg Ethene equiv	3,4E-03	1,1E-03	6,1E-05	N.R.	2,6E-04	N.R.	N.R.	1,2E-04	0	1,2E-04	1,7E-06
Depletion of abiotic resources - elements	Abiotic depletion potential for non fossil resources	kg Sb equiv	1,1E-04	3,1E-08	6,6E-05		2,2E-07			5,0E-09	0	1,2E-09	9,0E-09
Depletion of abiotic resources – fossil fuels	Abiotic depletion potential for fossil resources	MJ (net calorific value)	170,9	18,3	4,2		1,3			2,9	0	1,3	-1,3

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table I.1. Parameters describing environmental impacts

2. Use of resources

The data are included in the following table:

PARAMETER	UNIT	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			EN OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	24,6	3,3E-02	5,7E-02		2,1			5,4E-03	0	9,8E-02	3,9E-01
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0		0			0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	24,6	3,3E-02	5,7E-02		2,1			5,4E-03	0	9,8E-02	3,9E-01
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	MJ, net calorific value	256,8	18,6	5,3		2,0			2,9	0	1,5	-1,9
Use of non renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	256,8	18,6	5,3		2,0			2,9	0	1,5	-1,9
Use of secondary material	kg	0	0	0		0			0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Use of non renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Net use of fresh water	m^3	7,9E-02	5,1E-04	9,7E-04		3,0E-01			8,6E-05	0	2,4E-03	-2,0E-02

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table I.2. Parameters describing use of resources

3. Waste categories and other output flows

The data are included in the following table:

PARAMETER	UNIT	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,5E-02	0	2,2E-03	N.R.	1,8E-05	N.R.	N.R.	0	0	0	3,6E-05
Non hazardous waste disposed	kg	121,0	5,8E-02	6,8E-01		2,4E-02			9,4E-03	0	18,3	8,7
Radioactive waste disposed	kg	1,1E-02	3,3E-05	1,3E-04		3,7E-06			5,3E-06	0	0	2,5E-04

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table I.3. Parameters describing waste categories

4. Other output flows

The data are included in the following table:

PARAMETER	UNIT	ETAPAS DEL CICLO DE VIDA										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Materials for recycling	kg	0	0	1,6E-01		0			0	21,2	0	-3,9E-03
Materials for energy recovery	kg	0	0	4,9E-02		0			0	0	0	0
Exported energy	MJ per energy carrier	0	0	0		0			0	0	0	0

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table I.4. Parameters describing other output flows

Results of the LCA for the format with MINIMUM ENVIRONMENTAL IMPACT

1. Impact indicators

The data are included in the following table:

			LIFE CYCLE STAGES										
			PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
IMPACT CATEGORY	PARAMETER	UNIT	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Global warming	Global warming potential	kg CO_2 equiv	8,7	1,0	5,2E-01		1,5E-01			1,6E-01	0	1,4E-01	-1,3E-01
Ozone depletion	Ozone depletion potential	kg CFC 11 equiv	5,1E-07	1,9E-09	9,4E-09		5,4E-08			3,2E-10	0	1,2E-09	-1,5E-08
Acidification for soil and water	Acidification potential of soil and water	kg SO_2 equiv	3,1E-02	9,9E-03	5,0E-04		9,1E-04			8,0E-04	0	5,1E-04	7,2E-05
Eutrophication	Eutrophication potential	kg $(PO_4)^3$ equiv	3,7E-03	1,3E-03	2,1E-04	N.R.	1,6E-04	N.R.	N.R.	1,6E-04	0	7,4E-05	-2,8E-05
Photochemical ozone formation	Photochemical ozone formation potential	kg Ethene equiv	2,2E-03	7,6E-04	6,1E-05		2,6E-04			8,8E-05	0	8,9E-05	6,8E-07
Depletion of abiotic resources - elements	Abiotic depletion potential for non fossil resources	kg Sb equiv	1,1E-04	2,2E-08	6,6E-05		2,2E-07			3,7E-09	0	8,7E-10	6,5E-09
Depletion of abiotic resources – fossil fuels	Abiotic depletion potential for fossil resources	MJ (net calorific value)	110,6	13,0	4,2		1,3			2,1	0	1,0	-1,0

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement
B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table II.1. Parameters describing environmental impacts

2. Use of resources

The data are included in the following table:

PARAMETER	UNIT	ETAPAS DEL CICLO DE VIDA										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	14,8	2,3E-02	5,7E-02		2,1			4,1E-03	0	7,3E-02	2,7E-01
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0		0			0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	14,8	2,3E-02	5,7E-02		2,1			4,1E-03	0	7,3E-02	2,7E-01
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	MJ, net calorific value	164,7	13,2	5,3		2,0			2,2	0	1,1	-1,4
Use of non renewable primary energy resources used as raw materials	MJ, net calorific value	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	164,7	13,2	5,3		2,0			2,2	0	1,1	-1,4
Use of secondary material	kg	0	0	0		0			0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Use of non renewable secondary fuels	MJ, net calorific value	0	0	0		0			0	0	0	0
Net use of fresh water	m^3	6,1E-02	3,6E-04	9,7E-04		3,0E-01			6,4E-05	0	1,8E-03	-1,5E-02

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table II.2. Parameters describing use of resources

3. Waste categories and other output flows

The data are included in the following table:

PARAMETER	UNIT	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	9,6E-03	0	2,2E-03	N.R.	1,8E-05	N.R.	N.R.	0	0	0	3,3E-05
Non hazardous waste disposed	kg	60,0	4,1E-02	6,8E-01		2,4E-02			7,1E-03	0	13,7	6,5
Radioactive waste disposed	kg	5,5E-03	2,4E-05	1,3E-04		3,7E-06			4,0E-06	0	0	1,9E-04

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Potencial de reutilización, recuperación y reciclado de materiales

N.R.: Not Relevant

Table II.3. Parameters describing waste categories

4. Other output flows

The data are included in the following table:

PARÁMETRO	UNIDAD	LIFE CYCLE STAGES										
		PRODUCT STAGE	TRANSPORT / CONSTRUCTION		USE			END OF LIFE				BENEFITS AND LOADS BEYOND THE LIFE CYCLE
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
Componentes para su reutilización	kg	0	0	0	N.R.	0	N.R.	N.R.	0	0	0	0
Materiales para el reciclaje	kg	0	0	1,6E-01		0			0	15,9	0	-3,9E-03
Materiales para valorización energética (recuperación de energía)	kg	0	0	4,9E-02		0			0	0	0	0
Energía exportada	MJ por vector energético	0	0	0		0			0	0	0	0

A1. Raw materials supply
A2. Transport
A3. Production
A4 Transport to the building site
A5. Installation or construction

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement

B5. Refurbishment
B6. Operational energy use
B7. Operational water use

C1. De-construction, demolition
C2. Transport to waste processing
C3. Waste processing for reuse, recovery and/or recycling
C4. Disposal

D. Reuse, recovery and recycling potential

N.R.: Not Relevant

Table II.4. Parameters describing other output flows

PERONDA
CERAMICAS