GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

AENOR

Environmental Product Declaration

EN ISO 14025:2010
EN 15804:2012+A1:2013

Coverlam ceramic tiles (BIa classification in accordance with EN 14411:2016)

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COVERLAM by GRESPANIA
A NEW SKIN FOR ARCHITECTURE

GRESPANIA, S.A.

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

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AENOR is a founding member of ECO Platform, the European Association of Environmental Declarations verification Programmes

GlobalEPD-RCP-002 rev. 1
CEN standard EN 15804:2012+A1:2013 serves as the core RCP

Independent verification of the declaration and data, according to EN ISO 14025:2010

☐ Internal ☑ **External**

Organismo de verificación

AENOR

1 General Information

1.1. The organization

Grespania is an international company dedicated to manufacturing and marketing ceramic products featuring innovative properties and design. Ongoing investment, continual adoption of the latest advances in design and manufacturing and a paramount concern for the environment have all helped consolidate Grespania's global market leadership over the past 40 years.

Grespania currently has three factories employing state-of-the-art technologies and the most advanced processes for the production of porcelain floor tiles, white body wall tiles and thin, large-format laminate porcelain tiles in sizes up to 120x360 cm. In addition to its production centres in Spain, the company has subsidiaries in France, Italy, the Netherlands, Poland and the UK. Thanks to this combination of advanced production centres with a solid network of subsidiaries, Grespania is able to provide quality products worldwide.

1.2. Scope of the Declaration

This Environmental Product Declaration includes environmental information for the ceramic tiles (BIII), manufactured by GRESPANIA, S.A. in the geographical and technological environment of Spain 2017.

The results shown indicate the environmental performance of the average ceramic tile, weighted by production, as well as the environmental data for the tiles that register the minimum and maximum impact, thus delimiting the LCA results. This is a cradle-to-grave EPD.

1.3. Lyfe cycle and conformity

This EPD has been drawn up and verified according to UNE-EN ISO 14025:2010, UNE-EN 15804:2012+A1:2014 and the PCR indicated in table 1.

Title	Ceramic coverings
Registration code	GlobalEPD-RCP-002 rev. 1
Issue date	2018/07/11
Conformidad	UNE-EN 15804
Programme	GlobalEPD
Programme Operator	AENOR

Table 1. Information about the PCR

This EPD includes the life cycle stages indicated in table 2. Thus, this EPD is cradle to grave.

This Declaration cannot be subject to comparison with others as drawn up in other Programmes or in accordance with different reference documents. This EPD is not comparable with other EPD not developed according to the standard EN 15804. In the same way, environmental Declarations cannot be subject to comparison if the origin of the data is different (the data sets, for example), if not all the 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 EN ISO 14025, 6.7.2.

Product stage	A1	Raw material supply	X
	A2	Transport to the manufacturer	X
	A3	Manufacturing	X
Construction	A4	Transport to the building site	X
	A5	Installation / construction	X
Use stage	B1	Use	NR
	B2	Maintenance	X
	B3	Repair	NR
	B4	Replacement	NR
	B5	Refurbishment	NR
	B6	Operational energy use	NR
	B7	Operational water use	NR
End of life	C1	De-construction / demolition	NR
	C2	Transport	X
	C3	Waste processing	X
	C4	Disposal	X
	D	Reuse, recovery and/or recycling potentials	X

X = Module included in the LCA; NR = Not Relevant; MNA = Module Not Assessed

Table 2. System boundary. Information modules included

2 The product

2.1. Identification of the Product

COVERLAM are large-format ceramic tiles belonging to the BIa water absorption group, a classification based on UNE-EN 14411: 2016 (equivalent to ISO 13006:2018); that is, pressed ceramic tiles that have a water absorption coefficient of ≤ 0.5%.

COVERLAM includes different models with different formats; specifically, the product formats assessed within the scope of this analysis range in thickness from 3.5 mm to 10 mm and have an average weight of 11.7 kg/m^2.

The appendixes contain the results for the formats included within the scope of this EPD that register the minimum and maximum environmental impact, corresponding to the 3.5mm-thick 100x300cm format and the 10mm-thick 100x100cm format, respectively.

2.2. Intended use of the product

The function of the product is tiling surfaces. This analysis has evaluated environmental performance in the use stage of porcelain tiles employed as flooring in the interior of a home. However, the versatility of these pieces means that they can be installed in other places, such as offices, shops, hospitals, etc., in both indoor and outdoor spaces, as well as for tiling walls or other surfaces.

The Life Cycle Analysis (LCA) on which this declaration is based was carried out in adherence to ISO 14040 and ISO 14044 and the PCR document for ceramic tiles v.02, PCR nº 2 of the GlobalEPD Programme, which complies with UNE EN15804:2012+A1:2014.

The following table refers to the technical features of all ceramic tiles, and are those stipulated under UNE-EN 14411:2016.

2.3. Composition of the product

None of the components of the final product are included in the candidate list for authorization of substances of very high concern.

Substance	Content	Units
clay, feldspars, sand, and deflocculants	98%	kg/m^2
feldspars, carbonates, quartz, silicates, kaolins zirconium oxides, clay, alumina, zinc oxide	2%	kg/m^2

Table 3. Composition

Figure 1. Installed product

3 Information regarding the LCA

3.1. Life cycle analysis

The Life Cycle Analysis (LCA) on which this EPD is based was carried out using data provided directly by the manufacturer, Grespania S.A., on its COVERLAM ceramic tiles manufactured in 2017

The Life Cycle Analysis (LCA) on which this declaration is based was carried out in adherence to ISO 14040 and ISO 14044 and the GlobalEPD PCR-002 document version 2 for ceramic tiles of the GlobalEPD programme operated by AENOR.

The results for the COVERLAM tiles that have the least and the greatest environmental impact (corresponding to the 3.5mm-thick 100x300cm format and 10mm-thick 100x100cm format, respectively) are presented in Appendixes I and II. The software used for the LCA was GaBi 8.7.0.18, with the 8.007 version of the database (Thinkstep). The characterization factors used are those set out in UNE EN 15804:2012+A1:2014.

3.2. Functional unit

The functional unit considered is "**1 m² covering of a (flooring) surface for 50 years with COVERLAM ceramic tiles**".

3.3. Reference service life

The reference service life of the product is the same as that of the building where it is installed—provided that it has been correctly installed—since it is a long-lasting product and does not need replacing. The analysis is based on a service life of 50 years. See Table 4.

3.4. Allocation and cut-off criteria

In this cradle-to-grave LCA, a cut-off criterion of 1% has been applied for energy use (renewable and non-renewable) and 1% of the total mass in those unit processes for which there are insufficient data. In total, more than 95% of all system inputs and outputs of matter and energy have been included, with unavailable or unquantified data omitted.

The omitted data are the following:

- Diffuse emissions of particles into the atmosphere produced during the transportation and storage of powdered raw materials.
- Unlegislated channelled atmospheric emissions produced during the combustion stages (spray-drying, drying and firing of tiles).

Perfomance characteristic	Value	Units
Reference service life	Minimum 50 years	Years
Declared product properties (at gate), finishes, etc.	Minimum values for relevant characteristics according to Annex G of UNE-EN 14411. For more information, please request the manufacturer's technical data sheet for the model in question.	
Design parameters of the application (manufacturer's instructions)	Request the manufacturer's technical data sheet for the model in question.	
Estimation of the quality of work when installed in accordance with manufacturer's instructions	Request the manufacturer's recommendations for installation.	
Outdoor environment (for outdoor applications)	Values for the relevant characteristics according to Annex G of UNE-EN 14411. For more information, please request the manufacturer's technical data sheet for the model in question.	
Indoor environment (for indoor applications)	Values for the relevant characteristics according to Annex G of UNE-EN 14411. For more information, please request the manufacturer's technical data sheet for the model in question.	
Use conditions	For more information, please request technical data sheets for the model in question.	
Maintenance	For more information, please request technical data sheets for the model in question.	

Table 4. Reference service life

- The process of recycling and reusing the waste generated over the life cycle of the ceramic tiles, based on the PCR. However, the waste recycling process and the benefits derived from this recycling will be accounted for in module D.

- The production of machinery and industrial equipment. This is due to the difficulty of compiling an inventory all the goods involved, and also because the LCA community believes that the environmental impact per unit of product is relatively low compared to the other processes that are included. Moreover, the databases used do not include these processes, so any attempt to include them would require additional effort beyond the scope of this analysis. Likewise, the waste generated in the maintenance of this machinery and equipment is also excluded due to its low impact.

3.5. Representativeness, quality and selection of the data

The primary data have been directly provided by the company GRESPANIA S.A. and come from its manufacturing plant in Moncofa *(*Castellón, Spain*)*. Secondary data are sourced from GaBi databases, compilation 8007 and modelled with GaBi version 8.0.7.18. All data refer to the geographical scenario of Spain 2017.

The results presented are representative of COVERLAM tiles, expressed as an average and weighted by the production of ceramic tiles in the COVERLAM range. This average value is delimited on either side by the products that register the minimum and maximum environmental impact.

3.6. Other calculations rules and hypotheses

The load allocations applied were those required in order to be able to quantify the products that register the minimum and maximum environmental impact.

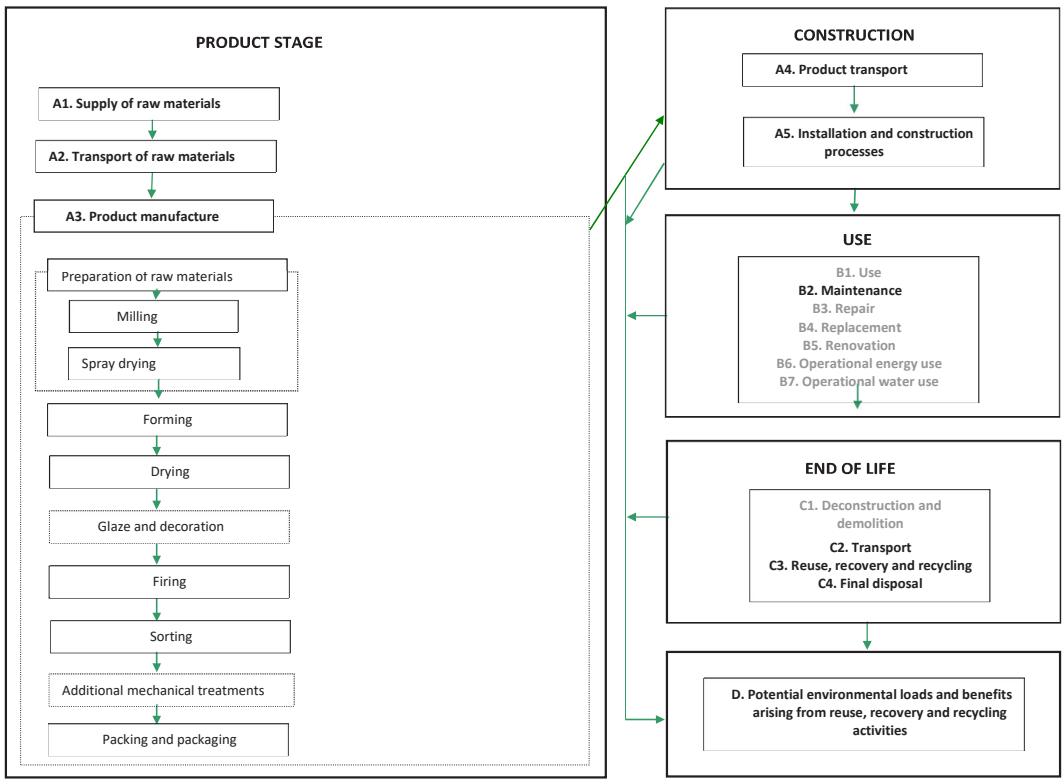

Figure 2. Life cycle

4 System boundaries, scenarios and additional technical information

4.1. Upstream processes and manufacturing (A1-A3)

The analysis includes all modules of the life cycle applicable to ceramic tiles, according to the PCR; see Figure 2.

Raw materials and transport (A1-A2)

The raw materials needed to manufacture ceramic tiles are classified as: plastic raw materials and non-plastic or tempering raw materials. It is generally accepted that the relative proportions of these two types of materials should be such that the mixture obtained is plastic enough to be enable proper moulding of the tile, while at the same time ensuring that the unfired tile is resistant enough to allow processing. The principal plastic raw materials are clay and kaolin. The most common non-plastic or tempering raw materials are siliceous sands and alkali feldspars. Other raw materials to consider are the waste from the factory itself, which can be sludge or raw or fired tile fragments, introduced in the milling stage of the raw materials.

As for the raw materials for the glazes, the most commonly-used ones are quartz, kaolin, alkali feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits. In addition, specifically-prepared ceramic pigments are also used, usually made by the calcination of oxides and additives (suspending agents, deflocculants, binders) in order to maintain the optimal rheological properties of the suspension and thus facilitate glazing and ensure the required appearance (texture, uniformity of colour)

Ceramic frits are insoluble glass, pre-prepared by fusing their original raw materials. It has been estimated that on average 36% of the raw materials used in the glazes applied to COVERLAM tiles are subjected to the process of "fritting".

The raw materials used are sourced from different locations, depending on their nature and properties. Raw materials from outside Spain are transported by cargo ship to the Port of Castellón, and from there by truck to the production plants. For marine transport, the analysis is based on a type of transoceanic cargo ship; the distance travelled differs in each case, depending on the source.

For road transport, the analysis is based on a 27t delivery truck that complies with Euro 6 legislation. All raw materials are transported in bulk; in other words, they do not require packaging, except for the decorative materials.

Manufacturing (A3)

The preparation of raw materials for Coverlam takes place in external companies.

In the formulation process, the proportion and source of the raw materials are defined in order to set the characteristics of the productive process and the required features of the end product.

After the raw materials have been mixed, this mixture is subjected to a process of wet milling and spray-drying to obtain the spray-dried granule.

The spray-dryer has a heat and power cogeneration system installed. Cogeneration produces electricity using the residual heat given off by combustion, by means of a system of steam turbines and alternators. All the hot gases are used in the spray-dryer. Part of the electrical energy generated is used in the production process, thereby reducing the demand for electricity from the grid, while part is sold to the grid, and is thus considered a co-product.

Once the spray-dried granule has been produced, this is transported in bulk in 27t dump trucks to the GRESPANIA factory. After arriving at the factory, the spray-dried powder is unloaded into storage hoppers. By means of a feeding system of conveyor belts fitted with scales, the granule is passed to the forming stage.

A continuous roller press system is used to form COVERLAM ceramic tiles. This system consists in dropping a controlled quantity—depending on the desired thickness—of spray-dried granule onto a conveyor belt. The upper belt running over the press makes it possible to produce thin, large-format slabs. The formed tiles are then fed into a continuous dryer to reduce their moisture content and thereby increase their mechanical resistance, which enables their subsequent processing.

Just after they come out of the dryer, the tiles are coated with a thin layer of engobe and glaze, applied using digital glazing and spraying techniques.

The tiles are then decorated using different types of applications, primarily inkjet and, to a lesser degree, crushed frits and the rotogravure technique.

Firing is the most important stage in the ceramic tile production process as it is the moment when the properties of the pieces, which have already been formed, undergo a fundamental change, yielding a hard material, resistant to water and chemicals. The product is fired in single-layer roller kilns.

After firing, some of the tiles are taken to specialized companies to carry out mechanical treatments such as cutting, surface polishing, rectifying, etc.

After passing quality control processes, the sorted tiles are first packed in cardboard packaging, then stacked on wooden pallets and wrapped in LDPE plastic.

4.2. Transport to site and construction process

Transport to site (A4)

33% of the product is distributed within Spain, 32% to Europe and 35% to the rest of the world.

For road transport, the analysis is based on a 27 t EURO 6 truck. For transcontinental transport, estimates are based on a medium-sized transoceanic cargo ship. All models used are included in the GaBi database version 8.7.0.18

Parameter	Value	Units
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc.	0,16 l diesel fuel (27t Euro 6 truck) 0,0001 l fuel oil (cargo ship)	
Distance	300 km national distribution: 33% 1390 km distribution to rest of Europe: 32% 6520 km distribution to the rest of the world: 35%	km
Capacity utilisation (including empty returns)	85 % for road transport and 100% for cargo ship	%
Bulk density of transported products	415,4	kg/m³
Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	0,2	

Table 5. A4 Transport to site

Product installation and construction process (A5)

After removing the packaging, the product is installed. As per the data obtained and in order to apply a real-world scenario, it has been established that the application of quick-drying mortar is required for the installation.

Adhesive mortars are cementitious adhesives made up of a mixture of hydraulic binders, mineral fillers, and organic additives. They just need to be mixed with water or a liquid addition immediately before use. These mortars consist of a mixture of grey or white cement, siliceous and/or limestone mineral fillers, and organic additives: water retaining components, water-redispersible polymers, rheological modifiers, fibres, etc.

Waste from the packaging of the tiles is managed separately, depending on the geographical location of the place of installation.

Parameter	Value	Units
Ancillary materials for installation (specified by material)	Adhesive cement: 3.5kg	
Water use	0,00088	m³
Other resource use	Not applicable	
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Packaging waste Cardboard: 0,16 Film: 0,02 Wood: 0,33	kg
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	Incinerated cardboard: 0.001 Recycled cardboard: 0,010 Cardboard sent to landfill: 0,001 Incinerated plastic: 0.0011 Recycled plastic: 0,0072 Plastic sent to landfill: 0.002 Incinerated wood: 0,012 Recycled wood: 0.,12 Wood sent to landfill: 0,03	kg

Table 6. A5 Installation of the product in the building

4.3. Use related to the building fabric and the operation of the building

Once installed, the tile does not require any energy input for its use, nor does it require any maintenance except for standard cleaning. As such, of all the abovementioned modules, only the environmental loads attributable to the maintenance of the product are considered (module B2).

According to GRESPANIA, S.A., the reference service life of the product is the same as that of the building where it is installed–provided that it has been correctly installed–since it is a long-lasting product

and does not need replacing. The analysis is based on a service life of 50 years.

Maintenance (B2)

Tiles are cleaned with a damp cloth and if the surface shows any dirt or grease, cleaning agents such as detergents or bleach can be added. This analysis is based on the consumption of water and disinfectant for floor tiles installed in a residential use scenario; that is, tiles are cleaned with water once a week and with water and detergent every two weeks over the 50-year service life.

Parameter	Value	Units
Maintenance process	Washed once a week with water and every two weeks with water and detergent (residential use)	
Maintenance cycle	Not applicable	
Ancillary materials for maintenance, e.g. cleaning agent, specify materials	Detergent: 1.34 E-04 kg/wash	kg/cycle
Waste material resulting from maintenance (specify materials)	Not applicable	
Net fresh water consumption during maintenance	0,1 l water/wash	l/cycle
Energy input during maintenance, e.g. vacuum cleaning, energy carrier type, e.g. electricity, and amount, if applicable and relevant	Not applicable	

Table 7. Use stage. B2 Maintenance

4.4. End of life

Deconstruction and demolition (C1)

After reaching the end of its service life, the product shall be removed, either as part of a building renovation or during demolition. When part of the demolition of a building, the impacts attributable to the removal of the product are negligible.

Transport (C2)

Product waste is transported by a truck that complies with Euro 6 regulations, over a distance of about 50 km to the destination.

Waste processing (C3)

Based on the distribution of tiles (A5), and the latest statistical data (Eurostat, 2016), 76% of construction and demolition waste is sent for reuse, recovery and recycling.

Disposal (C4)

20 % of the product is sent to controlled landfill.

Parameter	Value	Units
Collection process	0	kg collected separately
	16,4	kg collected with construction waste mixture
Recovery system specified by type	0	kg for reuse
	13,2	kg for recycling
	0	kg for energy recovery
Distance to disposal	50	km
Disposal	3,2	kg
Assumptions for scenario development, e.g. transportation	Product waste is transported by heavy-duty truck (24 t) that complies with Euro 6 regulations. Estimates are based on a distance of 50 km, both to the final disposal point and to the recycling plant. Also included is the truck's return trip (100% empty returns)	

Table 8. End of life

4.5. Benefits and loads beyond the system boundary

It is assumed that loads are avoided in the manufacturing stage (waste such as cardboard, plastic and wood), in the installation stage (waste from tile packaging: cardboard, plastic and wood) and at the end of life of the product.

5 Declaration of the environmental parameters of the LCA and LCI

The table below shows the average parameter values of the LCA.

The results associated with the ceramic tiles that have the greatest and least environmental impact are presented in Appendixes I and II.

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	9,0	4,3E-01	4,0E-01		1,4E-01							6,0E-02	0	3,2E-02	-1,65E-01
ODP	3,5E-08	1,2E-14	2,2E-13		6,7E-08							1,6E-15	0	3,3E-14	-3,06E-09
AP	1,8E-02	3,4E-04	6,6E-04		7,4E-04							4,6E-05	0	1,9E-04	-5,80E-04
EP	2,1E-03	7,7E-05	1,2E-04	NR	1,9E-04	NR	NR	NR	NR	NR	NR	1,1E-05	0	2,6E-05	-7,30E-05
POCP	1,4E-03	4,7E-05	5,3E-05		2,4E-04							6,6E-06	0	1,5E-05	-6,19E-05
ADPE	3,1E-06	3,5E-08	6,1E-07		1,9E-07							4,9E-09	0	1,2E-08	-3,55E-08
ADFP	137,9	5,8	2,1		7,2E-01							8,1E-01	0	4,2E-01	-3,7

GWP	*[kg CO_2 eq]*	Global warming potential
ODP	*[kg CFC-11 eq]*	Depletion potential of the stratospheric ozone layer
AP	*[kg SO_2 eq]*	Acidification potential of soil and water
EP	*[kg $(PO_4)^{3-}$ eq]*	Eutrophication potential
POCP	*[kg Ethene eq]*	Formation potential of tropospheric ozone
ADPE	*[kg Sb eq]*	Abiotic depletion potential for non fossil resources
ADPF	*[MJ]*	Abiotic depletion potential for fossil resources

Table 9. Parameters describing environmental impacts defined in EN 15804

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	23,3	3,2E-01	4,9E-01		2,6							4,5E-02	0	5,1E-02	-0,7
PERM	0	0	0		0							0	0	0	0
PERT	23,3	3,2E-01	4,9E-01		2,6							4,5E-02	0	5,1E-02	-0,7
PENRE	149,5	5,8	2,3		8,2E-01							8,1E-01	0	4,3E-01	-4,05
PENRM	0	0	0		0							0	0	0	0
PENRT	149,5	5,8	2,3	NR	8,2E-01	NR	NR	NR	NR	NR	NR	8,1E-01	0	4,3E-01	-4,05
SM	0	0	0		0							0	0	0	0
RSF	0	0	0		0							0	0	0	0
NRSF	0	0	0		0							0	0	0	0
FW	2,7	2,5E-02	1,8E-01		1,1E-01							3,5E-03	0	2,4E-02	-2,3E-01

PERE *[MJ]* Use of renewable primary energy excluding renewable primary energy resources used as raw materials

PERM *[MJ]* Use of renewable primary energy resources used as raw materials

PERT *[MJ]* Total use of renewable primary energy resources

PENRE *[MJ]* Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials

PERNRM *[MJ]* Use of non renewable primary energy resources used as raw materials

PERNRT *[MJ]* Total use of non renewable primary energy resources

SM *[MJ]* Use of secondary material

RSF *[MJ]* Use of renewable secondary fuels

NRSF *[MJ]* Use of non renewable secondary fuels

FW *[m³]* Net use of fresh water

Table 10. Parameters describing resource use

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	2,3E-02	0	0		0							0	0	0	4,4E-04
NHWD	107,2	2,1E-02	6,2E-01		7,9E-02							3,0E-03	0	4,1	-3,41
RWD	4,6E-03	7,9E-06	1,0E-04		8,5E-06							1,1E-06	0	5,9E-06	-4,8E-07
CRU	0	0	0	NR	0	NR	NR	NR	NR	NR	NR	0	0	0	0
MFR	0	0	8,2E-02		0							0	8,2	0	-7,7E-02
MER	0	0	0		0							0	0	0	0
EEE	0	0	0		0							0	0	0	0

HWD	*[kg]*	Hazardous waste disposed
NHWD	*[kg]*	Non hazardous waste disposed
RWD	*[kg]*	Radioactive waste disposed
CRU	*[kg]*	Components for re-use
MFR	*[kg]*	Materials for recycling
MER	*[kg]*	Materials for energy recovery
EEE	*[MJ]*	Exported electric energy

Table 11. Parameters describing output flows and waste categories

6 Additional environmental information

6.1. Indoor air emissions

As part of the manufacturing process, ceramic tiles undergo a thermal process exceeding 1000 °C. At these temperatures, any organic compound in the composition decomposes, resulting in an end product that is inert and free from volatile organic compounds that could be emitted in its use stage.

6.2. Release to soil and water

Ceramic tiles do not release any compounds into either the soil or water in their use stage. This is because it is an entirely inert product that does not undergo any physical, chemical or biological transformations; it is neither soluble nor combustible; it is not physically or chemically reactive; it is not biodegradable; and it does not adversely affect other materials with which it comes into contact in such a way as to generate environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to the quality of surface or groundwater.

ANNEX I Declaration of the environmental parameters of the LCA and LCI for the format with the MINIMUM environmental impact

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	6,3	2,9E-01	2,7E-01		9,3E-02							4,1E-02	0	2,2E-02	-1,12E-01
ODP	2,5E-08	7,9E-15	1,5E-13		4,5E-08							1,1E-15	0	2,2E-14	-2,08E-09
AP	1,3E-02	2,3E-04	4,5E-04		5,0E-04							3,1E-05	0	1,3E-04	-3,94E-04
EP	1,6E-03	5,2E-05	7,9E-05	NR	1,3E-04	NR	NR	NR	NR	NR	NR	7,2E-06	0	1,8E-05	-4,95E-05
POCP	1,0E-03	3,2E-05	3,6E-05		1,6E-04							4,5E-06	0	1,0E-05	-4,20E-05
ADPE	2,6E-06	2,4E-08	4,2E-07		1,3E-07							3,3E-09	0	7,9E-09	-2,41E-08
ADFP	94,1	3,9	1,4		4,9E-01							5,5E-01	0	2,8E-01	-2,5

GWP	*[kg CO_2 eq]*	Global warming potential
ODP	*[kg CFC-11 eq]*	Depletion potential of the stratospheric ozone layer
AP	*[kg SO_2 eq]*	Acidification potential of soil and water
EP	*[kg $(PO_4)^{3-}$ eq]*	Eutrophication potential
POCP	*[kg Ethene eq]*	Formation potential of tropospheric ozone
ADPE	*[kg Sb eq]*	Abiotic depletion potential for non fossil resources
ADPF	*[MJ]*	Abiotic depletion potential for fossil resources

Table I.1. Parameters describing environmental impacts defined in EN 15804

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	20,0	2,2E-01	3,3E-01		1,8							4,0E-02	0	3,4E-02	-0,5
PERM	0	0	0		0							0	0	0	0
PERT	20,0	2,2E-01	3,3E-01		1,8							4,0E-02	0	3,4E-02	-0,5
PENRE	104,3	3,9	1,6		5,6E-01							7,2E-01	0	2,9E-01	-2,8
PENRM	0	0	0		0							0	0	0	0
PENRT	104,3	3,9	1,6	NR	5,6E-01	NR	NR	NR	NR	NR	NR	7,2E-01	0	2,9E-01	-2,8
SM	0	0	0		0							0	0	0	0
RSF	0	0	0		0							0	0	0	0
NRSF	0	0	0		0							0	0	0	0
FW	2,1	1,7E-02	1,2E-01		7,4E-02							3,1E-03	0	1,6E-02	-1,6E-01

PERE *[MJ]* Use of renewable primary energy excluding renewable primary energy resources used as raw materials

PERM *[MJ]* Use of renewable primary energy resources used as raw materials

PERT *[MJ]* Total use of renewable primary energy resources

PENRE *[MJ]* Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials

PERNRM *[MJ]* Use of non renewable primary energy resources used as raw materials

PERNRT *[MJ]* Total use of non renewable primary energy resources

SM *[MJ]* Use of secondary material

RSF *[MJ]* Use of renewable secondary fuels

NRSF *[MJ]* Use of non renewable secondary fuels

FW *[m³]* Net use of fresh water

Table I.2. Parameters describing resource use

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	1,6E-02	0	0		0							0	0	0	3,0E-04
NHWD	72,9	1,4E-02	4,2E-01		5,3E-02							2,6E-03	0	2,8	-2,3
RWD	3,9E-03	5,4E-06	7,1E-05		5,8E-06							9,8E-07	0	4,0E-06	-3,3E-07
CRU	0	0	0	NR	0	NR	NR	NR	NR	NR	NR	0	0	0	0
MFR	0	0	5,6E-02		0							0	5,6	0	-5,2E-02
MER	0	0	0		0							0	0	0	0
EEE	0	0	0		0							0	0	0	0

HWD *[kg]* Hazardous waste disposed
NHWD *[kg]* Non hazardous waste disposed
RWD *[kg]* Radioactive waste disposed
CRU *[kg]* Components for re-use
MFR *[kg]* Materials for recycling
MER *[kg]* Materials for energy recovery
EEE *[MJ]* Exported electric energy

Table I.3. Parameters describing output flows and waste categories

ANNEX II Declaration of the environmental parameters of the LCA and LCI for the format with the MAXIMUM environmental impact

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	17,7	9,7E-01	9,2E-01		3,1E-01							1,4E-01	0	7,4E-02	-3,78E-01
ODP	7,1E-08	2,7E-14	5,0E-13		1,5E-07							3,7E-15	0	7,5E-14	-7,00E-09
AP	3,1E-02	7,7E-04	1,5E-03		1,7E-03							1,0E-04	0	4,4E-04	-1,33E-03
EP	3,5E-03	1,8E-04	2,7E-04	NR	4,4E-04	NR	NR	NR	NR	NR	NR	2,4E-05	0	6,0E-05	-1,67E-04
POCP	2,6E-03	1,1E-04	1,2E-04		5,4E-04							1,5E-05	0	3,4E-05	-1,41E-04
ADPE	4,1E-06	8,0E-08	1,4E-06		4,4E-07							1,1E-08	0	2,7E-08	-8,11E-08
ADFP	280,5	13,2	4,7		1,7							1,9	0	9,6E-01	-8,4

GWP	*[kg CO_2 eq]*	Global warming potential
ODP	*[kg CFC-11 eq]*	Depletion potential of the stratospheric ozone layer
AP	*[kg SO_2 eq]*	Acidification potential of soil and water
EP	*[kg $(PO_4)^{3-}$ eq]*	Eutrophication potential
POCP	*[kg Ethene eq]*	Formation potential of tropospheric ozone
ADPE	*[kg Sb eq]*	Abiotic depletion potential for non fossil resources
ADPF	*[MJ]*	Abiotic depletion potential for fossil resources

Table II.1. Parameters describing environmental impacts defined in EN 15804

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	23,9	7,3E-01	1,1		6,0							1,3E-01	0	1,2E-01	-1,7
PERM	0	0	0		0							0	0	0	0
PERT	23,9	7,3E-01	1,1		6,0							1,3E-01	0	1,2E-01	-1,7
PENRE	292,6	13,2	5,3		1,9							2,4	0	9,9E-01	-9,3
PENRM	0	0	0		0							0	0	0	0
PENRT	292,6	13,2	5,3	NR	1,9	NR	NR	NR	NR	NR	NR	2,4	0	9,9E-01	-9,3
SM	0	0	0		0							0	0	0	0
RSF	0	0	0		0							0	0	0	0
NRSF	0	0	0		0							0	0	0	0
FW	4,1	5,8E-02	4,1E-01		2,5E-01							1,1E-02	0	5,5E-02	-5,3E-01

PERE *[MJ]* Use of renewable primary energy excluding renewable primary energy resources used as raw materials

PERM *[MJ]* Use of renewable primary energy resources used as raw materials

PERT *[MJ]* Total use of renewable primary energy resources

PENRE *[MJ]* Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials

PERNRM *[MJ]* Use of non renewable primary energy resources used as raw materials

PERNRT *[MJ]* Total use of non renewable primary energy resources

SM *[MJ]* Use of secondary material

RSF *[MJ]* Use of renewable secondary fuels

NRSF *[MJ]* Use of non renewable secondary fuels

FW *[m³]* Net use of fresh water

Table II.2. Parameters describing resource use

	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	5,3E-02	0	0		0							0	0	0	1,0E-03
NHWD	239,9	4,8E-02	1,4		1,8E-01							8,7E-03	0	9,3	-7,8
RWD	4,3E-03	1,8E-05	2,4E-04		2,0E-05							3,3E-06	0	1,4E-05	-1,1E-06
CRU	0	0	0	NR	0	NR	NR	NR	NR	NR	NR	0	0	0	0
MFR	0	0	1,9E-01		0							0	18,7	0	-1,8E-01
MER	0	0	0		0							0	0	0	0
EEE	0	0	0		0							0	0	0	0

HWD	*[kg]*	Hazardous waste disposed
NHWD	*[kg]*	Non hazardous waste disposed
RWD	*[kg]*	Radioactive waste disposed
CRU	*[kg]*	Components for re-use
MFR	*[kg]*	Materials for recycling
MER	*[kg]*	Materials for energy recovery
EEE	*[MJ]*	Exported electric energy

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

References

[1] General Instructions of the GlobalEPD Programme, 2nd revision. AENOR. February 2016

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

[3] EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

[4] Sectoral Life Cycle Analysis of ceramic tiles. Annex I of report C180794 of the Institute of Ceramic Technology.

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