EPD

CERTIFICATION

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AMALFI COLLECTION

Product

Medium Porcelain Stoneware

Owner

cifre cerámica

Product description

The product covered is Medium Porcelain Stoneware that includes several models of Porcelain Stoneware.

PCR Reference

RCP002 - Productos de revestimiento cerámico – V.2 (2015)

Production plant

CIFRE CERÁMICA S.L.
Ctra. Vila-real – Onda km. 10
12200 Onda – Castellón SPAIN

Validity

From: 07/05/2019 To: 07/05/2024

ENVIRONMENTAL PRODUCT DECLARATION
Medium Porcelain Stoneware
EXECUTIVE SUMMARY

PROGRAMME OPERATOR DAPconstrucción®

Environmental product declarations of construction sector
www.csontenible.net

Administrator of Programme Operator

Col·legi d'Aparelladors, Arquitectes Tècnics de Barcelona i Enginyers de l'Edificació (CAATEEB)
Bon Pastor, 5 · 08021 Barcelona
www.apabcn.cat

Owner of the Declaration

CIFRE CERÁMICA S.L.
Ctra. Vila-real – Onda km 10. 12200 Onda – Castellón, SPAIN.

Declaration carried out by:

ReMa-INGENIERÍA, S.L.
Calle Crevillente 1, entlo - 12005 Castellón - SPAIN

Declaration Number

DAPcons®.002.023

Declared Product

Medium Porcelain Stoneware

Product description

The product in question is a Medium Porcelain Stoneware that includes several models of Porcelain Stoneware. The variability of Life Cycle Inventory Assessment (LCIA) results doesn't exceed 10%.

Registration date

07/05/2019

Validity

This verified declaration authorises the owner to use the DAPcons® eco-label logo. The declaration is applicable exclusively to the product in question and for five years as of the date of registration.The responsible for the information contained in this declaration is:
CIFRE CERÁMICA S.L.

Endorsed by CAATEEB	Endorsed by authorised verifier
Mr. Jordi Gosalves i López, President of the CAATEEB	Mr. Ferran Pérez, Verifier accredited by the DAPconstruction® Program

ITeC
Institut de Tecnologia de la Construcció de Catalunya

This environmental product declaration complies with standards ISO 14025 and UNE EN 15804 + A1 and contains information of an environmental nature about the life cycle of Medium Porcelain Stoneware by CIFRE at its plant in Vall d'Alba, Castellón, Spain. This declaration is based on the document RCP 002 Productos de revestimiento cerámico – Versión 2 – 2015.09.18. The environmental product declaration (DAPcons®) may not be comparable to another EPD if it is not based on the UNE EN 15804 + A1 standard

EPD

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1. PRODUCT DESCRIPTION AND APPLICATION

The product covered is Medium Porcelain Stoneware that includes several models of porcelain stoneware whose variability of Life Cycle Inventory Assessment (LCIA) results doesn't exceed 10%.

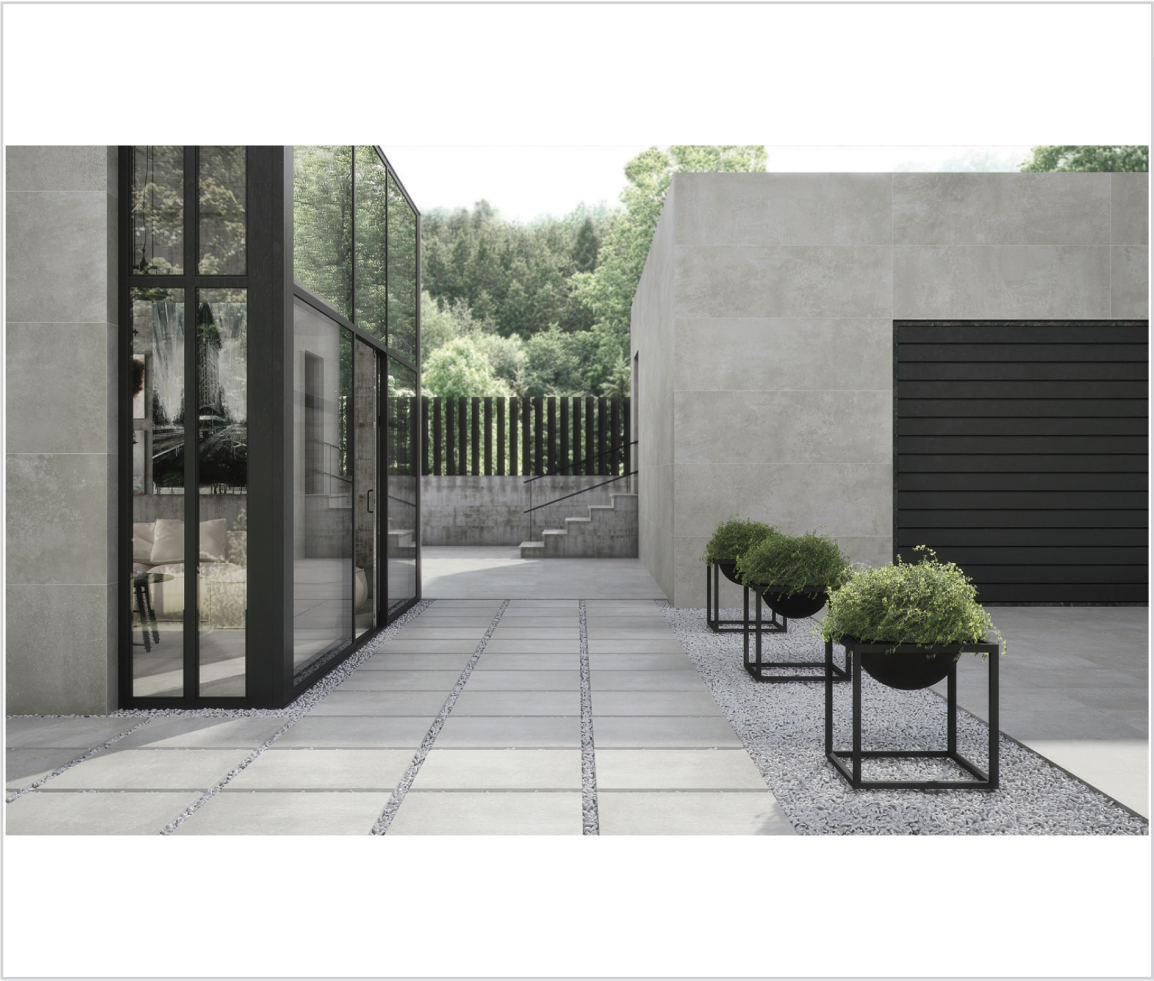
It includes the formats 20x120, 60x120, 30x60, 60x60, 75x75, 21,5x90, 90x90, 25x150, 75x150, 33,3x33,3 and 45x45, belonging the following water absortion groups:

- Group BIa: dry-pressed tiles with a rate of water absortion E ≤0,5%.

- Group BIb: dry-pressed tiles with a rate of water absortion between 0,5%< E ≤3%.

Average weight: 22,39 kg/m2

The main recommended use for this product is to tile floors and/or clad walls and façades, both exterior and interior.



2. LIFE CYCLE PHASES DESCRIPTION

2.1. Manufacture (A1, A2 and A3)

Raw materials (A1 and A2)

The Medium Porcelain Stoneware basically consists of clay, sand and feldspar with an enamel layer mainly comprising feldspar, carbonate, silicate and kaolin, amongst others.

The raw materials used have different origins (provincial, national, Turkey, Ukraine, Italy or the United Kingdom). This variation is due to the inability to obtain these materials from a single source. The raw materials from outside Spain are transported by freighter to the port of Castellón and then by truck to the plants. For marine transport, a transoceanic freighter was chosen, with transport distance differing according to the source (Turkey, UK, Ukraine). All raw materials are transported by bulk, i.e. they do not require any packaging materials.

Manufacturing (A3)

The production plant has several suppliers of spray-dried powder. The raw materials arrive at the spraying plant and are stored in silos. Before use, the raw materials are mechanically ground by a hammer mil to get them loose. Once the mixture is made, it is subjected to the processes of grinding and spraying. This stage of the production process consists of obtaining a homogeneous mixture of the different components with a determined particle size and conditioning it for the appropriate molding of the piece.
The spray-dried powder is transported in bulk to the production plant, where it is stored in silos. Subsequently, the spray-dried clay is sent to the press through a sieve. As flat tiles have an easy shape (rectangular, square, etc.) and hold a small thickness-surface ratio, its moulding its carried out by one-way dry pressing with single-acting press, where only one of the surfaces of the piece receives pressure. The freshly-moulded pieces are introduced in a drying system similar to a wheel with a given lap-time according to each product in order to reduce its moisture, doubling or tripling its mechanical resistance, which allows a later processing. The tiles leaving the drying plant are covered by one or more glazing layers by using bell-shaped glaze application or under pressure glazing application system (airless). The firing is the most important stage of the production process of ceramic tiles, as this is when the previously moulded tiles undergo a fundamental modification of their properties. Once fired, some tiles are sent to classification, whereas others are sent to the squaring process to meet the client requirements. Finally, the tiles are packaged using cardboard, pallets and polyethylene. Once the pallet is made up, it is stored in the logistics area of the plant.

2.2. Construction (A4 and A5)

Product transport to the building site (A4)

Using the data provided by the company from the country sales of the products, an average transport distance has been calculated.

The truck used complies with the Euro III standard, consumes 1,25E-05 kg of diesel / kg of transported cargo and km traveled.

For transcontinental transport, medium-sized transoceanic freighters are considered appropriate.

Table 1. Transport scenarios of product to the building site

Destination	Type of transport	Percentage (%)	Average Km
Spain	27 t truck	35,57	390
Europe	27 t truck freighter	31,45	1180,36 1444,08
Rest of the world	27 t truck freighter	32,98	589,19 6480,80
		Total 100%	

Construction and instalation process (A5)

Once the product is unpacked, it can be installed. According to the data obtained and with a view to applying a real scenario, it is established that installation calls for the use of adhesive mortar (CaSO4). Tile adhesives are cement-based adhesives comprising a mixture of hydraulic binders, mineral fillers and organic additives, mixed with water or added liquid just before use. They consist of a mixture of white or grey cement, siliceous and/or limestone mineral fillers and organic additives, water retainers, water redispersible polymers, rheology modifiers, fibres, etc.

2.3. Product use (B1-B7)

The use phase is divided into the following modules: Use (B1), Maintenance (B2), Repair (B3), Replacement (B4), Rehabilitation (B5), Use of operational energy (B6) and Use of operational water (B7).
Once installed, the Medium Porcelain Stoneware product requires no further energy input for use, nor does it call for maintenance, except normal cleaning operations. For this reason, of all the modules listed above, only the environmental impacts attributable to product maintenance are applicable (module B2). According to CIFRE, the life cyle of the reference product is the same as that of the building in which it is used. Prrovided that it is correctly installed, it is a lasting and difficult to Access product. Therefore, it is not easy to replace.

Maintenance (B2): The product should be cleaned with a damp cloth. If the surface is dirty or greasy, cleaning agents such as detergents or bleach may be added. This study considers the consumption of water and disinfectant for a scenario of residential use.

Scenario 1: residential use – 0.03 kg of detergent and 5 l of water are used to wash 50 m2 of tiles, once a week.

2.4. End-of-life (C1-C4)

- Deconstruction and demolition (C1): Once it reaches the end of its life cycle, the product will be removed, either in the framework of rehabilitation of the building or during its demolition. In the case of the demolition of a building, the impacts attributable to the removal of the product are negligible.

- Transport (C2): The product waste is transported by truck in compliance with Euro III norms, to its destination at a distance of 50 km.

- Waste management for reuse, recovery and recycling (C3): Nowadays, in Spain there is no specific basic legislation on the production and management of waste produced by construction and demolition (CDW). Therefore it is covered by Basic Law 10/1998 on waste. The most usual type of treatment of CDW in Spain is to place it in a landfill site (83%), and the rest is recycled. This is the scenario applied in this report; 17% of the product is recycled.

- Disposal (C4): 83% of the product is sent to a landfill site.

2.5. Benefits and loads beyond the system boundary (D)

It is considered that impacts are avoided in the installation (waste of packaging such as cardboard, plastic and pallets) and at the end of the product life.

3. LIFE CYCLE ASSESSEMENT

The life cycle assessment on which this declaration is based was carried out in keeping with ISO standards 14040 and 14044 and the document RCP 002 Productos de revestimiento cerámico Version 2 – 2015.09.18.

This LCA is “cradle to grave”, that is, it covers the phases of manufacture of the product, construction, use and end of life.

Specific data from the production plant in Vall d’Alba, Castellón, Spain corresponding to the year 2016 has been used to inventory the manufacturing phase. For the rest of the phases, generic data has been used, taken mostly from the official database of the Program Operator DAPcontruccion and the Ecoinvent v3.2 database.

3.1. Functional unit

The functional unit is “1 m2 of flooring of a dwelling with Medium Porcelain Stoneware for 50 years of residential use”.

3.2. System boundary

Table 2. Declared modules

Product stage			Construction Process Stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw materials supply	Transport	Manufacturing	Transport	Construction – Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X = Included in LCA **MND** = Module Not Declared

3.3. Data analysis for the life cycle (ACV)

Table 3. Indicators of the environmental impact

Parameter	Unit	Life Cycle Phase									
		Manufacture	Construction		Use				End of Life		
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4
Abiotic Resources Depletion Potential (elements)	kg Sb eq	9,68E-02	5,74E-03	4,67E-03	0,00E+00	1,03E-02	0,00E+00	0,00E+00	6,73E-04	8,47E-05	1,37E-03
Abiotic Resources Depletion Potential (fossil fuels)	MJ, net calorific value	2,01E+02	1,50E+01	9,34E+00	0,00E+00	2,14E+01	0,00E+00	0,00E+00	1,40E+00	1,76E-01	2,84E+00
Acidification potential	Kg SO_2 eq	4,97E-02	1,20E-02	2,68E-03	0,00E+00	1,27E-02	0,00E+00	0,00E+00	6,43E-04	1,23E-04	8,84E-04
Ozone Depletion potential	Kg CFC-11 eq	2,43E-06	1,62E-07	2,54E-08	0,00E+00	3,34E-07	0,00E+00	0,00E+00	1,60E-08	1,68E-09	2,93E-08
Global warming	Kg CO_2 eq	1,13E+01	1,05E+00	5,64E-01	0,00E+00	2,75E+00	0,00E+00	0,00E+00	9,72E-02	1,48E-02	1,02E-01
Eutrophication	kg $(PO_4)^{3-}$ eq	6,62E-03	1,58E-03	7,75E-04	0,00E+00	8,47E-03	0,00E+00	0,00E+00	1,11E-04	7,03E-06	1,57E-04
Photochemical ozone formation, POCP	kg ethene eq	2,04E-03	4,11E-04	1,68E-04	0,00E+00	2,32E-03	0,00E+00	0,00E+00	1,42E-05	5,81E-06	3,72E-05

A1. Raw materials suply
A2. Transport
A3 Manufacturing Product
A4. Transport
A5. Construction – Installation process

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement
B5. Refurbisshment
B6. Operational Energy use
B7. Operational water use

C1. Decosntruction and demolition
C2. Transport
C3. Waste management for reuse, recovery and recycling.
C4. Disposal

MND. Module not declared

Table 4. Indicators of resources use

Parameter	Unit	Life Cycle Phase									
		Manufacture	Construction		Use			End of life			
		A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw material	MJ	8,26E+00	1,45E-01	9,41E-01	0,00E+00	5,20E+00	0,00E+00	0,00E+00	3,89E-03	1,94E-02	6,82E-02
Use of renewable primary energy used as raw material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	8,26E+00	1,45E-01	9,41E-01	0,00E+00	5,20E+00	0,00E+00	0,00E+00	3,89E-03	1,94E-02	6,82E-02
Use of non-renewable primary energy, exclouding the resources of non-renewable primary energy used as a raw material	MJ	2,02E+02	1,62E+01	9,36E+00	0,00E+00	3,41E+01	0,00E+00	0,00E+00	1,52E+00	2,09E-01	3,05E+00
Use of non-renewable primary energy used as raw material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	2,02E+02	1,62E+01	9,36E+00	0,00E+00	3,41E+01	0,00E+00	0,00E+00	1,52E+00	2,09E-01	3,05E+00
Use of secondary materials	kg	1,26E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m^3	2,77E-02	6,34E-04	2,54E-03	0,00E+00	8,75E-01	0,00E+00	0,00E+00	3,40E-05	3,04E-05	1,89E-04
Hazardous waste disposed	kg	3,64E-04	5,32E-06	1,47E-05	0,00E+00	3,35E-05	0,00E+00	0,00E+00	3,54E-07	1,02E-07	1,91E-06
Non-hazardous waste disposed	kg	1,75E+00	7,97E-03	2,67E-01	0,00E+00	3,56E-01	0,00E+00	0,00E+00	2,66E-04	1,68E-04	1,86E+01
Radioactive waste disposed	kg	2,21E-04	1,07E-04	4,57E-05	0,00E+00	5,77E-05	0,00E+00	0,00E+00	1,04E-05	1,17E-06	1,90E-05
Components for its reutilisation	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for the recycling	kg	5,61E+00	0,00E+00	1,71E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,81E+00	0,00E+00
Materials for the energetic evaluation	kg	2,57E-03	0,00E+00	6,92E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	6,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

A1. Raw materials suply
A2. Transport
A3 Manufacturing Product
A4. Transport
A5. Construction – Installation process

B1. Use
B2. Maintenance
B3. Repair
B4. Replacement
B5. Refurbisshment
B6. Operational Energy use
B7. Operational water use

C1. Decosntruction and demolition
C2. Transport
C3. Waste management for reuse, recovery and recycling.
C4. Disposal

MND. Module not declared

3.4. Potential environmental benefits and impacts derived from activities of reuse, recovery and recycling

Table 5. Indicators of impact evolution. Reuse, recovery and recycling

Parameter	Unit expresed by functional unit or declared unit	D.
Potential depletion of abiotic resorces (ADP-elements)*	Kg Sb eq	-1,67E-03
Potential depletion of abiotic resorces (ADP-fossil fuels)*	MJ, net calorific value	-2,98E+00
Potential acidification of the ground and water resources, AP	Kg SO_2 eq	-6,86E-04
Ozone depletion potential, ODP	Kg CFC-11 eq	-2,68E-08
Global warming potential, GWP	Kg CO_2 eq	-1,47E-01
Eutrophication potential, EP	Kg $(PO4)_3$ eq	-2,58E-04
Photochemical ozone creation potential, POCP	Kg ethene eq	-3,71E-05

* ADP-elements: including all the non-renewable abiotic material resources
* ADP-fossil fuels: Incuding all the fossil resources

Table 6. Life cycle inventory data. Reuse, recovery and recycling

Parameter	Unit expresed by functional unit or declared unit	D.
Use of renewable primary energy, exclouding the resources of non-renewable primary energy used as a raw material	MJ	-6,01E-03
Use of renewable primary energy used as raw material	MJ	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	-6,01E-03
Use of non-renewable primary energy, exclouding the resources of non-renewable primary energy used as a raw material	MJ	-8,06E-01
Use of non-renewable primary energy used as raw material	MJ	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	-8,06E-01
Use of secondary materials	kg	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00
Net use of fresh water	m^3	-1,33E-05
Hazardous waste disposed	kg	-6,85E-07
Non-hazardous waste disposed	kg	-3,42E-04
Radioactive waste disposed	kg	-2,21E-07
Components for its reutilization	kg	0,00E+00
Materials to recycle	kg	0,00E+00
Materials for the energetic valorization	kg	0,00E+00
Exported energy	MJ	0,00E+00

MJ, net calorific value

3.5. Recommendations of this DAP

Construction products should be compared by applying the same functional unit and level of building, i.e. including the product's behaviour throughout its life cycle.
Environmental product declarations of different systems of type III eco-labelling are not directly comparable, as the rules of calculation may be different.
This declaration represents the average behaviour of the Medium Porcelain Stoneware product by CIFRE.

3.6. Cut-off rules

Over 95% of all the inputs and outputs of mass and energy of the system have been included, excluding, among others, diffuse emissions in the factory.

3.7. Additional environmental information

The porcelain stoneware does not release hazardous substances in indoor air, soil and water during the use phase.

3.8. Other data

Waste from the ceramics industry is included as "non-hazardous waste" in the European List os Waste under LOW code 17 01 03 "tiles and ceramics" and EWC 17 01 07 "Mixtures of concrete, bricks, tiles and ceramics other tan those mentioned in 17 01 06".

4. TECHNICAL INFORMATION AND SCENARIOS

4.1. Transport from the factory to the building site (A4)

Parameter	Parameter expresed by declared unit
Type and consumption of fuel or vehicle used	17t truck:1,19E-05 kg diesel/kgkm 27t truck:1,25E-05 kg diesel/kgkm
Distance	Road transport: 767 km Sea transport: 4547 km
Utilization of the vehicle (including the empty return)	85% for road transport and 100% for freighter
Density of the transported product	1.490 kg/m3
Factor of calculating the capacity of the volume used	1

4.2. Installation processes (A5)

Parameter	Parameter expresed by declared unit
Auxiliary materials for installation	Mortar: 3.5 kg
Water consumption	0.875 kg of water
Consumption of other resources	There is no consumption of other resources
Quantitive despription of the type of energy and consumption during the installation process	There is no energy consumption
Waste in the construction site, generated by the installation of the product (specify types)	Plastic waste: 1,86E-02 kg Wood waste: 1,59E-01 kg Cardboard waste: 1,96E-01
Material output as a result of the waste management processes in the place of installation. For example: collection for recycling, for energetic recovery and final disposal	See previous point, “Waste on the construction site, generated by the installation of the product”
Emisions to the air, ground or water	Not detected

4.3. Reference service life (B1)

Parameter	Parameter expresed by declared unit
Reference service life	50 years
Properties and characteristics of the product	material for wall and floor covering-
Requirements (maintenance frequency, ways of using, repair, etc.)	-

4.4. Maintenance (B2), repair (B3), replacement (B4) or refurbishement (B5)

Parameter	Parameter expresed by fdeclared unit
Maintenance, for example: cleaning agent, type of surfactant	Cleaning: detergent + water
Maintenance cycle	1 cleaning / week
Auxiliar materials for the maintenance process	Detergent 0.00006 kg / cleaning
Energy imput for the maintenance process	-
Net consumption of fresh water during the maintenance or repair process	0.1 kg / cleaning
Inspection, maintenance or repair process	-
Inspection, maintenance or repair cycle	-
Auxiliary materials, e.g. lubricant	-
Changing of parts during the product life cycle	-
Energy input during the process of maintenance, type of energy, e.g. electricity and quantity	-
Energy input during the process of reparation, renovation, replacement, if it is applicable and significant	-
Loss of material during maintenance or repair	-
Service life of the product for inclusion as a basis to calculate the number of times a change is needed in the building	50 years

4.5. Operational use of energy (B6) and water (B7)

Parameter	Parameter expresed by declared unit
Energy type, for example: electricity, natural gas, use of heat for a district	Does not require water or energy
Output power potential of equipments	-
Net consumption of fresh water	-
Characteristic representation (energy efficiency, emissions...)	-

4.6. End of life (C1-C4)

Process	Parameter expressed for declared unit of the components, products or materials
Collection processes	22,39 kg collected together with construction waste
Recycling systems	3,81 kg
Disposal	18,58 kg

5. ADDITIONAL INFORMATION

Declaration of Performance:
Nº 001-CPR-PRBR-2013-07-01
Nº 004-CPR-PR-2013-07-01
Nº 006-CPR-PRAD-2013-07-01
Nº 008-CPR-GPAD-2013-07-01
Nº 009-CPR-PRF-2013-07-01

- Euroclass reaction to fire: A1 / A1fl
- Breaking strength: BIa Group ≥ 1300 N BIb Group ≥ 1100 N
- Water absorption: BIa Group E ≤ 0,5% BIb Group 0,5%< E ≤3%.

6. PCR AND VERIFICATION

This declaration is based on the Document

RCP 002 Productos de revestimiento cerámico - Version 2 – 2015.09.18.

Independent verification of the declaration and data according to ISO 14025 and UNE EN15804 + A1

☐ Internal ☒ External

Independent verifier appointed

Mr. Ferran Pérez, Verifier accredited by the DAPconstruction® Program

ACAT Oficina d'Acreditació d'Entitats Col·laboradores
Verificació VEDAP-001-10

Verification date

24 / 04 / 2019

References

• ANÁLISIS DE CICLO DE VIDA DE LOS PRODUCTOS: GRES PORCELÁNICO MEDIO (BIa - BIb) CIFRE CERÁMICA, S.L. ReMa-INGENIERÍA, S.L. 2019 (no publicado)
• ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework y Requirements and guidelines
• ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
• Handbook of Emission Factors for Road Transport (HBEFA). 2016. http://www.hbefa.net/
• GaBi Database & Modelling Principles. Version 1.0, November 2013. PE International. 2013.

ADMINISTRATOR OF PROGRAMME OPERATOR

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EMAS GESTIÓ AMBIENTAL VERIFICADA REG. No. 000142

CERTIFICAZIONE DI SISTEMA AMBIENTALE DNV·GL ISO 14001