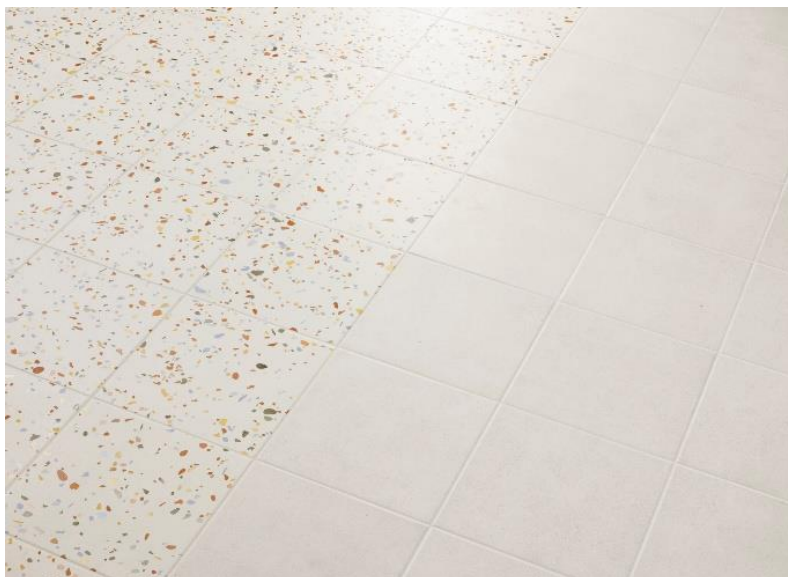


# ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION FORM

## ENVIRONMENTAL PRODUCT DECLARATION

*In compliance with the standard NF EN 15804+A2 and the national  
supplement NF EN 15804+A2/CN*

Floor Tiles (Group Blb)  
([translation to English](#))



Registration number: 20240136726 ([the original verified and approved  
FDES/EPD is in French](#))

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Version: 1.1

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## 1. Notice

The information contained in this declaration is provided under the responsibility of Aleluia Cerâmicas, SA in accordance with the standard NF EN 15804+A2 and the national supplement NF EN 15804+A2/CN:2022.

Any use, total or partial, of the information provided in this document must be accompanied, at a minimum, by the full reference to the original FDES, as well as its producer, who may provide a complete copy.

The standard EN 15804:2012+A2:2019+AC from CEN, and the national supplement NF EN 15804+A2/CN serve as rules for defining product categories (PCR).

NOTE The literal translation into French of “EPD (Environmental Product Declaration)” is “DEP” (Déclaration Environnementale de Produit). However, in France, the term FDES (Fiche de Déclaration Environnementale et Sanitaire) is commonly used, which brings together both the Environmental Declaration and Health information of the product covered by this FDES. The FDES is, therefore, a “EPD” complemented by health information.

## 2. Reading guide

The inventory data visualization complies with the requirements of the standard NF EN 15804+A2 and the national supplement NF EN 15804+A2/CN.

Reading example:  $-9.0 \text{ E } -03 = -9.0 \times 10^{-3}$  (scientific writing).

The following display rules apply:

- When the inventory calculation result is zero, then the zero value will be displayed.
- Abbreviation used:
  - N/A: Not applicable
  - UF: Functional Unit
  - LCA: Life Cycle Assessment
  - RSL: Reference Service Life
  - LCV: Lower Calorific Value
- The units used are specified before each flow:
  - the kilogram “kg”,
  - the gram “g”,
  - the liter “l”,
  - the kilowatt-hour “kWh”,
  - the megajoule “MJ”,
  - the square meter “m<sup>2</sup>”
  - Kelvin “K”,
  - the watt “W”,
  - the kilometer “km”,
  - the millimeter “mm”.

### **3. Precaution is using FDES for products comparison**

The FDES of construction products may not be comparable if they do not comply with the NF EN 15804+A2 standard.

The NF EN 15804+A2 standard defines in § 5.3 Comparability of EPD\* for construction products, the conditions under which construction products can be compared, based on the information provided by FDES:

*“Consequently, a comparison of the environmental performance of construction products using EPD information shall be based on the product’s use in and its impacts on the building, and shall consider the complete life cycle (all information modules)”*

*NOTE 1 Outside the scope of environmental assessment of a building, FDES are not tools for comparing construction products and services.*


*NOTE 2 To evaluate the contribution of buildings to sustainable development, a comparison of environmental aspects and impacts must be carried out in conjunction with the socioeconomic aspects and impacts related to the building.*

*NOTE 3 Reference values are necessary for the interpretation of a comparison.*

## 1 General information

Name(s) and address(es) of the declarant(s)	Aleluia Cerâmicas, SA Avenida Europa, 466. Quinta do Simão, Esgueira 3800-230 Aveiro. Portugal
The unit(s), manufacturer or group of manufacturers or their representatives for whom the FDES is representative	Manufacturing units: – Esgueira Unit - Avenida Europa, 466. Quinta do Simão, Esgueira   3800-230 Aveiro. Portugal – Ílhavo Unit - Zona Industrial da Mota, Gafanha da Encarnação 3830-527 Gafanha da Encarnação Portugal
Type of FDES	“cradle-to-grave” including module D
Type of FDES	Individual “scope”
Identification of the product by its name or explicit designation or by commercial reference(s)	Floor Tiles from the Blb group flooring (thickness from 6mm to 8.5mm)

Independent external verification carried out in accordance with the environmental declaration program in compliance with ISO 14025:2006 by:

The EN 15804+A2 standard from CEN serves as PCR	
Independent verification of declaration and data, according to EN ISO 14025:2010	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Third-Party Verification:	 <p>Verifier: Thomas Peverelli Verification program: FDES INIES Address: Association HQE, 4 Avenue Recteur Poincaré, 75016 Paris</p>
Program registration number according to ISO 14025	20240136726
Date of 1st publication:	January 2024
Verification date:	January 2024
Validity period:	5 years

## 2 Functional unit and product description

### 2.1 Functional unit description

To cover and decorate 1m<sup>2</sup> of interior or exterior surface/floor over the reference period of 50 years with Single-fired white body glazed floor tiles - Group Blb, according to the installation conditions.

### 2.2 Functional unit main performance

Table 1– Technical characteristics of Floor Tiles – EN 14411: Group Blb – Esgueira and Ílhavo manufacturing unit

Features	Standard	Specification EN 14411 Group Blb – GL	ALELUIA Results Specification
Size tolerance (%)	EN ISO 10545 - 2	± 0.6 (± 2 mm limit)	±0.4
Thickness (%)		± 5 (± 0.5 mm limit)	± 5 (± 0.5 mm limit)
Rectilinearity (%)		± 0.5 (± 1.5 mm limit)	±0.3
Orthogonality (%)		± 0.5 (± 2 mm limit)	±0.4
Flatness		± 0.5 (± 2 mm limit)	- 0.10 / + 0.15
<ul style="list-style-type: none"> <li>Central Curvature (%)</li> <li>Lateral rotation (%)</li> <li>Diagonal deflection (%)</li> </ul>		± 0.5 (± 2 mm limit)	- 0.10 / + 0.15
Surface quality (%)		≥ 95	≥ 95
Water absorption (%)	EN ISO 10545 - 3	> 0.5 and ≤ 3	≤ 3
Modulus of rupture (N/mm <sup>2</sup> )	EN ISO 10545 - 4	≥ 30	≥ 30
Flexion resistance (N)		W/thickness ≥ 7.5mm ≥ 1100 W/thickness < 7.5 mm ≥ 700	W/thickness ≥ 7.5mm ≥ 1100 (3) W/thickness < 7.5mm ≥ 700 (4)
Thermal shock resistance	EN ISO 10545-9	Resistant	Resistant
Crack resistance	EN ISO 10545-11	Resistant	Resistant
Stain resistance	EN ISO 10545-14	Minimum Class 3	Class 4 or 5
Chemical Resistance	EN ISO 10545-13	Minimum Class B	Class A
<ul style="list-style-type: none"> <li>Household Detergents</li> <li>Additives for pools</li> <li>Acids</li> <li>Alkalis</li> </ul>		Minimum Class B	Class A
		(1)	Class LA (1a)
		(1)	Class LA (1a)
Resistance to abrasion	EN ISO 10545 – 7	I to V	I to V (5)
Resistance to deep abrasion (mm <sup>3</sup> )	EN ISO 10545-12	Resistant	Resistant
Resistance to slipping	DIN 51130	Available test	Product by product
	DIN 51097		
	UNE 41901EX		

(1) To be indicated by the Producer – Product by Product; (1a) Acids and alkalis (Low concentration); (3) Sizes: 20x20; 45x45cm; (4) Size: 20x20cm

### 2.3 Product description and packaging

The floor tiles produced by the Esgueira unit comply with the European standard EN 14411 dry-pressed ceramic floors and wall tiles and ceramic floors and wall tiles with water absorption below 3% and above 0.5% (Group Blb - Annex H - GL).

The product is packed in primary cardboard box, covered with plastic film, and then placed on wooden pallets.

## 2.4 Description of product use (application areas)

These products have a wide range of applications in construction. They are used on interior and exterior floors of the following buildings:

- residential,
- public,
- industrial.

The Blb floor tile products developed by ALELUIA are multiple, depending on their application. These types of products are available on the market with a wide range of aesthetic and dimensional options, both in terms of visual effects as well as textures and colors.

## 2.5 Other technical characteristics not included in the functional unit

See point 2.2

## 2.6 Description of the main components and/or materials of the product

Table 2– Floor Tiles – Group Blb composition

<i>Parameters</i>	<i>Percentage (%)</i>	<i>Mass (kg)</i>
Ceramic support	97.0	17.27
Glaze, colorants, frits, and additives	3.0	0.53

Table 3 presents the reference flow of the life cycle assessment, the quantities of the studied product required by the described functional unit, any additional products required, and packaging quantities for the finished product.

Table 3– Reference flow, complementary product, and finished product packaging descriptions.

<i>Parameters</i>	<i>Unit</i>	<i>Value</i>
Reference flow		
Floor Tiles - Blb Group (Tiles)	kg/ m <sup>2</sup>	17.8
Reference thickness (average)	mm	6 to 8.5
Additional product required for installation		
Adhesive mortar for the installation of floor tiles coverings - Group Blb	kg/ m <sup>2</sup>	3.3
Finished product packaging		
Cardboard box	g/ m <sup>2</sup>	144.4
PE Film	g/ m <sup>2</sup>	39.9
Wooden pallet	g/ m <sup>2</sup>	461.0

## 2.7 Specify if the product contains substances from the candidate list of substances according to the REACH regulation (if greater than 1% by mass)

This product does not contain hazardous substances listed in the REACH candidate lists above the 0.1% limit (declaration).

## 2.8 Aptitude test for usage

The products comply with the standards EN 14411 “Ceramic tiles - Definitions, classification, characteristics, and marking” and ISO 13006 “Ceramic tiles — Definitions, classification, characteristics and marking”.

## 2.9 Distribution circuit (BtoB or BtoC)

BtoB.

## 2.10 Description of the reference service life (if applicable and in accordance with 7.3.3.2 of NF EN 15804)

In accordance with EN 17160, the PCR of this product, based on EN 14411:2012 (Ceramic tiles - Definitions, classification, characteristics, and marking), the reference service life of the product is estimated to be 50 years. See also Table H.2 — List of standard RSLs by product category (NF EN 15804+A2/CN). No repairs, renovations, or replacements are required during the service life.

Table 4– Description of the reference service life.

<i>Parameters</i>	<i>Units (expressed per functional unit or per unit)</i>
Reference Service Life	50 years
Declared product properties (at the factory gate)	See Table 1
Theoretical application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	NF P 61-204-1 – DTU52.2
Assumed quality of work	According to the manufacturer's instructions
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	NF P 61-204-2/3 – DTU52.2
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	NF P 61-204-1/3 – DTU52.2
Usage conditions, e.g. frequency of use, mechanical exposure	NF P 61-204-1 – DTU52.2
Maintenance service scenario, e.g. required frequency, type and quality and replacement of components	Wash with water and detergent once a week

## 2.11 Information describing biogenic carbon content

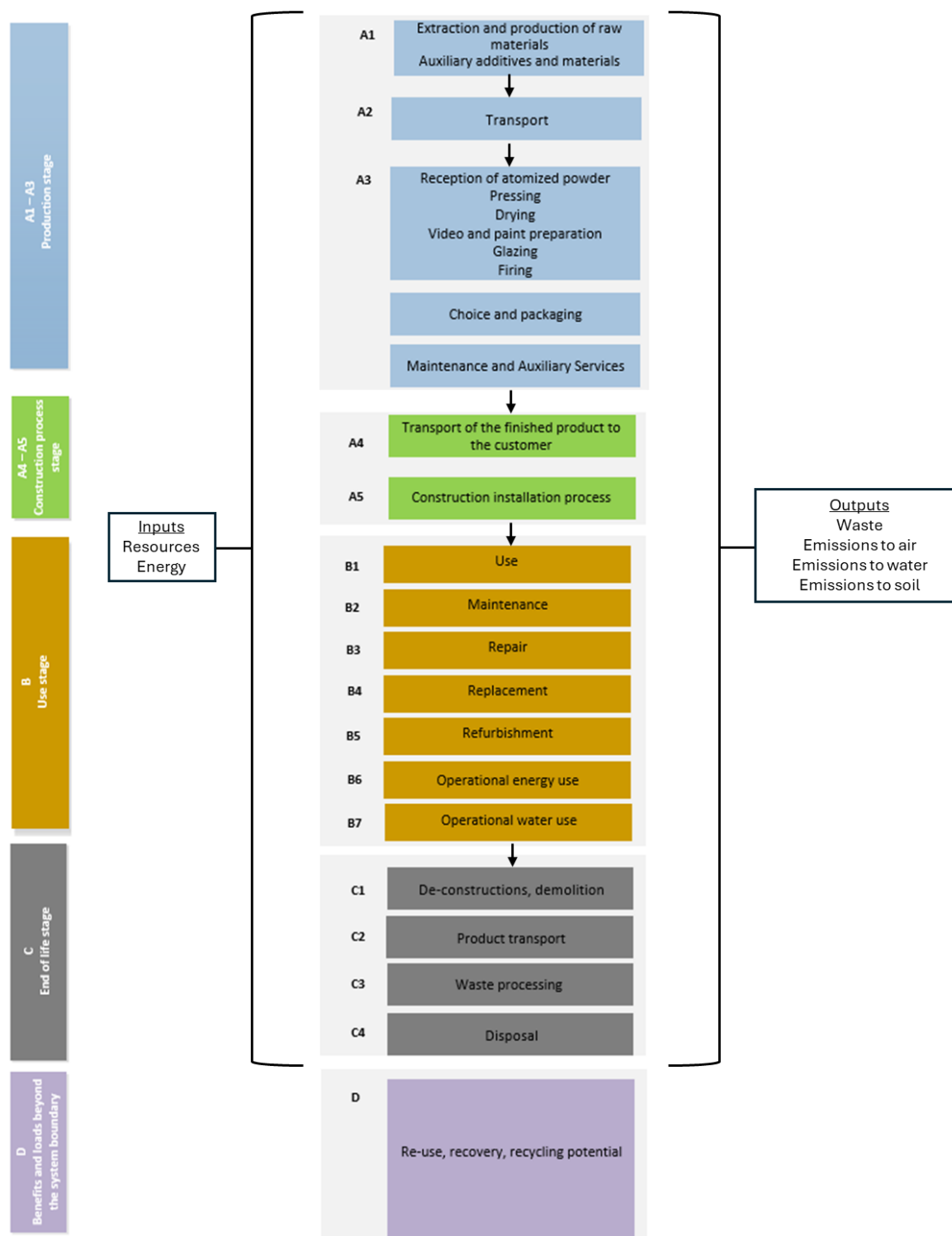
<b>Biogenic carbon content</b>	<b>Unit (expressed per functional unit)</b>
Biogenic carbon content of the product (at the factory gate)	0 kg C
Biogenic carbon content of associated packaging (at the factory gate)	2.34E-01 Kg C





### 3 Life cycle stages

The Environmental Product Declaration type carried out is from “cradle to grave” including module D (A1-D). The entire life cycle was taken into consideration.



DESCRIPTION OF THE SYSTEM BOUNDARIES (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)														
PRODUCT STAGE	CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Products	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-constructions, demolition	Transport	Waste processing	Disposal	Re-use, recovery, recycling potential
A1-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

### 3.1 Production stage, A1-A3

The A1 to A3 stages include the extraction of raw materials, their transport to the factory and the manufacturing of the product.

A1 – Extraction and transformation of raw materials: this stage includes the extraction and possible transformation of raw materials. The raw materials used are natural, synthetic and additives and the main ones are clays, feldspars, sands, and kaolin. The atomized powder preparation is carried out in an external factory.

A2 – Transport: the raw and auxiliary materials are transported by a cistern truck or by boat followed by a cistern truck.

A3 – Production:

The Aleluia (Esgueira and Ílhavo) possesses a technically advanced and innovative production process. This floor tile manufacturing process is called single-fired, meaning that both the base and the glaze are fired in a single firing.

The floor paste has a high percentage of feldspars which, after firing, results in a product with low water absorption and high mechanical resistance.

The manufacturing units (Esgueira and Ílhavo) purchases their coverings, flooring, and porcelain stoneware pastes from a Portuguese company in the form of atomized powder. After receiving the atomized powder, the process continues with pressing, quick drying, and glazing/decoration. All these operations are done continuously. Subsequently, the ceramic tiles are fired (rapid cycle) in roller kilns, and then they are selected and packaged.

In this way, the materials are transformed into new crystalline and glazed compounds that impart specific properties to the fired product: maintaining shape, good mechanical resistance, low porosity, chemical resistance, etc.

The firing is carried out using natural gas for heat propagation inside the roller kiln for ceramic product pastes.

The product that comes out of the Kiln is sorted and identified by quality, shades, and calibers, in the selection and packaging section. Semi-automatic machines are used to perform this task. Subsequently, the product is packed in boxes, wrapped in plastic film (plastification) and placed on wooden pallets (palletization).

Quality control covers the entire production process (from raw material reception to finished product) and aims to ensure product compliance with pre-established standards and norms. This can be done either by the laboratory throughout the production process or at the output of the selection section.

The products marketed by Aleluia only enter the final product warehouse after quality control approval.

After the operations described above, the product enters the finished product warehouse. This warehouse is responsible for controlling the flow and storing the finished product, efficiently ensuring the quality of the shipping service to the customer.

### 3.2 Construction process stage, A4-A5

Module A4 includes the transport from the production site to the installation site of the floor tiles. The scenario is based on a distance of 1435 km. This is the average of the distances to the destinations/departments in France, weighted by the quantities transported. This scenario is similar to the one defined in the EN 17160 standard. The transport is carried out by truck with a payload of 25 tons.

Table 5– A4 – Transport to the site

Scenario information	Units (expressed per functional unit)
Type of fuel and vehicle consumption or type of vehicle used for transport, e.g. long-distance truck, boat, etc.	Vehicle type: truck with 25 t payload class EURO 6 <i>Liters of fuel per distance or vehicle type, Commission Directive 2007/37/EC (European Emissions Standard)</i>
Distance	1435 km
Capacity utilization (including empty returns)	36%
Apparent density of the transported products	266.7 kg/m <sup>3</sup>
Volume capacity utilization coefficient	Coefficient: <1 for compressed or embedded products

Table 6– A5 - Building installation

Scenario information	Units (expressed per functional unit)
Auxiliary inputs for installation (specified by material)	3.3 kg of adhesive mortar for laying <b>ceramic flooring – Grupo B1b</b>
Water use	0.8 dm <sup>3</sup>
Use of other resources	--
Quantitative description of the type of energy (regional mix) and consumption during the installation process	--
Waste generated on the construction site prior to processing of waste generated by product installation (specified by type)	<b>B1b</b>
	Drop rate: 3%
	Ceramic scrap: 534g
	Card: 148g
	PE film: 41g
	Pallets: 475g
Materials (specified by type) produced by waste processing on the construction site, e.g. collection for recycling, energy recovery, disposal (specified by method)	<b>B1b</b>
	Recycled product waste: 373.8g
	Waste products to landfill: 160.2g
	Incinerated card: 12.3g
	Recycled card: 125.9g
	Card for landfill: 10.6g
	Incinerated PE: 12.9g
	Recycled PE: 15.3g
	PE for landfill: 12.9g
	Incinerated wood: 142.5g
	Recycled wood: 171.4g
	Wood for landfill: 161.0g
Direct emissions to ambient air, soil, and water	--

### 3.3 Use stage (exclusion of potential savings), B1-B7

The use stage is divided into seven modules:

Module B1 considers the use of the installed product.

When using floor tiles, no substances are released into the environment.

Module B2 includes maintenance (cleaning) of the tiles during their service life.

Tiles do not require replacement, repair, or rehabilitation, so modules B3-B4-B5 are exempt from impacts.

Modules B6-B7 are impact exempt.

**Table 7– Maintenance (B2)**

Scenario information	Units (expressed per functional unit)
<b>B2 Maintenance (if applicable)</b>	
Maintenance process	Cleaning 52 times a year (residential use)
Maintenance cycle	2600 per RSL or 52 per year
Auxiliary inputs for maintenance (e.g. cleaning product, specify materials)	0.134 ml of detergent and 0.1 l of water are used to wash 1 m <sup>2</sup> of floor tiles - Grupo B1b, once a week
Waste produced during maintenance (specify materials)	Not applicable
Net consumption of freshwater during maintenance	2.60E-01 m <sup>3</sup> per RSL
Energy input during maintenance (e.g. vacuuming), energy carrier type, for example electricity, and quantity, if applicable and relevant	Not applicable

### 3.4 End of life stage C1-C4

C1. De-constructions/demolition: after the end of its service life, the product will be removed either as part of the building's rehabilitation or during its demolition.

In the context of a building's demolition, the impacts attributable to the removal of the product are insignificant.

C2. Transport for waste treatment: the product's waste is transported by truck (50 km) for waste treatment.

C3. Waste treatment for reuse, recovery and/or recycling: 70% (EN 17160 and NF EN 15804+A2/CN).

C4. Waste disposal: 30% of the product is destined for landfill (in accordance with EN 17160 and NF EN 15804+A2/CN).

**Table 8– End of life**

Process	Units (expressed per functional unit of components, Products or materials specified by material type)
Collection process specified by type	Collection with mixed construction waste: 17.80 kg (100%) of product + 3.3 kg of mortar
Recovery system specified by type	0 kg destined for reuse 14.77 kg destined for recycling (70%) 0 kg destined for energy recovery
Disposal specified by type	6.33 kg of product destined for disposal (landfill) (30%)
Assumptions for scenario development (e.g. transportation)	Transport distance: 50km Transport using truck with a payload of 25 t class EURO 6

### 3.5 Re-use/ recovery/ recycling potential, D

Environmental benefits and loads beyond the system boundary.

After de-constructions/demolition stage, ceramic tiles can be rectified and used in various applications according to EN 17160.

In this case, and according to data from the APA (Portuguese Environmental Agency), Portugal has a valorization rate of around 75%. Therefore, 70% floor tiles were considered (NF EN 15804+A2).

In this case, the modeling was performed based on the replacement of natural lightweight aggregates (70%) with “crushed ceramic tiles”.

Valued materials/matter leaving the system boundary	Recycling processes beyond the system boundary	Saved materials/matter/energy	Associated quantities (expressed per functional unit)
Aggregates of crushed ceramic tiles	Not applicable. The necessary processes are accounted in module C3 and even in transport	Natural lightweight aggregates	12.5 kg/m <sup>2</sup>

The packaging materials used for exclusive purposes are analyzed to be below the exclusion criteria used and the cutoff rule.

## 4 Information to calculate life cycle assessment

Used CPR	NF EN 15804+A2:2019 and NF EN 15804+A2/CN EN 17160:2019 - Product category rules for ceramic tiles														
System boundary	“cradle to grave” including module D. The entire life cycle was taken into consideration. The life cycle stages included are:  - Product Stage (A1–A3) – the raw material supply stage (A1), transport (A2) and manufacturing (A3).  - Construction Process Stage (A4 – A5) – Transport (A4) and Installation (A5)  - Use stage (B1-B7)  - End of life stage (C1-C4)  - Environmental benefits and loads beyond the system boundary (D)														
Allocation rules	In this study associated with the manufacture of <b>Floor Tiles - Bib Group</b> , there are no co-products produced during its manufacturing process. However, in the same factory, porcelain tiles (Bla) are also produced at the Esgueira unit and BIII at the Ílhavo unit.  For certain flows, allocation was established based on measurements taken in each workshop. For any other flow, allocation is based on mass.														
Geographic representativeness and temporal representativeness of primary data	The primary data is from 2021. They are representative of the production of products in Portugal. The transport, construction, use and end-of-life scenarios are representative of product’s use in France. The sources are ALELUIA data, official statistics, and EN 17160:2019.  The base data is from Ecoinvent 3.7 (2021).														
Variability of results (for non-specific FDES, i.e. collective, individual and generic FDES )	The factory produces floor tiles of different sizes.  The maximum value of the range interval for each indicator of the environmental impact categories is less than or equal to 1.2 times the absolute value of the indicator’s average.  The maximum and minimum values of the indicators are as follows: <table><tr><th>Indicator</th><th>Minimum</th><th>Maximum</th></tr><tr><td>Climate change – total (kg CO<sub>2</sub> eq )</td><td>1.71E+01</td><td>1.95E+01</td></tr><tr><td>Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials (MJ, PCI)</td><td>2.51E+02</td><td>2.85E+02</td></tr><tr><td>Non-hazardous waste disposed (kg)</td><td>7.55E+00</td><td>8.75E+00</td></tr></table>			Indicator	Minimum	Maximum	Climate change – total (kg CO <sub>2</sub> eq )	1.71E+01	1.95E+01	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials (MJ, PCI)	2.51E+02	2.85E+02	Non-hazardous waste disposed (kg)	7.55E+00	8.75E+00
Indicator	Minimum	Maximum													
Climate change – total (kg CO <sub>2</sub> eq )	1.71E+01	1.95E+01													
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials (MJ, PCI)	2.51E+02	2.85E+02													
Non-hazardous waste disposed (kg)	7.55E+00	8.75E+00													
Environmental assessment methods	The retained indicators and impact categories for the environmental assessment were those indicated in the standard NF EN 15804+A2:2019/CN and its national supplement.  The environmental assessment was conducted using the SimaPro software version 9, with the Ecoinvent database.														

## 5 Life cycle assessment results

Below are tables summarizing the LCA results.

Due to rounding, totals may not equal the rounded sum. MND: Module not declared

For energy indicators used as raw materials: a negative value corresponds to the change in the use of raw materials for fuels (in the case of incineration, for example). Application of Annex I of NF EN 15804+A2/CN.

### CORE ENVIRONMENTAL IMPACT INDICATORS

Environmental Impact	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Global warming - total <i>kg CO<sub>2</sub>equiv/UF</i>	1.26E+01	3.45E+00	1.65E+00	0.00E+00	5.78E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-01	4.72E-02	5.27E-02	-2.55E-02
Global warming – fossil <i>kg CO<sub>2</sub>equiv/UF</i>	1.29E+01	3.44E+00	1.10E+00	0.00E+00	5.63E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-01	4.71E-02	5.26E-02	-2.40E-02
Global warming - biogenic <i>kg CO<sub>2</sub>equiv/UF</i>	-3.50E-01	2.75E-03	5.45E-01	0.00E+00	1.48E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.59E-05	3.47E-05	1.51E-04	-1.58E-03
Global warming – Land use and land use change <i>kg CO<sub>2</sub>equiv/UF</i>	1.60E-02	2.61E-05	5.71E-04	0.00E+00	3.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.10E-07	6.90E-07	1.19E-06	-1.41E-05
Depletion of the stratospheric ozone layer <i>kg CFC 11 equiv / UF</i>	2.34E-06	8.00E-07	9.79E-08	0.00E+00	6.16E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.79E-08	1.06E-08	1.19E-08	-4.44E-09
Acidification <i>mol H<sup>+</sup> equiv / UF</i>	3.09E-02	6.79E-03	3.07E-03	0.00E+00	3.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E-04	5.08E-04	4.73E-04	-2.05E-04
Eutrophication aquatic freshwater <i>kg P equiv / UF</i>	1.18E-04	1.88E-06	1.44E-05	0.00E+00	2.24E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.55E-08	3.52E-08	5.73E-08	-5.65E-07
Eutrophication aquatic marine <i>kg N equiv / UF</i>	9.14E-03	1.13E-03	9.50E-04	0.00E+00	5.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.95E-05	2.28E-04	2.06E-04	-8.17E-05
Eutrophication terrestrial <i>mol N equiv / UF</i>	8.98E-02	1.26E-02	9.26E-03	0.00E+00	5.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-04	2.50E-03	2.27E-03	-8.98E-04
Formation of tropospheric ozone <i>kg NMCOV equiv / UF</i>	3.62E-02	4.46E-03	2.86E-03	0.00E+00	2.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-04	6.84E-04	6.15E-04	-2.49E-04

### CORE ENVIRONMENTAL IMPACT INDICATORS

Environmental Impact	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De- constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Abiotic depletion for non-fossil resources (minerals and metals) (1) <i>kg Sb equiv /UF</i>	4.92E-05	1.46E-07	1.50E-06	0.00E+00	2.51E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-09	2.34E-09	2.53E-09	-6.86E-09
Abiotic depletion for fossil resources (fuels fossils) (1) <i>MJ/UF</i>	1.68E+02	4.89E+01	8.79E+00	0.00E+00	1.94E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+00	6.52E-01	7.34E-01	-4.91E-01
Water (user) deprivation (1) <i>m³ world equiv. deprived/UF</i>	2.48E+00	-1.04E-02	1.03E-01	0.00E+00	1.15E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.61E-04	1.35E-04	1.21E-04	-7.36E-03

(1) – The results of this environmental impact indicator should be used with caution because uncertainties in these results are high or experience with the indicator is limited.



### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Environmental Impact	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Incidence of disease due to emissions of Particulate Matter <i>Disease incidence/UF</i>	5.64E-07	1.99E-07	4.20E-08	0.00E+00	3.52E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.92E-09	7.22E-08	3.68E-08	-5.43E-09
Efficiency of Human Exposure in relation to U235 (human health) (1) <i>kBq U235 equiv /UF</i>	2.05E-01	2.15E-01	3.13E-02	0.00E+00	1.67E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.50E-03	2.85E-03	3.24E-03	-5.69E-03
Comparative Toxic Unit for ecosystems (freshwater) (2) <i>CTUe / UF</i>	9.77E+01	1.95E+01	9.18E+00	0.00E+00	8.65E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-01	2.18E-01	2.79E-01	-2.40E-01
Comparative Toxic Unit for humans, carcinogenic (2) <i>CTUh / UF</i>	2.05E-09	2.57E-10	2.02E-10	0.00E+00	1.86E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.97E-12	2.87E-12	5.71E-12	-1.85E-11
Comparative Toxic Unit for humans, non-carcinogenic (2) <i>CTUh / UF</i>	4.30E-08	3.06E-08	6.82E-09	0.00E+00	1.87E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-09	2.27E-10	3.85E-10	-2.00E-10
Soil quality index (2) <i>Without dimension /UF</i>	8.79E+01	1.56E-01	1.03E+01	0.00E+00	9.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-03	2.39E-03	2.69E-01	-8.35E-01

(1) - This impact category mainly addresses the potential impact of low-dose ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects of potential nuclear accidents, occupational exposure, or disposal of radioactive waste in underground facilities. The potential for ionizing radiation from soil, radon, and certain construction materials is also not measured by this indicator.

(2) – The results of this environmental impact indicator should be used with caution because uncertainties in these results are high or experience with the indicator is limited.

### INDICATORS DESCRIBING RESOURCE USE

Resource utilization	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - MJ/UF	2.14E+01	7.19E-02	1.42E+00	0.00E+00	4.37E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-03	1.04E-03	1.33E-02	-1.78E-01
Use of renewable primary energy resources used as raw materials - MJ/UF	5.11E-01	0.00E+00	2.19E-01	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	0.00E+00	0.00E+00
Total use of renewable primary energy resources - MJ/UF	2.19E+01	7.19E-02	1.64E+00	0.00E+00	4.37E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-03	1.04E-03	1.33E-02	-1.78E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ/UF	1.85E+02	5.19E+01	9.48E+00	0.00E+00	2.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E+00	6.92E-01	7.84E-01	-5.12E-01
Use of non-renewable primary energy resources used as raw materials - MJ/UF	6.15E-03	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00

### INDICATORS DESCRIBING RESOURCE USE

Resource utilization	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Total use of non-renewable primary energy resources - MJ/UF	1.85E+02	5.19E+01	9.48E+00	0.00E+00	2.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E+00	6.92E-01	7.84E-01	-5.12E-01
Use of secondary material - kg/UF	5.82E-01	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels - MJ/UF	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels - MJ/UF	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of the net value of fresh water - m <sup>3</sup> /UF	6.38E-02	9.68E-04	5.19E-03	0.00E+00	2.69E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.37E-05	1.64E-05	4.34E-05	-4.32E-03

WASTE CATEGORIES															
Waste Categories	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Hazardous waste disposed - kg/UF	7.27E-04	1.30E-04	2.62E-05	0.00E+00	9.78E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.51E-06	1.71E-06	1.93E-06	-7.12E-07
Non-hazardous waste disposed - kg/UF	1.46E+00	2.04E-03	3.03E-01	0.00E+00	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.12E-05	4.07E-05	6.32E+00	-5.84E-04
Radioactive waste disposed - kg/UF	2.37E-04	3.54E-04	2.90E-05	0.00E+00	1.54E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-05	4.69E-06	5.35E-06	-4.49E-06

OUTPUT FLOWS															
Output flows	Product Stage	Construction Process Stage		Use Stage							End of Life Stage				D Benefits and Loads Beyond the System Boundary
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-constructions/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Components for Reuse - kg/UF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling - kg/UF	5.79E-01	0	6.77E-01	0	0	0	0	0	0	0	0	0	1.48E+01	0	0
Materials for energy recovery - kg /UF	8.27E-03	0	1.63E-01	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (electric) - MJ/UF	1.60E-00	0	2.82E+01	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (vapor) - MJ/UF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (gas and process) - MJ/UF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ENVIRONMENTAL IMPACT Aggregation of the different modules to create a "Total Stage" or "Total Life Cycle"						
Impacts/Flows	Product Stage	Construction Process Stage	Use Stage	End of Life Stage	Total Life Cycle	Benefits and Loads Beyond the System Boundary
Core Environmental Impact Indicators						
Global warming - total <i>kg CO<sub>2</sub> equiv/UF</i>	1.26E+01	5.10E+00	5.78E-01	2.20E-01	1.85E+01	-2.55E-02
Global warming – fossil <i>kg CO<sub>2</sub> equiv/UF</i>	1.29E+01	4.55E+00	5.63E-01	2.20E-01	1.82E+01	-2.40E-02
Global warming - biogenic <i>kg CO<sub>2</sub> equiv/UF</i>	-3.50E-01	5.48E-01	1.48E-02	2.82E-04	2.13E-01	-1.58E-03
Global warming – Land use and land use change <i>kg CO<sub>2</sub> equiv/UF</i>	1.60E-02	5.98E-04	3.36E-04	2.79E-06	1.70E-02	-1.41E-05
Depletion of the stratospheric ozone layer <i>kg CFC 11 equiv / UF</i>	2.34E-06	8.98E-07	6.16E-08	5.04E-08	3.35E-06	-4.44E-09
Acidification <i>mol H<sup>+</sup> equiv / UF</i>	3.09E-02	9.86E-03	3.84E-03	1.22E-03	4.58E-02	-2.05E-04
Eutrophication aquatic freshwater <i>kg P equiv / UF</i>	1.18E-04	1.63E-05	2.24E-05	1.58E-07	1.57E-04	-5.65E-07
Eutrophication aquatic marine <i>kg N equiv / UF</i>	9.14E-03	2.08E-03	5.18E-04	4.74E-04	1.22E-02	-8.17E-05
Eutrophication terrestrial <i>mol N equiv / UF</i>	8.98E-02	2.19E-02	5.68E-03	5.21E-03	1.23E-01	-8.98E-04

ENVIRONMENTAL IMPACT Aggregation of the different modules to create a "Total Stage" or "Total Life Cycle"						
Impacts/Flows	Product Stage	Construction Process Stage	Use Stage	End of Life Stage	Total Life Cycle	Benefits and Loads Beyond the System Boundary
Formation of tropospheric ozone <i>kg NMCOV equiv /UF</i>	3.62E-02	7.32E-03	2.50E-03	1.45E-03	4.75E-02	-2.49E-04
Abiotic depletion for non-fossil resources (minerals and metals) (1) <i>kg Sb equiv /UF</i>	4.92E-05	1.64E-06	2.51E-07	9.97E-09	5.11E-05	-6.86E-09
Abiotic depletion for fossil resources (fuels fossils) (1) <i>MJ/UF</i>	1.68E+02	5.77E+01	1.94E+01	3.09E+00	2.49E+02	-4.91E-01
Water (user) deprivation (1) <i>m³ world equiv. deprived/UF</i>	2.48E+00	9.29E-02	1.15E+01	-1.05E-04	1.41E+01	-7.36E-03
Additional Environmental Impact Indicators						
Incidence of disease due to emissions of Particulate Matter <i>Disease incidence/UF</i>	5.64E-07	2.41E-07	3.52E-08	1.16E-07	9.55E-07	-5.43E-09
Efficiency of Human Exposure in relation to U235 (human health) (1) <i>kBq U235 equiv /UF</i>	2.05E-01	2.47E-01	1.67E-02	1.36E-02	4.82E-01	-5.69E-03
Comparative Toxic Unit for ecosystems (freshwater) (2) <i>CTUe / UF</i>	9.77E+01	2.87E+01	8.65E+00	1.18E+00	1.36E+02	-2.40E-01
Comparative Toxic Unit for humans, carcinogenic (2) <i>CTUh / UF</i>	2.05E-09	4.60E-10	1.86E-09	1.75E-11	4.38E-09	-1.85E-11
Comparative Toxic Unit for humans, non-carcinogenic (2) <i>CTUh / UF</i>	4.30E-08	3.74E-08	1.87E-08	1.68E-09	1.01E-07	-2.00E-10
Soil quality index (2) <i>Without dimension /UF</i>	8.79E+01	1.04E+01	9.60E-01	2.77E-01	9.95E+01	-8.35E-01
<p>(1) - This impact category mainly addresses the potential impact of low-dose ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects of potential nuclear accidents, occupational exposure, or disposal of radioactive waste in underground facilities. The potential for ionizing radiation from soil, radon, and certain construction materials is also not measured by this indicator.</p> <p>(2) – The results of this environmental impact indicator should be used with caution because uncertainties in these results are high or experience with the indicator is limited.</p>						

ENVIRONMENTAL IMPACT Aggregation of the different modules to create a "Total Stage" or "Total Life Cycle"						
Impacts/Flows	Product Stage	Construction Process Stage	Use Stage	End of Life Stage	Total Life Cycle	Benefits and Loads Beyond the System Boundary
Resource utilization						
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - MJ/UF	2.14E+01	1.49E+00	4.37E-01	1.69E-02	2.33E+01	-1.78E-01
Use of renewable primary energy resources used as raw materials - MJ/UF	5.11E-01	2.19E-01	0.00E+00	0.00E+00	7.29E-01	0.00E+00
Total use of renewable primary energy resources - MJ/UF	2.19E+01	1.71E+00	4.37E-01	1.69E-02	2.40E+01	-1.78E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ/UF	1.85E+02	6.14E+01	2.06E+01	3.28E+00	2.70E+02	-5.12E-01
Use of non-renewable primary energy resources used as raw materials - MJ/UF	6.15E-03	0.00E+00	0.00E+00	0.00E+00	6.15E-03	0.00E+00
Total use of non-renewable primary energy resources - MJ/UF	1.85E+02	6.14E+01	2.06E+01	3.28E+00	2.70E+02	-5.12E-01
Use of secondary material - kg/UF	5.82E-01	0.00E+00	0.00E+00	0.00E+00	5.82E-01	0.00E+00
Use of renewable secondary fuels - MJ/UF	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/UF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of the net value of fresh water - m <sup>3</sup> /UF	6.38E-02	6.16E-03	2.69E-01	9.35E-05	3.39E-01	-4.32E-03



ENVIRONMENTAL IMPACT Aggregation of the different modules to create a “Total Stage” or “Total Life Cycle”						
Impacts/Flows	Product Stage	Construction Process Stage	Use Stage	End of Life Stage	Total Life Cycle	Benefits and Loads Beyond the System Boundary
Waste categories						
Hazardous waste disposed - kg/UF	7.27E-04	1.56E-04	9.78E-06	8.15E-06	9.01E-04	-7.12E-07
Non-hazardous waste disposed - kg/UF	1.46E+00	3.05E-01	1.78E-02	6.32E+00	8.11E+00	-5.84E-04
Radioactive waste disposed - kg/UF	2.37E-04	3.83E-04	1.54E-05	2.24E-05	6.58E-04	-4.49E-06
Output flows						
Components for Reuse - kg/UF	0	0	0	0	0	0
Materials for recycling - kg/UF	5.79E-01	6.77E-01	0	1.48E+01	1.60E+01	0
Materials for energy recovery - kg /UF	8.27E-03	1.63E-01	0	0	1.71E-01	0
Exported energy (electric) - MJ/UF	1.60E-00	2.82E+01	0	0	2.99E+01	0
Exported energy (vapor) - MJ/UF	0	0	0	0	0	0
Exported energy (gas and process) - MJ/UF	0	0	0	0	0	0



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## 6 Additional environmental information regarding the release of hazardous substances to air, soil, and water during the use stage

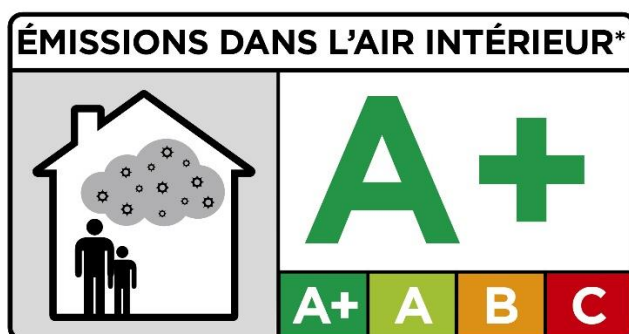
The correct use of the described products does not pose a danger to water, air or soil. It is inert when used properly.

### 6.1 Interior air

The product is rated A+. Source: ALELUIA self-declaration and Cerame- Unie guide.

The product's sanitary classification is 'A+' according to the decree of April 19, 2011, regarding the labeling of construction products or wall or floor coverings, and paints and varnishes on their emissions of volatile pollutants.

The test was conducted according to ISO 16000 by the LQAI/CTCV Portugal laboratory (Test report: LQAI.MC.97/11).



#### *Resistance to fungal growth development (if relevant)*

No test was conducted to characterize the product's behavior against fungal or bacterial growth.

#### *Radioactive transmissions (if relevant)*

No test was conducted regarding natural radioactive emissions.

#### *Soil and water (if relevant)*

Indoors, the product comes into contact with water, especially during cleaning, and outdoors, the product comes into contact with water, particularly rain, and during cleaning. Furthermore, the product does not come into contact with runoff water, infiltration water, groundwater, or surface water.

Consult Aleluia Cerâmicas SA for more information!



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## **7 Contribution of the product to the quality of life inside buildings**

### **Product characteristics that contribute to the creation hygrothermal comfort conditions in the building:**

This product does not claim any performance related to hygrothermal comfort.

### **Product characteristics that contribute to create acoustic comfort conditions in the building**

This product does not claim any performance related to acoustic comfort.

### **Product characteristics that contribute to create visual comfort conditions in the building**

The versatile and multifunctional design of the floor allows for the creation of a wide variety of environments, using various available colors and designs.

### **Product characteristics that contribute to create olfactory comfort conditions in the building**

It is an inert product and, therefore, this point does not apply to floor manufactured by Aleluia.

This product does not claim any performance related to olfactory comfort.



## 8 References

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