

# GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental  
Product  
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 17160: 2019

# TAU

cerámica

# AENOR

**TAU CERÁMICA SOLUTIONS S.L.**  
**Ceramic tiles.**  
**Porcelain stoneware tiles(Bla)**

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The owner of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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#### LCA Study

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|                                                                                                                                                                                                                                                     |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p align="center">EN 17160:2019 PCR for ceramic tiles<br/>EN 15804:2012+A2:2019 serves as the basis for the PCR</p>                                                                                                                                 |  |
| <p align="center">Independent verification of the declaration and data, in accordance with<br/>the Standard ISO 14025:2006</p> <p align="center"> <input type="checkbox"/> Internal         <input checked="" type="checkbox"/> External       </p> |  |
| <p align="center">Verification Body</p> <p align="center"><b>AENOR</b></p> <p align="center">Product certification body accredited by ENAC with accreditation No. 1/C-PR468</p>                                                                     |  |

## 1. General Information

### 1.1. Description of the organisation

**TAU Cerámica** has established itself as a global reference brand in the ceramic sector within the Pamesa group, known for the technical and aesthetic quality of its products, its constant commitment to innovation and development, and its dedication to social and environmental responsibility. Additionally, in recent years, the brand has stood out for its commitment to digital transformation and innovation in both products and sales tools. A trendsetting brand in continuous evolution.

### 1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at **PAMESA Industrial group** and marketed by **TAU Cerámica**, in the geographical and technological environment of Spain in 2023.

The location of the production centre is shown below:

|                                                                                           |
|-------------------------------------------------------------------------------------------|
| <b>Pamesa Porcelánico</b><br>Camino Alcora 8, 12550 Almazora, Castellón, Spain            |
| <b>TAU porcelánico</b><br>CV-16, km.2, 12006 Castellón, Spain                             |
| <b>Keramex</b><br>Carretera Villarreal Onda Km.6, 12540 Villarreal, Castellón, Spain      |
| <b>Compacglass I</b><br>Camí de la llima de Miralcamp, 4, 12200 Onda Castellón, Spain     |
| <b>Compacglass III</b><br>Carretera Onda, Villarreal Km.3.5, 12200 Onda, Castellón, Spain |
| <b>Compacglass IV</b><br>Camino de Palos, 13, 12200 Onda, Castellón, Spain                |

The Pamesa Industrial Group also has other facilities related to other stages of the production process:

|                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Elena</b><br>Localities of Esteruel y Gargallo, Teruel, Spain                                                            |
| <b>Mine Pilón</b><br>Localities of Mas de las Matas, Castellote and Seno, Teruel, Spain                                          |
| <b>Mine Valdecastillo</b><br>Localities of Berge, Castellote and Seno, Teruel, Spain                                             |
| <b>Arcillas Atomizadas</b><br>Av. Manuel Escobedo, 30, 12200 Onda, Castellón, Spain                                              |
| <b>Serviker</b><br>Camí Prats, s/n, 12110 L'Alcora, Castellón, Spain                                                             |
| <b>Compacglass II</b><br>Camí de la llima de Miralcamp, 4, 12200 Onda Castellón, Spain                                           |
| <b>Atommed</b><br>Cam. Foyes Ferraes, 19, 12110 L'Alcora, Castellón, Spain                                                       |
| <b>Polishing Plant Pamesa</b><br>Rectifying and polishing treatments<br>Camí Miralcamp, 105, 12200 Onda, Castellón, Spain        |
| <b>Logistics centre 1</b><br>Camino del Palmeral, 10 P.I. Colomer, 12200 Onda, Castellón, Spain                                  |
| <b>Logistics centre 2</b><br>Calle del Toll, 24, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 3</b><br>Calle del Toll, 11, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 4</b><br>Carretera CV-20 Km 3,5, 12200 Onda, Castellón, Spain                                                |
| <b>Logistics centre 5</b><br>Camí Miralcamp 47-49, 12200 Onda, Castellón, Spain                                                  |
| <b>Logistics centre 6</b><br>Camí cuadra la Torta, 2, 12006 Castellón de la Plana, Castellón Spain                               |
| <b>Logistics centre 7</b><br>Calle Argentina, 93 P.I. Sur 13, 12200 Onda, Castellón, Spain                                       |
| <b>Logistics centre 8</b><br>Calle Ratils, 23 P.I. Colomer, 12200 Onda, Castellón, Spain                                         |
| <b>Logistics centre 9</b><br>Calle Panamá, 1 esq. P.I. Sur 13, 12200 Onda, Castellón, Spain                                      |
| <b>Logistics centre 10</b><br>Avda. Mediterráneo, 53, 12200 Onda, Castellón, Spain                                               |
| <b>Logistics centre 11</b><br>Carretera Castellón – Alcora Pza. Polígono 4, 4 P.G. 12, 12130 Sant Joan de Moró, Castellón, Spain |

The results shown the environmental performance of the porcelain stoneware tiles, as average weighted by production. Moreover, the environmental data of the tiles with the lowest and highest impact, thus narrowing down the results obtained in the LCA are also declared. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

### 1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the EN ISO 14025:2010 and - EN 15804:2012+A2:2019 and the following Category Rule:

| INFORMATION ABOUT PRODUCT CATEGORY RULES |                                          |
|------------------------------------------|------------------------------------------|
| Descriptive title                        | Product Category Rules for Ceramic Tiles |
| Registration code and version            | EN 17160:2019                            |
| Publication date                         | 2019                                     |
| Compliance                               | EN 15804:2012 + A2:2019                  |
| Program Administrator                    | AENOR                                    |

This Environmental Statement includes the following stages of the life cycle:

#### Limits of the system. Information modules considered

|                                                                                      |    |                                                          |   |
|--------------------------------------------------------------------------------------|----|----------------------------------------------------------|---|
| Product Stage                                                                        | A1 | Raw materials supply                                     | X |
|                                                                                      | A2 | Transport                                                | X |
|                                                                                      | A3 | Manufacturing                                            | X |
| Construction                                                                         | A4 | Transport of the product                                 | X |
|                                                                                      | A5 | Installation and construction processes                  | X |
| Stage of use                                                                         | B1 | Use                                                      | X |
|                                                                                      | B2 | Maintenance                                              | X |
|                                                                                      | B3 | Repair                                                   | X |
|                                                                                      | B4 | Replacement                                              | X |
|                                                                                      | B5 | Refurbishment                                            | X |
|                                                                                      | B6 | Use of energy in service                                 | X |
|                                                                                      | B7 | Use of water in service                                  | X |
| End of life                                                                          | C1 | Deconstruction                                           | X |
|                                                                                      | C2 | Transport                                                | X |
|                                                                                      | C3 | Waste management                                         | X |
|                                                                                      | C4 | Waste disposal                                           | X |
|                                                                                      | D  | Potential for reuse, recovery and recycling of materials | X |
| X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated |    |                                                          |   |

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be comparable with EPDs not developed according to EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the EN ISO 14025 standard

## 2. Product information

### 2.1. Product Identification

The ceramic tiles included in this study belong to group Bla (porcelain stoneware tiles), a classification based on standard EN 14411:2016 (equivalent to standard ISO 13006:2018), i.e. they have a water absorption of less than 0.5% and are formed by pressing. Its common name is Porcelain Stoneware Tile.

The porcelain stoneware tiles included in this study include 59 commercial formats, with and without glaze, with and without mechanical treatments, with thicknesses ranging from 6.5 mm to 14 mm, with an average fired weight of 21.5 kg/m<sup>2</sup> and an unfired weight of 22.7 kg/m<sup>2</sup>.

The annexes contain the results of the formats included in the scope of this EIS that present the minimum and maximum environmental impact, corresponding to the following formats: 30.4x60.8 cm of 15.5 kg/m<sup>2</sup> and 40x40 cm of 34.6 kg/m<sup>2</sup> in weight before firing and after firing of 15.1 kg/m<sup>2</sup> and 29.8 kg/m<sup>2</sup> respectively.

The CPC code of the product is 37370.

### 2.2. Product technical features

The manufacturer declares the following information about the technical specifications of the product:

**Product technical features (UGL)**

| Technical properties                    | Standard                                                 | Average value                           |
|-----------------------------------------|----------------------------------------------------------|-----------------------------------------|
| Width                                   | EN-ISO<br>10545-2                                        | Complies with the standard              |
| Longitude                               |                                                          | Complies with the standard              |
| Thickness                               |                                                          | Complies with the standard              |
| Straightness of sides                   |                                                          | Complies with the standard              |
| Orthogonality                           |                                                          | Complies with the standard              |
| Surface Flatness                        |                                                          | Complies with the standard              |
| Warp                                    |                                                          | Complies with the standard              |
| Warpage                                 | EN-ISO<br>10545-4                                        | 35-45 N/mm <sup>2</sup>                 |
| Modulus of rupture<br>Breaking Strength | EN-ISO<br>10545-4                                        | 1600-2400 N<br>e>7.5 mm                 |
| Modulus of rupture<br>Bending strength  | EN-ISO<br>10545-6                                        | 110-130 mm <sup>3</sup>                 |
| Resistance to deep<br>abrasion          | EN-ISO<br>10545-8                                        | <7.0 x 10 <sup>-6</sup> C <sup>-1</sup> |
| Linear thermal<br>expansion             | EN-ISO<br>10545-9                                        | Resists                                 |
| Thermal shock<br>resistance             | EN-ISO<br>10545-12                                       | Resists                                 |
| Frost resistance                        | EN-ISO<br>10545-13                                       | UA Class                                |
| Chemical<br>resistance                  | EN-ISO<br>10545-14                                       | Complies with the standard              |
| Stain resistance                        | DIN 51130<br>DIN 51097<br>UNE 41901<br>EX<br>BS-EN 16165 | Depending on models                     |

**Product technical features (GL)**

| Technical properties                 | Standard        | Average value                                       |
|--------------------------------------|-----------------|-----------------------------------------------------|
| Width                                | EN-ISO 10545-2  | Complies with the standard                          |
| Length                               |                 | Complies with the standard                          |
| Thickness                            |                 | Complies with the standard                          |
| Straightness of Sides                |                 | Complies with the standard                          |
| Rectangularity                       |                 | Complies with the standard                          |
| Surface Flatness                     |                 | Complies with the standard                          |
| Warpage                              |                 | Complies with the standard                          |
| Modulus of rupture Breaking Strength | EN-ISO 10545-4  | 35 – 45 N/mm2                                       |
| Modulus of rupture Bending strength  |                 | 1600-2400 N e>7.5 mm                                |
| Resistance to Surface abrasion       | EN-ISO 10545-7  | Depending on models                                 |
| Linear thermal expansion             | EN-ISO 10545-8  | $<7.0 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$ |
| Thermal sock resistance              | EN-ISO 10545-9  | Resist                                              |
| Cracking resistance                  | EN-ISO 10545-11 | Resist                                              |
| Frost resistance                     | EN-ISO 10545-12 | Resist                                              |
| Chemical resistance                  | EN-ISO 10545-13 | Class GA                                            |
| Stain resistance                     | EN-ISO 10545-14 | Minimum class 3                                     |

This EPD covers residential interior and exterior flooring as a study scenario. However, the versatility of these ceramic tiles allows them to be installed in other locations such as walls, roofs, façades, exterior paving and other types of buildings with varying levels of foot traffic, such as hospitals, schools, offices and shopping centres

**2.3. Product composition**

The composition declared by the manufacturer is as follows:

**Product Composition**

| Substance/Component                                                                                 | Content |
|-----------------------------------------------------------------------------------------------------|---------|
| Support (clays, feldspars, sands, etc.)                                                             | 98%     |
| Decoration raw materials (grits, inks, dry-based glazes, liquid-based glazes and micronized glazes) | 2%      |

Substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization" do not exceed 0.1% by weight of the product

### 3. LCA Information

#### 3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the latest version of the 2024.2 database. (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2019 standard.

#### 3.2. Functional unit

The functional unit considered is **“Covering and decoration of 1 m<sup>2</sup> of indoor or outdoor flooring with ceramic tiles, with thicknesses ranging from 6.5 mm to 14 mm, from group B1a and an average weight of 21.6 kg/m<sup>2</sup> for 50 years.”**

#### 3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, as it is a long-lasting product that does not require replacement. A service life of 50 years has been considered

#### Reference service life

| Parameter                                                                                                                                                                    | Unit (expressed by functional unit)                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference service life                                                                                                                                                       | Minimum 50 years                                                                                                                                                       |
| Declared product properties (on gate), coatings, etc.                                                                                                                        | Minimum values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information, request technical data sheets according to model.        |
| Design parameters of the application (manufacturer's instructions), including references to good practices                                                                   | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |
| Estimated quality of work, when installed according to the manufacturer's specifications                                                                                     | For more information, request technical data sheets according to model.                                                                                                |
| Installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc. | Results of the values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information, request technical data sheets according to model. |
| Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure                                                                                  | Results of the values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information, request technical data sheets according to model. |
| Conditions of use, e.g.: frequency of use, mechanical exposure, etc.                                                                                                         | For more information, request technical data sheets according to model.                                                                                                |
| Maintenance, e.g.: required frequency, type and quality and replacement of replaceable components                                                                            | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |

### 3.4. Allocation rules

In accordance with the standards and PCR, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products.

In generally terms, the inputs and outputs assigned to the declared unit have been weighted averages based on the production or specific weight of the tiles before and after firing, according to the criteria for each stage of the process.

### 3.5. Cut-off rule and exclusions

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non - renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of powdered raw materials.
- Channelled atmospheric emissions, not regulated by law, generated during the combustion stages.
- Long-term emissions (>100 years).
- The production of goods, machinery, infrastructure, and industrial equipment that can be replaced in less than a year.
- Mortar losses in stage A5.
- Waste generated in mines, other than unusable soil, which is managed externally.
- The catalyst used in the installation of fibreglass.

- The processes of recycling and reusing waste generated throughout the life cycle of ceramic coverings that will form part of another system, based on the PCR.

### 3.6. Representativeness, quality and selection of data

The primary data have been provided directly by PAMESA Industrial Group, with six production centres located in Almazora, Castellón de la Plana, Onda and Villarreal (Castellón).

In addition, primary data has been obtained from four spray-dried granule manufacturing plants belonging to the PAMESA Industrial Group located in Alcora and Onda (Castellón), from three mines managed by PAMESA Industrial Group located in the municipalities of Estercuel, Gargallo, Mas de las Matas, Castellote, Seno and Berge (Teruel), from a polishing plant located in Onda (Castellón) and from the 11 logistics centres managed by the Pamesa Industrial Group.

Secondary data was obtained from the most up-to-date Sphera-GaBi databases [8] and modelled using LCA for Experts (Sphera-GaBi) [7]. All data refers to a geographical scenario for Spain in 2023.

The results presented are representative of ceramic tiles, expressed as an average weighted by the production of the ceramic tiles belonging to the Bla group range, limiting this average by the products with the minimum and maximum environmental impact.

The global warming potential (GWP-total) of the different technologies that make up the electricity mix used is 0.38 kgCO<sub>2</sub> eq/kWh

### 3.7. Other calculation rules and assumptions

The 59 ceramic tile references have different weights and environmental impacts. The following table shows the deviations between the formats with the highest and lowest environmental impact and the average, in relation to the product stage (A1-A3).

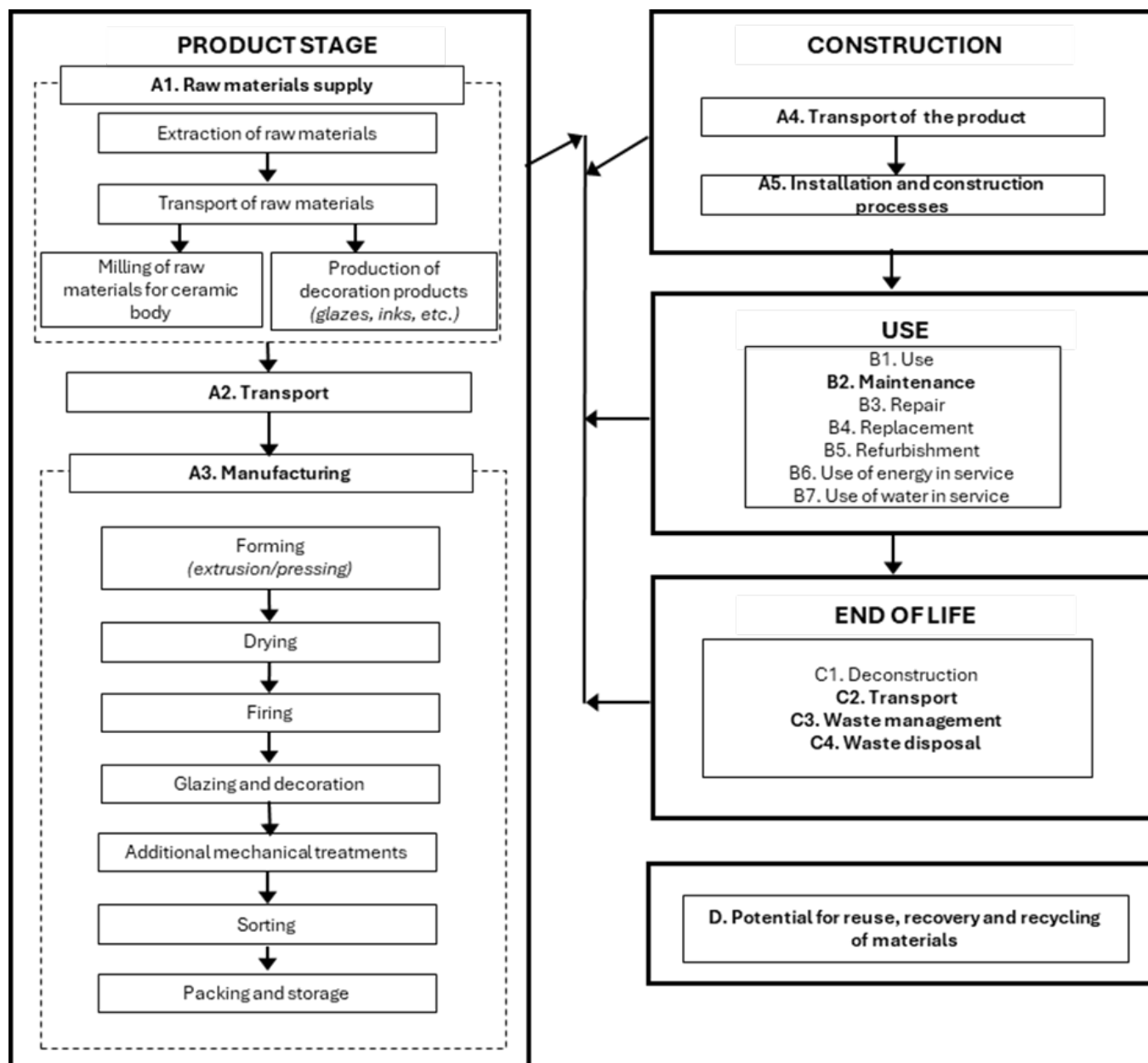
The maximum value corresponds to the format with the highest weight in raw material, the greatest application of decorative materials for that format, and the mechanical treatments applied. The minimum value corresponds to the format with the lowest weight in raw material, a minimum amount of decorative materials for that specific format, and no mechanical treatments.

Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values for stage A1-A3 respectively.

| Impact Indicator | Relative variation from the average |
|------------------|-------------------------------------|
| GWP-total        | -36%/+33%                           |
| AP               | -9%/+37%                            |
| POCP             | -7%/+35%                            |

## 4. System limits, scenarios, and additional technical information.

All life cycle modules relevant to ceramic tiles according to the PCRs have been included:



#### 4.1. Pre-manufacturing processes (upstream).

##### Raw materials (A1) and Transport (A2)

Ceramic tiles are composed of a ceramic support and a decorative layer.

The raw materials included in the composition of the substrate are mainly clays, feldspars, sands and ceramic waste generated during manufacture. Part of the clays present in the composition of Bla come from quarries managed by Pamesa.

The raw materials for decoration (glazes, engobes and inks) are produced in specialised plants. The most common raw materials are ceramic frits, pigments and inorganic materials.

The raw materials used have different origins, according to their nature and properties; they are transported by road or by ship in bulk, depending on the distance and location of the extraction point.

#### 4.2. Manufacturing of the product

##### Manufacturing (A3)

The raw materials are wet-milled and spray-dried to form granules.

This granule is sent to the forming stage by uniaxial dry pressing and later, they are placed in a continuous dryer to reduce their humidity.

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, and in some cases, it is mostly decorated by inkjet printing, grits can also be applied to give it different characteristics.

The pieces are then fired in single-layer roller kilns, resulting in a hard material that is resistant to water and chemicals.

Optionally, the parts undergo mechanical surface treatments, such as cutting, polishing, or rectifying.

After passing quality control processes, the classified pieces are assembled and packaged. Finally, they are transported to the brand's logistics centres for distribution.

#### 4.3. Construction Process

##### Transport (A4)

The product is distributed 22% in Spain, 45% in Europe and 33% in the rest of the world.

##### A4 Transport to site

| Scenario Information                                                                                                 | Unit (expressed by functional unit)                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Type and fuel consumption of the vehicle, type of vehicles used for transport, e.g. long distance trucks, ship, etc. | According to the destinations in the distribution as described above:<br>0.2476 l diesel (Euro truck 6, 27 t)<br>0.0244 l fuel oil (ship) |
| Distance                                                                                                             | 300 km national distribution: 22%<br>1390 km rest of Europe distribution: 45%<br>6520 km rest of the world distribution: 33%              |
| Capacity utilisation (including no-load return)                                                                      | 85% in truck<br>100% ship                                                                                                                 |
| Bulk density of transported products                                                                                 | ≈415.4 kg/m <sup>3</sup>                                                                                                                  |
| Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)                 | 1                                                                                                                                         |

##### Product installation and process construction (A5).

Once the product has been unpacked, it is installed using mortar, in accordance with the standard operating procedures for ceramic tiles.

Packaging waste is managed separately depending on the geographical location of the installation site. To this end, three scenarios have been considered.

Based on sales distribution, waste management has been considered for Spain, Europe and the rest of the world.

Furthermore, a 15% loss has been considered during the tile installation stage, according to data provided by Pamesa Industrial Group.

#### A5 Installation

| Scenario Information                                                                                                                                                                           | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary materials for installation (specify each material)                                                                                                                               | 3,3 kg/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                 |
| Water use                                                                                                                                                                                      | 0.8 l/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                  |
| Use of other resources                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                        |
| Quantitative description of the type of energy (regional mix) and consumption during the installation process                                                                                  | Not applicable                                                                                                                                                                                                                                                                                                                                                        |
| Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)                                                               | Product losses: 3227 g<br>Packaging wastes:<br>Cardboard: 162 g<br>Plastic: 28 g<br>Wood: 80 g                                                                                                                                                                                                                                                                        |
| Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route) | Product losses for recycling: 2,259 g<br>Product losses for final deposition: 968 g<br>Incinerated cardboard: 4 g<br>Recycled cardboard: 144 g<br>Cardboard for final deposition: 14 g<br>Incinerated plastic: 4 g<br>Recycled plastic: 20 g<br>Plastic for final deposition: 4 g<br>Incinerated wood: 25 g<br>Recycled wood: 37 g<br>Wood for final deposition: 18 g |
| Direct emissions to ambient air, soil and water                                                                                                                                                | Not applicable                                                                                                                                                                                                                                                                                                                                                        |

#### 4.4. Use linked to the structure of the building

##### B1 Use

Once installed, the tiles do not require any energy or water to operate. The only maintenance required after installation is normal cleaning.

For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

##### B2 Maintenance

Cleaning is carried out using a damp cloth and cleaning agents

| Use linked to the building structure                                                                                                     |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Scenario information                                                                                                                     | Unit (expressed per functional unit)                                                 |
| Maintenance process                                                                                                                      | According to PCR for ceramic tiles (EN17160) residential scenario for floor cleaning |
| Maintenance cycle                                                                                                                        | Wash once a week with water and once every two weeks with detergent                  |
| Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)                                                     | Detergent: 1.34E-04 kg/m <sup>2</sup> per wash                                       |
| Material wastage during maintenance (specify type))                                                                                      | Not applicable                                                                       |
| Net tap water consumption                                                                                                                | 0.1 l/m <sup>2</sup> per wash                                                        |
| Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant | Not applicable                                                                       |

##### B3-B4-B5 Repair, Replacement and refurbishment

Ceramic tiles do not require repair, replacement or refurbishment, and their potential impact is not significant.

#### 4.5. Use linked to the operation of the building

##### B6-B7 Operational energy use and Operational water use.

These modules are not relevant for ceramic tiles.

#### 4.6. End of life stage

##### C1 Deconstruction and demolition

The impacts attributable to the removal of the product in the context of a building rehabilitation or during its demolition are negligible, as specified in the RCP of ceramic tiles.

## C2 Transport

Product waste is transported 50 km by lorry for management, either by disposal in inert landfills or for recycling.

## C3 Waste management for reuse, recovery and recycling

70% of tiles are considered to be recycled and/or reused, as indicated in the PCR.

## C4 Final disposal

It was assumed that 30% of the product was sent to controlled landfills after its service life had ended. In addition, the adhesive material and 90% of the water used in the installation are taken into account.

### End of life

| Parameter                                              | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collection process, specified by type                  | 25,5 kg total                                                                                                                                                                                                                                                                                       |
| Recovery system, specified by type                     | 17,9 kg for recycling                                                                                                                                                                                                                                                                               |
| Disposal, specified by type                            | 7,7 kg to landfill                                                                                                                                                                                                                                                                                  |
| Assumptions for scenario development (e.g.: transport) | The product waste is transported in a Euro 6 compliant heavy-duty truck (27 t) to be managed either to landfilling or recycling. An average distance of 50km from the building site to the final destination is considered. The return journey of the lorries is also included (100% empty return). |

## 4.7. Benefits and burdens beyond the system

### Module D

The net environmental burdens and net benefits of obtaining the secondary material from waste at the installation stage and at the end of life of the product have been considered.

## 4.8. Information on biogenic carbon content

Ceramic tiles are mineral products and therefore do not contain biogenic carbon. According to standard EN 16449, it is necessary to calculate the biogenic carbon content, which in this case comes from packaging, wooden pallets and cardboard.

### Biogenic carbon content

| Parameter                              | Unit (expressed by functional unit) |
|----------------------------------------|-------------------------------------|
| Biogenic carbon content of the product | -                                   |
| Biogenic carbon content of the package | 1.9E-01 kg C                        |

## 5. Declaration of the environmental parameters of the LCA and the ICV.

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units       | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|-------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq   | 11.7    | 9.1E-01 | 3.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.4E-02 | 1.3E-01 | -2.1E-01 |
| GWP-biogenic                      | kg CO2 eq   | 6.1E-04 | 9.6E-05 | 4.8E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.2E-05 | 1.3E-03 | -8.0E-05 |
| GWP-luluc                         | kg CO2 eq   | 1.4E-02 | 1.3E-02 | 5.7E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-03 | 3.3E-06 | 5.5E-04 | -5.4E-04 |
| GWP-total                         | kg CO2 eq   | 11.7    | 9.2E-01 | 3.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.4E-02 | 1.3E-01 | -2.1E-01 |
| ODP                               | kg CFC11 eq | 1.3E-08 | 1.2E-13 | 2.0E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-14 | 7.1E-14 | 7.3E-14 | -4.9E-09 |
| AP                                | mol H+ eq   | 2.4E-02 | 3.8E-03 | 6.5E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-04 | 3.0E-05 | 9.4E-04 | -6.1E-04 |
| EP-freshwater                     | kg P eq     | 1.1E-04 | 3.2E-06 | 1.9E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 5.3E-07 | 2.6E-09 | 2.7E-06 | -2.2E-06 |
| EP-marine                         | kg N eq     | 6.2E-03 | 1.0E-03 | 1.9E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 5.0E-05 | 8.0E-06 | 2.6E-04 | -2.3E-04 |
| EP-terrestrial                    | mol N eq    | 6.8E-02 | 1.1E-02 | 2.0E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.9E-04 | 8.7E-05 | 2.7E-03 | -2.4E-03 |
| POCP                              | Kg NMVOC eq | 2.0E-02 | 3.0E-03 | 5.6E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 2.6E-05 | 7.5E-04 | -5.6E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq    | 7.0E-05 | 6.7E-08 | 1.1E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-08 | 1.1E-09 | 1.3E-08 | -1.0E-07 |
| ADP-fossil <sup>2</sup>           | MJ          | 174.2   | 11.0    | 33.9    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.9E-01 | 1.7     | -2.9E+00 |
| WDP <sup>2</sup>                  | m3          | 2.2     | 1.2E-02 | 4.5E-01 | 0  | 21.6    | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-03 | 8.5E-03 | 9.7E-03 | 3.6E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

### Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.2E-05 | 6.3E-08 | 3.4E-06 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-09 | 2.6E-10 | 1.1E-08 | -2.9E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 4.9E-01 | 2.8E-03 | 1.1E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 4.3E-04 | 6.1E-03 | 2.2E-03 | -1.1E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 62.0    | 8.1     | 13.6    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2     | 7.2E-02 | 1.0     | -1.7E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 3.7E-09 | 1.6E-10 | 7.4E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-11 | 3.2E-12 | 1.3E-10 | 6.6E-14  |
| HTP-nc <sup>2</sup> | CTUh                  | 2.2E-07 | 6.8E-09 | 4.6E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-09 | 3.1E-11 | 1.4E-08 | -1.7E-09 |
| SQP <sup>2</sup>    | -                     | 90.3    | 4.8     | 26.2    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.1E-01 | 1.4E-03 | 4.0E-01 | -2.0E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 44.3    | 8.5E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 3.2E-02 | 2.0E-01 | -8.8E-01 |
| PERM      | MJ             | 8.4     | 0       | 1.3     | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 52.7    | 8.5E-01 | 3.4     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 3.2E-02 | 2.0E-01 | -8.8E-01 |
| PENRE     | MJ             | 174.2   | 11.0    | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.9E-01 | 1.7     | -2.9E+00 |
| PENRM     | MJ             | 1.2     | 0       | 1.8E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 175.3   | 11.0    | 6.3     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.9E-01 | 1.7     | -2.9E+00 |
| SM        | kg             | 9.6E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 4.3E-02 | 9.5E-04 | 9.1E-03 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 1.1E-04 | 3.2E-04 | -1.5E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

### Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 4.0E-04 | 4.2E-10 | 6.1E-05 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.3E-11 | 8.7E-11 | 2.7E-08 | -4.1E-08 |
| DWD       | kg    | 9.6E-01 | 1.7E-03 | 1.4     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.7E-04 | 6.8E-05 | 7.8     | -1.4E-03 |
| RWD       | kg    | 5.9E-03 | 1.9E-05 | 1.1E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.0E-06 | 9.6E-05 | 2.3E-05 | -1.9E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

### Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.4E-01 | 0  | 2.5 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 17.9 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## 6. Additional environmental information.

### Indoor air emissions

Ceramic tiles undergo a thermal process exceeding 1000°C during their manufacture. At these temperatures, any organic compounds present in the composition decompose, resulting in an inert end product free of volatile organic compounds that could be emitted during use.

The Pamesa Industrial Group has FloorScore® certification with registration number SCS-FS-06088 for indoor air quality in accordance with CDPH/EHLB Standard Method v1.2-2017 (California Section 01350), effective 1 April 2017, for school classroom and private office parameters when modelled as flooring.

The concentration of volatile organic compounds (TVOC) is less than or equal to 0.5 mg/m<sup>3</sup> in accordance with the CDPH/EHLB v1.2-2017 standard method.

### Release to soil and water

Ceramic tiles do not emit any compounds into the soil or water during the use phase, as it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically, chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that could lead to environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to surface or groundwater quality.

### Environmental information about the company

TAU Cerámica's Bla group products have French certification for products that defines the conformity of the final product with NF-UPEC standards QB-32 and cahier 3778 regarding technical characteristics in accordance with the usability and purpose of the product.

The spray-dried granules used in the manufacture of Bla and Blb (BPN spray dried porcelain) have the radioactive isotope activity concentration indices defined by the European Union (IUE), as well as the limits set out in standard GB6566-2010 in force in the Republic of China (IINT, IEXT).

PAMESA's manufacturing companies are members of ECOEMBES, a non-profit organisation that manages the recycling of waste deposited in yellow and blue bins.

ISO 14021 certification of recycled content for different spray-dried granules with inventory data from 2023.

### Arcillas Atomizadas

Minimum recycled material content in c white pulp powder: 7.2%

% waste recycling in the spray-dried white pulp powder manufacturing process: 24.1%

### TAU Porcelánico

Minimum recycled material content in BPN spray-dried powder: 7%

% waste recycling in the BPN spray-dried powder manufacturing process: 14.2%

Furthermore, Ecoceramic Cerámica complies with the requirements established by the ISO 17889-1:2021 standard for porcelain stoneware ceramic tiles. It complies with the mandatory requirements and has obtained an Sr= 122.8 classification in the voluntary requirements.

## Annex I. Declaration of the environmental parameters of the LCA and LCI for the format with MINIMUM impacts

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3    | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|----------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 7.9      | 6.1E-01 | 2.3     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 9.8E-02 | 1.7E-02 | 9.0E-02 | -1.6E-01 |
| GWP-biogenic                      | kg CO2 eq      | -1.2E-02 | 6.4E-05 | 4.6E-02 | 0  | 4.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 8.6E-06 | 9.4E-04 | -2.1E-05 |
| GWP-luluc                         | kg CO2 eq      | 9.8E-03  | 8.4E-03 | 4.4E-03 | 0  | 2.4E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-03 | 2.4E-06 | 3.9E-04 | -3.9E-04 |
| GWP-total                         | kg CO2 eq      | 7.9      | 6.2E-01 | 2.4     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 9.9E-02 | 1.7E-02 | 9.2E-02 | -1.6E-01 |
| ODP                               | kg CFC11 eq    | 9.7E-09  | 8.0E-14 | 1.5E-09 | 0  | 6.6E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-14 | 5.1E-14 | 5.2E-14 | -5.0E-09 |
| AP                                | mol H+ eq      | 1.5E-02  | 2.6E-03 | 4.9E-03 | 0  | 6.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0E-04 | 2.1E-05 | 6.7E-04 | -5.2E-04 |
| EP-freshwater                     | kg P eq        | 5.7E-05  | 2.2E-06 | 1.2E-05 | 0  | 6.1E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 3.8E-07 | 1.9E-09 | 1.9E-06 | -2.0E-06 |
| EP-marine                         | kg N eq        | 3.9E-03  | 6.7E-04 | 1.5E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 3.6E-05 | 5.7E-06 | 1.8E-04 | -1.9E-04 |
| EP-terrestrial                    | mol N eq       | 4.3E-02  | 7.6E-03 | 1.6E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 4.3E-04 | 6.2E-05 | 2.0E-03 | -2.0E-03 |
| POCP                              | Kg NMVOC eq    | 1.3E-02  | 2.0E-03 | 4.4E-03 | 0  | 3.8E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 1.8E-05 | 5.4E-04 | -4.7E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 2.1E-05  | 4.5E-08 | 3.2E-06 | 0  | 3.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 7.8E-09 | 8.1E-10 | 9.4E-09 | -7.3E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 121.2    | 7.3     | 25.2    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2     | 4.2E-01 | 1.2     | -2.4E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 1.6      | 7.9E-03 | 3.5E-01 | 0  | 21.9    | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-03 | 6.1E-03 | 6.9E-03 | 9.2E-03  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.5E-05 | 4.2E-08 | 2.3E-06 | 0  | 3.7E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-09 | 1.9E-10 | 8.2E-09 | -2.3E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 3.8E-01 | 1.9E-03 | 9.0E-02 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.1E-04 | 4.4E-03 | 1.6E-03 | -9.0E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 37.5    | 5.4     | 9.4     | 0  | 4.4     | 0  | 0  | 0  | 0  | 0  | 0  | 8.7E-01 | 5.2E-02 | 7.3E-01 | -1.3E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 1.7E-09 | 1.1E-10 | 4.3E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-11 | 2.3E-12 | 9.3E-11 | 1.7E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 4.5E-08 | 4.6E-09 | 1.9E-08 | 0  | 2.9E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 7.9E-10 | 2.2E-11 | 9.9E-09 | -1.3E-09 |
| SQP <sup>2</sup>    | -                     | 81.9    | 3.2     | 24.6    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 5.8E-01 | 9.9E-04 | 2.8E-01 | -1.5E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 36.1    | 5.7E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.0E-01 | 2.3E-02 | 1.4E-01 | -8.9E-01 |
| PERM      | MJ             | 5.9     | 0       | 8.8E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 42.0    | 5.7E-01 | 3.0     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.0E-01 | 2.3E-02 | 1.4E-01 | -8.9E-01 |
| PENRE     | MJ             | 121.2   | 7.3     | 5.9     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2     | 4.2E-01 | 1.2     | -2.4E+00 |
| PENRM     | MJ             | 8.4E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 122.0   | 7.3     | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2     | 4.2E-01 | 1.2     | -2.4E+00 |
| SM        | kg             | 6.6E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 3.1E-02 | 6.4E-04 | 7.2E-03 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-04 | 8.0E-05 | 2.3E-04 | -1.4E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 3.0E-04 | 2.8E-10 | 4.5E-05 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 4.5E-11 | 6.2E-11 | 1.9E-08 | -2.9E-08 |
| DWD       | kg    | 5.9E-01 | 1.1E-03 | 1.0     | 0  | 7.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-04 | 4.9E-05 | 5.6     | -8.9E-04 |
| RWD       | kg    | 4.7E-03 | 1.3E-05 | 9.2E-04 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-06 | 6.9E-05 | 1.7E-05 | -2.1E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 5.8E-02 | 0  | 1,8 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13,4 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## Annex II. Declaration of the environmental parameters of the LCA and LCI for the format with MAXIMUM impact

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 16.0    | 1.3     | 3.7     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-01 | 3.3E-02 | 1.7E-01 | -2.8E-01 |
| GWP-biogenic                      | kg CO2 eq      | 1.2E-02 | 1.4E-04 | 4.9E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.6E-05 | 1.8E-03 | -1.5E-04 |
| GWP-luluc                         | kg CO2 eq      | 1.9E-02 | 1.8E-02 | 7.5E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.9E-03 | 4.5E-06 | 7.5E-04 | -7.5E-04 |
| GWP-total                         | kg CO2 eq      | 16.0    | 1.3     | 3.7     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-01 | 3.3E-02 | 1.8E-01 | -2.8E-01 |
| ODP                               | kg CFC11 eq    | 1.0E-08 | 1.7E-13 | 1.5E-09 | 0  | 6.4E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-14 | 9.7E-14 | 1.0E-13 | -5.0E-09 |
| AP                                | mol H+ eq      | 2.7E-02 | 5.5E-03 | 7.1E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-04 | 4.1E-05 | 1.3E-03 | -7.3E-04 |
| EP-freshwater                     | kg P eq        | 5.8E-05 | 4.6E-06 | 1.2E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 7.3E-07 | 3.6E-09 | 3.7E-06 | -2.6E-06 |
| EP-marine                         | kg N eq        | 6.4E-03 | 1.4E-03 | 2.0E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 6.9E-05 | 1.1E-05 | 3.5E-04 | -2.8E-04 |
| EP-terrestrial                    | mol N eq       | 7.1E-02 | 1.6E-02 | 2.2E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 8.2E-04 | 1.2E-04 | 3.8E-03 | -3.0E-03 |
| POCP                              | Kg NMVOC eq    | 2.1E-02 | 4.3E-03 | 6.1E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-04 | 3.5E-05 | 1.0E-03 | -6.9E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 1.9E-05 | 9.7E-08 | 2.9E-06 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-08 | 1.5E-09 | 1.8E-08 | -1.4E-07 |
| ADP-fossil <sup>2</sup>           | MJ             | 235.0   | 15.8    | 43.9    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 2.3     | 8.1E-01 | 2.3     | -3.5E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 2.5     | 1.7E-02 | 5.0E-01 | 0  | 21.4    | 0  | 0  | 0  | 0  | 0  | 0  | 2.6E-03 | 1.2E-02 | 1.3E-02 | 7.0E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 3.3E-05 | 9.1E-08 | 4.9E-06 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-09 | 3.6E-10 | 1.6E-08 | -3.6E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 6.2E-01 | 4.0E-03 | 1.3E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 6.0E-04 | 8.4E-03 | 3.1E-03 | -1.5E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 58.3    | 11.7    | 13.7    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 9.9E-02 | 1.4     | -2.2E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 2.8E-09 | 2.3E-10 | 6.2E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 3.4E-11 | 4.4E-12 | 1.8E-10 | 2.6E-14  |
| HTP-nc <sup>2</sup> | CTUh                  | 5.8E-08 | 9.8E-09 | 2.3E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-09 | 4.2E-11 | 1.9E-08 | -2.2E-09 |
| SQP <sup>2</sup>    | -                     | 91.0    | 7.0     | 26.7    | 0  | 7.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1     | 1.9E-03 | 5.5E-01 | -2.6E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ    | 50.5    | 1.2     | 2.1     | 0  | 4.1     | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-01 | 4.4E-02 | 2.7E-01 | -8.8E-01 |
| PERM      | MJ    | 8.4     | 0       | 1.3     | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ    | 59.0    | 1.2     | 3.4     | 0  | 4.1     | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-01 | 4.4E-02 | 2.7E-01 | -8.8E-01 |
| PENRE     | MJ    | 235.0   | 15.8    | 6.3     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 2.3     | 8.1E-01 | 2.3     | -3.5E+00 |
| PENRM     | MJ    | 1.2     | 0       | 1.8E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ    | 236.2   | 15.8    | 6.4     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 2.3     | 8.1E-01 | 2.3     | -3.5E+00 |
| SM        | kg    | 1.5     | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m3    | 4.9E-02 | 1.4E-03 | 1.0E-02 | 0  | 2.8E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-04 | 1.5E-04 | 4.4E-04 | -1.5E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 7.0E-04 | 6.0E-10 | 1.1E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 8.6E-11 | 1.2E-10 | 3.7E-08 | -5.6E-08 |
| DWD       | kg    | 1.3     | 2.4E-03 | 1.9     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.7E-04 | 9.4E-05 | 10.8    | -2.0E-03 |
| RWD       | kg    | 7.4E-03 | 2.8E-05 | 1.3E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 4.1E-06 | 1.3E-04 | 3.2E-05 | -1.8E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 5.6E-02 | 0  | 3,4 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 23,7 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## References

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# AENOR



Una declaración ambiental verificada

# GlobalEPD

# GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental  
Product  
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 17160: 2019

**TAU**  
*cerámica*

# AENOR

**TAU CERÁMICA SOLUTIONS S.L.**  
**Ceramic tiles.**  
**Glazed stoneware tiles(BIb)**

Date of first issue: 2025-09-26

Expiration Date: 2030-09-25

The declared validity is subject to registration and publication at [www.aenor.com](http://www.aenor.com)

Registration code: GlobalEPD EN 17160 - 058



The owner of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes

|                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>EN 17160:2019 PCR for ceramic tiles<br/>EN 15804:2012+A2:2019 serves as the basis for the PCR</p>                                                                                                  |
| <p>Independent verification of the declaration and data, in accordance with<br/>the Standard ISO 14025:2006</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> |
| <p>Verification Body</p> <p><b>AENOR</b></p> <p>Product certification body accredited by ENAC with accreditation No. 1/C-PR468</p>                                                                    |

## 1. General Information

### 1.1. Description of the organisation

**TAU Cerámica** has established itself as a global reference brand in the ceramic sector within the PAMESA group, known for the technical and aesthetic quality of its products, its constant commitment to innovation and development, and its dedication to social and environmental responsibility. Additionally, in recent years, the brand has stood out for its commitment to digital transformation and innovation in both products and sales tools. A trendsetting brand in continuous evolution.

### 1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at **PAMESA GROUP** and marketed by **TAU Cerámica**, in the geographical and technological environment of Spain in 2023.

The location of the production centre is shown below:

|                                                                                           |
|-------------------------------------------------------------------------------------------|
| <b>TAU porcelánico</b><br>CV-16, km.2, 12006 Castellón, Spain                             |
| <b>Compacglass I</b><br>Camí de la llima de Miralcamp, 4, 12200 Onda Castellón, Spain     |
| <b>Compacglass III</b><br>Carretera Onda, Villarreal Km.3.5, 12200 Onda, Castellón, Spain |
| <b>Compacglass IV</b><br>Camino de Palos, 13, 12200 Onda, Castellón, Spain                |

The Pamesa Industrial Group also has other facilities related to other stages of the production process:

|                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Elena</b><br>Localities of Esteruel y Gargallo, Teruel, Spain                                                            |
| <b>Mine Pilón</b><br>Localities of Mas de las Matas, Castellote and Seno, Teruel, Spain                                          |
| <b>Mine Valdecastillo</b><br>Localities of Berge, Castellote and Seno, Teruel, Spain                                             |
| <b>Arcillas Atomizadas</b><br>Av. Manuel Escobedo, 30, 12200 Onda, Castellón, Spain                                              |
| <b>Serviker</b><br>Camí Prats, s/n, 12110 L'Alcora, Castellón, Spain                                                             |
| <b>Compacglass II</b><br>Camí de la llima de Miralcamp, 4, 12200 Onda Castellón, Spain                                           |
| <b>Atommed</b><br>Cam. Foyes Ferraes, 19, 12110 L'Alcora, Castellón, Spain                                                       |
| <b>Logistics centre 1</b><br>Camino del Palmeral, 10 P.I. Colomer, 12200 Onda, Castellón, Spain                                  |
| <b>Logistics centre 2</b><br>Calle del Toll, 24, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 3</b><br>Calle del Toll, 11, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 4</b><br>Carretera CV-20 Km 3,5, 12200 Onda, Castellón. Spain                                                |
| <b>Logistics centre 5</b><br>Camí Miralcamp 47-49, 12200 Onda, Castellón, Spain                                                  |
| <b>Logistics centre 6</b><br>Camí cuadra la Torta, 2, 12006 Castellón de la Plana, Castellón Spain                               |
| <b>Logistics centre 7</b><br>Calle Argentina, 93 P.I. Sur 13, 12200 Onda, Castellón, Spain                                       |
| <b>Logistics centre 8</b><br>Calle Ratils, 23 P.I. Colomer, 12200 Onda, Castellón, Spain                                         |
| <b>Logistics centre 9</b><br>Calle Panamá, 1 esq. P.I. Sur 13, 12200 Onda, Castellón, Spain                                      |
| <b>Logistics centre 10</b><br>Avda. Mediterráneo, 53, 12200 Onda, Castellón, Spain                                               |
| <b>Logistics centre 11</b><br>Carretera Castellón – Alcora Pza. Polígono 4, 4 P.G. 12, 12130 Sant Joan de Moró, Castellón, Spain |

The results shown the environmental performance of the porcelain stoneware tiles, as average weighted by production. Moreover, the environmental data of the tiles with the lowest and highest impact, thus narrowing down the results obtained in the LCA are also declared. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

### 1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the EN ISO 14025:2010 and - EN 15804:2012+A2:2019 and the following Category Rule:

| INFORMATION ABOUT PRODUCT CATEGORY RULES |                                          |
|------------------------------------------|------------------------------------------|
| Descriptive title                        | Product Category Rules for Ceramic Tiles |
| Registration code and version            | EN 17160:2019                            |
| Publication date                         | 2019                                     |
| Compliance                               | EN 15804:2012 + A2:2019                  |
| Program Administrator                    | AENOR                                    |

This Environmental Statement includes the following stages of the life cycle:

#### Limits of the system. Information modules considered

|                                                                                      |    |                                                          |   |
|--------------------------------------------------------------------------------------|----|----------------------------------------------------------|---|
| Product Stage                                                                        | A1 | Raw materials supply                                     | X |
|                                                                                      | A2 | Transport                                                | X |
|                                                                                      | A3 | Manufacturing                                            | X |
| Construction                                                                         | A4 | Transport of the product                                 | X |
|                                                                                      | A5 | Installation and construction processes                  | X |
| Stage of use                                                                         | B1 | Use                                                      | X |
|                                                                                      | B2 | Maintenance                                              | X |
|                                                                                      | B3 | Repair                                                   | X |
|                                                                                      | B4 | Replacement                                              | X |
|                                                                                      | B5 | Refurbishment                                            | X |
|                                                                                      | B6 | Use of energy in service                                 | X |
|                                                                                      | B7 | Use of water in service                                  | X |
| End of life                                                                          | C1 | Deconstruction                                           | X |
|                                                                                      | C2 | Transport                                                | X |
|                                                                                      | C3 | Waste management                                         | X |
|                                                                                      | C4 | Waste disposal                                           | X |
|                                                                                      | D  | Potential for reuse, recovery and recycling of materials | X |
| X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated |    |                                                          |   |

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be comparable with EPDs not developed according to EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the EN ISO 14025 standard

## 2. Product information

### 2.1. Product Identification

The ceramic tiles included in this study belong to group BIb (glazed stoneware), classification based on standard EN 14411: 2016 (equivalent to standard ISO 13006:2018), i.e. they have water absorption between 0.5% and 3% and are formed by pressing. Their common name is glazed stoneware.

The glazed stoneware tiles included in this study comprise 14 commercial formats, with and without glaze, with and without mechanical treatment, with thicknesses ranging from 8.5 mm to 10.5 mm, with an average fired weight of 21.1 kg/m<sup>2</sup> and an unfired weight of 22.0 kg/m<sup>2</sup>.

The annexes contain the results for the formats included in the scope of this EPD that have the minimum and maximum environmental impact, corresponding to the following formats: 60.8x60.8 cm weighing 19.7 kg/m<sup>2</sup> and 75x75 cm weighing 27.0 kg/m<sup>2</sup> before firing and 18.4 kg/m<sup>2</sup> and 25.9 kg/m<sup>2</sup> after firing, respectively.

The CPC code of the product is 37370.

### 2.2. Product technical features

The manufacturer declares the following information about the technical specifications of the product:

**Product technical features (GL)**

| Technical properties                    | Standard            | Average value                            |
|-----------------------------------------|---------------------|------------------------------------------|
| Width                                   | EN-ISO 10545-2      | Complies with the standard               |
| Length                                  |                     | Complies with the standard               |
| Thickness                               |                     | Complies with the standard               |
| Straightness of Sides                   |                     | Complies with the standard               |
| Rectangularity                          |                     | Complies with the standard               |
| Surface Flatness                        |                     | Complies with the standard               |
| Warpage                                 |                     | Complies with the standard               |
| Modulus of rupture<br>Breaking Strength | EN-ISO 10545-4      | 30 – 40 N/mm <sup>2</sup> e=9.5mm        |
| Modulus of rupture Bending strength     |                     | 1600-2400 N e=9.5mm                      |
| Resistance to Surface abrasion          | EN-ISO 10545-7      | Depending on models                      |
| Linear thermal expansion                | EN-ISO 10545-8      | <7.0 x 10 <sup>-6</sup> °C <sup>-1</sup> |
| Thermal shock resistance                | EN-ISO 10545-9      | Resist                                   |
| Cracking resistance                     | EN-ISO 10545-11     | Resist                                   |
| Frost resistance                        | EN-ISO 10545-12     | Resist                                   |
| Chemical resistance                     | EN-ISO 10545-13     | Class GA                                 |
| Stain resistance                        | UNE-EN-ISO 10545-14 | Minimum class 5                          |

This EPD covers residential interior and exterior flooring as a study scenario. However, the versatility of these ceramic tiles allows them to be installed in other locations such as walls, roofs, façades, exterior paving and other types of buildings with varying levels of foot traffic, such as hospitals, schools, offices and shopping centres

### 2.3. Product composition

The composition declared by the manufacturer is as follows:

**Product Composition**

| Substance/Component                                                                                 | Content |
|-----------------------------------------------------------------------------------------------------|---------|
| Support (clays, feldspars, sands, etc.)                                                             | 91%     |
| Decoration raw materials (grits, inks, dry-based glazes, liquid-based glazes and micronized glazes) | 9%      |

Substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization" do not exceed 0.1% by weight of the product

### 3. LCA Information

#### 3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the latest version of the 2024.2 database. (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2019 standard.

#### 3.2. Functional unit

The functional unit considered is **"Covering and decoration of 1 m<sup>2</sup> of interior flooring with ceramic tiles from group Blb (various formats from 8.5 mm to 10.5 mm and an average weight of 21.1 kg/m<sup>2</sup>) for 50 years "**.

#### 3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, as it is a long-lasting product that does not require replacement. A service life of 50 years has been considered

#### Reference service life

| Parameter                                                                                                                                                                    | Unit (expressed by functional unit)                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference service life                                                                                                                                                       | Minimum 50 years                                                                                                                                                           |
| Declared product properties (on gate), coatings, etc.                                                                                                                        | Minimum values of the relevant characteristics according to Annex H of the EN 14411.<br><br>For more information, request technical data sheets according to model.        |
| Design parameters of the application (manufacturer's instructions), including references to good practices                                                                   | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                              |
| Estimated quality of work, when installed according to the manufacturer's specifications                                                                                     | For more information, request technical data sheets according to model.                                                                                                    |
| Installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc. | Results of the values of the relevant characteristics according to Annex H of the EN 14411.<br><br>For more information, request technical data sheets according to model. |
| Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure                                                                                  | For more information, request technical data sheets according to model.                                                                                                    |
| Conditions of use, e.g.: frequency of use, mechanical exposure, etc.                                                                                                         | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                              |

### 3.4. Allocation rules

In accordance with the standards and PCR, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products.

In generally terms, the inputs and outputs assigned to the declared unit have been weighted averages based on the production or specific weight of the tiles before and after firing, according to the criteria for each stage of the process.

### 3.5. Cut-off rule and exclusions

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non - renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of powdered raw materials.
- Channelled atmospheric emissions, not regulated by law, generated during the combustion stages.
- Long-term emissions (>100 years).
- The production of goods, machinery, infrastructure, and industrial equipment that can be replaced in less than a year.
- Mortar losses in stage A5.
- Waste generated in mines, other than unusable soil, which is managed externally.
- The catalyst used in the installation of fibreglass.

- The processes of recycling and reusing waste generated throughout the life cycle of ceramic coverings that will form part of another system, based on the PCR.

### 3.6. Representativeness, quality and selection of data

The primary data have been provided directly by PAMESA Industrial Group, with six production centres located in Almazora, Castellón de la Plana, Onda and Villarreal (Castellón).

In addition, primary data has been obtained from four spray-dried granule manufacturing plants belonging to the PAMESA Industrial Group located in Alcora and Onda (Castellón), from three mines managed by PAMESA Industrial Group located in the municipalities of Esteruel, Gargallo, Mas de las Matas, Castellote, Seno and Berge (Teruel), from a polishing plant located in Onda (Castellón) and from the 11 logistics centres managed by the Pamesa Industrial Group.

Secondary data was obtained from the most up-to-date Sphera-GaBi databases [8] and modelled using LCA for Experts (Sphera-GaBi) [7]. All data refers to a geographical scenario for Spain in 2023.

The results presented are representative of ceramic tiles, expressed as an average weighted by the production of the ceramic tiles belonging to the BIb group range, limiting this average by the products with the minimum and maximum environmental impact.

The global warming potential (GWP-total) of the different technologies that make up the electricity mix used is 0.38 kgCO<sub>2</sub> eq/kWh

### 3.7. Other calculation rules and assumptions

The 14 ceramic tile references have different weights and environmental impacts. The following table shows the deviations between the formats with the highest and lowest environmental impact and the average, in relation to the product stage (A1-A3).

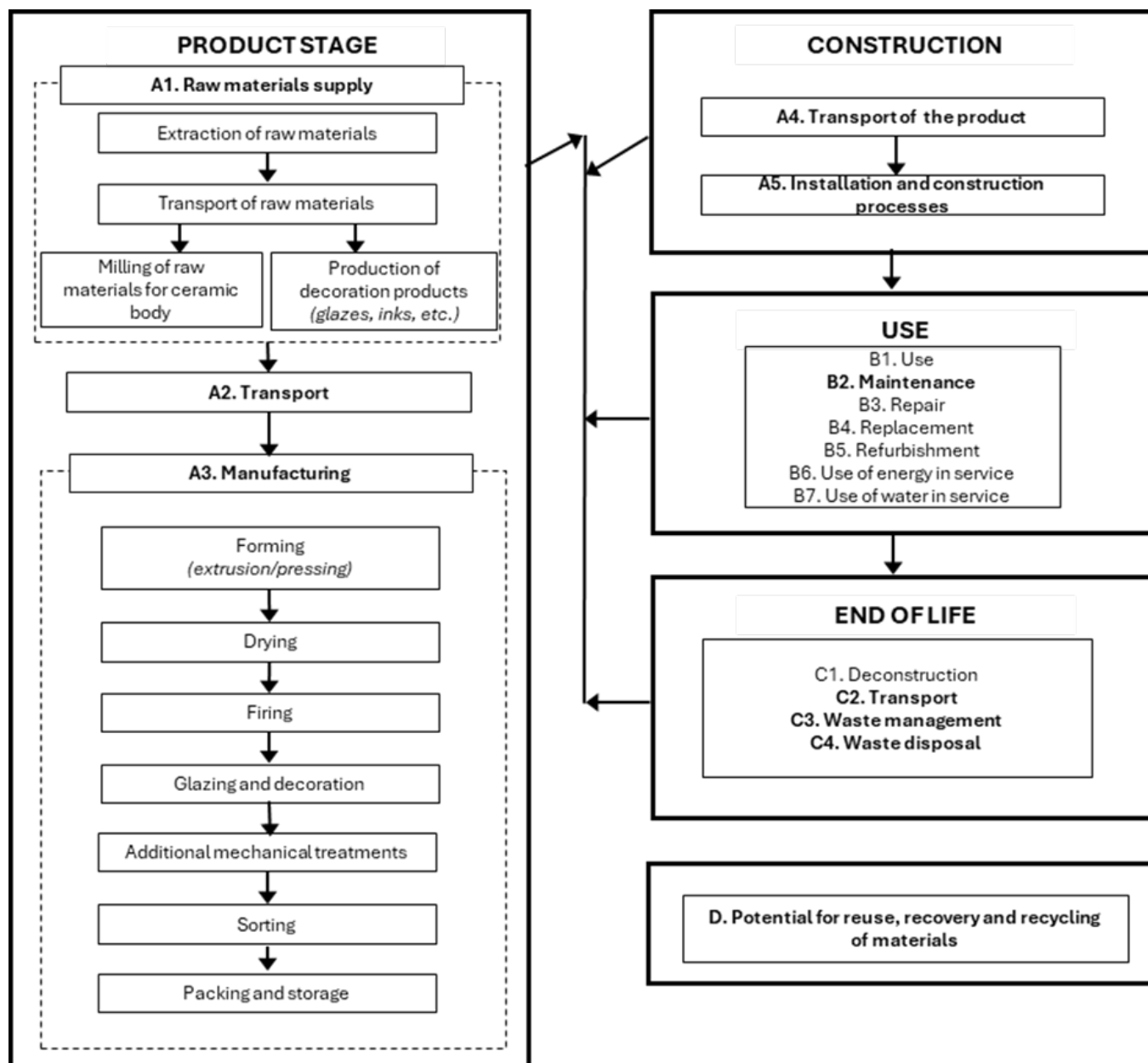
The maximum value corresponds to the format with the highest weight in raw material and the greatest application of decorative materials for that format. The minimum value corresponds to the format with the lowest weight in raw material and a minimum amount of decorative materials for that specific format.

Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values for stage A1-A3 respectively.

| Impact Indicator | Relative variation from the average |
|------------------|-------------------------------------|
| GWP-total        | -12%/+16%                           |
| AP               | -0%/+24%                            |
| POCP             | -0%/+23%                            |

## 4. System limits, scenarios, and additional technical information.

All life cycle modules relevant to ceramic tiles according to the PCRs have been included:



#### 4.1. Pre-manufacturing processes (upstream).

##### Raw materials (A1) and Transport (A2)

Ceramic tiles are composed of a ceramic support and a decorative layer.

The raw materials included in the composition of the substrate are mainly clays, feldspars, sands and ceramic waste generated during manufacture. Part of the clays present in the composition of Blb come from quarries managed by Pamesa.

The raw materials for decoration (glazes, engobes and inks) are produced in specialised plants. The most common raw materials are ceramic frits, pigments and inorganic materials. The raw materials used have different origins, according to their nature and properties; they are transported by road or by ship in bulk, depending on the distance and location of the extraction point.

#### 4.2. Manufacturing of the product

##### Manufacturing (A3)

The raw materials are wet-milled and spray-dried to form granules.

This granule is sent to the forming stage by uniaxial dry pressing and later, they are placed in a continuous dryer to reduce their humidity.

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, and in some cases, it is mostly decorated by inkjet printing, grits can also be applied to give it different characteristics.

The pieces are then fired in single-layer roller kilns, resulting in a hard material that is resistant to water and chemicals.

Optionally, the parts undergo mechanical surface treatments, such as cutting, polishing, or rectifying.

After passing quality control processes, the classified pieces are assembled and packaged. Finally, they are transported to the brand's logistics centres for distribution.

#### 4.3. Construction Process

##### Transport (A4)

The product is distributed 22% in Spain, 45% in Europe and 33% in the rest of the world.

##### A4 Transport to site

| Scenario Information                                                                                                 | Unit (expressed by functional unit)                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Type and fuel consumption of the vehicle, type of vehicles used for transport, e.g. long distance trucks, ship, etc. | According to the destinations in the distribution as described above:<br>0.2608 l diesel (Euro truck 6, 27 t)<br>0.0256 l fuel oil (ship) |
| Distance                                                                                                             | 300 km national distribution: 22%<br>1390 km rest of Europe distribution: 45%<br>6520 km rest of the world distribution: 33%              |
| Capacity utilisation (including no-load return)                                                                      | 85% in truck<br>100% ship                                                                                                                 |
| Bulk density of transported products                                                                                 | ≈415.4 kg/m <sup>3</sup>                                                                                                                  |
| Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)                 | 1                                                                                                                                         |

##### Product installation and process construction (A5).

Once the product has been unpacked, it is installed using mortar, in accordance with the standard operating procedures for ceramic tiles.

Packaging waste is managed separately depending on the geographical location of the installation site. To this end, three scenarios have been considered.

Based on sales distribution, waste management has been considered for Spain, Europe and the rest of the world.

Furthermore, a 15% loss has been considered during the tile installation stage, according to data provided by Pamesa Industrial Group.

#### A5 Installation

| Scenario Information                                                                                                                                                                           | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary materials for installation (specify each material)                                                                                                                               | 3,3 kg/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                               |
| Water use                                                                                                                                                                                      | 0.8 l/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                |
| Use of other resources                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                      |
| Quantitative description of the type of energy (regional mix) and consumption during the installation process                                                                                  | Not applicable                                                                                                                                                                                                                                                                                                                                                      |
| Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)                                                               | Product losses: 3172 g<br>Packaging wastes:<br>Cardboard: 124 g<br>Plastic: 18 g<br>Wood: 41 g                                                                                                                                                                                                                                                                      |
| Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route) | Product losses for recycling: 2220 g<br>Product losses for final deposition: 952 g<br>Incinerated cardboard: 3 g<br>Recycled cardboard: 110 g<br>Cardboard for final deposition: 11 g<br>Incinerated plastic: 2 g<br>Recycled plastic: 13 g<br>Plastic for final deposition: 3 g<br>Incinerated wood: 13 g<br>Recycled wood: 19 g<br>Wood for final deposition: 9 g |
| Direct emissions to ambient air, soil and water                                                                                                                                                | Not applicable                                                                                                                                                                                                                                                                                                                                                      |

#### 4.4. Use linked to the structure of the building

##### B1 Use

Once installed, the tiles do not require any energy or water to operate. The only maintenance required after installation is normal cleaning.

For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

##### B2 Maintenance

Cleaning is carried out using a damp cloth and cleaning agents

| Use linked to the building structure                                                                                                     |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Scenario information                                                                                                                     | Unit (expressed per functional unit)                                                 |
| Maintenance process                                                                                                                      | According to PCR for ceramic tiles (EN17160) residential scenario for floor cleaning |
| Maintenance cycle                                                                                                                        | Wash once a week with water and once every two weeks with detergent                  |
| Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)                                                     | Detergent: 1.34E-04 kg/m <sup>2</sup> per wash                                       |
| Material wastage during maintenance (specify type))                                                                                      | Not applicable                                                                       |
| Net tap water consumption                                                                                                                | 0.1 l/m <sup>2</sup> per wash                                                        |
| Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant | Not applicable                                                                       |

##### B3-B4-B5 Repair, Replacement and refurbishment

Ceramic tiles do not require repair, replacement or refurbishment, and their potential impact is not significant.

#### 4.5. Use linked to the operation of the building

##### B6-B7 Operational energy use and Operational water use.

These modules are not relevant for ceramic tiles.

#### 4.6. End of life stage

##### C1 Deconstruction and demolition

The impacts attributable to the removal of the product in the context of a building rehabilitation or during its demolition are negligible, as specified in the RCP of ceramic tiles.

## C2 Transport

The product waste is transported 50 km by lorry for management, either by disposal in inert landfills or for recycling.

## C3 Waste management for reuse, recovery and recycling

70% of tiles are considered to be recycled and/or reused, as indicated in the PCR.

## C4 Final disposal

It was assumed that 30% of the product was sent to controlled landfills after its service life had ended. In addition, the adhesive material and 90% of the water used in the installation are taken into account.

### End of life

| Parameter                                              | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collection process, specified by type                  | 25.2 kg total                                                                                                                                                                                                                                                                                       |
| Recovery system, specified by type                     | 17.6 kg for recycling                                                                                                                                                                                                                                                                               |
| Disposal, specified by type                            | 7.5 kg to landfill                                                                                                                                                                                                                                                                                  |
| Assumptions for scenario development (e.g.: transport) | The product waste is transported in a Euro 6 compliant heavy-duty truck (27 t) to be managed either to landfilling or recycling. An average distance of 50km from the building site to the final destination is considered. The return journey of the lorries is also included (100% empty return). |

## 4.7. Benefits and burdens beyond the system

### Module D

The net environmental burdens and net benefits of obtaining the secondary material from waste at the installation stage and at the end of life of the product have been considered.

## 4.8. Information on biogenic carbon content

Ceramic tiles are mineral products and therefore do not contain biogenic carbon. According to standard EN 16449, it is necessary to calculate the biogenic carbon content, which in this case comes from packaging, wooden pallets and cardboard.

### Biogenic carbon content

| Parameter                              | Unit (expressed by functional unit) |
|----------------------------------------|-------------------------------------|
| Biogenic carbon content of the product | -                                   |
| Biogenic carbon content of the package | 1.4E-01 kg C                        |

## 5. Declaration of the environmental parameters of the LCA and the ICV.

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units       | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|-------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq   | 11.8    | 9.6E-01 | 3.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.5E-02 | 1.3E-01 | -2.1E-01 |
| GWP-biogenic                      | kg CO2 eq   | 1.4E-02 | 1.0E-04 | 3.7E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.3E-05 | 1.4E-03 | -1.2E-04 |
| GWP-luluc                         | kg CO2 eq   | 1.4E-02 | 1.3E-02 | 5.9E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-03 | 3.4E-06 | 5.7E-04 | -5.7E-04 |
| GWP-total                         | kg CO2 eq   | 11.8    | 9.7E-01 | 3.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.5E-02 | 1.3E-01 | -2.1E-01 |
| ODP                               | kg CFC11 eq | 1.0E-08 | 1.3E-13 | 1.5E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-14 | 7.4E-14 | 7.6E-14 | -3.7E-09 |
| AP                                | mol H+ eq   | 2.7E-02 | 4.0E-03 | 6.9E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-04 | 3.1E-05 | 9.8E-04 | -5.2E-04 |
| EP-freshwater                     | kg P eq     | 1.7E-04 | 3.4E-06 | 2.8E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 5.6E-07 | 2.7E-09 | 2.8E-06 | -2.0E-06 |
| EP-marine                         | kg N eq     | 7.3E-03 | 1.1E-03 | 2.0E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 5.2E-05 | 8.4E-06 | 2.7E-04 | -2.0E-04 |
| EP-terrestrial                    | mol N eq    | 7.9E-02 | 1.2E-02 | 2.2E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 6.2E-04 | 9.1E-05 | 2.9E-03 | -2.2E-03 |
| POCP                              | Kg NMVOC eq | 2.0E-02 | 3.1E-03 | 5.7E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-04 | 2.7E-05 | 7.9E-04 | -5.0E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq    | 1.2E-04 | 7.1E-08 | 1.8E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-08 | 1.2E-09 | 1.4E-08 | -1.0E-07 |
| ADP-fossil <sup>2</sup>           | MJ          | 169.4   | 11.5    | 33.2    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.2E-01 | 1.8     | -2.5E+00 |
| WDP <sup>2</sup>                  | m3          | 2.4     | 1.2E-02 | 4.7E-01 | 0  | 21.6    | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-03 | 8.9E-03 | 1.0E-02 | 5.8E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

### Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.2E-05 | 6.6E-08 | 3.4E-06 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-09 | 2.8E-10 | 1.2E-08 | -2.4E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 4.8E-01 | 2.9E-03 | 1.0E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 4.5E-04 | 6.4E-03 | 2.3E-03 | -1.1E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 82.2    | 8.6     | 16.7    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 7.5E-02 | 1.1     | -1.7E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 5.0E-09 | 1.7E-10 | 9.4E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.6E-11 | 3.3E-12 | 1.4E-10 | 2.3E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 3.6E-07 | 7.2E-09 | 6.6E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-09 | 3.2E-11 | 1.4E-08 | -1.6E-09 |
| SQP <sup>2</sup>    | -                     | 94.5    | 5.1     | 26.9    | 0  | 7.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.4E-01 | 1.4E-03 | 4.1E-01 | -2.0E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 52.4    | 9.0E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.3E-02 | 2.1E-01 | -5.2E-01 |
| PERM      | MJ             | 5.6     | 0       | 8.4E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 58.0    | 9.0E-01 | 2.9     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.3E-02 | 2.1E-01 | -5.2E-01 |
| PENRE     | MJ             | 169.4   | 11.5    | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.2E-01 | 1.8     | -2.5E+00 |
| PENRM     | MJ             | 7.8E-01 | 0       | 1.2E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 170.2   | 11.5    | 6.2     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.2E-01 | 1.8     | -2.5E+00 |
| SM        | kg             | 9.3E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 5.0E-02 | 1.0E-03 | 1.0E-02 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 1.2E-04 | 3.4E-04 | -1.0E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

### Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 6.1E-04 | 4.4E-10 | 9.1E-05 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.6E-11 | 9.1E-11 | 2.8E-08 | -4.3E-08 |
| DWD       | kg    | 5.0E-01 | 1.8E-03 | 1.4     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.8E-04 | 7.2E-05 | 8.2     | -1.5E-03 |
| RWD       | kg    | 5.4E-03 | 2.0E-05 | 1.0E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.1E-06 | 1.0E-04 | 2.4E-05 | -1.5E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

### Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.8E-01 | 0  | 2.4 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 17.6 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## 6. Additional environmental information.

### Indoor air emissions

Ceramic tiles undergo a thermal process exceeding 1000°C during their manufacture. At these temperatures, any organic compounds present in the composition decompose, resulting in an inert end product free of volatile organic compounds that could be emitted during use.

The concentration of volatile organic compounds (TVOC) is less than or equal to 0.5 mg/m<sup>3</sup> in accordance with the CDPH/EHLB v1.2-2017 standard method.

### Release to soil and water

Ceramic tiles do not emit any compounds into the soil or water during the use phase, as it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically, chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that could lead to environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to surface or groundwater quality.

### Environmental information about the company

The spray-dried granules used in the manufacture of BIa and BIb (BPN spray dried porcelain) have the radioactive isotope activity concentration indices defined by the European Union (IUE), as well as the limits set out in standard GB6566-2010 in force in the Republic of China (IINT, IEXT).

PAMESA's manufacturing companies are members of ECOEMBES, a non-profit organisation that manages the recycling of waste deposited in yellow and blue bins.

ISO 14021 certification of recycled content for different spray-dried granules with inventory data from 2023.

#### Arcillas Atomizadas

Minimum recycled material content in c white pulp powder: 7.2%

% waste recycling in the spray-dried white pulp powder manufacturing process: 24.1%

#### TAU Porcelánico

Minimum recycled material content in BPN spray-dried powder: 7%

% waste recycling in the BPN spray-dried powder manufacturing process: 14.2%

## Annex I. Declaration of the environmental parameters of the LCA and LCI for the format with MINIMUM impacts

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 9.9     | 8.1E-01 | 2.7     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 2.2E-02 | 1.1E-01 | -1.8E-01 |
| GWP-biogenic                      | kg CO2 eq      | 4.4E-04 | 8.5E-05 | 3.5E-02 | 0  | 4.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.1E-05 | 1.2E-03 | -8.8E-05 |
| GWP-luluc                         | kg CO2 eq      | 1.2E-02 | 1.1E-02 | 5.2E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-03 | 3.0E-06 | 5.0E-04 | -4.9E-04 |
| GWP-total                         | kg CO2 eq      | 9.9     | 8.2E-01 | 2.7     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-01 | 2.2E-02 | 1.2E-01 | -1.8E-01 |
| ODP                               | kg CFC11 eq    | 7.6E-09 | 1.1E-13 | 1.1E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-14 | 6.4E-14 | 6.6E-14 | -3.8E-09 |
| AP                                | mol H+ eq      | 2.0E-02 | 3.4E-03 | 5.8E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 2.7E-05 | 8.5E-04 | -4.8E-04 |
| EP-freshwater                     | kg P eq        | 1.1E-04 | 2.9E-06 | 1.9E-05 | 0  | 6.1E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 4.8E-07 | 2.4E-09 | 2.4E-06 | -1.9E-06 |
| EP-marine                         | kg N eq        | 5.4E-03 | 9.0E-04 | 1.7E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.5E-05 | 7.3E-06 | 2.3E-04 | -1.9E-04 |
| EP-terrestrial                    | mol N eq       | 5.9E-02 | 1.0E-02 | 1.9E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.4E-04 | 7.9E-05 | 2.5E-03 | -2.0E-03 |
| POCP                              | Kg NMVOC eq    | 1.6E-02 | 2.7E-03 | 4.9E-03 | 0  | 3.8E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-04 | 2.3E-05 | 6.8E-04 | -4.6E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 6.0E-05 | 6.0E-08 | 9.0E-06 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 9.8E-09 | 1.0E-09 | 1.2E-08 | -8.9E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 145.7   | 9.8     | 29.3    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5     | 5.3E-01 | 1.5     | -2.3E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 1.9     | 1.0E-02 | 4.1E-01 | 0  | 21.7    | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-03 | 7.7E-03 | 8.8E-03 | 4.4E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.9E-05 | 5.6E-08 | 2.9E-06 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-09 | 2.4E-10 | 1.0E-08 | -2.2E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 4.2E-01 | 2.5E-03 | 9.6E-02 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.9E-04 | 5.6E-03 | 2.0E-03 | -1.0E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 57.3    | 7.2     | 12.7    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.1     | 6.6E-02 | 9.3E-01 | -1.5E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 2.9E-09 | 1.4E-10 | 6.1E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-11 | 2.9E-12 | 1.2E-10 | 2.7E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 9.8E-08 | 6.1E-09 | 2.7E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0E-09 | 2.8E-11 | 1.2E-08 | -1.5E-09 |
| SQP <sup>2</sup>    | -                     | 79.1    | 4.3     | 24.4    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 7.3E-01 | 1.2E-03 | 3.6E-01 | -1.8E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 43.0    | 7.6E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-01 | 2.9E-02 | 1.8E-01 | -5.2E-01 |
| PERM      | MJ             | 5.6     | 0       | 8.4E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 48.6    | 7.6E-01 | 2.9     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-01 | 2.9E-02 | 1.8E-01 | -5.2E-01 |
| PENRE     | MJ             | 145.7   | 9.8     | 6.0     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5     | 5.3E-01 | 1.5     | -2.3E+00 |
| PENRM     | MJ             | 7.8E-01 | 0       | 1.2E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 146.5   | 9.8     | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5     | 5.3E-01 | 1.5     | -2.3E+00 |
| SM        | kg             | 8.3E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 4.0E-02 | 8.5E-04 | 8.5E-03 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-04 | 1.0E-04 | 2.9E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 6.1E-04 | 3.7E-10 | 9.2E-05 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 5.7E-11 | 7.9E-11 | 2.4E-08 | -3.7E-08 |
| DWD       | kg    | 2.9E-01 | 1.5E-03 | 1.2     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.4E-04 | 6.2E-05 | 7.1     | -1.3E-03 |
| RWD       | kg    | 4.9E-03 | 1.7E-05 | 9.5E-04 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.7E-06 | 8.7E-05 | 2.1E-05 | -1.6E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 3.7E-02 | 0  | 2.1 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 15.7 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## Annex II. Declaration of the environmental parameters of the LCA and LCI for the format with MAXIMUM impact

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 13.2    | 1.1     | 3.2     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-01 | 2.8E-02 | 1.5E-01 | -2.3E-01 |
| GWP-biogenic                      | kg CO2 eq      | 2.0E-02 | 1.2E-04 | 3.8E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.4E-05 | 1.5E-03 | -1.4E-04 |
| GWP-luluc                         | kg CO2 eq      | 1.6E-02 | 1.5E-02 | 6.5E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-03 | 3.9E-06 | 6.5E-04 | -6.5E-04 |
| GWP-total                         | kg CO2 eq      | 13.2    | 1.1     | 3.3     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-01 | 2.8E-02 | 1.5E-01 | -2.3E-01 |
| ODP                               | kg CFC11 eq    | 8.4E-09 | 1.5E-13 | 1.3E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-14 | 8.4E-14 | 8.6E-14 | -3.8E-09 |
| AP                                | mol H+ eq      | 2.7E-02 | 4.7E-03 | 7.0E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-04 | 3.5E-05 | 1.1E-03 | -5.7E-04 |
| EP-freshwater                     | kg P eq        | 1.3E-04 | 3.9E-06 | 2.3E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 6.3E-07 | 3.1E-09 | 3.2E-06 | -2.1E-06 |
| EP-marine                         | kg N eq        | 7.1E-03 | 1.2E-03 | 2.0E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 5.9E-05 | 9.5E-06 | 3.1E-04 | -2.2E-04 |
| EP-terrestrial                    | mol N eq       | 7.7E-02 | 1.4E-02 | 2.2E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 7.0E-04 | 1.0E-04 | 3.3E-03 | -2.4E-03 |
| POCP                              | Kg NMVOC eq    | 2.0E-02 | 3.6E-03 | 5.8E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-04 | 3.0E-05 | 8.9E-04 | -5.5E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 7.0E-05 | 8.2E-08 | 1.1E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-08 | 1.3E-09 | 1.5E-08 | -1.2E-07 |
| ADP-fossil <sup>2</sup>           | MJ             | 191.9   | 13.3    | 36.9    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.9     | 7.0E-01 | 2.0     | -2.7E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 2.5     | 1.4E-02 | 4.9E-01 | 0  | 21.5    | 0  | 0  | 0  | 0  | 0  | 0  | 2.3E-03 | 1.0E-02 | 1.1E-02 | 7.0E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.6E-05 | 7.7E-08 | 4.0E-06 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-09 | 3.1E-10 | 1.3E-08 | -2.7E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 5.3E-01 | 3.4E-03 | 1.1E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 5.1E-04 | 7.3E-03 | 2.7E-03 | -1.2E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 76.2    | 9.9     | 16.0    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 8.6E-02 | 1.2     | -1.9E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 3.5E-09 | 1.9E-10 | 7.2E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.9E-11 | 3.8E-12 | 1.5E-10 | 2.2E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 1.2E-07 | 8.3E-09 | 3.1E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-09 | 3.7E-11 | 1.6E-08 | -1.8E-09 |
| SQP <sup>2</sup>    | -                     | 101.2   | 5.9     | 28.0    | 0  | 7.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 9.6E-01 | 1.6E-03 | 4.7E-01 | -2.2E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ    | 58.6    | 1.0     | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-01 | 3.8E-02 | 2.3E-01 | -5.1E-01 |
| PERM      | MJ    | 5.6     | 0       | 8.4E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ    | 64.1    | 1.0     | 3.0     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-01 | 3.8E-02 | 2.3E-01 | -5.1E-01 |
| PENRE     | MJ    | 191.9   | 13.3    | 6.2     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.9     | 7.0E-01 | 2.0     | -2.7E+00 |
| PENRM     | MJ    | 7.8E-01 | 0       | 1.2E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ    | 192.7   | 13.3    | 6.3     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.9     | 7.0E-01 | 2.0     | -2.7E+00 |
| SM        | kg    | 1.1     | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m3    | 5.2E-02 | 1.2E-03 | 1.0E-02 | 0  | 2.8E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-04 | 1.3E-04 | 3.8E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 8.1E-04 | 5.1E-10 | 1.2E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 7.4E-11 | 1.0E-10 | 3.2E-08 | -4.9E-08 |
| DWD       | kg    | 3.9E-01 | 2.1E-03 | 1.5     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.2E-04 | 8.1E-05 | 9.3     | -1.8E-03 |
| RWD       | kg    | 6.1E-03 | 2.3E-05 | 1.1E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.5E-06 | 1.1E-04 | 2.7E-05 | -1.5E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 4.6E-02 | 0  | 2.9 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 21.0 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## References

- [1] General Programme Instructions of GlobalEPD. 3rd revision. AENOR. October 2023.
- [2] EN ISO 14025:2010 Environmental labels. Type III environmental declarations. Principles and procedures (ISO 14025:2006).
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- [9] Estudio de Análisis de Ciclo de Vida. Grupo Empresarial Pamesa Annex I of report C243201; September 2025. version 4 issued by Institute of Ceramic Technology.

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# AENOR



Una declaración ambiental verificada

# GlobalEPD

# GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental  
Product  
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 17160: 2019

**TAU**  
*cerámica*

# AENOR

**TAU CERÁMICA SOLUTIONS S.L.**  
**Ceramic tiles.**  
**Glazed stoneware tiles (B1a)**

Date of first issue: 2025-09-26

Expiration Date: 2030-09-25

The declared validity is subject to registration and publication at [www.aenor.com](http://www.aenor.com)

Registration code: GlobalePD EN 17160 - 059



The owner of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes

|                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>EN 17160:2019 PCR for ceramic tiles<br/>EN 15804:2012+A2:2019 serves as the basis for the PCR</p>                                                                                                  |
| <p>Independent verification of the declaration and data, in accordance with<br/>the Standard ISO 14025:2006</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> |
| <p>Verification Body</p> <p><b>AENOR</b></p> <p>Product certification body accredited by ENAC with accreditation No. 1/C-PR468</p>                                                                    |

## 1. General Information

### 1.1. Description of the organisation

**TAU Cerámica** has established itself as a global reference brand in the ceramic sector within the Pamesa group, known for the technical and aesthetic quality of its products, its constant commitment to innovation and development, and its dedication to social and environmental responsibility. Additionally, in recent years, the brand has stood out for its commitment to digital transformation and innovation in both products and sales tools. A trendsetting brand in continuous evolution.

### 1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at **PAMESA GROUP** and marketed by **TAU Cerámica**, in the geographical and technological environment of Spain in 2023.

The location of the production centre is shown below:

|                                                                                              |
|----------------------------------------------------------------------------------------------|
| <b>Compacglass I</b><br>Camí de la lloma de Miralcamp, 4, 12200 Onda<br>Castellón, Spain     |
| <b>Compacglass III</b><br>Carretera Onda, Villarreal Km.3.5, 12200 Onda,<br>Castellón, Spain |
| <b>Compacglass IV</b><br>Camino de Palos, 13, 12200 Onda, Castellón, Spain                   |

The Pamesa Industrial Group also has other facilities related to other stages of the production process:

|                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Galve</b><br>Locality of Galve, Teruel, Spain                                                                              |
| <b>Mine Pilón</b><br>Localities of Mas de las Matas, Castellote y Seno, Teruel,<br>Spain                                           |
| <b>Amizalsa</b><br>Diseminado Simona, 10, 12110 L'Alcora, Castellón, Spain                                                         |
| <b>Logistic centre 1</b><br>Camino del Palmeral, 10 P.I Colomer, 12200 Onda,<br>Castellón, Spain                                   |
| <b>Logistic centre 2</b><br>Calle del Toll, 24, 12200 Onda, Castellón, Spain                                                       |
| <b>Logistic centre 3</b><br>Calle del Toll, 11, 12200 Onda, Castellón, Spain                                                       |
| <b>Logistic centre 4</b><br>Carretera CV-20 Km 3,5, 12200 Onda, Castellón. Spain                                                   |
| <b>Logistic centre 5</b><br>Camí Miralcamp 47-49, 12200 Onda, Castellón, Spain                                                     |
| <b>Logistic centre 6</b><br>Camí cuadra la Torta, 2, 12006 Castellón de la Plana,<br>Castellón Spain                               |
| <b>Logistic centre 7</b><br>Calle Argentina, 93 P.I. Sur 13, 12200 Onda, Castellón,<br>Spain                                       |
| <b>Logistic centre 8</b><br>Calle Ratils, 23 P.I. Colomer, 12200 Onda, Castellón,<br>Spain                                         |
| <b>Logistic centre 9</b><br>Calle Panamá, 1 esq. P.I. Sur 13, 12200 Onda, Castellón,<br>Spain                                      |
| <b>Logistic centre 10</b><br>Avda. Mediterráneo, 53, 12200 Onda, Castellón, Spain                                                  |
| <b>Logistic centre 11</b><br>Carretera Castellón – Alcora Pza. Polígono 4, 4 P.G. 12,<br>12130 Sant Joan de Moró, Castellón, Spain |

The results shown the environmental performance of the porcelain stoneware tiles, as average weighted by production. Moreover, the environmental data of the tiles with the lowest and highest impact, thus narrowing down the results obtained in the LCA are also declared. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

### 1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the EN ISO 14025:2010 and - EN 15804:2012+A2:2019 and the following Category Rule:

| INFORMATION ABOUT PRODUCT CATEGORY RULES |                                          |
|------------------------------------------|------------------------------------------|
| Descriptive title                        | Product Category Rules for Ceramic Tiles |
| Registration code and version            | EN 17160:2019                            |
| Publication date                         | 2019                                     |
| Compliance                               | EN 15804:2012 + A2:2019                  |
| Program Administrator                    | AENOR                                    |

This Environmental Statement includes the following stages of the life cycle:

#### Limits of the system. Information modules considered

|                                                                                      |    |                                                          |   |
|--------------------------------------------------------------------------------------|----|----------------------------------------------------------|---|
| Product Stage                                                                        | A1 | Raw materials supply                                     | X |
|                                                                                      | A2 | Transport                                                | X |
|                                                                                      | A3 | Manufacturing                                            | X |
| Construction                                                                         | A4 | Transport of the product                                 | X |
|                                                                                      | A5 | Installation and construction processes                  | X |
| Stage of use                                                                         | B1 | Use                                                      | X |
|                                                                                      | B2 | Maintenance                                              | X |
|                                                                                      | B3 | Repair                                                   | X |
|                                                                                      | B4 | Replacement                                              | X |
|                                                                                      | B5 | Refurbishment                                            | X |
|                                                                                      | B6 | Use of energy in service                                 | X |
|                                                                                      | B7 | Use of water in service                                  | X |
| End of life                                                                          | C1 | Deconstruction                                           | X |
|                                                                                      | C2 | Transport                                                | X |
|                                                                                      | C3 | Waste management                                         | X |
|                                                                                      | C4 | Waste disposal                                           | X |
|                                                                                      | D  | Potential for reuse, recovery and recycling of materials | X |
| X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated |    |                                                          |   |

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be comparable with EPDs not developed according to EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the EN ISO 14025 standard

## 2. Product information

### 2.1. Product Identification

The ceramic tiles included in this study belong to group BIIa (glazed stoneware), classification based on standard EN 14411: 2016 (equivalent to standard ISO 13006:2018), i.e. they have water absorption between 3% and 6% and are formed by pressing. Their common name is glazed stoneware.

The glazed stoneware tiles included in this study comprise 5 commercial formats with and without glaze, with and without mechanical treatment, with thicknesses ranging from 8.7 mm a 9.5 mm, , with an average fired weight of 18.8 kg/m<sup>2</sup> and an unfired weight of 22.1 kg/m<sup>2</sup>.

The annexes contain the results for the formats included in the scope of this EPD that have the minimum and maximum environmental impact, corresponding to the following formats: 20x60 cm weighing before firing of 21 kg/m<sup>2</sup> and 45x45 cm with a unfired weight of 22.7 kg/m<sup>2</sup> and fired of 19.5 kg/m<sup>2</sup> y 18.3 kg/m<sup>2</sup> respectively.

The CPC code of the product is 37370.

### 2.2. Product technical features

The manufacturer declares the following information about the technical specifications of the product:

**Product technical features**

| Technical properties                 | Standard        | Average value                            |
|--------------------------------------|-----------------|------------------------------------------|
| Width                                | EN-ISO 10545-2  | Complies with the standard               |
| Length                               |                 | Complies with the standard               |
| Thickness                            |                 | Complies with the standard               |
| Straightness of Sides                |                 | Complies with the standard               |
| Rectangularity                       |                 | Complies with the standard               |
| Surface Flatness                     |                 | Complies with the standard               |
| Warpage                              |                 | Complies with the standard               |
| Modulus of rupture Breaking Strength | EN-ISO 10545-4  | 30 – 40 N/mm <sup>2</sup>                |
| Modulus of rupture Bending strength  |                 | 1100-1900 N                              |
| Resistance to Surface abrasion       | EN-ISO 10545-7  | Not applicable                           |
| Linear thermal expansion             | EN-ISO 10545-8  | <7.0 x 10 <sup>-6</sup> °C <sup>-1</sup> |
| Thermal sock resistance              | EN-ISO 10545-9  | Resist                                   |
| Cracking resistance                  | EN-ISO 10545-11 | Resist                                   |
| Chemical resistance                  | EN-ISO 10545-13 | Class GA                                 |
| Stain resistance                     | EN-ISO 10545-14 | Complies with the standard               |

This EPD covers residential interior and exterior flooring as a study scenario. However, the versatility of these ceramic tiles allows them to be installed in other locations such as walls, roofs, façades, exterior paving and other types of buildings with varying levels of foot traffic, such as hospitals, schools, offices and shopping centres

### 2.3. Product composition

The composition declared by the manufacturer is as follows:

**Product Composition**

| Substance/Component                                                                                 | Content |
|-----------------------------------------------------------------------------------------------------|---------|
| Support (clays, feldspars, sands, etc.)                                                             | 93%     |
| Decoration raw materials (grits, inks, dry-based glazes, liquid-based glazes and micronized glazes) | 7%      |

Substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization" do not exceed 0.1% by weight of the product

### 3. LCA Information

#### 3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the latest version of the 2024.2 database. (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2019 standard.

#### 3.2. Functional unit

The functional unit considered is **“Covering and decoration of 1 m<sup>2</sup> of an interior floor with ceramic tiles of group BIIa (various formats from 8.7 mm to 9.5 mm and an average weight of 18.8 kg/m<sup>2</sup>) over 50 years”**.

#### 3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, as it is a long-lasting product that does not require replacement. A service life of 50 years has been considered

#### Reference service life

| Parameter                                                                                                                                                                    | Unit (expressed by functional unit)                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference service life                                                                                                                                                       | Minimum 50 years                                                                                                                                                       |
| Declared product properties (on gate), coatings, etc.                                                                                                                        | Minimum values of the relevant characteristics according to Annex J of the EN 14411.<br>For more information, request technical data sheets according to model.        |
| Design parameters of the application (manufacturer's instructions), including references to good practices                                                                   | For more information, request technical data sheets according to model.                                                                                                |
| Estimated quality of work, when installed according to the manufacturer's specifications                                                                                     | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |
| Installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc. | Results of the values of the relevant characteristics according to Annex J of the EN 14411.<br>For more information, request technical data sheets according to model. |
| Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure                                                                                  | For more information, request technical data sheets according to model.                                                                                                |
| Conditions of use, e.g.: frequency of use, mechanical exposure, etc.                                                                                                         | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |

### 3.4. Allocation rules

In accordance with the standards and PCR, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products.

In generally terms, the inputs and outputs assigned to the declared unit have been weighted averages based on the production or specific weight of the tiles before and after firing, according to the criteria for each stage of the process.

### 3.5. Cut-off rule and exclusions

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non - renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of powdered raw materials.
- Channelled atmospheric emissions, not regulated by law, generated during the combustion stages.
- Long-term emissions (>100 years).
- The production of goods, machinery, infrastructure, and industrial equipment that can be replaced in less than a year.
- Mortar losses in stage A5.
- Waste generated in mines, other than unusable soil, which is managed externally.
- The catalyst used in the installation of fibreglass.

- The processes of recycling and reusing waste generated throughout the life cycle of ceramic coverings that will form part of another system, based on the PCR.

### 3.6. Representativeness, quality and selection of data

The primary data have been provided directly by PAMESA Industrial Group, with five production centres located in Onda (Castellón), a mine located in the province of Teruel and a spray-drier located in Castellón. Primary data have also been obtained from the eleven logistics centres of the Pamesa Industrial Group

Secondary data was obtained from the most up-to-date Sphera-GaBi databases [8] and modelled using LCA for Experts (Sphera-GaBi) [7]. All data refers to a geographical scenario for Spain in 2023.

The results presented are representative of ceramic tiles, expressed as an average weighted by the production of the ceramic tiles belonging to the Billa group range, limiting this average by the products with the minimum and maximum environmental impact.

The global warming potential (GWP-total) of the different technologies that make up the electricity mix used is 0.38 kgCO<sub>2</sub> eq/kWh

### 3.7. Other calculation rules and assumptions

The 5 ceramic tile references have different weights and environmental impacts. The following table shows the deviations between the formats with the highest and lowest environmental impact and the average, in relation to the product stage (A1-A3).

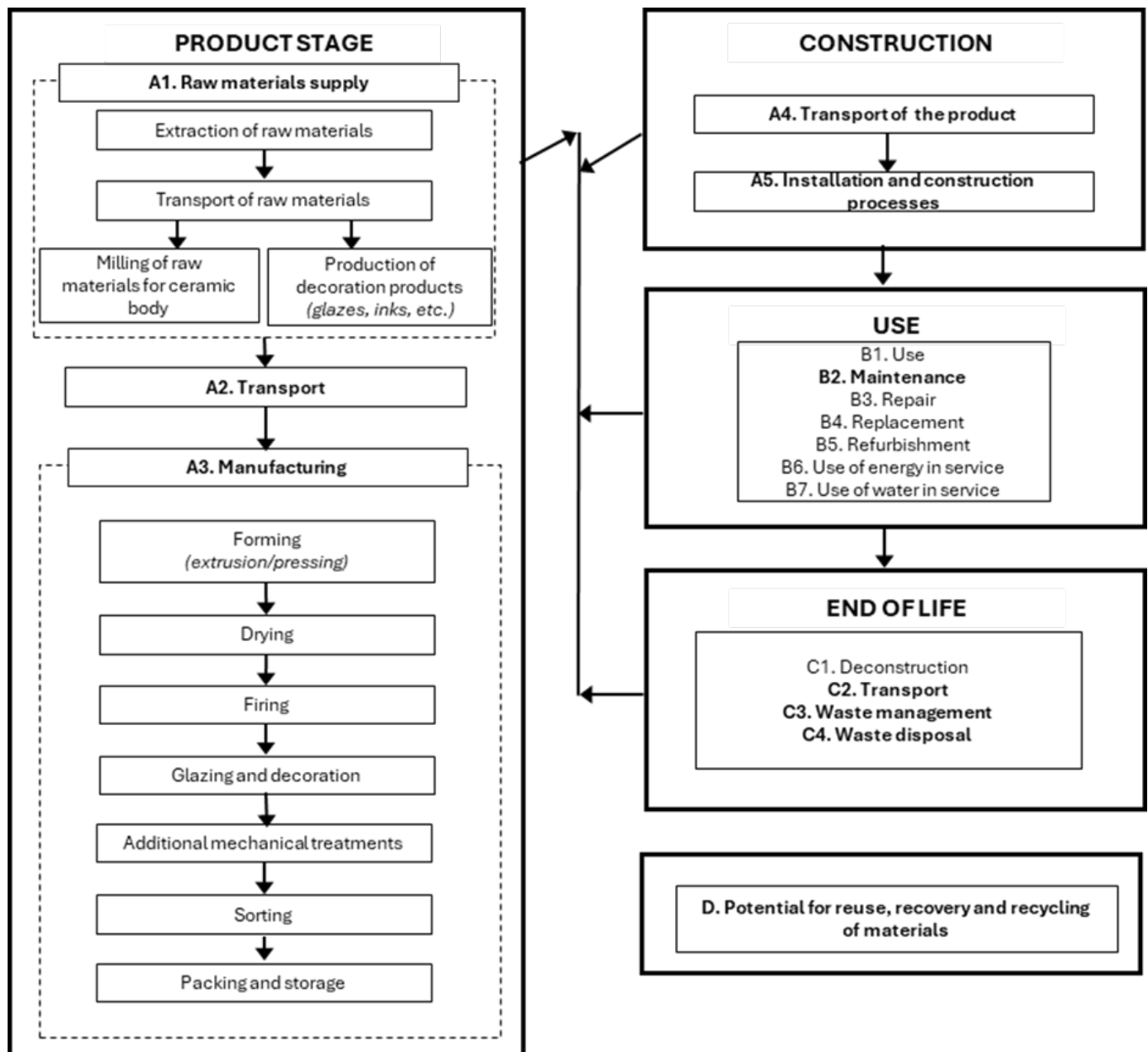
The maximum value corresponds to the format with the highest weight in raw material and the greatest application of decorative materials for that format. The minimum value corresponds to the format with the lowest weight in raw material and a minimum amount of decorative materials for that specific format.

Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values for stage A1-A3 respectively.

| Impact Indicator | Relative variation from the average |
|------------------|-------------------------------------|
| GWP-total        | 7%/-9%                              |
| AP               | 12%/-25%                            |
| POCP             | 11%/-21%                            |

## 4. System limits, scenarios, and additional technical information.

All life cycle modules relevant to ceramic tiles according to the PCRs have been included:



#### 4.1. Pre-manufacturing processes (upstream).

##### Raw materials (A1) and Transport (A2)

Ceramic tiles are composed of a ceramic support and a decorative layer.

The raw materials included in the composition of the substrate are mainly clays, feldspars, sands and ceramic waste generated during manufacture. Part of the clays present in the composition of Blla come from quarries managed by Pamesa.

The raw materials for decoration (glazes, engobes and inks) are produced in specialised plants. The most common raw materials are ceramic frits, pigments and inorganic materials. The raw materials used have different origins, according to their nature and properties; they are transported by road or by ship in bulk, depending on the distance and location of the extraction point.

#### 4.2. Manufacturing of the product

##### Manufacturing (A3)

The raw materials are wet-milled and spray-dried to form granules.

This granule is sent to the forming stage by uniaxial dry pressing and later, they are placed in a continuous dryer to reduce their humidity.

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, and in some cases, it is mostly decorated by inkjet printing, grits can also be applied to give it different characteristics.

The pieces are then fired in single-layer roller kilns, resulting in a hard material that is resistant to water and chemicals.

Optionally, the parts undergo mechanical surface treatments, such as cutting, polishing, or rectifying.

After passing quality control processes, the classified pieces are assembled and packaged. Finally, they are transported to the brand's logistics centres for distribution.

#### 4.3. Construction Process

##### Transport (A4)

The product is distributed 22% in Spain, 45% in Europe and 33% in the rest of the world.

##### A4 Transport to site

| Scenario Information                                                                                                 | Unit (expressed by functional unit)                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Type and fuel consumption of the vehicle, type of vehicles used for transport, e.g. long distance trucks, ship, etc. | According to the destinations in the distribution as described above:<br>0.256 l diesel (Euro truck 6, 27 t)<br>0.025 l fuel oil (ship) |
| Distance                                                                                                             | 300 km national distribution: 22%<br>1390 km rest of Europe distribution: 45%<br>6520 km rest of the world distribution: 33%            |
| Capacity utilisation (including no-load return)                                                                      | 85% in truck<br>100% ship                                                                                                               |
| Bulk density of transported products                                                                                 | ≈415.4 kg/m <sup>3</sup>                                                                                                                |
| Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)                 | 1                                                                                                                                       |

#### Product installation and process construction (A5).

Once the product has been unpacked, it is installed using mortar, in accordance with the standard operating procedures for ceramic tiles.

Packaging waste is managed separately depending on the geographical location of the installation site. To this end, three scenarios have been considered.

Based on sales distribution, waste management has been considered for Spain, Europe and the rest of the world.

Furthermore, a 15% loss has been considered during the tile installation stage, according to data provided by Pamesa Industrial Group.

#### A5 Installation

| Scenario Information                                                                                                                                                                           | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary materials for installation (specify each material)                                                                                                                               | 3,3 kg/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                   |
| Water use                                                                                                                                                                                      | 0.8 l/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                    |
| Use of other resources                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                          |
| Quantitative description of the type of energy (regional mix) and consumption during the installation process                                                                                  | Not applicable                                                                                                                                                                                                                                                                                                                                                          |
| Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)                                                               | Product losses: 2827 g<br>Packaging wastes:<br>Cardboard: 118 g<br>Plastic: 17 g<br>Wood: 44 g                                                                                                                                                                                                                                                                          |
| Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route) | Product losses for recycling: 1979 g<br>Product losses for final deposition: 848 g<br>Incinerated cardboard: 3 g<br>Recycled cardboard: 105 g<br>Cardboard for final deposition: 10 g<br>Incinerated plastic: 3 g<br>Recycled plastic: 14 g<br>Plastic for final deposition: 3 g<br>Incinerated wood: 14 g<br>Recycled plastic: 20 g<br>Wood for final deposition: 10 g |
| Direct emissions to ambient air, soil and water                                                                                                                                                | Not applicable                                                                                                                                                                                                                                                                                                                                                          |

#### 4.4. Use linked to the structure of the building

##### B1 Use

Once installed, the tiles do not require any energy or water to operate. The only maintenance required after installation is normal cleaning.

For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

#### B2 Maintenance

Cleaning is carried out using a damp cloth and cleaning agents

#### Use linked to the building structure

| Scenario information                                                                                                                     | Unit (expressed per functional unit)                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Maintenance process                                                                                                                      | According to PCR for ceramic tiles (EN17160) residential scenario for floor cleaning |
| Maintenance cycle                                                                                                                        | Wash once a week with water and once every two weeks with detergent                  |
| Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)                                                     | Detergent: 1.34E-04 kg/m <sup>2</sup> per wash                                       |
| Material wastage during maintenance (specify type))                                                                                      | Not applicable                                                                       |
| Net tap water consumption                                                                                                                | 0.1 l/m <sup>2</sup> per wash                                                        |
| Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant | Not applicable                                                                       |

#### B3-B4-B5 Repair, Replacement and refurbishment

Ceramic tiles do not require repair, replacement or refurbishment, and their potential impact is not significant.

#### 4.5. Use linked to the operation of the building

##### B6-B7 Operational energy use and Operational water use.

These modules are not relevant for ceramic tiles.

#### 4.6. End of life stage

##### C1 Deconstruction and demolition

The impacts attributable to the removal of the product in the context of a building rehabilitation or during its demolition are negligible, as specified in the RCP of ceramic tiles.

## C2 Transport

The product waste is transported 50 km by lorry for management, either by disposal in inert landfills or for recycling.

## C3 Waste management for reuse, recovery and recycling

70% of tiles are considered to be recycled and/or reused, as indicated in the PCR.

## C4 Final disposal

It was assumed that 30% of the product was sent to controlled landfills after its service life had ended. In addition, the adhesive material and 90% of the water used in the installation are taken into account.

### End of life

| Parameter                                              | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collection process, specified by type                  | 22.9 kg total                                                                                                                                                                                                                                                                                       |
| Recovery system, specified by type                     | 16.0 kg for recycling                                                                                                                                                                                                                                                                               |
| Disposal, specified by type                            | 6.9 kg to landfill                                                                                                                                                                                                                                                                                  |
| Assumptions for scenario development (e.g.: transport) | The product waste is transported in a Euro 6 compliant heavy-duty truck (27 t) to be managed either to landfilling or recycling. An average distance of 50km from the building site to the final destination is considered. The return journey of the lorries is also included (100% empty return). |

## 4.7. Benefits and burdens beyond the system

### Module D

The net environmental burdens and net benefits of obtaining the secondary material from waste at the installation stage and at the end of life of the product have been considered.

## 4.8. Information on biogenic carbon content

Ceramic tiles are mineral products and therefore do not contain biogenic carbon. According to standard EN 16449, it is necessary to calculate the biogenic carbon content, which in this case comes from packaging, wooden pallets and cardboard.

### Biogenic carbon content

| Parameter                              | Unit (expressed by functional unit) |
|----------------------------------------|-------------------------------------|
| Biogenic carbon content of the product | -                                   |
| Biogenic carbon content of the package | 1.4E-01 kg C                        |

## 5. Declaration of the environmental parameters of the LCA and the ICV.

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units       | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|-------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq   | 13.3    | 9.4E-01 | 3.2     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.4E-02 | 1.3E-01 | -2.0E-01 |
| GWP-biogenic                      | kg CO2 eq   | 7.4E-03 | 9.9E-05 | 3.7E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.2E-05 | 1.3E-03 | -1.2E-04 |
| GWP-luluc                         | kg CO2 eq   | 1.1E-02 | 1.3E-02 | 5.4E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-03 | 3.4E-06 | 5.6E-04 | -5.6E-04 |
| GWP-total                         | kg CO2 eq   | 13.3    | 9.5E-01 | 3.2     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 2.4E-02 | 1.3E-01 | -2.0E-01 |
| ODP                               | kg CFC11 eq | 1.1E-08 | 1.2E-13 | 1.7E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-14 | 7.5E-14 | 7.5E-14 | -3.7E-09 |
| AP                                | mol H+ eq   | 2.5E-02 | 3.9E-03 | 6.5E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-04 | 3.1E-05 | 9.6E-04 | -5.3E-04 |
| EP-freshwater                     | kg P eq     | 1.7E-04 | 3.3E-06 | 2.8E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 5.5E-07 | 2.7E-09 | 2.8E-06 | -2.0E-06 |
| EP-marine                         | kg N eq     | 7.0E-03 | 1.0E-03 | 2.0E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 5.1E-05 | 8.2E-06 | 2.6E-04 | -2.0E-04 |
| EP-terrestrial                    | mol N eq    | 7.6E-02 | 1.2E-02 | 2.2E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 6.1E-04 | 8.9E-05 | 2.8E-03 | -2.2E-03 |
| POCP                              | Kg NMVOC eq | 2.0E-02 | 3.1E-03 | 5.6E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-04 | 2.6E-05 | 7.7E-04 | -5.0E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq    | 1.2E-04 | 7.0E-08 | 1.8E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-08 | 1.2E-09 | 1.3E-08 | -1.0E-07 |
| ADP-fossil <sup>2</sup>           | MJ          | 157.1   | 11.3    | 31.3    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.1E-01 | 1.7     | -2.5E+00 |
| WDP <sup>2</sup>                  | m3          | 2.0     | 1.2E-02 | 4.1E-01 | 0  | 21.6    | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-03 | 8.8E-03 | 9.9E-03 | 5.5E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

### Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.7E-06 | 6.5E-08 | 3.0E-07 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-09 | 2.7E-10 | 1.2E-08 | -2.5E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 3.5E-01 | 2.9E-03 | 8.6E-02 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 4.5E-04 | 6.3E-03 | 2.3E-03 | -1.1E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 74.6    | 8.4     | 15.5    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 7.4E-02 | 1.0     | -1.6E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 4.9E-09 | 1.7E-10 | 9.1E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-11 | 3.3E-12 | 1.3E-10 | 1.5E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 3.5E-07 | 7.1E-09 | 6.6E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-09 | 3.2E-11 | 1.4E-08 | -1.6E-09 |
| SQP <sup>2</sup>    | -                     | 91.0    | 5.0     | 26.3    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.3E-01 | 1.4E-03 | 4.1E-01 | -2.0E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 44.3    | 8.8E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.3E-02 | 2.0E-01 | -5.4E-01 |
| PERM      | MJ             | 5.9     | 0       | 8.9E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 50.2    | 8.8E-01 | 3.0     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.3E-02 | 2.0E-01 | -5.4E-01 |
| PENRE     | MJ             | 157.1   | 11.3    | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.1E-01 | 1.7     | -2.5E+00 |
| PENRM     | MJ             | 8.5E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 157.9   | 11.3    | 6.2     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.7     | 6.1E-01 | 1.7     | -2.5E+00 |
| SM        | kg             | 6.4E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 4.1E-02 | 9.8E-04 | 8.7E-03 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 1.1E-04 | 3.3E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

### Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 4.3E-10 | 1.5E-04 | 0  | 1.8E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.5E-11 | 9.0E-11 | 2.7E-08 | -4.2E-08 |
| DWD       | kg    | 3.8E-01 | 1.8E-03 | 1.3     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.8E-04 | 6.8E-05 | 8.1     | -1.5E-03 |
| RWD       | kg    | 4.1E-03 | 2.0E-05 | 8.3E-04 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.1E-06 | 9.9E-05 | 2.4E-05 | -1.4E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

### Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.8E-01 | 0  | 2.1 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 16.0 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## 6. Additional environmental information.

### Indoor air emissions

Ceramic tiles undergo a thermal process exceeding 1000°C during their manufacture. At these temperatures, any organic compounds present in the composition decompose, resulting in an inert end product free of volatile organic compounds that could be emitted during use.

The concentration of volatile organic compounds (TVOC) is less than or equal to 0.5 mg/m<sup>3</sup> in accordance with the CDPH/EHLB v1.2-2017 standard method.

### Release to soil and water

Ceramic tiles do not emit any compounds into the soil or water during the use phase, as it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically, chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that could lead to environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to surface or groundwater quality.

### Environmental information about the company

The spray-dried granules used in the manufacture of B11a (Spray-dried red body floor tile) have the radioactive isotope activity concentration indices defined by the European Union (IUE), as well as the limits set out in standard GB6566-2010 in force in the Republic of China (IINT, IEXT).

PAMESA's manufacturing companies are members of ECOEMBES, a non-profit organisation that manages the recycling of waste deposited in yellow and blue bins.

ISO 14021 certification of recycled content for different spray-dried granules with inventory data from 2023.

### AMIZALSA

Minimum recycled material content in spray-dried powder: 5.8%.

% waste recycling in spray-dried powder manufacturing process: 25.7%.

## Annex I. Declaration of the environmental parameters of the LCA and LCI for the format with MINIMUM impacts

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 12.3    | 8.8E-01 | 3.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-01 | 2.3E-02 | 1.2E-01 | -1.9E-01 |
| GWP-biogenic                      | kg CO2 eq      | 6.4E-03 | 9.2E-05 | 3.7E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.2E-05 | 1.3E-03 | -1.1E-04 |
| GWP-luluc                         | kg CO2 eq      | 1.1E-02 | 1.2E-02 | 5.2E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-03 | 3.2E-06 | 5.3E-04 | -5.3E-04 |
| GWP-total                         | kg CO2 eq      | 12.3    | 8.9E-01 | 3.1     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-01 | 2.3E-02 | 1.2E-01 | -1.9E-01 |
| ODP                               | kg CFC11 eq    | 9.1E-09 | 1.1E-13 | 1.4E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-14 | 7.0E-14 | 7.0E-14 | -3.6E-09 |
| AP                                | mol H+ eq      | 2.2E-02 | 3.7E-03 | 6.0E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-04 | 2.9E-05 | 9.1E-04 | -5.1E-04 |
| EP-freshwater                     | kg P eq        | 1.3E-04 | 3.1E-06 | 2.2E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 5.2E-07 | 2.5E-09 | 2.6E-06 | -1.9E-06 |
| EP-marine                         | kg N eq        | 6.2E-03 | 9.7E-04 | 1.9E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.9E-05 | 7.8E-06 | 2.5E-04 | -1.9E-04 |
| EP-terrestrial                    | mol N eq       | 6.7E-02 | 1.1E-02 | 2.0E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.8E-04 | 8.4E-05 | 2.7E-03 | -2.1E-03 |
| POCP                              | Kg NMVOC eq    | 1.7E-02 | 2.9E-03 | 5.2E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 2.5E-05 | 7.3E-04 | -4.8E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 8.9E-05 | 6.5E-08 | 1.3E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-08 | 1.1E-09 | 1.3E-08 | -9.5E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 145.4   | 10.6    | 29.4    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.7E-01 | 1.6     | -2.4E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 1.8     | 1.1E-02 | 3.8E-01 | 0  | 21.6    | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-03 | 8.3E-03 | 9.4E-03 | 5.0E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.3E-06 | 6.1E-08 | 2.4E-07 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-09 | 2.6E-10 | 1.1E-08 | -2.4E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 3.3E-01 | 2.7E-03 | 8.2E-02 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 4.2E-04 | 6.0E-03 | 2.2E-03 | -1.0E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 64.6    | 7.8     | 13.9    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2     | 7.0E-02 | 9.9E-01 | -1.6E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 3.6E-09 | 1.5E-10 | 7.2E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.4E-11 | 3.1E-12 | 1.3E-10 | 1.6E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 2.5E-07 | 6.6E-09 | 5.1E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-09 | 3.0E-11 | 1.3E-08 | -1.5E-09 |
| SQP <sup>2</sup>    | -                     | 89.0    | 4.7     | 26.0    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 7.8E-01 | 1.3E-03 | 3.8E-01 | -1.9E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 43.0    | 8.2E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 3.1E-02 | 1.9E-01 | -5.4E-01 |
| PERM      | MJ             | 5.9     | 0       | 8.9E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 48.9    | 8.2E-01 | 3.0     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-01 | 3.1E-02 | 1.9E-01 | -5.4E-01 |
| PENRE     | MJ             | 145.4   | 10.6    | 6.0     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.7E-01 | 1.6     | -2.4E+00 |
| PENRM     | MJ             | 8.5E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 146.3   | 10.6    | 6.2     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6     | 5.7E-01 | 1.6     | -2.4E+00 |
| SM        | kg             | 7.1E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 3.7E-02 | 9.2E-04 | 8.1E-03 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-04 | 1.1E-04 | 3.1E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 6.0E-07 | 4.0E-10 | 9.7E-08 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.1E-11 | 8.5E-11 | 2.6E-08 | -4.0E-08 |
| DWD       | kg    | 3.1E-01 | 1.6E-03 | 1.3     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.6E-04 | 6.4E-05 | 7.6     | -1.4E-03 |
| RWD       | kg    | 3.9E-03 | 1.9E-05 | 8.0E-04 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.9E-06 | 9.3E-05 | 2.2E-05 | -1.4E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.3E-01 | 0  | 2.2 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 16.5 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## Annex II. Declaration of the environmental parameters of the LCA and LCI for the format with MAXIMUM impact

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 14.5    | 1.0     | 3.4     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 2.6E-02 | 1.4E-01 | -2.1E-01 |
| GWP-biogenic                      | kg CO2 eq      | 3.0E-02 | 1.1E-04 | 4.0E-02 | 0  | 4.3E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.3E-05 | 1.4E-03 | -1.3E-04 |
| GWP-luluc                         | kg CO2 eq      | 1.3E-02 | 1.4E-02 | 5.8E-03 | 0  | 2.3E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.3E-03 | 3.6E-06 | 6.0E-04 | -5.9E-04 |
| GWP-total                         | kg CO2 eq      | 14.5    | 1.0     | 3.4     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 2.6E-02 | 1.4E-01 | -2.1E-01 |
| ODP                               | kg CFC11 eq    | 1.5E-08 | 1.3E-13 | 2.2E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-14 | 7.9E-14 | 7.9E-14 | -3.6E-09 |
| AP                                | mol H+ eq      | 3.1E-02 | 4.2E-03 | 7.5E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-04 | 3.2E-05 | 1.0E-03 | -5.4E-04 |
| EP-freshwater                     | kg P eq        | 2.5E-04 | 3.6E-06 | 4.0E-05 | 0  | 6.0E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 5.8E-07 | 2.8E-09 | 2.9E-06 | -2.0E-06 |
| EP-marine                         | kg N eq        | 8.7E-03 | 1.1E-03 | 2.3E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 5.4E-05 | 8.7E-06 | 2.8E-04 | -2.1E-04 |
| EP-terrestrial                    | mol N eq       | 9.3E-02 | 1.2E-02 | 2.4E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 6.5E-04 | 9.4E-05 | 3.0E-03 | -2.3E-03 |
| POCP                              | Kg NMVOC eq    | 2.4E-02 | 3.3E-03 | 6.3E-03 | 0  | 3.7E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-04 | 2.8E-05 | 8.2E-04 | -5.2E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 1.6E-04 | 7.5E-08 | 2.4E-05 | 0  | 3.1E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-08 | 1.2E-09 | 1.4E-08 | -1.1E-07 |
| ADP-fossil <sup>2</sup>           | MJ             | 172.2   | 12.1    | 33.7    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.8     | 6.4E-01 | 1.8     | -2.6E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 2.5     | 1.3E-02 | 4.9E-01 | 0  | 21.6    | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-03 | 9.3E-03 | 1.1E-02 | 6.1E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.2E-06 | 6.9E-08 | 3.7E-07 | 0  | 3.6E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-09 | 2.9E-10 | 1.2E-08 | -2.6E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 4.0E-01 | 3.1E-03 | 9.3E-02 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 4.7E-04 | 6.7E-03 | 2.4E-03 | -1.1E-02 |
| ETP-fw <sup>2</sup> | CTUe                  | 99.2    | 9.0     | 19.3    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 7.9E-02 | 1.1     | -1.7E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 6.4E-09 | 1.8E-10 | 1.2E-09 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.7E-11 | 3.5E-12 | 1.4E-10 | 1.4E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 4.2E-07 | 7.5E-09 | 7.7E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-09 | 3.4E-11 | 1.5E-08 | -1.7E-09 |
| SQP <sup>2</sup>    | -                     | 121.5   | 5.4     | 31.0    | 0  | 7.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.8E-01 | 1.5E-03 | 4.3E-01 | -2.1E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ    | 60.5    | 9.4E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.4E-02 | 2.1E-01 | -5.4E-01 |
| PERM      | MJ    | 5.9     | 0       | 8.9E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ    | 66.4    | 9.4E-01 | 3.0     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-01 | 3.4E-02 | 2.1E-01 | -5.4E-01 |
| PENRE     | MJ    | 172.2   | 12.1    | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.8     | 6.4E-01 | 1.8     | -2.6E+00 |
| PENRM     | MJ    | 8.5E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ    | 173.1   | 12.1    | 6.2     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.8     | 6.4E-01 | 1.8     | -2.6E+00 |
| SM        | kg    | 7.7E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m3    | 5.3E-02 | 1.1E-03 | 1.1E-02 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-04 | 1.2E-04 | 3.5E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 4.6E-10 | 1.5E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.8E-11 | 9.5E-11 | 2.9E-08 | -4.5E-08 |
| DWD       | kg    | 4.5E-01 | 1.9E-03 | 1.4     | 0  | 7.6E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.9E-04 | 7.1E-05 | 8.5     | -1.6E-03 |
| RWD       | kg    | 4.5E-03 | 2.1E-05 | 9.0E-04 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.3E-06 | 1.0E-04 | 2.5E-05 | -1.4E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 2.2E-01 | 0  | 2.1 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 15.6 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

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# AENOR



Una declaración ambiental verificada

# GlobalEPD

# GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental  
Product  
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 17160: 2019

**TAU**  
*cerámica*

# AENOR

**TAU CERÁMICA SOLUTIONS S.L.**  
**Ceramic tiles.**  
**Earthenware tiles (BIII)**

Date of first issue: 2025-09-26

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The declared validity is subject to registration and publication at [www.aenor.com](http://www.aenor.com)

Registration code: GlobalEPD EN 17160 - 060



The owner of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes

|                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>EN 17160:2019 PCR for ceramic tiles<br/>EN 15804:2012+A2:2019 serves as the basis for the PCR</p>                                                                                                  |
| <p>Independent verification of the declaration and data, in accordance with<br/>the Standard ISO 14025:2006</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> |
| <p>Verification Body</p> <p><b>AENOR</b></p> <p>Product certification body accredited by ENAC with accreditation No. 1/C-PR468</p>                                                                    |

## 1. General Information

### 1.1. Description of the organisation

**TAU Cerámica** has established itself as a global reference brand in the ceramic sector within the PAMESA group, known for the technical and aesthetic quality of its products, its constant commitment to innovation and development, and its dedication to social and environmental responsibility. Additionally, in recent years, the brand has stood out for its commitment to digital transformation and innovation in both products and sales tools. A trendsetting brand in continuous evolution.

### 1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at **PAMESA GROUP** and marketed by **TAU Cerámica**, in the geographical and technological environment of Spain in 2023.

The location of the production centre is shown below:

|                                                                                          |
|------------------------------------------------------------------------------------------|
| <b>Compacglass I</b><br>Camí de la llima de Miralcamp, 4, 12200 Onda<br>Castellón, Spain |
| <b>Compacglass IV</b><br>Camino de Palos, 13, 12200 Onda, Castellón, Spain               |

The Pamesa Industrial Group also has other facilities related to other stages of the production process:

|                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Galve</b><br>Locality of Galve, Teruel, Spain                                                                           |
| <b>Mine Elena</b><br>Localities of Esteruel y Gargallo, Teruel, Spain                                                           |
| <b>Mine Pilón</b><br>Localities of Mas de las Matas, Castellote y Seno, Teruel, Spain                                           |
| <b>Mine Valdecastillo</b><br>Localities of Mas de las Matas, Castellote y Seno, Teruel, Spain                                   |
| <b>Arcillas Atomizadas</b><br>Av. Manuel Escobedo, 30, 12200 Onda, Castellón, Spain                                             |
| <b>Amizalsa</b><br>Diseminado Simona, 10, 12110 L'Alcora, Castellón, Spain                                                      |
| <b>Logistic centre 1</b><br>Camino del Palmeral, 10 P.I Colomer, 12200 Onda, Castellón, Spain                                   |
| <b>Logistic centre 2</b><br>Calle del Toll, 24, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistic centre 3</b><br>Calle del Toll, 11, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistic centre 4</b><br>Carretera CV-20 Km 3,5, 12200 Onda, Castellón, Spain                                                |
| <b>Logistic centre 5</b><br>Camí Miralcamp 47-49, 12200 Onda, Castellón, Spain                                                  |
| <b>Logistic centre 6</b><br>Camí cuadra la Torta, 2, 12006 Castellón de la Plana, Castellón Spain                               |
| <b>Logistic centre 7</b><br>Calle Argentina, 93 P.I. Sur 13, 12200 Onda, Castellón, Spain                                       |
| <b>Logistic centre 8</b><br>Calle Ratils, 23 P.I. Colomer, 12200 Onda, Castellón, Spain                                         |
| <b>Logistic centre 9</b><br>Calle Panamá, 1 esq. P.I. Sur 13, 12200 Onda, Castellón, Spain                                      |
| <b>Logistic centre 10</b><br>Avda. Mediterráneo, 53, 12200 Onda, Castellón, Spain                                               |
| <b>Logistic centre 11</b><br>Carretera Castellón – Alcora Pza. Polígono 4, 4 P.G. 12, 12130 Sant Joan de Moró, Castellón, Spain |

The results shown the environmental performance of the porcelain stoneware tiles, as average weighted by production. Moreover, the environmental data of the tiles with the lowest and highest impact, thus narrowing down the results obtained in the LCA are also declared. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

### 1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the EN ISO 14025:2010 and - EN 15804:2012+A2:2019 and the following Category Rule:

| INFORMATION ABOUT PRODUCT CATEGORY RULES |                                          |
|------------------------------------------|------------------------------------------|
| Descriptive title                        | Product Category Rules for Ceramic Tiles |
| Registration code and version            | EN 17160:2019                            |
| Publication date                         | 2019                                     |
| Compliance                               | EN 15804:2012 + A2:2019                  |
| Program Administrator                    | AENOR                                    |

This Environmental Statement includes the following stages of the life cycle:

#### Limits of the system. Information modules considered

|                                                                                      |    |                                                          |   |
|--------------------------------------------------------------------------------------|----|----------------------------------------------------------|---|
| Product Stage                                                                        | A1 | Raw materials supply                                     | X |
|                                                                                      | A2 | Transport                                                | X |
|                                                                                      | A3 | Manufacturing                                            | X |
| Construction                                                                         | A4 | Transport of the product                                 | X |
|                                                                                      | A5 | Installation and construction processes                  | X |
| Stage of use                                                                         | B1 | Use                                                      | X |
|                                                                                      | B2 | Maintenance                                              | X |
|                                                                                      | B3 | Repair                                                   | X |
|                                                                                      | B4 | Replacement                                              | X |
|                                                                                      | B5 | Refurbishment                                            | X |
|                                                                                      | B6 | Use of energy in service                                 | X |
|                                                                                      | B7 | Use of water in service                                  | X |
| End of life                                                                          | C1 | Deconstruction                                           | X |
|                                                                                      | C2 | Transport                                                | X |
|                                                                                      | C3 | Waste management                                         | X |
|                                                                                      | C4 | Waste disposal                                           | X |
|                                                                                      | D  | Potential for reuse, recovery and recycling of materials | X |
| X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated |    |                                                          |   |

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be comparable with EPDs not developed according to EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the EN ISO 14025 standard

## 2. Product information

### 2.1. Product Identification

The ceramic tiles included in this study belong to group BIII (Earthenware tiles), classification based on standard EN 14411: 2016 (equivalent to standard ISO 13006:2018), i.e. they have a water absorption of more than 10% and are formed by pressing. Its common name is earthenware tile.

The earthenware tile included in this study include 10 commercial formats, all of them are glazed, with and without mechanical treatment, with thicknesses ranging from 7 mm a 10.5 mm, with an average fired weight of 16.1 kg/m<sup>2</sup> and an average unfired weight of 16.9 kg/m<sup>2</sup>.

In the annexes, the results of the formats included in the scope of this EPD with the minimum and maximum environmental impact can be found, corresponding to the formats: 25x50 cm weighing before firing of 13.4 kg/m<sup>2</sup> and 20x60 cm weighing before firing of 18.7 kg/m<sup>2</sup>, and fired of 13.3 kg/m<sup>2</sup> and 16.5 kg/m<sup>2</sup> respectively.

The CPC code of the product is 37370.

### 2.2. Product technical features

The manufacturer declares the following information about the technical specifications of the product:

**Product technical features**

| Technical properties                    | Standard        | Average value                                                            |
|-----------------------------------------|-----------------|--------------------------------------------------------------------------|
| Width                                   | EN-ISO 10545-2  | Complies with the standard                                               |
| Length                                  |                 | Complies with the standard                                               |
| Thickness                               |                 | Complies with the standard                                               |
| Straightness of Sides                   |                 | Complies with the standard                                               |
| Rectangularity                          |                 | Complies with the standard                                               |
| Surface Flatness                        |                 | Complies with the standard                                               |
| Warpage                                 |                 | Complies with the standard                                               |
| Modulus of rupture<br>Breaking Strength | EN-ISO 10545-4  | 15-25 N/mm <sup>2</sup><br>e>7.5mm<br>15-25 N/mm <sup>2</sup><br>e<7.5mm |
| Modulus of rupture<br>Breaking Strength | EN-ISO 10545-4  | 600-900 N e>7.5mm<br>>400 N e<7.5mm                                      |
| Resistance to Surface abrasion          | EN-ISO 10545-7  | According to models                                                      |
| Linear thermal expansion                | EN-ISO 10545-8  | <7.0 x 10 <sup>-6</sup> °C <sup>-1</sup>                                 |
| Thermal sock resistance                 | EN-ISO 10545-9  | Resist                                                                   |
| Cracking resistance                     | EN-ISO 10545-11 | Resist                                                                   |
| Chemical resistance                     | EN-ISO 10545-13 | Class GA                                                                 |
| Stain resistance                        | EN-ISO 10545-14 | Minimum class 3                                                          |

This EPD covers residential interior and exterior flooring as a study scenario. However, the versatility of these ceramic tiles allows them to be installed in other locations such as walls, roofs, façades, exterior paving and other types of buildings with varying levels of foot traffic, such as hospitals, schools, offices and shopping centres

### 2.3. Product composition

The composition declared by the manufacturer is as follows:

**Product Composition**

| Substance/Component                                                                                 | Content |
|-----------------------------------------------------------------------------------------------------|---------|
| Support (clays, feldspars, sands, etc.)                                                             | 91%     |
| Decoration raw materials (grits, inks, dry-based glazes, liquid-based glazes and micronized glazes) | 9%      |

Substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization" do not exceed 0.1% by weight of the product

### 3. LCA Information

#### 3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the latest version of the 2024.2 database. (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2019 standard.

#### 3.2. Functional unit

The functional unit considered is **“Covering and decoration of 1 m<sup>2</sup> of an interior wall with ceramic tiles of group BIII (various formats, 7 mm to 10.5 mm thick and an average weight of 16.0 kg/m<sup>2</sup>) over 50 years”**.

#### 3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, as it is a long-lasting product that does not require replacement. A service life of 50 years has been considered

#### Reference service life

| Parameter                                                                                                                                                                    | Unit (expressed by functional unit)                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference service life                                                                                                                                                       | Minimum 50 years                                                                                                                                                       |
| Declared product properties (on gate), coatings, etc.                                                                                                                        | Minimum values of the relevant characteristics according to Annex L of the EN 14411.<br>For more information, request technical data sheets according to model.        |
| Design parameters of the application (manufacturer's instructions), including references to good practices                                                                   | For more information, request technical data sheets according to model.                                                                                                |
| Estimated quality of work, when installed according to the manufacturer's specifications                                                                                     | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |
| Installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc. | Results of the values of the relevant characteristics according to Annex L of the EN 14411.<br>For more information, request technical data sheets according to model. |
| Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure                                                                                  | For more information, request technical data sheets according to model.                                                                                                |
| Conditions of use, e.g.: frequency of use, mechanical exposure, etc.                                                                                                         | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                          |

### 3.4. Allocation rules

In accordance with the standards and PCR, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products.

In generally terms, the inputs and outputs assigned to the declared unit have been weighted averages based on the production or specific weight of the tiles before and after firing, according to the criteria for each stage of the process.

### 3.5. Cut-off rule and exclusions

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non - renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of powdered raw materials.
- Channelled atmospheric emissions, not regulated by law, generated during the combustion stages.
- Long-term emissions (>100 years).
- The production of goods, machinery, infrastructure, and industrial equipment that can be replaced in less than a year.
- Mortar losses in stage A5.
- Waste generated in mines, other than unusable soil, which is managed externally.
- The catalyst used in the installation of fibreglass.

- The processes of recycling and reusing waste generated throughout the life cycle of ceramic coverings that will form part of another system, based on the PCR.

### 3.6. Representativeness, quality and selection of data

The primary data have been provided directly by PAMESA Industrial Group, with two production centres located in Chilches and Moncófar (Castellón), of the four mines managed by PAMESA located in the municipalities of Estercuel, Gargallo, Mas de las Matas, Castellote, Seno, and Berge (Teruel); the two spray-dried granule factories of the Pamesa Industrial Group in Onda and Alcora; and the 11 logistics centres managed by the Pamesa Industrial Group.

Secondary data was obtained from the most up-to-date Sphera-GaBi databases [8] and modelled using LCA for Experts (Sphera-GaBi) [7]. All data refers to a geographical scenario for Spain in 2023.

The results presented are representative of ceramic tiles, expressed as an average weighted by the production of the ceramic tiles belonging to the BIII group range, limiting this average by the products with the minimum and maximum environmental impact.

The global warming potential (GWP-total) of the different technologies that make up the electricity mix used is 0.38 kgCO<sub>2</sub> eq/kWh

### 3.7. Other calculation rules and assumptions

The 10 ceramic tile references have different weights and environmental impacts. The following table shows the deviations between the formats with the highest and lowest environmental impact and the average, in relation to the product stage (A1-A3).

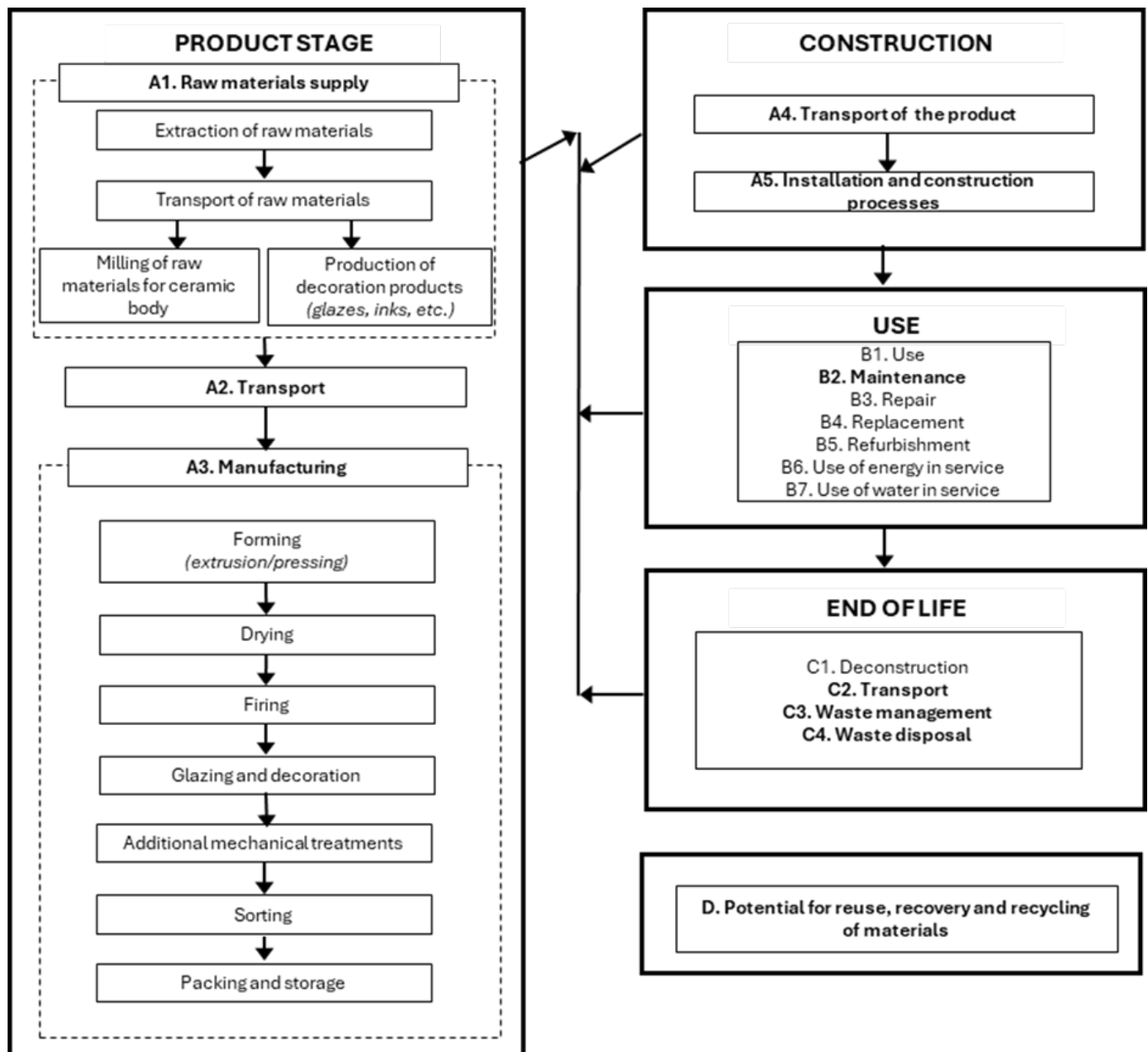
The maximum value corresponds to the format with the highest weight in raw material and the greatest application of decorative materials for that format. The minimum value corresponds to the format with the lowest weight in raw material and a minimum amount of decorative materials for that specific format.

Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values for stage A1-A3 respectively.

| Impact Indicator | Relative variation from the average |
|------------------|-------------------------------------|
| GWP-total        | -4%/+26%                            |
| AP               | -8%/+38%                            |
| POCP             | -6%/+34%                            |

## 4. System limits, scenarios, and additional technical information.

All life cycle modules relevant to ceramic tiles according to the PCRs have been included:



#### 4.1. Pre-manufacturing processes (upstream).

##### Raw materials (A1) and Transport (A2)

Ceramic tiles are composed of a ceramic support and a decorative layer.

The raw materials included in the composition of the substrate are mainly clays, feldspars, sands and ceramic waste generated during manufacture. Part of the clays present in the composition of BIII come from quarries managed by Pamesa.

The raw materials for decoration (glazes, engobes and inks) are produced in specialised plants. The most common raw materials are ceramic frits, pigments and inorganic materials. The raw materials used have different origins, according to their nature and properties; they are transported by road or by ship in bulk, depending on the distance and location of the extraction point.

#### 4.2. Manufacturing of the product

##### Manufacturing (A3)

The raw materials are wet-milled and spray-dried to form granules.

This granule is sent to the forming stage by uniaxial dry pressing and later, they are placed in a continuous dryer to reduce their humidity.

The pieces, immediately after leaving the dryer, are covered with a thin layer or several layers of engobe and glaze, applied onto the body by means of curtain and spraying techniques. In addition, in some cases, the product is decorated using different types of applications, the most common being inkjet printing. This treatment is carried out in order to confer upon the surface of the fired product a series of technical and aesthetic properties, such as impermeability, ease of cleaning, gloss, colour, surface texture, and chemical and mechanical resistance.

Firing is the most important stage in the ceramic tile production process, as it is the moment when the previously moulded pieces undergo a fundamental transformation in their properties, resulting in a hard material resistant to water and chemical agents. The firing of ceramic tiles is carried out by single-firing in single-layer roller kilns.

After passing quality control processes, the classified pieces are assembled and packaged. Finally, they are transported to the brand's logistics centres for distribution.

#### 4.3. Construction Process

##### Transport (A4)

The product is distributed 22% in Spain, 45% in Europe and 33% in the rest of the world.

##### A4 Transport to site

| Scenario Information                                                                                                 | Unit (expressed by functional unit)                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Type and fuel consumption of the vehicle, type of vehicles used for transport, e.g. long distance trucks, ship, etc. | According to the destinations in the distribution as described above:<br>0.1863 l diesel (Euro truck 6, 27 t)<br>0.0183 l fuel oil (ship) |
| Distance                                                                                                             | 300 km national distribution: 22%<br>1390 km rest of Europe distribution: 45%<br>6520 km rest of the world distribution: 33%              |
| Capacity utilisation (including no-load return)                                                                      | 85% in truck<br>100% ship                                                                                                                 |
| Bulk density of transported products                                                                                 | ≈415.4 kg/m <sup>3</sup>                                                                                                                  |
| Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)                 | 1                                                                                                                                         |

## Product installation and process construction (A5).

Once the product has been unpacked, it is installed using mortar, in accordance with the standard operating procedures for ceramic tiles.

Packaging waste is managed separately depending on the geographical location of the installation site. To this end, three scenarios have been considered.

Based on sales distribution, waste management has been considered for Spain, Europe and the rest of the world.

Furthermore, a 15% loss has been considered during the tile installation stage, according to data provided by Pamesa Industrial Group.

### A5 Installation

| Scenario Information                                                                                                                                                                           | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary materials for installation (specify each material)                                                                                                                               | 3,3 kg/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                   |
| Water use                                                                                                                                                                                      | 0.8 l/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                    |
| Use of other resources                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                          |
| Quantitative description of the type of energy (regional mix) and consumption during the installation process                                                                                  | Not applicable                                                                                                                                                                                                                                                                                                                                                          |
| Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)                                                               | Product losses: 2413 g<br>Packaging wastes:<br>Cardboard: 119 g<br>Plastic: 21 g<br>Wood: 49 g                                                                                                                                                                                                                                                                          |
| Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route) | Product losses for recycling: 1689 g<br>Product losses for final deposition: 724 g<br>Incinerated cardboard: 3 g<br>Recycled cardboard: 105 g<br>Cardboard for final deposition: 10 g<br>Incinerated plastic: 3 g<br>Recycled plastic: 15 g<br>Plastic for final deposition: 3 g<br>Incinerated wood: 16 g<br>Recycled plastic: 23 g<br>Wood for final deposition: 11 g |
| Direct emissions to ambient air, soil and water                                                                                                                                                | Not applicable                                                                                                                                                                                                                                                                                                                                                          |

## 4.4. Use linked to the structure of the building

### B1 Use

Once installed, the tiles do not require any energy or water to operate. The only maintenance required after installation is normal cleaning.

For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

### B2 Maintenance

Cleaning is carried out using a damp cloth and cleaning agents

| Use linked to the building structure                                                                                                     |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Scenario information                                                                                                                     | Unit (expressed per functional unit)                                                 |
| Maintenance process                                                                                                                      | According to PCR for ceramic tiles (EN17160) residential scenario for floor cleaning |
| Maintenance cycle                                                                                                                        | Wash once a week with water and once every two weeks with detergent                  |
| Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)                                                     | Detergent: 1.34E-04 kg/m <sup>2</sup> per wash                                       |
| Material wastage during maintenance (specify type))                                                                                      | Not applicable                                                                       |
| Net tap water consumption                                                                                                                | 0.1 l/m <sup>2</sup> per wash                                                        |
| Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant | Not applicable                                                                       |

### B3-B4-B5 Repair, Replacement and refurbishment

Ceramic tiles do not require repair, replacement or refurbishment, and their potential impact is not significant.

#### 4.5. Use linked to the operation of the building

#### B6-B7 Operational energy use and Operational water use.

These modules are not relevant for ceramic tiles.

#### 4.6. End of life stage

##### C1 Deconstruction and demolition

The impacts attributable to the removal of the product in the context of a building rehabilitation or during its demolition are negligible, as specified in the RCP of ceramic tiles.

##### C2 Transport

The product waste is transported 50 km by lorry for management, either by disposal in inert landfills or for recycling.

##### C3 Waste management for reuse, recovery and recycling

70% of tiles are considered to be recycled and/or reused, as indicated in the PCR.

##### C4 Final disposal

It was assumed that 30% of the product was sent to controlled landfills after its service life had ended. In addition, the adhesive material and 90% of the water used in the installation are taken into account.

#### End of life

| Parameter                                              | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collection process, specified by type                  | 20.1 kg total                                                                                                                                                                                                                                                                                       |
| Recovery system, specified by type                     | 14.1 kg for recycling                                                                                                                                                                                                                                                                               |
| Disposal, specified by type                            | 6.0 kg to landfill                                                                                                                                                                                                                                                                                  |
| Assumptions for scenario development (e.g.: transport) | The product waste is transported in a Euro 6 compliant heavy-duty truck (27 t) to be managed either to landfilling or recycling. An average distance of 50km from the building site to the final destination is considered. The return journey of the lorries is also included (100% empty return). |

#### 4.7. Benefits and burdens beyond the system

##### Module D

The net environmental burdens and net benefits of obtaining the secondary material from waste at the installation stage and at the end of life of the product have been considered.

#### 4.8. Information on biogenic carbon content

Ceramic tiles are mineral products and therefore do not contain biogenic carbon. According to standard EN 16449, it is necessary to calculate the biogenic carbon content, which in this case comes from packaging, wooden pallets and cardboard.

#### Biogenic carbon content

| Parameter                              | Unit (expressed by functional unit) |
|----------------------------------------|-------------------------------------|
| Biogenic carbon content of the product | -                                   |
| Biogenic carbon content of the package | 1.4E-01 kg C                        |

## 5. Declaration of the environmental parameters of the LCA and the ICV.

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units       | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|-------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq   | 11.0    | 6.9E-01 | 2.8     | 0  | 2.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 1.9E-02 | 1.0E-01 | -1.6E-01 |
| GWP-biogenic                      | kg CO2 eq   | 1.0E-02 | 7.2E-05 | 3.9E-02 | 0  | 5.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 9.5E-06 | 1.0E-03 | -6.9E-05 |
| GWP-luluc                         | kg CO2 eq   | 9.8E-03 | 9.5E-03 | 4.5E-03 | 0  | 1.8E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-03 | 2.6E-06 | 4.3E-04 | -4.3E-04 |
| GWP-total                         | kg CO2 eq   | 11.0    | 7.0E-01 | 2.9     | 0  | 2.8E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 1.9E-02 | 1.0E-01 | -1.6E-01 |
| ODP                               | kg CFC11 eq | 1.3E-08 | 9.0E-14 | 1.9E-09 | 0  | 1.0E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-14 | 5.6E-14 | 5.7E-14 | -3.6E-09 |
| AP                                | mol H+ eq   | 2.0E-02 | 2.9E-03 | 5.7E-03 | 0  | 9.1E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-04 | 2.4E-05 | 7.4E-04 | -4.6E-04 |
| EP-freshwater                     | kg P eq     | 1.7E-04 | 2.4E-06 | 2.8E-05 | 0  | 7.0E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 4.2E-07 | 2.1E-09 | 2.1E-06 | -1.7E-06 |
| EP-marine                         | kg N eq     | 6.2E-03 | 7.6E-04 | 1.8E-03 | 0  | 2.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 4.0E-05 | 6.3E-06 | 2.0E-04 | -1.7E-04 |
| EP-terrestrial                    | mol N eq    | 6.7E-02 | 8.5E-03 | 2.0E-02 | 0  | 2.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.7E-04 | 6.9E-05 | 2.2E-03 | -1.8E-03 |
| POCP                              | Kg NMVOC eq | 1.7E-02 | 2.3E-03 | 5.1E-03 | 0  | 5.6E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 2.0E-05 | 6.0E-04 | -4.3E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq    | 1.2E-04 | 5.1E-08 | 1.8E-05 | 0  | 3.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 8.6E-09 | 8.9E-10 | 1.0E-08 | -7.8E-08 |
| ADP-fossil <sup>2</sup>           | MJ          | 136.4   | 8.3     | 27.6    | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 4.7E-01 | 1.3     | -2.1E+00 |
| WDP <sup>2</sup>                  | m3          | 1.9     | 8.9E-03 | 4.1E-01 | 0  | 1.7     | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-03 | 6.7E-03 | 7.7E-03 | 3.3E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

### Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.7E-06 | 4.7E-08 | 3.0E-07 | 0  | 5.1E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-09 | 2.1E-10 | 9.0E-09 | -2.1E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 3.5E-01 | 2.1E-03 | 8.5E-02 | 0  | 3.2E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 3.4E-04 | 4.9E-03 | 1.8E-03 | -8.9E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 67.9    | 6.1     | 14.1    | 0  | 6.5E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 9.6E-01 | 5.7E-02 | 8.1E-01 | -1.3E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 4.7E-09 | 1.2E-10 | 8.8E-10 | 0  | 3.8E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-11 | 2.5E-12 | 1.0E-10 | 1.5E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 3.5E-07 | 5.2E-09 | 6.5E-08 | 0  | 4.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 8.7E-10 | 2.4E-11 | 1.1E-08 | -1.3E-09 |
| SQP <sup>2</sup>    | -                     | 92.4    | 3.7     | 26.3    | 0  | 1.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 6.4E-01 | 1.1E-03 | 3.1E-01 | -1.6E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 43.9    | 6.4E-01 | 2.1     | 0  | 6.4E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 2.5E-02 | 1.6E-01 | -6.2E-01 |
| PERM      | MJ             | 6.0     | 0       | 9.0E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 49.9    | 6.4E-01 | 3.0     | 0  | 6.4E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 2.5E-02 | 1.6E-01 | -6.2E-01 |
| PENRE     | MJ             | 136.4   | 8.3     | 5.9     | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 4.7E-01 | 1.3     | -2.1E+00 |
| PENRM     | MJ             | 8.8E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 137.3   | 8.3     | 6.1     | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3     | 4.7E-01 | 1.3     | -2.1E+00 |
| SM        | kg             | 1.2     | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 4.2E-02 | 7.2E-04 | 8.8E-03 | 0  | 2.4E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 8.8E-05 | 2.5E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

### Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 3.1E-10 | 1.5E-04 | 0  | 1.3E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 5.0E-11 | 6.9E-11 | 2.1E-08 | -3.2E-08 |
| DWD       | kg    | 4.9E-01 | 1.3E-03 | 1.1     | 0  | 5.9E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-04 | 5.4E-05 | 6.2     | -1.1E-03 |
| RWD       | kg    | 3.9E-03 | 1.5E-05 | 7.9E-04 | 0  | 7.8E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 2.4E-06 | 7.6E-05 | 1.8E-05 | -1.5E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

### Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.8E-01 | 0  | 1.8 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 14.1 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## 6. Additional environmental information.

### Indoor air emissions

Ceramic tiles undergo a thermal process exceeding 1000°C during their manufacture. At these temperatures, any organic compounds present in the composition decompose, resulting in an inert end product free of volatile organic compounds that could be emitted during use.

The concentration of volatile organic compounds (TVOC) is less than or equal to 0.5 mg/m<sup>3</sup> in accordance with the CDPH/EHLB v1.2-2017 standard method.

### Release to soil and water

Ceramic tiles do not emit any compounds into the soil or water during the use phase, as it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically, chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that could lead to environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to surface or groundwater quality.

### Environmental information about the company

The spray-dried granules used in the manufacture of BIII (white body spray-dried wall tile and red body spray-dried floor tile) have the radioactive isotope activity concentration indices defined by the European Union (IUE), as well as the limits set out in standard GB6566-2010 in force in the Republic of China (IINT, IEXT).

PAMESA's manufacturing companies are members of ECOEMBES, a non-profit organisation that manages the recycling of waste deposited in yellow and blue bins.

ISO 14021 certification of recycled content for different spray-dried granules with inventory data from 2023.

### AMIZALSA

Minimum recycled material content in spray-dried powder: 5.8%.

% waste recycling in spray-dried powder manufacturing process: 25.7%.

## Annex I. Declaration of the environmental parameters of the LCA and LCI for the format with MINIMUM impacts

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3    | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|----------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 8.1      | 5.1E-01 | 2.3     | 0  | 2.8E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 8.6E-02 | 1.5E-02 | 7.9E-02 | -1.4E-01 |
| GWP-biogenic                      | kg CO2 eq      | -4.0E-03 | 5.4E-05 | 3.7E-02 | 0  | 5.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 7.6E-06 | 8.2E-04 | -3.6E-05 |
| GWP-luluc                         | kg CO2 eq      | 7.3E-03  | 7.1E-03 | 3.7E-03 | 0  | 1.8E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-03 | 2.1E-06 | 3.5E-04 | -3.4E-04 |
| GWP-total                         | kg CO2 eq      | 8.1      | 5.2E-01 | 2.4     | 0  | 2.8E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 8.7E-02 | 1.5E-02 | 8.0E-02 | -1.4E-01 |
| ODP                               | kg CFC11 eq    | 8.2E-09  | 6.7E-14 | 1.2E-09 | 0  | 1.0E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-14 | 4.5E-14 | 4.6E-14 | -3.6E-09 |
| AP                                | mol H+ eq      | 1.3E-02  | 2.2E-03 | 4.4E-03 | 0  | 9.1E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 9.1E-05 | 1.9E-05 | 5.9E-04 | -4.0E-04 |
| EP-freshwater                     | kg P eq        | 8.4E-05  | 1.8E-06 | 1.5E-05 | 0  | 7.1E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 3.4E-07 | 1.7E-09 | 1.7E-06 | -1.5E-06 |
| EP-marine                         | kg N eq        | 4.0E-03  | 5.7E-04 | 1.4E-03 | 0  | 2.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 3.2E-05 | 5.0E-06 | 1.6E-04 | -1.5E-04 |
| EP-terrestrial                    | mol N eq       | 4.3E-02  | 6.4E-03 | 1.6E-02 | 0  | 2.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 3.7E-04 | 5.5E-05 | 1.7E-03 | -1.6E-03 |
| POCP                              | Kg NMVOC eq    | 1.1E-02  | 1.7E-03 | 4.1E-03 | 0  | 5.6E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0E-04 | 1.6E-05 | 4.7E-04 | -3.7E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 5.0E-05  | 3.8E-08 | 7.5E-06 | 0  | 3.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 6.8E-09 | 7.1E-10 | 8.2E-09 | -6.3E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 102.6    | 6.2     | 22.2    | 0  | 4.8E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 3.7E-01 | 1.1     | -1.9E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 1.3      | 6.6E-03 | 3.2E-01 | 0  | 1.8     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-03 | 5.4E-03 | 6.1E-03 | 1.8E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 7.8E-07 | 3.6E-08 | 1.6E-07 | 0  | 5.1E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 9.6E-10 | 1.7E-10 | 7.2E-09 | -1.8E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 2.7E-01 | 1.6E-03 | 7.3E-02 | 0  | 3.2E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 2.7E-04 | 3.9E-03 | 1.4E-03 | -7.6E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 39.1    | 4.6     | 9.5     | 0  | 6.6E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 7.7E-01 | 4.6E-02 | 6.4E-01 | -1.1E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 2.2E-09 | 9.1E-11 | 4.9E-10 | 0  | 3.9E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-11 | 2.0E-12 | 8.2E-11 | 1.8E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 1.3E-07 | 3.9E-09 | 3.1E-08 | 0  | 4.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 7.0E-10 | 1.9E-11 | 8.7E-09 | -1.1E-09 |
| SQP <sup>2</sup>    | -                     | 74.3    | 2.7     | 23.4    | 0  | 1.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 5.1E-01 | 8.7E-04 | 2.5E-01 | -1.3E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 33.4    | 4.8E-01 | 2.1     | 0  | 6.5E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.9E-02 | 2.0E-02 | 1.2E-01 | -6.2E-01 |
| PERM      | MJ             | 6.0     | 0       | 9.0E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 39.4    | 4.8E-01 | 3.0     | 0  | 6.5E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 8.9E-02 | 2.0E-02 | 1.2E-01 | -6.2E-01 |
| PENRE     | MJ             | 102.6   | 6.2     | 5.9     | 0  | 4.8E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 3.7E-01 | 1.1     | -1.9E+00 |
| PENRM     | MJ             | 8.8E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 103.4   | 6.2     | 6.0     | 0  | 4.8E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 3.7E-01 | 1.1     | -1.9E+00 |
| SM        | kg             | 9.5E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 2.9E-02 | 5.4E-04 | 6.8E-03 | 0  | 2.4E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 9.9E-05 | 7.0E-05 | 2.0E-04 | -1.0E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 2.4E-10 | 1.5E-04 | 0  | 1.3E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 4.0E-11 | 5.5E-11 | 1.7E-08 | -2.6E-08 |
| DWD       | kg    | 2.8E-01 | 9.6E-04 | 8.7E-01 | 0  | 6.0E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-04 | 4.3E-05 | 4.9     | -8.3E-04 |
| RWD       | kg    | 3.2E-03 | 1.1E-05 | 6.9E-04 | 0  | 7.9E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 1.9E-06 | 6.0E-05 | 1.5E-05 | -1.6E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 7.0E-02 | 0  | 1.6 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 12.1 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## Annex II. Declaration of the environmental parameters of the LCA and LCI for the format with MAXIMUM impact

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 11.4    | 7.3E-01 | 2.9     | 0  | 2.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 2.0E-02 | 1.0E-01 | -1.7E-01 |
| GWP-biogenic                      | kg CO2 eq      | 1.1E-02 | 7.7E-05 | 3.9E-02 | 0  | 5.3E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 1.0E-05 | 1.1E-03 | -7.7E-05 |
| GWP-luluc                         | kg CO2 eq      | 1.0E-02 | 1.0E-02 | 4.7E-03 | 0  | 1.8E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-03 | 2.7E-06 | 4.6E-04 | -4.5E-04 |
| GWP-total                         | kg CO2 eq      | 11.4    | 7.4E-01 | 2.9     | 0  | 2.8E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 2.0E-02 | 1.1E-01 | -1.7E-01 |
| ODP                               | kg CFC11 eq    | 1.1E-08 | 9.5E-14 | 1.7E-09 | 0  | 1.0E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-14 | 5.9E-14 | 6.0E-14 | -3.6E-09 |
| AP                                | mol H+ eq      | 1.9E-02 | 3.1E-03 | 5.5E-03 | 0  | 9.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 2.5E-05 | 7.8E-04 | -4.7E-04 |
| EP-freshwater                     | kg P eq        | 1.4E-04 | 2.6E-06 | 2.4E-05 | 0  | 7.0E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 4.4E-07 | 2.2E-09 | 2.2E-06 | -1.7E-06 |
| EP-marine                         | kg N eq        | 5.9E-03 | 8.0E-04 | 1.8E-03 | 0  | 2.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 4.2E-05 | 6.6E-06 | 2.1E-04 | -1.8E-04 |
| EP-terrestrial                    | mol N eq       | 6.3E-02 | 9.0E-03 | 1.9E-02 | 0  | 2.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.9E-04 | 7.2E-05 | 2.3E-03 | -1.9E-03 |
| POCP                              | Kg NMVOC eq    | 1.6E-02 | 2.4E-03 | 5.0E-03 | 0  | 5.6E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 2.1E-05 | 6.2E-04 | -4.4E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 8.9E-05 | 5.4E-08 | 1.3E-05 | 0  | 3.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 9.0E-09 | 9.3E-10 | 1.1E-08 | -8.2E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 142.0   | 8.8     | 28.6    | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.9E-01 | 1.4     | -2.2E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 1.9     | 9.4E-03 | 4.0E-01 | 0  | 1.7     | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-03 | 7.1E-03 | 8.0E-03 | 3.6E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 1.3E-06 | 5.0E-08 | 2.4E-07 | 0  | 5.0E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-09 | 2.2E-10 | 9.5E-09 | -2.2E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 3.5E-01 | 2.2E-03 | 8.6E-02 | 0  | 3.2E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 3.6E-04 | 5.1E-03 | 1.9E-03 | -9.3E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 60.4    | 6.5     | 13.0    | 0  | 6.5E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 6.0E-02 | 8.5E-01 | -1.4E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 3.7E-09 | 1.3E-10 | 7.2E-10 | 0  | 3.8E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 2.0E-11 | 2.7E-12 | 1.1E-10 | 1.4E-13  |
| HTP-nc <sup>2</sup> | CTUh                  | 2.4E-07 | 5.5E-09 | 4.9E-08 | 0  | 4.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 9.2E-10 | 2.6E-11 | 1.1E-08 | -1.4E-09 |
| SQP <sup>2</sup>    | -                     | 92.8    | 3.9     | 26.4    | 0  | 1.1E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 6.7E-01 | 1.1E-03 | 3.3E-01 | -1.6E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ    | 44.7    | 6.8E-01 | 2.1     | 0  | 6.4E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 2.7E-02 | 1.6E-01 | -6.2E-01 |
| PERM      | MJ    | 6.0     | 0       | 9.0E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ    | 50.7    | 6.8E-01 | 3.0     | 0  | 6.4E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 2.7E-02 | 1.6E-01 | -6.2E-01 |
| PENRE     | MJ    | 142.0   | 8.8     | 6.0     | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.9E-01 | 1.4     | -2.2E+00 |
| PENRM     | MJ    | 8.8E-01 | 0       | 1.3E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ    | 142.9   | 8.8     | 6.1     | 0  | 4.7E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.9E-01 | 1.4     | -2.2E+00 |
| SM        | kg    | 1.3     | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m3    | 4.1E-02 | 7.6E-04 | 8.6E-03 | 0  | 2.3E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 9.2E-05 | 2.7E-04 | -1.1E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 3.3E-10 | 1.5E-04 | 0  | 1.3E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 5.2E-11 | 7.2E-11 | 2.2E-08 | -3.4E-08 |
| DWD       | kg    | 4.3E-01 | 1.4E-03 | 1.1     | 0  | 5.9E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-04 | 5.7E-05 | 6.5     | -1.2E-03 |
| RWD       | kg    | 4.0E-03 | 1.5E-05 | 8.2E-04 | 0  | 7.8E-07 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-06 | 8.0E-05 | 1.9E-05 | -1.5E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.3E-01 | 0  | 2.0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 14.4 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## References

- [1] General Programme Instructions of GlobalEPD. 3rd revision. AENOR. October 2023.
- [2] EN ISO 14025:2010 Environmental labels. Type III environmental declarations. Principles and procedures (ISO 14025:2006).
- [3] EN 15804:2012+A2:2019 Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
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- [5] EN ISO 14044:2006 Environmental Management. Life Cycle Assessment. Requirements and guidelines.
- [6] EN 17160:2019 Product Category Rules for ceramic tiles.
- [7] LCA for experts (Sphera-GaBi) v 10 software-system. SpheraSolutions. Compilation 10.9.1.17. Further information: <https://sphera.com/life-cycle-assessment-lca-software/>
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# AENOR



Una declaración ambiental verificada

# GlobalEPD

# GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental  
Product  
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 17160: 2019

# TAU

cerámica

# AENOR

**TAU CERÁMICA SOLUTIONS S.L.**  
**Ceramic tiles.**  
**Porcelain stoneware tiles**  
**(Bla Slab)**

Date of first issue: 2025-09-26

Expiration Date: 2030-09-25

The declared validity is subject to registration and publication at [www.aenor.com](http://www.aenor.com)

Registration code: GlobalEPD EN 17160 - 061



The owner of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes

|                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>EN 17160:2019 PCR for ceramic tiles<br/>EN 15804:2012+A2:2019 serves as the basis for the PCR</p>                                                                                                  |
| <p>Independent verification of the declaration and data, in accordance with<br/>the Standard ISO 14025:2006</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> |
| <p>Verification Body</p> <p><b>AENOR</b></p> <p>Product certification body accredited by ENAC with accreditation No. 1/C-PR468</p>                                                                    |

## 1. General Information

### 1.1. Description of the organisation

**TAU Cerámica** has established itself as a global reference brand in the ceramic sector within the PAMESA group, known for the technical and aesthetic quality of its products, its constant commitment to innovation and development, and its dedication to social and environmental responsibility. Additionally, in recent years, the brand has stood out for its commitment to digital transformation and innovation in both products and sales tools. A trendsetting brand in continuous evolution.

### 1.2. Scope of the declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at **PAMESA GROUP** and marketed by **TAU Cerámica**, in the geographical and technological environment of Spain in 2023.

The location of the production centre is shown below:

|                                                               |
|---------------------------------------------------------------|
| <b>ASCALE Tech</b>                                            |
| Carretera Castellón, 117, 12110 L'Alcora, Castellón,<br>Spain |

The Pamesa Industrial Group also has other facilities related to other stages of the production process:

|                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Elena</b><br>Localities of Esteruel y Gargallo, Teruel, Spain                                                            |
| <b>Mine Pilón</b><br>Localities of Mas de las Matas, Castellote and Seno, Teruel, Spain                                          |
| <b>Mine Valdecastillo</b><br>Localities of Berge, Castellote and Seno, Teruel, Spain                                             |
| <b>Arcillas Atomizadas</b><br>Av. Manuel Escobedo, 30, 12200 Onda, Castellón, Spain                                              |
| <b>Serviker</b><br>Camí Prats, s/n, 12110 L'Alcora, Castellón, Spain                                                             |
| <b>Atommed</b><br>Cam. Foyes Ferraes, 19, 12110 L'Alcora, Castellón, Spain                                                       |
| <b>Logistics centre 1</b><br>Camino del Palmeral, 10 P.I. Colomer, 12200 Onda, Castellón, Spain                                  |
| <b>Logistics centre 2</b><br>Calle del Toll, 24, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 3</b><br>Calle del Toll, 11, 12200 Onda, Castellón, Spain                                                    |
| <b>Logistics centre 4</b><br>Carretera CV-20 Km 3,5, 12200 Onda, Castellón, Spain                                                |
| <b>Logistics centre 5</b><br>Camí Miralcamp 47-49, 12200 Onda, Castellón, Spain                                                  |
| <b>Logistics centre 6</b><br>Camí cuadra la Torta, 2, 12006 Castellón de la Plana, Castellón Spain                               |
| <b>Logistics centre 7</b><br>Calle Argentina, 93 P.I. Sur 13, 12200 Onda, Castellón, Spain                                       |
| <b>Logistics centre 8</b><br>Calle Ratils, 23 P.I. Colomer, 12200 Onda, Castellón, Spain                                         |
| <b>Logistics centre 9</b><br>Calle Panamá, 1 esq. P.I. Sur 13, 12200 Onda, Castellón, Spain                                      |
| <b>Logistics centre 10</b><br>Avda. Mediterráneo, 53, 12200 Onda, Castellón, Spain                                               |
| <b>Logistics centre 11</b><br>Carretera Castellón – Alcora Pza. Polígono 4, 4 P.G. 12, 12130 Sant Joan de Moró, Castellón, Spain |

The results shown the environmental performance of the porcelain stoneware tiles, as average weighted by production. Moreover, the environmental data of the tiles with the lowest and highest impact, thus narrowing down the results obtained in the LCA are also declared. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

### 1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the EN ISO 14025:2010 and - EN 15804:2012+A2:2019 and the following Category Rule:

| INFORMATION ABOUT PRODUCT CATEGORY RULES |                                          |
|------------------------------------------|------------------------------------------|
| Descriptive title                        | Product Category Rules for Ceramic Tiles |
| Registration code and version            | EN 17160:2019                            |
| Publication date                         | 2019                                     |
| Compliance                               | EN 15804:2012 + A2:2019                  |
| Program Administrator                    | AENOR                                    |

This Environmental Statement includes the following stages of the life cycle:

#### Limits of the system. Information modules considered

|                                                                                      |    |                                                          |   |
|--------------------------------------------------------------------------------------|----|----------------------------------------------------------|---|
| Product Stage                                                                        | A1 | Raw materials supply                                     | X |
|                                                                                      | A2 | Transport                                                | X |
|                                                                                      | A3 | Manufacturing                                            | X |
| Construction                                                                         | A4 | Transport of the product                                 | X |
|                                                                                      | A5 | Installation and construction processes                  | X |
| Stage of use                                                                         | B1 | Use                                                      | X |
|                                                                                      | B2 | Maintenance                                              | X |
|                                                                                      | B3 | Repair                                                   | X |
|                                                                                      | B4 | Replacement                                              | X |
|                                                                                      | B5 | Refurbishment                                            | X |
|                                                                                      | B6 | Use of energy in service                                 | X |
|                                                                                      | B7 | Use of water in service                                  | X |
| End of life                                                                          | C1 | Deconstruction                                           | X |
|                                                                                      | C2 | Transport                                                | X |
|                                                                                      | C3 | Waste management                                         | X |
|                                                                                      | C4 | Waste disposal                                           | X |
|                                                                                      | D  | Potential for reuse, recovery and recycling of materials | X |
| X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated |    |                                                          |   |

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be comparable with EPDs not developed according to EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the EN ISO 14025 standard

## 2. Product information

### 2.1. Product Identification

The ceramic tiles included in this study belong to group Bla (porcelain stoneware tiles), a classification based on standard EN 14411:2016 (equivalent to standard ISO 13006:2018), i.e. they have a water absorption of less than 0.5% and are formed by pressing.

Its common name is Porcelain Stoneware Tile. The porcelain stoneware tiles included in this study include five commercial formats, all of them are glazed and some of them are treated mechanically, 6 mm of thickness, with an average fired weight of 15.0 kg/m<sup>2</sup> and an unfired weight of 18.8 kg/m<sup>2</sup>.

In the annexes, the results of the formats included in the scope of this EPD with the minimum and maximum environmental impact can be found, corresponding to the formats: 120x260 cm and 162x324 cm of 18.8 kg/m<sup>2</sup> weight before firing and after firing of 15.0 kg/m<sup>2</sup>.

The CPC code of the product is 37370.

### 2.2. Product technical features

The manufacturer declares the following information about the technical specifications of the product:

**Product technical features (GL)**

| Technical properties                            | Standard        | Average value                                          |
|-------------------------------------------------|-----------------|--------------------------------------------------------|
| Thickness                                       | EN-ISO 10545-3  | Complies with the standard                             |
| Water absorption                                | EN-ISO 10545-3  | ≤ 0.1%                                                 |
| Modulus of rupture<br>Breaking Strength         | EN-ISO 10545-4  | ≥ 50 N/mm <sup>2</sup>                                 |
| Modulus of rupture<br>Bending strenght          | EN-ISO 10545-4  | >1000 N e=6mm                                          |
| Impact resistance                               | EN-ISO 10545-5  | >0.8 with no visible effects                           |
| Surface Abrasion (Glazed)                       | EN-ISO 10545-7  | Declared value                                         |
| Thermal Expansion                               | EN-ISO 10545-8  | <5.7 x 10 <sup>-6</sup> °C <sup>-1</sup>               |
| Thermal Shock                                   | EN-ISO 10545-9  | Resist                                                 |
| Moisture Expansion                              | EN-ISO 10545-10 | <0.1 mm/m                                              |
| Crazing Resistance                              | EN-ISO 10545-11 | Resist                                                 |
| Frost Resistance                                | EN-ISO 10545-12 | Resist                                                 |
| Resistance to Chemicals: cleaning products      | EN-ISO 10545-13 | A                                                      |
| Chemical resistance: swimming pool salts        |                 | A                                                      |
| Resistance to Chemicals: low acid concentration |                 | LA Matt finishes<br>LB Gloss finishes                  |
| Resistance to Chemicals: low base concentration |                 | Minimum 5 Matt finishes<br>Minimum 4 Polished finishes |
| Stain Resistance                                | EN-ISO 10545-14 | Minimum 5 Matt finishes<br>Minimum Polished finishes   |
| Determination of lead and cadmium               | EN-ISO 10545-15 | Lead < 0.1 mg/l<br>Cadmium < 0.01 mg/l                 |
| Resistance to dry heat                          | EN 13310        | Resistant                                              |
| Resistance to ultraviolet rays                  | DIN 51094       | No changes                                             |

This EPD covers residential interior and exterior flooring as a study scenario. However, the versatility of these ceramic tiles allows them to be installed in other locations such as walls, roofs, façades, exterior paving and other types of buildings with varying levels of foot traffic, such as hospitals, schools, offices and shopping centres

### 2.3. Product composition

The composition declared by the manufacturer is as follows:

| Product Composition                                                                                 |         |
|-----------------------------------------------------------------------------------------------------|---------|
| Substance/Component                                                                                 | Content |
| Support (clays, feldspars, sands, etc.)                                                             | 95%     |
| Decoration raw materials (grits, inks, dry-based glazes, liquid-based glazes and micronized glazes) | 5%      |

Substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization" do not exceed 0.1% by weight of the product

### 3. LCA Information

#### 3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the latest version of the 2024.2 database. (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2019 standard.

#### 3.2. Functional unit

The functional unit considered is **“Covering and decorating 1 m<sup>2</sup> of interior flooring with ceramic tiles from the Bla Slab group (6 mm thick and weighing an average of 15 kg/m<sup>2</sup> for 50 years)”**.

#### 3.3. Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, as it is a long-lasting product that does not require replacement. A service life of 50 years has been considered

#### Reference service life

| Parameter                                                                                                                                                                    | Unit (expressed by functional unit)                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference service life                                                                                                                                                       | Minimum 50 years                                                                                                                                                      |
| Declared product properties (on gate), coatings, etc.                                                                                                                        | Minimum values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information request technical data sheets according to model         |
| Design parameters of the application (manufacturer's instructions), including references to good practices                                                                   | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                         |
| Estimated quality of work, when installed according to the manufacturer's specifications                                                                                     | For more information request technical data sheets according to model.                                                                                                |
| Installed from outside environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature, etc. | Results of the values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information request technical data sheets according to model. |
| Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure                                                                                  | Results of the values of the relevant characteristics according to Annex G of the EN 14411.<br>For more information request technical data sheets according to model. |
| Conditions of use, e.g.: frequency of use, mechanical exposure, etc.                                                                                                         | For more information request technical data sheets according to model.                                                                                                |
| Maintenance, e.g.: required frequency, type and quality and replacement of replaceable components                                                                            | For more information: <a href="#">Recomendaciones en la instalación de productos cerámicos – TAU cerámica</a>                                                         |

### 3.4. Allocation rules

In accordance with the standards and PCR, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products.

In generally terms, the inputs and outputs assigned to the declared unit have been weighted averages based on the production or specific weight of the tiles before and after firing, according to the criteria for each stage of the process.

### 3.5. Cut-off rule and exclusions

In this cradle-to-grave LCA study, a cut-off rule of 1% for the energy use (renewable and non - renewable) and 1% of total mass in those unitary processes, whose data is insufficient, have been applied. In total, more than 95% of all mass and energy inputs and outputs of the system have been included, excluding the not available nor quantified data.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of powdered raw materials.
- Channelled atmospheric emissions, not regulated by law, generated during the combustion stages.
- Long-term emissions (>100 years).
- The production of goods, machinery, infrastructure, and industrial equipment that can be replaced in less than a year.
- Mortar losses in stage A5.
- Waste generated in mines, other than unusable soil, which is managed externally.
- The catalyst used in the installation of fibreglass.

- The processes of recycling and reusing waste generated throughout the life cycle of ceramic coverings that will form part of another system, based on the PCR.

### 3.6. Representativeness, quality and selection of data

The primary data have been provided directly by PAMESA Industrial Group, from the production centre located in Alcora (Castellón). In addition, primary data has been obtained from two spray-dried granule manufacturing plants belonging to Grupo Empresarial Pamesa located in Alcora and Onda (Castellón), from three mines managed by PAMESA located in the municipalities of Esteruel, Gargallo, Mas de las Matas, Castellote, Seno y Berge (Teruel) and from the eleven logistics centres belonging to the Grupo Empresarial Pamesa.

In addition, primary data has been obtained from external suppliers of spray-dried granules and, where primary data from suppliers was not available, data from the ASCER sectoral EPD for Spanish ceramic tiles has been used.

Secondary data was obtained from the most up-to-date Sphera-GaBi databases [8] and modelled using LCA for Experts (Sphera-GaBi) [7]. All data refers to a geographical scenario for Spain in 2023.

The results presented are representative of ceramic tiles, expressed as an average weighted by the production of the ceramic tiles belonging to the Bla Worktop group range, limiting this average by the products with the minimum and maximum environmental impact

The global warming potential (GWP-total) of the different technologies that make up the electricity mix used is 0.38 kgCO<sub>2</sub> eq/kWh

### 3.7. Other calculation rules and assumptions

The five ceramic tile references have the same thickness and granule weight but differ in the amount of decorative material. The following table shows the deviations of the format with the highest and lowest environmental impact from the average, in relation to the product stage (A1-A3).

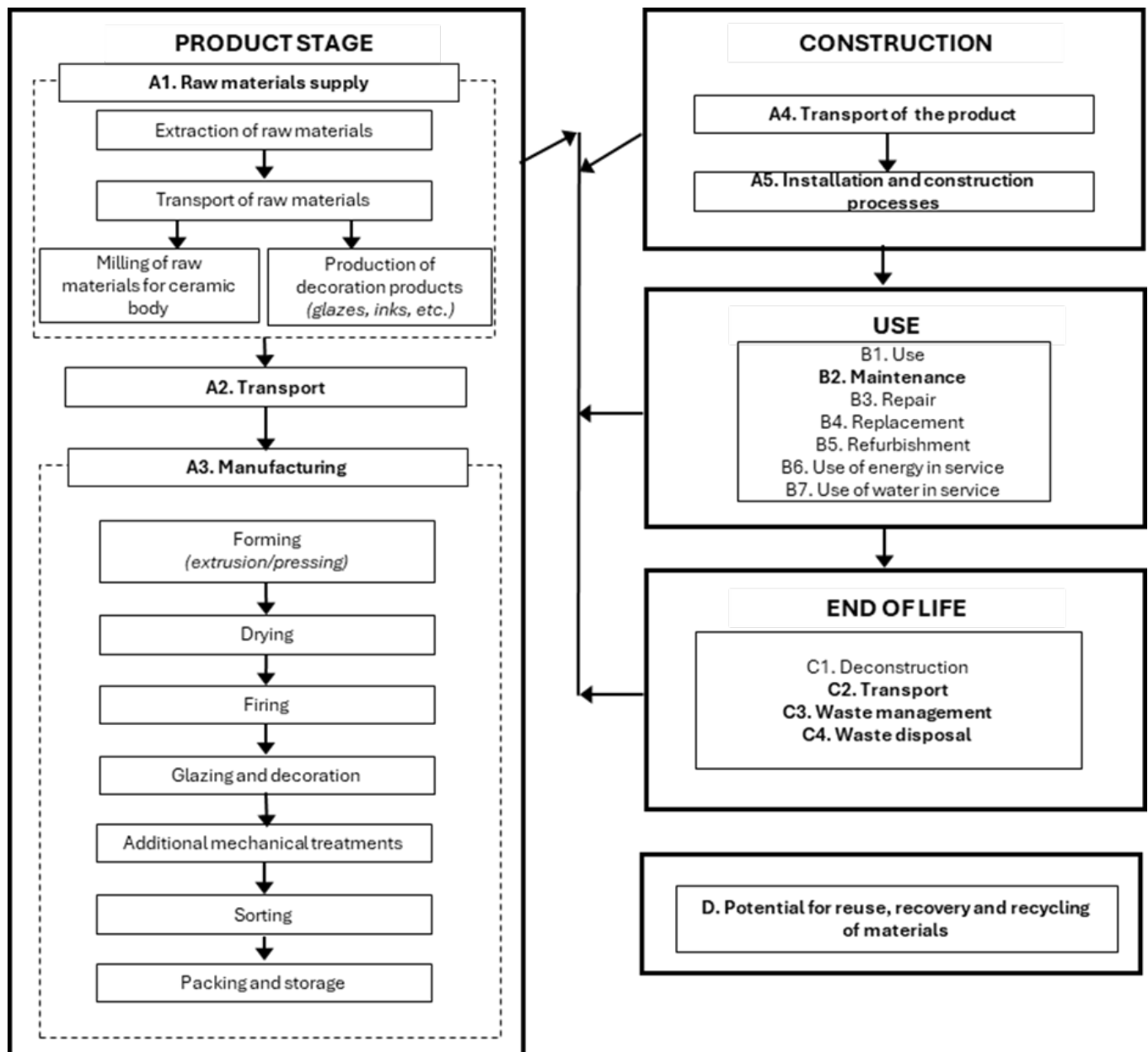
The maximum value corresponds to the format with the highest raw weight of support and the highest application of decorative materials for that format. The minimum value corresponds to the format with the lowest raw weight of support and a minimum amount of decorative materials for that specific format.

Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values for stage A1-A3 respectively.

| Impact Indicator | Relative variation from the average |
|------------------|-------------------------------------|
| GWP-total        | 5%/-3%                              |
| AP               | 9%/-10%                             |
| POCP             | 10%/-8%                             |

## 4. System limits, scenarios, and additional technical information.

All life cycle modules relevant to ceramic tiles according to the PCRs have been included:



#### 4.1. Pre-manufacturing processes (upstream).

##### Raw materials (A1) and Transport (A2)

Ceramic tiles are composed of a ceramic support and a decorative layer.

The raw materials included in the composition of the support are mainly clays, feldspars, sands and ceramic waste generated during the manufacture. A small proportion of the clays used in the average composition of Bla Slab come from quarries managed by Pamesa.

The raw materials for decoration (glazes, engobes and inks) are produced in specialised plants. The most common raw materials are ceramic frits, pigments and inorganic materials. Ceramic frits are insoluble glasses, prepared in advance by complete melting of their original raw materials and fast cooling.

The raw materials used have different origins, according to their nature and properties; they are transported by road or by ship in bulk, depending on the distance and location of the extraction point.

#### 4.2. Manufacturing of the product

##### Manufacturing (A3)

The raw materials are wet-milled and spray-dried to form granules.

This granule is sent to the forming stage by uniaxial dry pressing and later, they are placed in a continuous dryer to reduce their humidity. The granules come from spray driers belonging to the Grupo Empresarial Pamesa and also from external.

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, and in some cases, it is mostly decorated by inkjet printing, grits can also be applied to give it different characteristics.

The pieces are then fired in single-layer roller kilns, resulting in a hard material that is resistant to water and chemicals.

Optionally, the parts undergo mechanical surface treatments, such as cutting, polishing, or rectifying.

After passing quality control processes, the classified pieces are assembled and packaged. Finally, they are transported to the brand's logistics centres for distribution.

#### 4.3. Construction Process

##### Transport (A4)

The product is distributed 34% in Spain, 16% in Europe and 51% in the rest of the world.

##### A4 Transport to site

| Scenario Information                                                                                                 | Unit (expressed by functional unit)                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Type and fuel consumption of the vehicle, type of vehicles used for transport, e.g. long distance trucks, ship, etc. | According to the destinations in the distribution as described above:<br>0.1394 l diesel (Euro truck 6, 27 t)<br>0.0464 l fuel oil (ship) |
| Distance                                                                                                             | 300 km national distribution: 34%<br>1390 km rest of Europe distribution: 16%<br>6520 km rest of the world distribution: 51%              |
| Capacity utilisation (including no-load return)                                                                      | 85% in truck<br>100% ship                                                                                                                 |
| Bulk density of transported products                                                                                 | ≈415.4 kg/m <sup>3</sup>                                                                                                                  |
| Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)                 | 1                                                                                                                                         |

## Product installation and process construction (A5).

Once the product has been unpacked, it is installed using mortar, in accordance with the standard operating procedures for ceramic tiles.

Packaging waste is managed separately depending on the geographical location of the installation site. To this end, three scenarios have been considered.

Based on sales distribution, waste management has been considered for Spain, Europe and the rest of the world.

Furthermore, a 15% loss has been considered during the tile installation stage, according to data provided by Pamesa Industrial Group.

### A5 Installation

| Scenario Information                                                                                                                                                                           | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary materials for installation (specify each material)                                                                                                                               | 3,3 kg/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                 |
| Water use                                                                                                                                                                                      | 0.8 l/m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                  |
| Use of other resources                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                        |
| Quantitative description of the type of energy (regional mix) and consumption during the installation process                                                                                  | Not applicable                                                                                                                                                                                                                                                                                                                                                        |
| Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)                                                               | Product losses: 2250 g<br>Packaging wastes:<br>Cardboard: 147 g<br>Plastic: 42 g<br>Wood: 54 g                                                                                                                                                                                                                                                                        |
| Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route) | Product losses for recycling: 1575 g<br>Product losses for final deposition: 675 kg<br>Incinerated cardboard: 5 g<br>Recycled cardboard: 123 g<br>Cardboard for final deposition: 19 g<br>Incinerated plastic: 4 g<br>Recycled plastic: 29 g<br>Plastic for final deposition: 9 g<br>Incinerated wood: 18 g<br>Recycled wood: 37 g<br>Wood for final deposition: 29 g |
| Direct emissions to ambient air, soil and water                                                                                                                                                | Not applicable                                                                                                                                                                                                                                                                                                                                                        |

## 4.4. Use linked to the structure of the building

### B1 Use

Once installed, the tiles do not require any energy or water to operate. The only maintenance required after installation is normal cleaning.

For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

### B2 Maintenance

Cleaning is carried out using a damp cloth and cleaning agents

#### Use linked to the building structure

| Scenario information                                                                                                                     | Unit (expressed per functional unit)                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Maintenance process                                                                                                                      | According to PCR for ceramic tiles (EN17160) residential scenario for floor cleaning |
| Maintenance cycle                                                                                                                        | Wash once a week with water and once every two weeks with detergent                  |
| Auxiliary materials for maintenance (e.g. cleaning products) (specify each material)                                                     | Detergent: 1.34E-04 kg/m <sup>2</sup> per wash                                       |
| Material wastage during maintenance (specify type))                                                                                      | Not applicable                                                                       |
| Net tap water consumption                                                                                                                | 0.1 l/m <sup>2</sup> per wash                                                        |
| Energy input during maintenance (e.g. vacuum cleaning), type of energy carrier (e.g. electricity) and amount, if applicable and relevant | Not applicable                                                                       |

### B3-B4-B5 Repair, Replacement and refurbishment

Ceramic tiles do not require repair, replacement or refurbishment, and their potential impact is not significant.

#### 4.5. Use linked to the operation of the building

##### B6-B7 Operational energy use and Operational water use.

These modules are not relevant for ceramic tiles.

#### 4.6. End of life stage

##### C1 Deconstruction and demolition

The impacts attributable to the removal of the product in the context of a building rehabilitation or during its demolition are negligible, as specified in the RCP of ceramic tiles.

##### C2 Transport

Product waste is transported 50 km by lorry for management, either by disposal in inert landfills or for recycling.

##### C3 Waste management for reuse, recovery and recycling

70% of tiles are considered to be recycled and/or reused, as indicated in the PCR.

##### C4 Final disposal

It was assumed that 30% of the product was sent to controlled landfills after its service life had ended. In addition, the adhesive material and 90% of the water used in the installation are taken into account.

#### End of life

| Parameter                                              | Unit (expressed by functional unit)                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collection process, specified by type                  | 19.0 kg total                                                                                                                                                                                                                                                                                       |
| Recovery system, specified by type                     | 13.3 kg for recycling                                                                                                                                                                                                                                                                               |
| Disposal, specified by type                            | 5.7 kg to landfill                                                                                                                                                                                                                                                                                  |
| Assumptions for scenario development (e.g.: transport) | The product waste is transported in a Euro 6 compliant heavy-duty truck (27 t) to be managed either to landfilling or recycling. An average distance of 50km from the building site to the final destination is considered. The return journey of the lorries is also included (100% empty return). |

#### 4.7. Benefits and burdens beyond the system

##### Module D

The net environmental burdens and net benefits of obtaining the secondary material from waste at the installation stage and at the end of life of the product have been considered.

#### 4.8. Information on biogenic carbon content

Ceramic tiles are mineral products and therefore do not contain biogenic carbon. According to standard EN 16449, it is necessary to calculate the biogenic carbon content, which in this case comes from packaging, wooden pallets and cardboard.

#### Biogenic carbon content

| Parameter                              | Unit (expressed by functional unit) |
|----------------------------------------|-------------------------------------|
| Biogenic carbon content of the product | -                                   |
| Biogenic carbon content of the package | 1.6E-01 kg C                        |

## 5. Declaration of the environmental parameters of the LCA and the ICV.

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units       | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|-------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq   | 17.3    | 4.3E-01 | 3.8     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 1.5E-02 | 1.1E-01 | -2.0E-01 |
| GWP-biogenic                      | kg CO2 eq   | 2.4E-02 | 1.2E-04 | 1.3E-01 | 0  | 4.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 8.0E-06 | 1.1E-03 | -6.0E-05 |
| GWP-luluc                         | kg CO2 eq   | 1.3E-02 | 4.8E-03 | 4.4E-03 | 0  | 2.4E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-03 | 4.2E-06 | 4.6E-04 | -4.5E-04 |
| GWP-total                         | kg CO2 eq   | 17.4    | 4.4E-01 | 3.9     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 1.5E-02 | 1.1E-01 | -2.0E-01 |
| ODP                               | kg CFC11 eq | 5.3E-08 | 5.4E-14 | 8.0E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-14 | 1.1E-13 | 6.1E-14 | -4.5E-09 |
| AP                                | mol H+ eq   | 2.8E-02 | 4.1E-03 | 7.1E-03 | 0  | 6.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 1.8E-05 | 7.8E-04 | -6.7E-04 |
| EP-freshwater                     | kg P eq     | 1.2E-04 | 1.3E-06 | 2.2E-05 | 0  | 6.1E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 4.5E-07 | 1.6E-09 | 2.3E-06 | -1.9E-06 |
| EP-marine                         | kg N eq     | 8.2E-03 | 1.0E-03 | 2.2E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.2E-05 | 5.1E-06 | 2.2E-04 | -2.2E-04 |
| EP-terrestrial                    | mol N eq    | 8.8E-02 | 1.1E-02 | 2.4E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.0E-04 | 5.5E-05 | 2.3E-03 | -2.3E-03 |
| POCP                              | Kg NMVOC eq | 3.0E-02 | 3.0E-03 | 7.2E-03 | 0  | 3.8E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-04 | 1.5E-05 | 6.3E-04 | -5.7E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq    | 5.9E-05 | 2.8E-08 | 8.9E-06 | 0  | 3.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 9.1E-09 | 1.3E-09 | 1.1E-08 | -8.6E-08 |
| ADP-fossil <sup>2</sup>           | MJ          | 280.7   | 5.2     | 49.0    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.2E+00 |
| WDP <sup>2</sup>                  | m3          | 3.3     | 4.7E-03 | 6.1E-01 | 0  | 21.7    | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-03 | 7.4E-03 | 8.1E-03 | 9.6E-03  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

### Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.1E-05 | 7.2E-08 | 3.2E-06 | 0  | 3.7E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-09 | 1.6E-10 | 9.5E-09 | -3.7E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 1.3     | 1.2E-03 | 2.3E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.6E-04 | 4.9E-03 | 1.9E-03 | -9.5E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 71.0    | 3.8     | 14.3    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 2.4E-02 | 8.6E-01 | -1.4E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 4.0E-09 | 7.2E-11 | 7.7E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-11 | 2.2E-12 | 1.1E-10 | -1.1E-12 |
| HTP-nc <sup>2</sup> | CTUh                  | 1.2E-07 | 2.8E-09 | 3.0E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 9.2E-10 | 1.4E-11 | 1.2E-08 | -1.4E-09 |
| SQP <sup>2</sup>    | -                     | 115.8   | 1.9     | 29.6    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 6.8E-01 | 2.8E-03 | 3.3E-01 | -1.7E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 54.1    | 3.3E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.1E-02 | 1.7E-01 | -2.2E+00 |
| PERM      | MJ             | 10.0    | 0       | 1.5     | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 64.1    | 3.3E-01 | 3.6     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.1E-02 | 1.7E-01 | -2.2E+00 |
| PENRE     | MJ             | 280.7   | 5.2     | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.2E+00 |
| PENRM     | MJ             | 1.8     | 0       | 2.7E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 282.5   | 5.2     | 6.4     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.2E+00 |
| SM        | kg             | 5.2E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 6.1E-02 | 3.7E-04 | 1.2E-02 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 9.7E-05 | 2.7E-04 | -1.7E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

### Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 1.9E-10 | 1.5E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 5.3E-11 | 1.3E-10 | 2.2E-08 | -3.4E-08 |
| DWD       | kg    | 5.9E-01 | 7.3E-04 | 1.2     | 0  | 7.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-04 | 5.7E-05 | 6.6     | -1.1E-03 |
| RWD       | kg    | 1.5E-02 | 8.6E-06 | 2.4E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-06 | 7.7E-05 | 1.9E-05 | -1.3E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

### Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.6E-01 | 0  | 1.9 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13.3 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## 6. Additional environmental information.

### Indoor air emissions

Ceramic tiles undergo a thermal process exceeding 1000°C during their manufacture. At these temperatures, any organic compounds present in the composition decompose, resulting in an inert end product free of volatile organic compounds that could be emitted during use.

The Pamesa Industrial Group has FloorScore® certification with registration number SCS-FS-06088 for indoor air quality in accordance with CDPH/EHLB Standard Method v1.2-2017 (California Section 01350), effective 1 April 2017, for school classroom and private office parameters when modelled as flooring.

The concentration of volatile organic compounds (TVOC) is less than or equal to 0.5 mg/m<sup>3</sup> in accordance with the CDPH/EHLB v1.2-2017 standard method.

### Release to soil and water

Ceramic tiles do not emit any compounds into the soil or water during the use phase, as it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically, chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that could lead to environmental pollution or harm human health. It is a non-leaching product and therefore does not pose a risk to surface or groundwater quality.

### Environmental information about the company

The spray-dried granules used in the manufacture of Bla Worktops and Hobs (BPA spray-dried porcelain) comply with the radioactive isotope activity concentration levels defined by the European Union (I<sub>UE</sub>) and the limits set out in standard GB6566-2010 in force in the People's Republic of China (I<sub>INT</sub>, I<sub>EXT</sub>).

PAMESA's manufacturing companies are members of ECOEMBES, a non-profit organisation that manages the recycling of waste deposited in yellow and blue containers.

## Annex I. Declaration of the environmental parameters of the LCA and LCI for the format with MINIMUM impacts

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 16.4    | 4.3E-01 | 3.7     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.1E-01 | 1.5E-02 | 1.1E-01 | -2.0E-01 |
| GWP-biogenic                      | kg CO2 eq      | 2.2E-02 | 1.2E-04 | 1.3E-01 | 0  | 4.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 8.0E-06 | 1.1E-03 | -5.9E-05 |
| GWP-luluc                         | kg CO2 eq      | 1.2E-02 | 4.8E-03 | 4.3E-03 | 0  | 2.4E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-03 | 4.2E-06 | 4.6E-04 | -4.5E-04 |
| GWP-total                         | kg CO2 eq      | 16.5    | 4.4E-01 | 3.8     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 1.5E-02 | 1.1E-01 | -2.0E-01 |
| ODP                               | kg CFC11 eq    | 2.8E-08 | 5.4E-14 | 4.2E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.5E-14 | 1.1E-13 | 6.1E-14 | -4.5E-09 |
| AP                                | mol H+ eq      | 2.5E-02 | 4.1E-03 | 6.7E-03 | 0  | 6.1E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 1.8E-05 | 7.8E-04 | -6.7E-04 |
| EP-freshwater                     | kg P eq        | 1.1E-04 | 1.3E-06 | 2.2E-05 | 0  | 6.1E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 4.4E-07 | 1.5E-09 | 2.2E-06 | -1.9E-06 |
| EP-marine                         | kg N eq        | 7.3E-03 | 1.0E-03 | 2.1E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.2E-05 | 5.1E-06 | 2.2E-04 | -2.2E-04 |
| EP-terrestrial                    | mol N eq       | 8.0E-02 | 1.1E-02 | 2.2E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.0E-04 | 5.5E-05 | 2.3E-03 | -2.3E-03 |
| POCP                              | Kg NMVOC eq    | 2.7E-02 | 3.0E-03 | 6.7E-03 | 0  | 3.8E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-04 | 1.5E-05 | 6.3E-04 | -5.6E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 4.6E-05 | 2.8E-08 | 6.9E-06 | 0  | 3.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 9.1E-09 | 1.3E-09 | 1.1E-08 | -8.5E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 263.2   | 5.2     | 46.4    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.1E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 3.1     | 4.7E-03 | 5.9E-01 | 0  | 21.7    | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-03 | 7.4E-03 | 8.1E-03 | 9.4E-03  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals** Abiotic resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.1E-05 | 7.2E-08 | 3.2E-06 | 0  | 3.7E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-09 | 1.6E-10 | 9.5E-09 | -3.7E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 1.0     | 1.2E-03 | 1.9E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.6E-04 | 4.9E-03 | 1.9E-03 | -9.5E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 57.8    | 3.8     | 12.4    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 2.4E-02 | 8.5E-01 | -1.4E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 4.2E-09 | 7.2E-11 | 8.0E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-11 | 2.2E-12 | 1.1E-10 | -1.1E-12 |
| HTP-nc <sup>2</sup> | CTUh                  | 1.2E-07 | 2.8E-09 | 3.1E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 9.2E-10 | 1.4E-11 | 1.1E-08 | -1.4E-09 |
| SQP <sup>2</sup>    | -                     | 116.6   | 1.9     | 29.7    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 6.7E-01 | 2.8E-03 | 3.3E-01 | -1.7E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ             | 53.7    | 3.3E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.1E-02 | 1.6E-01 | -2.2E+00 |
| PERM      | MJ             | 10.0    | 0       | 1.5     | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ             | 63.7    | 3.3E-01 | 3.6     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.1E-02 | 1.6E-01 | -2.2E+00 |
| PENRE     | MJ             | 263.2   | 5.2     | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.1E+00 |
| PENRM     | MJ             | 1.8     | 0       | 2.7E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ             | 265.0   | 5.2     | 6.4     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.3E-01 | 1.4     | -3.1E+00 |
| SM        | kg             | 5.2E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ             | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m <sup>3</sup> | 5.6E-02 | 3.7E-04 | 1.1E-02 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 9.6E-05 | 2.7E-04 | -1.7E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 1.9E-10 | 1.5E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 5.2E-11 | 1.3E-10 | 2.2E-08 | -3.4E-08 |
| DWD       | kg    | 5.9E-01 | 7.3E-04 | 1.2     | 0  | 7.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.2E-04 | 5.7E-05 | 6.5     | -1.1E-03 |
| RWD       | kg    | 1.4E-02 | 8.5E-06 | 2.4E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.5E-06 | 7.7E-05 | 1.9E-05 | -1.3E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.9E-01 | 0  | 1.9 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13.3 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

## Annex II. Declaration of the environmental parameters of the LCA and LCI for the format with MAXIMUM impact

### Environmental impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks

| Parameter                         | Units          | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------------------------------|----------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| GWP-fossil                        | kg CO2 eq      | 17.9    | 4.4E-01 | 3.9     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 1.5E-02 | 1.1E-01 | -2.1E-01 |
| GWP-biogenic                      | kg CO2 eq      | 2.1E-02 | 1.2E-04 | 1.3E-01 | 0  | 4.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 8.2E-06 | 1.1E-03 | -6.3E-05 |
| GWP-luluc                         | kg CO2 eq      | 1.3E-02 | 5.0E-03 | 4.4E-03 | 0  | 2.4E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 1.8E-03 | 4.3E-06 | 4.7E-04 | -4.6E-04 |
| GWP-total                         | kg CO2 eq      | 17.9    | 4.5E-01 | 4.0     | 0  | 1.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 1.5E-02 | 1.1E-01 | -2.1E-01 |
| ODP                               | kg CFC11 eq    | 5.6E-08 | 5.5E-14 | 8.4E-09 | 0  | 6.5E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 1.6E-14 | 1.2E-13 | 6.2E-14 | -4.5E-09 |
| AP                                | mol H+ eq      | 3.1E-02 | 4.2E-03 | 7.5E-03 | 0  | 6.0E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-04 | 1.8E-05 | 8.0E-04 | -6.8E-04 |
| EP-freshwater                     | kg P eq        | 1.5E-04 | 1.3E-06 | 2.7E-05 | 0  | 6.1E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 4.6E-07 | 1.6E-09 | 2.3E-06 | -1.9E-06 |
| EP-marine                         | kg N eq        | 9.0E-03 | 1.1E-03 | 2.3E-03 | 0  | 1.4E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 4.3E-05 | 5.2E-06 | 2.2E-04 | -2.2E-04 |
| EP-terrestrial                    | mol N eq       | 9.7E-02 | 1.2E-02 | 2.5E-02 | 0  | 1.4E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 5.1E-04 | 5.6E-05 | 2.4E-03 | -2.4E-03 |
| POCP                              | Kg NMVOC eq    | 3.2E-02 | 3.1E-03 | 7.6E-03 | 0  | 3.8E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1.4E-04 | 1.6E-05 | 6.4E-04 | -5.7E-04 |
| ADP-minerals& metals <sup>2</sup> | kg Sb eq       | 1.0E-04 | 2.9E-08 | 1.5E-05 | 0  | 3.2E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 9.3E-09 | 1.4E-09 | 1.1E-08 | -8.7E-08 |
| ADP-fossil <sup>2</sup>           | MJ             | 288.3   | 5.3     | 50.1    | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.4E-01 | 1.4     | -3.2E+00 |
| WDP <sup>2</sup>                  | m <sup>3</sup> | 3.4     | 4.8E-03 | 6.3E-01 | 0  | 21.7    | 0  | 0  | 0  | 0  | 0  | 0  | 1.7E-03 | 7.6E-03 | 8.3E-03 | 1.1E-02  |

**GWP - total:** Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metalsAbiotic** resource depletion potential for non-fossil resources; **APD-fossil:** Abiotic resource depletion potential for fossil resources; **WDP:** Water deprivation potential (user), water-weighted deprivation consumption. **NR:** Not relevant

## Additional environmental impacts

| Parameter           | Units                 | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|---------------------|-----------------------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PM                  | Incidence of diseases | 2.1E-05 | 7.4E-08 | 3.2E-06 | 0  | 3.7E-09 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-09 | 1.7E-10 | 9.7E-09 | -3.7E-09 |
| IRP <sup>1</sup>    | kBq U235 eq           | 1.3     | 1.3E-03 | 2.3E-01 | 0  | 2.1E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 3.7E-04 | 5.0E-03 | 1.9E-03 | -9.7E-03 |
| ETP-fw <sup>2</sup> | CTUe                  | 81.9    | 3.9     | 16.0    | 0  | 4.3     | 0  | 0  | 0  | 0  | 0  | 0  | 1.0     | 2.5E-02 | 8.7E-01 | -1.4E+00 |
| HTP-c <sup>2</sup>  | CTUh                  | 5.0E-09 | 7.4E-11 | 9.2E-10 | 0  | 2.6E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 2.1E-11 | 2.2E-12 | 1.1E-10 | -1.1E-12 |
| HTP-nc <sup>2</sup> | CTUh                  | 2.1E-07 | 2.9E-09 | 4.4E-08 | 0  | 2.8E-08 | 0  | 0  | 0  | 0  | 0  | 0  | 9.4E-10 | 1.4E-11 | 1.2E-08 | -1.5E-09 |
| SQP <sup>2</sup>    | -                     | 111.7   | 1.9     | 29.0    | 0  | 7.2E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 6.9E-01 | 2.9E-03 | 3.4E-01 | -1.7E+00 |

**PM:** Potential incidence of diseases due to particulate matter (PM) emissions; **IRP** : Exposure efficiency of human potential relative to U235; **ETP-fw** : Comparative toxic unit potential for ecosystems - freshwater; **HTP-c** : Comparative toxic unit potential for ecosystems - carcinogenic effects; **HTP-nc** : Comparative toxic unit potential for ecosystems - non-carcinogenic effects; **SQP** : Soil Quality Potential Index; **NR**: Not relevant

**Notice 1:** This impact category deals primarily with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation in the soil, due to radon or some building materials, is not measured with this parameter either.

**Notice 2:** The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

## Use of resources

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| PERE      | MJ    | 52.1    | 3.4E-01 | 2.1     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.2E-02 | 1.7E-01 | -2.2E+00 |
| PERM      | MJ    | 10.0    | 0       | 1.5     | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PERTH     | MJ    | 62.1    | 3.4E-01 | 3.6     | 0  | 4.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.2E-01 | 5.2E-02 | 1.7E-01 | -2.2E+00 |
| PENRE     | MJ    | 288.3   | 5.3     | 6.1     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.4E-01 | 1.4     | -3.2E+00 |
| PENRM     | MJ    | 1.8     | 0       | 2.7E-01 | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| PENRT     | MJ    | 290.1   | 5.3     | 6.4     | 0  | 3.2     | 0  | 0  | 0  | 0  | 0  | 0  | 1.4     | 4.4E-01 | 1.4     | -3.2E+00 |
| SM        | kg    | 5.2E-01 | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| RSF       | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| NRSF      | MJ    | 0       | 0       | 0       | 0  | 0       | 0  | 0  | 0  | 0  | 0  | 0  | 0       | 0       | 0       | 0        |
| FW        | m3    | 6.3E-02 | 3.8E-04 | 1.2E-02 | 0  | 2.9E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 1.3E-04 | 9.9E-05 | 2.8E-04 | -1.7E-03 |

**PERE:** Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as feedstock; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of piped water resources; **NR:** Not relevant

## Waste Categories

| Parameter | Units | A1-A3   | A4      | A5      | B1 | B2      | B3 | B4 | B5 | B6 | B7 | C1 | C2      | C3      | C4      | D        |
|-----------|-------|---------|---------|---------|----|---------|----|----|----|----|----|----|---------|---------|---------|----------|
| etc.      | kg    | 1.0E-03 | 2.0E-10 | 1.5E-04 | 0  | 1.7E-10 | 0  | 0  | 0  | 0  | 0  | 0  | 5.4E-11 | 1.3E-10 | 2.3E-08 | -3.5E-08 |
| DWD       | kg    | 6.5E-01 | 7.5E-04 | 1.3     | 0  | 7.7E-02 | 0  | 0  | 0  | 0  | 0  | 0  | 2.3E-04 | 5.8E-05 | 6.7     | -1.2E-03 |
| RWD       | kg    | 1.5E-02 | 8.8E-06 | 2.4E-03 | 0  | 1.0E-05 | 0  | 0  | 0  | 0  | 0  | 0  | 2.6E-06 | 7.9E-05 | 2.0E-05 | -1.3E-05 |

**HWD:** Hazardous waste disposed of; **NHWD:** Non-hazardous waste disposed of; **RWD:** Radioactive waste disposed of; **NR:** Not relevant

## Output flows

| Parameter | Units | A1-A3   | A4 | A5  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3   | C4 | D |
|-----------|-------|---------|----|-----|----|----|----|----|----|----|----|----|----|------|----|---|
| RAW       | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| MFR       | kg    | 1.9E-01 | 0  | 1.9 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13.3 | 0  | 0 |
| MORE      | kg    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |
| EE        | MJ    | 0       | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0 |

**CRU:** Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

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