DAPHabitat System

Environmental Product Declaration

www.daphabitat.pt

[according to ISO 14025, EN 15804:2012+A2:2019 e EN 15942]

Declaration number: DAP 010:2025

GLAZED PORCELAIN (Group Bla)

Issue date: 23/07/2025

Valid until: 22/07/2030

Gresart – Cerâmica Industrial, S.A.

GRES PANARIA Portugal S.A.

Cluster Habitat Sustentável

Version 1.5 Edition June 2024

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1. GENERAL INFORMATION

1.1. The DAPHabitat System

Programme operator:	Associação Plataforma para a Construção Sustentável www.clusterhabitat.pt geral@clusterhabitat.pt Cluster Habitat Sustentável
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@clusterhabitat.pt
Telephone number:	(+351) 234 401 576
Website:	www.daphabitat.pt
Logo:	dap habitat

1.2. EPD owner

Name of the owner:	Gres Panaria Portugal, S.A.
Production site:	Gresart – Cerâmica Industrial, S.A. Zona Industrial de Vila Verde 3771-954 Oliveira do Bairro, Portugal
Address (head office):	Gres Panaria Portugal, S.A. (sede) Chousa Nova 3830-133, Ílhavo - Aveiro
Telephone number:	Gres Panaria: +351 234329700 Catarina Dias: +351 961537048 Gresart: +351 234740200
Email address:	catarina.dias@grespanaria.pt; geral@grespanaria.com;
Website:	https://grespanaria.com/pt
Logo:	GRES PANARIA Portugal S.A.
Information concerning the applicable management Systems:	Scope of certification: Design, development and manufacture of wall and floor ceramic tiles, porcelain tiles, as well as commercialization of ceramic decorative accessories. NP EN ISO 9001:2015 - Quality management systems — Certifying entity APCER, Certificate of conformity number 2000/CEP.1049. NP EN ISO 14001:2015- Environmental management systems — Certifying entity APCER, Certificate of conformity number PT-2005/AMB.0244

Specific aspects regarding production:	CAE$_{Rev.3}$ n.º 23312 – Manufacturing of tiles, mosaics, and ceramic slabs
Organization's environmental policy:	Gres Panaria Portugal, S.A., aware of its environmental and social responsibilities, is committed to the strategic guiding principles crucial for the continuous improvement of the Integrated Management System, as well as the sustainable development of the business and the return on invested capital. Thus, the management of Gres Panaria Portugal commits to the following: - Customer and stakeholder satisfaction, aiming at the internationalization of its brands and products in various markets; - Innovation and product development, anticipating customer expectations and ensuring the sustainability of products throughout their lifecycle; - Implementation of a culture of operational excellence that enhances process efficiency maximization; - Involvement and motivation of its employees, as they are a key asset for the company's success; - Environmental protection, including pollution prevention, contributing to the reduction of environmental impacts, and always opting for the best available technologies, whenever possible and economically viable, to improve environmental performance; - Prevention and minimization of health and safety risks for employees to contribute to their integrity and quality of life; - Compliance with applicable regulatory obligations inherent to its activities, products, and services. Thus, the company commits to implement, document, communicate, review, and disclose this Sustainability Policy, as well as other strategic premises, to all employees and shareholders in the interest of organizational transparency, aiming to involve employees, customers, suppliers, the local community, and society in general in its Management System.

PANARIA GROUP HISTORY

Gres Panaria Portugal, with three factories in Portugal, is part of Panariagroup, one of the leading Italian producers of ceramic tiles for floor and wall coverings and is positioned in the high-end and luxury segment of the market. The Group's product range combines the ancient art of ceramic with the most advanced standards for floor and wall coverings, offering specific solutions for any kind of application, from large commercial surfaces to residential use. Panariagroup produces ceramic porcelain stoneware. In particular, the porcelain stoneware denomination refers to an extremely compact, dry-pressed ceramic product characterized by excellent technical specifications (high mechanical strength and resistance to wear, chemicals and stains) and very low porosity. Due to these features, during the firing stage (at a temperature of over 1,200° C), the product reaches complete vitrification, acquiring extremely low water absorption properties (less than 0.5%) and consequently frost resistance, making it suitable for outdoor installation.

Panariagroup is also a leading company in the producing of laminated porcelain stoneware, a revolutionary product manufactured with an extremely innovative system, resulting from of a very advanced and high-performance technology, that allows the creation of tiles characterized by reduced thickness (as little as 3 mm). Panariagroup's products comply with ANSI A137.1 and ANSI 137.3, ISO 13006 and EN 14411. Panariagroup actively operates both in Italy and abroad through twelve Brands that can satisfy a diverse customer base focused on the technical and aesthetic quality of its products: Panaria Ceramica, Lea Ceramiche, Cotto d'Este, Blustyle, Florida Tile, Margres, Love Tiles, Gresart, Steuler Design, Kerateam, Nordceram, Grohn, Bellissimo and Maxa Ceramic Slabs.

The Group's driving force is its eight production plants, located in Finale Emilia, Fiorano Modenese and Toano, Italy, in Ílhavo, Aveiro and Oliveira do Bairro, Portugal, in Lawrenceburg, United States, and Leisnig, Germany. The Group also has two storage and shipping centers in Italy, located in Casalgrande and Sassuolo. Panariagroup has a large and widespread sales network that covers Italy, Portugal, Germany, the United States, India and over 130 Countries worldwide. At national and international levels, marketing and distribution of all Panariagroup products are coordinated by an organization of around 1,200 people, including area managers, commercial correspondents, sales agents and promoters. Moreover, in the United States, the Group directly manages 22 stores throughout the territory.

Panariagroup's mission is to develop and create well-being in harmony with people and the environment, with great willingness, passion and love for our work. To achieve these goals, the Group aims to generate sustainable value for its stakeholders, employees, and commercial partners, while respecting society and the environment. The Group has a strong focus on research and innovation. It aims to meet the highest expectations regarding wellbeing and aesthetics for both professional and private customers, as well as in architecture and the construction industry. Always at the vanguard of skilfully combining beauty, quality, and sustainability, Panariagroup works every day to reduce the environmental impact of its plants, demonstrating its commitment to ecosystem conservation and researching the best housing comforts. This is a vital commitment for those who, like Panariagroup, create products that millions worldwide encounter daily, at home or in public places. Acting responsibly means including sustainability among the aspects to consider in the company's daily choices, from purchasing raw materials to selling the final product.

GRESART

In 1986, Gresart, initially focused solely on the production of flooring, and underwent internal changes with the renewal of its management team and the merger between GRESART and AZUGRÉS, resulting in the company GRESART, S.A. Later, in 2005, the NP EN ISO 9001:2000 standard was implemented, which has been renewed and validated annually.

A new manufacturing unit was established in 2007 with more modern industrial equipment, resulting in increased production capacity and a wide range of glazed porcelain stoneware products. Furthermore, in 2019, a dry grinding line with state-of-the-art high-productivity, low-environmental-impact industrial equipment was adopted, requiring no water and having low energy consumption.

In 2020, solar panels were installed, producing 2 765 MWh of clean, renewable energy annually, thus reducing the annual emission of CO_2 equivalent tons. Two years later, GRESART opened a new showroom with over 500 m^2 of space, featuring various brands and interior designers. In 2023, GRESART was acquired by Gres Panaria Portugal and became part of the Italian multinational Panariagroup Industrie Ceramiche.

1.3. Information concerning the EPD

Authors:	1. Centro Tecnológico da Cerâmica e do Vidro 2. Gres Panaria Portugal, S.A.
Contact of the authors:	1. CTCV materials: habitat | iParque – Parque Tecnológico de Coimbra – Lote 6 | 3040-540 Antanhol – Portugal (T) +351 239 499 200 Marisa Almeida: marisa@ctcv.pt 2. Gres Panaria Portugal, S.A. - Chousa Nova 3830-133, Ílhavo – Aveiro (T) +351 234329700 E-mail: geral@grespanaria.com
Issue date:	23/07/2025
Registration date:	19/09/2025
Registration number:	DAP 010:2025
Valid until:	22/07/2030
Representativity of the EPD (location, manufacturer, group of manufacturers):	EPD of all porcelain glazed products of the Bla group, produced at the Oliveira do Bairro production unit (Gresart), belonging to the producer Gres Panaria Portugal, S.A.
Type of EPD	EPD - from cradle to grave with module D (A, B, C and D modules)

1.4. Demonstração de verificação

External independent verification, accordingly, with the standard ISO 14025:2010 and EN 15804:2012+A2:2019

Certification Body	Verifier
	
(CERTIF – Associação para a Certificação)	(Ricardo Mateus)

1.5. EPD registration

Programme operator

(Plataforma para a Construção Sustentável)

1.6. PCR (Product Category Rules) basic model

Name:	RCP de modelo base para produtos e serviços de construção
Issue date:	June 2024 Edition
Number of registrations on the database:	RCP-mb001
Version:	Version 3.0
Identification and contact of the coordinator(s):	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt José Dinis Silvestre | jose.silvestre@ist.utl.pt
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Composition of the Sectorial Panel:	-
Consultation period:	18/11/2015 - 18/01/2016 12/08/2023 – 30/11/2023
Valid until:	01/06/2027

CEN standard EN 15804 serves as the core Product Category Rules (PCR).

1.7. C-PCR (Complementary Product Category Rules)

Name:	1. PCR: Floor covering 2. PCR: Wall covering 3. EN 17160:2019 – Product category rules for ceramic tiles
Issue date:	1. 10/02/2014 2. 10/02/2014 3. 27-Fev-2019, em vigor desde 15-Abr-2019
Number of registrations on the database:	1. RCP001:2014 2. RCP002:2014 3. --
Version:	1. Version 1.2 (june 2022) 2. Version 1.2 (june 2022) 3. --
Identification and contact of the coordinator(s):	1. PCR: Floor covering • Marisa Almeida | marisa@ctcv.pt • Luís Arroja | arroja@ua.pt

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Composition of the Sectorial Panel:	1. PCR: Floor covering • RMC - Revestimentos de Mármore Compactos, S.A. • Dominó – Indústrias Cerâmicas, S.A. • APICER – Associação Portuguesa da Indústria de Cerâmica • Sonae Indústria, SGPS, S.A. 2. PCR: Wall covering • RMC - Revestimentos de Mármore Compactos, S.A. • Dominó – Indústrias Cerâmicas, S.A. • Sonae Indústria, SGPS, S.A. • APICER – Associação Portuguesa da Indústria de Cerâmica
Consultation period:	1. 01/08/2013 - 30/11/2013 2. 12/08/2013 - 30/11/2013 3. 18/11/2015 - 18/01/2016
Valid until:	1. 01/06/2027 2. 01/06/2027 3. --

1.8. Information concerning the product/product class

Identification of the product:	Glazed Porcelain Tiles of the Bla Group - Dry-Pressed Ceramic Tiles, with low water absorption Eb ≤ 0,5 %
Illustration of the product:	Examples of Glazed Porcelain manufactured by the Gresart unit in Oliveira do Bairro:  Glazed Porcelain Tiles, series FORM 30x60  Glazed Porcelain Tiles, series SLATE 30x60  Glazed Porcelain Tiles, series KECH 30x60
Brief description of the product:	Dry-Pressed Ceramic Tiles, with low water absorption Eb ≤ 0,5 %, for floor and wall tiles, both interior and exterior coverings.

Main technical characteristics of the product:

Table 1 - Technical product characteristics (EN 14411:2012, Group BIa, Annex G (GL)).

Technical Characteristics	Testing Standard	Requirement	Gresart
Length and Width	ISO 10545-2	± 0,6%	Complies with Standards
Thickness		± 5%	
Rectilinearity		± 0,5%	
Rectangularity		± 0,5%	
Flatness		± 0,5%	
Surface Quality		95% Defect Free	
Water absorption	ISO 10545-3	Eb ≤ 0,5%	Complies with Standards
Rupture Module	ISO 10545-4	≥ 35 N/mm2	Complies with Standards
Resistance to Abrasion (P.E.I.)	ISO 10545-7	Required	4
Linear Thermal Expansion Coefficient ($^oC^{-1}$)	ISO 10545-8	Required	6,9E-06
Thermal Shock Resistance	ISO 10545-9	Required	Cumpre a Norma
Tensile Strength	ISO 10545-11	Required	Cumpre a Norma
Frost Resistance	ISO 10545-12	Required	Cumpre a Norma
Slip Resistance	DIN 51130 DIN 51097 CEN/TS 16165	According to the manufacturer´s data	---
Resistance against acids and bases	ISO 10545-13	According to the manufacturer´s data	GLA
Resistance to Household cleaning products		Minimum: GB	GA
Resistance to Staining	ISO 10545-14	Minimum: 3	4
(*) – For more information, please contact Gres Panaria Portugal, S.A.			

The ceramic tile is subjected to a series of tests to determine the main technical characteristics of the product under the applicable standards.

Description of the product's application/use:

Glazed Porcelain is intended for use in floor (pavement) and wall (cladding) coverings. It is to be installed in both interior and exterior areas for residential, non-residential, and commercial use.
Glazed Porcelain tiles for the following applications:

- Floor cladding
- Wall cladding
- Interior covering
- Exterior covering
- Residential areas and buildings
- Public areas and buildings
- Industrial areas and buildings

Example:
FORM and SLATE: Recommended for residential flooring, medium-traffic commercial spaces, and exterior spaces that do not require slip-resistant features.
KECH: Recommended for interior and exterior coverings.

Placing on the market / Rules of application in the market / Technical rules of the product:	• EN 14411:2016 - Ceramic tiles - Definition, classification, characteristics, assessment and verification of constancy of performance and marking • ISO 13006:2018 – Ceramic tiles — Definitions, classification, characteristics and marking • EN ISO 10545 – Ceramic wall and floor (several parts) • DIN 51130:2014 - Slip resistance test for flooring • DIN 51097:2016 - Ramp testing
Quality control	According to the product's technical standards, CERTIF and NF-UPEC.
Special delivery conditions:	Not applicable.
Components and substances to declare:	The product contains no substance from the REACH candidate list of substances of very high concern at a concentration greater than 0.1% by weight. Table 2 - Main components of the product and/or materials.
Where explanatory material may be obtained:	https://gresart.com/pt
History of the LCA studies:	Not applicable.

Raw material	Percentage (mass)
Clay	52 %
Feldspar	44 %
Others	4 %
Packaging	
Wood	68 %
Plastic	3 %
Paper	27 %
Others	2 %

1.9. Calculation rules of the LCA

Functional unit:	1 m^2 of glazed porcelain for wall and floor covering (average product) with a reference service life of 50 years.
Declared unit:	-
System boundaries:	EPD from cradle to grave with module D (A, B, C and D modules)
Criteria for the exclusion:	According to paragraph 6.3.5 of EN 15804, the exclusion criterion for unit processes is 1% of the total energy consumed and 1% of the total mass of inputs, with particular attention to ensuring that no more than 5% of the energy and mass flows are excluded at the product stage. The following processes were not considered in this study: • Environmental impacts associated with the construction of industrial infrastructure and the manufacturing of machinery and equipment;

Name	Value	Unit of measurement
Declared unit of measurement	1	m^2
Weight (weighted average in the reference year)	18,5	Kg/m^2
Conversion factor	0,054	-

	• Environmental impacts related to infrastructure (production and maintenance of vehicles and roads) for the transportation of pre-products; • Long-term emissions. All known input and output flows have been considered.
Assumption and limitations:	For processes over which the producers have no influence or specific information, such as raw material extraction, generic data from the Ecoinvent v3.9.1 databases were used. The dataset used to model electricity and natural gas production was adapted to the national reality. The electricity mix was updated for the year 2022 using information from Redes Energéticas Nacionais (REN), the Entidade Reguladora dos Serviços Energéticos (ERSE), and Direção-Geral de Energia e Geologia (DGEG) to obtain more up-to-date results regarding the environmental impacts generated by the electricity grid in Portugal. The natural gas process was modelled for 2022 based on information provided by the DGEG's Energy in Portugal report, regarding the countries from which it is imported. The environmental impacts indicated in this EPD are a weighted average of all ceramic tiles manufactured in 2022, based on the industrial production of the Oliveira do Bairro facility. Modules A5 to C4 are scenarios based on average data, included in the EPD prepared by the European Ceramic Tile Manufacturers Federation / CET PCR 2014 / and later implemented in EN 17160 – Product category rules for ceramic tiles.
Quality and other characteristics about the information used in the LCA:	The production data collected correspond to the year 2022 and are in accordance with reality. The generic data used belong to the Ecoinvent v3.9.1 database and comply with the quality criteria (age, geographic and technological coverage, plausibility, etc.) for generic data. The information based on the LCA and additional information declared in this report complies with the applicable European and Portuguese Standards requirements. According to the criteria defined in Table E.1 of Annex E of the EN 15804+A2+AC standard, as outlined by the "UN Environment Global Guidance on LCA database development," the quality of all relevant data is considered to be from "good" to "very good" on a five-level qualitative scale, ranging from very poor to very good. The data quality for module D is also good (dominant) to very good, except for the geographic representativeness of some processes, which was considered good and reasonable.
Allocation rules:	Energy and material consumption were allocated to the product in question based on the mass of ceramic tiles produced annually. No other allocation was applied in the modules following the production stage. Some ceramic waste is recycled internally. Energy recovery, packaging materials, and end-of-life product materials were considered.
Software used for the assessment:	SimaPro, version 9.5
Background database used for the LCA:	Ecoinvent database version 3.9.1, published in March 2023; "cut-off" approach.
Comparability of EPD for construction products:	The EPD of construction products and services cannot be comparable if they are not produced according to EN 15804 and EN 15948 and according to the comparability conditions determined by ISO 14025. For each ceramic product of Gres Panaria (Gresart industrial unit), the environmental impacts can be determined by multiplying the results of this study by conversion factors (see item 1.10).

1.10. Use of the average environmental performance

This EPD presents the average environmental performance of the entire product range produced by Gresart, with the same raw material recipe.

The variability of environmental performance between specific products depends on the specific weight, which ranges from 15.3 kg/m^2 to 20.1 kg/m^2. To obtain the performance of a specific product different from the one presented with a weight of 18.5 kg/m^2, the impacts should be multiplied by the specific weight of that material and divided by the specific weight of 18.5 kg/m^2.

Nominal Size	Thickness	Weight (kg/m^2)	Conversion Factor
33,3x33,3	7.3 mm	15.315	0.828
60x60	8.0 mm	17.014	0.920
22,5x90	8.0 mm	17.606	0.952
22,5x90 (VABENE)	8.0 mm	17.606	0.952
30x60	8.0 mm	16.667	0.901
30x60 (Roriz)	8.0 mm	16.667	0.901
33x47	9.5 mm	19.266	1.041
60x60	8.0 mm	17.014	0.920
30x60	8.0 mm	16.667	0.901
10x10	8.0 mm	16.949	0.916
6.5x30	8.0 mm	17.647	0.954
90x90	9.0 mm	19.753	1.068
60x120	9.0 mm	20.139	1.089
20x120	9.0 mm	18.452	0.997
15x75	9.0 mm	19.027	1.028
90x90	9.0 mm	19.753	1.068

On average, the performance varies by approximately 12% from the average.

1.11. Technical information for Reference Service Life (RSL)

It depends on the reference service life of a building and its components; therefore, the standard value of 50 years will be considered.

Parameter	Results*
Reference Service Life	50 years
Declared product properties (at the gate) and finishes, etc.	See table 1
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	The product characteristics are under EN 14411.
An assumed quality of work, when installed in accordance with the manufacturer's instructions	See images – pictures of the product
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Applicable
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	Applicable
Usage conditions, e.g. frequency of use, mechanical exposure	Not applicable
Maintenance e.g. required frequency, type and quality and replacement of components	Periodic cleaning with non-abrasive products. Cleaning floor tiles, once a week.
** expressed by functional unit	

1.12. Flow diagram of input and output of the process

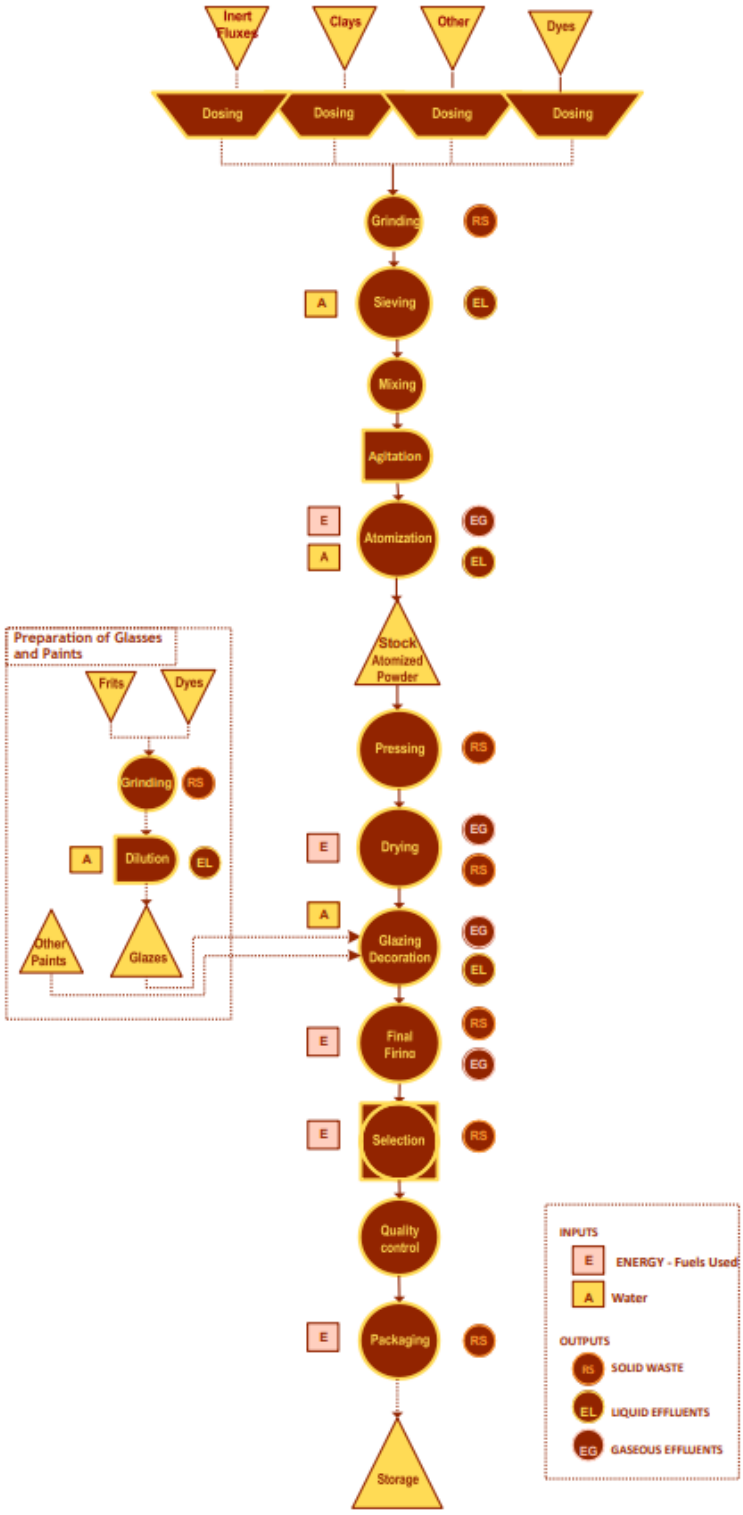

Figure 1 - Flowchart of the product's life cycle activities and unit processes

2. CORE ENVIRONMENTAL IMPACT INDICATORS

2.1. Description of the system boundaries

(✓= included; ND = module not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Rehabilitation	Operational energy use	Operational water use	Deconstruction and demolition	Transport	Waste process	Disposal	Reuse, recovery, potential recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Production stage, A1 - A3:

This stage includes modules A1 (Extraction and processing of raw materials), A2 (Transport), and A3 (Manufacturing).

Regarding transport (module A2), the raw materials and auxiliary materials arrive at the facility by road, in trucks.

Regarding stage A3 (Manufacturing), the manufacturing process of the wall and floor ceramic covering products made at Gresart consists of the following homogeneous sections:

- Paste preparation
- Atomization
- Pressing and drying
- Glazing
- Firing
- Sorting and packaging

Paste preparation

The raw materials are sourced from external suppliers. The primary raw materials are stored, in their entirety, within the facility, in predefined and identified locations.

The paste preparation begins with the mechanical breaking of the clay materials, followed by silos based on the technical characteristics of each raw material.

Following the technical data provided by the Production Department and using an electronic scale (which controls the quantities of various clays and provides consumption records), the raw materials are gathered in batches in well-defined proportions and transported from the silos to the mills for grinding and dilution of the mixtures.

After grinding, which takes approximately 9 hours on average, the resulting paste, known as slurry, passes through a mesh sieve and is deposited in homogenization tanks, equipped with agitators to keep the slurry in suspension.

Atomization

Subsequently, the slurry is transferred by pumping to an intermediate tank, which then supplies the atomizer, thus initiating the atomization process. This process produces the powder with the characteristics required for the next operation. The atomizer operates with a hot air generator powered by natural gas. The powder produced from this operation is siloed and left to rest, after which conveyors transport it to the following operations.

The gaseous effluents this equipment generates are directed to a treatment system (bag filter) and then emitted into the atmosphere through an appropriate chimney.

Pressing and Drying

The production process continuously integrates pressing, drying, and glazing operations. Traditional hydraulic units are used in pressing operations, while drying is carried out in four vertical and two horizontal dryers, which use natural gas as fuel. The maximum temperatures are around 220°C. During this operation, the various shapes of the produced patterns are formed. Each of the dryers is equipped with a chimney through which the gaseous effluents generated are emitted into the atmosphere.

Glazing

The glazing lines, located immediately after the dryers, are fed by conveyor belts, bringing the various patterns that make up the company's product range to life in this operation. Depending on the characteristics of the final product, the number and type of auxiliary equipment activated along the line vary, as well as the type of applications used for the surface finish. These applications are prepared in advance in the Glass and Paint Section. The glazed products are stored on trolley shelves and transported to the furnace entrances through a programmable automatic movement system (AGVs).

Firing

The thermal firing process is carried out in two roller kilns (one with a length of 94 meters at temperatures around 1180°C; the other with a length of 140.7 meters and a maximum temperature of about 1200°C), both fueled by natural gas. The gaseous effluents generated in these kilns are directed to a treatment system to reduce acid compounds, particularly fluorinated ones. These are two dry treatment systems (one for each kiln), consisting of injecting lime into the gas stream to be treated and its subsequent removal through a bag filter.

Selection and Packaging

There are two quality control processes in the selection:

One is a visual process involving human intervention, which consists of analyzing surface defects and where products are defined and classified by type of selection.

The other process is automatic and involves the analysis of the thickness and flatness of each piece. After optical reading of the selection indications, the pieces are automatically separated and packaged by selection and batches, then placed onto the respective pallets. After preparation, these are sent to the finished goods warehouse.

Construction Stage; A4 – A5

The A4 module includes the transportation from the production site to the consumer or to the installation location of the glazed porcelain products, according to EN 17160:2019. Three scenarios were considered:

• A4(1) – 300 km by road, by truck;

• A4(2) – 1390 km by road, by truck;

• A4(3) – 6520 km by sea, by ship.

The A5 phase corresponds to the construction and installation in the building. In this scenario, no energy is consumed during installation since only hand work is required. The A5 module considers all stages of tile installation (such as mortar consumption) and packaging waste processing (recycling, incineration, disposal). The scenario considers 3.3 kg of cement mortar per m^2 of ceramic tile, and 3% waste loss is assumed at the installation site of the product.

Destination	Type of transport	Average distance (km)
National	Truck with a capacity of 25 tons	300
Europe	Truck with a capacity of 25 tons	1390
International (Outside Europe)	Transoceanic cargo ship	6 520

Usage Stage; B1 – B7

Module B1 considers the use of the installed product. During the use of ceramic tiles, releases (emissions) of substances into the interior environment are not expected. Therefore, the environmental impacts generated during the use stage can be ignored, in accordance with the EN 17160:2019 standard relating to Product category rules for ceramic tiles.

B2 – Based on their design characteristics and components, ceramic products have a service life of 50 years. Throughout their reference service life, the ceramic product must be cleaned regularly, with varying intensity depending on the type of building: residential, commercial, sanitary, etc., where it is installed. If the surface is dirty or oily, cleaning products, such as detergents, can be used. Therefore, water and detergent consumption can be considered.

According to EN 17160:2019 on Product Category Rules for ceramic tiles, we have the "Maintenance Scenario for ceramic tiles.".

Modules B3-B4-B5 are related to tiles replacement, repair, and rehabilitation. If the tiles are correctly installed, no repair, replacement, or rehabilitation process will be necessary. For this reason, modules B3-B4-B5 are not considered.

Modules B6-B7 consider using energy and water to operate technical systems integrated into buildings (heating, cooling, ventilation, lighting, hot water systems, etc.). Operational use of energy or water is not considered.

End-of-life stage; C1 – C4

The end-of-life stage consists of the following modules: Deconstruction/demolition (C1); transportation of waste to the processing site and end-of-life (C2); waste treatment for reuse, recovery, and/or recycling (C3) and disposal (C4).

It was considered that 70% of the glazed porcelain would be recycled (C3) and 30% sent to landfill (C4). The end-of-life stage is the final phase in the life cycle of a material. Still, it, can become the first phase if, after demolition, the waste is recycled and reused;, that is, the recovery of the material is considered at the end of its useful life.

Recycling/Reuse/Recovery Potential; Module D

Module D includes the benefits or burdens to the environment generated by reusable products, recyclable materials and/or energy carriers leaving a product system.

It was assumed that 70% of the waste is reused at the end of its useful life (a conservative value), according to EN17160:2019 and based on statistical data on CDW (construction and demolition waste) from the APA (Portuguese Environment Agency).

2.1.1. **Justification for the exemption to declare modules C and** D

Not applicable.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

2.2. Core environmental impact indicators

		Global warming potential - total;	Global warming potential fossil;	Global warming potential - biogenic;	Global warming potential land use and land use change;	Depletion potential of the stratospheric ozone layer;	Acidification potential;
		GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP
Unit		kg CO2 eq.	kg CO2 eq.	kg CO2 eq.	kg CO2 eq.	kg CFC 11 eq.	mol H+ eq.
Modules A1-A3		1.06E+01	1.14E+01	-8.00E-01	1.38E-02	4.63E-07	2.58E-02
Module A4	Scenario A4.1	1.04E-03	8.29E-01	2.50E-04	1.62E-05	1.79E-08	1,04E-03
	Scenario A4.2	4.83E-03	3.84E+00	1.16E-03	7.52E-05	8.30E-08	4,83E-03
	Scenario A4.3	3.61E-02	1.15E+00	1.76E-04	3.84E-05	1.72E-08	3,61E-02
Module A5		2.64E-03	9.93E-01	5.27E-01	5.37E-04	1.63E-08	2.64E-03
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		4.07E-03	5.37E-01	5.14E-03	3.72E-04	4.08E-08	4.07E-03
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		6.95E-05	5.52E-02	1.67E-05	1.08E-06	1.19E-09	6.95E-05
Module B5		8.01E-04	9.96E-02	8.03E-04	4.97E-05	1.65E-09	8.01E-04
Module B6		4.64E-04	5.92E-02	5.75E-05	1.20E-05	1.03E-09	4.64E-04
Module B7		-1.87E-04	-2.35E-02	-1.35E-03	-6.09E-06	-3.99E-10	-1.87E-04
Module C1		1.06E+01	1.14E+01	-8.00E-01	1.38E-02	4.63E-07	2.58E-02
Module C2		4.83E-03	3.84E+00	1.16E-03	7.52E-05	8.30E-08	4.83E-03
Module C3		2.64E-03	9.93E-01	5.27E-01	5.37E-04	1.63E-08	2.64E-03
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		4.07E-03	5.37E-01	5.14E-03	3.72E-04	4.08E-08	4.07E-03

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES: P.C.I. – Net calorific value. Units expressed by functional unit (1m²).

		Eutrophication potential aquatic freshwater;	Eutrophication potential aquatic marine;	Eutrophication potential terrestrial;	Formation potential of tropospheric ozone;	Abiotic depletion potential for non-fossil resources;	Abiotic depletion potential for fossil resources potential;	Water (user) deprivation potential;
		EP-freshwater	EP-marine	EP-terrestrial	POCP	ADP-minerals&metals	ADP-fossil	WDP
Unit		kg P eq.	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m^3 eq. of globally unavailable water
Modules A1-A3		8.06E-05	5.99E-03	5.18E-02	2.53E-02	5.94E-05	1.57E+02	-4.96E+00
Module A4	Scenario A4.1	6.51E-07	2.58E-04	2.52E-03	1.94E-03	2.85E-08	1.10E+01	1,01E-02
	Scenario A4.2	3.02E-06	1.20E-03	1.17E-02	8.99E-03	1.32E-07	5.11E+01	4,68E-02
	Scenario A4.3	8.26E-07	9.03E-03	1.00E-01	2.65E-02	1.24E-08	1.41E+01	1,23E-02
Module A5		1.20E-05	7.47E-04	7.16E-03	2.42E-03	1.81E-06	7.99E+00	-1.01E-02
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		1.67E-05	4.93E-04	5.40E-03	2.27E-03	2.66E-07	1.84E+01	1.11E+01
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		4.34E-08	1.72E-05	1.68E-04	1.29E-04	1.90E-09	7.35E-01	6.73E-04
Module B5		1.85E-06	3.44E-04	3.75E-03	1.11E-03	4.36E-09	1.48E+00	5.54E-03
Module B6		7.03E-08	2.15E-04	2.33E-03	6.97E-04	2.41E-09	7.84E-01	9.97E-04
Module B7		-1.95E-07	-8.31E-05	-9.09E-04	-2.76E-04	-9.83E-09	-4.56E-01	-6.94E-03
Module C1		8.06E-05	5.99E-03	5.18E-02	2.53E-02	5.94E-05	1.57E+02	-4.96E+00
Module C2		3.02E-06	1.20E-03	1.17E-02	8.99E-03	1.32E-07	5.11E+01	4.68E-02
Module C3		1.20E-05	7.47E-04	7.16E-03	2.42E-03	1.81E-06	7.99E+00	-1.01E-02
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		1.67E-05	4.93E-04	5.40E-03	2.27E-03	2.66E-07	1.84E+01	1.11E+01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES: P.C.I. – Net calorific value. Units expressed by functional unit ($1m^2$). "The results obtained for the indicators "Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)", "Abiotic depletion potential for fossil resources potential (ADP-fossil)" and "Water (user) deprivation potential (WDP)" should be used with caution since the uncertainties associated with them are high or there is little experience with the indicator."

2.3. Additional environmental impact indicators

		Potential incidence of disease due to PM emissions	Potential human exposure efficiency relative to U235	Potential comparative toxic unit for ecosystems	Potential comparative toxic unit for humans, cancer effects	Potential comparative toxic unit for humans, not cancer effects	Potential soil quality index
		PM	IRP	ETP-fw	HTP-c	HTP-nc	SQP
Unit		Disease incidence	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Modules A1-A3		1.59E-06	1.14E-01	5.87E+01	2.74E-09	5.56E-08	1.14E+02
Module A4	Scenario A4.1	4.99E-08	1.75E-03	4.89E+00	5.14E-11	5.70E-09	2,09E-02
	Scenario A4.2	2.31E-07	8.13E-03	2.27E+01	2.38E-10	2.64E-08	9,70E-02
	Scenario A4.3	2.74E-08	1.54E-03	6.78E+00	1.71E-10	2.79E-09	1,96E-02
Module A5		7.13E-08	2.03E-02	3.21E+00	2.59E-10	5.04E-09	7.89E+00
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		3.80E-08	1.41E-02	1.30E+00	8.65E-10	1.70E-08	8.31E-01
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		3.33E-09	1.17E-04	3.26E-01	3.43E-12	3.80E-10	1.40E-03
Module B5		1.33E-07	3.83E-03	5.44E-01	9.16E-12	3.31E-10	4.45E-01
Module B6		6.10E-08	1.53E-04	3.76E-01	5.78E-12	2.28E-10	2.77E-01
Module B7		-5.69E-09	-4.29E-03	-1.40E-01	-1.27E-11	-8.33E-11	-2.18E+00
Module C1		1.59E-06	1.14E-01	5.87E+01	2.74E-09	5.56E-08	1.14E+02
Module C2		2.31E-07	8.13E-03	2.27E+01	2.38E-10	2.64E-08	9.70E-02
Module C3		7.13E-08	2.03E-02	3.21E+00	2.59E-10	5.04E-09	7.89E+00
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		3.80E-08	1.41E-02	1.30E+00	8.65E-10	1.70E-08	8.31E-01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES: Units expressed by functional unit ($1m^2$). The impact indicator "POTENTIAL HUMAN EXPOSURE EFFICIENCY RELATIVE TO U235" focuses mainly on the possible impact of a low dose of ionising radiation on human health resulting from the nuclear fuel cycle. It does not consider effects arising from possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation from soil, radon, and some building materials.

The results of the indicators "POTENTIAL COMPARATIVE TOXIC UNIT FOR ECOSYSTEMS (ETP-FW)", "POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, CANCER EFFECTS", "POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, NOT CANCER EFFECTS" and "POTENTIAL SOIL QUALITY INDEX" should be used with caution as the uncertainties associated with them are high or there is little experience with the indicator.

2.4. Indicators describing resource use

		Primary energy					
		EPR	RR	TRR	EPNR	RNR	TRNR
Unit		MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.
Modules A1-A3		2.43E+01	3.15E-05	2.43E+01	1.72E+02	2.81E-02	1.72E+02
Module A4	Scenario A4.1	1.56E-02	0.00E+00	1.56E-02	1.13E+01	0.00E+00	1,13E+01
	Scenario A4.2	7.24E-02	0.00E+00	7.24E-02	5.22E+01	0.00E+00	5,22E+01
	Scenario A4.3	1.79E-02	0.00E+00	1.79E-02	1.45E+01	0.00E+00	1,45E+01
Module A5		1.49E+00	2.19E-01	1.71E+00	9.04E+00	0.00E+00	9.04E+00
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		4.37E-01	0.00E+00	4.37E-01	2.06E+01	0.00E+00	2.06E+01
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		1.04E-03	0.00E+00	1.04E-03	7.52E-01	0.00E+00	7.52E-01
Module B5		8.01E-02	0.00E+00	8.01E-02	1.56E+00	0.00E+00	1.56E+00
Module B6		1.43E-02	0.00E+00	1.43E-02	8.35E-01	0.00E+00	8.35E-01
Module B7		-1.85E-01	0.00E+00	-1.85E-01	-5.32E-01	0.00E+00	-5.32E-01
Module C1		2.43E+01	3.15E-05	2.43E+01	1.72E+02	2.81E-02	1.72E+02
Module C2		7.24E-02	0.00E+00	7.24E-02	5.22E+01	0.00E+00	5.22E+01
Module C3		1.49E+00	2.19E-01	1.71E+00	9.04E+00	0.00E+00	9.04E+00
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		4.37E-01	0.00E+00	4.37E-01	2.06E+01	0.00E+00	2.06E+01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

EPR = use of renewable primary energy excluding renewable primary energy resources used as raw materials; RR = use of renewable primary energy resources used as raw materials; TRR = total use of renewable primary energy resources (EPR + RR); EPNR = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; RNR = use of non-renewable primary energy resources used as raw materials; TRNR = total use of non-renewable primary energy resources (EPRN + RNR);

NOTA: Units expressed by functional unit ($1 m^2$).

		Secondary materials and fuels, and use of water			
		MS	CSR	CSNR	Net use of fresh water
Unit		kg	MJ, P.C.I.	MJ, P.C.I.	m^3
Modules A1-A3		6.05E-01	0.00E+00	0.00E+00	-8.27E-02
Module A4	Scenario A4.1	0.00E+00	0.00E+00	0.00E+00	2,95E-04
	Scenario A4.2	0.00E+00	0.00E+00	0.00E+00	7,39E-05
	Scenario A4.3	0.00E+00	0.00E+00	0.00E+00	3,30E-05
Module A5		0.00E+00	0.00E+00	0.00E+00	7.34E-04
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		0.00E+00	0.00E+00	0.00E+00	2.69E-01
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		0.00E+00	0.00E+00	0.00E+00	1.06E-06
Module B5		0.00E+00	0.00E+00	0.00E+00	3.65E-04
Module B6		0.00E+00	0.00E+00	0.00E+00	3.51E-05
Module B7		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module C1		6.05E-01	0.00E+00	0.00E+00	-8.27E-02
Module C2		0.00E+00	0.00E+00	0.00E+00	7.39E-05
Module C3		0.00E+00	0.00E+00	0.00E+00	7.34E-04
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		0.00E+00	0.00E+00	0.00E+00	2.69E-01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

MS = use of secondary material; CSR = use of renewable secondary fuels; CSNR = use of non-renewable secondary fuels.

NOTA: Units expressed by functional unit ($1m^2$).

2.5. Other environmental information describing different waste categories

		Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed
Unit		kg	kg	kg
Modules A1-A3		4.09E-04	1.78E+00	8.53E-05
Module A4	Scenario A4.1	2.81E-05	4.44E-04	7,70E-05
	Scenario A4.2	1.30E-04	2.06E-03	3,57E-04
	Scenario A4.3	8.05E-06	6.54E-04	9,88E-05
Module A5		1.65E-05	1.91E-01	2.43E-05
Module B1		0.00E+00	0.00E+00	0.00E+00
Module B2		9.78E-06	1.78E-02	1.54E-05
Module B3		0.00E+00	0.00E+00	0.00E+00
Module B4		1.88E-06	2.96E-05	5.13E-06
Module B5		2.81E-06	2.26E+00	1.05E-05
Module B6		1.99E-06	6.53E+00	5.53E-06
Module B7		-7.40E-07	-6.07E-04	-4.67E-06
Module C1		4.09E-04	1.78E+00	8.53E-05
Module C2		1.30E-04	2.06E-03	3.57E-04
Module C3		1.65E-05	1.91E-01	2.43E-05
Module C4		0.00E+00	0.00E+00	0.00E+00
Module D		9.78E-06	1.78E-02	1.54E-05

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTE: Units expressed by functional units ($1m^2$).

The characteristics that make the waste hazardous are described in the applicable legislation in force, such as the European Waste Framework Directive.

2.6. Environmental information describing output flows

		Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
Unit		kg	kg	kg	MJ
Modules A1-A3		0.00E+00	4.71E-01	1.86E-03	3.90E-01
Module A4	Scenario A4.1	0.00E+00	0.00E+00	0.00E+00	0,00E+00
	Scenario A4.2	0.00E+00	0.00E+00	0.00E+00	0,00E+00
	Scenario A4.3	0.00E+00	0.00E+00	0.00E+00	0,00E+00
Module A5		0.00E+00	6.07E-01	1.07E-01	1.88E+01
Module B1		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B2		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B3		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B4		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B5		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B6		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module B7		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module C1		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module C2		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module C3		0.00E+00	1.30E+01	0.00E+00	0.00E+00
Module C4		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module D		0.00E+00	0.00E+00	0.00E+00	0.00E+00

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTE: Units expressed by functional units (1 m^2). The characteristics that make the waste hazardous are described in the applicable legislation in force, such as the European Waste Framework Directive.

2.7. Information describing the biogenic carbon content at the factory gate

Biogenic carbon content*	Units**	Modules A1-A3 (results)
Biogenic carbon content in product	Kg C	-
Biogenic carbon content in accompanying packaging	Kg C	2,04E-01

* 1 kg biogenic carbon is equivalent to 44/12 kg of CO2.

** This information can be omitted whenever the content of biogenic carbon in the product, or in the respective packaging, is less than 5% of the mass of the product, or the respective packaging.

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

3.1. Module A4 Transport to the building site – Construction process stage

The scenarios for transportation in A4 to the construction site are following with EN 17160:2019 regarding the product category rules for ceramic tiles.

Destination	Type of transport	Average distance (km)
National	Truck with a capacity of 25 tons	300
Europe	Truck with a capacity of 25 tons	1390
International (Outside Europe)	Transoceanic cargo ship	6 520

3.2. Module A5 Installation of the product in the building – Construction process stage

The scenario of 3.3 kg of cement mortar per m^2 of ceramic coating was considered for the installation phase. The material loss for ceramic tiles was estimated at 3%.

The amount of mortar was estimated based on the EN 17160:2019 standard on product category rules for ceramic covering (PCR for ceramic covering).

3.3. Module B1 - Use stage

According to the specific PCR rules for ceramic tile products – EN 17160:2019, the environmental impacts generated during the use phase are very low and, therefore, can be disregarded. Ceramic tiles are robust and have a hard surface that is resistant to abrasion.

3.4. Module B2 - Maintenance

Ceramic products for floors and walls, should be cleaned regularly depending on the type of building: residential, commercial, or healthcare. Water consumption and cleaning agents were considered. The values declared at this stage refer to a 50-year period. The scenario for the maintenance of ceramic tiles for floor and wall covering was conservative and in accordance with EN 17160:2019.

The scenario used for the maintenance of ceramic flooring was for residential use. It considers, using 0.134 ml of detergent and 0.1 l of water to clean 1 m^2 of ceramic flooring once a week.

3.5. Module B3 - Repair

The repair (B3), replacement (B4), and rehabilitation (B5) stages are not necessary for ceramic tiles.

According to EN 17160:2019, ceramic tiles do not require repairs during the use phase; therefore, no impact should be declared during the repair phase.

3.6. Module B4 – Replacement

According to EN 17160:2019, ceramic tiles do not require replacement during the use phase; therefore, no impact should be declared during the replacement phase.

3.7. Module B5 - Refurbishment

According to EN 17160: 2019, ceramic tiles do not require repairs during the use phase, and therefore, no impact should be declared during the refurbishment phase.

3.8. Módulo B6 - Energy usage (operational)

According to EN 17160: 2019, this module is irrelevant for ceramic tiles.

3.9. Módulo B7 - Water usage (operational)

According to EN 17160: 2019, this module is irrelevant for ceramic tiles.

3.10. Módulo C1 Demolition – End-of-Life Stage

According to EN 17160: 2019, this module is irrelevant for ceramic tiles.

3.11. Módulo C2 Transportation – End-of-Life Stage

Demolition waste from ceramic coverings is transported from the construction site to a container or treatment station by truck (25 tons), and an average distance of 20 km is considered, according to EN 17160:2019 reference scenario.

3.12. C3 Waste processing for reuse, recovery, and recycling – End-of-Life Stage

Destination	Result	Unit of measurement
Recycling (C3)	70	%

3.13. C4 Waste disposal – End-of-Life Stage

Destination	Result	Unit of measurement
Landfill (C4)	30	%

3.14. Scenarios and technical information for module D

Module D includes recycling credits for ceramic materials and packaging, as well as energy credits from the thermal recovery of packaging. According to EN 17160:2019, after the demolition/deconstruction phase, ceramic tiles can be crushed and used in a variety of different applications:

• In aggregates, as a basis for road construction;

• Concrete aggregates;

• When the ceramic covering is crushed, it forms recycled ceramic aggregates that can be integrated as a partial substitute for natural aggregates in hot mix asphalt [8];

• Recycled ceramic aggregates can be used in landfill construction [8];

• Recycled ceramic aggregates can be used in the construction of base courses on secondary roads [8].

In this case, and according to the Portuguese Environment Agency (APA, 2020), in Portugal, the recovery rate of ceramic materials in construction and demolition waste is approximately 75%.

It was considered that 70% of the waste from glazed porcelain products is recovered at the end of life (conservative value), according to EN 17160:2019.

3.15. Additional environmental information regarding the release of hazardous substances into air, soil, and water during the use stage

The product is classified as A+ according to French regulations. Source: Self-declaration by Gresart.

These products do not contain dangerous substances listed in the candidate lists of the REACH Regulation above the threshold of 0.1% (declarative).

4. REFERENCES

✓ Instruções Gerais do Sistema DAPHabitat, Versão 3.0, june 2024 (em www.daphabitat.pt);

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✓ NP ISO 14025:2009 Rótulos e declarações ambientais – Declarações ambientais Tipo III – Princípios e procedimentos;

✓ EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products;

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✓ Almeida. M. (2019). Desempenho ambiental de produtos no sector cerâmico em Portugal. PhD thesis. University of Aveiro;

✓ Ecoinvent database v.3.9.1 (2024). (www.ecoinvent.org);

✓ EN 17160:2019 Product category rules for ceramic tiles;

✓ Product Category Rules (PCR) – floor coverings. DAPHabitat system. Version 1.2, June 2022. (at www.daphabitat.pt);

✓ Product Category Rules (PCR) – wall coverings. DAPHabitat system. Version 1.2, June 2022. (at www.daphabitat.pt).