



Declaration number: DAP 00X:202X

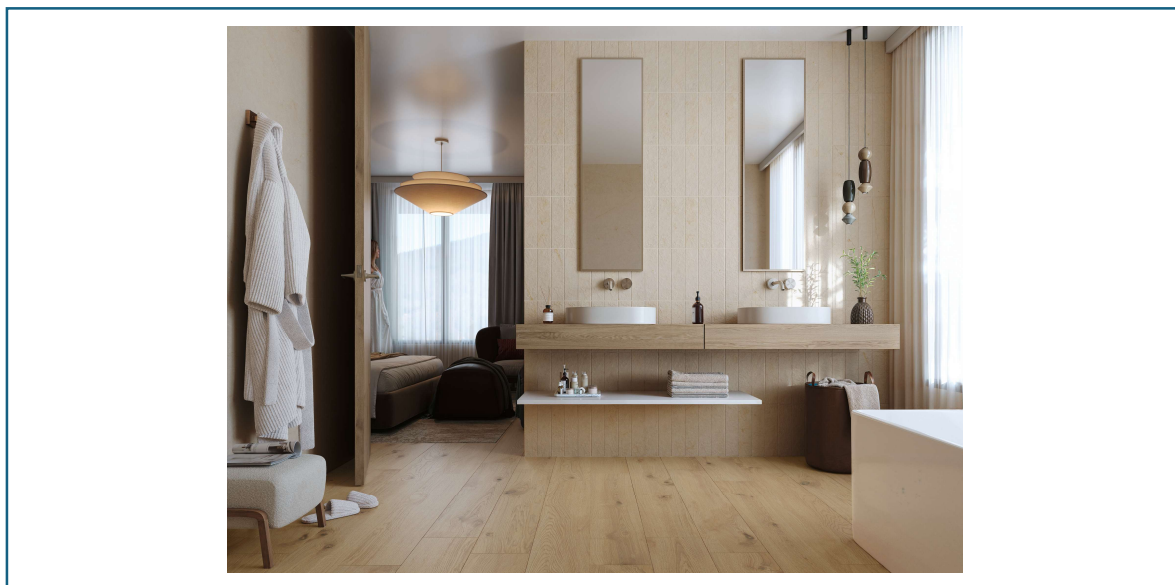


PORCELAIN TILES (Bla GROUP) 9.25-10.25mm

Issue date: xx/xx/202x

Valid until: xx/xx/202x

Recer-Indústria de Revestimentos Cerâmicos, S.A.



Version 1.7 Edition February 2026

Index

1.	GENERAL INFORMATION	4
1.1.	The DAPHabitat System.....	4
1.2.	EPD owner.....	4
1.3.	Information concerning the EPD	5
1.4.	Verification demonstration	6
1.5.	EPD registration.....	6
1.6.	PCR (Product Category Rules) basic model	6
1.7.	C-PCR (Complementary Product Category Rules)	7
1.8.	Information concerning the produc/product class.....	7
1.9.	Calculation rules of the LCA	10
1.10.	Use of the average environmental performance	11
1.11.	Technical information for Reference Service Life (RSL)	12
1.12.	Flow diagram of input and output of the process.....	13
2.	CORE ENVIRONMENTAL IMPACT INDICATORS	14
2.1.	Description of the system boundaries	14
2.1.1.	Justification for the exemption to declare modules C and D.....	Erro! Marcador não definido.
2.2.	Core environmental impact indicators	21
2.3.	Additional environmental impact indicators	23
2.4.	Indicators describing resource use	24
2.5.	Other environmental information describing different waste categories	26
2.6.	Environmental information describing output flows.....	27
2.7.	Information describing the biogenic carbon content at the factory gate	28
3.	SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION	28
3.1.	Module A4 Transport to the building site – Construction process stage	28
3.2.	Module A5 Installation of the product in the building – Construction process stage	29
3.3.	Module B1 - Use stage.....	30
3.4.	Module B2 - Maintenance	30
3.5.	Module B3 - Repair	30
3.6.	Module B4 – Replacement	30
3.7.	Module B5 - Refurbishment.....	31
3.8.	Module B6 - Energy usage (operational)	31
3.9.	Module B7 - Water usage (operational)	31
3.10.	Modulo C1 - Demolition – End-of-Life Stage.....	31
3.11.	Modulo C2 - Transportation – End-of-Life Stage	31

3.12.	Module C3 - Waste processing for reuse, recovery, and recycling – End-of-Life Stage	31
3.13.	Module C4 - Waste disposal – End-of-Life Stage	31
3.14.	Scenarios and technical information for module D	32
3.15.	Additional environmental information regarding the release of hazardous substances into air, soil, and water during the use stage.....	32
3.16.	Information on the use and adoption of Guarantees of Origin or other contractual instruments	Erro! Marcador não definido.
4.	REFERENCES	33

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:	R. Coronel Veiga Simão, Ed. CTCV Lufapo Hub 3025-307 Coimbra
Email address:	deptecnico@clusterhabitat.pt
Telephone number:	(+351) 234 401 576
Website:	www.daphabitat.pt
Logo:	

1.2. EPD owner

Name of the owner:	RECER-Indústria de Revestimentos Cerâmicos, S.A.
Production site:	Industrial Unit: ZI de Vila Verde, 3770-308 Oliveira do Bairro, Portugal
Address (head office):	Estrada de Vila Verde, 3770-305 Oliveira do Bairro, Portugal
Telephone number:	Recer: (T) +351 234 730 500
Email address:	recer@recer.pt
Website:	https://www.recer.pt/
Logo:	
Information concerning the applicable management Systems:	Certification of flooring products under the QB-UPEC mark by CSTB - Centre Scientifique et Technique du Bâtiment - France. NP EN ISO 9001:2015 standard awarded by the certification body SGS - International Certification Services NP EN ISO 14001:2015 standard awarded by the certification body SGS - International Certification Services
Specific aspects regarding production:	CAERev.3 n. °23312 – Manufacture of ceramic tiles, mosaics and slabs.
Organization's environmental policy:	Recer is aware of its responsibility in managing the impact of its activities, products, and services on Society.

It therefore establishes the commitment to the continuous improvement of the quality of its processes, products, and services, of its environmental performance, and of the safety of people, as a contribution to sustainable development.

To this end, it commits to:

Optimize resources (financial, technical, and human) in order to increase results and the sustainability of the business, as well as the appropriate protection of the environment and employees;

Meet the needs of customers and other relevant interested parties by providing products and services tailored to their expectations, in order to build relationships of trust;

Promote training and awareness among employees and others who work on behalf of the organization regarding their individual and collective obligations in safety, environmental protection, and the improvement of processes and products;

Comply with environmental, safety, and health compliance obligations and others applicable to its activities, products, and services, and establish prevention strategies;

Ensure the efficient use of resources, minimizing consumption and emissions of effluents and waste;

Meet the quality, environmental, and safety management requirements established in the corresponding standards (EN ISO 9001; EN ISO 14001; OHSAS 18001/NP 4397), ensuring the continuous improvement of the integrated management system and environmental performance.

1.3. Information concerning the EPD

Authors:	1. Centro Tecnológico da Cerâmica e do Vidro 2. Recer-Indústria de Revestimentos Cerâmicos, S.A.
Contact of the authors:	1. CTCV materials: habitat iParque Tecnológico de Coimbra – lote 6 3040-540 Antanhol – Portugal (T) + 351 239 499 200 Marisa almeida: marisa@ctcv.pt 2. Recer: Estr. Vila Verde, Apartado 20. 3771-953 Oliveira do Bairro, Portugal (T) +351 234 730 500. E-mail: geral@recer.pt
Issue date:	(To be filled in by the Verifying Body)
Registration date:	(To be filled in by the Program Operator)
Registration number:	(To be filled in by the Program Operator)
Valid until:	(To be filled in by the Verifying Body)
Representativity of the EPD (location, manufacturer, group of manufacturers):	EPD covers all glazed stoneware products of the Bla group, manufactured at Recer production unit 2 in Oliveira do Bairro, belonging to RECER-Indústria de Revestimentos Cerâmicos, S.A.
Type of EPD	EPD - from cradle to grave with module D
Geographical representation	Geographical area covered by this PAD's products

1.4. Verification demonstration

External independent verification, accordingly, with the standard ISO 14025:2010 and EN 15804:2012+A2:2019	
Certification Body This EPD was validated based on FDES registry number 20251047289, verified by the INIES (France) verification program on 10/12/2025	Verifier INIES Programme Verifier
(name)	(name)

1.5. EPD registration

Programme operator
(Associação 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:	Edição Junho 2024
Number of registrations on the database:	RCP-mb001
Version:	Versão 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
Identification and contact of the authors:	Marisa Almeida marisa@ctcv.pt Luís Arroja arroja@ua.pt José Silvestre jds@civil.ist.utl.pt Fausto Freire

	Cristina Rocha Ana Paula Duarte Ana Cláudia Dias Helena Gervásio Victor Ferreira Ricardo Mateus António Baio Dias
Composition of the Sectorial Panel:	-
Consultation period:	18/11/2015 - 18/01/2016 12/08/2023 – 30/11/2023
Valid until:	01/06/2027

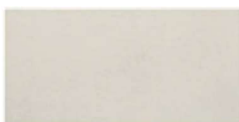
CEN standard EN 15804 serves as the core Product Category Rules (PCR).

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, in effect since 15-Abr-2019
Number of registrations on the database:	1. RCP001:2014 2. RCP002:2014 3. --
Version:	Version 1.7 (february 2026)
Identification and contact of the coordinator(s):	1. PCR: Floor covering • Marisa Almeida marisa@ctcv.pt • Luís Arroja arroja@ua.pt 2. PCR: Wall covering • Luís Arroja arroja@ua.pt • Marisa Almeida marisa@ctcv.pt
Identification and contact of the authors:	1. PCR: Floor covering • Marisa Almeida marisa@ctcv.pt • Luís Arroja arroja@ua.pt • Ana Cláudia Dias acdias@ua.pt 2. PCR: Wall covering • Marisa Almeida marisa@ctcv.pt • Luís Arroja arroja@ua.pt • Ana Cláudia Dias acdias@ua.pt
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:	(...)
Valid until:	(...)

1.8. Information concerning the product/product class

Identification of the product:	Dry-pressed porcelain ceramic tiles (stoneware) with a water absorption rate (Eb) of ≤ 0.5%.																																																									
Illustration of the product:	 Porcelain Tile, Grand Concrete series, 45x90R	 Porcelain Tile, Sphata Décor Nut series, 30x60	 Porcelain Tile, Trace Beige series, 60x60																																																							
	Examples of Porcelain Tile manufactured by Recer, S.A.																																																									
Brief description of the product:	Dry-Pressed ceramic tiles, with water absorption of < Eb 0.5%, for floors and/or wall tiles, interior and exterior coverings, both indoors and outdoors.																																																									
Main technical characteristics of the product:	Table 1 – Example of technical characteristics of porcelain ceramic tiles – EN 14411: Bla Group <table> <tr> <th>Technical Characteristics</th><th>Standard Test</th><th>Requirement</th><th>Value</th></tr> <tr> <td>WORK SIZE (mm)</td><td rowspan="9">ISO 10545-2</td><td>≤2% (Max.: ±5mm)</td><td>Complies</td></tr> <tr> <td>- Deviation from the Work Size (%)</td><td></td><td></td></tr> <tr> <td>- Deviation from Sample Average (%)</td><td>±0.6% (≤ ±2mm) [N≥15]</td><td>Complies</td></tr> <tr> <td>THICKNESS</td><td></td><td></td></tr> <tr> <td>- Deviation from the Work Size (%)</td><td>±5% (Max.: ±0.5mm) [N≥15]</td><td>Complies</td></tr> <tr> <td>STRAIGHTNESS</td><td></td><td></td></tr> <tr> <td>- Deviation from the Work Size (%)</td><td>±0.5% (≤±1.5mm) [N≥15]</td><td>Complies</td></tr> <tr> <td>SQUARENESS</td><td></td><td></td></tr> <tr> <td>- Deviation from the Work Size (%)</td><td>±0.5% (≤±2mm) [N≥15]</td><td>Complies</td></tr> <tr> <td>FLATNESS</td><td rowspan="2">ISO 10545-3</td><td></td><td></td></tr> <tr> <td>- Deviation from the diagonal or from the Work Size (%)</td><td>±0.5% (≤±2mm) [N≥15]</td><td>Complies</td></tr> <tr> <td>SURFACE QUALITY</td><td></td><td>95% Without defects</td><td>Complies</td></tr> <tr> <td>WATER ABSORPTION</td><td>ISO 10545-3</td><td>Eb ≤0,5 %</td><td>Complies</td></tr> <tr> <td>BENDING STRENGTH</td><td></td><td></td><td></td></tr> <tr> <td>- Breaking Strength (N)</td><td>ISO 10545-4</td><td>≥ 1300 (Thickness ≥ 7.5 mm)</td><td>Complies</td></tr> </table>			Technical Characteristics	Standard Test	Requirement	Value	WORK SIZE (mm)	ISO 10545-2	≤2% (Max.: ±5mm)	Complies	- Deviation from the Work Size (%)			- Deviation from Sample Average (%)	±0.6% (≤ ±2mm) [N≥15]	Complies	THICKNESS			- Deviation from the Work Size (%)	±5% (Max.: ±0.5mm) [N≥15]	Complies	STRAIGHTNESS			- Deviation from the Work Size (%)	±0.5% (≤±1.5mm) [N≥15]	Complies	SQUARENESS			- Deviation from the Work Size (%)	±0.5% (≤±2mm) [N≥15]	Complies	FLATNESS	ISO 10545-3			- Deviation from the diagonal or from the Work Size (%)	±0.5% (≤±2mm) [N≥15]	Complies	SURFACE QUALITY		95% Without defects	Complies	WATER ABSORPTION	ISO 10545-3	Eb ≤0,5 %	Complies	BENDING STRENGTH				- Breaking Strength (N)	ISO 10545-4	≥ 1300 (Thickness ≥ 7.5 mm)	Complies
Technical Characteristics	Standard Test	Requirement	Value																																																							
WORK SIZE (mm)	ISO 10545-2	≤2% (Max.: ±5mm)	Complies																																																							
- Deviation from the Work Size (%)																																																										
- Deviation from Sample Average (%)		±0.6% (≤ ±2mm) [N≥15]	Complies																																																							
THICKNESS																																																										
- Deviation from the Work Size (%)		±5% (Max.: ±0.5mm) [N≥15]	Complies																																																							
STRAIGHTNESS																																																										
- Deviation from the Work Size (%)		±0.5% (≤±1.5mm) [N≥15]	Complies																																																							
SQUARENESS																																																										
- Deviation from the Work Size (%)		±0.5% (≤±2mm) [N≥15]	Complies																																																							
FLATNESS	ISO 10545-3																																																									
- Deviation from the diagonal or from the Work Size (%)		±0.5% (≤±2mm) [N≥15]	Complies																																																							
SURFACE QUALITY		95% Without defects	Complies																																																							
WATER ABSORPTION	ISO 10545-3	Eb ≤0,5 %	Complies																																																							
BENDING STRENGTH																																																										
- Breaking Strength (N)	ISO 10545-4	≥ 1300 (Thickness ≥ 7.5 mm)	Complies																																																							

	- Rupture Module (N/mm ²)		≥ 30	Complies
	IMPACT RESISTANCE			
	Coefficient of Restitution	ISO 10545-5	≥ 0.55	Complies
	RESISTANCE TO DEEP ABRASION (mm ³)	ISO 10545-6	Not Applicable	~
	RESISTANCE SURFACE ABRASION (PEI)	ISO 10545-7	As per Manufacturer	5
	LINEAR THERMAL EXPANSION			
	- Coefficient of Linear Thermal Expansion (K ⁻¹)	ISO 10545-8	As per Manufacturer	< 9.0x10 ⁻⁶
	THERMAL SHOCK RESISTANCE	ISO 10545-9	Required	Complies
	MOISTURE EXPANSION	ISO 10545-10	As per Manufacturer	< 0.6mm/m
	CRAZING RESISTANCE	ISO 10545-11	Required	Complies
	FROST RESISTANCE	ISO 10545-12	Required	Complies
	CHEMICAL RESISTANCE			
	- Resistance to Cleaners and Pool Salt	ISO 10545-13	Min. B	A
	- Acid Resistance		As per Manufacturer	LA
	- Alkali Resistance		As per Manufacturer	LA
	STAINING RESISTANCE	ISO 10545-14	Min. Class 3	5
	ANTI-SLIP PROPERTIES	EN 16165		
	- Workrooms and Fields of Activities with Raise Slip Danger	B	As per Manufacturer, when applicable	"10° < α ≤ 19°
	[R10]"	A	As per Manufacturer, when applicable	"18° ≤ α < 24° [B]
	- Wet-Loaded Barefoot Areas	C	As per Manufacturer, when applicable	35 < PTV ≤ 45 [Classe 2]
Description of the product's application/use:	Porcelain Ceramic Tiles are designed for use on floors (pavements) and walls (cladding) and is suitable for installation in both interior and exterior areas for residential, non-residential, and commercial applications. This product is available in various finishes and formats, which should be considered when selecting a specific product for a given use. Porcelain Ceramic Tiles as suitable for the following applications : • Flooring • Wall cladding • Interior cladding • Exterior cladding • Residential spaces and buildings • Public spaces and buildings • Industrial spaces and buildings			
Packaging information:	Package	Bla group		
	Wood	255,6 g/m ²		
	Paper	237,3 g/m ²		
	Plastic	55,8 g/m ²		

Placing on the market / Rules of application in the market / Technical rules of the product:	EN 14411:2016 EN ISO 10545 EN 16165						
Quality control	According to the product's technical standards						
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 <table border="1"> <thead> <tr> <th>Raw material</th><th>Bla Group – (kg/m²)</th></tr> </thead> <tbody> <tr> <td>Atomized powder</td><td>20,22</td></tr> <tr> <td>Others</td><td>1,29</td></tr> </tbody> </table>	Raw material	Bla Group – (kg/m ²)	Atomized powder	20,22	Others	1,29
Raw material	Bla Group – (kg/m ²)						
Atomized powder	20,22						
Others	1,29						
Where explanatory material may be obtained:	https://www.recer.pt/downloads/						
History of the LCA studies:	Not applicable						

1.9. Calculation rules of the LCA

Functional unit:	To cover and decorate 1 m ² of floor and wall coverings indoors or outdoors for the reference lifespan of 50 years with porcelain ceramic tile (Bla group) with an average thickness of 9,37 mm (9,25 mm – 10,25 mm), in accordance with the installation terms.
System boundaries:	The type of Environmental Product Declaration conducted is “cradle to grave” with module D (A1-D)
Criteria for the exclusion:	The Life Cycle Assessment (LCA) carried out considered the production processes of wooden pallets, auxiliary inputs, and the energy used in the manufacture of porcelain ceramic tiles, for which inventory data is available. It should be noted that the processes not considered fall within the exclusion criteria defined by standard NP EN 15804:2012+A1:2015; the excluded data represent less than 1% of the total and 5% per module of the total mass and energy inputs. The principles of modularity and “polluter pays” were applied. The following processes were excluded: • environmental burdens associated with the construction and maintenance of infrastructures and equipment (capital goods); • long-term emissions.
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. 7 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 2023 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 modeled based on information provided by the DGEG's Energy in Portugal report (2023), 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 2023, based on the Recer industrial production.

Quality and other characteristics about the information used in the LCA:	The production data collected corresponds to the year 2023 and reflects the actual situation. The generic data used is sourced from the Ecoinvent v3.7 database and adheres to the quality criteria (age, geographical and technological coverage, plausibility, etc.) for generic data. The quality of data (primary and secondary) ranges from reasonable to very good for most processes, based on a five - level qualitative scale from very poor to very good, in accordance with the criteria of Annex E of EN 15804:2012+A2:2019.
Allocation rules:	At RECER's production unit, two types of products are manufactured: porcelain ceramic tiles (Bla) and white-body cladding (BIII). Therefore, a mass allocation was implemented based on tile production.
Software used for the assessment:	SigmaPro v9
Background database used for the LCA:	Ecoinvent 3.7
Comparability of EPD for construction products:	The EPD of construction products and services cannot be comparable in case they are not produced according to EN 15804 and EN 15948 and according to the comparability conditions determined by ISO 14025.

1.10. Use of the average environmental performance

In case a EPD is declared as having average environmental performance for a number of products, it should be included in the declaration to that effect, together with a description of the range/variability of the LCIA results, if significant, this means, higher than 10%). The thickness of the formats included within the scope of this EPD is on average 9,25 to 10,25 mm, with an average mass of 21,51 kg/m².

1.11. Technical information for Reference Service Life (RSL)

The reference service life is 50 years, in accordance with Annex H of standard NF EN 15804+A2/CN and the product standard EN 17160 (PCR for the category of ceramic covering products). The table below presents the description of the reference service life according to standard EN 15804:2012+A2:2019+AC/2021.

Parameter	Results
Reference service life	50 years
Declared product properties (at factory gate)	Minimum values for the relevant characteristics, in accordance with Annex L of standard EN 14411. For more information, please contact a company representative.
Theoretical application parameters (if imposed by the manufacturer), including references to applicable requirements and application codes	NF P 61 – 204 - 1 – DTU52.2
Assumed quality of work	See cover image. NF P 61 – 204 - 1 – DTU52.2
Outdoor environment (for outdoor applications), e.g. weather, pollutants, UV and wind exposure, building orientation, shading, temperature	NF P 61 – 204 - 1/3 – DTU52.2
Indoor environment (for indoor applications), e.g. temperature, humidity, exposure to chemicals	NF P 61 - 204 - 1/3 – DTU52.2
Maintenance scenario, e.g. required frequency, type and quality, and replacement of replaceable components	Regular cleaning with non-abrasive products Floor cleaning once a week
Conditions of use, e.g. frequency of use, mechanical exposure	Not applicable

Tabela 3 - Description of the reference service life duration

1.12. Flow diagram of input and output of the process

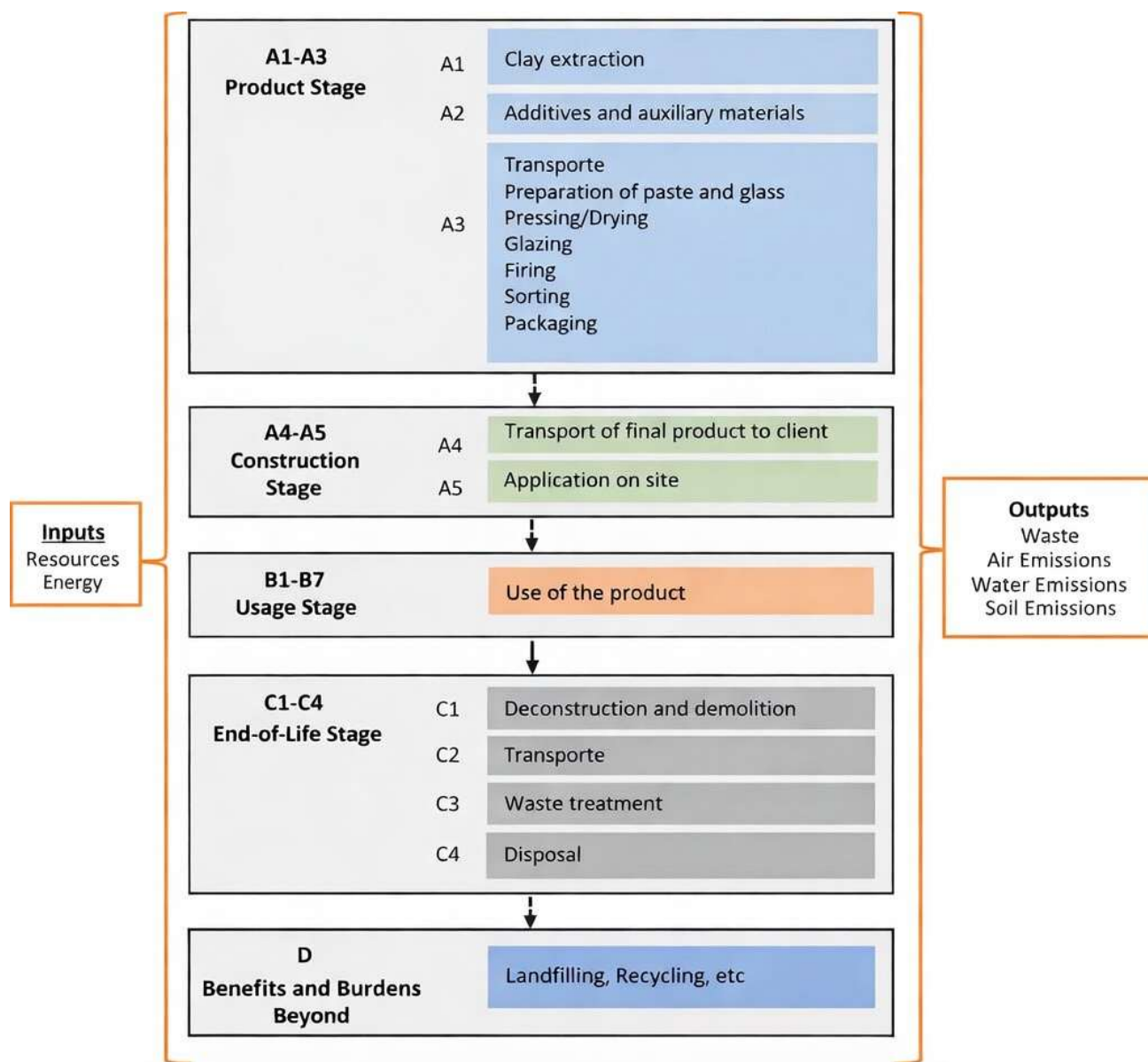


Figura 1 - Life cycle stages and unit processes of the product

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	Refurbishment	Operational energy use	Operational water use	Deconstruction and demolition	Transport	Waste processing	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:

In general, RECER's production process is composed of the following sections:

- Paste preparation
- Glaze preparation
- Pressing
- Glazing
- Firing
- Sorting and Packaging
- Finished products warehouse
- Maintenance
- Laboratory
- Finishing
- Rectification and cutting of pieces

Paste Preparation:

The raw materials are dosed and distributed separately into storage silos equipped with individual weighing systems, then directed to pre-loading hoppers that feed the mills and turbo-diluters.

The raw materials classified as “hard” (sands, feldspars, and a small percentage of clay) are wet-ground, while those classified as “plastic” (clays) are diluted in the turbo-diluters through rapid agitation.

After wet grinding and dilution, the resulting slurry or “casting slip” is discharged through sieves into underground tanks, where it is kept homogeneous by agitators. The “casting slip” is then pumped under high pressure to the atomizer, where it is atomized through fine nozzles in contact with a stream of hot air (around 600°C). The atomization process removes moisture from the “casting slip,” producing atomized powder, which is stored in high-capacity silos;

Glass preparation:

In this sector, glass and paints destined for glazing lines are prepared and ground;

Pressing and Drying:

In this stage, the parts are shaped in hydraulic presses, produced in different formats and surfaces. This is followed by continuous drying in vertical rapid dryers, in which moisture is removed to increase mechanical resistance and provide the parts with the appropriate temperature for the glazing process;

Glazing:

After drying, the tiles are conveyed to the glazing lines via conveyor belts, where the glass and various decorative motifs are applied;

Firing:

In this stage, the material is subjected to temperatures of around 1190°C in continuous roller ovens, undergoing complex physical and structural transformations, resulting in a resistant product with the desired physical and mechanical characteristics;

Selection/Packaging:

This operation consists of selecting the material according to quality criteria, batch, gauge, and flatness, followed by packaging and palletizing, always in an automated process.

Strapping and plastic wrapping are performed on an automated line, this being the last step before entering the finished goods warehouse. Selection is intended for selecting the material according to quality requirements.

Cutting and rectification:

To obtain a wide range of dimensions, there are two automatic cutting lines.

Cutting is carried out on machines with water-cooled discs, followed by a drying line with fans, and subsequently by manual selection and packaging.

Rectification of the parts consists of grinding them with water-cooled abrasive elements in order to achieve very precise dimensions.

After that, they are again continuously dried in a vertical rapid dryer, where moisture is removed;

Finishing:

In this section, the final finishing of the skirting boards resulting from cutting and straightening is carried out, as well as special pieces such as internal and external corners, thus obtaining pieces of greater commercial value.

There is a spray booth for the skirting boards and another for the complementary pieces, where the paint is applied cold and left to dry at room temperature.

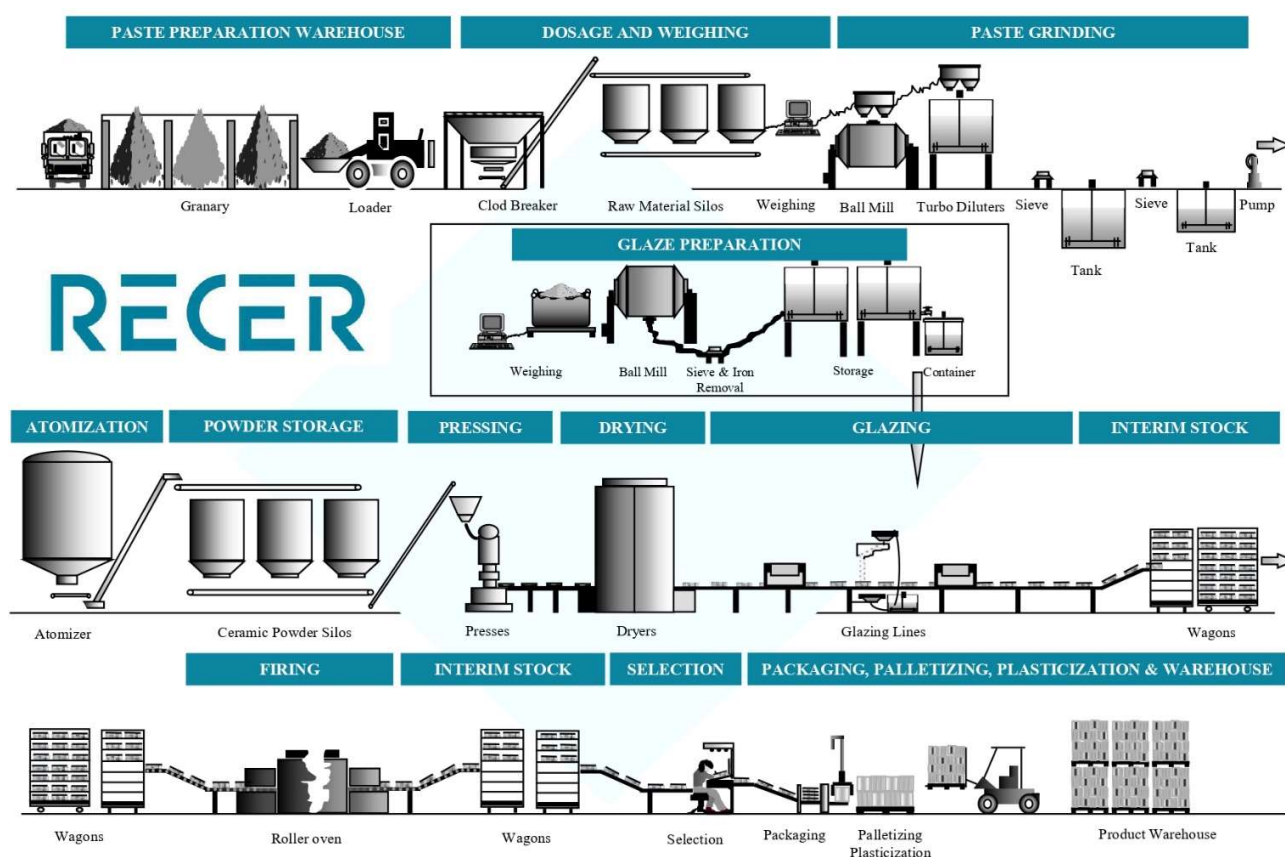


Figure 1 - Production process

Thus, the production process of the evaluated product involves several stages that imply the consumption of electricity, thermal energy and diesel, as well as the production of waste and emissions into the atmosphere.

For the modeling of the data relating to electricity consumption, the residual mix of 2023 was used, as indicated in the following table:

Origin	Contribution [%]
Renewable	70,7
Wind	29,3
Water	26,7
Solar	8,1
Biomass	6,6
Renewable Cogeneration	2,6
Other renewable sources	3,9
Non-renewable	22,7
Natural Gas	22,3
Cogeneration	4,4
Combined cycle	18,0
Other thermal production	0,4
Cogeneration	0,1
Others	0,4
Pumping / Turbo-diluters	6,5
Total Production	100

Table 1 – Energy composition of electricity produced in Portugal in 2023 (font: REN).

The climate impact of electricity production: 0.361 kg CO₂ eq. /kWh.

Construction Fase, A4-A5

The construction phase begins with the transport of the products to the construction site (A4).

For transport to the construction site (module A4), the following was considered:

- Average transport distance by truck: 1497 km

Module A5 corresponds to the construction and installation phase of the product in the building.

Table 2 - A4 - Transport to the construction site

Scenario information	Units (expressed by functional unit)
Fuel type and vehicle consumption, or type of vehicle used for transport, for example, long-distance truck, boat, etc.	Vehicle type: truck with a payload of 25 t, EURO 6 class Liters of fuel per distance or vehicle type, Commission Directive 2007/37/EC (European Emissions Standard)
Distance	Truck: 1497 km

Capacity utilization (including empty return)	< 100%
Apparent density of transported products	270 kg/m ³
Volume capacity utilization coefficient	Coefficient: = 1

Table 3 - A5 Installation in the building

Scenario information	Units (expressed by functional unit)	
Auxiliary inputs for installation (specified by material)	3.3 kg of adhesive mortar for laying ceramic flooring – Group Bla	
Water use	0,8 dm ³	
Use of other resources	Not applicable	
Quantitative description of the type of energy (regional mix) and consumption during the installation process.	-	
Waste generated at the construction site before treatment of waste generated by product installation (specified by type)		Bla
	Waste rate	3%
	Ceramic waste	645,3 g
	Card	237,3g
	PE film	55,8 g
	Pallets	255,6 g
Materials (specified by type) produced by processing waste at the construction site, for example, collection for recycling, energy recovery, disposal (specified by method).		Bla
	Recycled ceramic waste	451,7 g
	Ceramic waste for landfill	193,6 g
	Incinerated card	19,7 g
	Recycled card	200,8 g
	Landfill card	16,9 g
	Incinerated PE film	17,6 g
	Recycled PE film	20,8 g
	Landfill PE film	17,5 g
	incinerated wood	76,7 g
	Recycled wood	92,3 g
	Landfill wood	86,6 g
Direct emissions to ambient air, soil and water.	-	

Usage Stage, B1–B7

B1 – The environmental impacts generated during the usage phase are very low and can be considered negligible, as indicated in the EN 17160:2019 standard, which defines the product category rules (PCR) for ceramic tiles.

B2 – During their service life, ceramic products require regular cleaning, the frequency of which depends on the type of use and the environment where they are installed. In case of soiling, appropriate cleaning agents should be used, such as neutral detergents. Thus, representative water and detergent consumption is considered, as shown below.

Modules B3, B4, B5, B6 and B7 are not relevant, according to the EN 17160:2019 standard (PCR for ceramic tiles).

Table 4 - Maintenance (B2)

Scenario information	Units (expressed by functional unit)
Maintenance (B2) (if applicable)	
Maintenance process	Cleaning 52 times a year (residential use)
Maintenance cycle	Ceramic floor and wall coverings should be cleaned regularly, depending on the type of building: residential, commercial, or hospital. 2600 per RSL or 52 per year.
Auxiliary inputs for maintenance (e.g., cleaning product, specify materials)	0.134 ml of detergent and 0.1 L of water per m ² of ceramic tile (group BIa), once a week.
Waste produced during maintenance (specify materials)	Not applicable
Net consumption of fresh water during maintenance	2,60E-01 m ³ per RSL
Energy input during maintenance (e.g., vacuuming), type of energy, e.g., electricity, and quantity, if applicable and relevant.	Not applicable

End-of-Life Stage. C1–C4

The end-of-life phase of the product consists of the following modules:

C1 – Deconstruction/Demolition - This phase includes the dismantling or demolition of ceramic coverings, as well as the initial sorting of materials at the construction site.

C2 – Waste Transportation - The waste resulting from the demolition is transported from the point of generation to the treatment facilities or final destination.

C3 – Waste treatment for reuse, recovery and/or recycling - This stage includes the processes necessary to prepare waste after the end of the product's useful life, such as sorting, cleaning and other physical or mechanical treatments. The objective is to make the waste suitable for subsequent recycling or recovery.

Recycling is not included in this stage; it is considered outside the evaluation system (Module D), which takes into account the benefits and costs avoided resulting from the substitution of virgin materials.

C4 – Disposal - This stage considers the environmental impact associated with the disposal of waste that cannot be reused or recycled. Disposal is generally carried out by landfilling, controlled incineration or other appropriate treatment methods.

Table 5 - End-of-life

Process	Units (expressed by functional unit of components, products or materials specified by material type)
Collection process specified by type	Collection with mixed construction waste: 21,51 kg (100%) of product + 3,3 kg of mortar
Recovery system specified by type	0 kg destined for reuse 17,37 kg destined for recycling (70%) 0 kg destined for energy recovery
Disposal specified by type	7,44 kg of product destined for disposal (landfill) (30%)
Assumptions for scenario development (e.g., transportation)	Transport distance: 50 km Transport by 25 t truck, EURO 6 class payload

Benefits and Costs, D

The impacts and benefits of this step have been included within the system limits and are therefore validated.

Valued materials/materials that fall outside the system's boundaries.	Recycling processes beyond the system boundary.	Materials/materials/energy saved	Associated quantities
Crushed ceramic tile aggregates	Not applicable. The necessary processes are accounted for in module C3 and even in transport	Lightweight natural aggregates	17,37 kg/unit

Packaging materials used for exclusive purposes are assessed as being inferior to the exclusion criteria used and the cutoff rule.

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 CO ₂ eq.	kg CO ₂ eq.	kg CO ₂ eq.	kg CO ₂ eq.	kg CFC 11 eq.	mol H ⁺ eq.
Modules A1-A3	1,46E+01	1,53E+01	-6,58E-01	2,51E-02	5,15E-07	6,25E-02
Module A4	4,81E+00	4,81E+00	1,45E-03	9,42E-05	1,04E-07	6,05E-03
Module A5	1,85E+00	1,17E+00	6,80E-01	8,79E-04	1,80E-08	3,78E-03
Module B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module B2	5,42E-01	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	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B6	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C2	1,61E-01	1,61E-01	4,85E-05	3,15E-06	3,47E-09	2,02E-04
Module C3	1,15E-01	1,14E-01	9,34E-04	5,77E-05	1,90E-09	9,17E-04
Module C4	6,74E-02	6,73E-02	6,58E-05	1,24E-05	1,18E-09	5,27E-04
Module D	-2,89E-02	-2,73E-02	-1,57E-03	-7,08E-06	-4,63E-10	-2,17E-04

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 or declared unit.

The life cycle stages (or scenarios) not considered in the study can be eliminated of the table, through the function "eliminate lines".

The values to be indicated in the table shall be presented with two significant figures or scientific notation. This numeric representation should be uniform for the same index.

	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	Unit	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m3 World eq. deprived
Modules A1-A3	2,85E-04	2,67E-02	1,08E-01	4,72E-02	5,64E-03	2,21E+02	9,58E+00
Module A4	3,78E-06	1,50E-03	1,46E-02	1,13E-02	1,65E-07	6,39E+01	5,85E-02
Module A5	1,82E-05	1,46E-03	9,00E-03	3,12E-03	1,69E-04	9,97E+00	4,31E-01
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	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00
Module B6	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00
Module C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C2	1,26E-07	5,01E-05	4,88E-04	3,76E-04	5,52E-09	2,14E+00	1,96E-03
Module C3	2,15E-06	3,93E-04	4,28E-03	1,27E-03	5,00E-09	1,70E+00	6,42E-03
Module C4	7,79E-08	2,44E-04	2,65E-03	7,92E-04	2,73E-09	8,91E-01	1,13E-03
Module D	-2,27E-07	-9,67E-05	-1,06E-03	-3,21E-04	-1,14E-08	-5,30E-01	-8,07E-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 or declared unit.

The life cycle stages (or scenarios) not considered in the study can be eliminated of the table, through the function “eliminate lines” .

The values to be indicated in the table shall be presented with two significant figures or scientific notation. This numeric representation should be uniform for the same index.

“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	7,82E-07	7,16E-01	1,43E+02	2,51E-08	3,87E-07	4,72E+02
Module A4	2,90E-07	1,02E-02	2,84E+01	2,98E-10	3,31E-08	1,22E-01
Module A5	4,68E-08	3,84E-02	6,15E+00	8,84E-10	1,54E-08	1,86E+01
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	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B6	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C2	9,67E-09	3,40E-04	9,48E-01	9,96E-12	1,10E-09	4,06E-03
Module C3	1,52E-07	4,45E-03	6,23E-01	1,06E-11	3,82E-10	5,18E-01
Module C4	6,94E-08	1,75E-04	4,26E-01	6,58E-12	2,60E-10	3,16E-01
Module D	-6,61E-09	-4,99E-03	-1,63E-01	-1,48E-11	-9,69E-11	-2,53E+00

LEGEND:

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

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.

NOTES:

Units expressed by functional unit or declared unit.

The life cycle stages (or scenarios) not considered in the study can be eliminated of the table, through the function “eliminate lines”.

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. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

2.4. Indicators describing resource use

	Primary energy					
	EPR	RR	TRR	EPRN	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	4,09E+01	4,14E-01	4,13E+01	2,21E+02	4,47E-03	2,21E+02
Module A4	9,06E-02	0,00E+00	9,06E-02	6,54E+01	0,00E+00	6,54E+01
Module A5	2,01E+00	2,19E-01	2,22E+00	1,06E+01	0,00E+00	1,06E+01
Module B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module B2	4,39E-01	0,00E+00	4,39E-01	1,97E+01	0,00E+00	1,97E+01
Module B3	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B5	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B7	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module C2	3,03E-03	0,00E+00	3,03E-03	2,18E+00	0,00E+00	2,18E+00
Module C3	9,31E-02	0,00E+00	9,31E-02	1,80E+00	0,00E+00	1,80E+00
Module C4	1,46E-02	0,00E+00	1,46E-02	9,47E-01	0,00E+00	9,47E-01
Module D	-2,15E-01	0,00E+00	-2,15E-01	-6,19E-01	0,00E+00	-6,19E-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); EPRN = 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);

NOTE: Units expressed by functional unit or declared unit.

	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	0,00E+00	0,00E+00	0,00E+00	2,31E-01
Module A4	0,00E+00	0,00E+00	0,00E+00	1,22E-03
Module A5	0,00E+00	0,00E+00	0,00E+00	1,03E-02
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	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	4,08E-05
Module C3	0,00E+00	0,00E+00	0,00E+00	4,38E-04
Module C4	0,00E+00	0,00E+00	0,00E+00	4,89E-05
Module D	0,00E+00	0,00E+00	0,00E+00	-5,22E-03

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.

NOTE: Units expressed by functional units or declared units.

The stages of the life cycle (or scenarios) not considered in the study can be eliminated of the table, through the function “eliminate lines”

The values to be indicated in the table shall be presented with two significant figures or scientific notation. This numeric representation should be uniform for the same index

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	2,11E-03	3,64E+00	9,98E-04
Module A4	1,63E-04	2,58E-03	4,47E-04
Module A5	6,77E-05	3,25E-01	5,17E-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	0,00E+00	0,00E+00	0,00E+00
Module B5	0,00E+00	0,00E+00	0,00E+00
Module B6	0,00E+00	0,00E+00	0,00E+00
Module B7	0,00E+00	0,00E+00	0,00E+00
Module C1	0,00E+00	0,00E+00	0,00E+00
Module C2	5,45E-06	8,61E-05	1,49E-05
Module C3	3,22E-06	2,62E+00	1,21E-05
Module C4	5,89E-06	7,44E+00	1,04E-07
Module D	-8,60E-07	-7,05E-04	-5,43E-06

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 or declared units.

The stages of the life cycle (or scenarios) not considered in the study can be eliminated of the table, through the function "eliminate lines"

The values to be indicated in the table should be presented with two significant figures or scientific notation. This numeric representation should be uniform for the same indicator.

2.6. Environmental information describing output flows

Unit	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy		
				Energy carrier 1	...	Energy carrier n
Unit	kg	kg	kg	MJ	MJ	MJ
Modules A1-A3	0,00E+00	7,40E-02	2,57E-02	6,02E+00	0,00E+00	0,00E+00
Module A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module A5	0,00E+00	7,56E-01	1,11E-01	2,40E+01	0,00E+00	0,00E+00
Module B1	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B3	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B5	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module B7	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
Module C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C3	0,00E+00	1,74E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C4	0,00E+00	0,00E+00	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	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 or declared units.

The stages of the life cycle (or scenarios) not considered in the study can be eliminated of the table, through the function "eliminate lines"

The values to be indicated in the table should be presented with two significant figures or scientific notation. This numeric representation should be uniform for the same indicator.

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	0
Biogenic carbon content in accompanying packaging	Kg C	5,81E-02 kg C
* 1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂ .		
** 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

Parameter	Results expressed per functional or declared unit
Scenario	The scenario is based on a distance of 1497 km.
Related scenario	Not Applicable
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.	Vehicle type: truck with a payload of 25 t, EURO 6 class Liters of fuel per distance or vehicle type, Commission Directive 2007/37/EC (European Emissions Standard)
Distance	1497 km
Capacity utilization (including empty returns)	< 100%
Bulk density of transported products	270 kg/m ³
Volume capacity utilization factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Coefficient: = 1
* Expressed per functional unit or per declared unit	
** Directive 2007/37/EC (European Emission Standard)	

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

Scenario Information	Units (expressed per functional unit)	
Auxiliary inputs for installation (specified by material)	3.3 kg of adhesive mortar for ceramic flooring installation – Group Blb	
Water use	0,8 dm ³	
Use of other resources	Not applicable	
Quantitative description of the type of energy (regional mix) and consumption during the installation process	-	
Waste generated at the construction site before treatment of waste from product installation (specified by type)		Bla
	Waste rate	3%
	Ceramic waste	645,3 g
	Card	237,3g
	PE film	55,8 g
	Pallets	255,6 g
Materials (specified by type) produced by waste processing at the construction site, for example, collection for recycling, energy recovery, disposal (specified by method)		Bla
	Recycled ceramic waste	451,7 g
	Ceramic waste for landfill	193,6 g
	Incinerated card	19,7 g
	Recycled card	200,8 g
	Landfill card	16,9 g
	Incinerated PE film	17,6 g
	Recycled PE film	20,8 g
	Landfill PE film	17,5 g
	incinerated wood	76,7 g
	Recycled wood	92,3 g
	Landfill wood	86,6 g
Direct emissions to ambient air, soil, and water	-	

3.3. Module B1 - Use stage

According to the specific PCR for the category of ceramic tiles - EN 17160, the environmental impacts generated during the use phase are very low and therefore can be disregarded. Ceramic tiles are robust and have a hard, abrasion-resistant surface.

No environmental impacts are expected during the use phase.

3.4. Module B2 - Maintenance

Parameter	Results expressed by functional or declared unit.
Scenario	N/A
Relative scenario	N/A
Maintenance process	Cleaning 52 times a year (residential use)
Maintenance cycle	Ceramic floor and wall coverings should be cleaned regularly, depending on the type of building: residential, commercial, or hospital. 2600 per RSL or 52 per year.
Auxiliary materials for maintenance, e.g. cleaning agent (specify materials)	0.134 ml of detergent and 0.1 L of water per m ² of ceramic tile (group B1b), once a week.
Waste materials resulting from maintenance (specify materials)	Not Applicable
Fresh water consumed during maintenance.	2,60E-01 m ³ per RSL
Energy input during maintenance, e.g., vacuum cleaning, type of energy carrier, e.g., electricity and quantity, if applicable and relevant.	N/A
Transportation	N/A
N/A – Not Applicable	

3.5. Module B3 - Repair

In general, the lifespan of ceramic tiles is equal to the lifespan of the building. Repair, replacement, and rehabilitation are not necessary for ceramic floors.

According to EN 17160, ceramic floors do not require repairs during the use phase and therefore no impact should be declared in the repair phase.

3.6. Module B4 – Replacement

In general, the lifespan of ceramic tiles is equal to the lifespan of the building. Repair, replacement, and rehabilitation are not necessary for ceramic floors

3.7. Module B5 - Refurbishment

This module is not relevant for ceramic coatings, according to EN 17160.

3.8. Module B6 - Energy usage (operational)

This module is not relevant for ceramic coatings, according to EN 17160.

3.9. Module B7 - Water usage (operational)

This module is not relevant for ceramic coatings, according to EN 17160.

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

This module is not relevant for ceramic coatings, according to EN 17160.

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

The demolition waste from ceramic tiles is transported from the construction site to a container or treatment plant by truck, and the average distance is considered to be 50km.

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

Destination	Result	Unit of measurement
Recycling (C3)	70	%

3.13. Module 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, and energy credits from thermal recovery from packaging.

According to EN 17160, after the demolition/deconstruction stage, ceramic tiles can be crushed and used in a variety of different applications:

- In aggregates, as a base for road construction;
- Concrete aggregates;
- When ceramic pavements are crushed, they form recycled ceramic aggregates that can be integrated as a partial substitute for natural aggregate in hot asphalt mix [8];
- Recycled ceramic aggregates can be used in the construction of sanitary landfills [8];
- Recycled ceramic aggregates can be used in the construction of secondary road base courses [8].

In this case, EN 17160 refers to a default value of 70%, 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%, so a more conservative value was assumed, aligned with the specific PCR for ceramics (EN 17160).

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+. Source: self-declaration by Recer, S.A. and Cerame-Unie guide.

4. REFERENCES

- ✓ Instruções Gerais do Sistema DAPHabitat, Versão 3.0, june 2024 (em www.daphabitat.pt);
- ✓ RCP – modelo base para produtos e serviços de construção. Sistema DAPHabitat. Versão 3.0, june 2024 (em www.daphabitat.pt);
- ✓ 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;
- ✓ EN 15942:2021 Sustainability of construction works – Environmental product declarations – Communication format business-to-business.