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AENOR

Environmental Product Declaration

UNE-EN ISO 14025: 2010
UNE-EN 15804:2012+A2:2020
EN 17160:2019

CIFRE CERÁMICA S.L.
Porcelain stoneware (Bla)

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cifrecerámica

The EPD holder is responsible for the content of the Declaration. The holder is responsible for keeping the records and documents supporting the content of the Declaration.

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

Standard UNE-EN 17160:2019 The European Standard EN 15804:2012+A2:2020 serve as the basis for the PCR
Independent verification of the declaration and data in accordance with EN ISO 14025:2010 ☐ Internal ☒External
Verification body AENOR The Certification Body is accredited by ENAC. 1/C-PR468

1. General Information

1.1. The organization

In Cifre Cerámica, our strength is in a wide range of products, in which constant innovation, technology and design are our main assets, in order to obtain a high-end, fresh and modern product, to provide a solution to the construction requirements of contemporary architecture.

With more than 40 years of experience, Cifre Cerámica is present in more than 100 countries.

To cover all this, we have a highly qualified team, whose main objective is to provide exclusive and personalized treatment to our clients.

1.2. Scope of the Declaration

This Environmental Product Declaration includes environmental information for a group of products manufactured at their supplier's plants in Vall d'Alba and Vilafamés (province of Castellón) in a geographical and technological environment of Spain 2021.

The results shown present the environmental performance of the average porcelain stoneware, weighted by production, as well as the environmental data of the tiles that present a minimum and maximum impact, thus limiting the results obtained in the LCA. The scope of this Environmental Product Declaration (EPD) is cradle to grave.

1.3. Life cycle and compliance

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010, 15804:2012+A2:2020 and UNE-EN 17160:2019 (Product category rules for ceramic tiles).

PRODUCT CATEGORY RULES INFORMATION	
Descriptive title	UNE EN 1760:2019. Product category rules for ceramic tiles
Registration code and version	UNE-EN 1760:2019
Date of isssue	2019
Conformity	UNE-EN 15804:2012 + A2:2020
Program Operator	AENOR

This Environmental Statement includes the following life cycle stages:

Limits of the system. Information modules considered

Product Stage	A1	Raw materials supply	X
	A2	Transport	X
	A3	Manufacturing	X
Construction	A4	Transport of the product	X
	A5	Installation and construction processes	X
Use	B1	Use	X
	B2	Maintenance	X
	B3	Repair	X
	B4	Replacement	X
	B5	Refurbishment	X
	B6	Use of energy in service	X
	B7	Use of water in service	X
End of Life	C1	Deconstruction	X
	C2	Transport	X
	C3	Waste management	X
	C4	Waste disposal	X
	D	Potential for reuse, recovery and recycling of materials	X

X = Module included in the LCA

This DAP may not be comparable with those developed in other Programs or according to different reference documents, particularly it may not be comparable with DAP not developed in accordance with the UNE-EN 15804+ A2 Standard.

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

The comparison of construction products must be made on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), that is, including the behavior of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 Standard.

2. The product

2.1. Product identification

The ceramic tiles commercialized by Cifre Cerámica included in this study belong to group BIa (porcelain stoneware), classification based on the UNE-EN 14411: 2016 standard (equivalent to ISO 13006: 2018), i.e. they have a water absorption of less than 0.5% and their forming is by pressing. Its common name is Porcelain Stoneware.

The porcelain stoneware tiles included in this study include 17 commercial formats, with enamel, with and without mechanical treatment, of thicknesses ranging from 8.5mm to 11.0 mm, with an average weight of 21.0 kg/m^2.

In the annexes, you can find the results of the formats included in the scope of this EPD that present the minimum and maximum environmental impact, corresponding to the formats: 30x60 SL of 18.6 kg/m^2 and 75x150 RC of 23.6kg/m^2 weight in cooked respectively.

The CPC code of the product is 37370.

2.2. Product composition

The composition declared by the manufacturer is as follows:

Product

Composition	Content
Support (clays, feldspars, sands, etc.)	97%
Decoration materials (feldspars, carbonates, zirconium, etc.)	3%

The substances contained in the product listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" do not exceed 0.1% by weight of the product.

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

Product technical features

Essentials features		ISO 10545	Results
Surface aspect Parts with no defects		2	100%
Dimension Characteristics	**Maximum deviation**	2	100%
	On the measure of manufacture		*0,02%, 0,1mm / 0,02%, 0,1mm*
	Measurement of straightness of sides		*-0,02%, -0,1mm / 0,02%, 0,1mm*
	Measurement of rectangularity		*-0,05%, -0,3mm / 0,05%, 0,3mm*
	Measurement of edge curvature		*-0,02%, -0,1mm / 0,12%, 0,7mm*
	Measurement of centre curvature		*-0,01%, -0,1mm / 0,05%, 0,4mm*
	Measurement of warpage		*-0,07%, -0,6mm / 0,07%, 0,6mm*
	Measurement of thickness		*-1,11%, -0,1mm / 2,22%, 0,2mm*
Water absorption		3	*E=0,4% máx 0,5%*
	Bending strength	4	*e ≥ 7,5 mm*
	Breaking strength		*1790N*
	Modulus of rupture		*Media = 39 N/mm2 Mín = 37 N/mm2*
Abrasion resistance		7	*Clase*/Class 4
Coefficient of linear thermal expansion		8	*6,2 x 10-6 ºC-1*
Thermal shock resistance		9	*Resistente*
Cracking resistance		11	*Resistente*
Frost resistance		12	*Resistente*
Chemical Resistance	Household chemicals and swimming pool salts	13	A
	Acids and alkalis - Low concentrations (L)		LA
	Acids and alkalis – High concentrations (H)		HA
Stain resistance		14	5

This EPD contemplates residential interior floor coverings as a study scenario, however, the versatility of these ceramic tiles allows their installation in other places such as walls, roofs, façades, exterior flooring and in other types of buildings with different pedestrian traffic intensities, such as hospitals, schools, offices or shopping centres.

3. LCA Information

3.1. Life Cycle Assessment

The LCA has been carried out with the support of the LCA for Experts software (Sphera-GaBi) [7] and with the database version 2023.2 (SP40.0) [8]) (SpheraSolutions). The characterisation factors used are those included in the EN 15804:2012+A2:2020 standard.

3.2. Functional unit / Declared unit.

The functional unit considered is ***"Covering 1 m² of a surface area (interior floors) of a dwelling with Bla Group ceramic tiles for 50 years"."***

3.3. Reference service life (RSL)

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

Reference service life

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

3.4. Allocation rules.

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

Generally speaking, in the allocation of inputs and outputs to the declared unit, production-weighted averages have been carried out.

3.5. Cut-off rule and exclusions.

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

The excluded data are the following:

- Diffuse particle emissions to the atmosphere.
- Atmospheric emissions of pollutants, non-regulated.
- Long-term emissions (>100 years)
- The production of some auxiliary materials used in the production of tiles representing less than 0.01% by total mass.
- Machinery and industrial equipment production.

3.6. Representativeness, quality and selction of data

The primary data have been provided directly by the supplier company. For the secondary data, the most updated Sphera-GaBi databases [8] have been used and modelled with the version of LCA for Experts (Sphera-GaBi) [7]. All data belong to a geographical scenario of Spain 2021.

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

3.7. Other calculation rules and assumptions

The load allocations applied were those necessary to be able to quantify the specific data of the ceramic tile, as well as the calculations necessary to be able to allocate the data associated with the products with the minimum and maximum environmental impact.

The global warming potential (GWPtotal) of the different technologies that make up the electricity mix used is 0,0628kg eq CO_2 /MJ.

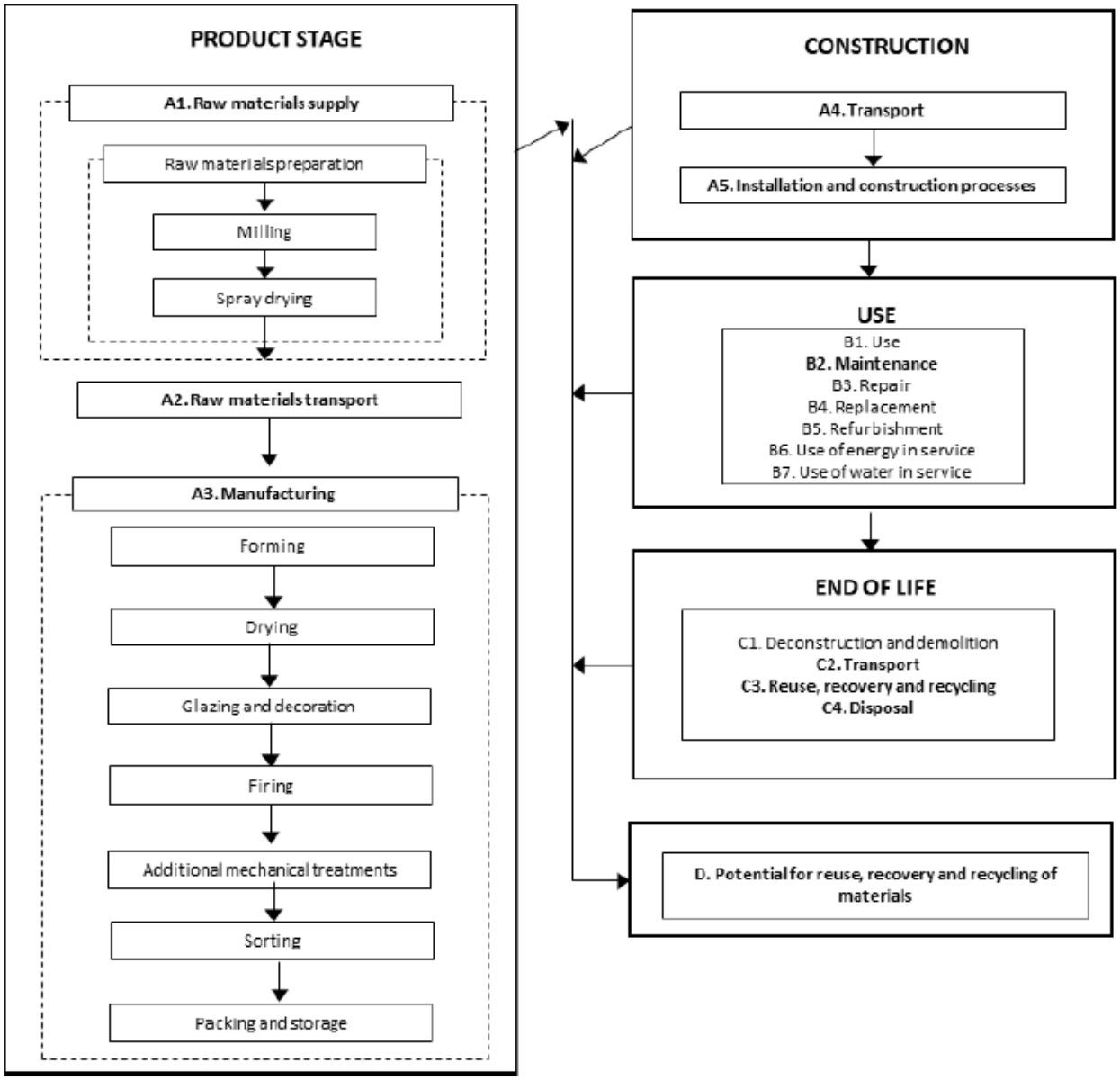
3.8. Deviations from impact results

The 17 tile references have different environmental impacts. The following table shows the deviations of the format with the highest and lowest environmental impact with respect to the average, in relation to the product stage (A1-A3). Annex I and Annex II show the environmental impact results of the reference with minimum and maximum impact values respectively.

Impact category	Deviation from the average scenario
GWP-total	-11%/+17%
AP	-7%/+10%
POCP	-5%/+7%

4. System boundaries, scenarios and additional technical information.

All life cycle modules relevant to ceramic coatings according to PCR have been included:



4.1. Pre-manufacturing processes (upstream)

Raw materials (A1) and Transport (A2)

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

The raw materials included in the composition of the support are mainly clays, feldspars, sands and ceramic waste generated during the manufacture.

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

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

4.2. Manufacturing of the product (A3)

The raw materials are wet-milling and subsequent spray drying to obtain granules.

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

The tiles coming from the dryer are covered with one or more thin layers of engobe and glaze, and in some cases, it is mostly decorated by inkjet printing.

Then, the parts are then fired in single-stage roller kilns to produce a hard, water- and chemical-resistant material.

Optionally, the parts are subjected to mechanical surface treatments, such as cutting, polishing or grinding.

After passing the quality control processes, the sorted parts are boxed and packaged.

4.3. Construction process Transport (A4)

The product is distributed 41% in Spain, 24% in Europe and 35% in the rest of the world.

Module A4 Transport to site

Scenario information	Transport to the construction site
Parameter	Result (expressed per functional unit)
Type and fuel consumption of the vehicle	According to the destinations in the distribution as described above: 0,1200l diésel (Euro truck 6, 27 t) 0,0191 l fueloil (ship)
Distance	300 km national distribution: 41% 1390 km rest of Europe distribution: 24% 6520 km rest of the world distribution: 35%
Capacity utilisation (including no-load return)	85% in truck 100% ship
Bulk density of transported products	≈1800 kg/m^3
Usable capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packed compressed or nested)	Not applicable

4.4. Product installation and construction process (A5).

Once the product is unpacked, it is installed. According to the PCR for ceramic tiles, it has been established that the application of mortar is required for installation.

The waste derived from the packaging of the pieces is managed separately according to the geographical location of the installation site. On the other hand, 3% of product scrap have been considered at the installation stage as a hypothesis.

Module A5 - Installation

Scenario Information	Quantity per declared unit
Supplementary materials for installation	3.3 kg
Water use	0.8 l
Use of other resources	Not applicable
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Not applicable
Waste of materials at the construction site before processing of waste generated at the product installation (specified by type)	Product losses: 629g Packaging wastes: Cardboard: 169 g Plastic: 35g Wood: 686 g
Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route)	Product losses for recycling: 440g Product losses for final deposition:189g Incinerated cardboard: 1g Recycled cardboard: 168g Cardboard for final deposition: 0 g Incinerated plastic: 3g Recycled plastic: 26g Plastic for final deposition:5g Incinerated wood: 138g Recycled wood: 531g Wood for final deposition: 18g
Direct emissions to ambient air, soil and water	Not applicable

4.5. Use linked to the structure of the building

B1 Use

Once it had been installed, the tile does not require any energy input for its use and does not require maintenance after installation, except for normal cleaning operations. For this reason, only the environmental burdens attributable to the maintenance of the product (module B2) are considered.

B2 Maintenance

Cleaning is done with a damp cloth and cleaning agents.

Módulo B2 – Maintenance

Scenario information	Quantity per declared unit
Maintenance process	According to PCR for ceramic tiles (UNE-EN17160) residential scenario for floor cleaning
Maintenance cycle	Wash 1 time a week with water and 1 every two with detergent
Auxiliary materials for maintenance (e.g. cleaning products) (specifying each material)	Detergent: 1,34E-04 kg/m^2
Material waste during maintenance (specifying type)	Not applicable
Net tap water consumption	0,1 l/m^2
Energy input during maintenance (e.g. suction cleaning), type of energy carrier (e.g. electricity) and quantity, if applicable and relevant	Not applicable

B3-B4-B5 Repair, Replacement and Rehabilitation

Ceramic tiles do not require repair, replacement or rehabilitation.

4.6. Use linked to the operation of the building

B6-B7 Use of energy and water for operation

These modules are not relevant for ceramic tiles.

4.6 End of life satge

C1 Deconstruction and demolition

The impacts attributable to the removal of the product during building renovation or demolition are negligible.

C2 Transport

The product residues are transported 50 km by truck for management, either by deposition in landfills or for recycling.

C3 Waste management for reuse, recovery and recycling

It has been considered that 70% of tiles are recycled and/or reused, as indicated in the PCR.

C4 Final elimination

It is estimated that 30% of the product is sent to a controlled landfill after the end of its serv life.

End of life

Parameter	Unit (expressed per functional unit)
Collection process, specified by type	24,3 kg total
	17,0 kg for recycling
Delete, specified by type	7,3 kg product or material for final disposal
Hypotheses for scenario development (e.g. transport)	The waste of the product is transported in a large tonnage truck (27 t) that complies with the Euro 6 standard to be managed, either by deposition in inert landfills, or recycled. An average distance of 50km from the building site to the final destination is considered. The return trip of the trucks (100% empty return) is also included.

4.7. Beneficts and loads beyond the system

Module D

The environmental loads and benefits of obtaining secondary material from the waste generated at the installation stage (tile waste, tile packaging waste: cardboard, plastic and wood) and at the end of life of the product have been considered.

4.8. Information on biogenic carbon content

As indicated by the UNE EN 15804+A2 standard, the biogenic carbon content in the packaging can be omitted if the materials containing biogenic carbon in the packaging/product are less than 5% of the total mass of the product.

5. LCA and LCI Environmental Parameter Declaration.

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	**kg CO_2** eq.	9,4	4,2E-01	1,1	0	2,0E-01	0	0	0	0	0	0	1,4E-01	0	8,8E-02	-1,8E-01
GWP-fossil	**kg CO_2** eq.	9,4	4,3E-01	1,1	0	2,1E-01	0	0	0	0	0	0	1,4E-01	0	8,8E-02	-1,8E-01
GWP-biogenic	**kg CO_2** eq.	5,8E-02	-4,7E-03	5,3E-03	0	1,9E-03	0	0	0	0	0	0	-1,9E-03	0	9,1E-04	-6,4E-05
GWP-luluc	**kg CO_2** eq.	6,2E-03	3,2E-03	7,9E-04	0	1,6E-05	0	0	0	0	0	0	1,3E-03	0	3,8E-04	-4,5E-04
GWP-total	**kg CO_2** eq.	9,5	4,3E-01	1,1	0	2,1E-01	0	0	0	0	0	0	1,4E-01	0	8,9E-02	-1,8E-01
ODP	**kg CFC 11 eq.**	3,1E-08	5,0E-14	9,4E-10	0	9,3E-08	0	0	0	0	0	0	1,8E-14	0	5,1E-14	-5,0E-09
AP	**mol H^+** eq.	3,3E-02	2,7E-03	2,6E-03	0	2,2E-03	0	0	0	0	0	0	1,5E-04	0	6,5E-04	-6,3E-04
EP-freshwater	**kg P eq.**	1,1E-04	1,3E-06	4,6E-06	0	5,5E-06	0	0	0	0	0	0	5,1E-07	0	1,9E-06	-1,7E-06
EP-freshwater	**kg PO_4^{3-}** eq.	3,4E-04	4,0E-06	1,4E-05	0	1,7E-05	0	0	0	0	0	0	1,6E-06	0	5,7E-06	-5,1E-06
EP-marine	**kg N eq.**	1,1E-02	6,8E-04	8,8E-04	0	2,5E-04	0	0	0	0	0	0	4,7E-05	0	1,8E-04	-2,0E-04
EP-terrestrial	**mol N eq.**	1,2E-01	7,5E-03	9,6E-03	0	9,0E-03	0	0	0	0	0	0	5,6E-04	0	1,9E-03	-2,2E-03
POCP	**kg NMVOC eq.**	3,1E-02	2,0E-03	2,5E-03	0	1,6E-03	0	0	0	0	0	0	1,5E-04	0	5,2E-04	-5,6E-04
ADP-minerals&metals*	**kg Sb eq.**	4,9E-05	2,4E-08	1,5E-06	0	1,4E-08	0	0	0	0	0	0	9,2E-09	0	9,1E-09	-6,7E-08
ADP-fossil*	**MJ**	153,0	5,6	8,7	0	1,4	0	0	0	0	0	0	1,9	0	1,2	-3,0
WDP	**m^3**	2,4	4,3E-03	1,6E-01	0	14,4	0	0	0	0	0	0	1,7E-03	0	6,7E-03	-1,6E-02

GWP-GHG: Global warming potential, UNE-EN15804:2012+A1:2014; **GWP - total:** Global warming potential**; GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic global warming potential**; GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus**; EP-freshwater:** Eutrophication potential, fraction of nutrients reaching the final freshwater compartment**; EP-marine:** Eutrophication potential, fraction of nutrients reaching the final seawater compartment**; EP-terrestrial:** Eutrophication potential, accumulated surplus**; POCP:** Tropospheric ozone formation potential**; ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources**; APD-fossil:** Abiotic resource depletion potential for fossil resources**; WDP:** Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,7E-05	4,5E-08	5,3E-07	0	1,5E-08	0	0	0	0	0	0	1,1E-09	0	7,9E-09	-3,3E-09
IRP [1]	**kBq U235 eq**	28,2	4,0	2,8	0	6,6E-01	0	0	0	0	0	0	1,4E+00	0	7,1E-01	-0,9
ETP-fw [2]	**CTUe**	3,5E-09	8,0E-11	2,1E-10	0	7,8E-11	0	0	0	0	0	0	2,8E-11	0	9,0E-11	3,2E-12
HTP-c [2]	**CTUh**	6,3E-08	3,4E-09	9,4E-09	0	9,0E-09	0	0	0	0	0	0	1,2E-09	0	9,6E-09	-8,5E-10
HTP-nc [2]	**CTUh**	2,9E-01	1,5E-03	3,3E-02	0	1,8E-03	0	0	0	0	0	0	5,3E-04	0	1,6E-03	-9,4E-03
SQP [2]	**-**	131,0	2,0	10,2	0	238,0	0	0	0	0	0	0	7,9E-01	0	2,8E-01	-1,3E+00

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

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	45,5	3,5E-01	2,5	0	4,9	0	0	0	0	0	0	1,4E-01	0	1,4E-01	-6,0
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	45,5	3,5E-01	2,5	0	4,9	0	0	0	0	0	0	1,4E-01	0	1,4E-01	-6,0
PENRE	**MJ**	153,0	5,63	8,7	0	1,4	0	0	0	0	0	0	1,9	0	1,2	-3,0
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	153,0	5,63	8,7	0	1,4	0	0	0	0	0	0	1,9	0	1,2	-3,0
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,2E-02	3,8E-04	3,1E-03	0	1,9E-01	0	0	0	0	0	0	1,5E-04	0	2,2E-04	-1,9E-03

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

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	1,8E-11	3,7E-05	0	6,7E-12	0	0	0	0	0	0	5,9E-12	0	1,9E-08	-2,8E-08
NHWD	**kg**	2,3	8,1E-04	3,1E-01	0	5,3E-02	0	0	0	0	0	0	2,9E-04	0	5,5	-6,9E-04
RWD	**kg**	2,9E-03	9,9E-06	2,4E-04	0	1,6E-05	0	0	0	0	0	0	3,6E-06	0	1,6E-05	-3,7E-05

HWD: Hazardous waste disposed of**; NHWD:** Non-hazardous waste disposed of**; RWD:** Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	2,2E-02	0	3,3E-01	0	0	0	0	0	0	0	0	0	12,7	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse**; MFR:** Materials for recycling**; MER:** Materials for energy recovery; **EE:** Energy exported

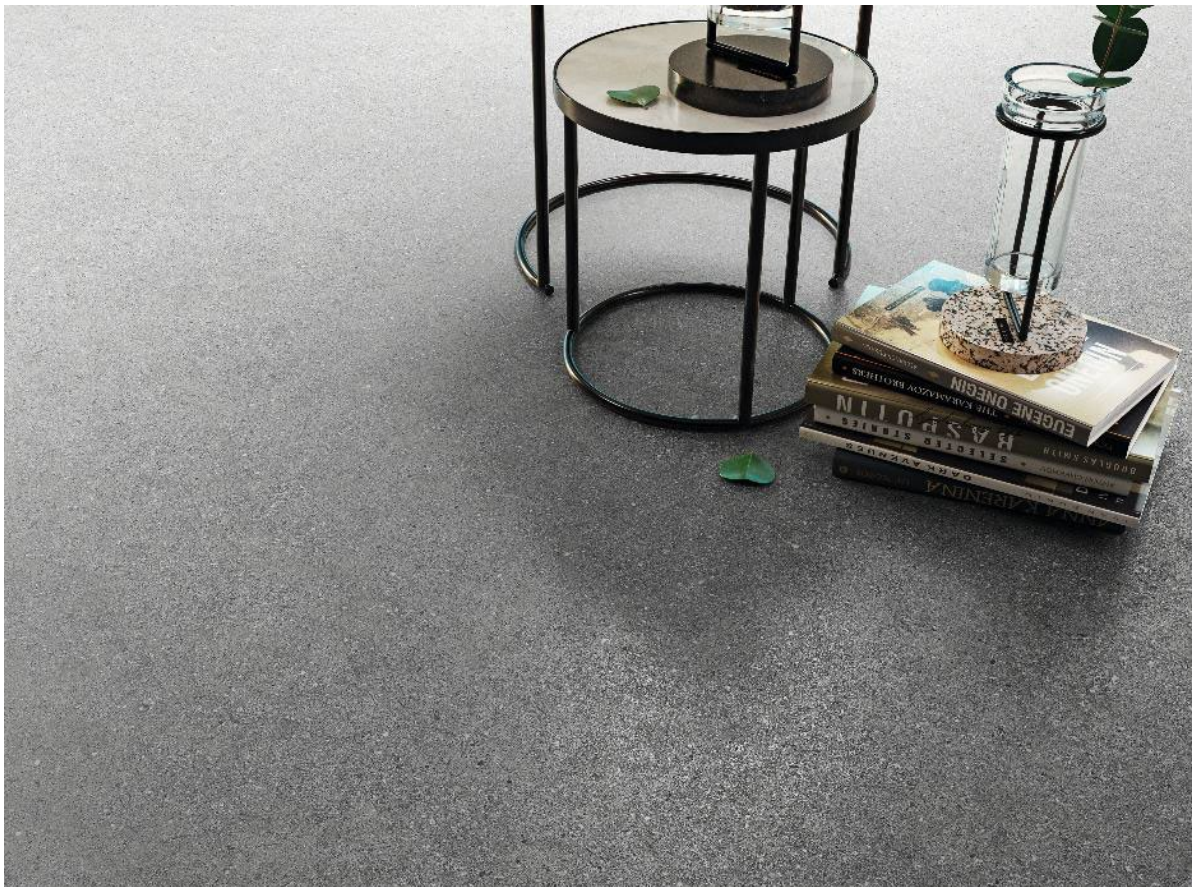
6. Additional Environmental Information

Indoor air emissions

Ceramic tiles, in their manufacturing process, undergo a thermal process that exceeds 1000 ºC. At these temperatures, any organic compound present in the compositions decomposes, resulting in an inert end product free of volatile organic compounds that may be emitted in its use phase.

Release to soil and water

Ceramic tiles do not emit any compound to the floor or water in its stage of use, since it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically or chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that may lead to contamination of the environment or harm human health. It is a product that does not leach so it does not pose a risk to the quality of surface or groundwater.



Annex I. Declaration of environmental parameters for the MINIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	**kg CO_2** eq.	8,3	3,6E-01	9,5E-01	0	1,7E-01	0	0	0	0	0	0	1,2E-01	0	7,5E-02	-1,5E-01
GWP-fossil	**kg CO_2** eq.	8,4	3,7E-01	9,5E-01	0	1,8E-01	0	0	0	0	0	0	1,2E-01	0	7,5E-02	-1,5E-01
GWP-biogenic	**kg CO_2** eq.	5,2E-02	-4,1E-03	4,6E-03	0	1,7E-03	0	0	0	0	0	0	-1,6E-03	0	7,8E-04	-5,5E-05
GWP-luluc	**kg CO_2** eq.	5,4E-03	2,8E-03	6,8E-04	0	1,4E-05	0	0	0	0	0	0	1,1E-03	0	3,3E-04	-3,8E-04
GWP-total	**kg CO_2** eq.	8,4	3,6E-01	9,6E-01	0	1,8E-01	0	0	0	0	0	0	1,2E-01	0	7,6E-02	-1,5E-01
ODP	**kg CFC 11 eq.**	2,8E-08	4,3E-14	8,4E-10	0	7,9E-08	0	0	0	0	0	0	1,6E-14	0	4,3E-14	-4,3E-09
AP	**mol H^+** eq.	3,1E-02	2,3E-03	2,3E-03	0	1,9E-03	0	0	0	0	0	0	1,3E-04	0	5,6E-04	-5,4E-04
EP-freshwater	**kg P eq.**	9,8E-05	1,1E-06	4,1E-06	0	4,7E-06	0	0	0	0	0	0	4,4E-07	0	1,6E-06	-1,4E-06
EP-freshwater	**kg PO_4^{3-}** eq.	3,0E-04	3,4E-06	1,2E-05	0	1,5E-05	0	0	0	0	0	0	1,3E-06	0	4,9E-06	-4,4E-06
EP-marine	**kg N eq.**	1,1E-02	5,8E-04	7,9E-04	0	2,1E-04	0	0	0	0	0	0	4,0E-05	0	1,5E-04	-1,7E-04
EP-terrestrial	**mol N eq.**	1,2E-01	6,5E-03	8,6E-03	0	7,7E-03	0	0	0	0	0	0	4,8E-04	0	1,6E-03	-1,9E-03
POCP	**kg NMVOC eq.**	2,9E-02	1,7E-03	2,2E-03	0	1,4E-03	0	0	0	0	0	0	1,2E-04	0	4,5E-04	-4,8E-04
ADP-minerals&metals*	**kg Sb eq.**	5,0E-05	2,0E-08	1,5E-06	0	1,2E-08	0	0	0	0	0	0	7,9E-09	0	7,8E-09	-5,7E-08
ADP-fossil*	**MJ**	137,0	4,8	7,6	0	1,2	0	0	0	0	0	0	1,6	0	1,0	-2,6
WDP	**m^3**	2,5	3,7E-03	1,5E-01	0	12,3	0	0	0	0	0	0	1,4E-03	0	5,8E-03	-1,4E-02

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

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,4E-05	3,8E-08	4,5E-07	0	1,3E-08	0	0	0	0	0	0	9,4E-10	0	6,8E-09	-2,9E-09
IRP [1]	**kBq U235 eq**	25,2	3,4	2,4	0	5,6E-01	0	0	0	0	0	0	1,2E+00	0	6,1E-01	-7,9E-01
ETP-fw [2]	**CTUe**	3,2E-09	6,9E-11	1,8E-10	0	6,7E-11	0	0	0	0	0	0	2,4E-11	0	7,7E-11	2,7E-12
HTP-c [2]	**CTUh**	6,0E-08	2,9E-09	8,2E-09	0	7,7E-09	0	0	0	0	0	0	1,1E-09	0	8,2E-09	-7,3E-10
HTP-nc [2]	**CTUh**	2,9E-01	1,3E-03	2,9E-02	0	1,5E-03	0	0	0	0	0	0	4,5E-04	0	1,3E-03	-8,1E-03
SQP [2]	**-**	120,0	1,7	9,0	0	204,0	0	0	0	0	0	0	6,8E-01	0	2,4E-01	-1,11

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

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Paramter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	44,1	3,0E-01	2,3	0	4,2	0	0	0	0	0	0	1,2E-01	0	1,2E-01	-5,1
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	44,1	3,0E-01	2,3	0	4,2	0	0	0	0	0	0	1,2E-01	0	1,2E-01	-5,1
PENRE	**MJ**	137,0	4,81	7,6	0	1,2	0	0	0	0	0	0	1,6	0	1,0	-2,6
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	137,0	4,81	7,6	0	1,2	0	0	0	0	0	0	1,6	0	1,0	-2,6
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,3E-02	3,3E-04	2,8E-03	0	1,6E-01	0	0	0	0	0	0	1,3E-04	0	1,9E-04	-1,6E-03

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

Outflows and waste categories

Parámetro	Unidades	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	1,5E-11	3,7E-05	0	5,74E-12	0	0	0	0	0	0	5,0E-12	0	1,59E-08	-2,4E-08
NHWD	**kg**	2,0	6,9E-04	2,6E-01	0	4,49E-02	0	0	0	0	0	0	2,5E-04	0	4,67	-5,9E-04
RWD	**kg**	3,1E-03	8,5E-06	2,2E-04	0	1,40E-05	0	0	0	0	0	0	3,1E-06	0	1,4E-05	-3,1E-05

HWD: Hazardous waste disposed of**; NHWD:** Non-hazardous waste disposed of**; RWD:** Radioactive waste disposed of

Parámetro	Unidades	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	1,9E-02	0	2,8E-01	0	0	0	0	0	0	0	0	0	10,9	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse**; MFR:** Materials for recycling**; MER:** Materials for energy recovery; **EE:** Energy exported

Annex II. Declaration of environmental parameters for the MAXIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	**kg CO_2** eq.	10,9	4,8E-01	1,3	0	2,3E-01	0	0	0	0	0	0	1,6E-01	0	1,0E-01	-2,0E-01
GWP-fossil	**kg CO_2** eq.	11,0	4,9E-01	1,3	0	2,4E-01	0	0	0	0	0	0	1,7E-01	0	1,0E-01	-2,1E-01
GWP-biogenic	**kg CO_2** eq.	6,6E-02	-5,5E-03	6,1E-03	0	2,2E-03	0	0	0	0	0	0	-2,2E-03	0	1,1E-03	-7,4E-05
GWP-luluc	**kg CO_2** eq.	7,1E-03	3,7E-03	9,1E-04	0	1,9E-05	0	0	0	0	0	0	1,5E-03	0	4,4E-04	-5,1E-04
GWP-total	**kg CO_2** eq.	11,1	4,9E-01	1,2797	0	2,5E-01	0	0	0	0	0	0	1,6E-01	0	1,0E-01	-2,1E-01
ODP	**kg CFC 11 eq.**	3,5E-08	5,8E-14	1,1E-09	0	1,1E-07	0	0	0	0	0	0	2,1E-14	0	5,8E-14	-5,8E-09
AP	**mol H^+** eq.	3,7E-02	3,1E-03	2,9E-03	0	2,5E-03	0	0	0	0	0	0	1,7E-04	0	7,5E-04	-7,3E-04
EP-freshwater	**kg P eq.**	1,3E-04	1,5E-06	5,3E-06	0	6,4E-06	0	0	0	0	0	0	5,9E-07	0	2,2E-06	-1,9E-06
EP-freshwater	**kg PO_4^{3-}** eq.	3,8E-04	4,6E-06	1,6E-05	0	2,0E-05	0	0	0	0	0	0	1,8E-06	0	6,6E-06	-5,9E-06
EP-marine	**kg N eq.**	1,2E-02	7,8E-04	9,8E-04	0	2,8E-04	0	0	0	0	0	0	5,4E-05	0	2,1E-04	-2,3E-04
EP-terrestrial	**mol N eq.**	1,3E-01	8,7E-03	1,1E-02	0	1,0E-02	0	0	0	0	0	0	6,5E-04	0	2,2E-03	-2,5E-03
POCP	**kg NMVOC eq.**	3,3E-02	2,3E-03	2,7E-03	0	1,9E-03	0	0	0	0	0	0	1,7E-04	0	6,0E-04	-6,4E-04
ADP-minerals&metals*	**kg Sb eq.**	5,1E-05	2,7E-08	1,6E-06	0	1,7E-08	0	0	0	0	0	0	1,1E-08	0	1,1E-08	-7,7E-08
ADP-fossil*	**MJ**	179,0	6,5	10,1	0	1,6	0	0	0	0	0	0	2,2	0	1,4	-3,5
WDP	**m^3**	2,7	5,0E-03	1,8E-01	0	16,6	0	0	0	0	0	0	1,9E-03	0	7,8E-03	-1,9E-02

GWP-GHG: Global warming potential, UNE EN15804:2012+A1:2014; **GWP - total:** Global warming potential**; GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic global warming potential**; GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus**; EP-freshwater:** Eutrophication potential, fraction of nutrients reaching the final freshwater compartment**; EP-marine:** Eutrophication potential, fraction of nutrients reaching the final seawater compartment**; EP-terrestrial:** Eutrophication potential, accumulated surplus**; POCP:** Tropospheric ozone formation potential**; ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources**; APD-fossil:** Abiotic resource depletion potential for fossil resources**; WDP:** Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM [1]	**Incidence of diseases**	2,0E-05	5,1E-08	6,1E-07	0	1,7E-08	0	0	0	0	0	0	1,3E-09	0	9,1E-09	-3,8E-09
IRP [1]	**kBq U235 eq**	32	4,6	3,2	0	0,8	0	0	0	0	0	0	1,6E+00	0	8,2E-01	-1,1E+00
ETP-fw [2]	**CTUe**	3,9E-09	9,2E-11	2,4E-10	0	9,0E-11	0	0	0	0	0	0	3,2E-11	0	1,0E-10	3,7E-12
HTP-c [2]	**CTUh**	7,0E-08	4,0E-09	1,1E-08	0	1,0E-08	0	0	0	0	0	0	1,4E-09	0	1,1E-08	-9,9E-10
HTP-nc [2]	**CTUh**	3,4E-01	1,7E-03	3,8E-02	0	2,1E-03	0	0	0	0	0	0	6,1E-04	0	1,8E-03	-1,1E-02
SQP [2]	**-**	148,0	2,3	11,6	0	274,0	0	0	0	0	0	0	9,1E-01	0	3,2E-01	-1,5E+00

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

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	52,6	4,0E-01	2,9	0	5,6	0	0	0	0	0	0	1,6E-01	0	1,6E-01	-6,9
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	52,6	4,0E-01	2,9	0	5,6	0	0	0	0	0	0	1,6E-01	0	1,6E-01	-6,9
PENRE	**MJ**	179,0	6,5	10,1	0	1,6	0	0	0	0	0	0	2,2	0	1,4	-3,5
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	179,0	6,5	10,1	0	1,6	0	0	0	0	0	0	2,2	0	1,4	-3,5
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,8E-02	4,4E-04	3,5E-03	0	2,1E-01	0	0	0	0	0	0	1,7E-04	0	2,6E-04	-2,2E-03

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

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,2E-03	2,0E-11	3,7E-05	0	7,7E-12	0	0	0	0	0	0	6,8E-12	0	2,2E-08	-3,2E-08
NHWD	kg	2,7	9,3E-04	3,5E-01	0	6,1E-02	0	0	0	0	0	0	3,3E-04	0	6,3	-7,9E-04
RWD	kg	3,5E-03	1,1E-05	2,8E-04	0	1,9E-05	0	0	0	0	0	0	4,1E-06	0	1,9E-05	-4,2E-05

HWD: Hazardous waste disposed of**; NHWD:** Non-hazardous waste disposed of**; RWD:** Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	2,6E-02	0	3,8E-01	0	0	0	0	0	0	0	0	0	14,7	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse**; MFR:** Materials for recycling**; MER:** Materials for energy recovery; **EE:** Energy exported

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