ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Wall Tile

from

VitrA Karo

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com. EPD of multiple products, based on average product.

Programme:	The International EPD® System www.environdec.com
Programme operator:	EPD International AB
Licensee:	EPD Türkiye
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Publication date:	2024-11-22
Validity date:	2029-11-21
Geographical scope:	Global

PROGRAMME INFORMATION

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

Product category rules (PCR):
PCR 2019:14 Construction products, version 1.3.4, Construction EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works
UN CPC code for wall tiles is 3731.

PCR review was conducted by:
The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile

Independent third-party EPD verification of the declaration and data, according to ISO 14025:2006:

☐ Process Certification ☒ Individual Verification

Verification:

External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through an individual EPD verification

Third party individual verifier: Prof. Vladimír Kočí

Approved by:
The International EPD® System

LCA practitioner: Gülbahar Korkusuz & Hüdai Kara-- Metsims Sustainability Consulting

The procedure for follow-up during EPD validity, as defined in the GPI, involves third-party verifier:

☐ Yes ☒ No

The environmental impacts of different EPDs can be compared only taking into account all the technical information supporting the functional unit definition as requested by the PCR.

EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

Programme Operator

EPD International AB
Box 210 60, SE-100 31 Stockholm, Sweden
info@environdec.com

Ownership

EPD owner
has the sole ownership, liability and responsibility of the EPD.

It all started with a small workshop in the Istanbul district of Kartal...

Propelled by a vision of smart and sustainable living for people of every age, ability, and cultural background, the Eczacıbaşı Building Products Division is gaining prominence in global design markets while maintaining its longstanding leadership in Turkey's ceramic sanitary ware and ceramic tile markets.

In pursuing this vision, the Division is supported by its multi-brand/multi-manufacturing site/multi-market growth strategy. Eight of the Division's 13 manufacturing sites are located in major international markets, including France, where it is the majority shareholder of V&B Fliesen GmbH, the former tile division of Villeroy & Boch AG, and Germany, where it owns Burgbad AG, the leader of the European luxury bathroom furniture market. In Russia, another major market, the Division has established two manufacturing plants for tiles and ceramic sanitary ware that are supporting its growing sales in the region.

Investments in capacity have been matched by an expansion of the Division's marketing network in international markets, high profile brand and product communication campaigns, and the development of innovative products and collections – an area where it is collaborating with prominent international designers.

VitrA also has a team of in-house designers who represent the backbone of its design philosophy and culture. These emerging stars are supported by multidisciplinary teams at the VitrA Innovation Center, Turkey's first R&D center for building products, which the Division established in 2011. Increasingly contributing to the performance of the Division, the VitrA Innovation Center has received the distinction of "Best R&D Center in the Ceramics and Refractory Industry" from the Turkish Ministry of Science, Industry and Technology for five consecutive years.

International sales, which account for about two-thirds of the Division's total sales, are supported by the Division's marketing and sales companies in Germany, the UK, and Russia. In collaboration with the marketing and sales offices of the Division's manufacturing subsidiaries in Europe, this network serves some 21,000 retail sales points (including sub-dealers) and 150 exclusive showrooms in major international markets.

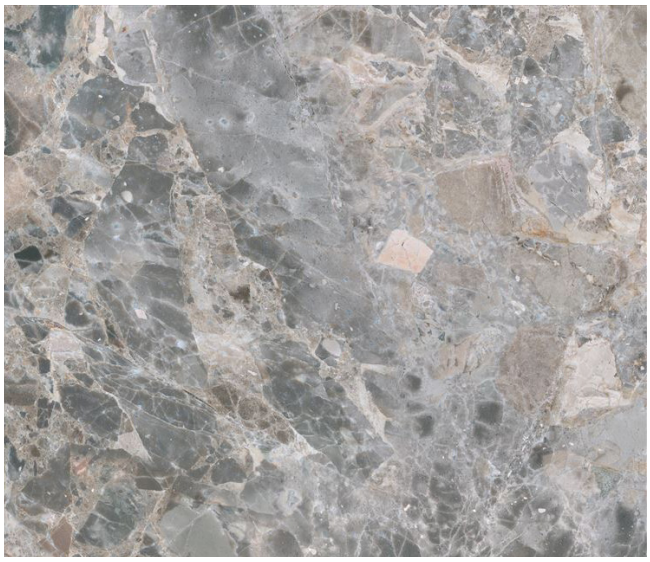
VitrA Tile manufactures some 4000 varieties of ceramic, porcelain tiles for building interiors and exteriors, terracing and swimming pools. Most of these tiles are produced at its plant at the Building Product Division's production compound at Bozüyük, which has an annual tile capacity of 30 million square meters.

Product Description

Wall tiles contain inorganic materials such as clay, kaolin and calcit, but they may also include other raw materials. The production technology of tiles is dry pressing. The required composition is blended with water to form slurry. This slurry then fed into spray driers to form uniform granules ready for compaction. These granules are then shaped to form the green body. The formed green body may then be glazed if required. The green ceramic body is fired at high temperatures, resulting in a hard body. VitrA wall tiles come in several various dimensions depending on the intended use. Wall tiles have water absorption of more than 10%.

This EPD covers the production of wall tiles in Bozüyük, Bilecik plant. UN CPC code for wall tiles is 3731.

The assessment is based on the most produced tile type within the product range for 1 m² of wall tile.



Product Application

Wall tiles are largely used as interior wall coverings. Interior applications are mainly in bathrooms and kitchens in residential applications.

No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations are present in the ceramic tiles manufactured by VitrA, either above the threshold for registration with the European Chemicals Agency or above 0.1 % (wt/wt).

Technical Specifications

Tests such as dimension and surface quality, physical and chemical properties are applied to wall tiles. All VitrA tiles ready for delivery pass these tests.

Water absorption	E > 10 %
Breaking strength	min. 600 N for thickness ≥ 7.5 mm min. 200 N for thickness < 7.5 mm
Modulus of rupture	min 15 N/mm²
Deep abrasion	Not applicable
Surface abrasion	Not intended to be used on the floor
Coefficient of friction	Not intended to be used on the floor
Staining resistance	min. Class 3
Resistance to household chemicals, pool salts	min. Class B

Content Declaration

Product composition is presented as percentages rather than specific weights to maintain confidentiality while transparently communicating the relative proportions of each component.

Product Components	Weight, %/m²	Post-industrial Recycled Material, weight-%/m²	Post-consumer Recycled Material, weight-%/m²	Biogenic Material, weight of % and kgC/product
Clay	55-60	0	0	0
Calcit	5-15	0	0	0
Kaolin	5-10	0	0	0
Ceramic Waste[1]	0-15	100	0	0
Others[2]	<1	0	0	0
Total	100	0-15	0	0
Packaging Materials	Weight, %/m²	Post-consumer Recycled Material, weight-%/m²	Weight biogenic carbon kg C/product or declared unit	
Corrugated Paper	80-95	0	0.007	
Plastic Stripe	1-20	0	0	
Total	100	0	0.007	

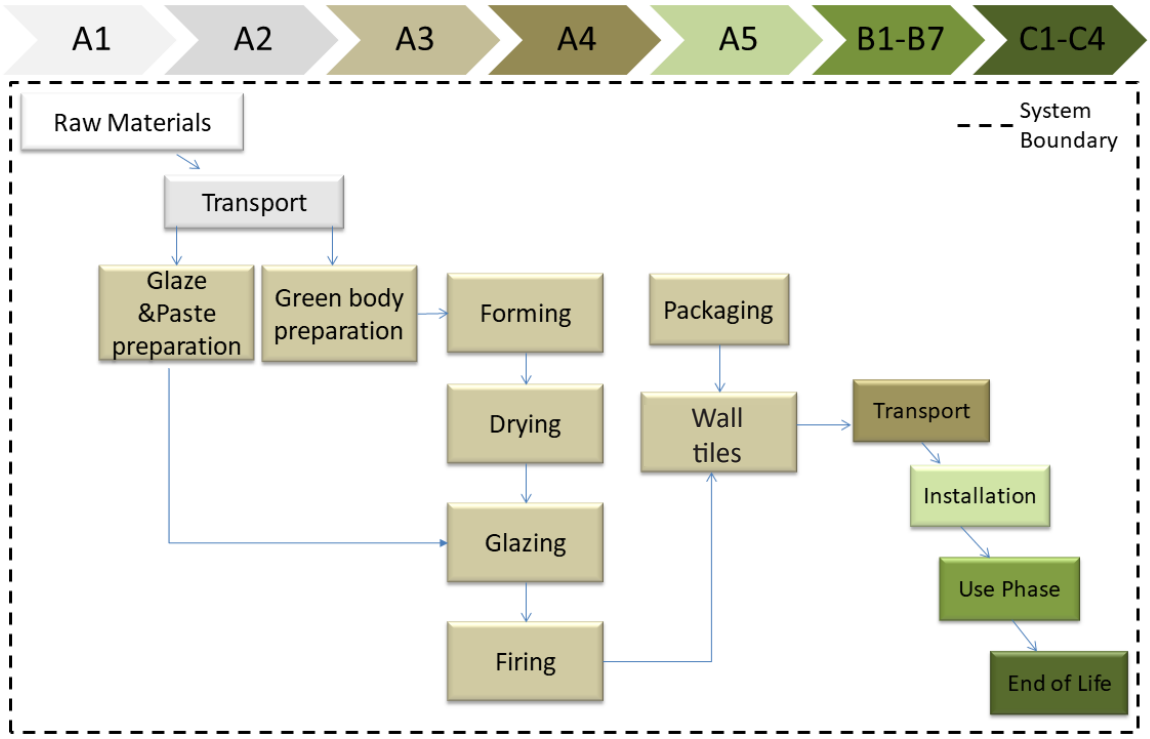
[1] Pre-consumer material is diverted from the waste stream during a manufacturing process but is not considered a finished product. It typically includes scraps, trimmings, and overproduction materials that are reused within the same manufacturing process or another. The reutilization of materials generated in a process and capable of being reclaimed within the same process that generated it is excluded from this definition. From a carbon intensity perspective, pre-consumer materials do not complete their life cycle. So, carbon emissions should behave like a virgin material. (ISO14021)

[2] Others includes dispersant, binders, pigments and rheological additives.

Manufacturing

Wall tiles include several different products with different recipes. According to the recipe, raw materials are loaded into the mills for wet grinding and to form a slurry. The slurry then spray dried to form granules and after sieving process stored in the press-feeding silos ready for dry compaction. Hydraulic presses are used for dry compaction to form green tile. Green tiles are then dried in fast vertical-drying unit to remove the excess humidity before glazing applications or might remain unglazed. Within the glazing unit printing and other surface design applications are performed. Tiles are then fired at high temperatures to form hard body. After quality checks, tiles are packed for dispatch.

Manufacturing process of wall tiles can be seen in detail from the flow chart given below.



Flow chart of manufacturing walltiles and LCA system boundary.

Source of electricity

VitrA uses renewable energy within their manufacturing process. Electricity is supplied from solar and hydropower plants. Electricity data is taken from ecoinvent 3.10. database which has a carbon intensity of 0.077 kg CO_2 eq./kWh for solar power and 0.005 kg CO_2 eq./kWh for hydropower.

Product Processing / Installation

Wall tiles are fixed to the walls using tile cement and subsequently the seams are filled with mortar. No emissions occur during the installation stage.

Packaging

Products are packed in cardboard boxes, strech hoods, plastic stripes.

Reference Service Life (RSL)

The Reference Service Life (RSL) of the wall tiles is thought to be same as with the whole building life.

Reuse Phase

Wall tiles are not collected for the purposes of reuse or recycled materials.

Disposal

According to the European Waste Catalogue and The Waste Code List of the Turkish Ministry of Environment and Urban Planning, wall tiles waste belongs to the group of construction and demolition wastes - tiles and ceramics" (code: 17 01 03). After domestic usage, ceramic tile products end up at construction and demolition waste landfills.

Environment at VitrA

Environmental protection

VitrA Tiles Co.'s environmental policy is based on the principle "Being aware of our responsibilities towards the environment and society, our aim is to bequeath a viable and clean environment to future generations". Adopting a green approach both to the production process and to products, protecting the environment and reducing the consumption of resources such as raw materials, energy and water are vital components of all processes.

VitrA Tiles Co. re-uses residual glaze and mud in production, recovers the waste heat of the kilns and uses it for spray drying. The company treats domestic and industrial wastewater and reuses over 90% of the treated industrial water in production, and has built a pallet repair station and begun repairing old pallets by re-using them in packaging.

Activities being conducted include: Reducing noise levels in the processes from 90 dbA to 80 dbA through sound insulation, making the dust collection system a closed-cycle combining the forklift battery charging points in a single location and establishing a "battery charging station", eliminating back injury risks in the Quality Separation areas by employing a conveyor system an establishing a ventilation system to reduce ambient temperature.

Protection of environment, decreasing and legal withdrawal of wastes, effective usage of natural resources, decreasing of environmental risks is of primary importance. Activities relating to recycling of wastes and effective usage of resources, casting of environmental effects before plant and process design are conducted according to certified ISO 14001 Environmental Management System.

Continuous improvement works for effective usage of energy, energy effectiveness projects, assessment of present-potential opportunities, development and application of energy policy and reduction of greenhouse gas emissions done according to ISO 50001 Energy Management System.

The technology investments of energy for conscious usage and recycling to nature, responsibility of preserving natural resources started from production phase for all processes and recycling systems were developed to decrease wastes to minimum.

PRODUCT STAGE

A1. Raw Material Supply includes raw material extraction and pre-treatment processes before production. In this report, production for each product starts with raw material acquisition.

A2. Transport is relevant for delivery of raw materials to the plant and involves forklift usage within the factory.

A3. Manufacturing stages include production of granules by spray drying, forming, drying, glazing, firing and packaging. Transport is only relevant for delivery of raw materials to the plant and forklift usage within the factory. Packaging waste scenario is created separately depending on the geographic location of the installation process. Renewable energy is used as energy source in the manufacturing.

CONSTRUCTION PROCESS STAGE

A4. Transport includes transportation of wall tiles to the construction site. VitrA transport tiles by seaway, airway and road haulage to the distribution centres for export.

A5. Installation of the Product stage includes the adhesive mortar and water usage in the construction site. For 1 m^2 wall tile installation; 5 kg mortar and 1.5 L water usage was assumed.

USE STAGE

B1. Use stage concerns emissions into environment. Wall tiles are inert materials, so during the use stage, they do not cause any emissions. Hence, use phase is not relevant for the assessment.

B2. Maintenance includes cleaning of tiles. VitrA advices to use 0.2 mL detergent which contains stain remover or neutral low-sulphate and rinse with 0.1 L tap water after cleaning. The results are given for a one-time cleaning activity, as the activity will vary by user

B3. Repair: VitrA wall tiles require no repairing during the use phase and therefore no impacts has ocurred in this module.

B4. Replacement: VitrA wall tiles require no replacement during the use phase and therefore no impacts has ocurred in this module.

B5. Refurbishment: VitrA wall tiles require no refurbishment during the use phase and therefore no impacts has ocurred in this module.

B6. Operational Energy Use: Operational energy use is not relevant for this product.

B7. Operational Water Use: Operational water use is not relevant for this product.

END OF LIFE STAGE

C1. De-construction, Demolition at the end of RSL is usually conducted with a selective deconstruction/ demolition. The environmental impacts generated during this phase are very low and therefore can be neglected.

C2. Transport (Waste) includes the transportation of the discarded tiles, packaging material and adhesive mortar to final disposal. Average distance from demolition site to inert landfil site for final disposal is assumed to be 50 km.

C3. Waste Processing concerns processing of discarded porselain tiles for recycle or reuse. The environmental impacts generated during this phase are very low and therefore can be neglected.

C4. Disposal is the final stage of product life. Wall tiles end up at construction and demolition waste landfills as their final fate and modelled as such in this LCA.

USE STAGE

D. Benefits & Loads from the tiles are calculated in this stage.

Functional Unit	The functional unit is the production of 1 m^2 the most produced wall tile with a mass of 13.39kg.
Goal and Scope	Evaluation of environmental impacts for 1 m^2 wall tile from the range of products that are produced the most from cradle to grave.
System Boundary	The system boundary covers A1 - A3 product stages referred as 'Raw material supply', 'Transport' and ' Manufacturing' , A4 - A5 'Construction', B1 - B7 'Use' and C1 – C4 'End of life' stages.
Cut-off Rules	The criteria for exclusion were set so that individual input flows less than 1% of the total, with a cumulative limit of less than 5%, could be omitted. This was contingent upon confirming that these excluded flows did not significantly alter the reported data, with "significant" defined as affecting the total by less than 5%.
Background Data	For all LCA modelling and calculation, Ecoinvent database (v3.10) and SimaPro (v9.6) LCA software were used. Characterization factors of EN 15804 reference package based on EF 3.1 are utilized. Impact of infrastructure and capital goods are excluded from the analysis.
Data Quality	Raw materials, energy and water consumption, waste and material and product transport data is collected from VitrA.
Period Under Review	All primary data collected from VitrA refers to the period year of 2023.
Assumptions	Upstream and downstream road transportation are assumed to be carried out with Euro5 motor vehicles with a size class of > 32 metric tonnes where distances acquired through Google Maps. In addition, 50 km distance for the waste transport at C2 stage is assumed.
Allocations	No allocation was performed for this LCA study.

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS
	Raw Materials Supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse-Recycling-Recovery Potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules Declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO		TR	GLO													
Specific Data Used	88%			-													
Variation-products	0%			-													
Variation-sites	0%			-													

Description of the system boundary
(X = Included in LCA, MND= Module Not Declared, NR=Not Relevant, GLO: Global, TR: Türkiye)

Core Environmental Impact Indicators (Mandatory)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	7.25E+00	1.06E+00	7.98E+00	0.00E+00	2.09E-02	0.00E+00	0.00E+00	1.80E-01	0.00E+00	2.05E-01	-5.60E-01
GWP-fossil	kg CO_2 eq.	7.27E+00	1.06E+00	7.91E+00	0.00E+00	1.57E-02	0.00E+00	0.00E+00	1.80E-01	0.00E+00	2.03E-01	-5.58E-01
GWP-biogenic	kg CO_2 eq.	-2.09E-02	1.68E-04	6.38E-02	0.00E+00	8.29E-05	0.00E+00	0.00E+00	3.06E-05	0.00E+00	1.17E-03	-1.77E-04
GWP-luluc	kg CO_2 eq.	2.81E-03	4.93E-04	5.75E-03	0.00E+00	5.18E-03	0.00E+00	0.00E+00	7.14E-05	0.00E+00	4.92E-05	-9.64E-04
ODP	kg CFC-11 eq	1.60E-07	1.50E-08	1.42E-07	0.00E+00	4.24E-10	0.00E+00	0.00E+00	2.51E-09	0.00E+00	6.36E-09	-8.44E-09
AP	mol H^+ eq.	1.44E-02	1.84E-02	4.74E-02	0.00E+00	8.93E-05	0.00E+00	0.00E+00	6.00E-04	0.00E+00	2.24E-03	-4.52E-03
EP-Freshwater	kg P eq.	5.96E-04	5.63E-05	2.46E-03	0.00E+00	5.10E-06	0.00E+00	0.00E+00	1.41E-05	0.00E+00	3.41E-04	-5.88E-05
EP-Marine	kg N eq.	4.08E-03	4.70E-03	8.04E-03	0.00E+00	6.09E-05	0.00E+00	0.00E+00	1.94E-04	0.00E+00	5.59E-04	-1.42E-03
EP-Terrestrial	mol N eq.	4.31E-02	5.21E-02	8.24E-02	0.00E+00	2.31E-04	0.00E+00	0.00E+00	2.11E-03	0.00E+00	6.00E-03	-1.56E-02
POCP	kg NMVOC eq.	2.07E-02	1.48E-02	3.29E-02	0.00E+00	7.34E-05	0.00E+00	0.00E+00	8.34E-04	0.00E+00	2.20E-03	-4.92E-03
*ADPE	kg Sb eq.	2.06E-05	2.11E-06	8.67E-05	0.00E+00	1.40E-07	0.00E+00	0.00E+00	5.77E-07	0.00E+00	3.89E-07	-2.17E-06
*ADPF	MJ	8.95E+00	9.83E-01	4.19E+01	0.00E+00	8.38E-02	0.00E+00	0.00E+00	2.46E-01	0.00E+00	3.19E-01	-9.91E-01
*WDP	m^3 depriv.	2.11E-01	4.70E-02	3.63E+00	0.00E+00	2.54E-02	0.00E+00	0.00E+00	1.14E-02	0.00E+00	-2.65E+00	-6.29E-01
Additional Environmental Impact Indicators (Mandatory)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
**GWP-GHG	kg CO_2 eq.	7.29E+00	1.06E+00	8.11E+00	0.00E+00	2.09E-02	0.00E+00	0.00E+00	1.80E-01	0.00E+00	2.04E-01	-5.61E-01
Additional Environmental Impact Indicators (Optional)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
PM	Disease inci	1.79E-07	5.55E-08	4.98E-07	0.00E+00	1.09E-09	0.00E+00	0.00E+00	1.43E-08	0.00E+00	3.41E-08	-5.55E-08
***IR	kBq U235 eq.	2.11E-01	8.79E-03	3.75E-01	0.00E+00	1.23E-03	0.00E+00	0.00E+00	2.07E-03	0.00E+00	6.33E-03	-1.11E-02
*HTP-c	CTUh	2.08E-08	4.92E-09	3.03E-08	0.00E+00	1.27E-10	0.00E+00	0.00E+00	9.31E-10	0.00E+00	1.15E-09	-3.21E-09
*HTP-nc	CTUh	3.12E-08	5.94E-09	1.91E-07	0.00E+00	2.21E-10	0.00E+00	0.00E+00	1.57E-09	0.00E+00	5.62E-09	-4.58E-09
*SQP	Pt	2.05E+01	4.61E+00	4.00E+01	0.00E+00	4.00E-01	0.00E+00	0.00E+00	1.51E+00	0.00E+00	1.16E+01	-1.45E+01
Acronyms	GWP-total: Climate change. GWP-fossil: Climate change- fossil. GWP-biogenic: Climate change - biogenic. GWP-luluc: Climate change - land use and transformation. ODP: Ozone layer depletion. AP: Acidification terrestrial and freshwater. EP-freshwater: Eutrophication freshwater. EP-marine: Eutrophication marine. EP-terrestrial: Eutrophication terrestrial. POCP: Photochemical oxidation. ADPE: Abiotic depletion - elements. ADPF: Abiotic depletion - fossil resources. WDP: Water scarcity. PM: Respiratory inorganics - particulate matter. IR: Ionising radiation. ETP-FW: Ecotoxicity freshwater. HTP-c: Cancer human health effects. HTP-nc: Non-cancer human health effects. SQP: Land use related impacts. soil quality.											
Legend	A1: Raw Material Supply. A2: Transport. A3: Manufacturing. A1-A3: Sum of A1. A2. and A3. A4: Transport to Site. A5: Installation. B1: Use. B2: Maintenance. B3: Repair. B4: Replacement. B5: Refurbishment. B6:Operational Energy Use. B7: Operational Water Use. C1: De-Construction. C2: Waste Transport. C3: Waste Processing. C4: Disposal. D: Benefits and Loads Beyond the System Boundary.											

Indicators describing resource use (Mandatory)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
PERE	MJ	1.24E+01	1.36E-01	1.50E-01	0.00E+00	1.50E-01	0.00E+00	0.00E+00	8,57E+00	0.00E+00	8,57E+00	-1,62E-01
PERM	MJ	1.35E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
PERT	MJ	1.38E+01	1.36E-01	1.50E-01	0.00E+00	1.50E-01	0.00E+00	0.00E+00	8,57E+00	0.00E+00	8,57E+00	-1,62E-01
PENRE	MJ	1.05E+02	1.38E+01	2.99E-01	0.00E+00	2.99E-01	0.00E+00	0.00E+00	1,29E+02	0.00E+00	1,29E+02	-7,61E+00
PENRM	MJ	6.31E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
PENRT	MJ	1.06E+02	1.38E+01	2.99E-01	0.00E+00	2.99E-01	0.00E+00	0.00E+00	1,29E+02	0.00E+00	1,29E+02	-7,61E+00
SM	kg	1.91E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
FW	m^3	4.87E-02	1.57E-03	9.21E-02	0.00E+00	1.16E-03	0.00E+00	0.00E+00	3,95E-04	0.00E+00	5,28E-03	-4,71E-02
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy resources used as raw materials, PENRT: Total use of non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water.											
Environmental information describing waste categories (Mandatory)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
HWD	kg	2.54E-03	2.68E-04	4.72E-03	0.00E+00	1.96E-05	0.00E+00	0.00E+00	6,34E-05	0.00E+00	2,39E-03	-2,87E-04
NHWD	kg	1.07E+00	3.32E-01	1.33E+00	0.00E+00	9.64E-04	0.00E+00	0.00E+00	1,19E-01	0.00E+00	2,03E+01	-3,15E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Environmental information describing output flow (Mandatory)												
	Unit	A1-3	A4	A5	B1	B2	B3-7	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE-Electric	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE-Thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy thermal.											
* Disclaimer 1	The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator											
** Disclaimer 2	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO_2 is set to zero.											
*** Disclaimer 3	This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.											

REFERENCES

International Organization for Standardization. (2018). ISO 50001:2018: Energy management systems. Geneva, Switzerland: ISO.

International EPD® System. (2021). General Programme Instructions of the International EPD® System (Version 5.0). Stockholm, Sweden: EPD International AB.

International Organization for Standardization. (2000). ISO 14020:2000: Environmental labels and declarations — General principles. Geneva, Switzerland: ISO.

European Committee for Standardization. (2021). EN 15804:2012+A2:2019/AC:2021: Sustainability of construction works - Environmental product declarations — Core rules for the product category of construction products. Brussels, Belgium: CEN.

European Committee for Standardization. (2017). EN 16757: Sustainability of construction works – Environmental product declarations – Product category rules for concrete and concrete elements. Brussels, Belgium: CEN.

International Organization for Standardization. (2009). ISO 14025: Environmental labels and declarations - Type III environmental declarations — Principles and procedures. Geneva, Switzerland: ISO.

International Organization for Standardization. (2006). ISO 14040/44: Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006). Geneva, Switzerland: ISO.

IVL Swedish Environmental Research Institute. (2019). PCR for construction products and construction services (Version 1.3.4). Stockholm, Sweden: IVL Swedish Environmental Research Institute.

European Commission – Joint Research Centre. (2020). Annex C: End-of-Life formulas and parameters (Version 2.1, May 2020). Part of the Product Environmental Footprint Category Rules (PEFCR) Guidance for the Product Environmental Footprint (PEF) method, developed under the European Commission's PEF initiative. JRC Technical Reports. https://publications.jrc.ec.europa.eu/repository/handle/JRC115959

International EPD® System. (n.d.). The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. Retrieved from https://www.environdec.com

Ecoinvent Centre. (n.d.). Ecoinvent. Retrieved from https://www.ecoinvent.org

Pré Consultants. (n.d.). SimaPro LCA Software. The Netherlands: Pré Consultants. Retrieved from https://www.pre-sustainability.com

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