ITALGRANITI GROUP

EPD®

ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

PORCELAIN STONEWARE

Thickness 9 mm and 20 mm

(BIa classification according to EN 14411:2016)

from

Italgraniti Group S.p.A.

VIA RADICI IN PIANO 355, FRAZ. CASINALBO - FORMIGINE (MO) - ITALY
PRODUCTION SITE: VIA PER CARPI 54 - SAN MARTINO IN RIO (RE) - ITALY

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-05447
Publication date:	2022-01-25
Valid until:	2027-01-24

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

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

ISO standard ISO 21930 and CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Construction products, PCR 2019:14 version 1.11 C-PCR-002 Ceramic tiles (EN 17160:2019), version 2019
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of member. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☒ External ☐ Internal covering ☐ EPD process certification ☒ EPD verification
Third party verifier: Marcel Gomez Ferrer Marcel Gómez Consultoria Ambiental, info@marcelgomez.com Phone: +34 630 64 35 93 Email: info@marcelgomez.com Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Name and contact information of LCA practitioners:
Esalex srl, www.esalex.eu, info@esalex.eu

Company information

Owner of the EPD: Italgraniti Group S.p.A.

Contact: Armando Bergamini, email: A.Bergamini@italgranitigroup.com

Description of the organisation: Italgraniti Group has been on the market since 1975 (Impronta before and Italgraniti since 1994). The company is an Italian excellence in the production and commercialization of ceramic products. The porcelain stoneware of Italgraniti has highest technical and aesthetic performance and the company has attention to product quality and service.
The company is located in Formigine (MO) with a productive site in San Martino in Rio (RE), a historical district for the ceramic production. The plant of Formigine has function of warehouse with administrative offices. The plant in San Martino in Rio is the production site, with 3 independent production lines. This plant, highly technological, covers an area of 145.084 m^2, of which 35.201 m^2 covered.
Italgraniti group sells his products all over the world, to 1000 client located in 110 country in 5 continents (77% of products is exported).
Italgraniti Group S.p.A. is certified ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 and registered EMAS.

More information: www.italgranitigroup.com

Name and location of production site:
Italgraniti Group S.p.A.
Via per Carpi 54,
San Martino in Rio (RE) - Italy
T. +39 059 888411
info@italgranitigroup.com

Product information

Product name: Porcelain stoneware

Product description and identification: The products offered by Italgraniti group to the market are the excellence of Italian-made products, in their design, assortment of colours and decoration, ant the use of state-of-art technologies and raw materials. The slabs are resistant and durable, with different superficial effects, that give to the product adapt for all type of internal and external applications. Italgraniti group produces product of 50 collections, 30 formats and 160 colours.
In the EPD the porcelain stoneware tiles with thickness 9 mm and 20 mm produced by Italgraniti group are studied.

The collections for product with 9 mm thickness included in LCA study are:

- Charm experience
- Terre
- Nuances
- Silver grain
- Ceppo di Grè
- Lux experience
- Allure
- Icon blue
- Loft
- Shale
- Marble experience
- Mataline
- Up_stone
- Sands experience
- Nordic stone
- Alnus
- Spatula
- Beige experience
- My plank
- Stone plan
- Square
- Stone mix Scrapwood
- Maxiwood
- Mineral D
- Stone D.

The collections for product with 20 mm thickness included in LCA study are:

- Outdoorfloor20
- Charm experience
- Terre
- Nuances
- Silver grain + ceppo di Grè

- Allure
- Icon blue
- Loft
- Shale
- Metaline
- Up_stone
- Nordic stone
- My plank
- Stone plan
- Square
- Mineral D.

UN CPC code: **3732** Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous earths

Geographical scope: Global
The pretended communication of the EPD is B2B.

Technical specification:
The products has technical specification conforming to the standard EN14411 and ISO 13006 annex G Group Bla UGL with Ev ≤0,5% and to the standard EN14411 and ISO 13006 annex G Group Bla UGL with Ev ≤0,5%.
Conforming to standard EN14411 and ISO 13006 annex G Group Bla UGL with Ev ≤0,5%:

PHYSICAL PROPERTIES	TESTING METHOD	REFERENCE STANDARD				PRODUCT VALUES
Sizes	EN ISO 10545-2		**7cm ≤ N < 15cm**	**N ≥ 15 cm**		Conforming
			(mm)	(%)	(mm)	
		Length and width	±0.9	±0.6	±2.0	
		Thickness	±0.5	±5.0	±5.0	
		Lineartity	±0.75	±0.5	±1.5	
		Wedging	±0.75	±0.5	±2.0	
		Warpage	±0.75	±0.5	±2.0	
		appearance: percentage of acceptable tiles	95 % min.	95 % min.		
Water absorption %	EN ISO 10545-3	Ev ≤ 0,5%				Conforming
Modulus of rupture	EN ISO 10545-4	Average value 35 N/mm² min.				Conforming
Breakage resistence		sp. > = 7,5 mm: min 1300 N sp. < 7,5 mm: min 700 N				Conforming
Deep abrasion resistance	EN ISO 10545-6	175 mm3 max				Average < 150 mm3
Thermal expansion coefficient	EN ISO 10545-8	Declared value				6,8 MK^{-1}
Thermal shock resistance	EN ISO 10545-9	Pass according to ISO 10545-1				Resistant
Frost resistance	EN ISO 10545-12	Pass according to ISO 10545-1				Resistant
Resistance to low concentrations of acids and alkali -	EN ISO 10545-13	Declared value				Resistant

Resistance to high concentrations of acids and alkali		Declared value	Resistant
Resistance to domestic chemicals and additives for swimming pools		UB min	UA
Stain resistance of unglazed matte porcelain	EN ISO 10545-14	Declared value	Resistant
Slip resistance	DIN 51130	If needed	Value available upon request
	DIN 51097		Value available upon request
	B.C.R.A. - D.M.236/ 89		> 0,40 Dry / > 0,40 Wet
	ANSI A326.3 D COF		≥ 0,42 Wet

Conforming to the standard EN14411 ISO 13006 annex G Group Bla UGL with Ev ≤0,5%

PHYSICAL PROPERTIES	TESTING METHOD	REFERENCE STANDARD			PRODUCT VALUES
Sizes	EN ISO 10545-2		**7cm ≤ N < 15cm**	**N ≥ 15 cm**	Conforming
			(mm)	(%) (mm)	
		Length and width	±0.9	±0.6 ±2.0	
		Thickness	±0.5	±5.0 ±5.0	
		Lineartity	±0.75	±0.5 ±1.5	
		Wedging	±0.75	±0.5 ±2.0	
		Warpage	±0.75	±0.5 ±2.0	
		appearance: percentage of acceptable tiles	95 % min.	95 % min.	
Water absorption %	EN ISO 10545-3	Ev ≤ 0,5%			Conforming
Modulus of rupture	EN ISO 10545-4	Average value 35 N/mm² min.			Conforming
Breakage resistence		sp. > = 7,5 mm: min 1300 N sp. < 7,5 mm: min 700 N			Conforming
Abrasion resistance	EN ISO 10545-7	Required			See single tile picture
Thermal expansion coefficient	EN ISO 10545-8	Testing method available			6,8 MK^{-1}
Thermal shock resistance	EN ISO 10545-9	Testing method available			Resistant
Frost resistance	EN ISO 10545-12	Required			Resistant
Resistance to low concentrations of acids and alkali -	EN ISO 10545-13	See manufacturer's declaration			Resistant
Resistance to high concentrations of acids and alkali		Testing method available			Resistant
Resistance to domestic chemicals and additives for swimming pools		GB min.			Conforming
Stain resistance of unglazed matte porcelain	EN ISO 10545-14	Declared value			Resistant
Slip resistance	B.C.R.A. - D.M.236/ 89	If needed			Value available upon request

LCA information

Funcional unit: 1 m^2 of porcelain stoneware with thickness of 9 mm or 20 mm installed and with a useful life of 50 years. The product is used as floors and walls recovering and decoration for interiors and exteriors.
The study comprises the raw material extraction, raw material transportation, manufacturing, transportation to costumer, installation, end-of-life of product.

Reference service life: 50 years

Time representativeness: primary data refer to 2020 year. The generic data has been updated in 2019 (Ecoinvent 3.6).

Geographical representativeness: primary data are derived from Italgraniti group in San Martino in Rio production site. The secondary data are derived by database Ecoinvent 3.6 (RER or GLO records).

Technological representativeness: primary data are derived from processes and products of Italgraniti group under study. The secondary data are derived from databases of Italgraniti similar technology.

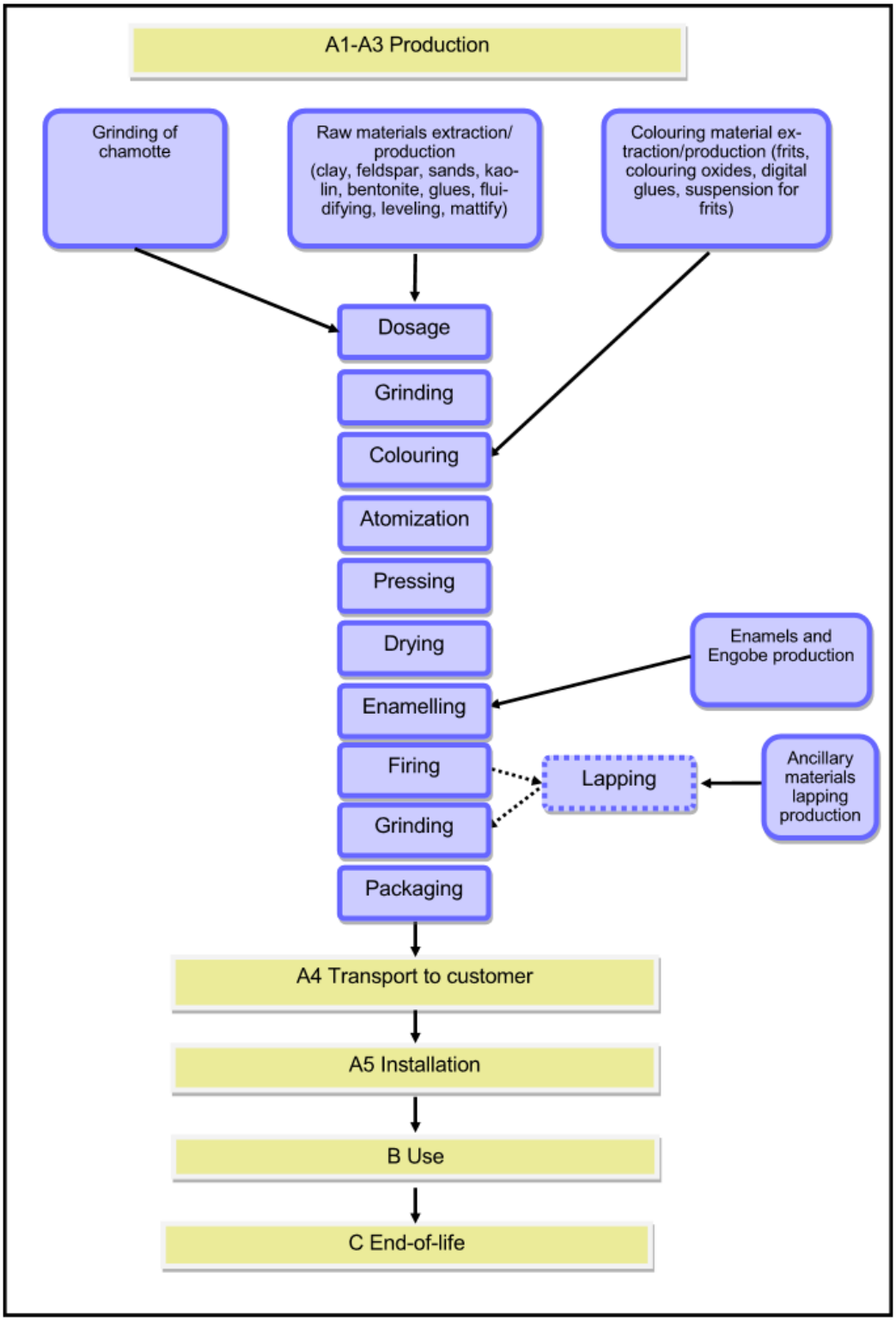
Database and LCA software used: for the elaboration of data SimaPro v. 9.1.0.8; the database used is Ecoinvent 3.6.

Description of system boundaries: cradle-to-grave (A-B-C) + module D

Excluded lifecycle stages: all life stages are included in the LCA study

More information: www.italgranitigroup.com

Production process
The system boundary is presented in the flow chart below:


A1-A3 Production
Grinding of chamotte
Raw materials extraction/ production (clay, feldspar, sands, kaolin, bentonite, glues, fluidifying, leveling, mattify)
Colouring material extraction/production (frits, colouring oxides, digital glues, suspension for frits)
Dosage
Grinding
Colouring
Atomization
Pressing
Drying
Enamels and Engobe production
Enamelling
Firing
Lapping
Ancillary materials lapping production
Grinding
Packaging
A4 Transport to customer
A5 Installation
B Use
C End-of-life

The production process analysed in the LCA study object of this EPD is characterized by a series of steps from the raw materials suppy to the production of finished slab.

- Dosage: The raw materials are stocked in silos and in warehouse boxes. The dosage takes place through weighting belts that determine the specific quantities of raw materials according to the recipes elaborated by internal laboratory.
- Grinding: the raw materials (clay, feldspar, sands, kaolin, bentonite and other materials) are shredded in mill with fluidifying and water to generate a mixture called “slip”.
- Colouring: colouring materials are added to slip (frits, colouring oxides).
- Atomization: the slip is subsequently dried by the spray drying technique, which takes place in the atomizers. Atomization is a continuous and controlled process that allows to obtain a semi-finished product whose residual moisture content, the shape and size of the granules are suitable for the next phase.
- Pressing: the atomized powders are compacted by a hydraulic press and uploaded in molds for forming the tiles.
- Drying: this phase aims to reduce the level of moisture in the tiles and takes place by transferring heat from the air to the raw tile with consequent transformation of water into water vapor.
- Enamelling: the raw tile is covered with a uniform veil of a glass composition called engobe, whose function is to protect the tile. After the engobe, the tile is digital printed and decoratated. Finally, the enamel is applied, a substance that acts as a protection from oxidizing agents, water and acids.
- Firing: this process consists in heating the materials by transferring energy at a certain temperature and for a specific time. In first time the a pre-heating with temperature between 500°C and 700°C happens, then the temperature can reache 1200°C.
- Lapping: the tile can be subject to a mechanical treatment, which makes the surface smooth and shiny.
- Grinding: this is a mechanical process for reducing the inhomogeneity of the finished products in terms of dimensions and edges.
- Packaging: Italgraniti packs its products with wood packaging (pallet, wood stand, crate), shrink plastic, cardboard, strapping.

Additional information:

- The allocation is applied in the LCA study: when necessary, mass allocation is used.
- Electricity: the supplier energy mix in the 2020 is used in production phase. 1 kWh – medium voltage = 0,549 kg CO_2eq.
- Cut-off: at least 95% of the energy and materials used by module has been introduced, as well as 99% of the total use of energy and materials
- The modularity principle, as well as the polluter payer principle have been followed
- The long-term emissions have not been included.
- The next processes have not been included since its impact is not significant:
    - Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process.
    - Personnel-related impacts, such as transportation to and from work.

- The impact method used are:
    - EN 15804+A2 v.1.00
    - Cumulative energy demand v. 1.00 for resource use
    - EDIP 2003 v. 1.07 for waste production.

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

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

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-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	Europe	Italy	Italy	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global
Specific data used	Yes					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Less than 10% of impacts in every group of products.					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	One manufacturing site – not relevant					-	-	-	-	-	-	-	-	-	-	-	-

- Module A1 – Raw material supply: this module includes the extraction and production of raw material. The processing of recycled materials (chamotte) is also accounted in this module.
  In the module the 2019 electricity mix of supplier is modelled (0,149 kg CO_2eq/MJ) 19,81% renewable resources, 4,64% Nuclear, 11,6% Hard coal, 59% Natural gas, 0,69% Petroleum products, 4,26% other resources. The natural gas production used in productive process is included (0,051 kg CO_2eq/MJ).

- Module A2 – Transport: this module includes the transportation of raw materials from the production site to the Italgraniti group gate.

- Module A3 – Manufacturing: this module considers Italgraniti group S.p.A. internal processes, including consumption of energy, resources and packaging.

- Module A4 – Transport: this module considers the transport of product to construction site. The distances are calculated as average weighted (in Italy and abroad) of all transport of 2020; for the model the distances from Italgraniti Group site to centre of state (for abroad distribution) or to the centre of province (for Italian distribution) are cosidered. The distribution modelled is: 18% in Italy and 82% abroad.

PARAMETER	DESCRIPTION / VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc	From Ecoinvent Truck (16-32 metric ton): 0,0375 kg of diesel low sulfur for ton*km transported Ferry: 0,030 kg of heavy fuel oil for ton*km transported Ship: 0,0025 kg of heavy fuel oil for ton*km transported Train: 0,0007 kg of diesel for ton*km transported
Distance	The distances are calculated as weighted average of all transportation in Italy and abroad in 2020: - Truck: 819,36 km - Ferry: 2,70 km - Ship: 3816,51 km - Train: 117,99 km
Capacity utilisation (including empty returns)	From Ecoinvent database: Truck: 66% Ferry: 50% Ship: 70% Train: unspecified
Bulk density of transported products (kg/m3)	For tile 9 mm: 2283,33 For tile 20 mm: 2188,00

- Module A5 – Construction installation: this module considers the installation of product in the building with use of auxiliary materials.

PARAMETER	DESCRIPTION	VALUE
Auxiliary materials for installation	Kg	0
Use of water	m^3	8,0E-04
Use of other resources	Cement glue (kg)	5
	Cement grout (kg)	0,0086 kg for 9 mm tiles 0,0192 kg for 20 mm tiles
	Liquid detergent (kg)	0,0282
Quantitative description of energy type and consumption during the preparation and installation process	Electric energy (kWh)	0 (manual installation)
Direct emissions to ambient air, soil and water	kg	0
Waste materials on the building site, before waste processing, generated by the product's installation; specified by type	Product losses	5%
	Wood packaging (kg)	0,47
	Cardboard (kg)	0,14
	Shrink plastic (kg)	0,04
	Strapping (kg)	0,009

Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal; specified by route	Landfill	100% of product packaging (0,47 kg of wood, 0,14 kg of cardboard, 0,05 kg of plastic) and 5% of product losses

- Module B – Use stage: The product is maintained with a periodic cleaning with water (every week) and detergent (every 2 weeks) for 50 years.

SCENARIO INFORMATION	DESCRIPTION / VALUE
Maintenance process	Periodic cleaning with water and detergent
Maintenance cycle	For 50 years
Ancillary materials for maintenance	Detergent: 0,134 ml/two weeks
Waste material resulting from maintenance	Not relevant
Net fresh water consumption during maintenance	Tap water: 0,1 l/week
Energy input during maintenance	No energy use during maintenance

- Module C1 – Deconstruction/demolition: The product is uninstalled with the use of jackhammer and the consume of 0,03 kWh of electricity.

- Module C2 – Transport to waste processing: the product is then transported to disposal; the scenario provides the transport for 50 km.

- Module C3 - Waste processing for reuse, recovery and/or recycling: the product is send to landfill; any process of reuse, recovery and/or recycling isn't considered in the study.

- Module C4 - Disposal: the product is totally disposed in landfill.

PARAMETER	DESCRIPTION / VALUE
Collection process specified by type	Product waste are collected with 16-32 metric ton truck
Recovery system specified by type	There is no recovery, recycling or reuse
Disposal specified by type	100 % Landfill
Assumptions for scenario development (e.g. transportation)	16-32 metric ton truck. Distance: 50 km

Module D - Reuse-Recovery-Recycling potential: Module D calculates the potential environmental benefits of the recycling or reuse of materials. The product has not considerable benefits due to recycling or/and reuse.

Content information for 9 mm thickness tile (20,55 kg)

Product components	Weight, %	Post-consumer material, weight-%	Renewable material, weight-%
Clay	>45%	0	0
Feldspar	<40%	100 (pre-consumer)	0
Chamotte	>1%	0	0
Sands	>10%	0	0
Kaolin/Bentonite/Engobe	<2%	0	0
Frits/colouring oxides/suspension for frit	<1%	0	0
Other additives	<2%	0	0
TOTAL Kg	20,55		
Total pre-consumer materials	1,10%		
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Wood	0,47	2,27	
Strapping (plastic)	0,0089	0,043	
Cardboard	0,14	0,69	
Shrink plastic	0,044	0,21	
TOTAL	0,66	3,22	

During the life cycle of the product any hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" has not been used in a percentage higher than 0,1% of the weight of the product.

Environmental Information - 9 mm thickness

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil (kg CO_2 eq.)	1,11E+01	3,86E+00	2,63E+00	0,00E+00	7,69E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,46E-02	1,77E-01	0,00E+00	1,08E-01	0,00E+00
GWP-biogenic (kg CO_2 eq.)	-7,53E-01	2,27E-03	3,67E-01	0,00E+00	-2,72E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,46E-04	6,85E-05	0,00E+00	2,15E-04	0,00E+00
GWP-luluc (kg CO_2 eq)	5,24E-03	1,80E-03	7,54E-04	0,00E+00	1,85E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,10E-05	6,41E-05	0,00E+00	3,02E-05	0,00E+00
GWP-total (kg CO_2 eq)	1,04E+01	3,86E+00	3,00E+00	0,00E+00	6,82E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,48E-02	1,77E-01	0,00E+00	1,08E-01	0,00E+00
ODP (kg CFC 11 eq.)	1,60E-06	8,18E-07	2,12E-07	0,00E+00	4,11E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,03E-09	3,87E-08	0,00E+00	4,46E-08	0,00E+00
AP (mol H^+ eq.)	3,31E-02	4,09E-02	9,47E-03	0,00E+00	4,75E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,26E-04	9,05E-04	0,00E+00	1,03E-03	0,00E+00
EP-freshwater (kg PO_4^{3-} eq.)	5,01E-04	1,18E-04	1,08E-04	0,00E+00	1,72E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,20E-06	5,07E-06	0,00E+00	3,72E-06	0,00E+00
EP-freshwater (kg P eq)	1,63E-04	3,83E-05	3,51E-05	0,00E+00	5,60E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,37E-06	1,65E-06	0,00E+00	1,21E-06	0,00E+00
EP-marine (kg N eq.)	7,27E-03	1,14E-02	2,62E-03	0,00E+00	2,64E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E-05	3,02E-04	0,00E+00	3,53E-04	0,00E+00
EP-terrestrial (mol N eq.)	7,44E-02	1,26E-01	2,68E-02	0,00E+00	1,25E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,37E-04	3,33E-03	0,00E+00	3,90E-03	0,00E+00
POCP (kg NMVOC eq.)	2,44E-02	3,41E-02	7,48E-03	0,00E+00	3,90E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,33E-05	9,48E-04	0,00E+00	1,13E-03	0,00E+00
ADP-minerals&metals (kg Sb eq.) [1]	5,29E-04	8,60E-05	3,99E-05	0,00E+00	1,93E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,82E-08	4,69E-06	0,00E+00	9,90E-07	0,00E+00
ADP-fossil (MJ) [1]	1,69E+02	5,59E+01	2,18E+01	0,00E+00	1,39E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	2,63E+00	0,00E+00	3,03E+00	0,00E+00
WDP (m^3) [1]	4,27E+00	1,78E-01	4,65E-01	0,00E+00	1,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-03	8,51E-03	0,00E+00	1,36E-01	0,00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption														

[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.

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2] (kg CO_2 eq.)	1,09E+01	3,82E+00	2,85E+00	0,00E+00	9,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,41E-02	1,75E-01	0,00E+00	1,06E-01	0,00E+00

[2] 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. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Information on biogenic carbon content

Results per functional unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	1,21E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Use of resources

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B2**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE (MJ)	1,99E+01	7,85E-01	1,56E+00	0,00E+00	5,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-02	2,93E-02	0,00E+00	2,45E-02	0,00E+00
PERM (MJ)	9,74E+00	0,00E+00	8,47E-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	0,00E+00	0,00E+00
PERT (MJ)	2,96E+01	7,85E-01	2,41E+00	0,00E+00	5,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-02	2,93E-02	0,00E+00	2,45E-02	0,00E+00
PENRE (MJ)	1,69E+02	5,59E+01	2,18E+01	0,00E+00	1,42E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	2,63E+00	0,00E+00	3,03E+00	0,00E+00
PENRM (MJ)	2,17E+00	0,00E+00	1,94E-01	0,00E+00	3,66E-02	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)	1,71E+02	5,59E+01	2,20E+01	0,00E+00	1,42E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	2,63E+00	0,00E+00	3,03E+00	0,00E+00
SM (kg)	1,21E+00	0,00E+00	1,06E-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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW (m^3)	8,42E-02	1,02E-02	3,44E-02	0,00E+00	5,27E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,04E-04	4,99E-04	0,00E+00	3,36E-03	0,00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water														

Waste production and output flows

Waste production

Results per functional unit														
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed (kg)	2,48E-04	1,28E-04	3,33E-05	0,00E+00	1,12E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,44E-07	6,93E-06	0,00E+00	4,52E-06	0,00E+00
Non-hazardous waste disposed (kg)	1,85E+00	2,14E+00	2,00E+00	0,00E+00	1,01E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,56E-03	1,24E-01	0,00E+00	2,05E+01	0,00E+00
Radioactive waste disposed (kg)	2,15E-04	3,70E-04	7,85E-05	0,00E+00	2,55E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,93E-07	1,73E-05	0,00E+00	1,99E-05	0,00E+00

Output flows

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (kg)	1,38E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Content information for 20 mm thickness tile (43,76 kg)

Product components	Weight, %	Post-consumer material, weight-%	Renewable material, weight-%
Clay	>45%	0	0
Feldspar	<40%	100 (pre-consumer)	0
Chamotte	>1%	0	0
Sands	>10%	0	0
Kaolin/Bentonite/Engobe	<2%	0	0
Frits/colouring oxides/suspension for frit	<1%	0	0
Other additives	<2%	0	0
TOTAL Kg	43,76		
Total pre-consumer materials	1,10%		
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Wood	0,47	1,06	
Strapping (plastic)	0,0089	0,02	
Cardboard	0,14	0,33	
Shrink plastic	0,044	0,10	
TOTAL	0,66	1,51	

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0,1% of the weight of the product.

Environmental Information – 20 mm thickness

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil (kg CO_2 eq.)	1,31E+01	8,08E+00	2,96E+00	0,00E+00	7,69E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,46E-02	3,77E-01	0,00E+00	2,30E-01	0,00E+00
GWP-biogenic (kg CO_2 eq.)	-7,55E-01	4,76E-03	3,67E-01	0,00E+00	-2,72E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,46E-04	1,46E-04	0,00E+00	4,57E-04	0,00E+00
GWP-luluc (kg CO_2 eq)	9,00E-03	3,78E-03	1,05E-03	0,00E+00	1,85E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,10E-05	1,36E-04	0,00E+00	6,42E-05	0,00E+00
GWP-total (kg CO_2 eq)	1,24E+01	8,09E+00	3,33E+00	0,00E+00	6,82E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,48E-02	3,77E-01	0,00E+00	2,31E-01	0,00E+00
ODP (kg CFC 11 eq.)	1,85E-06	1,71E-06	2,74E-07	0,00E+00	4,11E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,03E-09	8,24E-08	0,00E+00	9,49E-08	0,00E+00
AP (mol H^+ eq.)	5,07E-02	8,57E-02	1,27E-02	0,00E+00	4,75E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,26E-04	1,93E-03	0,00E+00	2,19E-03	0,00E+00
EP-freshwater (kg PO_4^{3-} eq.)	7,49E-04	2,46E-04	1,27E-04	0,00E+00	1,72E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,20E-06	1,08E-05	0,00E+00	7,93E-06	0,00E+00
EP-freshwater (kg P eq)	2,44E-04	8,02E-05	4,14E-05	0,00E+00	5,60E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,37E-06	3,51E-06	0,00E+00	2,58E-06	0,00E+00
EP-marine (kg N eq.)	9,56E-03	2,38E-02	3,40E-03	0,00E+00	2,64E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E-05	6,43E-04	0,00E+00	7,52E-04	0,00E+00
EP-terrestrial (mol N eq.)	1,04E-01	2,64E-01	3,56E-02	0,00E+00	1,25E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,37E-04	7,09E-03	0,00E+00	8,30E-03	0,00E+00
POCP (kg NMVOC eq.)	3,19E-02	7,15E-02	9,85E-03	0,00E+00	3,90E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,33E-05	2,02E-03	0,00E+00	2,41E-03	0,00E+00
ADP-minerals&metals (kg Sb eq.) [1]	1,11E-03	1,80E-04	7,40E-05	0,00E+00	1,93E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,82E-08	9,98E-06	0,00E+00	2,11E-06	0,00E+00
ADP-fossil (MJ) [1]	1,93E+02	1,17E+02	2,64E+01	0,00E+00	1,39E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	5,59E+00	0,00E+00	6,44E+00	0,00E+00
WDP (m^3) [1]	7,35E+00	3,73E-01	6,37E-01	0,00E+00	1,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-03	1,81E-02	0,00E+00	2,89E-01	0,00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption														

[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.

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2] (kg CO_2 eq.)	1,28E+01	8,01E+00	3,17E+00	0,00E+00	9,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,41E-02	3,73E-01	0,00E+00	2,26E-01	0,00E+00

1 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. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Information on biogenic carbon content

Results per functional unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	1,21E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Use of resources

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B2**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE (MJ)	2,15E+01	1,64E+00	1,69E+00	0,00E+00	5,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-02	6,25E-02	0,00E+00	5,21E-02	0,00E+00
PERM (MJ)	9,74E+00	0,00E+00	8,47E-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	0,00E+00	0,00E+00
PERT (MJ)	3,12E+01	1,64E+00	2,54E+00	0,00E+00	5,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-02	6,25E-02	0,00E+00	5,21E-02	0,00E+00
PENRE (MJ)	1,93E+02	1,17E+02	2,64E+01	0,00E+00	1,42E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	5,59E+00	0,00E+00	6,44E+00	0,00E+00
PENRM (MJ)	2,17E+00	0,00E+00	1,94E-01	0,00E+00	3,66E-02	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)	1,95E+02	1,17E+02	2,65E+01	0,00E+00	1,42E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E-01	5,59E+00	0,00E+00	6,44E+00	0,00E+00
SM (kg)	2,59E+00	0,00E+00	2,25E-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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW (m^3)	1,39E-01	2,15E-02	3,79E-02	0,00E+00	5,27E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,04E-04	1,06E-03	0,00E+00	7,16E-03	0,00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water														

Waste production and output flows

Waste production

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed (kg)	3,07E-04	2,68E-04	4,39E-05	0,00E+00	1,12E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,44E-07	1,47E-05	0,00E+00	9,63E-06	0,00E+00
Non-hazardous waste disposed (kg)	3,71E+00	4,49E+00	3,38E+00	0,00E+00	1,01E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,56E-03	2,64E-01	0,00E+00	4,37E+01	0,00E+00
Radioactive waste disposed (kg)	2,96E-04	7,75E-04	1,05E-04	0,00E+00	2,55E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,93E-07	3,68E-05	0,00E+00	4,23E-05	0,00E+00

Output flows

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (kg)	1,38E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional information

No further information is provided.

This document is the first emission of EPD.

References

- General Programme Instructions of the International EPD® System. Version 3.01.
- PCR 2019:14. CONSTRUCTION PRODUCTS. Version 1.11
- EN 17160:2019 Product category rules for ceramic tiles
- ISO 14040:2006 Environmental management-Life Cycle Assessment - Principles and framework
- ISO 14044:2006 Environmental management-Life Cycle Assessment-Requirements and guidelines
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures
- EN 15804:2012+A2:2019, Sustainability of construction works — Environmental product declarations
- Project report rev.1 of 13/01/2022 – Life cycle assessment: Porcelain stoneware

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