

Environmental Product Declaration

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

Porcelain Tile from

ING | KUTAHYA
SERAMİK

Programme: The International EPD® System

Programme Operator: EPD International AB

Local Operator: EPD Turkey

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Programme Information

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)
Product Category Rules (PCR): 2019:14 Version 1.2.5, 2024-12-20, Construction Products and CPC 54
Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works

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

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

EPD process certification EPD verification

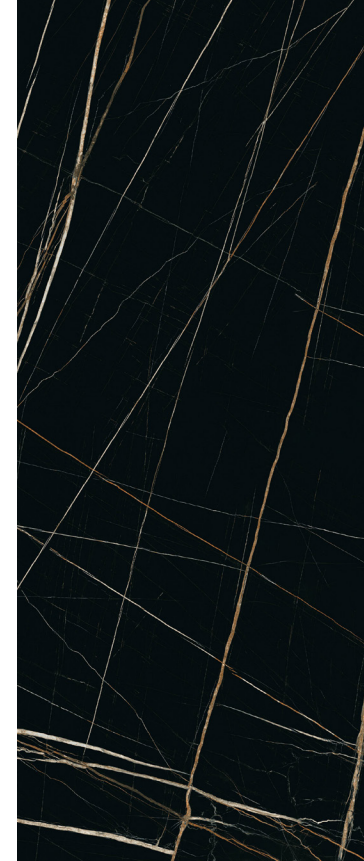
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Approved by: The International EPD® System Technical Committee, supported by the Secretariat

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.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, 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. For further information about comparability, see EN 15804 and ISO 14025.



About

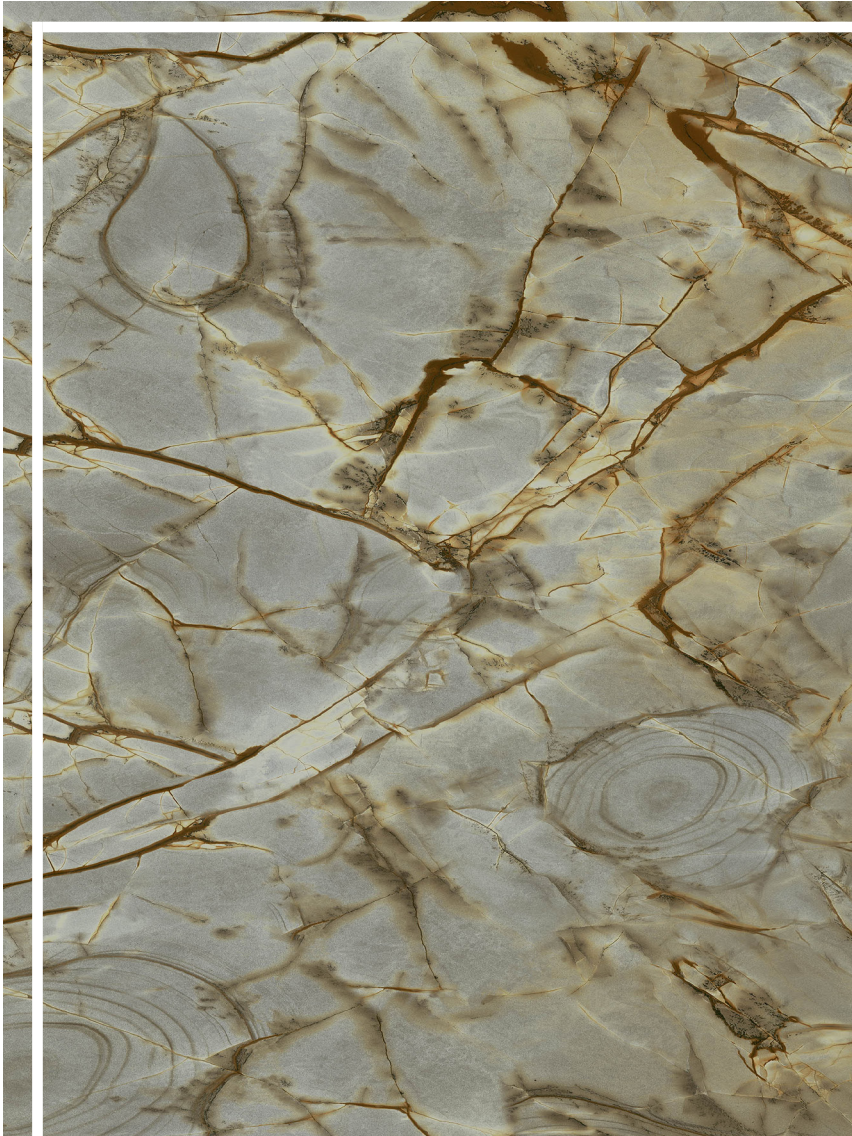
NG Kütahya Seramaik

NG Kütahya Seramik sets the trends in its sector with its firsts, innovations and distinctive designs. Ceramics of 120x240 cm, 120x120 cm and 30x240 cm sizes are produced by NG Kütahya Seramik for the first time in Turkey. NG Kütahya Seramik, which adds a unique, contemporary and luxurious look to living spaces by equipping its innovative sized collections with architectural and aesthetic touches, reflects the plain beauty of nature to spaces with its high technology.

NG Kütahya Seramik, the owner of many international design awards, won the "IF Product Design 2011" award with its Versatile collection in 2011. NG Kütahya Seramik was also the first and only ceramic brand in the world which was awarded the "Red Dot Design Award Best" award within the same year. With its three-dimensional series Nexus, it received an award in the product design category at the "Red Dot Design Award. NG Kütahya Seramik, which brings the world's most modern and advanced technologies to the Turkish ceramic industry, won the Best Industrial Building Award twice in the "Sign of the City Awards" contest.

In Super brands 2016-2017; it was selected as Turkey's Super Brand with its innovative dimensions, modern technology, distinctive designs and international awards. NG Kütahya Seramik, which has always been a pioneer in the industry, became "Turkey's Most Respected Ceramic Brand" in the ceramic category of the 2019 Turkey Reputation Index Survey. It has been selected as the "Diamond Brand of Turkey" for two years in a row in the 2019-2020 Economic Benefit Index (EFE), which was carried out jointly by the Turkish Reputation Academy and Yıldız Technical University.

03 About Product



Ceramic tiles are primarily made of naturally occurring materials such as kaolin, clay and feldspar, but they may also include other raw materials such as marble, frit, dolomite, bentonite and quartz. The required composition is blended with water to form uniform slurry, which is generally referred as “masse”. This slurry is then fed into spray driers to form uniform granules ready for compaction.

These granules are shaped to form the bisque or green body. This can be glazed or left unglazed depending on its intended use. The green ceramic body is fired at high temperatures, resulting in a hard body. Floor tiles tend to have better mechanical strength compared to wall tiles, due to their lower porosity. Depending on the use, tiles might be glazed to control abrasion and slip resistance.

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Technical Specifications

Technical Specifications	Turkish and AND European Standards	Standard Numbers
	EN 14411 ANNEX G Grup B1a Eb ≤ % 0,5	Test Method
Length and width	7 cm ≤ N < 15cm +/- 0,9 mm N ≥ 15cm +/- % 0,6 +/- 2 mm	EN ISO 10545-2
Thickness	7 cm ≤ N < 15cm +/- 0,5 mm N ≥ 15cm +/- % 5 +/- 0,5 mm	EN ISO 10545-2
Straightness of sides	7 cm ≤ N < 15cm +/- 0,75 mm N ≥ 15cm +/- % 0,5 +/- 1,5 mm	EN ISO 10545-2
Rectangularity	7 cm ≤ N < 15cm +/- 0,75 mm N ≥ 15cm +/- % 0,5 +/- 2,0 mm	EN ISO 10545-2
Surface flatness	7 cm ≤ N < 15cm + 0,75 mm N ≥ 15cm +/- % 0,5 +/-2,0mm	EN ISO 10545-2
Water absorption	Eb ≤ % 0,5	EN ISO 10545-3
Breaking strength	Thickness ≥ 7,5 mm Min:1300 N Thickness < 7,5 mm Min:700 N	EN ISO 10545-4
Strength or modulus of rupture	Min:35 N/mm ²	EN ISO 10545-4
Abrasion resistance (unglazed)	Maximum 175 mm ³	EN ISO 10545-6
Abrasion resistance (glazed)	"Abrasion class : II - IV (Abrasion class and cycles passed)"	EN ISO 10545-7
Coefficient of linear thermal expansion	Declared value	EN ISO 10545-8
Thermal shock resistance	Required	EN ISO 10545-9
Crazing resistance	Required	EN ISO 10545-11
Frost resistance	Required	EN ISO 10545-12
Slipperiness	Declared value	CEN/TS 16165
Bond strength/adhesion (for cementitious adhesives)	Declared value	EN 12004:2007+A1
Moisture expansion	Declared value	EN ISO 10545-10
Small colour differences (for solid color tiles)	Glazed tiles: Δ E _{cmc} < 0,75 / Unglazed tiles : Δ E _{cmc} < 1,0	EN ISO 10545-16
Impact resistance	Declared value	EN ISO 10545-5
Reaction to fire	(Class A1 or A1FL)	-
Resistance to staining	Glazed tiles Min:Class3 / Unglazed tiles:Declared value	EN ISO 10545-14
Resistance to chemicals	"Resistance to high and low concentrations of acids and alkalis: Declared value Resistance to household chemicals and swimming pool salts: Min:B"	EN ISO 10545-13
Release of dangerous substances	Declared value	EN ISO 10545-15

Raw Metarial	Composition (%)
Feldspar	60-70
Clay	10-20
Industrial Sludge	10-20
Others	0-5

Packaging Material	Weight (%/m ²)
Cardboard	97.2
Plastic	2.6
Paper	0.8
Others	<1

Usage Areas

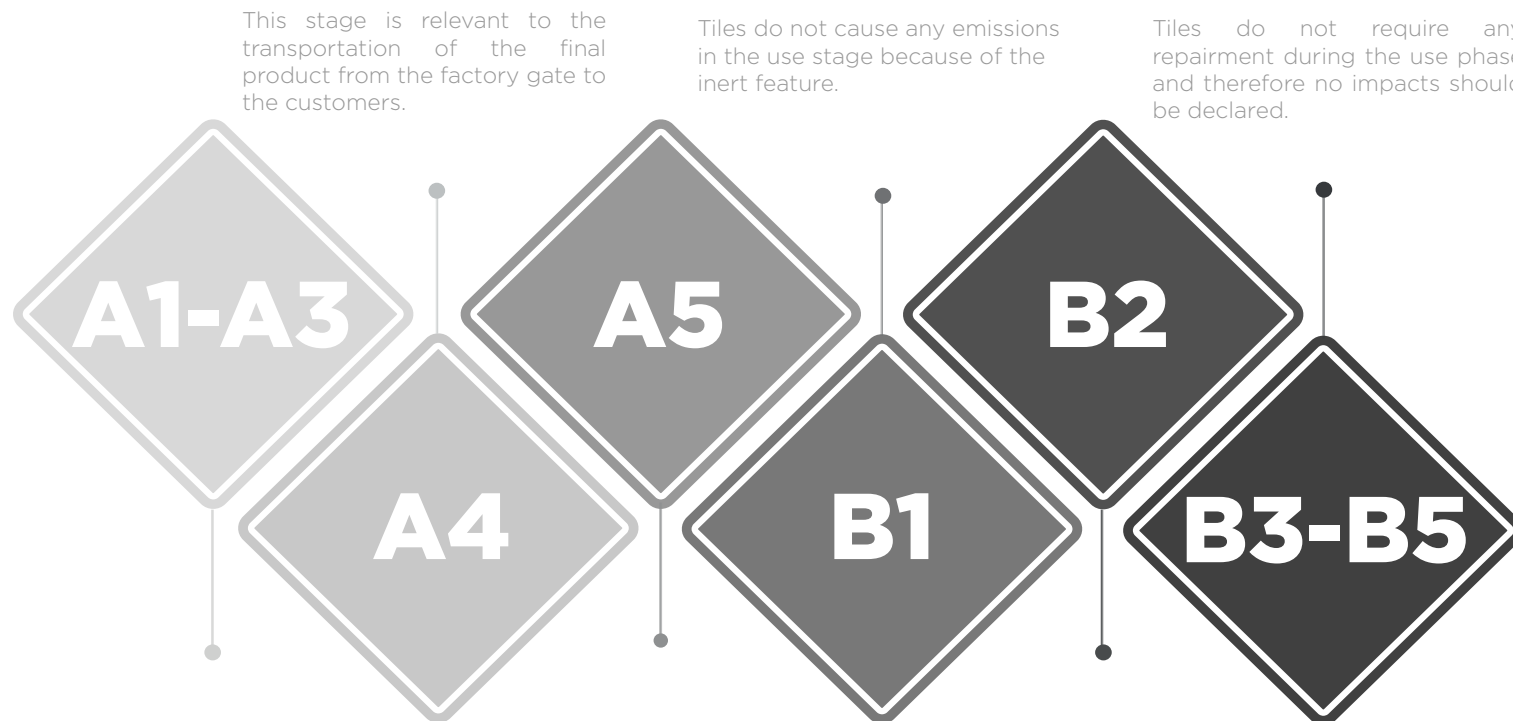
Ceramic Wall, Floor and Porcelain Tiles manufactured in the production plant of NG Kütahya are largely used as interior and exterior wall coverings. Thanks to their superior technical characteristics, the products may be utilized in the following areas:

- Commercial buildings (shopping centres, hotels, offices, banks, restaurants, stores, etc., areas with heavy circulation),
- Residential areas (luxurious houses, villas etc.),
- Public buildings (justice halls, municipality buildings, etc.),
- Education and cultural buildings (schools, theatres, cultural centres, etc.),
- Floors, walls and exterior facades; and
- Floors of outdoor facilities such as gardens, terraces, poolside and recreation areas.

Interior applications are mainly in bathrooms and kitchens in residential applications while the exterior applications can include swimming pools, facades, commercial and industrial applications etc. For interior applications, floor tiles should be selected regarding the technical specifications such as PEI value, hardness, stain resistance, chemical resistance and easy cleaning, if they are to be used in the interiors of a residence.

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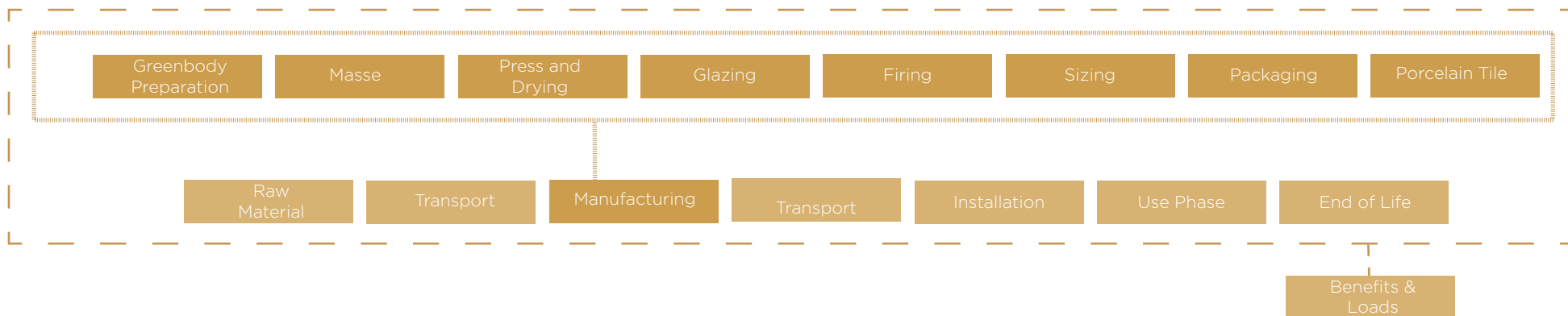
System Boundary



A1 represents raw material supply which includes raw material extraction and pre-treatment processes before production. A2 relevant to raw material transportation to the plant and A3 refers to the impact occurs from manufacturing process.

This stage includes the adhesive mortar and water usage in the construction site. For 1 m² tile installation; 6 kg mortar and 1.5L water usage was advised by NG Kütahya Seramik.

NG Kütahya Seramik advises to use 0.2 mL detergent and rinse with 0.1L tap water after cleaning. The results are given for a one-time cleaning activity, as the activity will vary by user.



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System Boundary

Deconstruction of tiles at the end of their life is done manually. So no impact occurs in this module.

Environmental impacts generated during the crushing of discarded tiles before recycle or reuse are

Inert filler benefits and recycling of packaging materials specified in the disposal stage.



Tiles do not require any water and energy in the use phase and therefore no impacts occurred in this module.

Waste transport includes discarded tiles and mortar to disposal area. Distance from demolition site to inert landfill site for final disposal is assumed as 50 km.

Tiles end up at construction and demolition waste landfills at their end of life and modelled as such in this LCA.

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LCA RESULTS



Goal and Scope

Evaluation of environmental impacts for 1 m² average tiles from cradle to grave.

System Boundary

The system boundary of the Kütahya Seramik Tiles are cradle to grave with module D.

Information on biogenic carbon content according to EN 15804+A2

Biogenic Carbon Content	Unit	Quantity
Biogenic carbon content in product	kg C	0.023
Biogenic carbon content in packaging	kg C	-0.013

	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	Deconstruction & Demolition	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	>90%					-											
Variation - products	0%					-											
Variation - Sites	0%					-											

(X = Included in LCA, ND= Not Declared, NR=Not Relevant)

REACH Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt)

Database and LCA Software

Ecoinvent 3.8 and SimaPro 9.3 is used for the calculation.

Data Quality

Raw materials, energy and water consumption, waste generation, material and product transport data are primary data collected from NG Kütahya Seramik.

Period Under Review

All primary data collected from Kütahya Seramik is for the period year of 2022.

Declared Unit

1 m² average tile with an average weight of 18.9 kg and a thickness of 8 mm.

Geographical Scope

The geographical scope of this EPD is Global.

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP - Fossil	kg CO ₂ eq	9.21	1.66	6.60	0	4.82E-04	0	0	0.252	0	0.308	-0.714
GWP- Biogenic	kg CO ₂ eq	0.009	0.005	0.126	0	2.56E-04	0	0	6.07E-04	0	0.038	-0.002
GWP - Luluc	kg CO ₂ eq	0.002	0.001	0.007	0	6.27E-04	0	0	1.23E-04	0	3.10E-04	-0.002
GWP - Total	kg CO ₂ eq	9.22	1.67	6.73	0	0.001	0	0	0.252	0	0.346	-0.719
ODP	kg CFC-11 eq	1.36E-06	3.77E-07	6.41E-07	0	7.95E-11	0	0	5.34E-08	0	9.31E-08	-1.38E-07
AP	mol H+ eq	0.023	0.009	0.044	0	5.36E-06	0	0	0.001	0	0.003	-0.007
EP - Freshwater	kg P eq	0.003	1.26E-04	0.002	0	3.73E-06	0	0	2.13E-05	0	8.93E-05	-8.04E-05
EP - Marine	kg N eq	0.008	3.86E-04	0.007	0	1.14E-05	0	0	6.53E-05	0	2.73E-04	-2.46E-04
EP - Terrestrial	mol N eq	0.005	0.002	0.007	0	5.24E-06	0	0	2.91E-04	0	0.001	-0.002
POCP	kg NMVOC	0.054	0.026	0.074	0	1.81E-05	0	0	0.003	0	0.010	-0.022
ADPE	kg Sb eq	0.014	0.007	0.022	0	2.75E-06	0	0	0.001	0	0.002	-0.005
ADPF	MJ	5.99E-05	5.58E-06	1.18E-04	0	8.93E-09	0	0	1.11E-06	0	1.00E-06	-4.18E-06
WDP	m ³ depriv.	145	25.0	95.2	0	0.005	0	0	3.64	0	7.19	-10.17
PM	disease inc.	4.00	0.081	4.06	0	0.007	0	0	0.013	0	0.312	-0.878
IR	kBq U-235 eq	2.08E-07	1.12E-07	3.81E-07	0	7.47E-11	0	0	1.53E-08	0	5.01E-08	-6.74E-08
ETP - FW	CTUe	100	19.5	222	0	0.064	0	0	3.35	0	5.31	-9.66
HTP - C	CTUh	2.89E-09	6.60E-10	8.73E-09	0	1.40E-12	0	0	1.09E-10	0	2.21E-10	-5.51E-10
HTP - NC	CTUh	1.07E-07	2.02E-08	2.13E-07	0	2.74E-11	0	0	3.08E-09	0	3.49E-09	-9.97E-09
SQP	Pt	35.1	17.2	55.1	0	0.040	0	0	2.21	0	17.8	-22.8
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.											
Disclaimer 1	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.											
Disclaimer 2	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.											

Resource Use												
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	5.49	0.418	6.07	0	0.019	0	0	0.049	0	0.123	-0.222
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	5.49	0.418	6.07	0	0.019	0	0	0.049	0	0.123	-0.222
PENRE	MJ	145	25.0	95.2	0	0.006	0	0	3.64	0	7.19	-10.2
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	145	25.0	95.2	0	0.006	0	0	3.64	0	7.19	-10.2
SM	MJ	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	0.135	0.004	0.092	0	3.00E-04	0	0	0.001	0	0.008	-0.067
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.											
Waste Output Flows												
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	kg	2.16E-07	0	0	0	0	0	0	0	0	0	0
NHWD	kg	3.10E-07	0	0	0	0	0	0	0	0	24.9	0
RWD	kg	0	0	0	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0
EE(Electrical)	MJ	0	0	0	0	0	0	0	0	0	0	0
EE(Thermal)	MJ	0	0	0	0	0	0	0	0	0	0	0
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.											
Climate Impact												
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
*GHG-GWP	kg CO ₂ eq	9.09	1.65	6.45	0	0.001	0	0	7.60	0	0.326	-0.709
GHG-GWP = 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. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013												
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.											

08

References

GPI/ General Programme Instructions of the International EPD® System. Version 4.0.

EN ISO 9001/ Quality Management Systems - Requirements

EN ISO 14001/ Environmental Management Systems - Requirements

Ecoinvent / Ecoinvent Centre. www.ecoinvent.org

ISO 14020:2000/ Environmental Labels and Declarations — General principles

EN 15804:2012+A2:2019/ Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations -Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10. Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

PCR for Construction Products and CPC 54 Construction Services/ Prepared by IVL Swedish Environmental Research Institute. Swedish Environmental Protection Agency. SP Trä. Swedish Wood Preservation Institute. Swedisol. SCDA. Svenskt Limträ AB. SSAB. The International EPD System. 2019:14 Version 1.11 DATE 2019-12-20

The International EPD® System/ 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. www.environdec.com

SimaPro/ SimaPro LCA Software. Pré Consultants. the Netherlands. www.presustainability.com

ngkutahyaseramik.com.tr/

09

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