ENVIRONMENTAL PRODUCT DECLARATION

Porcelain Tile

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

EPD® TURKEY
ENVIRONMENTAL PRODUCT DECLARATIONS

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

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The International EPD® System
www.environdec.com

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Graniser CERAMICS

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

Programme Information

Enviromental **P**roduct **D**eclarations

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Product Category Rules (PCR): 2019:14 Version 1.11. 2021-02-05. Construction Products and CPC 54 Construction Services. EN 15804:2012 + A2:2019 Sustainability of Construction Works

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

EPD process certification EPD verification X

Third party verifier: Prof. Vladimír Kocí

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No X

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.

About the Company

Enviromental **P**roduct **D**eclarations

GRANİSER GRANİT SERAMİK A.Ş. was established in 1997 by focusing on infrastructure. technology. design and quality standards. The company has grown rapidly with the innovations it has brought to the sector and has become one of Turkey's leading ceramic tile manufacturers aiming for excellence in customer care.

The Head Office of GRANİSER GRANİT SERAMİK A.Ş. is in İzmir/ Turkey. The production facility is located in Akhisar / Manisa Organized Industrial Zone, which is 1 kilometer distance to the Izmir-Istanbul highway. The production facility established on an area of 275 decares and the factory has an annual production capacity of 22 million square meters. The double-fired wall tiles, floor tiles and glazed porcelain tiles in various sizes and designs are produced with 11 kilns and 20 production lines.

Our company has a strong distribution channel with over 40 authorized dealers in the Turkish market. Meanwhile it continues to increase its strength in the foreign market day by day with its exports to more than 60 countries. The needs of all markets. especially Israel. UK. USA and Germany. are met with a product portfolio that is constantly renewed and follows the trends closely. Our company continues to be the center of attention with its products that leading the sector in Unicera and Cersaie fairs with more than 40 new designs every year.

Graniser Seramik was awarded the 1st place prize for ten consecutive times that exports the most in the sector at the "Stars of Export" award ceremony organized by the Aegean Exporters' Association.

Graniser Seramik. which carries many novelties in the ceramic industry. continues its goal of creating products that are as real as natural with the motto of "In Pursuit of Perfection" within the framework of the principle of sustainable management of environment and energy resources.

GRANİSER GRANİT SERAMİK A.Ş. which exhibits its stance on providing quality products and unlimited customer satisfaction with ISO 9001 Quality Management System and ISO 10002 Customer Satisfaction Management System certificates. has adopted the manufacture of products by preserving and increasing the value of the products. while reducing the use of raw materials. energy consumption and waste generation at the production stage as the general principle of production.

Our company has been registered with Zero Waste. ISO 14001 Environmental Management System and ISO 50001 Energy Management system certificates to realize sustainable production by using reliable and healthy processes and systems for employees. society and consumers that do not pollute the nature. protect natural resources at every step from the first stage of the product to its presentation to the consumer.

The security sought in processes such as the health and safety of employees and visitors. the management of warehouse shipping areas. the physical security of the factory. loading operations. electronic data circulation and logistics have been provided with the implementation of the ISO 45001 Occupational Health and Safety Management System.

Our company protects information resources and increases the awareness of employees and related parties with the ISO 27001 Information Security Management System based on the fact that it is not possible to protect information security and business continuity with only technical measures. also needs to provide precautions and audits.

GRANİSER GRANİT SERAMİK A.Ş. is audited by the Turkish Standards Institute (TSE) every year in accordance with the Turkish and European Standards with TS EN 14411 Ceramic Tiles" and "TSE Double Star" certificates. CE and UKCA labels are used on the products. LCA report and Product Carbon Footprint documents in compliance with ISO 14040/44. EN15804-A2:2019 and EN 16903 have been obtained to take place in Leed and Breeam Green Building projects. Our ISO 14025 EPD Environmental Product Statements have been published on the ECO-Platform for wall tiles. floor tiles and ceramic products.

GRANİSER GRANİT SERAMİK A.Ş owes its rapid and successful rise to its qualified and devoted employees. it supports the continuous training and development with the motto "Together We are Stronger".

Product Information

Enviromental **P**roduct **D**eclarations

Composition

Graniser Glazed Porcelain Tile is produced from kaolin. clay and feldspar. The distribution of the composition is given in the table.

After production. the final products are packed. Products are packaged with recycleable cardboards and plastics.

UN CPC code for Graniser Porcelain Tiles is 37310.

Raw Material	%
Kaolin	15-20
Clay	40-50
Feldspar	30-40

Manufacturing

Ceramic tile produced from clays and/or other inorganic raw materials. Tiles are pressed by dry-pressing at room temperature followed by drying and firing at temperatures sufficient to develop the required technical properties. Ceramic tiles manufactured through a defined process and featuring a specific water absorption.

Applications

Houses. office and administration buildings. business and shopping centers. hotels and any type of building.

Product Information

Technical Specifications

Graniser CERAMICS	CERAMIC TILES -GLAZED PORCELAIN-	
	TS EN 14411:2016 ANNEX G, GROUP BI_a	**GRANISER CERAMICS**
LENGTH AND WIDTH	N ≥ 15 cm Max. ± 2 mm	N ≥ 15 cm Max. ± 1.8 mm
THICKNESS	N ≥ 15 cm Max. ± 0.5 mm	N ≥ 15 cm Max. ± 0.5 mm
STRAIGHTNESS OF SIDES	N ≥ 15 cm Max. ± 1.5 mm	N ≥ 15 cm Max. ± 1.2 mm
RECTANGULARITY	N ≥ 15 cm Max. ± 2.0 mm	N ≥ 15 cm Max. ± 1.8 mm
SURFACE FLATNESS	Centre curvature: ± 2.0 mm Edge curvature: ± 2.0 mm Warpage: ± 2.0 mm	Centre curvature: ± 1.8 mm Edge curvature: ± 1.8 mm Warpage: ± 1.8 mm
WATER ABSORPTION (E_v)	Max. 0.5 % Individual max. 0.6 %	Max. 0.5 % Individual max. 0.6 %
MODULUS OF RUPTURE (N/mm²)	Min: 35 N / mm² Individual Min. 32 N / mm²	Min: 40 N/mm²
ABRASION RESISTANCE (P.E.I)	Declared value(s)	Indicated for each product
COEFFICIENT OF THERMAL EXPANSION	Declared value(s)	Max. 9 X 10^{-6}
THERMAL SHOCK RESISTANCE	Pass	Passed
CRAZING RESISTANCE IN GLAZED TILES	Pass	Passed
FROST RESISTANCE	Pass	Passed
RESISTANCE TO LOW AND HIGH CONCENTRATION OF ACIDS AND ALKALIS	Declared value(s)	Indicated for each product
RESISTANCE TO HOUSEHOLD CHEMICALS	Min. Class B	Min. Class B
RESISTANCE TO STAINING	Min. Class 3	Min. Class 3
RELEASE OF DANGEROUS SUBSTANCES **a) Cadmium (in mg/dm²)** **b) Lead (in mg/dm²)**	Declared value(s) Declared value(s)	< 0.005 mg/dm² < 0.005 mg/dm²

LCA Information

Enviromental **P**roduct **D**eclarations

Declared Unit	1 m^2 of average Porcelain Tile (25 kg)
Time Representativeness	2020
Database(s) and LCA Software Used	Ecoinvent 3.5. SimaPro 9.1

The inventory for the LCA study is based on the 2020 production figures for Graniser Porcelain Tiles.

This EPD's system boundary is cradle to grave. The results of the LCA with the indicators as per EPD requirement are given in the following tables for product manufacture (A1, A2, A3), construction process stage (A4, A5), use stage (B2,B3,B4,B5), end of life stage (C1, C2, C3, C4) and benefits and load stage (D).

The system boundaries in tabular form for all modules are shown in the table below.

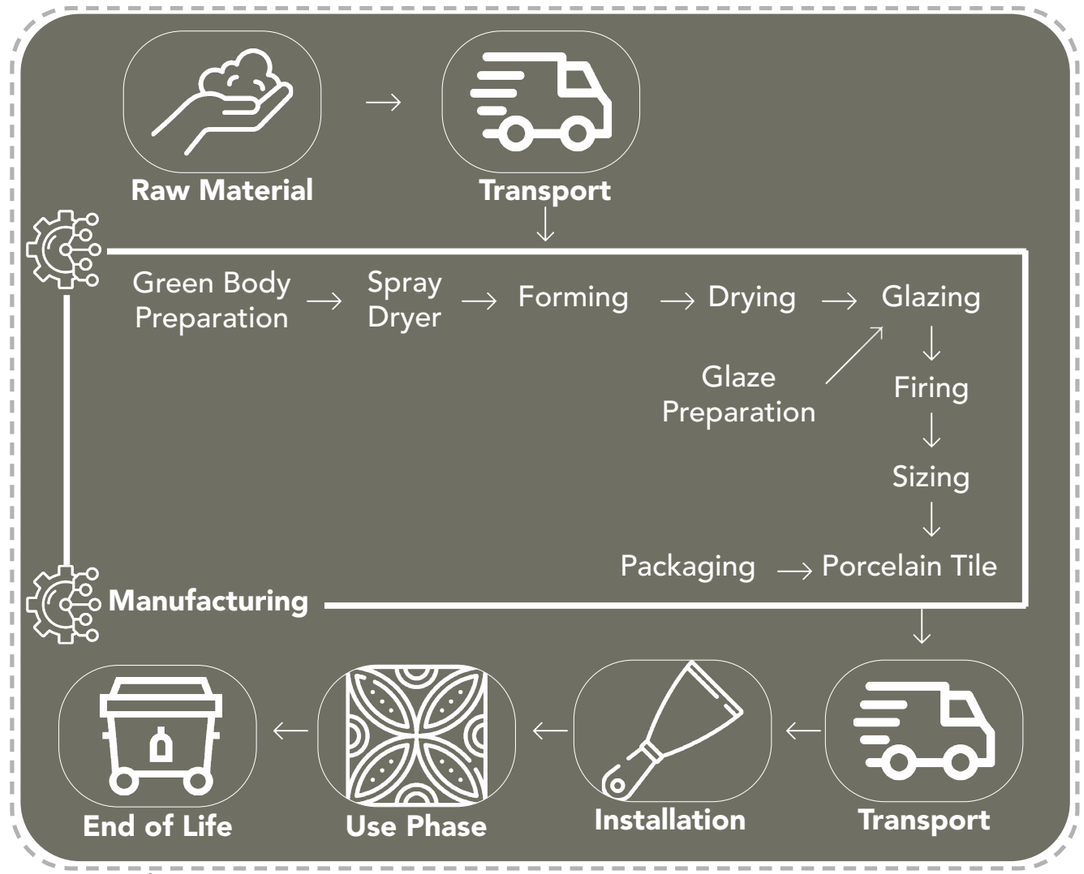
	Product Stage			Constrcu-tion Process Stage		Use Stage							End of Life Stage				Bene-fits and Loads
	Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction. demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
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	TR	TR	TR	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific Data Used	90%	90%	90%	90%	90%	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	NR					-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	NR					-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA, NR: Not Relevant)

Note: The LCA was modelled for specific product at plant so there is no variation.
Note: All primary data is taken from Graniser Manisa Plant and Ecoinvent was used for secondary data.

System Boundary

Enviromental **P**roduct **D**eclarations



A1: Raw Material Supply includes raw material extraction and pre-treatment processes before production. For porcelain tiles, production starts with raw materials.

A2: Transportation to Production Site is relevant for delivery of raw materials to the plant and 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.

A4: Transport From the Gate to the Site stage involves transportation of porcelain tiles to the construction site.

A5: Installation stage includes the adhesive mortar and water usage in the construction site. For 1 m^2 floor tile installation; 6 kg mortar and 1.5 L water usage was assumed.

B1: Use Stage concerns emissions into environment. Porcelain tiles are inert materials. so during the use stage. they do not cause any emissions.

B2: Maintenance Stage includes cleaning of tiles with water and detergent. Graniser advices to use detergent containing stain remover or neutral lowsulphate and rinse with tap water after cleaning. 0.2 mL detergent and 0.1 L water use is assumed to wash 1 m^2 tiles. Maintenance cycle of porcelain tiles is 4 times a year.

B3: Repair is not required during the use phase and therefore no impacts should be declared.

B4: Replacement is not required during the use phase and therefore no impacts ocurred in this module.

B5: Refurbishment is not required during the use phase and therefore no impacts has occurred in this module.

B6: Operational Energy Use is not required in the use stage.

B7: Operational Water Use is not required in the use stage.

C1: Deconstruction and 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 includes the transportation of the discarded tiles and adhesive mortar to final disposal. Average distance from demolition site to inert landfill site for final disposal is assumed to be 50 km.

C3: Waste Processing concerns crushing of discarded porcelain tiles before recycle or reuse. The environmental impacts generated during the C3 phase are very low and therefore can be neglected.

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

D : Benefits and Loads stage includes calculation of inert filler benefits and recycling of packaging materials specified in the disposal stage.

More LCA Information

Enviromental **P**roduct **D**eclarations

Goal and Scope
Evaluation of environmental impacts for 1 m^2 average floor tiles 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’, C1 – C4 ‘End of life’ and benefits and load (D) stages.

Background Data
Ecoinvent database (Ver.3.5) (www.ecoinvent.org)

Data Quality
Raw materials. energy and water consumption. waste. material and product transport data is primary data collected from Graniser.

Period Under Review
All primary data collected from Graniser is for the period year of 2020.

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).

Allocations
No allocation was performed for this EPD. There are no coproducts in the production of porcelain tiles. Hence. there is no need for co-product allocation. Transport is allocated according to tonnages for raw materials bought by Graniser. Similarly. water consumption and energy consumption are also allocated according to the production figures.

Cut-Off Criteria
1% cut-off applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

Geographical Scope
The geographical scope of this EPD is global.

LCA Results

Environmental Impacts for 1 m^2 of **Graniser Porcelain Tile**

Impact Category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	11.7	0.694	8.05	0	386E-6	0	0	0	0	0	0	0.306	0	0.418	-0.964
GWP - Biogenic	kg CO_2 eq	-0.095	209E-6	0.034	0	-766E-6	0	0	0	0	0	0	34.7E-6	0	0.129	-0.001
GWP - Luluc	kg CO_2 eq	0.009	222E-6	0.006	0	629E-6	0	0	0	0	0	0	108E-6	0	165E-6	-485E-6
GWP - Total	kg CO_2 eq	11.6	0.694	8.09	0	249E-6	0	0	0	0	0	0	0.306	0	0.547	-0.966
ODP	kg CFC-11 eq	1.66E-6	156E-9	761E-9	0	52.7E-12	0	0	0	0	0	0	67.6E-9	0	134E-9	-195E-9
AP	mol H+ eq	0.029	0.005	0.051	0	4.50E-6	0	0	0	0	0	0	0.001	0	0.004	-0.009
EP - Freshwater	kg P eq	0.002	59.3E-6	0.003	0	167E-9	0	0	0	0	0	0	27.6E-6	0	126E-6	-154E-6
*EP - Freshwater	kg PO_4 eq	0.005	181E-6	0.009	0	512E-9	0	0	0	0	0	0	84.5E-6	0	386E-6	-472E-6
EP - Marine	kg N eq	0.007	1.13E-3	0.008	0	4.48E-6	0	0	0	0	0	0	346E-6	0	1.4E-3	-0.002
EP - Terrestrial	mol N eq	0.076	0.013	0.087	0	16.0E-6	0	0	0	0	0	0	0.004	0	0.013	-0.027
POCP	kg NMVOC	0.022	0.004	0.029	0	2.52E-6	0	0	0	0	0	0	0.001	0	0.004	-0.007
ADPE	kg Sb eq	10.4E-6	1.83E-6	41.5E-6	0	1.82E-9	0	0	0	0	0	0	1.2E-6	0	519E-9	-2.74E-6
ADPF	MJ	187	10.5	113	0	0.004	0	0	0	0	0	0	4.56	0	10.1	-14.2
WDP	m^3 depriv.	4.71	0.071	4.69	0	0.006	0	0	0	0	0	0	0.032	0	0.434	-1.55
PM	disease inc.	262E-9	45.5E-9	456E-9	0	70.3E-12	0	0	0	0	0	0	18.9E-9	0	65.7E-9	-83.4E-9
IR	kBq U-235 eq	0.407	0.051	0.512	0	25.4E-6	0	0	0	0	0	0	0.021	0	0.048	-0.080
ETP - FW	CTUe	71.9	7.43	222	0	0.039	0	0	0	0	0	0	3.39	0	7.02	-11.9
HTTP - C	CTUh	2.11E-9	220E-12	9.7E-9	0	943E-15	0	0	0	0	0	0	111E-12	0	248E-12	-665E-12
HTTP - NC	CTUh	51.7E-9	8.23E-9	233E-9	0	21.0E-12	0	0	0	0	0	0	3.75E-9	0	5.32E-9	-14.0E-9
SQP	Pt	37.3	6.43	33.0	0	0.040	0	0	0	0	0	0	2.63	0	22.2	-9.70
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 Enrgy 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.															
*Disclaimer 3	EP-freshwater: This indicator has been calculated as “kg P eq”as required in the characterization model. (EUTREND model. Struijs et al. 2009b. as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)															

Climate Impact for 1 m^2 of **Graniser Porcelain Tile**

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG*	kg CO_2eq	11.6	0.688	7.87	0	998E-6	0	0	0	0	0	0	0.303	0	0.459	-0.953
Acronyms	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology.															
*Disclaimer 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															

Resource Use for 1 m^2 of **Graniser Porcelain Tile**

Impact Category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	7.95	0.118	6.82	0	0.006	0	0	0	0	0	0	0.050	0	0.158	-0.309
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	7.95	0.118	6.82	0	0.006	0	0	0	0	0	0	0.050	0	0.158	-0.309
PENRE	MJ	187	10.5	113	0	0.005	0	0	0	0	0	0	4.56	0	10.1	-14.2
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	187	10.5	113	0	0.005	0	0	0	0	0	0	4.56	0	10.1	-14.2
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	0.087	0.002	0.085	0	208E-6	0	0	0	0	0	0	762E-6	0	0.010	-0.037
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.															

Output Flows for 1 m^2 of **Graniser Porcelain Tile**

Impact Category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	0.002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHWD	kg	0.021	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	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	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	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.															

References

Enviromental **P**roduct **D**eclarations

/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

/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

/Ecoinvent / Ecoinvent Centre. www.ecoinvent.org

/SimaPro/ SimaPro LCA Software. Pré Consultants. the Netherlands. www.pre-sustainability.com

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