

ENVIRONMENTAL PRODUCT DECLARATION

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



An EPD may be updated or depublished if conditions change.
To find the latest version of the EPD and to confirm its
validity, see www.environdec.com.

Programme
The International EPD

Licensee
EPD Türkiye

EPD Registration
number
EPD-IES-0016643

Version Date
2025-01-10

Validity Date
2030-01-09

Geographical Scope
Türkiye

Programme Information

Programme: The International
EPD System,

Programme Operator: EPD
International AB

Box 210 60
SE - 100 31
Stockholm / Sweden

www.environdec.com
info@environdec.com

Licensee: EPD Türkiye

SÜRATAM Sürdürülebilirlik
Danışmanlığı A.Ş.
www.suratam.org

Nef 09 B Blok No: 7 / 15
34415
Kağıthane, İstanbul / Türkiye

www.epdturkey.org
info@epdturkey.org

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction Product 1.3.4, Valid until: 2025 – 06- 20 UN CPC Code: 373 Refractory products and structural non-refractory clay products
Life Cycle Assessment (LCA)
LCA accountability: Greenlife Danışmanlık Müh. Eğt. Ve Tas. Hiz. Tic. Ltd. Şti.
Third-party verification
External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> EPD verification through an individual EPD verification Third-party verifier: Hudai Kara PhD, Metsims Sustainability Consulting, Oxford, U.K.
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

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 Our Company

KÜMAŞ Magnesite Inc.

KÜMAŞ Magnesite Inc., founded in 1972, specializes in producing sintered magnesite, basic refractory bricks, and mortar using natural magnesite ore from the Kütahya-Eskişehir-Bilecik region. The company began producing sintered magnesite in 1976 and became an integrated organization with the addition of a brick factory in 1990. In 2008, they expanded to producing fused magnesite.

Today, KÜMAŞ provides sintered magnesite, fused magnesite, fused oxochrome, and calcined magnesite derivatives as industrial raw materials. Additionally, it manufactures magnesite, dolomite, and alumina-based refractory bricks and mortars at its integrated brick and mortar plants. Located on the Kütahya Province, Eskişehir Road 9th Km, KÜMAŞ operates over a total area of 695,270 m², with 68,561 m² dedicated to closed facilities. Their product range includes "Sintered Magnesite, Calcined Magnesite, Fused Magnesite, Kures Powder, and Refractory Bricks and Mortar."



KÜMAŞ Magnesite Inc. Production site

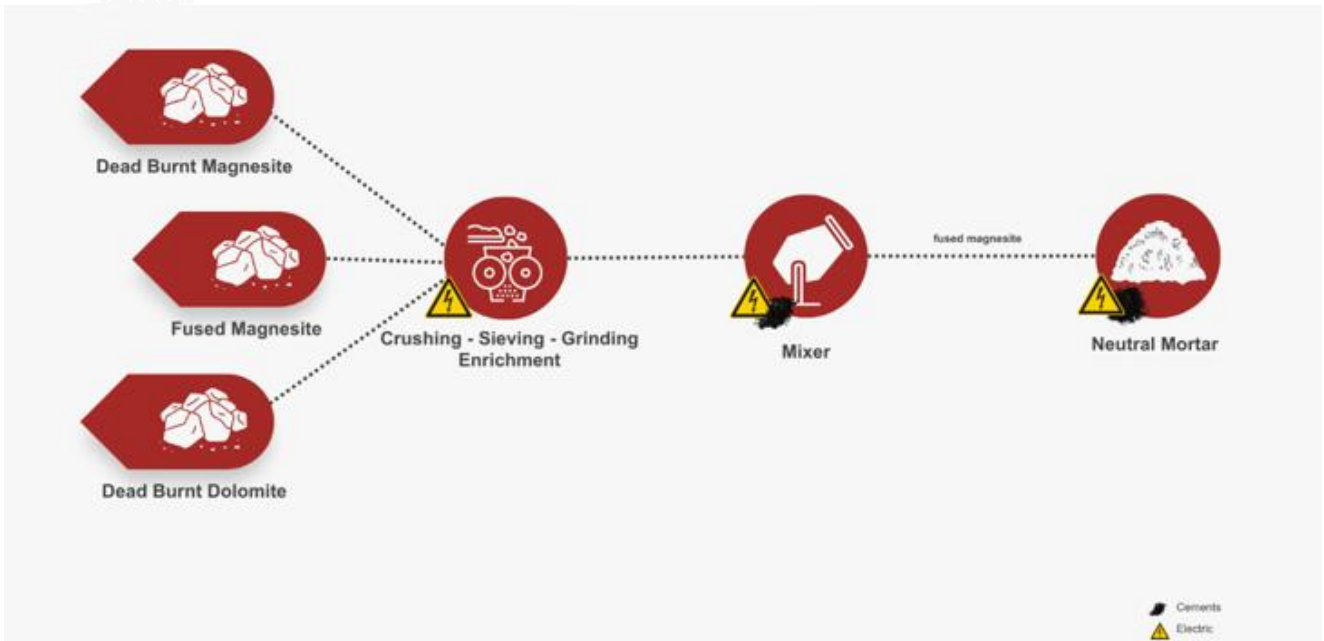
Owner of EPD: KÜMAŞ Magnesite Inc.

Adress of production site: Eskişehir Karayolu 9 km. Merkez, Kütahya/ Türkiye

Product Information

Neutral Mortar Manufacturing

The production flow chart of neutral mortar is shown below.



Production flow chart of neutral mortar

Raw ore arrives at the stockpile in the form of chocks and is reduced in the jaw crusher and fed to the bunkers. The materials coming from the lines are directed to the screens and sent to the dryer silos after screening. The material dried at 200°C is separated according to size in the magnetic separator and sent to the silos of the rotary furnace storage area. The materials directed to the optical separator are fed to the rotary furnace storage area by belts. In the semi-finished product production section, ores are transported to the silos by belts and fed to the rotary furnace. The materials, which become sinter in the rotary furnace, are passed through the cooler and directed to the screening plants. Here, the materials subjected to laboratory analyses are divided in the warehouse accordingly. The materials to be sold are bagged, packaged and loaded onto vehicles. In the neutral mortar plant, the materials taken from the melting plant and the raw materials and additives taken from outside are fed into silos and mortar is prepared according to the product recipe. The prepared mortars are packed in big bags and kraft bags and made ready for dispatch.

Product Information

Neutral Mortar

Neutral mortar is used in iron and steel induction furnaces.

After the fused magnesite taken from the smelting plant is passed through crusher, elevator, sieve and mill systems, the raw materials (WFA) and additives that we purchase from outside are fed directly into the silos manually. From these materials fed into the silos, mortar is prepared by mixing in the mixer according to the product recipe, and it is ready for shipment in 0.5-1.5 tonne big bags and 25 kg kraft bags. In the production of neutral mortar, 13.5% of our own raw material (KÜMAŞ) and 86.5% imported WFA-calcined alumina are used.

Content Declaration

Product Component	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product
Aluminum oxide	800 - 900	0.00	0.00	0.00
Cement	100 - 200	0.00	0.00	0.00
Total	1000	0.00	0.00	0.00

Due to confidentiality, only a range is provided.

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product
Big Bag	22.56	2.25	0
Pallet	0.68	0.07	0.32
Plastic Film	16.26	1.63	7.64
Total	39.51	3.95	7.96

No substances that are listed in the “Candidate List of Substances of very high concern for authorization” are contained in the declared unit.

LCA Information

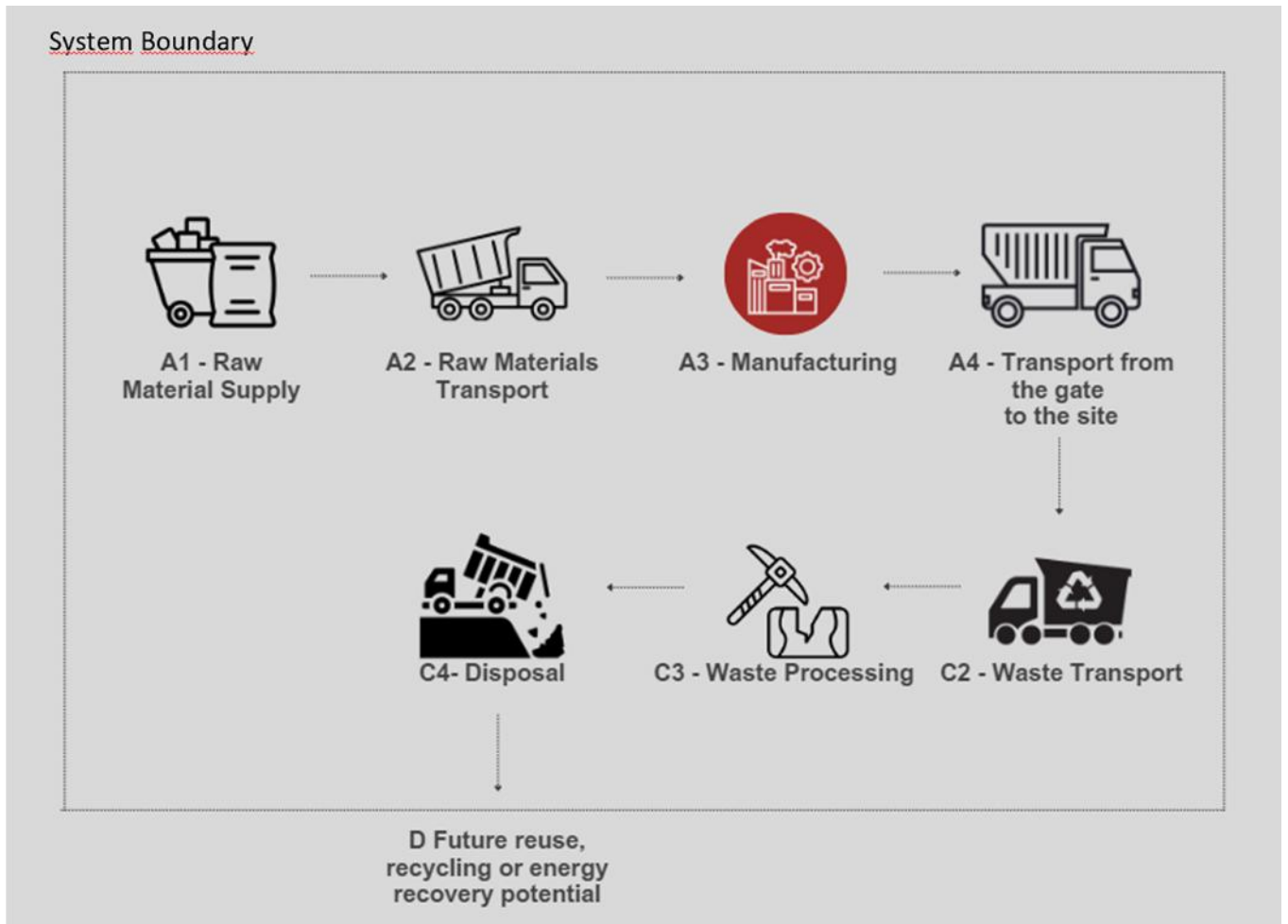
Declared unit: 1 tonne of Neutral Mortar

Conversion factor: 1

Reference service life: NA

Database(s) and LCA software used: Ecoinvent 3.9.1 SimaPro 9.5.0.2.

Characterization factors used: EN 15804 method based on EF 3.1 normalization and weight values, published in July 2022, were used.



System boundary diagram

LCA Information

	Product Stage			Construction Process Stage		Use Stage							End of life Stage				Resource Recovery Stage
	Raw Material	Raw Material Transport	Manufacturing	Transport to Plant	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / Demolition	Transport to Disposal Site	Waste Processing	Disposal	Future reuse, recycling or energy recovery potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module Declared	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	GLO	GLO	TR	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Share of specific data	85%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = Included in LCA, MND = Module Not Declared

LCA Information

A1 Raw Material Supply

fused magnesite is the main raw materials of neutral mortar in raw material supply, are produced by Kümaş Magnesite. Other products and packaging products are purchased. All products are included in the life cycle analysis.

A2 Raw Material Transport

The transport of raw materials and packaging used was calculated as the weighted average of the purchase data. The purchased products were transported by road and sea. For road transport, >32 metric ton EURO 6 lorry data was used and for sea transport, container ship data was used.

A3 Manufacturing

Annual weighted average method was used to calculate the amount of energy consumed in production. Electricity are used in the production of the product. Electricity is taken from the electricity grid of the production site of Türkiye. Pallets and plastic bags used for transport in production are also included in the system.

A4 Transport

The distance of shipment of the products sold is calculated using the weighted average method according to the location of the customers. The products were transported by road and sea. For road transport, >32 metric ton EURO 6 lorry data was used and for sea transport, container ship data was used.

A5 Construction

The construction assumed to be done via human power. Therefore, there is not an impact in A5 module. The packaging materials leaves the system in this stage and the packaging materials are send to recycling.

LCA Information

C1 Deconstruction

It is assumed that the deconstruction is done manually (human power is used) Therefore, there is not an impact in C1 module.

C2 Waste Transport

The distance for transportation of the product as waste after use is assumed to be 500 km and for road transport, 16-32 metric ton EURO 6 lorry data was used.

C3 Waste Processing

It is assumed that those that can be reused at the end of the lifetime of the neutral mortar are crushed and used by re-feeding method. It is assumed that 30kWh electricity is consumed for the crushing of 1 ton of neutral mortar. This value was obtained from the supplier providing scrap bricks to Kümaş Magnesite.

C4 Disposal

It is assumed that 3% of the refuse produced is reused, 56% is recycled and 41% is landfilled.

D Future reuse, recycling or energy recovery potential

It is accepted in C4 module that 41% of the products go to landfill after they become waste. The calculation was made based on the scenario that the remaining 59% is crushed and used by tertiary parties. In this module the benefit from the recycled 56% of raw material is shown.

Electricity data used in LCA model

Electricity Data: Residual mix is calculated from «Electricity, medium voltage {TR}| market for electricity, medium voltage | Cut-off, S» by excluding renewable energy generation. The composition of the residual mix was then 62.7% coal, 36.6% natural gas, and 0.7% oil. GWP-GHG value of the used electricity data is 0.79 kg CO₂/kWh.

LCA Results

Mandatory impact category indicators according to EN 15804+A2

Environmental Impacts for 1 tonne of Neutral Mortar									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO2 eq.	2.97E+03	8.90E+01	0.00E+00	0.00E+00	5.01E+01	8.40E+02	4.21E+01	-1.57E+03
GWP - Biogenic	kg CO2 eq.	-2.53E+01	0.00E+00	2.53E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP - Luluc	kg CO2 eq.	4.89E+00	5.16E-02	0.00E+00	0.00E+00	2.44E-02	1.42E+00	1.69E-02	-2.66E+00
GWP - Total	kg CO2 eq.	2.95E+03	8.90E+01	2.53E+01	0.00E+00	5.01E+01	8.42E+02	4.21E+01	-1.57E+03
ODP	kg CFC11 eq	6.38E-05	1.89E-06	0.00E+00	0.00E+00	1.14E-06	1.84E-05	2.75E-07	-3.43E-05
AP	mol H+ eq	2.41E+01	6.44E-01	0.00E+00	0.00E+00	1.24E-01	6.84E+00	1.33E-01	-1.28E+01
EP-freshwater	kg P eq	1.37E+00	5.97E-03	0.00E+00	0.00E+00	3.70E-03	3.96E-01	1.23E-02	-7.39E-01
EP-marine	kg N eq	3.96E+00	1.55E-01	0.00E+00	0.00E+00	3.38E-02	1.09E+00	1.39E+00	-2.03E+00
EP-terrestrial	mol N eq	4.19E+01	1.68E+00	0.00E+00	0.00E+00	3.47E-01	1.16E+01	3.77E-01	-2.16E+01
POCP	kg NMVOC eq	1.24E+01	6.17E-01	0.00E+00	0.00E+00	2.02E-01	3.37E+00	2.86E-01	-6.29E+00
ADP minerals&metals*	kg Sb eq	2.85E-03	2.20E-04	0.00E+00	0.00E+00	1.40E-04	6.94E-04	4.86E-05	-1.30E-03
ADP fossil*	MJ	3.21E+04	1.30E+03	0.00E+00	0.00E+00	7.60E+02	8.62E+03	2.66E+02	-1.61E+04
WDP	m3 depriv.	4.59E+02	5.71E+00	0.00E+00	0.00E+00	3.63E+00	1.31E+02	9.28E+00	-2.44E+02

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

LCA Results

Additional mandatory and voluntary impact category indicators

Environmental Impacts for 1 tonne of Neutral Mortar									
Indicator	Unit	A1-A3	A4	B	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO2 eq	2.98E+03	8.92E+01	0.00E+00	0.00E+00	5.02E+01	8.44E+02	4.86E+02	-1.58E+03

Resource use indicators

Environmental Impacts for 1 tonne of Neutral Mortar									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.64E+03	1.77E+01	0.00E+00	0.00E+00	1.11E+01	2.60E+02	1.25E+01	-4.85E+02
PERM	MJ	1.24E+01	0,00E+00	0,00E+0	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1.65E+03	1.77E+01	0.00E+00	0.00E+00	1.11E+01	2.60E+02	1.25E+01	-4.85E+02
PENRE	MJ	3.21E+04	1.30E+03	0.00E+00	0.00E+00	7.60E+02	8.62E+03	2.66E+02	-1.61E+04
PENRM	MJ	1.59E+03	0,00E+00	0,00E+0	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3.37E+04	1.30E+03	0.00E+00	0.00E+00	7.60E+02	8.62E+03	2.66E+02	-1.61E+04
SM	kg	3.00E-02	0,00E+00	0,00E+0	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+0	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+0	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	4.41E+02	5.71E+00	0,00E+00	0,00E+00	3.62E+00	1.32E+02	9.30E+00	-2.47E+02

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

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

LCA Results

Waste indicators

Environmental Impacts for 1 tonne Neutral Mortar									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.75E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	3.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	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

Output flow indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	3.00E+02	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.60E+02	0.00E+00	0.00E+00
Materials for energy	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
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
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

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

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

EN 15804:2012+A2:2019 / AC: 2021 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 The International EPD System, 2019:14 Version 1.3.4. Date:2024.04.30

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

*Munoz, I., Soto, A., Maza, D., and Bayon, F., Life cycle assessment of refractory waste management in a Spanish steel works, 2020.

Contact Information

Program Operator



THE INTERNATIONAL EPD® SYSTEM

EPD International AB
Box 210 60
SE-100 31 Stocholm, Sweden

www.environdec.com
info@environdec.com

Licensee



THE INTERNATIONAL EPD® SYSTEM

EPD Türkiye
www.epdturkey.org
info@epdturkey.org

SÜRATAM Sürdürülebilirlik
Danışmanlığı A.Ş.
Nef 09 B Block No: 7 / 15
34415
Kağıthane, İstanbul / Türkiye
www.suratam.org

Owner of the Declaration



Kümaş Manyezit Sanayi A.Ş.

Eskişehir Karayolu 9 Km.
Kütahya, Türkiye

srd.isg@kumasref.com
<https://www.kumasref.com>

LCA Practitioner and EPD Design



Greenlife Danışmanlık Müh. Eğt. ve Tas
Hiz. Tic. Ltd. Şti.

Mustafa Kemal mah. 2140. Cad. No:16/5
Ankara, Türkiye

info@greenlifedanismanlik.com
www.greenlifedanismanlik.com

Third Party Verifier



Metsims Sustainability Consulting
Dr. Hüdai Kara

Oxford, United Kingdom

