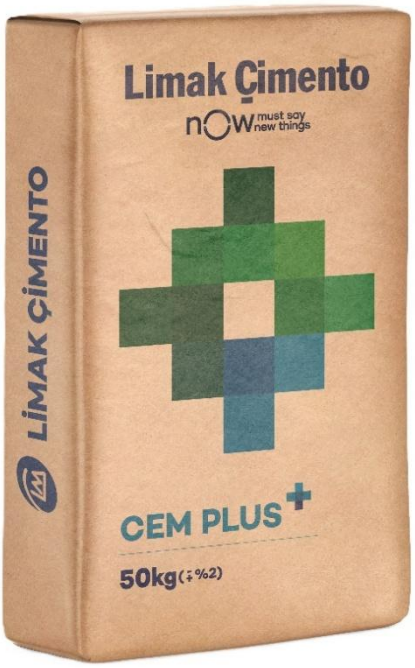
ENVIRONMENTAL PRODUCT DECLARATION

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

CEM PLUS+ 42,5 [CEM II/A-M (V-LL) 42,5 R]

from

LİMAK ÇİMENTO SANAYİ VE TİCARET A.Ş.



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Geographical Scope:	Global

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ECO PLATFORM EPD VERIFIED

GENERAL INFORMATION

PROGRAMME

EPD registered through fully aligned regional programme: EPD Türkiye

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VERIFICATION

CEN standard EN15804 serves as the core Product Category Rules (PCR).
Product category rule: 2019:14 Construction products, version 1.3.3, Construction EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works and c-PCR-001 Cement and building lime (EN 16908) (2024-04-30).
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. No chair has been appointed. The review panel may be contacted via the Secretariat www.environdec.com/contact.
External and independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier ☐ EPD verification by accredited certification body ☐ EPD verification by EPD Process Certification*
Third party verifier: Vladimir Kočí Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No
LCA practitioner: Gülay Öncar Şentürk; Sabri İnkaya -- Venus Mühendislik

COMPARABILITY

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.

The owner of this EPD, Limak Çimento Sanayi ve Ticaret A.Ş. has the sole ownership, liability, and responsibility for this EPD.

CONTACT INFORMATION

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COMPANY INFORMATION

Product Provider

As a subsidiary of Limak Holding, we have been operating in the cement industry since 2000. We strengthen our presence in the industry with our 11 cement factories, 28 ready-mixed concrete facilities, 8 sub-brands and nearly 2000 employees, and continue to move forward with advanced technologies and our pioneering steps in the industry by implementing “Best Available Techniques” in line with our strong decarbonization roadmap.

In our triple transformation journey, we make it our mission to break new ground in the industry, our country, and even the world on a daily basis by improving our sustainability and digitalization processes, particularly human resources.

In all our facilities, we carry out our production activities in compliance with the management system certificates we obtained in various fields. We conduct our operations in compliance with national and international legal regulations, ISO 9001 Quality Management System, ISO 14001 Environmental Management System, ISO 45001 Occupational Health and Safety Management System, ISO 50001 Energy Management System, ISO 14046 Water Footprint and ISO 14064 Greenhouse Gas and Emissions Management System standards. Furthermore, we pay attention to manage all our processes in line with the Equator Principles (EPs), the World Bank, the International Finance Corporation (IFC) Performance Criteria and the European Bank for Reconstruction and Development (EBRD) Performance Requirements.

Our slogan “Now, must say new things” emphasizes our commitment to change and innovation in the industry. We are aware that in our rapidly changing world, the most effective way to achieve success is to be agile and able to adapt quickly to changing conditions. In this context, our understanding of Triple Transformation, which we built on digitalization, sustainability and human orientation, is the most concrete example of our determination to lead this change.

As the Limak Cement family, by adopting an approach focused on continuous development and innovation, we encourage transformation and flexibility in our individual and professional lives as well as in our business. With this approach, the practices we have realized in the fields of environmental, social and governance (ESG) reflect our belief in the future and the value we provide to the society.

Our motto reflects our mission to be not simply a brand that transcends traditional boundaries, but also a leading source of industry innovation. With the determination to do better every day and contribute to our environment and our industry, we develop new solutions beyond the conventional. Thus, we say “Now, must say new things” as a symbol of our determination to move forward with an innovative perspective and to respond to the needs of our world in the most effective way in every step.

PRODUCT INFORMATION

Product Identification

The system analyzed in this EPD comprises the life cycle of the production of the cement CEM PLUS+ 42,5 CEM II/A-M (V-LL) 42.5 R (CPC 37440 “Portland cement, aluminous cement, slag cement and similar hydraulic cement, except in the form of clinkers”) is a high-performance Portland Composite Cement made exclusively from Portland cement clinker, high purity limestone, fly ash and gypsum in accordance with EN 197-1:2011 at Limak Çimento’s Anka Plant.

Information about the product

The Declared Unit of this LCA is 1 tonne of product ready to be sent to the customer. The product included in this declaration is CEM PLUS+ 42,5 (CEM II/A-M (V-LL) 42.5 R) from Limak Çimento. All environmental impacts and use of resources, both direct and indirect, are reported to this unit.

Composition

Component	Weight (%)	Post-consumer material weight- %	Biogenic material kg C/ kg
Grey Clinker	75-83	0	0
Natural gypsum	4-7	0	0
Cementitious materials	12-20	0	0
SUM	100	0	0

This product is marketed in bulk, so there are no packaging materials.

Technical characteristics according to EN 197-1

Mechanical and technical properties	Amount	Unit
Compressive strength 2 days	≥ 20	MPa
Compressive strength 28 days	≥ 42,5 ≤ 62,5	MPa
Initial setting time	≥ 60	min
Soundness	≤ 10	min

Areas of use:

Reinforced concrete buildings and infrastructure projects

Production of prefabricated elements

Road, bridge and tunnel construction

Industrial floor applications

LCA INFORMATION

Declared Unit	1 tonne of CEM PLUS+ 42,5 (CEM II/A-M (V-LL) 42.5 R)
Reference Year	2023
Databases and LCA Software	Ecoinvent v3.10 and SimaPro v9.6.0.1

This EPD covers all product stages from “cradle to gate” with options (modules A1-A3+A4), since the product fulfils all the conditions required by EN 15804:2012+A2:2019/AC:2021;

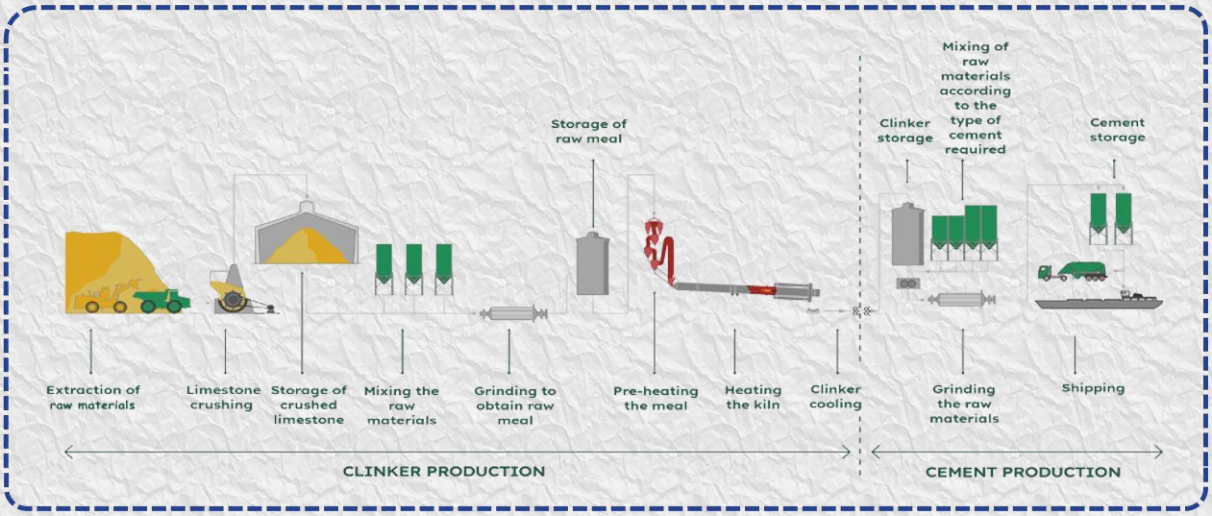
- The product is physically integrated with other products during installation so they cannot be physically separated at the end of life.
- The product is no longer identified at the end of life as a result of a physical-chemical transformation process.
- The product does not contain biogenic carbon.

The stages and modules included in this EPD are showed in the following table:

	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	GLO	GLO	TR	GLO	-	-	-	-	-	-	-	-	-	-	-	-	-
Share of specific data	>90%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation products	0%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation sites	0%				-	-	-	-	-	-	-	-	-	-	-	-	-

GLO: Global, TR: Türkiye, X = Module included, ND = Not declared

SYSTEM BOUNDRY



A1: Raw Material Supply

This stage includes raw materials extraction and pre-treatment processes before production. Main materials used in the production of the investigated product is clinker, gypsum, limestone and supplementary cementitious materials. Impacts of these materials are considered at this stage.

A2: Raw Material Transport

This stage includes transportation-related impacts of needed materials for the production of clinker. It is observed that both highway and seaway transportation are heavily involved at this stage. Transport routes and distances are supplier-specific and provided by the manufacturer.

A3: Manufacturing

This stage includes production-related environmental impacts of the investigated product. Main steps of cement production including the clinker production are raw material extraction, grinding, blending, pre-heating, kiln phase, cooling, and final grinding. The manufacturer supplies all energy-related inputs for the reference year 2023. The manufacturing data is for Limak Çimento's Anka Plant.

Since the product is sold only in bulk, no packaging material is considered.

A4: Final Product Shipment

This stage is relevant for the delivery of the final product to the intended markets and customers. Highway transportation is involved in this stage. The transport routes and distances are supplier-specific and provided by the manufacturer.

ADDITIONAL INFORMATION

System Boundary

The system boundary follows a cradle-to-gate approach with optional modules (A1-3+A4) included.

Cut-Off Rules

A 1% cut-off rule has been applied. Data for elementary flows to and from the product system contributing to at least 99% of the declared environmental impacts have been included in the analysis.

REACH Regulation Compliance

This product does not contain substances listed in the Candidate List of Substances of Very High Concern (SVHC) for authorisation under the REACH Regulation. No substances exceeding the registration threshold set by the European Chemicals Agency (ECHA) or surpassing 0.1% (wt/wt) are present in the product.

Background Data and Specific Data

For LCA modelling and calculations, the Ecoinvent v3.10 database and SimaPro v9.6.0.1 LCA software were used. The characterization factors applied align with EN 15804 reference package based on EF 3.1 methodology. The impacts of infrastructure and capital goods are excluded from the analysis.

Allocations

Energy consumption data have been weighted according to production figures during the relevant period. Additionally, hazardous and non-hazardous waste quantities have been allocated proportionally based on the total waste generated within the considered time frame.

Electricity Mix

The electricity data used in manufacturing is sourced from the Ecoinvent 3.10 database, representing medium-voltage electricity production in Türkiye. The electricity mix has a Global Warming Potential (GWP-GHG) impact of 0.537 kg CO_2 eq./kWh, based on the reference year 2020. The electricity mix composition is as follows:

Hydropower – 29%
Hard Coal – 21%
Natural Gas – 19%
Lignite – 14%
Wind – 10%
Geothermal – 4%
Biogas – 1%
Other sources – 1%
Biomass – <1%

Assumptions

For upstream and downstream road transportation, Euro 5 motor vehicles with a size class exceeding 32 metric tonnes are assumed to be used. The transportation distances have been obtained using Google Maps.

LCA RESULTS

Core Environmental Impact Indicators (Mandatory)			
Impact Category	**Unit**	**A1-A3**	**A4**
GWP - Total	kg CO2 eq.	6,92E+02	9,40E+00
GWP - Fossil	kg CO2 eq.	6,88E+02	9,40E+00
GWP - Biogenic	kg CO2 eq.	2,92E+00	4,85E-03
GWP - Luluc	kg CO2 eq.	5,15E-01	3,22E-03
ODP	kg CFC-11 eq.	6,97E-07	1,89E-07
AP	mol H+ eq.	2,26E+00	3,03E-02
EP - Freshwater	kg P eq.	6,67E+03	1,25E+01
EP - Marine	kg N eq.	6,06E-01	1,03E-02
EP - Terrestrial	mol N eq.	5,06E+00	1,12E-01
POCP	kg NMVOC eq.	1,28E+00	4,94E-02
*ADPE	kg Sb eq.	2,19E-04	2,54E-05
*ADPF	MJ	2,47E+03	1,36E+02
*WDP	m3 depriv.	2,58E+02	6,49E-01
Additional Environmental Impact Indicators (Mandatory)			
**GWP - GHG	kg CO2 eq.	6,89E+02	9,40E+00
Additional Environmental Impact Indicators (Optional)			
PM	disease inc.	2,30E-05	9,34E-07
***IR	kBq U-235 eq.	1,48E+00	1,65E-01
ETP-FW	CTUe	1,10E+03	3,22E+01
*HTP - C	CTUh	5,32E-07	5,81E-08
*HTP - NC	CTUh	2,33E-06	8,78E-08
*SQP	Pt	3,54E+02	1,37E+02
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: Transportation, A3: Manufacturing, A4: Final Product Shipment		

Indicators describing resource use (Mandatory)			
Impact Category	**Unit**	**A1-A3**	**A4**
PERE	MJ	2,35E+02	2,16E+00
PERM	MJ	0.00E+00	0.00E+00
PERT	MJ	2,35E+02	2,16E+00
PENRE	MJ	2,62E+03	1,45E+02
PENRM	MJ	0.00E+00	0.00E+00
PENRT	MJ	2,62E+03	1,45E+02
SM	kg	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00
FW	m3	3,97E+00	5,64E-09
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy resources used as raw materials, PENRT: Total use of non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water.		

Environmental information describing waste categories (Mandatory)			
Impact Category	**Unit**	**A1-A3**	**A4**
HWD	kg	4,05E+00	1,34E-01
NHWD	kg	7,12E+00	1,54E-01
RWD	kg	0.00E+00	0.00E+00

Environmental information describing output flow (Mandatory)			
CRU	kg	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00
EE (Electrical)	MJ	0.00E+00	0.00E+00
EE (Thermal)	MJ	0.00E+00	0.00E+00
Acronyms	HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy thermal.		
***Disclaimer 1**	The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.		
****Disclaimer 2**	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR6 methodology. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The GWP-GHG indicator is identical to GWP-total except that the characterization factor (CF) for biogenic CO2 is set to zero.		
*****Disclaimer 3**	This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.		

REFERENCES

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

ISO 14020:2000 Environmental labels and declarations - General principles

ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2021 Environmental management - Life cycle assessment - Principles and framework

ISO 14044:2021 Environmental management - Life cycle assessment - Requirements and guidelines

ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

The International EPD® System/ www.environdec.com

PCR for Construction Products and 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 1.3.4.

The International EPD® System/ PCR 2019:14 Construction products v1.3.4 (EN 15804:2012+A2.2019/AC:2021)

Product Environmental Footprint Category Rules
https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_guidance

Ecoinvent / Ecoinvent Centre, / http://www.ecoinvent.org/

SimaPro/ SimaPro LCA Software, https://simapro.com/

Limak Çimento Website, www.limakcement.com

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