



THE INTERNATIONAL EPD® SYSTEM



THE INTERNATIONAL EPD SYSTEM

CEM I 42.5N

ARABIAN CEMENT COMPANY



EPD ENVIRONMENTAL PRODUCT DECLARATION

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

[CEMI 42.5N]

From:
ARABIAN CEMENT COMPANY



ARABIAN CEMENT
العربية للأسمنت

Programme: The International EPD System, www.environdec.com

Programme operator: EPD International AB

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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



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EXCELLENCE

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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

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 products, version 1.3.2
c-PCR-001 Cement and Building Lime (EN 16908:2017+A1:2022) 2022-05-18
UN CPC 3744

PCR review was conducted by:
The Technical Committee of the International EPD® System.
A full list of members available on www.environdec.com. The review panel may be contacted via
info@environdec.com.

Life Cycle Assessment (LCA)

LCA accountability:



Third-party verification

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



EPD verification by accredited certification body

Third-Party Verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by accredited certification body

Third party verification: EUROCERT S.A.



Chlois 89, Athina 144 52, Greece
email: info@eurocert.gr
www.eurocert.gr

EUROCERT S.A. is an approved certification body accountable for third-party verification

The certification body is accredited by: Hellenic Accreditation System SA (E.S.Y.D.), Accreditation No. 21

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

Yes
 No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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.

ADDITIONAL INFORMATION

Arabian Cement Company hereby declares that all cement products are in compliance with the REACH Regulation (EC) No 1907/2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals. Cement does not contain any Substances of Very High Concern (SVHC) currently on the candidate list. REACH SVHC list is not static and is updated frequently thus the company will continue to evaluate, research and review to fulfil the demands of the regulation. More information about cement safety handling is available at the Safety Data Sheet (SDS) is sent to the customers with the product.

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.



COMPANY INFORMATION

Owner of the EPD: [Arabian Cement Company]
Contact: [Hazem Mosher]

Arabian Cement Company (ACC) is a fully integrated cement plant and a leading cement producer and seller in Egypt. The company was founded in 1997, and among the leading cement producers in Egypt. An Egyptian company dedicated to serving our customers and spare no effort in implementing the latest technologies for operations.



9001:2015



45001:2018



14001:2015



50001:2018



197-1:2012



197-1:2011

BUILDING A BETTER WORLD

ACC has been continuously striving to improve energy and environmental performance supported by a strong top management commitment.

Our environmental policy is designed to contribute to building a better world. We operate our facilities in accordance with local laws, standards and regulations, applying state-of-the-art environmental management systems.

At ACC, we are always keen to minimize the use of non-renewable resources whenever possible. We also work on limiting the hazardous outcomes and other wastes of our operations. This could be achieved by using substitute raw materials and alternative fuels as well as disposing of wastes using safe and environment-friendly methods. It is our duty to conduct environmental audits for all facilities periodically.

We have implemented cutting-edge technologies and adopted organizational structures to facilitate the usage of many types of alternative fuels from scratch since 2013, achieving high substitution rates of alternative fuels over standard fuels. We are pioneering in the use of alternative energy in the Egyptian cement industry as the first cement company in Egypt to establish a solar power station inside its plant. In 2019, ACC won the first prize in this year's competition "1st Alternative Fuel Award 2019" from MW – LECHTENBERG & PARTNER

Product-related or management system-related certifications:

[ISO 9001:2015 Type Quality Management System, ISO 14001:2015 Environmental Management System, 45001:2018 Occupational Health and Safety Management System -certificates, EMAS-registrations, ISO 50001:2018 Energy Management System, NF mark 197-1:2012 and CE mark 197-1: 2011]

Name and location of production site(s):

Arabian Cement Company - Ramleya Plant
KM 94, Kattameya - Ein Sokhna Old Road -Suez



PRODUCT INFORMATION

PRODUCT DESCRIPTIONS
CEM I 42.5N



Al Mosalah Portland Cement CEM I 42.5N

Composition: 95 to 100% clinker and minor components between 0 and 5%. Calcium sulfate is added to adjust the setting time. All components comply with ES 4756-1/2009 and EN 197-1/2000.

Advantages

High Strength Cement.
Low Volume Expansion.
Greater Rate of Strength Gain.

Applications

Concrete With Special Needs.
Concrete Pump.

Shotcrete, Mortar, Supporting Floors.

Cast-In-Place And Precast Structures And Construction Elements With A Thickness Below 0.8 M, With Fast Execution Rate, Made Also In Cold Weather Conditions: Foundations, Columns, Structural Walls, Precast Floor Elements, Roofs Etc.

Structural And Wear Layers For Roads, Streets, Industrial Platforms, Warehouses And Various Circulation Surfaces, Including Sections Of Disperse Or Continuous Reinforced.

Precast Elements Made Of Normal And Reinforced Concrete, Precompressed Concrete Elements (Tramway Sleepers, Railway Sleepers, Hollow Core Slabs, And Beams For Overhead).

Repairs For Industrial Civil Engineering Works, Roads, Bridges Etc., Including Works Exposed To The Effects Of Freezing Temperatures When They Are Saturated With Water And Art Works: Beams, Frames, Arches, Beams Caissons, Floor Slabs

Property	ES4756-1/2009 EN 197-1/2000	ACC Results
Loss on ignition, %	= 5.0	3.2
Insoluble residue, %	= 5.0	0.8
Sulfate content (as SO3), %	= 3.5	3.0
Initial setting time, min	= 60	155
Soundness (expansion), mm	= 10.0	1
Chloride content, %	= 0.10	0.04
Early strength - 2 days, MPa	= 10	20.5
Standard strength - 28 days, MPa	42.5-62.5	51.9

Property	ES4756-1/2009 EN 197-1/2000	ACC Results
Loss on ignition, %	= 5.0	3.2
Insoluble residue, %	= 5.0	0.8
Sulfate content (as SO3), %	= 3.5	3.0

LCA INFORMATION

DECLARED UNIT

The declared unit is 1 tn (1.000 kg).

GOAL AND SCOPE

This EPD evaluates the environmental impacts of the production of 1 ton CEMI 42.5N from cradle to gate.

BACKGROUND DATA

The most recent version of Ecoinvent database (v.3.8) was used as a source of background data.

SOFTWARE

The software used for the production of the LCA results is GCCA's Industry EPD Tool for Cement and Concrete (v4.2)

DATA QUALITY

ISO 9001 and ISO 50001 were applied in terms of data collection and quality requirements. The data concerning the modules A3 (product manufacturing) and A2 (transportation) were provided by Arabian Cement Company and involved all input and output materials to the plant, the consumed utilities (energy, water) and the distances and means of transport for each input stream. These data were representative for the full year 2023, The background data for the module A1 e.g. electricity generation, raw materials and fuels production were recovered from Ecoinvent database (v.3.8). Regarding electricity mix, guarantees of origin in combination with the latest (2023) national residual electricity mix as published in EPRD were utilized.

ALLOCATIONS

Wherever possible allocation was avoided. The production was divided into two sub-processes, clinker and cement, and the related input and output data to each sub-process were collected. In some cases that data were not able to be attributed directly to the specific product production, they were allocated by physical properties (mass).

ASSUMPTIONS

It is assumed that for the road and sea transportation a lorry 16-32 metric ton, bulk carrier for dry goods were used respectively. CUT-OFF RULES The cut-off rule for insufficient data or data gaps that are less than 1% of the total input mass and less than 5% of energy usage and mass per module was applied only to the grinding aid

TIME REPRESENTIVENESS

All primary data used in this study is for the entire year 2023.

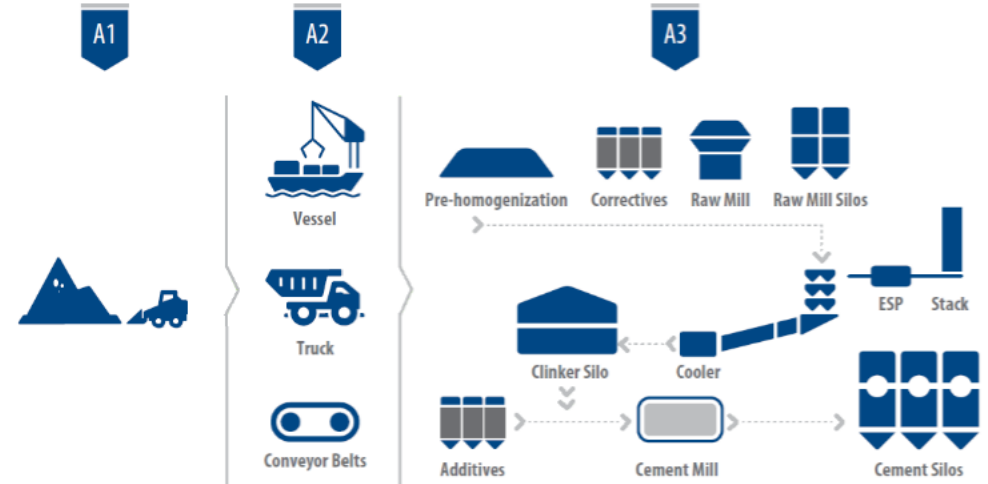
GEOGRAPHICAL SCOPE

Worldwide



SYSTEM BOUNDARIES

The scope of this study is “cradle to gate” covering the product stage (modules A1-A3), since the product fulfills the three conditions required by EN 15804:2012+A2:2019, about the exclusion of modules C1-C4 and D. The stage included in the study is just product stage (A1-A3), since the product fulfills the three conditions required: - the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life, and - the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and - the product or material does not contain biogenic carbon.



X= Included, ND= Module Not Declared

	Product Stage			Construction Stage		Use Stage							End-of-life Stage			Resource Recovery stage		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3		C4	
Raw Materials Supply	X																	Reuse-Recovery-Recycling-potential
Transport	X	X																
Manufacturing			X															
Transport				X	X													
Construction installation						X	X											
Use								X	X									
Maintenance										X	X							
Repair												X	X					
Replacement													X	X				
Refurbishment														X	X			
Operational energy use																		
Operational water use																		
De-construction and demolition																		
Transport																		
Waste processing for reuse,																		
Disposal																		
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND
Geography	EG	EG	EG	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-		-
Variation-products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-		-
Variation-sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-		-

A1: Raw Material Supply

Production starts with raw materials supply. This stage includes the mining and processing of raw materials, the extraction and processing of fuels and the recycling of secondary materials.

A2: Transportation of raw materials to manufacturer

Transport concerns the delivery of raw materials from the supplier to the gate of the manufacturing plant. Raw materials are transported by truck, vessels and conveyor belts from nearby quarries.

A3: Manufacturing

The cement manufacturing starts with the formation of a raw materials homogeneous stockpile that has the right proportion of calcium oxide, alumina, silica and iron oxide. This stockpile is called pre-blending and contains mainly limestone and clay with additional materials in smaller proportions like fluoride, bauxite and hornstone. The stockpile is reclaimed, regularly analyzed and adjusted by correctives addition to fulfill the raw mix design requirements in terms of chemistry. Then, it is fed to the raw mill for grinding where a fine powder, called raw meal, is produced. The raw meal is stored into silos where further homogenization takes place and then fed to the rotary kiln for sintering where the temperature rises at around 1450 °C by fuels burning and clinkerization reactions take place. At the end of the kiln, the sintered material is rapidly cooled and clinker is formed. Finally, cement is produced in the cement mills where clinker is ground with gypsum and certain natural or artificial materials and then stored into silos.



ENVIRONMENTAL PERFORMANCE INDICATORS

Indicator	Unit	A1	A2	A3	A1-A3 (Total)
Global Warming Potential, GHG	kg CO ₂ eq.	8.50E+02	8.26E-04	3.02E+01	8.80E+02 **
Global Warming Potential, total	kg CO ₂ eq.	8.50E+02	8.26E-04	3.02E+01	8.80E+02 *
Global Warming Potential, fossil fuels	kg CO ₂ eq.	8.50E+02	8.25E-04	3.02E+01	8.80E+02 *
Global Warming Potential, biogenic	kg CO ₂ eq.	1.12E-01	3.23E-07	1.29E-02	1.25E-01 *
Global Warming Potential, land use and land use change	kg CO ₂ eq.	5.05E-02	2.79E-07	1.98E-02	7.03E-02
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.08E-05	1.57E-10	2.36E-06	1.32E-05
Acidification potential, Accumulated Exceedance	mol H ⁺ eq.	2.66E+00	4.27E-06	2.09E-01	2.87E+00
Eutrophication potential, fraction of nutrients reaching freshwater end compartment	kg P eq.	6.56E-02	6.15E-08	1.06E-02	7.62E-02
Eutrophication potential, fraction of nutrients reaching marine end compartment	kg N eq.	4.29E-03	5.35E-09	7.77E-04	5.06E-03
Eutrophication potential, Accumulated Exceedance	mol N eq.	6.34E+00	1.53E-05	3.02E-01	6.64E+00
Formation potential of tropospheric ozone	kg NMVOC eq.	1.50E+00	4.60E-06	8.89E-02	1.59E+00
Abiotic depletion potential for non- fossil resources ***	kg Sb eq.	1.23E-04	1.54E-09	2.61E-05	1.49E-04
Abiotic depletion potential for fossil resources potential ***	MJ, net calorific value	3.49E+03	1.30E-02	3.91E+02	3.88E+03
Water (user) deprivation potential, deprivation-weighted water consumption ***	m ³ world eq. deprived	2.26E+01	9.57E-05	4.38E+00	2.70E+01

* The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production.

** The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production.

*** The results of the environmental impact indicators ADPE, ADPF and WDP shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Parameters Describing Resource Use

Indicator	Unit	A1	A2	A3	A1-A3 (Total)
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	8.99E+01	3.76E-04	4.61E+01	1.36E+02
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ, net calorific value	8.99E+01	3.76E-04	4.61E+01	1.36E+02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value	3.49E+03	1.30E-02	3.91E+02	3.88E+03
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ, net calorific value	3.49E+03	1.30E-02	3.91E+02	3.88E+03
Use of secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ, net calorific value	2.12E+02	0.00E+00	0.00E+00	2.12E+02
Use of non-renewable secondary fuels	MJ, net calorific value	2.64E+02	0.00E+00	0.00E+00	2.64E+02
Net use of fresh water	m ³	5.69E-01	2.87E-06	1.22E-01	6.91E-01

Other Environmental Information Describing Waste Categories

Indicator	Unit	A1	A2	A3	A1-A3 (Total)
Hazardous waste disposed	kg	5.58E-04	0.00E+00	3.85E-04	9.44E-04
Non-hazardous waste disposed	kg	4.83E-02	0.00E+00	3.33E-02	8.15E-02
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Environmental information describing output flows

Indicator	Unit	A1	A2	A3	A1-A3 (Total)
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.03E-01	0.00E+00	7.11E-02	1.74E-01
Materials for energy recovery	kg	1.30E-02	0.00E+00	9.00E-03	2.20E-02
Exported energy	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Extra Indicators

Indicator	Unit	A1	A2	A3	A1-A3 (Total)
Emissions from calcination and removals from carbonation	kg CO ₂ eq.	4.90E+02	0.00E+00	0.00E+00	4.90E+02
Emissions from combustion of secondary fuels from renewable sources used in production processes	kg CO ₂ eq.	9.14E-02	0.00E+00	0.00E+00	9.14E-02
Emissions from combustion of secondary fuels from non-renewable sources used in production processes	kg CO ₂ eq.	1.44E+01	0.00E+00	0.00E+00	1.44E+01
Removals and emissions associated with biogenic carbon content of the bio-based product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Removals and emissions associated with biogenic carbon content of the bio-based packaging	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ACC is utilizing its electrical consumption 97% from National Grid and 3% from its Solar Power Plant considering the national grid emission factor for the grid electricity.

	GWP-GHG	Units
A1-A3 Manufacturing	3.02E+01	kg CO ₂ eq.
Electricity, purchased from the grid	3.01E+01	kg CO ₂ eq.
Electricity, produced on-site	1.11E-01	kg CO ₂ eq.

GWP-GHG intensity of electricity: 7.5E-1 kg CO₂ eq./kWh

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks



REFERENCES

- GPI V.4.0:2021-03-29 GENERAL PROGRAMME INSTRUCTIONS OF THE INTERNATIONAL EPD® SYSTEM
- PCR 2019:14 V.1.3.2 PRODUCT CATEGORY RULES | CONSTRUCTION PRODUCTS | THE INTERNATIONAL EPD® SYSTEM 2023-12-08
- EN 15804:2012+A2:2019/AC:2021 SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS - CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS
- C-PCR-001 CEMENT AND BUILDING LIME (EN 16908:2017) | THE INTERNATIONAL EPD® SYSTEM
- EN 16908:2017+A1:2022 CEMENT AND BUILDING LIME - ENVIRONMENTAL PRODUCT DECLARATIONS - PRODUCT
- CATEGORY RULES COMPLEMENTARY TO EN 15804
- EN 197-1:2011 COMPOSITION, SPECIFICATIONS AND CONFORMITY CRITERIA
- ISO 14020:2000 ENVIRONMENTAL LABELS AND DECLARATIONS - GENERAL PRINCIPLES
- ISO 14025:2006 ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES AND PROCEDURES
- ISO 14040:2006 ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - PRINCIPLES AND FRAMEWORK
- ISO 14044:2006 ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - REQUIREMENTS AND GUIDELINES
- ECOINVENT CENTRE | WWW.ECO-INVENT.ORG
- GCCA'S INDUSTRY EPD TOOL FOR CEMENT AND CONCRETE (V4.2)