السويس للأسمنت
Suez Cement
HEIDELBERGCEMENT Group

OASIS – MC 12.5X

Environmental Product Declaration

SUEZ CEMENT

HEIDELBERGCEMENT Group

Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
EPD registration number: S-P-05702
Publication date: 2022-08-04
Valid until: 2027-08-04
Geographical scope: Worldwide

General Information

Manufacturer Information

Manufacturer EPD	Suez Cement Group of Companies (SCGC)
Production Sites	K70 Maadi/Ain Sokhna Road, Suez, Egypt Kafr Elw, Helwan, Cairo, 16, Egypt
Contact details	a.arafa@suezcem.com
Website	https://www.suezcement.com.eg/en

Product Identification

Product name	MC 12.5X
Place(s) of production	Suez, Egypt Helwan, Egypt
UN CPC code	374 – Plaster, lime and cement

The International EPD System

EPDs within the same product category but from different programmes may not be comparable.

EPD Information

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The International EPD SystemEPD
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.
EPD author	Dr. Nasser Ayoub, DCarbon Egypt Ashrakat Osama, DCarbon Egypt
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	2022-08-04
EPD verifier	Elisabet Amat
EPD number	S-P-05702
Publishing date	2022-08-04
EPD valid until	2027-08-04

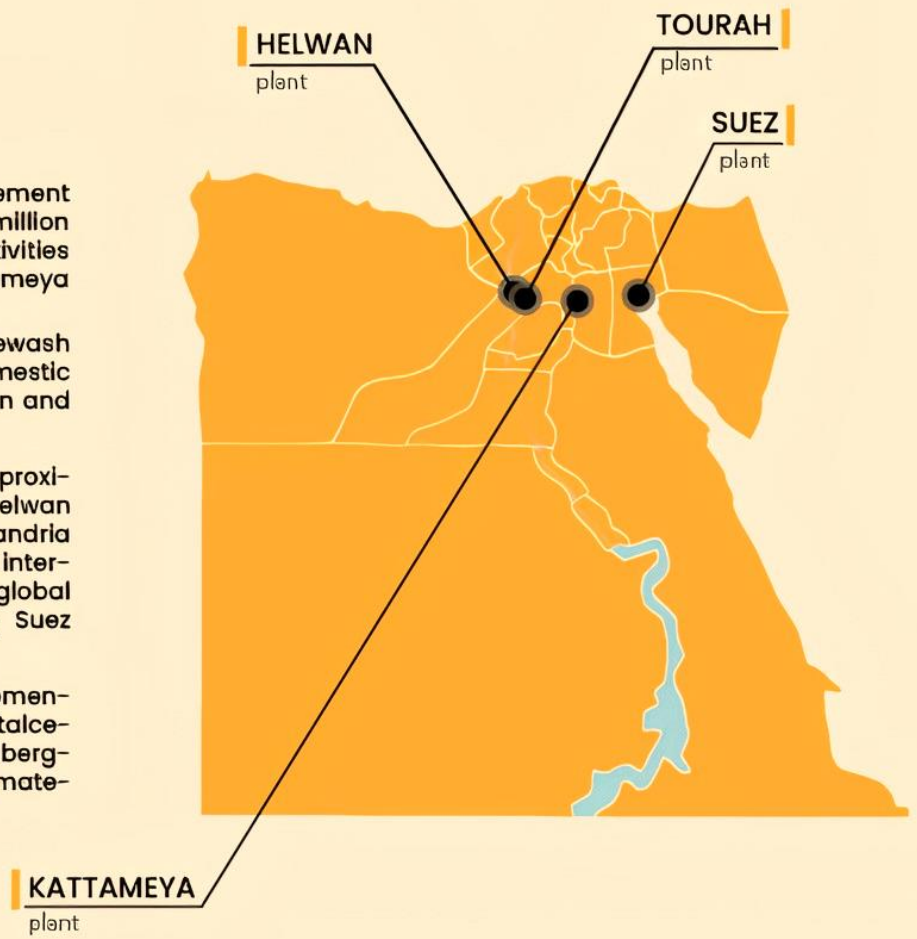
ABOUT SUEZ CEMENT

Established in 1977, Suez Cement is the largest grey cement producer in Egypt with a production capacity of four million tons of cement per year. The company started its activities by building its first plant in Suez followed by its Kattameya plant with total investments of about L.E. 1.7 billion.

Both plants operate using the dry method with whitewash and primary heating. The company serves the domestic market and also exports its products to Arab, African and European markets.

In August 2005, Suez Cement Company acquired approximately 99% of ASEC Cement Company (currently Helwan Cement Company), listed on the Cairo and Alexandria Stock Exchange, in collaboration with other local and international partners. The acquisition took place with a global investment of around USD 605 million, allowing Suez Cement to strengthen its leadership in Egypt.

In July 2016, Heidelberg Cement acquired 45% of Italcementi, a subsidiary of Italmobiliare. Suez Cement, in which Italcementi owned a 55% stake, therefore joined the Heidelberg-Cement Group as one of the world's leading building materials producers.



Sustainability Commitments

SCGC strives to be an environmentally- conscious organization, mindful of the harm it may cause to its surroundings. It has continuously invested towards a better Egypt and a cleaner environment and has made a long-term commitment towards being environmentally responsible. Suez Cement dedicates a substantial part of its industrial investments to the implementation of a comprehensive environmental policy.

For SCFC, the development of EPD is a vital step towards its commitment to environmental and social responsibility. With the issuing of EPD, we thrive to pursue the highest levels of:

Product Quality

Environmentally friendly process operations

Customer satisfaction quality

Innovation and business opportunity

To learn more about Suez Cement's sustainability commitment, visit https://www.suezcement.com.eg/en/sustainability-commitments-2030

Product Information

Product Description

Masonry cement (MC 12.5X) is a special blended cement that is mixed in specific proportions with limestone, gypsum and slag. The same product is produced in two different cement plants – Suez Plant and Helwan Plant. The report presents the average EPDs of to two identical products produced at two different production sites.

Product Application

For Suez Cement, MC 12.5X has many applications that include (1) non-structural concrete applications, (2) plastering, rendering and pavement works, (3) tile adhesives and grouting mortars (4) non-structural precast elements.

Chemical Properties of the product

Test method EN-196-2

Table 1 Chemical properties of the product

Chemical Requirements	Unit	Value
Loss of ignition	%	15.695
Insoluble Residue	%	1.94
Sulfur Trioxide	%	2.9
Chloride (Cl^-)	%	0.066
Chromium hexavalent (Cr^{+6})	ppm	0.855
Na_2O_{eq}	%	0.652

Physical properties of the product

Table 2 Physical properties of the product

Chemical Requirements	Unit	Value – Helwan Plant
Specific Surface (Blaine)	cm^2/gm	4094
The Residue on a 45 µm	%	6.85
2 days compressive strength	N/mm^2	8.655
7 days compressive strength	N/mm^2	14.34
28 days compressive strength	N/mm^2	17.93
Initial Setting Time	min	156
Soundness (Le Chatelier)	mm	0.875

Contents of the Products are presented in the tables below.

Table 3 Materials of Products

Material	Weight, kg	% Weight	Post-consumer %	Renewable %	Country / Region of origin
Limestone	660.987	66.099%	-	-	Egypt
Clay	107.088	10.709%	-	-	Egypt
Iron ore	8.153	0.815%	-	-	Egypt
Gypsum	85.754	8.575%	-	-	Egypt
Blast furnace slag	138.017	13.802%	-	-	Egypt
	Packaging Material				
Kraft Paper	2.200	-	-	-	Egypt
Wooden Pallet	29.620	-	-	-	Egypt
Steel drums	0.002	-	-	-	Egypt
Jumbo polypropylene bags	0.0007	-			Egypt

The MC 12.5X are dispatched into kraft paper bag packaging and transported to customers.

Substances, Reach - Very High Concern

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

Raw material supply: A1

The environmental impacts of raw material supply include emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed, along with waste handling from the various production processes. All major upstream processes are taken into consideration. This stage includes all raw materials which end up in the final products. The main raw material for MC 12.5X is Limestone, Clay and Blast furnace slag. All raw materials as well as ancillary materials were considered in this study

Transport: A2

The considered transportation impacts include exhaust emissions resulting from transportation of raw materials from suppliers to manufacturing facilities as well as the environmental impacts of the production of the diesel used. The manufacturing, maintenance, and disposal of the vehicles as well as tire and road wear during transportation have also been included in the databases. The transportation distances were calculated based on information provided by the Manufacturer.

Manufacturing: A3

The environmental impacts considered for the production stage cover all materials including packaging materials and ancillary materials. Also, fuels used by machines, as well as handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study considers also the losses occurring during the manufacturing processes.

Limestone and clay, two naturally occurring raw materials, are extracted from quarries usually located near the cement plants, limestone and clay undergo local primary crushing to have their size reduced and to facilitate transportation to the manufacturing plants. The blast furnace is obtained from the iron/steel industries.

The first step in the processing of raw materials into cement is grinding and drying. The raw materials, adequately proportioned and possibly incorporating additives, are ground into a very fine powder, called raw meal, which is then transported to blending silos and finally sent to storage. The raw meal is then fed to the kilns and is heated up to 1450°C in order to obtain clinker, whose components impart hydraulic properties to cement. The clinker is then removed from the kiln, rapidly cooled, and then stored. The final step of the cement manufacturing process consists of grinding clinker blended with gypsum and other secondary constituents. This technique results in the production of most types of finalized cement. The cement is then stored in specially devised silos.

TRANSPORT AND INSTALLATION (A4-A5) – Optional Scenario

Transportation to use site: A4

Transportation impacts occurred from final products delivery to construction material production facilities site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transportation of MC 12.5X from Suez Cement and Helwan Cement facility to customers as optional scenario.

Vehicle capacity utilization volume factor is assumed to be 100 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly. Also, volume capacity utilization factor is assumed to be 100 for the nested packaged products.

Installation into the building: A5

As MC 12.5X cement is used in infrastructure and construction process, the environmental impacts from installation into the building (A5) is only limited to the generation and treatment of waste at the use site

PRODUCT USE AND MAINTENANCE (B1-B7) and PRODUCT END OF LIFE (C1-C4, D)

This EPD does not cover the use phase or the end-of-life phase. Air soil, and water impacts during the use phase and the end-of-life phase have not been studied.

Technical Flowchart

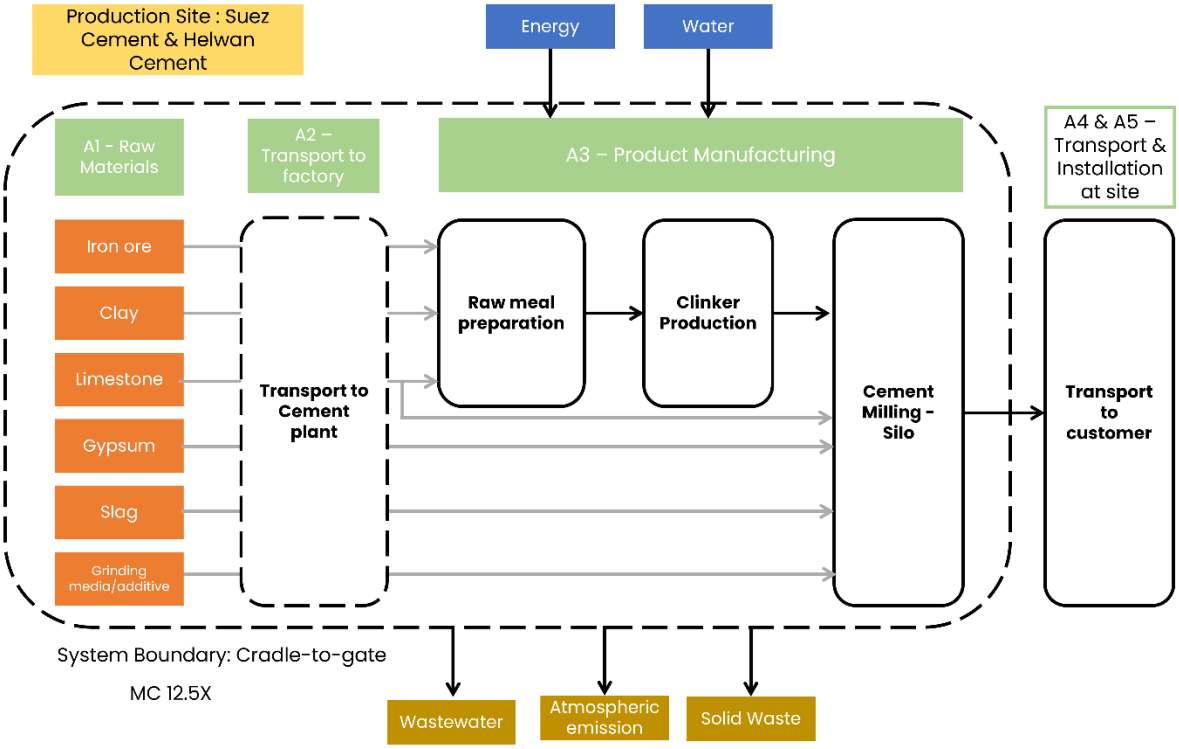


Figure 1 The process diagram

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Feb 2021 – Nov 2021

DECLARED UNIT

Declared unit	1 metric ton of MC 12.5X
Mass per declared unit	1000 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.0009

SYSTEM BOUNDARY

This EPD covers the *cradle to gate with options* scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly).

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
EG	EG	EG	EG	EG	-	-	-	-	-	-	-	-	-	-	-	-		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR. x= module is included in the study

Cut-Off CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes for which data is available are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The are no excluded input and output flows. The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 -standard. Allocation was based on the mass of the MC 12.5X product. The Suez Cement and Helwan Cement facility produces more than one cement product, so raw materials have been modelled based on product composition in each system. Energy use and process emissions for clinker production was based on mass of product composition.

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data is presented in annex 1.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
GWP – total	kg CO_2e	4,62E0	4,82E0	5,14E2	5,23E2	3,15E0	5,24E0
GWP – fossil	kg CO_2e	4,62E0	4,81E0	5,15E2	5,25E2	3,18E0	6,8E-2
GWP – biogenic	kg CO_2e	1,01E-3	3,39E-3	-1,41E0	-1,41E0	2,31E-3	5,17E0
GWP – LULUC	kg CO_2e	3,47E-3	1,47E-3	7,1E-2	7,6E-2	9,57E-4	6,57E-5
Ozone depletion pot.	kg $CFC_{-11}e$	7,36E-7	1,13E-6	1,42E-5	1,6E-5	7,48E-7	1,27E-8
Acidification potential	mol H^+e	7,36E-2	2,03E-2	2,01E0	2,11E0	1,34E-2	6,55E-4
EP-freshwater[3)]	kg Pe	1,11E-4	3,97E-5	9,57E-3	9,72E-3	2,59E-5	1,77E-6
EP-marine	kg Ne	2,43E-2	6,14E-3	2,54E-1	2,85E-1	4,03E-3	3,77E-3
EP-terrestrial	mol Ne	3,33E-1	6,78E-2	2,76E0	3,16E0	4,45E-2	1,46E-3
POCP ("smog")	kg NMVOCe	7,38E-2	2,17E-2	1,3E0	1,4E0	1,43E-2	1,62E-3
ADP-minerals & metals	kg Sbe	1,1E-2	8,5E-5	3,36E-4	1,14E-2	5,43E-5	6,6E-7
ADP-fossil resources	MJ	5,91E1	7,46E1	2,92E3	3,06E3	4,95E1	1,13E0
Water use[2)]	m^3e depr.	4,99E0	2,78E-1	3,46E1	3,98E1	1,84E-1	3,02E-2

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
Particulate matter	Incidence	1,14E-6	4,3E-7	2,55E-5	2,7E-5	2,88E-7	6,79E-9
Ionizing radiation[5)]	kBq U235e	2,46E-1	3,25E-1	2,54E0	3,11E0	2,16E-1	4,67E-3
Ecotoxicity (freshwater)	CTUe	2,34E3	5,74E1	7,75E3	1,01E4	3,78E1	1,06E1
Human toxicity, cancer	CTUh	4,75E-9	1,48E-9	1,25E-6	1,26E-6	9,67E-10	4,62E-11
Human tox. non-cancer	CTUh	1,18E-7	6,76E-8	2,72E-6	2,91E-6	4,48E-8	8,42E-9
SQP[4)]	-	4,34E1	1,1E2	3,24E2	4,77E2	7,47E1	2,43E0

4) SQP = Land use related impacts/soil quality.5) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
Renew. PER as energy	MJ	2,98E0	9,33E-1	2,42E2	2,46E2	6,23E-1	4,61E-2
Renew. PER as material	MJ	0E0	0E0	5,07E2	5,07E2	0E0	0E0
Total use of renew. PER	MJ	2,98E0	9,33E-1	7,49E2	7,53E2	6,23E-1	4,61E-2
Non-re. PER as energy	MJ	5,91E1	7,46E1	2,92E3	3,06E3	4,95E1	1,13E0
Non-re. PER as material	MJ	0E0	0E0	2,39E-2	2,39E-2	0E0	0E0
Total use of non-re. PER[6)]	MJ	5,91E1	7,46E1	2,92E3	3,06E3	4,95E1	1,13E0
Secondary materials	kg	0E0	0E0	2,45E-2	2,45E-2	0E0	0E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	1,89E2	1,89E2	0E0	0E0
Use of net fresh water	m^3	2,52E-1	1,54E-2	8,67E-1	1,13E0	1,03E-2	7,74E-4

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
Hazardous waste	kg	2,52E-1	7,41E-2	1,56E1	1,6E1	4,81E-2	2,99E-3
Non-hazardous waste	kg	6,11E0	7,86E0	4E2	4,14E2	5,32E0	2,23E0
Radioactive waste	kg	3,41E-4	5,11E-4	3,3E-3	4,15E-3	3,4E-4	6,14E-6

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**
GWP-GHG[7)]	kg CO_2e	4,62E0	4,81E0	5,15E2	5,25E2	3,18E0	6,8E-2

7) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator Is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity grid mix profile based on BUR, Egypt. 2018
Electricity CO_2e / kWh	0.6
District heating data source and quality	-
District heating CO_2e / kWh	-

BIBLIOGRAPHY

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Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021)

General Programme Instructions of the international EPD® system. Version 4.0

MC 12.5X LCA background report

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Suez Cement Group of Companies (SCGC)
EPD author	Dr. Nasser Ayoub, DCarbon Egypt
EPD verifier	Elisabet Amat
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Flexible EPD Generator.

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Elisabet Amat
EPD verification started on	2022-06-07
EPD verification completed on	2022-08-04
Supply-chain specific data %	100%
Approver of the EPD verifier	The International EPD System

Author	Answer
EPD author	Dr. Nasser Ayoub, DCarbon Egypt Ashrakat Osama, DCarbon Egypt
EPD author training	2021-10-26

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification

Elisabet Amat

VERIFICATION AND REGISTRATION (ENVIRONDEC)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Third party verifier	Elisabet Amat
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☐ yes ☑ no

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ANNEX 1 : Environmental impacts – en 15804+A1, cml / iso 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
Global Warming Pot.	kg CO_2e	4,55E0	4,77E0	5,06E2	5,15E2	3,15E0	2,44E0
Ozone depletion Pot.	kg CFC-11e	6,01E-7	8,95E-7	1,23E-5	1,38E-5	5,94E-7	1,03E-8
Acidification	kg SO_2e	2,92E-2	1,02E-2	1,78E0	1,82E0	6,47E-3	1,07E-3
Eutrophication	kg PO_4^3e	8,42E-3	2,09E-3	4,03E-1	4,13E-1	1,31E-3	5,91E-3
POCP (“smog”)	kg C_2H_4e	1,39E-3	6,22E-4	1,12E-1	1,14E-1	4,1E-4	7,35E-4
ADP-elements	kg Sbe	1,1E-2	8,5E-5	3,36E-4	1,14E-2	5,43E-5	6,6E-7
ADP-fossil	MJ	5,91E1	7,46E1	2,92E3	3,06E3	4,95E1	1,13E0

End of Document