ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Ready Mix Concrete - 40 MPa
Emirates Beton Readymix

EPD HUB, HUB-0250
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GENERAL INFORMATION

MANUFACTURER

Manufacturer	Emirates Beton Readymix
Address	Mafraq, Abu Dhabi
Contact details	GM.eb@ebrm.ae
Website	www.emiratesbeton.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with modules C1-C4, D
EPD author	Praveen Dhilip Kumar, Grey Matters
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	H.H, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Ready Mix Concrete - 40 MPa
Additional labels	
Product reference	AB4029
Place of production	Abu Dhabi, UAE
Period for data	Calendar year 2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	Not applicable

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 cubic meter of ready-mix concrete
Declared unit mass	2480 kg
GWP-fossil, A1-A3 (kgCO2e)	2.26E2
GWP-total, A1-A3 (kgCO2e)	2.28E2
Secondary material, inputs (%)	0.00119
Secondary material, outputs (%)	80.0
Total energy use, A1-A3 (kWh)	606.0
Total water use, A1-A3 (m3e)	5.61

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Emirates Beton ReadyMix (EB) is a ready-mix concrete company that leads the industry in the design, production and supply of ready-mix concrete.

The company was established in 2008 by a dynamic and highly qualified group of people with over 20 years of pioneering experience in the ready-mix concrete industry. The fast-growing company is now a major industry player and boasts of a reputation for superb products and outstanding services

PRODUCT DESCRIPTION

The product is a ready-mix concrete consisting of aggregates, cement and filler. It complies with below standards

- Dubai Municipality Circular 202: Use of Eco-friendly Cementitious Materials in Concrete
- ACI 211: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- ACI 318: Building Code Requirements for Structural Concrete
- ASTM C94: Standard Specification for Ready-Mixed Concrete BS
- EN 206-1: Concrete Specification, Performance, Production and Conformity

Further information can be found at www.emiratesbeton.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals		
Minerals	100	UAE
Fossil materials		
Bio-based materials		

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	-

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 cubic meter of ready-mix concrete
Mass per declared unit	2480 kg
Functional unit	
Reference service life	

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

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

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		
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
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.

MANUFACTURING AND PACKAGING (A1-A3)

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

The product is made of aggregates (extracted from natural rock formations and reduced to usable sizes by mechanical crushing in the local quarry, UAE), cement (manufactured locally in UAE) and water (Sourced from local supplier through lorry). Ready-mix concrete production starts by transporting the binders, aggregates, and additives to the manufacturing site and storing them into closed silos and containers. The aggregates are then dosed onto a scale and transferred to a central mixer. In the mixer, cement is added to the aggregates, after which the material is mixed dry. Water and additives are then added to the mixture, followed by wet mixing. After mixing, the concrete mass is unloaded from the central mixer into the drum of the concrete transit mixer truck, which is transported to the construction site. The defected/rejected concrete is discarded as waste, dumped into a waste bin in the production facility.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

This EPD does not cover the transport (A4) and installation (A5) phase.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

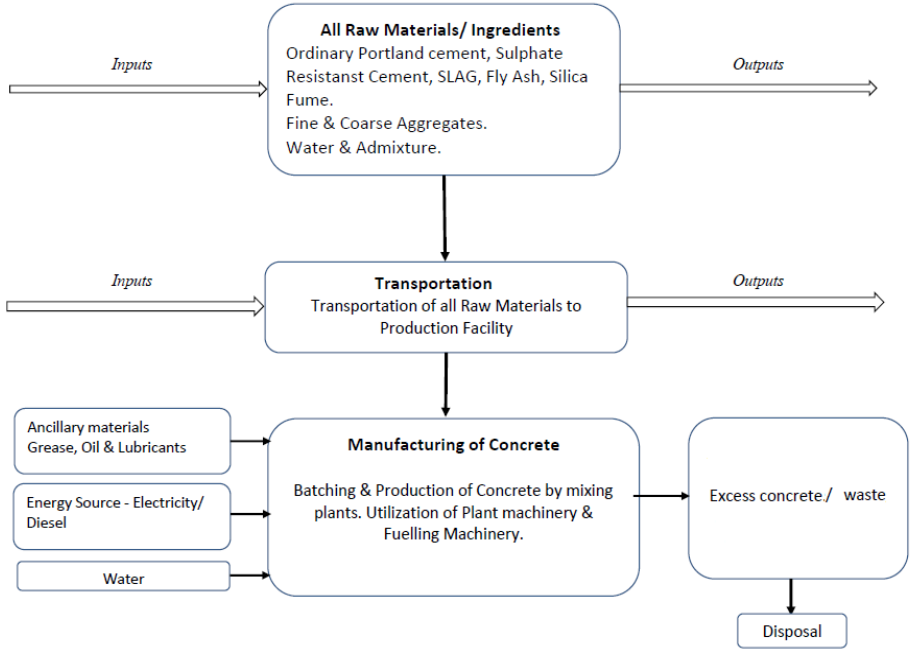
At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines. Energy consumption of a demolition process is on the average 10 kWh/m2 (Bozdağ, Ö & Seçer, M. 2007). Basing on a Level(s) project, an average mass of a reinforced concrete building is about 1000 kg/m2. Therefore, energy consumption demolition is assumed to be 10 kWh/1000 kg = 0.01 kWh/kg. The source of energy is diesel fuel used by work machines (C1).

The demolished concrete pieces are delivered to the nearest construction waste treatment plant. It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. Transportation distance to the closest disposal area is estimated as 23 km and the transportation method is dump truck which is the most common (C2).

At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use. It can be assumed that 100% of the concrete elements are transported to a waste treatment plant, where the concrete elements are crushed and separated. About 80% of concrete is recycled. The process losses of the waste treatment plant are assumed to be negligible (C3). The remaining 20% of concrete are assumed to be sent to the landfill (C4).

Due to the recycling potential of reinforcement steel and concrete, they can be used as secondary raw material, which avoids the use of virgin raw materials. The 80 % of concrete going to waste processing is converted into secondary raw materials after recycling. The recycled material content in the concrete is assumed to be 10.32 % (D).

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard 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 for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Allocated by mass or volume
Packaging materials	Not applicable
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	Not applicable

There is no average result considered in this study since this EPD refers to one specific product produced in one production plant.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

Bozdağ, Ö., & Seçer, M. (2007): Energy consumption of RC buildings during their life cycle

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,8E2	4,24E1	5,65E0	2,28E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,18E0	5,35E0	7,94E0	2,62E0	-1,45E1
GWP – fossil	kg CO_2e	1,78E2	4,24E1	5,64E0	2,26E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,18E0	5,35E0	7,94E0	2,61E0	-1,43E1
GWP – biogenic	kg CO_2e	1,88E0	2,92E-2	1,13E-2	1,92E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,27E-3	2,99E-3	2,21E-3	5,18E-3	-1,76E-1
GWP – LULUC	kg CO_2e	1,65E-1	1,35E-2	8,11E-4	1,8E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,91E-4	1,67E-3	6,71E-4	7,76E-4	-1,85E-2
Ozone depletion pot.	kg $CFC_{-11}e$	9,93E-6	9,87E-6	1,25E-6	2,11E-5	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,77E-6	1,21E-6	1,71E-6	1,08E-6	-1,29E-6
Acidification potential	mol H^+e	7,05E-1	2,02E-1	4,7E-2	9,55E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,55E-2	2,27E-2	8,3E-2	2,48E-2	-9,34E-2
EP-freshwater[2)]	kg Pe	2,17E-3	3,49E-4	2,94E-5	2,55E-3	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,31E-5	5,05E-5	3,21E-5	3,16E-5	-9,17E-4
EP-marine	kg Ne	1,52E-1	5,92E-2	1,96E-2	2,3E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,78E-2	6,75E-3	3,67E-2	8,54E-3	-1,97E-2
EP-terrestrial	mol Ne	1,78E0	6,54E-1	2,15E-1	2,65E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,14E-1	7,45E-2	4,02E-1	9,4E-2	-2,6E-1
POCP ("smog")[3)]	kg NMVOCe	4,72E-1	2,05E-1	5,91E-2	7,37E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,14E-1	2,38E-2	1,11E-1	2,73E-2	-6,55E-2
ADP-minerals & metals[4)]	kg Sbe	1,52E-2	7,59E-4	2,01E-5	1,6E-2	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,25E-5	8,99E-5	1,21E-5	2,39E-5	-1,58E-3
ADP-fossil resources	MJ	1,39E3	6,54E2	8,11E1	2,13E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,13E2	8,18E1	1,09E2	7,3E1	-2,05E2
Water use[5)]	m^3e depr.	5,68E1	2,44E0	3,17E-1	5,96E1	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,1E-1	3,46E-1	2,04E-1	3,38E0	-2,55E1

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	5,92E-6	3,72E-6	4,05E-7	1,01E-5	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,27E-6	4,75E-7	1,01E-5	4,82E-7	-1,09E-6
Ionizing radiation[6)]	kBq U235e	5,47E0	2,85E0	3,47E-1	8,67E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,82E-1	3,45E-1	4,68E-1	3E-1	-1,3E0
Ecotoxicity (freshwater)	CTUe	3,18E3	5,04E2	4,91E1	3,73E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,6E1	6,74E1	6,41E1	4,61E1	-2,49E2
Human toxicity, cancer	CTUh	5,52E-8	1,33E-8	3,66E-9	7,22E-8	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,36E-9	1,61E-9	2,3E-9	1,09E-9	-1,28E-8
Human tox. non-cancer	CTUh	1,66E-6	5,9E-7	5,09E-8	2,3E-6	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,82E-8	7,46E-8	5,65E-8	3,37E-8	-3,02E-7
SQP[7)]	-	1,64E3	9,5E2	1,02E1	2,6E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,89E0	1,22E2	2,8E0	1,24E2	-1,42E2

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,12E2	8,23E0	6,28E-1	1,21E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,09E-1	8,79E-1	5,91E-1	5,9E-1	-1,75E1
Renew. PER as material	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	1,12E2	8,23E0	6,28E-1	1,21E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,09E-1	8,79E-1	5,91E-1	5,9E-1	-1,75E1
Non-re. PER as energy	MJ	1,33E3	6,54E2	8,11E1	2,06E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,13E2	8,18E1	1,09E2	7,3E1	-2,05E2
Non-re. PER as material	MJ	6,92E1	0E0	0E0	6,92E1	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-5,54E1	-1,38E1	0E0
Total use of non-re. PER	MJ	1,39E3	6,54E2	8,11E1	2,13E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,13E2	8,18E1	5,39E1	5,92E1	-2,05E2
Secondary materials	kg	2,88E-2	0E0	7,42E-4	2,95E-2	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	5,47E0	1,35E-1	1,07E-2	5.61	MND	MND	MND	MND	MND	MND	MND	MND	MND	9,94E-3	1,71E-2	9,65E-3	7,99E-2	-2,04E0

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	5,28E0	6,57E-1	7,87E-2	6,02E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,21E-1	9,88E-2	0E0	6,81E-2	-1,07E0
Non-hazardous waste	kg	1,99E2	6,84E1	2,33E1	2,91E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,29E0	8,97E0	0E0	4,96E2	-4,37E1
Radioactive waste	kg	4,94E-3	4,48E-3	5,59E-4	9,98E-3	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,88E-4	5,46E-4	0E0	4,83E-4	-9,43E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,98E3	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	1,75E2	4,2E1	5,6E0	2,22E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,11E0	5,3E0	7,88E0	2,56E0	-1,4E1
Ozone depletion Pot.	kg CFC_{-11}e	1,15E-5	7,85E-6	1,66E-6	2,1E-5	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,4E-6	9,64E-7	1,36E-6	8,52E-7	-1,18E-6
Acidification	kg SO_2e	6,61E-1	1,09E-1	2,34E-2	7,93E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,21E-2	1,6E-2	1,17E-2	1,03E-2	-5,75E-2
Eutrophication	kg PO_4^3e	1,72E-1	2,02E-2	5,05E-3	1,97E-1	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,13E-3	3,62E-3	2,06E-3	2E-3	-3,09E-2
POCP (“smog”)	kg C_2H_4e	2,51E-2	5,96E-3	1,25E-3	3,23E-2	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,24E-3	6,86E-4	1,21E-3	7,58E-4	-4,69E-3
ADP-elements	kg Sbe	1,52E-2	7,59E-4	2,01E-5	1,6E-2	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,25E-5	8,99E-5	1,21E-5	2,39E-5	-1,58E-3
ADP-fossil	MJ	1,39E3	6,54E2	8,11E1	2,13E3	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,13E2	8,18E1	1,09E2	7,3E1	-2,05E2

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 reference standard, 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 digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

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 reference standard.

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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
27.01.2023