ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

EPD HUB, HUB-1866

Published on 12.08.2024, last updated on 12.08.2024, valid until 12.08.2029.

40 MPa (Type I+25%NP+8%SF)-DSP
Saudi Readymix Concrete Co, Joint Stock Company Unlisted

MANUFACTURER AND SITE

Manufacturer	Saudi Readymix Concrete Co, Joint Stock Company Unlisted
Address	2nd Industrial City, Dammam, Kingdom of Saudi Arabia, P.O Box 8635, 34333, , , Dammam, , SA
Contact details	info@saudireadymix.com.sa
Website	www.saudireadymix.com.sa
Place of production	Saudi Arabia
Period for data	1.1.2023 - 31.12.2023

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2 and ISO 14025
PCR	EPD Hub Core PCR version 1.1, 5 Dec 2023
cPCR	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 options, A4-A5, and modules C1-C4, D
EPD author	Khaldoon Slaiai - Saudi Readymix
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Xinyuan Zhang, as an authorized verifier acting for EPD Hub Limited

PRODUCT SPECIFICATION

Product name	40 MPa (Type I+25%NP+8%SF)-DSP
Concrete type	Ready-mix concrete
Product standards	EN 206-1
Compressive strength class	C40/50
Strength evaluation days	28 days
Exposure class	XD3
Product description	(0103-APSZ5FAA001) - (SRM-3) 40MPA+25%NP+8%MS@56Days-210±35mm slump-20mm Agg-CY Dammam Stadium Project Supplementary Cementitious Materials: --> 25% Saudi Natural Pozzolans --> 8% Silica Fume

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 cubic meter
Declared unit mass, kg	2355.9
Global Warming Potential A1-A3	
GWP-total (kg CO_2e)	3,17E+02
GWP-fossil (kg CO_2e)	3,16E+02
GWP-biogenic (kg CO_2e)	1,55E-01
GWP-luluc	1,18E-01

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

LIFE CYCLE ASSESSMENT

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	x	x	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.

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. 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

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	No allocation
Packaging materials	Not applicable
Ancillary materials	Allocated by mass
Manufacturing energy and waste	Allocated by mass

AVERAGES AND VARIABILITY

This EPD is product and factory specific and does not contain average calculations.

Product raw material main composition

The product is a ready-mix concrete consisting of aggregates, cement, filler, admixtures, and water. Main material categories as per EPD Hub GPI are shown below:

Raw material category	Amount, mass- %	Material origin
Metals	0	NA
Minerals	93.7	various
Fossil materials	0.13	various
Bio-based materials	0	NA

SUBSTANCES, REACH - VERY HIGH CONCERN

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

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0

PRODUCT LIFE CYCLE

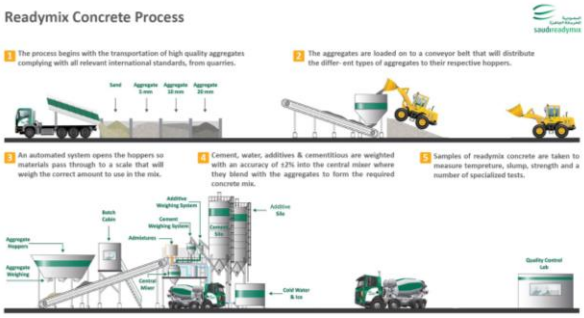
MANUFACTURING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production. 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.

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 concrete 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 mixer into the tank of the concrete mixer truck, which is transported to the construction site.

No packaging is included as the product is transported with mixer trucks.

MANUFACTURING PROCESS DIAGRAM (A1-A3)



TRANSPORT AND INSTALLATION (A4-A5)

The concrete is transported to the building site using an average lorry. Transportation impacts occurred from final products delivery to construction site cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions (A4).

Installation includes the energy used for concrete application. This consists of the energy spent by a concrete mixer truck and a concrete pump. A production loss of
3 % at installation is assumed (A5).

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, the concrete is assumed to be a part of a concrete building which demolished with machinery that consumes energy in the form of diesel (C1).

The concrete blocks gotten after the demolition are delivered 50 km by a lorry to the nearest construction waste treatment (C2). It is assumed that 100% of the demolished concrete is transported to a site where this waste is processed by, crushing the blocks to gravel. About 70% of the concrete can be recycled this way (C3). The remaining 30% of concrete is assumed to be sent to the landfill for disposal (C4). The crushed concrete received from waste treatment can be used as a replacement for virgin gravel or for raw materials in road construction (D). The process losses of the waste treatment plant are assumed to be negligible.

LCA SOFTWARE AND BIBLIOGRAPHY

The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data.

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	2,85E+02	2,45E+01	7,12E+00	3,17E+02	8,77E+00	1,72E+01	MND	MND	MND	MND	MND	MND	MND	4,12E+00	1,07E+01	6,52E+00	3,68E+00	-1,31E+01
GWP – fossil	kg CO_2e	2,85E+02	2,45E+01	7,12E+00	3,16E+02	8,77E+00	1,72E+01	MND	MND	MND	MND	MND	MND	MND	4,12E+00	1,07E+01	6,63E+00	3,72E+00	-1,32E+01
GWP – biogenic	kg CO_2e	1,55E-01	0,00E+00	-3,10E-04	1,55E-01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,09E-01	-4,65E-02	1,09E-01
GWP – LULUC	kg CO_2e	1,08E-01	9,04E-03	3,08E-04	1,18E-01	3,15E-03	4,54E-03	MND	MND	MND	MND	MND	MND	MND	4,10E-04	3,84E-03	6,60E-04	3,51E-03	-1,83E-02
Ozone depletion pot.	kg CFC_{-11}e	1,07E-05	5,63E-06	1,29E-06	1,76E-05	2,09E-06	2,20E-06	MND	MND	MND	MND	MND	MND	MND	8,80E-07	2,55E-06	1,42E-06	1,51E-06	-1,11E-06
Acidification potential	mol H^+e	8,80E-01	1,04E-01	6,59E-02	1,05E+00	3,66E-02	1,07E-01	MND	MND	MND	MND	MND	MND	MND	4,28E-02	4,46E-02	6,88E-02	3,50E-02	-8,64E-02
EP-freshwater[2)]	kg Pe	3,26E-03	2,01E-04	5,09E-05	3,51E-03	6,00E-05	1,33E-04	MND	MND	MND	MND	MND	MND	MND	1,36E-05	7,32E-05	2,19E-05	3,90E-05	-7,82E-04
EP-marine	kg Ne	2,55E-01	3,08E-02	2,32E-02	3,09E-01	1,11E-02	4,24E-02	MND	MND	MND	MND	MND	MND	MND	1,89E-02	1,35E-02	3,05E-02	1,21E-02	-1,87E-02
EP-terrestrial	mol Ne	2,94E+00	3,40E-01	2,52E-01	3,53E+00	1,22E-01	4,70E-01	MND	MND	MND	MND	MND	MND	MND	2,08E-01	1,49E-01	3,34E-01	1,33E-01	-2,44E-01
POCP ("smog")[3)]	kg NMVOCe	7,37E-01	1,09E-01	6,71E-02	9,12E-01	3,93E-02	1,28E-01	MND	MND	MND	MND	MND	MND	MND	5,71E-02	4,79E-02	9,19E-02	3,88E-02	-6,27E-02
ADP-minerals & metals[4)]	kg Sbe	1,50E-03	5,74E-05	2,13E-06	1,56E-03	2,06E-05	5,19E-05	MND	MND	MND	MND	MND	MND	MND	2,09E-06	2,51E-05	3,36E-06	8,55E-06	-1,33E-04
ADP-fossil resources	MJ	1,60E+03	3,68E+02	3,90E+01	2,01E+03	1,34E+02	1,66E+02	MND	MND	MND	MND	MND	MND	MND	5,54E+01	1,64E+02	8,91E+01	1,02E+02	-1,96E+02
Water use[5)]	m^3e depr.	2,70E+01	1,65E+00	2,77E-01	2,90E+01	6,19E-01	1,17E+00	MND	MND	MND	MND	MND	MND	MND	1,49E-01	7,55E-01	2,40E-01	3,24E-01	-2,61E+01

1) GWP = Global Warming Potential. 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e. 3) POCP = Photochemical ozone formation. 4) ADP = Abiotic depletion potential. 5) 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 experience with the indicator.

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	7,74E-06	2,82E-06	2,43E-07	1,08E-05	1,03E-06	2,72E-06	MND	MND	MND	MND	MND	MND	MND	1,15E-06	1,26E-06	1,41E-05	7,05E-07	-1,11E-06
Ionizing radiation[6)]	kBq U235e	5,67E+00	1,75E+00	2,92E-01	7,72E+00	6,91E-01	7,22E-01	MND	MND	MND	MND	MND	MND	MND	2,54E-01	8,43E-01	4,10E-01	4,62E-01	-3,12E+00
Ecotoxicity (freshwater)	CTUe	5,74E+03	3,31E+02	4,62E+01	6,11E+03	1,12E+02	2,49E+02	MND	MND	MND	MND	MND	MND	MND	3,33E+01	1,36E+02	5,36E+01	6,66E+01	-2,36E+02
Human toxicity, cancer	CTUh	5,99E-08	8,13E-09	1,12E-09	6,91E-08	2,94E-09	4,48E-09	MND	MND	MND	MND	MND	MND	MND	1,28E-09	3,59E-09	2,05E-09	1,66E-09	-1,37E-08
Human tox. non-cancer	CTUh	2,11E-06	3,28E-07	4,40E-08	2,48E-06	1,18E-07	1,24E-07	MND	MND	MND	MND	MND	MND	MND	2,41E-08	1,44E-07	3,87E-08	4,35E-08	-2,51E-07
SQP[7)]	-	1,25E+03	4,24E+02	6,23E+00	1,68E+03	1,56E+02	7,96E+01	MND	MND	MND	MND	MND	MND	MND	7,20E+00	1,91E+02	1,16E+01	2,18E+02	-1,89E+02

6) 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. 7) SQP = Land use related impacts/soil quality.

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	9,60E+01	4,14E+00	2,91E-01	1,00E+02	1,74E+00	3,69E+00	MND	MND	MND	MND	MND	MND	MND	3,16E-01	2,12E+00	5,09E-01	8,86E-01	-1,83E+01
Renew. PER as material	MJ	8,46E-01	0,00E+00	-1,69E-03	8,44E-01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-5,91E-01	-2,53E-01	5,91E-01
Total use of renew. PER	MJ	9,69E+01	4,14E+00	2,89E-01	1,01E+02	1,74E+00	3,69E+00	MND	MND	MND	MND	MND	MND	MND	3,16E-01	2,12E+00	-8,14E-02	6,33E-01	-1,77E+01
Non-re. PER as energy	MJ	1,58E+03	3,68E+02	9,94E+01	2,05E+03	1,34E+02	1,67E+02	MND	MND	MND	MND	MND	MND	MND	5,54E+01	1,64E+02	8,91E+01	1,02E+02	-1,96E+02
Non-re. PER as material	MJ	2,38E+01	0,00E+00	-4,75E-02	2,37E+01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,66E+01	-7,12E+00	1,66E+01
Total use of non-re. PER	MJ	1,60E+03	3,68E+02	9,93E+01	2,07E+03	1,34E+02	1,67E+02	MND	MND	MND	MND	MND	MND	MND	5,54E+01	1,64E+02	7,25E+01	9,49E+01	-1,80E+02
Secondary materials	kg	2,97E-01	1,02E-01	2,41E-03	4,02E-01	3,78E-02	5,19E-02	MND	MND	MND	MND	MND	MND	MND	2,17E-02	4,61E-02	3,49E-02	2,14E-02	-2,17E-01
Renew. secondary fuels	MJ	6,85E-03	1,03E-03	3,48E-05	7,91E-03	3,33E-04	3,96E-04	MND	MND	MND	MND	MND	MND	MND	7,08E-05	4,07E-04	1,14E-04	5,60E-04	-1,55E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,43E+00	4,77E-02	5,23E-03	1,48E+00	1,78E-02	5,47E-02	MND	MND	MND	MND	MND	MND	MND	3,36E-03	2,17E-02	5,41E-03	1,12E-01	-6,31E-01

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	7,61E+00	4,88E-01	2,63E-02	8,12E+00	1,44E-01	3,79E-01	MND	MND	MND	MND	MND	MND	MND	7,41E-02	1,75E-01	1,19E-01	0,00E+00	-1,11E+00
Non-hazardous waste	kg	1,85E+02	8,01E+00	1,77E+00	1,95E+02	2,50E+00	2,81E+01	MND	MND	MND	MND	MND	MND	MND	5,21E-01	3,05E+00	8,38E-01	7,07E+02	-3,45E+01
Radioactive waste	kg	1,01E-02	2,46E-03	4,68E-04	1,31E-02	9,25E-04	1,11E-03	MND	MND	MND	MND	MND	MND	MND	3,90E-04	1,13E-03	6,27E-04	0,00E+00	-1,03E-03

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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	9,34E-05	0,00E+00	3,30E+00	3,30E+00	0,00E+00	4,96E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,65E+03	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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	2,84E+02	2,42E+01	7,06E+00	3,15E+02	8,68E+00	1,70E+01	MND	MND	MND	MND	MND	MND	MND	4,07E+00	1,06E+01	6,55E+00	3,65E+00	-1,29E+01
Ozone depletion Pot.	kg CFC_{-11}e	8,55E-06	4,46E-06	1,02E-06	1,40E-05	1,66E-06	1,75E-06	MND	MND	MND	MND	MND	MND	MND	6,97E-07	2,02E-06	1,12E-06	1,19E-06	-9,20E-07
Acidification	kg SO_2e	6,52E-01	8,06E-02	4,95E-02	7,82E-01	2,83E-02	7,77E-02	MND	MND	MND	MND	MND	MND	MND	3,05E-02	3,46E-02	4,91E-02	2,64E-02	-6,69E-02
Eutrophication	kg PO_4^3e	2,20E-01	1,84E-02	8,40E-03	2,47E-01	6,34E-03	2,00E-02	MND	MND	MND	MND	MND	MND	MND	7,07E-03	7,73E-03	1,14E-02	5,70E-03	-3,24E-02
POCP (“smog”)	kg C_2H_4e	2,60E-02	3,15E-03	1,68E-03	3,08E-02	1,12E-03	2,16E-03	MND	MND	MND	MND	MND	MND	MND	6,67E-04	1,36E-03	1,07E-03	1,11E-03	-4,59E-03
ADP-elements	kg Sbe	9,80E-04	5,56E-05	3,82E-06	1,04E-03	2,00E-05	3,62E-05	MND	MND	MND	MND	MND	MND	MND	2,05E-06	2,44E-05	3,31E-06	8,43E-06	-1,31E-04
ADP-fossil	MJ	1,60E+03	3,68E+02	9,94E+01	2,07E+03	1,34E+02	1,68E+02	MND	MND	MND	MND	MND	MND	MND	5,54E+01	1,64E+02	8,91E+01	1,02E+02	-1,96E+02

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 concrete 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.

Xinyuan Zhang, as an authorized verifier acting for EPD Hub Limited

26.07.2024

VERIFIED ISO 14025