RAK*fix* L.L.C

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for

Bondcrete from RAK*fix* L.L.C.

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

ECO PLATFORM EPD EN 15804 VERIFIED

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Programme Operator:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Geographical Scope:	Middle East
UN CPC Code:	37410 (Plasters)

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Product Category Rules (PCR): Construction Products, 2019:14, Version 1.11

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

EPD process certification ✔ EPD verification

Third party verifier: Professor Vladimír Kocí

Approved by: The International EPD® System

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

Yes ✔ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs for construction products are primarily intended for use in B2B communication, but their use in B2C communication under certain conditions is not precluded. For EPDs intended for B2C communication, refer to ISO 14025. EPDs of construction products may not be comparable if they do not comply with EN 15804.

About Company

RAK*fix* is a leading manufacturer of dry mix mortar based on cement, lime and gypsum. RAK*fix* is located in Ras Al Khaimah, which is well known for its high quality natural mineral resources.

RAK*fix* dry mix mortars are transported in dry form to the construction site, where only water is added to the dry mortar in specified quantity just before the application.

RAK*fix* has a wide range of machines to suit all applications and volume of work. For a large scale of plaster job, plastering machines with the silo system is the perfect solution. Plastering machines mix and spray the wet mortar on to the wall or ceiling where it is levelled and finished by skilled masons. RAK*fix* provides PFT G4 plastering machines to get a consistent quality of wet plaster mortar. An uninterrupted supply of dry mix plaster from the silo, which stands at a convenient place, ensures a continuous work and high output. For high-rise towers relay stations are provided to convey the dry mortar to any desired height. For masonry mortar and screed RAK*fix* provides horizontal screw mixer for continuous supply of wet mortar.

RAK*fix* offers jobsite training for the masons for machine operation and application of dry mix products.

RAK*fix* dry mix mortars are designed in accordance with the relevant standard specifications of BS, ASTM and DIN. The product range includes different kind of plasters/renders, colored decorative renders, ordinary and special masonry mortars, screeds, concrete repair mortar and grouts.

Product Information

Product applied as dash bond coat over the concrete surfaces to provide key for the application of plaster over it, the product ensures a strong bonding with the concrete surfaces.

Cementitious dash bond coat as per BS EN 13914-1, 13914-2 & ASTM C 926.

Product UN CPC code is 37410 (Plasters).

Bondcrete

RAK*fix* 010	Bonding key coat for general concrete surface
RAK*fix* 012	Bonding key coat for densified concrete surface
RAK*fix* 014	Bonding key coat for ultra-smooth and impermeable concrete surface
RAK*fix* 016	Bonding key coat for non-absorbing surface of EPS/XPS

Bondcrete is free from substances of very high concern (SVHC). The product contains no substances from the REACH Candidate list of 19.01.2021.

LCA Information

Declared Unit: 1 kg of Bondcrete cement based bonding compound for concrete substrates.

Time Representativeness: 2021

Database(s) and LCA Software Used: Ecoinvent 3.6, SimaPro 9.1

The inventory for the LCA study is based on the 2020 production figures for RAK*fix* production plant in United Arab Emirates .

This EPD's system boundary is cradle to gate. The system boundary covers A1 - A4 product stages.

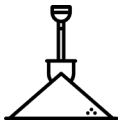
Upstream	Core		Downstream												Otther Environmental Information
Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction, demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

*ND: Not declared.

System Boundary

A1 . Raw Material Supply

Portland cement



Crushed and graded lime stone aggregate

Additives

A2. Transport

Transport of raw materials

A3. Manufacturing

Manufacturing

A4. Transport to Site

Transport of product

System boundary — — —

System Description

A1: Raw Material Supply

RAK*fix* uses three main raw materials; portland cement, crushed and graded limestone aggregate and additives. Each raw material consists of several production steps include raw material extraction/preparation and industrial production processes.

A2: Transportation

Additives are supplied from Europe. Except additives, all of other raw materials are supplied from U.A.E.

Transport Data (A2)	
Vehicle Types	Transport, freight, lorry 16-32 metric ton, euro5 {RoW}| market for transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, S Transport, freight, sea, transoceanic ship
Data Type	Related transport data from Ecoivent 3.6

A3: Manufacturing

RAK*fix* produces Bondcrete from raw materials, and packages with paper bags shrink wrapped with PE film, and stacked out the wooden pallets. During manufacturing, there is no waste arising from raw materials.

A4: Transport to Site

Bondcrete that produced by RAK*fix* is transported to site by truck. The average distance from manufacturing facility to site is calculated as 100 km.

Transport Data (A4)	
Vehicle Types	Transport, freight, lorry 16-32 metric ton, euro5 {RoW}| market for transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, S
Data Type	Related transport data from Ecoivent 3.6

LCA RESULTS

Bondcrete

Environmental Impacts for 1 kg Bondcrete						
Impact category	Unit	A1	A2	A3	A1-A3	A4
GWP - Fossil	kg CO_2 eq	3.74E-01	5.85E-03	2.37E-02	4.04E-01	1.67E-02
GWP - Biogenic	kg CO_2 eq	5.13E-03	1.22E-06	-7.99E-02	-7.48E-02	3.49E-06
GWP - Luluc	kg CO_2 eq	7.93E-05	1.72E-06	4.13E-05	1.22E-04	4.90E-06
GWP - Total	kg CO_2 eq	3.79E-01	5.85E-03	-5.62E-02	3.29E-01	1.67E-02
ODP	kg CFC11 eq	1.31E-08	1.34E-09	2.04E-09	1.65E-08	3.82E-09
AP	mol H+ eq	9.84E-04	2.40E-05	8.59E-05	1.09E-03	6.87E-05
EP - Freshwater	kg P eq	3.27E-05	4.62E-07	4.75E-06	3.79E-05	1.32E-06
EP - Freshwater*	kg PO_4 eq	10E-05	14.14E-07	14.54E-06	11.6E-05	4.04E-06
EP - Marine	kg N eq	2.59E-04	7.00E-06	2.37E-05	2.90E-04	2.00E-05
EP - Terrestrial	mol N eq	2.98E-03	7.69E-05	2.65E-04	3.32E-03	2.20E-04
POCP	kg NMVOC eq	7.53E-04	2.34E-05	7.70E-05	8.54E-04	6.69E-05
ADPE	kg Sb eq	1.52E-07	1.73E-08	4.40E-08	2.13E-07	4.93E-08
ADPF	MJ	1.54E+00	8.88E-02	3.78E-01	2.01E+00	2.54E-01
WDP	m^3 depriv.	2.62E-02	6.04E-04	7.69E-03	3.45E-02	1.73E-03
PM	disease inc.	7.97E-09	4.10E-10	2.27E-09	1.06E-08	1.17E-09
IR	kBq U-235 eq	6.03E-03	4.19E-04	1.27E-03	7.72E-03	1.20E-03
ETP - FW	CTUe	4.48E+00	6.35E-02	3.33E-01	4.87E+00	1.81E-01
HTTP - C	CTUh	5.49E-11	1.85E-12	1.37E-11	7.04E-11	5.29E-12
HTTP - NC	CTUh	2.68E-09	7.27E-11	2.49E-10	3.00E-09	2.08E-10
SQP	Pt	4.04E-01	5.96E-02	7.02E+00	7.48E+00	1.70E-01

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: Transport, A3: Manufacturing, A1-A3: Sum of A1, A2, and A3, A4: Transport to Site, A5: Installation, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.

Disclaimer 1: 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.

Disclaimer 2: 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.

**EP-Freshwater: This indicator has been calculated as "kg P eq" as required in the characterization model. (EUTREND model, Struijs et al, 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)*

Resource Use for 1 kg Bondcrete						
Impact Category	Unit	A1	A2	A3	A1+A3	A4
PERE	MJ	7.73E-02	8.76E-04	1.09E+00	1.16E+00	2.50E-03
PERM	MJ	0	0	0	0	0
PERT	MJ	7.73E-02	8.76E-04	1.09E+00	1.16E+00	2.50E-03
PENRE	MJ	1.54E+00	8.88E-02	3.78E-01	2.01E+00	2.54E-01
PENRM	MJ	0	0	0	0	0
PENRT	MJ	1.54E+00	8.88E-02	3.78E-01	2.01E+00	2.54E-01
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	2.04E-03	1.50E-05	2.87E-04	2.35E-03	4.30E-05

Waste & Output Flows for 1 kg Bondcrete						
Impact Category	Unit	A1	A2	A3	A1+A3	A4
HWD	kg	0	0	0	0	0
NHWD	kg	0	0	1.25E-03	1.25E-03	0
RWD	kg	0	0	0	0	0
CRU	kg	0	0	0	0	0
MFR	kg	0	0	1.25E-03	1.25E-03	0
MER	kg	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0

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, 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.

Result per functional declared unit		
Biogenic Carbon Content	Unit	A1-A3
Biogenic carbon content in product	kg C	0.02
Biogenic carbon content in packaging	kg C	0.29
Note: It was assumed 50% of the wood packaging material is biogenic carbon.		

References

/GPI/ General Programme Instructions of the International EPD® System. Version 3.0.

/EN ISO 9001/ Quality Management Systems - Requirements

/EN ISO 14001/ Environmental Management Systems - Requirements

/ISO 45001/ Occupational Health & Safety Management System - Requirements

/ISO 14020:2000/ Environmental Labels and Declarations — General principles

/EN 15804:2012+A2:2019/ Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

/ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

/ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

/PCR for Construction Products and CPC 54 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 1.1 DATE 2019-12-20

/The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

/Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

/SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

/Air emissions is taken from Greenhouse gas reporting: conversion factors 2020 / https://www.gov.uk/ Access Date: 19.03.2021

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