ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025:2006 and EN 15804:2012+A2:2019 for

FLOOR MIX MORTAR

by Readymix Industries (Israel) Ltd.

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

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EPD International AB

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Israel

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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.

PROGRAMME INFORMATION

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):

PCR 2019:14 Construction Products, version 1.2.2, with UN CPC 3733, Construction EN 15804:2012 + A2:2019 Sustainability of Construction Works

PCR review was conducted by: The Technical Committee of the International EPD® System.

Review Chair: Claudia A. Peña, University of Concepción, Chile

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.

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Life Cycle Assessment (LCA)

LCA accountability: Yıldıray Yılmaz, Metsims Sustainability Consulting

Third-party Verification

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

✓ EPD verification by individual 3rd party verifier

Third party verifier: Prof. Ing. Vladimír Kočí, Ph.D., MBA, LCA Studio Šárecká 5,16000 Prague 6- Czech Republic

Approved by: The International EPD® System

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

Yes No ✓

Readymix Industries (Israel) Ltd. has the sole ownership, liability, and responsibility for this EPD.

HOW TO READ THIS EPD?

An Environmental Product Declaration (EPD) is an ISO Type III Environmental Declaration based on ISO 14025 standard. An EPD transparently reports the environmental performance of products or services from a lifecycle perspective. The preparation of an EPD includes different stages, from acquiring raw materials to the end of life of the final product/service. EPDs are based on international standards and consider the entire value chain. Additionally, EPD is a third-party verified document. This EPD includes several sections described below.

1. General and Program Information

The first part of an EPD has information about the name of the manufacturer and product/service and other general information such as the validity and expiration dates of the document, the name of the program operator, geographical scope, etc. The second page states the standards followed and gives information about the program operator, third-party verifier, etc. The followed Product Category Rule (PCR) is indicated on the second page.

2. Company and Product/Service Information

Information about the company and the investigated product is given in this section. It summarizes the characteristics of the product provided by the manufacturer. It also includes information about the product such as product composition and packaging.

3. LCA Information

LCA information is one of the most important parts of the EPD as it describes the functional/declared unit, time representativeness of the study, database(s) and LCA software, along with system boundaries. The table presented in this part has columns for each stage in the life cycle. The considered stages are marked 'X' whereas the ones that are not considered are labeled as 'ND' (Not Relevant). Not all EPDs consider the full life cycle assessment for a product's entire life stages. The 'System Boundary' page is also the place where one can find detailed information about the stages and the assumptions made.

4. LCA Results

The results of the Life Cycle Assessment analysis are presented in table format. The first column in each table indicates the name of the impact category and their measurement units are presented in the second column. These tables show an amount at each life cycle stage to see the impact of different indicators on different stages. Each impact can be understood as what is released through the production of the declared unit of the material—in this case, 1 m^3 of floor mix mortar. The benefits of reuse/recycling of the declared product is reflected in this section.

The first impact in the table is global warming potential (GWP), which shows how much CO_2 is released at each stage. Other impacts include eutrophication potential, acidification potential, ozone layer depletion, land use related impacts, etc. The second table provides results for resource use and the third table is about the waste produced during the production. The fourth and final table shows the results for the GWP-GHG indicator, which is almost equivalent to the GWP-Total indicator mentioned previously. The only difference is that this indicator excludes the biogenic carbon content by following a certain methodology.

ABOUT THE COMPANY

The Readymix Group is Israel's leading producer and supplier of raw materials for the Construction Industry. Over the decades, the Group has built its reputation on providing building solutions based on products and services representing consistent high quality, excellence, and reliability. Readymix Industries (Israel) is a story of development, success, and contribution to the country's industry. In the early '60s, the British company RMC began to expand worldwide and established Readymix Industries (Israel) Ltd. in 1962. The hands that had cast the first concrete cube in the company's plant in December 1962, are the same hands that have brought the company this far. In 2005, RMC was acquired by Cemex.

Cemex is a leading vertically integrated heavy building materials company focused on four core businesses— Cement, Ready-Mix Concrete, Aggregates, and Urbanization Solutions. The Group is active in several fields and specializes in ready-mixed concrete, aggregates, infrastructure products, landscape products, chemical admixtures for concrete and white cement.

The Readymix Group's Concrete Division is the leading producer of ready-mixed concrete and mortar in Israel. With a national network of plants from Kiryat Shmona in the north to Eilat in the south, the Group can ensure transfer and efficient supply to its customers. Readymix has supplied concrete for many of Israel's most prominent construction projects, including power stations, bridges, airports and many other important projects, such as Ben Gurion 2000 Airport, the Ayalon Highway, the Ashkelon and Herzliya marinas, the CrossIsrael Highway, the Haifa national soccer stadium and a desalination plant.

ABOUT THE PRODUCT

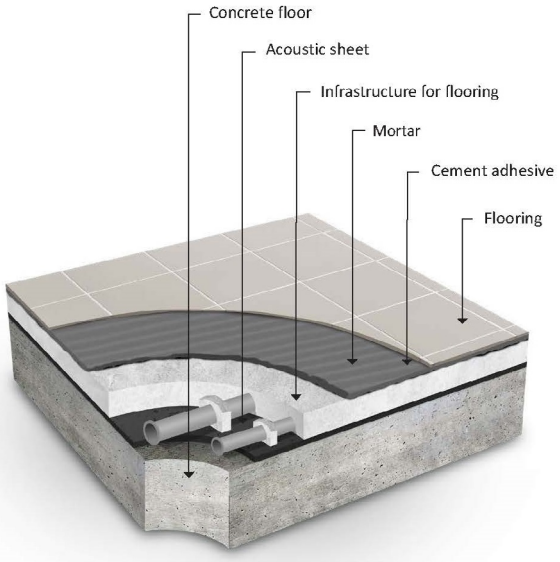
Floor mix mortar is Readymix's innovative & improved ready-mortar specially designed for floor tiling placement and finishes. The characterization and technical specifications of the product is given in below table.

FLOOR MIX MORTAR	
Product Benefits	• Suitable for concrete work and repairs in various applications • Can be applied up to a thickness of 80 mm • High workability and low shrinkage • Easy to work with improved flexibility and workability
Uses	• Suitable for indoor and outdoor use • Suitable with ceramic, porcelain, terrazzo, and natural stone tiles • Can be applied on top of FM Fast, concrete, mud and stabilized sand
Features and Technical Data	• Consist of cement, aggregates, water, various additives • Contains polymer fibers to reduce fracture • Spatial weight between 1650-1800 kg/m³ • Free drying shrinkage - 0.5 mm/m • Pressure resistance, after 35 days- 18 MPa • Tensile strength- 1 MPa • Controlled drying shrinkage- no ring cracks

The product mainly consists of two materials: cement and aggregates. Minor additives such as polypropylene fibers are used with small quantities along with water. The percentage breakdown for the wet weight composition is shown below. The product weights 1556 kg for 1 m³ for wet and 1796 kg for 1 m³ for dry weight.

Product Composition (% for wet weight)	
Fine aggregates	67%
Cement (mainly CEM II) + CEM I	19%
Water	13%
Fibers and Additives	<1%

Since the product is freshly transported, there is no packaging use.



LCA INFORMATION

Functional Unit / Declared Unit	1 m³ of Floor Mix Mortar
Time Representativeness	2021
Database(s) and LCA Software Used	Ecoinvent 3.8 and SimaPro 9.3
System Boundaries	Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and A4 module)

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads
	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
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules Declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	IL	IL	IL	IL	-	-	-	-	-	-	-	-	IL	IL	IL	IL	IL
Specific Data Used	>90%	>90%	>90%	>90%	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Products	NR					-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	<10%					-	-	-	-	-	-	-	-	-	-	-	-

(X = Included in LCA, ND= Not declared, NR= Not relevant)

LCA INFORMATION

The inventory for the LCA study is based on the 2021 production figures of Readymix Industries (Israel) Ltd. considering the company's production plants throughout Israel. This EPD investigates the environmental performance of floor mix mortar product of the company based on 1 m³ declared unit. This EPD's system boundary is cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and A4 module).

Allocations

Water consumption, energy consumption, and raw material transportation were weighted according to 2021 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2021 total waste generation.

Cut-off Criteria

1% cut-off applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

REACH Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Geographical Scope

The geographical scope of this EPD is Israel.

Data Quality and Modelling

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using the Cumulative Energy Demand (LHV) methodology, while freshwater use is calculated with selected inventory flows in SimaPro according to the PCR. There are no co-product allocations within the LCA study underlying this EPD. The SimaPro 9.3 LCA software and the Ecoinvent 3.8 LCA database were used to calculate the environmental impacts. The regional energy dataset is used for all energy calculations.

Variation - Sites

The percentage of raw meterials used in the product and the energy requirements do not change from one plant to another. Thus, the variation of sites in terms of GWP-GHG is less than 10 %.

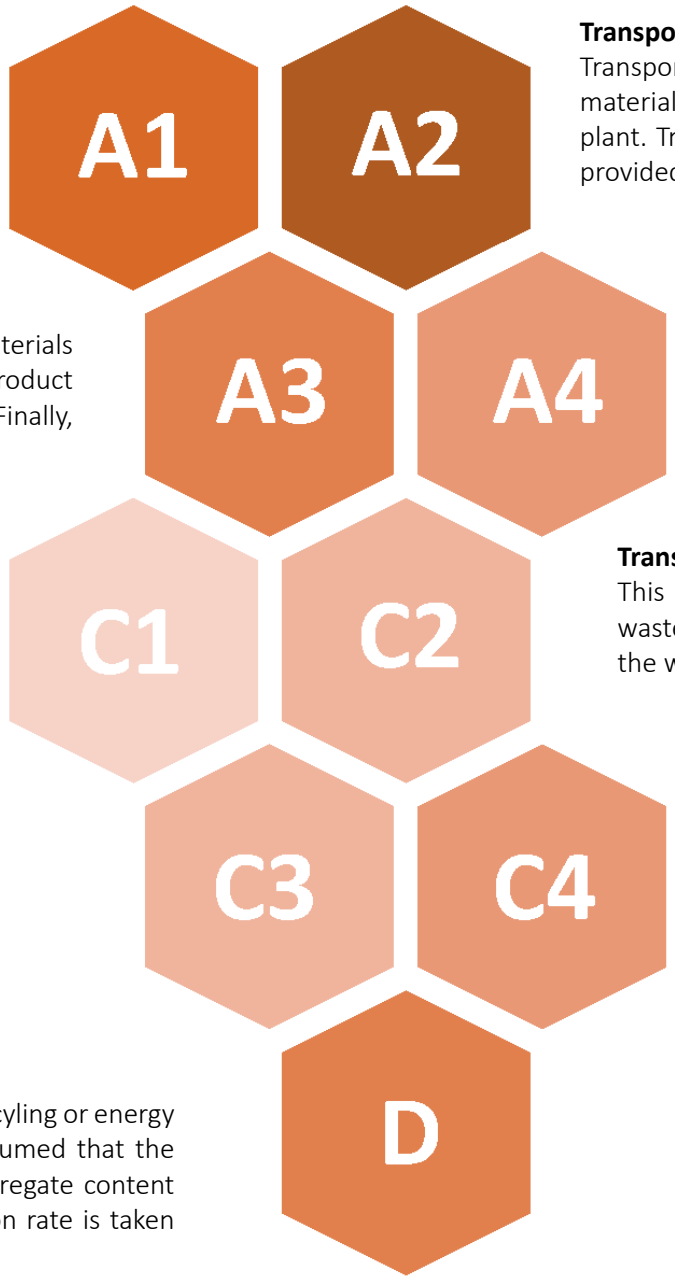
Raw Material Supply
Production starts with acquiring the raw materials. Raw material supply stage includes raw material extraction and/or preparation and pre-treatment processes before production. The main materials used in the mortar are cement, fine aggregates such as sand, and some minor additives.

Manufacturing
Mortar production starts with gathering the raw materials in needed quantities and mixing them according to product formulation. Then the mix is transferred to special silos. Finally, the product is distributed to the customers.

Demolition / Deconstruction
This stage includes the demolition/deconstruction of the mortar. It is assumed 0.01 kWh/kg energy is used.

Waste Processing
It is assumed that no waste processing is needed.

Future Reuse, Recycling or Energy Recovery Potential
This stage aims to analyze the benefits from the reuse, recyling or energy recovery potential of the investigated product. It is assumed that the recycled mortar is used as a substitute for the fine aggregate content during the cement/concrete production. The substitution rate is taken as 1 % of the recycled mortar.



Transport of Raw Materials
Transport is relevant for delivery of raw materials and other materials to the plant, and the transport of materials within the plant. Transport distances of the raw materials to different plant provided by the company for each route.

Transport to Site
Transport routes for the final product to sites are provided by the company. Based on the given information, the product shipment distances of the routes are calculated.

Transport
This stage is related with the transportation of construction waste to a waste processing area. The transport distance of the waste material is taken as 40 km.

Disposal
This stage considers the impacts of the disposal of the related product. 48% of the product is assumed to be recycled and the rest is landfilled as inert waste.

LCA Results for 1 m³ of Floor Mix Mortar

Impact Category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP- Fossil	kg CO_2 eq	309	2.00	11.1	5.84	0	8.51	-0.089
GWP- Biogenic	kg CO_2 eq	4.95	0.004	-0.031	0.011	0	0.110	-291E-6
GWP- Luluc	kg CO_2 eq	0.465	0.001	450E-6	0.002	0	0.009	-59.6E-6
GWP- Total	kg CO_2 eq	314	2.00	11.0	5.853	0	8.63	-0.089
ODP	kg CFC-11 eq	13.1E-6	460E-9	361E-9	1.34E-6	0	2.59E-6	-15.7E-9
AP	mol H+ eq	1.07	0.008	0.060	0.025	0	0.072	-0.001
*EP- Freshwater	kg P eq	0.036	146E-6	0.003	425E-6	0	0.002	-13.2E-6
EP- Marine	kg N eq	0.280	0.003	0.009	0.007	0	0.025	-224E-6
EP- Terrestrial	mol N eq	3.14	0.028	0.094	0.081	0	0.270	-0.002
POCP	kg NMVOC	0.744	0.007	0.025	0.020	0	0.066	-0.001
ADPE	kg Sb eq	0.001	4.56E-6	14.3E-6	13.3E-6	0	27.8E-6	-537E-9
ADPF	MJ	1631	30.6	150.8	89.3	0	200	-1.23
WDP	m^3 depriv.	51.3	0.114	0.665	0.334	0	8.69	-0.341
PM	disease inc.	10.7E-6	178E-9	79.2E-9	519E-9	0	1.41E-6	-10.5E-9
IR	kBq U-235 eq	6.13	0.143	0.026	0.418	0	0.934	-0.007
ETP- FW	CTUe	4129	25.9	70.4	75.6	0	156	-1.27
HTTP- C	CTUh	82.5E-9	668E-12	998E-12	1.95E-9	0	6.25E-9	-66.6E-12
HTTP- NC	CTUh	2.67E-6	26.4E-9	41.2E-9	77.1E-9	0	95.6E-9	-1.27E-9
SQP	Pt	2746	35.9	16.5	105	0	496	-6.89

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, C1: Deconstruction / Demolition, C2: 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.

LCA RESULTS

Resource use								
Impact Category	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	91.3	0.339	0.678	0.989	0	3.39	-0.035
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	91.3	0.339	0.678	0.989	0	3.39	-0.035
PENRE	MJ	1633	30.6	151	89.4	0	200	-1.23
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	1633	30.6	151	89.4	0	200	-1.23
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	6.75	0.006	0.040	0.018	0	0.226	-0.026
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.							

Waste&Output Flows								
Impact Category	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	0	0	0	0	0	0	0
NHWD	kg	23.3	0	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0
Acronyms	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.							

Climate Impact According to PCR 2019:14								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
*GHG-GWP	kg CO_2 eq	307	1.98	11.0	5.79	0	8.42	-0.087

GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology
* The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013

REFERENCES

GPI/ General Programme Instructions of the International EPD® System. Version 4.0.

EN ISO 9001/ Quality Management Systems- Requirements

EN ISO 14001/ Environmental Management Systems- Requirements

EN ISO 50001/ Energy Management Systems- 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 1.11 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

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