



ENVIRONMENTAL PRODUCT DECLARATION

ROYAL EL MINYA CEMENT CO.

FOR MULTIPLE PRODUCTS CEM I 52,5R, CEM II/A-LL 52,5N, AND CEM II/A-LL 52,5R BASED ON THE AVERAGE RESULTS OF THE GROUP PRODUCTS

CEM II/A-LL 52,5R IS NOT YET ON THE MARKET - RESULTS OF THIS EPD SHALL BE USED WITH CARE AS THE LCI DATA FOR THIS PRODUCT IS NOT YET BASED ON 1 YEAR OF PRODUCTION WHICH MAY RESULT IN INCREASED UNCERTAINTY.

IN ACCORDANCE WITH ISO 14025:2006 AND EN 15804:2012+A2:2019/AC:2021 AND ISO 21930

PROGRAM: THE INTERNATIONAL EPD® SYSTEM, WWW.ENVIRONDEC.COM

PROGRAM OPERATOR: EPD INTERNATIONAL AB

EPD REGISTRATION NUMBER: EPD-IES-0020045

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VALID UNTIL: 2030.02.23

GEOGRAPHICAL SCOPE: WORLDWIDE



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.

General Information

ACCOUNTABILITIES FOR PCR, LCA AND INDEPENDENT, THIRD-PARTY VERIFICATION

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR) Product Category Rules (PCR):

- PCR 2019:14 Construction products; Version 1.3.4.
- c-PCR-001 Cement and Building Lime (EN 16908:2017+A1:2022) 2022-05-18
- UN CPC: 3744

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by individual verifier.

Third-party verifier: Callum Hill director at JCH Industrial Ecology Ltd.

Approved by: The International EPD® System The EPD owner has the sole ownership, liability, and responsibility for the EPD. info@environdec.com,

EPDs within the same product category but registered in different EPD programs, 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 characterization 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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Company Information

Royal Cement is a leading manufacturer of premium white cement, recognized as one of the most prestigious players in the global market. With operations spanning over 50 countries across Africa, the Middle East, Europe, and the United States, Royal Cement is a trusted supplier for large-scale projects and industries worldwide.

Since its establishment in 2006 and full-scale operations in 2010, Royal El Minya Cement has specialized in producing high-quality white clinker, white Portland cement, and white masonry cement.

EPD Owner: Royal El Minya Cement Co..

Production site(s): El Minya, Egypt

Product Information

Product name: CEM I 52,5R, CEM II/A-LL 52,5N, CEM II/A-LL 52,5R

Product description: Royal White cement products is versatile and suitable for various uses including the production of white and colored concrete, plastering with dyes, and creating decorative elements such as interlocking pavers and garden architecture components. Its high early strength makes it particularly useful for projects requiring rapid formwork removal, while its compatibility with chemical additives enhances its workability in diverse construction scenarios.

This is an average product group EPD for cement types CEM I 52,5R, CEM II/A-LL 52,5N, and CEM II/A-LL 52,5R which comply with the requirements of EN 197-1. The specific cement types are produced at the Royal El Minya Cement Co. production site at El Minya, Egypt

Packaging materials: No packaging materials for products used for delivery are considered in this case.



Product Information

Technical characteristics according to EN 197-1		CEM I 52,5R	CEM II/A-LL 52,5N
Mechanical properties	2 days compressive strength (N/mm ²)	38.8	28.46
	28 days compressive strength(N/mm ²)	63.37	57.06
Chemical properties	Sulfate content (SO ₃ , % w/w)	3.48	3.26
	Chloride content (Cl, % w/w)	0.06	0.08
Physical properties	Initial setting time (min)	100	150
	Soundness (mm)	0.71	0.5

CEM II/A-LL 52,5R is a new product that is not yet on the market.

Composition by mass %	CEM I 52,5R	CEM II/A-LL 52,5N /CEM II/A-LL 52,5R
Clinker	95-100	80-94
Limestone	-	6-20
Minor additional constituents	0-5	0-5

All products are manufactured in compliance to the ES 4756-1/2022 and BS EN 197-1/2011 standards.

UN CPC code: 3744

LCA Information

Functional unit / declared unit: The declared unit is one (1) ton (1000 kg).

Reference service life: Not relevant due to the cradle-to-gate boundary conditions.

Time representativeness: The data used in this study cover the reporting year of 2024.

Database(s) and LCA software used: GCCA Industry EPD Tool for Cement and Concrete (V.5) and Ecoinvent database (V 3.10).

Goal and scope: This EPD evaluates the environmental impacts of the production of one (1) ton CEM I 52,5R, CEM II/A-LL 52,5N and CEM II/A-LL 52,5R from Cradle to gate (A1-A3).

Data quality: ISO 14044 was applied in terms of data collection and quality requirements. The data concerning the modules A1 (raw material supply), A2 (transportation) and A3 (product manufacturing) were provided by Royal El Minya Cement Co. and involved all input and output materials to the plant, the consumed utilities (energy, water) and the distances and means of transport for each input stream.

Regarding electricity mix, contribution percentage of the Egyptian fuel profile for energy production were added to the GCCA tool in order to account for the emission results from the electricity consumption. Where the emissions factor published by the Egyptian Electricity Holding Company (EEHC) in the latest annual report for 2022/2023 is 376.7 tCO₂e/GWh.

The background data for the module A1 e.g. electricity generation, raw materials and fuels production were recovered from GCCA Environmental Product Declaration tool (V5.0). GCCA's Industry EPD Tool for Cement and Concrete is a web-based calculation tool for EPDs of clinker, cement, aggregates, concrete and precast elements, available in both International and North American versions. The present report refers to the **International version only**.



The latter complies with the latest cement and concrete PCRs registered at the International EPD® System (Environdec), namely c-PCR-001 Cement and building limes (EN 16908) for cement and c-PCR003 Concrete and concrete elements (EN 16757) for concrete and precast elements, both registered as complementary PCRs of PCR 2019:14 Construction products (EN 15804+A2).

The GCCA EPD tool (V 5.0) is developed by Quantis <https://quantisintl.com/> and verified by Studio Fieschi <http://www.studiofieschi.it/en>.

The International EPD® System, which provides the framework to develop and publish EPDs based on ISO 14025 and EN 15804, gives the final approval of the tool's compliance with the rules.

The underpinning database for the GCCA EPD tool is the version of the Ecoinvent database (V.3.10) and cement manufacturing data obtained through the GNR process (<https://gccassociation.org/sustainability-innovation/gnr-gcca-in-numbers/>).

The database of Ecoinvent (V.3.10) was used to complete any missing data.

Generic data used in this study concerning:

- CO₂ emission factors for different transportation way
- CO₂ emission factors for fuels and raw materials
- Specific emission factor of used energy mix (kg CO₂/kWh).

There is no missing data for the case of Royal cement production plant, since all the required raw data were provided by the technical staff of the plant, using all the available sources which are:

- i) The ERP system (SAP) that company uses
- ii) Flow meters for consumed and recycled water
- iii) Data, for emissions, which are continuously recorded and obtained by the environmental measurement reports that are carried out each quarter for the plant performance.

Geographical scope: Worldwide.

Allocations: The allocation has been avoided where that was possible. Production was split into two sub-processes, clinker and cement, and the associated input and output data for each subprocess were recorded. When data could not be directly attributed to a specific product, they were assigned by physical properties (mass).

No by-products occur during clinker and cement production; therefore, there is no need for allocations in by-products.

For water (and recycled), wastes and emissions allocation, the “clinker to cement ratio” was used for allocating the volumes to clinker or cement respectively.

The study does not include the followings:

- Capital equipment production
- Equipment maintenance
- Human labour and employee transport.

Assumptions: For the road and sea transportation a lorry >32 metric ton, EURO6 and bulk carrier for dry goods were used respectively. The cement recipe (materials percentage participation) was defined by the pre-verified and automated ERP system (SAP) that company uses.

For the cement types CEM I 52,5R, CEM II/A-LL 52,5N, and CEM II/A-LL 52,5R, the packaging materials are not taken into consideration.

Cut-off rules: The cut-off rule for insufficient data or data gaps that are less than 1% of the total input mass or mass per module was applied. In case of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1% of renewable and nonrenewable primary energy usage and 1% of the total mass input of that unit process. The total of neglected input flows for the stages ‘cradle through gate’ shall be a maximum of 5% of energy usage and mass.” (EN 15804:2012+A2:2019).

Regarding the LCA model, the default cut-off criteria are applied for all processes from the Ecoinvent database. In addition, all custom processes developed for the specific purposes of the project are consistent with the rules and guidelines of the Ecoinvent database, and hence the same cutoff criteria are applied.

Comparability: EPD performance for construction products that they do not comply with EN 15804 may not be comparable. EPDs from separate programs but within the same product category may not be comparable as well.

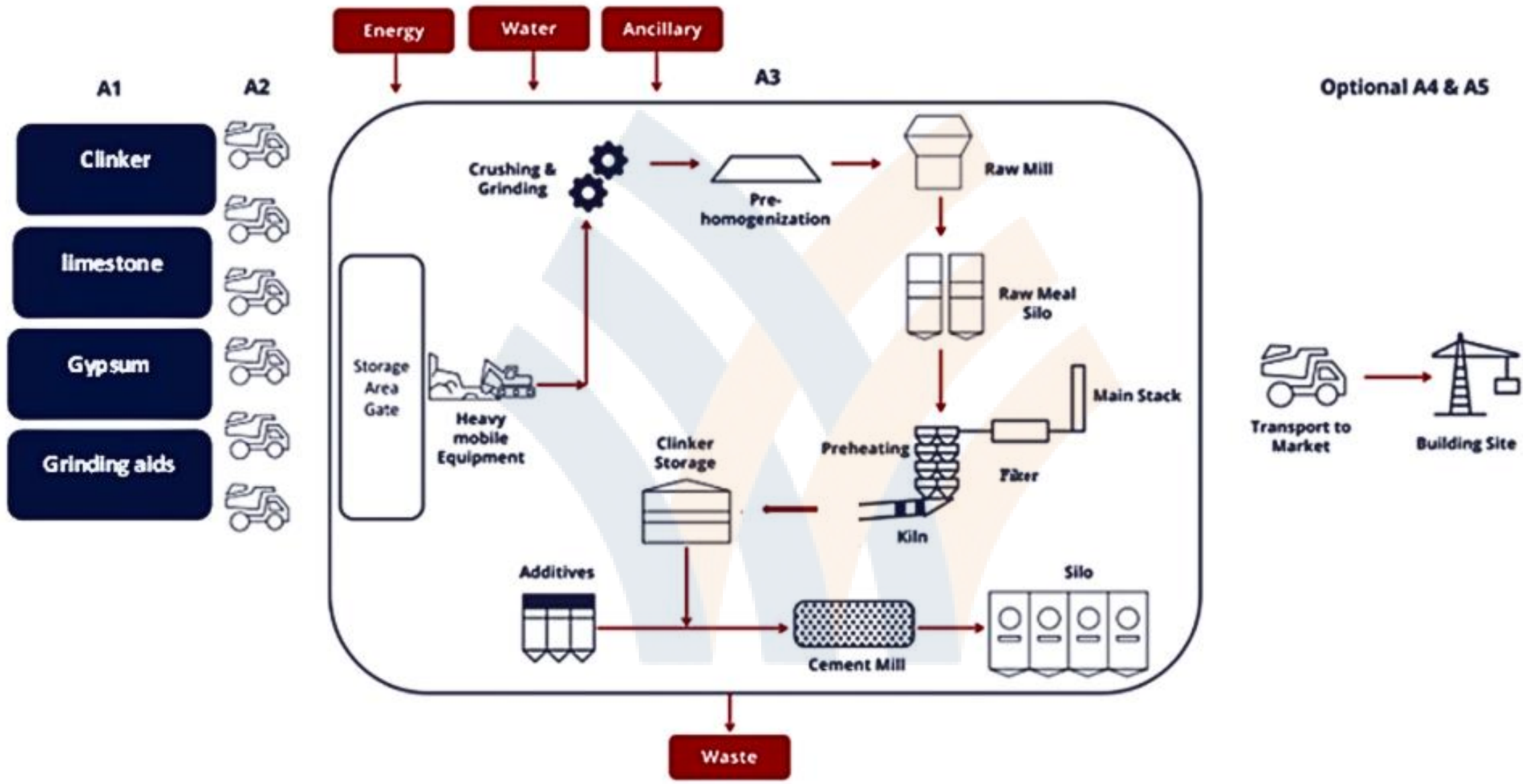
Description of system boundaries: The scope of this study is “Cradle to gate” covering the product stage (modules A1-A3), since the product fulfils the three conditions required by EN 15804:2012+A2:2019, about the exclusion of modules C1-C4 and D. The EPD covers the product stage (“cradle to gate”, A1-A3), since the three criteria of EN 15804 are met for the exclusion of stages B1-B7, C1-C4 and D.

System Diagram

The scope of this study is “Gradle to gate” covering the product stage (modules A1-A3), since the product fulfills the three conditions required by EN 15804:2012+A2:2019, about the exclusion of modules C1-C4 and D.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	EG	EG	EG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>95%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	± 7%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

More information: X= Module Declared, MND = module not declared.



Environmental Information

For construction services, the total value of A1-A3 shall be replaced with the total value of A1-A5, The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks

Potential environmental impact – mandatory indicators according to EN 15804 Results per tonne of cement

Indicator	A1-A3 (Total)	Unit
Global Warming Potential, GHG	1.21E+03	kg CO ₂ eq.
Global Warming Potential, total	1.21E+03	kg CO ₂ eq.
Global Warming Potential, fossil fuels	1.21E+03	kg CO ₂ eq.
Global Warming Potential, biogenic	5.02E-01	kg CO ₂ eq.
Global Warming Potential, land use and land use change	1.33E-01	kg CO ₂ eq.
Depletion potential of the stratospheric ozone layer	1.09E-05	kg CFC 11 eq.
Acidification potential, Accumulated Exceedance	2.27E+00	mol H+ eq.
Eutrophication potential, fraction of nutrients reaching freshwater end compartment	1.31E-02	kg P eq.
Eutrophication potential, fraction of nutrients reaching marine end compartment	2.69E-01	kg N eq.
Eutrophication potential, Accumulated Exceedance	4.48E+00	mol N eq.
Formation potential of tropospheric ozone	1.83E+00	kg NMVOC eq.
Abiotic depletion potential for non- fossil resources	3.90E-03	kg Sb eq.
Abiotic depletion potential for fossil resources potential	8.40E+03	MJ, net calorific value
Water (user) deprivation potential, deprivation-weighted water consumption	8.44E+01	m ³ world eq. deprived

Notes

1. According to the polluter pays principle (EN 15804) the system that generates the waste is responsible for declaring the impacts of waste processing until the end of waste stage is reached. The indicated value (net value) therefore does not include the CO₂ emissions from waste incineration. The use of imported energy from the waste within “use of secondary fuel” as a more appropriate indicator does not currently exist. This indicator is not mandatory by EN 15804.
2. This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.
3. 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

Parameters describing resource use

Results per tonne of cement		
Indicator	A1-A3 (Total)	Unit
PERE	1.79E+02	MJ, net calorific value
PERM	0.00E+00	MJ, net calorific value
PERT	1.79E+02	MJ, net calorific value
PENRE	8.40E+03	MJ, net calorific value
PENRM	0.00E+00	MJ, net calorific value
PENRT	8.40E+03	MJ, net calorific value
SM	0.00E+00	kg
RSF	0.00E+00	MJ, net calorific value
NRSF	1.16E+02	MJ, net calorific value
FW	3.00E+00	m ³

Acronyms

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding nonrenewable primary energy 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste production

Results per tonne of cement		
Indicator	A1-A3 (Total)	Unit
HWD	9.14E-03	kg
NHWD	1.11E-02	kg
RWD	1.75E-03	kg

Acronyms

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

Output flows

Results per tonne of cement		
Indicator	A1-A3 (Total)	Unit
CRU	0.00E+00	kg
MFR	0.00E+00	kg
MER	0.00E+00	kg
EE	0.00E+00	MJ per energy carrier

Acronyms

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy, electricity.

Additional Information

Royal El Minya Cement Co. hereby declares that all cement products are in compliance with the REACH Regulation (EC) No1907/2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals. Cement does not contain any Substances of Very High Concern (SVHC) currently on the candidate list. REACH SVHC list is not static and is updated frequently, thus the company will continue to evaluate, research and review to fulfil the demands of the regulation.

Difference versus previous versions

This is the first EPD version for Royal El Minya Cement Co.

References

- ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.
- ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
- ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
- Ecoinvent database (V 3.10).
- EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- Int'l EPD System PCR 2019:14 Construction products, version 1.3.2 EPD.
- General Programme Instructions of the international EPD® system. Version 5.0

Contact Information

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