

Environmental Product Declaration



Environmental Product Declaration for ready mix concrete products produced by Holcim Ecuador at their Pascuales facility in Guayaquil, Ecuador

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers concrete products produced by Holcim Ecuador. Declared unit: 1 m3 of concrete
Declaration Owner:	Holcim Ecuador S/N Av. Barcelona y José Rodríguez Bonin, Edif. El Caimán Piso 2 Guayaquil, Ecuador www.holcim.com.ec
Program Operator:	Labeling Sustainability Address, 11670 W Sunset Blvd. City, State, Los Angeles, CA www.labelingsustainability.com/
Product Category Rule:	ISO 21930:2017 Sustainability in Building Construction – Environmental Declaration of Building Products: serves as the core PCR Product Category Rule of Environmental Product Declarations PCR for Concrete serves as the sub-category PCR. PCR Program Operator: NSF International Sub-category PCR review was conducted by: Thomas P. Gloria, Ph. D. of Industrial Ecology Consultants: 35 Bracebridge, Rd., Newton, MA 02459-1728, t.gloria@industrial-ecology.com. Dr. Michael Overcash of Environmental Clarity: 2908 Chipmunk Lane, Raleigh, NC 27607-3117, mrovercash@earthlink.net. Mr. Bill Stough of Sustainable Research Group: PO Box 1684, Grand Rapids, MI 49501-1684, bstough@sustainableresearchgroup.com.
Independent LCA Reviewer and EPD Verifier:	This EPD was independently verified in accordance with ISO 14025 and ISO 21930. The life cycle assessment was independently reviewed in accordance with ISO 14044 and the referenced PCR. Independent verification of the declaration, according to ISO 14025:2006 External Third Party Verifier Denice V. Staaf, Certified 3rd Party Verifier under Labeling Sustainability (www.labelingsustainability.com)
Date of Issue:	22 August 2025
Period of Validity:	5 years; valid until 22 August 2030
EPD Number:	HOECU08222501



STUDY GOAL

The intended application of this life cycle assessment (LCA) is to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, www.labelingsustainability.com. This EPD was independently verified in accordance with ISO 14025:2006 and ISO 21930:2017. The life cycle assessment was independently reviewed in accordance ISO 14044:2006 and the referenced PCR.

EPDs are comparable only if prepared from cradle-to-grave life cycle results and based on the same function, quantified by the same functional unit, and taking account of replacement based on the product reference service life (RSL) relative to an assumed building service life, can be used to assist purchasers and users in making informed comparisons between products. This EPD is meant for B2B communication.

DESCRIPTION OF PRODUCT AND SCOPE

This EPD reports on 20 concrete mixes manufactured at the Pascuales Holcim Ecuador concrete facility in Guayaquil, Ecuador.

This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study, and therefore, stages extending beyond the plant gate are not included in this LCA. Excluded stages include transportation of the manufactured material to the construction site; on-site construction processes and components; building (infrastructure) use and maintenance; and "end-of-life" effects.

READY MIX CONCRETE DESIGN SUMMARY

The following tables provide a list of the ready mix concrete products considered in this EPD along with key performance parameters.

Table 1: Declared products considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
1	10082436 274.5NS1915002 PISOS	4.5MPa 28d strength ready mix concrete.	Ready Mix	4.5	Proprietary
2	10060328 054.5NS1913001 TCP	4.5MPa 28d strength ready mix concrete.	Ready Mix	4.5	Proprietary
3	10077462 06210NS0900033 PERMEABLE Color naranja	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
4	06210NS0900033 PERMEABLE Color verde	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
5	10077462 06210NS0900001	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary

	PERMEABLE Gris o sin color				
6	10067620 23210NS1220001 ECOPACT	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
7	10067784 23210NS1218001 ECOPACT	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
8	10067249 23210NS1913001 ECOPACT	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
9	10077462 06210NS0900033 PERMEABLE Color rojo	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
10	10073141 23210NS1910001 ECOPACT	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
11	10045700 01210NS1913001 ESTRUCTURAL	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
12	10077462 06210NS0900033 PERMEABLE Color Amarillo	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
13	10067790 23240NS1218001 ECOPACT	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
14	10067785 23240NS1913001 ECOPACT	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
15	10067250 23280NS1913001 ECOPACT	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
16	10067619 27280NS1918092 PISOS	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
17	10045704 01280NS1913001 ESTRUCTURAL	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
18	10016132 01280NS1915001 ESTRUCTURAL	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
19	10073674 10350NS1915024 CONCRETO CLASE F A/C 0.40	35MPa 28d strength ready mix concrete.	Ready Mix	35	Proprietary
20	10046466 01350NS1913001 ESTRUCTURAL	35MPa 28d strength ready mix concrete.	Ready Mix	35	Proprietary

READY MIX CONCRETE DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each ready mix design considered. Please note that the breakdown has been randomly altered and is therefore only an approximation; this manipulation is to ensure confidentiality.

Table 2: Ready mix concrete composition

Product Components	Raw Material, weight%
Cement	Proprietary
Mineral Additions (River sand and Gravel)	30-60.00
Others	0.01-5.00
Total	100.00

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study (ND= Not Defined)

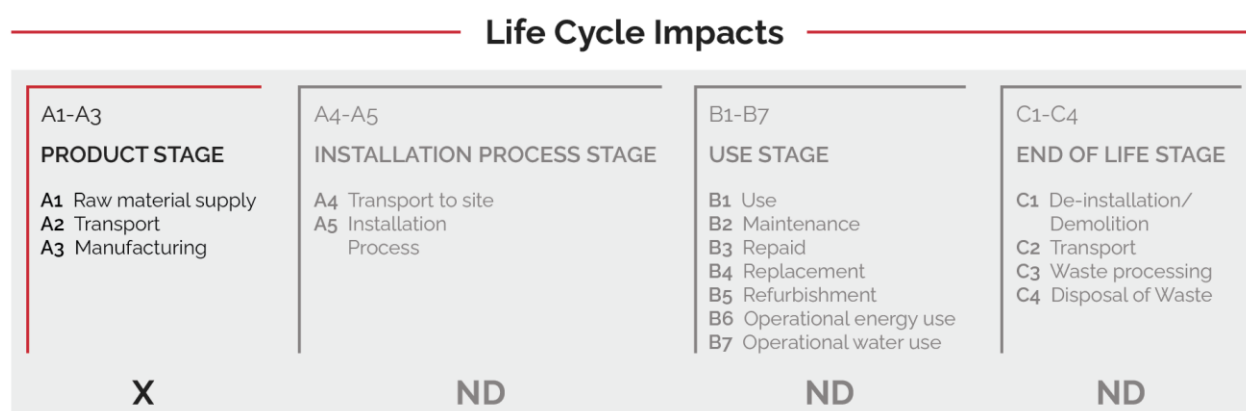


Figure 1: General life cycle phases for consideration in a construction works system

According to the PCR, the following figure illustrates the general activities and input requirements for producing ready mix concrete products and is not necessarily exhaustive.

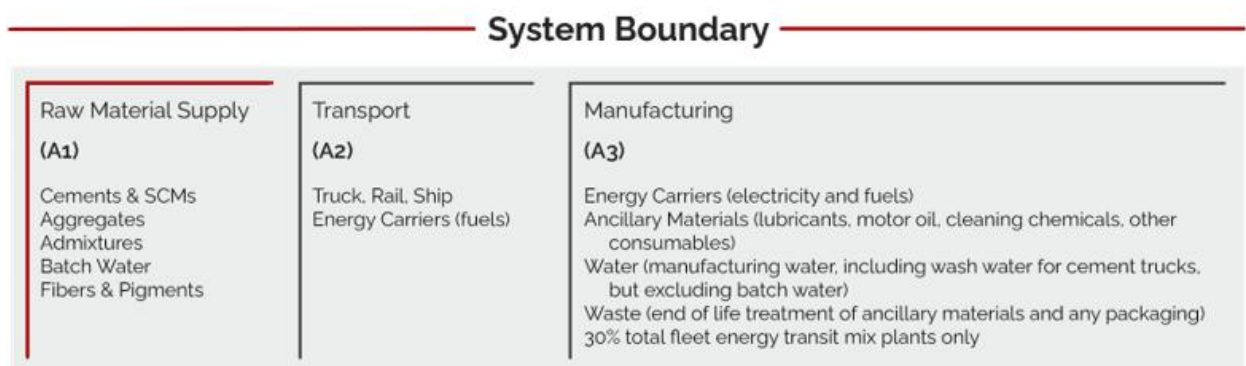


Figure 2: General system inputs considered in the product system and categorized by modules in scope

All operating data is formulated using the actual data from Holcim Ecuador's plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a LCA spreadsheet and was then input into LCA.no EPD generator. Primary data were utilized. Explanations of the contribution of each data source to this study are outlined in the section "Data Sources and Quality".

Allocation procedures shall be uniformly applied to similar inputs and outputs of the system under consideration. Whenever possible allocation can be avoided as per ISO 14044:2006, Section, 4.3.4.2. This subcategory PCR recognizes fly ash, silica fume, granulated blast furnace slag, cement kiln dust, flue gas desulfurization (FGD) gypsum, and post-consumer gypsum as recovered materials. Thus, the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a cement material input.

CUT-OFF CRITERIA

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

DATA SOURCES AND DATA QUALITY ASSESSMENT

Table 3: LCI inputs assumed for module A1 (i.e., raw material supply)

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Guayas	2024	2	3	1	3	3
Limestone gravel	limestone quarry operation/limestone, unprocessed/RoW/kg ; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Guayas	2024	2	3	1	3	3
Additives	chemical production, organic/chemical, organic/GLO/kg	ecoinvent v3.10 in 2024	Guayas	2024	2	3	1	3	3
Inorganic chemical	chemical production, inorganic/chemical, inorganic/GLO/kg	ecoinvent v3.10 in 2024	Antioquia	2024	2	3	1	3	3

River sand	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Guayas	2024	2	3	1	3	3
HE Cement	HE Cement	Program Operator: Labeling Sustainability- EPD ID: e717da92-6eee-4fdb-b7d3-acfac1d3dfo1	Guayas	29 November 2022	3	3	3	3	3
GU Cement	GU Cement	Program Operator: Labeling Sustainability- EPD ID: e717da92-6eee-4fdb-b7d3-acfac1d3dfo1	Guayas	29 November 2022	3	3	3	3	3

LIMITATIONS

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. Further, LCA offers a wide array of environmental impact indicators, and this EPD reports a collection of those, as specified by the PCR.

In addition to the impact results, this EPD provides several metrics related to resource consumption and waste generation. While these data may be informational in other ways, they do not provide a measure of impact on the environment.

TOTAL IMPACT SUMMARY

The following table reports the total LCA results for each product produced at the given ready mix concrete facility on a per 1m³ of concrete basis.

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

Table 4: Total life cycle (across modules in scope) impact results for Mix designs, assuming the geometric mean point values on a per 1 m3 of concrete basis

a) Midpoint Impact Categories

Indicator/LCI Metric	Strength, MPa	GWP100	ODP	AP	EP	SFP	ADPfossil
Unit	28 days	kg CO2- eq	kg CFC- 11-eq	kg SO2- eq	kg N-eq	kg O3-eq	MJ
10082436 274.5NS1915002 PISOS	4.5	310.56	2.22E-06	0.3514	2.2253	6.7242	986.2300
10060328 054.5NS1913001 TCP	4.5	293.54	2.09E-06	0.3375	2.1274	6.5621	928.5700
10077462 06210NS0900033 PERMEABLE Color naranja	21	289.06	2.26E-06	0.4457	2.0833	6.8982	1005.6600
06210NS0900033 PERMEABLE Color verde	21	289.00	2.26E-06	0.4460	2.0800	6.9000	1010.0000
10077462 06210NS0900001 PERMEABLE Gris o sin color	21	266.11	1.77E-06	0.2981	1.9892	5.6906	749.6700
10067620 23210NS1220001 ECOPACT	21	211.47	1.62E-06	0.3001	1.8396	5.8553	757.7800
10067784 23210NS1218001 ECOPACT	21	211.89	1.65E-06	0.3037	1.8525	5.9106	778.7600
10067249 23210NS1913001 ECOPACT	21	197.18	1.57E-06	0.2923	1.7730	5.7804	751.4800
10077462 06210NS0900033 PERMEABLE Color rojo	21	289.06	2.26E-06	0.4457	2.0833	6.8982	1005.6600
10073141 23210NS1910001 ECOPACT	21	198.47	1.52E-06	0.2901	1.7550	5.7952	720.4400
10045700 01210NS1913001 ESTRUCTURAL	21	226.55	1.68E-06	0.2895	1.7848	5.9859	789.2200
10077462 06210NS0900033 PERMEABLE Color Amarillo	21	289.06	2.26E-06	0.4457	2.0833	6.8982	1005.6600
10067790 23240NS1218001 ECOPACT	24	213.7	1.63E-06	0.3006	1.8522	5.8399	757.5600

10067785 23240NS1913001 ECOPACT	24	207.72	1.64E-06	0.3021	1.8319	5.9149	778.1600
10067250 23280NS1913001 ECOPACT	28	217.25	1.68E-06	0.3075	1.8827	5.9430	785.9600
10067619 27280NS1918092 PISOS	28	269.02	1.97E-06	0.3221	2.0126	6.3785	898.5700
10045704 01280NS1913001 ESTRUCTURAL	28	266.03	1.96E-06	0.3137	1.9957	6.2038	894.9800
10016132 01280NS1915001 ESTRUCTURAL	28	260.44	1.92E-06	0.3169	1.9656	6.3459	884.1200
10073674 10350NS1915024 CONCRETO CLASE F A/C 0.40	35	320.47	2.33E-06	0.3617	2.2699	6.9758	1046.3500
10046466 01350NS1913001 ESTRUCTURAL	35	290.33	2.09E-06	0.3224	2.1227	6.1686	929.3000

b) Resource Inventory Metrics

Indicator/LCI Metric	Strengt h, MPa	RPRE	PRM	NRPRE	NRPRM	SM	RSF	RE	FW
Unit	28 days	MJ	MJ	MJ	kg	MJ	MJ	MJ	m3
10082436 274.5NS191500 2 PISOS	4.5	81.41	334.016	705.417	280.875	11.705	0.025	0.143	0.711
10060328 054.5NS191300 1 TCP	4.5	96.330 4	333.992	656.68 9	271.949	11.001	0.024	0.135	0.700
10077462 06210NS09000 33 PERMEABLE Color naranja	21	95.102	333.964	750.917	254.823	10.155	0.025	0.124	0.915
06210NS09000 33 PERMEABLE Color verde	21	95.1	334.00 0	751.000	255.00 0	10.200	0.025	0.124	0.915
10077462 06210NS09000 01 PERMEABLE Gris o sin color	21	116.23 4	333.964	494.904	254.823	10.155	0.022	0.124	0.485
10067620 23210NS12200 01 ECOPACT	21	145.68 2	333.869	499.120	258.712	7.574	0.021	0.090	0.703
10067784 23210NS121800 1 ECOPACT	21	145.64 3	333.868	513.907	264.905	7.551	0.021	0.089	0.704

10067249 23210NS191300 1 ECOPACT	21	160.77 7	333.846	485.863	265.670	6.886	0.020	0.081	0.691
10077462 06210NS09000 33 PERMEABLE Color rojo	21	95.102 6	333.964	750.917	254.823	10.155	0.025	0.124	0.915
10073141 23210NS191000 1 ECOPACT	21	159.17 3	333.850	467.809	252.688	7.001	0.020	0.083	0.687
10045700 01210NS191300 1 ESTRUCTURAL	21	156.46	333.893	527.560	261.713	8.042	0.021	0.098	0.655
10077462 06210NS09000 33 PERMEABLE Color Amarillo	21	95.102 6	333.964	750.917	254.823	10.155	0.025	0.124	0.915
10067790 23240NS12180 01 ECOPACT	24	143.16 5	333.872	499.400	258.218	7.688	0.021	0.091	0.702
10067785 23240NS19130 01 ECOPACT	24	150.15 8	333.861	511.521	266.69 3	7.345	0.020	0.087	0.710
10067250 23280NS19130 01 ECOPACT	28	139.94 7	333.876	521.302	264.718	7.803	0.021	0.092	0.714
10067619 27280NS19180 92 PISOS	28	118.65 9	333.954	624.341	274.291	9.874	0.023	0.121	0.691
10045704 01280NS19130 01 ESTRUCTURAL	28	121.49 3	333.950	621.254	273.785	9.733	0.023	0.119	0.711
10016132 01280NS19150 01 ESTRUCTURAL	28	126.63 3	333.941	611.908	272.274	9.479	0.023	0.116	0.691
10073674 10350NS191502 4 CONCRETO CLASE F A/C 0.40	35	74.332	334.026	761.522	284.88 6	12.015	0.026	0.147	0.704
10046466 01350NS19130 01 ESTRUCTURAL	35	98.939 1	333.987	652.522	276.837	10.860	0.023	0.133	0.702

c) Waste/output Inventory Metrics

Indicator/LCI Metric	Strength, MPa	HWD	NHWD	HLRW	MR	MER
Unit	28 days	kg	kg	kg	kg	kg
10082436 274.5NS1915002 PISOS	4.5	19.979	249.632	0.0015	0.0011	0.0598
10060328 054.5NS1913001 TCP	4.5	18.758	245.097	0.0014	0.0010	0.0562
10077462 06210NS0900033 PERMEABLE Color naranja	21	19.838	302.523	0.0016	0.0010	0.0519
06210NS0900033 PERMEABLE Color verde	21	19.8	303	0.0016	0.0010	0.0519
10077462 06210NS0900001 PERMEABLE Gris o sin color	21	17.119	236.138	0.0013	0.0010	0.0519
10067620 23210NS1220001 ECOPACT	21	13.17	241.811	0.0010	0.0005	0.0476
10067784 23210NS1218001 ECOPACT	21	13.192	243.224	0.0010	0.0005	0.0474
10067249 23210NS1913001 ECOPACT	21	12.112	240.088	0.0009	0.0005	0.0432
10077462 06210NS0900033 PERMEABLE Color rojo	21	19.838	302.523	0.0016	0.0010	0.0519
10073141 23210NS1910001 ECOPACT	21	12.19	237.685	0.0009	0.0005	0.0440
10045700 01210NS1913001 ESTRUCTURAL	21	13.889	232.909	0.0010	0.0008	0.0411
10077462 06210NS0900033 PERMEABLE Color Amarillo	21	19.838	302.523	0.0016	0.0010	0.0519
10067790 23240NS1218001 ECOPACT	24	13.348	242.183	0.0010	0.0006	0.0483
10067785 23240NS1913001 ECOPACT	24	12.875	242.677	0.0010	0.0005	0.0461
10067250 23280NS1913001 ECOPACT	28	13.598	244.351	0.0010	0.0006	0.0490
10067619 27280NS1918092 PISOS	28	16.963	242.012	0.0013	0.0010	0.0504

10045704 01280NS1913001 ESTRUCTURAL	28	16.731	241.537	0.0013	0.0009	0.0497
10016132 01280NS1915001 ESTRUCTURAL	28	16.315	240.37	0.0012	0.0009	0.0484
10073674 10350NS1915024 CONCRETO CLASE F A/C 0.40	35	20.556	252.343	0.0015	0.0011	0.0614
10046466 01350NS1913001 ESTRUCTURAL	35	18.554	245.636	0.0014	0.0010	0.0555