

Environmental Product Declaration



Environmental Product Declaration for ready mix concrete products produced by Holcim Ecuador at their Quevedo facility in Quevedo, 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:	27 August 2025
Period of Validity:	5 years; valid until 27 August 2030
EPD Number:	HOECU08272508



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 19 concrete mixes manufactured at the Quevedo Holcim Ecuador concrete facility in Quevedo, 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	10056077 20140NS1915001 CONCRETO	14MPa 28d strength ready mix concrete.	Ready Mix	14	Proprietary
2	10016137 03180NS1918001 ALTA FLUIDEZ	18MPa 28d strength ready mix concrete.	Ready Mix	18	Proprietary
3	10044278 01180NS1915001 ESTRUCTURAL	18MPa 28d strength ready mix concrete.	Ready Mix	18	Proprietary
4	10016134 01210NS1915001 ESTRUCTURAL	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary

5	10077455 03210NS1918010 ALTA FLUIDEZ T2H	21MPa 28d strength ready mix concrete.	Ready Mix	21	Proprietary
6	10049041 042407S1915001 ROCAFAST	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
7	10075513 042403S1918001 ROCAFAST T2H	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
8	10060385 03240NS1918001 ALTA FLUIDEZ T2H	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
9	10016140 03240NS1918001 ALTA FLUIDEZ	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
10	10072148 03240NS0918001 ALTA FLUIDEZ	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
11	10044281 01240NS1915001 ESTRUCTURAL	24MPa 28d strength ready mix concrete.	Ready Mix	24	Proprietary
12	10016142 03280NS1918001 ALTA FLUIDEZ	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
13	10061252 08280NS0910001 PROYECTADO	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
14	10016132 01280NS1915001 ESTRUCTURAL	28MPa 28d strength ready mix concrete.	Ready Mix	28	Proprietary
15	10060388 03300NS1918001 ALTA FLUIDEZ T2H	30MPa 28d strength ready mix concrete.	Ready Mix	30	Proprietary
16	10084316 01300NS1915024 ESTRUCTURAL	30MPa 28d strength ready mix concrete.	Ready Mix	30	Proprietary
17	10044295 01300NS1915001 ESTRUCTURAL	30MPa 28d strength ready mix concrete.	Ready Mix	30	Proprietary
18	10059447 03350NS1918001 ALTA FLUIDEZ T2H	35MPa 28d strength ready mix concrete.	Ready Mix	35	Proprietary
19	10044297 01350NS1915001 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)

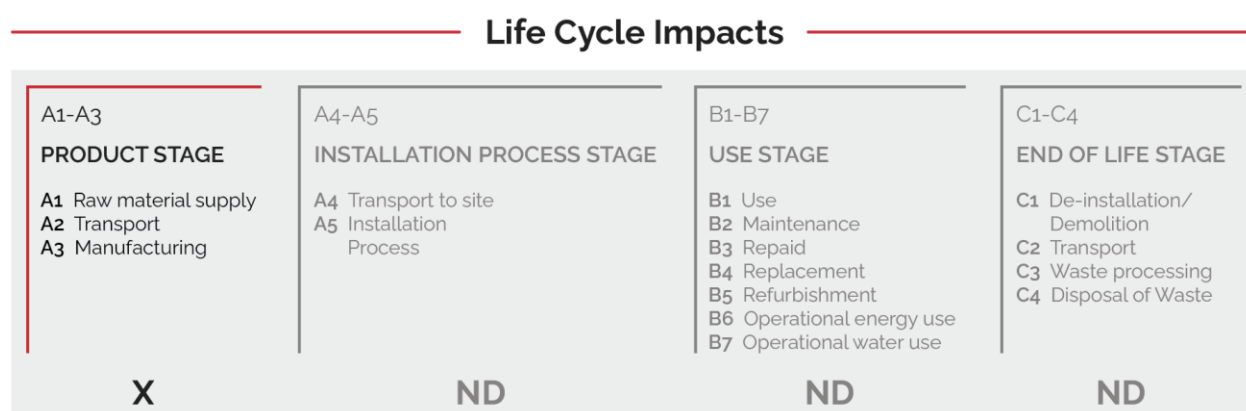


Figure 1: General life cycle phases for consideration in a construction works system

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.

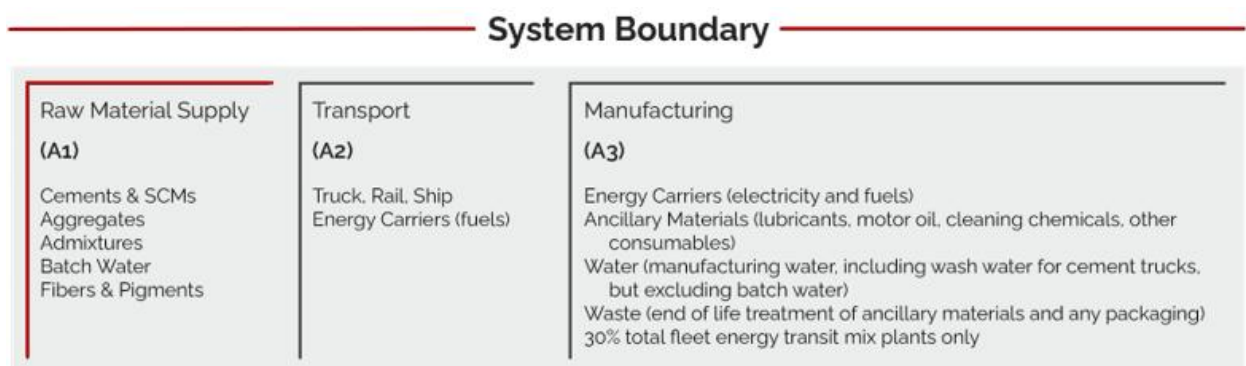


Figure 2: General system inputs considered in the product system and categorized by modules in scope

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	ADP _{fossil}
Unit	28 days	kg CO ₂ - eq	kg CFC- 11-eq	kg SO ₂ - eq	kg N-eq	kg O ₃ -eq	MJ
10056077 20140NS1915001 CONCRETO	14	233.13	2.30E-06	0.48286	0.96643	12.36119	1317.267
10016137 03180NS1918001 ALTA FLUIDEZ	18	258.26	2.48E-06	0.49828	1.07627	12.74704	1398.352
10044278 01180NS1915001 ESTRUCTURAL	18	240	2.35E-06	0.491	0.995	12.5	1340
10016134 01210NS1915001 ESTRUCTURAL	21	251.02	2.46E-06	0.50074	1.06545	12.62588	1387.972
10077455 03210NS1918010 ALTA FLUIDEZ T2H	21	260.67	2.54E-06	0.51086	1.09822	12.9485	1436.684
10049041 042407S1915001 ROCAFAST	24	304.82	2.79E-06	0.53947	1.31469	13.23429	1516.819
10075513 042403S1918001 ROCAFAST T2H	24	333.24	2.97E-06	0.56097	1.46295	13.45644	1583.95
10060385 03240NS1918001 ALTA FLUIDEZ T2H	24	278.67	2.65E-06	0.52135	1.19729	12.99113	1471.046
10016140 03240NS1918001 ALTA FLUIDEZ	24	277.3	2.62E-06	0.51989	1.18949	12.90003	1448.362
10072148 03240NS0918001 ALTA FLUIDEZ	24	292.84	2.74E-06	0.53279	1.27746	13.04598	1498.825
10044281 01240NS1915001 ESTRUCTURAL	24	280.82	2.64E-06	0.5198	1.19988	12.98262	1464.349
10016142 03280NS1918001 ALTA FLUIDEZ	28	295.17	2.72E-06	0.53207	1.27717	13.03475	1484.072
10061252 08280NS0910001 PROYECTADO	28	313.21	2.83E-06	0.55064	1.35849	13.31572	1528.928
10016132 01280NS1915001 ESTRUCTURAL	28	291.47	2.72E-06	0.52947	1.25815	13.09128	1495.882

10060388 03300NS1918001 ALTA FLUIDEZ T2H	30	319	2.94E-06	0.55331	1.40883	13.40809	1589.091
10084316 01300NS1915024 ESTRUTURAL	30	313.69	2.86E-06	0.54789	1.3761	13.25204	1544.448
10044295 01300NS1915001 ESTRUTURAL	30	311.42	2.83E-06	0.54319	1.34926	13.27899	1534.125
10059447 03350NS1918001 ALTA FLUIDEZ T2H	35	342.11	3.11E-06	0.57518	1.53569	13.64049	1655.318
10044297 01350NS1915001 ESTRUTURAL	35	343.74	3.11E-06	0.57136	1.51466	13.8087	1663.48

b) Resource Inventory Metrics

Indicator/LCI Metric	Strenght h, MPa	RPRE	PRM	NRPRE	NRPRM	SM	RSF	RE	FW
Unit	28 days	MJ	MJ	MJ	kg	MJ	MJ	MJ	m3
10056077 20140NS1915001 CONCRETO	14	160.0433	3.2063	1262.202	55.12928	7.45115	0.0217	0.08982	0.83261
10016137 03180NS1918001 ALTA FLUIDEZ	18	180.5091	3.23937	1341.833	56.57625	8.4375	0.02365	0.10191	0.98568
10044278 01180NS1915001 ESTRUTURAL	18	166	3.22	1280	54.1	7.73	0.0223	0.00933	0.828
10016134 01210NS1915001 ESTRUTURAL	21	175.1881	3.22992	1323.884	64.15543	8.15569	0.02271	0.09845	0.86114
10077455 03210NS1918010 ALTA FLUIDEZ T2H	21	181.9473	3.24032	1373.377	63.37133	8.46569	0.02401	0.10225	0.96012
10049041 042407S1915001 ROCAFAST	24	221.667	3.30645	1451.625	65.26619	10.43839	0.02582	0.12644	0.9433
10075513 042403S1918001 ROCAFAST T2H	24	247.077	3.34802	1512.807	71.2214	11.67838	0.02698	0.14164	0.9441
10060385 03240NS1918001 ALTA FLUIDEZ T2H	24	198.5565	3.26772	1402.906	68.20688	9.28295	0.02446	0.11227	0.94991

10016140 03240NS19180 01 ALTA FLUIDEZ	24	198.1116	3.2677 2	1383.32 3	65.1097 5	9.28295	0.0241 3	0.11227	0.8887 5
10072148 03240NS09180 01 ALTA FLUIDEZ	24	211.7771	3.2894 5	1426.46 4	72.43471	9.93112	0.0247 8	0.1202 2	0.9059 6
10044281 01240NS191500 1 ESTRUCTURAL	24	200.502	3.2715	1399.89 9	64.5158 2	9.39567	0.0246 1	0.11365	0.9607 5
10016142 03280NS19180 01 ALTA FLUIDEZ	28	214.074 7	3.2941 7	1417.89 9	66.2473 4	10.0720 3	0.0249 1	0.12195	0.8960 7
10061252 08280NS09100 01 PROYECTADO	28	229.595 4	3.3196 8	1463.62 4	65.3854	10.8329 3	0.0260 7	0.13127	0.8729 8
10016132 01280NS191500 1 ESTRUCTURAL	28	209.915 9	3.2866 1	1427.61 6	68.3343 7	9.84658	0.0250 7	0.11918	0.9544 5
10060388 03300NS19180 01 ALTA FLUIDEZ T2H	30	233.728 6	3.3244	1509.18 5	79.9787 9	10.9738 4	0.0264 3	0.133	0.9948 2
10084316 01300NS191502 4 ESTRUCTURAL	30	230.062 5	3.3196 8	1471.54 6	72.9783 7	10.8329 3	0.0258 6	0.13127	0.9068
10044295 01300NS191500 1 ESTRUCTURAL	30	227.483	3.3159	1467.11 8	67.0783 1	10.7202	0.0261 1	0.1298 9	0.9752 8
10059447 03350NS19180 01 ALTA FLUIDEZ T2H	35	254.279 2	3.3574 7	1567.38	88.0196 5	11.9601 9	0.0273 8	0.1450 9	0.9680 6
10044297 01350NS191500 1 ESTRUCTURAL	35	254.053 6	3.3574 7	1584.02 2	79.52751	11.9601 9	0.0283 4	0.1450 9	1.10407

c) Waste/output Inventory Metrics

Indicator/LCI Metric	Strength, MPa	HWD	NHWD	HLRW	MR	MER
Unit	28 days	kg	kg	kg	kg	kg
10056077 20140NS1915001 CONCRETO	14	13.54142	58.77768	0.00099	0.00139	0.03747
10016137 03180NS1918001 ALTA FLUIDEZ	18	15.18075	62.92774	0.00111	0.00146	0.04252
10044278 01180NS1915001 ESTRUCTURAL	18	14	59.8	0.00102	0.00141	0.0389
10016134 01210NS1915001 ESTRUCTURAL	21	14.7828	63.66925	0.00108	0.00144	0.04108
10077455 03210NS1918010 ALTA FLUIDEZ T2H	21	15.32003	65.23539	0.00112	0.00146	0.04266
10049041 042407S1915001 ROCAFAST	24	18.53034	72.42954	0.00136	0.0016	0.05275
10075513 042403S1918001 ROCAFAST T2H	24	20.59561	78.17004	0.00151	0.00169	0.05909
10060385 03240NS1918001 ALTA FLUIDEZ T2H	24	16.67048	68.90602	0.00122	0.00152	0.04684
10016140 03240NS1918001 ALTA FLUIDEZ	24	16.63364	68.04117	0.00122	0.00152	0.04684
10072148 03240NS0918001 ALTA FLUIDEZ	24	17.75165	72.04741	0.00131	0.00157	0.05015
10044281 01240NS1915001 ESTRUCTURAL	24	16.81691	68.35152	0.00123	0.00153	0.04742
10016142 03280NS1918001 ALTA FLUIDEZ	28	17.92449	71.06549	0.00131	0.00158	0.05088
10061252 08280NS0910001 PROYECTADO	28	19.18159	74.0532	0.0014	0.00163	0.05477
10016132 01280NS1915001 ESTRUCTURAL	28	17.58654	70.90092	0.00129	0.00156	0.04972
10060388 03300NS1918001 ALTA FLUIDEZ T2H	30	19.53179	77.78763	0.00144	0.00164	0.05549

10084316 01300NS1915024 ESTRUCTURAL	30	19.22829	75.45988	0.00141	0.00163	0.05477
10044295 01300NS1915001 ESTRUCTURAL	30	19.00128	73.78826	0.00139	0.00162	0.05419
10059447 03350NS1918001 ALTA FLUIDEZ T2H	35	21.21352	83.31718	0.00157	0.00171	0.06053
10044297 01350NS1915001 ESTRUCTURAL	35	21.16213	81.65272	0.00156	0.00171	0.06053