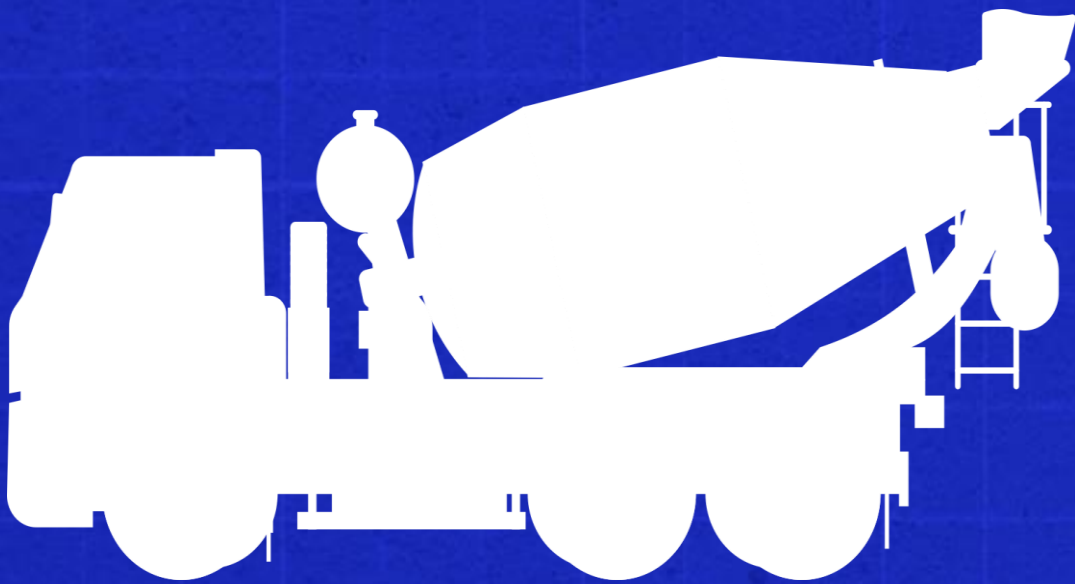




ENVIRONMENTAL PRODUCT DECLARATION



Environmental Product Declaration for ready mix concrete products produced by CEMEX México at their MX-PD0192 AEROPUERTO QRO facility in Querétaro, México.

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers ready mix concrete products produced by CEMEX Concretos S.A. de C.V. Declared unit: 1 m3 of concrete
Declaration Owner:	CEMEX Concretos S.A. de C.V./ CEMEX S.A.B. de C.V.
	444 av. Constitución Pte, Col. Centro
	Monterrey, Nuevo León.
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Program Operator:	Labeling Sustainability
	Address, 11670 W Sunset Blvd.
	Los Angeles, CA
	www.labelinsustainability.com
Product Category Rule:	Core PCR: ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services SubPCR: NSF International (March 2020). Product Category Rule (PCR) for Environmental Product Declarations (EPD) PCR for Concrete, v2.1
	Sub 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 . Mr. Jack Geilbig, EcoForm: 2624 Abelia Way, Suite 611, Knoxville, TN 37931, jgeilbig@ecoform.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 ISO 14044 and the referenced PCR.
	Independent verification of the declaration, according to ISO 14025:2006
	External
	Third Party Verifier
	Geoffrey Guest, Certified 3rd Party Verifier under the International EPD Program (www.environdec.com), CSA Group (www.csaregistries.ca)
Date of Issue:	26 June 2023
Period of Validity:	5 years; valid until 26 June 2028
EPD Number:	6b155abf-ba7d-48d5-84b2-4057cbbc054a



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COMPANY DESCRIPTION

CEMEX Concretos S.A. de C.V./ CEMEX S.A.B. de C.V. (CEMEX) is a global building materials company dedicated to building a better future through sustainable products and solutions. CEMEX is committed to achieving carbon neutrality through constant innovation and industry leadership in research and development. CEMEX is at the front of the circular economy within the construction value chain and promotes innovative processes with the use of advanced technologies to increase the use of waste as raw materials and alternative fuels in its operations. CEMEX provides cement, ready-mix concrete, aggregates, and urban solutions in fast-growing markets around the world, powered by a multinational workforce focused on delivering superior customer experience, using digital technologies.

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, <http://labelingsustainability.com/>. This level of study is in accordance with EPD Product Category Rule (PCR) for Ready Mix Concrete published by NSF International (2019) and is a sub-PCR of International Standards Organization (ISO) 21930:2017 Sustainability in buildings and civil works - Core rules for EPDs of construction products and services; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. It is also aligned to the Guidelines for Providing Product Sustainability Information from United Nations Environmental Program. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This project report was commissioned to offer customers information to help them make informed product decisions; improve the environmental performance of CEMEX Concretos S.A. de C.V. / CEMEX S.A.B. de C.V. by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal among other certification rating systems; and to strengthen CEMEX's license to operate in the community. The intended audience for this LCA report is CEMEX Concretos S.A. de C.V.'s employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policy makers, government officials interested in sustainability, academic professors, and LCA professionals. This LCA report does not include product comparisons from other facilities.

DESCRIPTION OF PRODUCT AND SCOPE

This EPD reports on 88 concrete mixes manufactured at the CEMEX concrete facility at Aeropuerto plant in Carretera Queretaro-Tequisapan Km. 18, Col. Guadalupe La Venta, Querétaro, México.

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. Transportation from the plant to the jobsite, Module A4, was hand



calculated using the proportion of diesel allotted to that stage from primary CEMEX records and diesel the emissions factor. Excluded stages include 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.

Mix Designs: 0 to 15 MPa

Table 1: Declared products with Mix designs: 0 to 15MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day compressive strength, MPa	H ₂ O to cement ratio
2	Convencional - 100 - 28 días	9.8 MPa 28d strength ready mix concrete.	Ready mix Concrete	9.8	1.12
3	Convencional - 150 - 28 días	14.7 MPa 28d strength ready mix concrete.	Ready mix Concrete	14.7	0.97
13	Ligero - 150 - 28 días	14.7 MPa 28d strength ready mix concrete.	Ready mix Concrete	14.7	0.45
15	Relleno fluido - 14 - 28 días	1.4 MPa 28d strength ready mix mortar	Ready mix Mortar	1.4	2.24
16	Relleno fluido - 25 - 28 días	2.5 MPa 28d strength ready mix mortar	Ready mix Mortar	2.5	1.76
17	Relleno fluido - 50 - 28 días	5 MPa 28d strength ready mix mortar	Ready mix Mortar	5.0	1.32
18	Relleno fluido - 60 - 28 días	5.9 MPa 28d strength ready mix mortar	Ready mix Mortar	5.9	1.11
25	Mortero estabilizado - 100 - 28 días	9.8 MPa 28d strength ready mix mortar.	Ready mix Mortar	9.8	0.99
26	Mortero estabilizado - 125 - 28 días	12.3 MPa 28d strength ready mix mortar	Ready mix Mortar	12.3	0.87
27	Mortero estabilizado - 150 - 28 días	14.7 MPa 28d strength ready mix mortar	Ready mix Mortar	14.7	0.76
29	Mortero estabilizado - 85 - 28 días	8.8 MPa 28d strength ready mix mortar	Ready mix Mortar	8.8	0.96



30	Pavicrete - 150 - 28 días	14.7 MPa 28d strength ready mix concrete.	Ready mix Concrete	14.7	0.83
50	Vertua Clásico Convencional - 150 - 28 días	14.7 MPa 28d strength ready mix concrete.	Ready mix Concrete	14.7	0.97
54	Ligero - 100 - 28 días	9.8 MPa 28d strength ready mix concrete.	Ready mix Concrete	9.8	0.50
57	Relleno fluido - 100 - 28 días	9.8 MPa 28d strength ready mix mortar	Ready mix Mortar	9.8	1.01
66	Mortero - 100 - 28 días	9.8 MPa 28d strength ready mix mortar	Ready mix Mortar	9.8	1.02
68	Mortero - 150 - 28 días	14.7 MPa 28d strength ready mix mortar.	Ready mix Mortar	14.7	0.83
80	Reducrack Sin malla - 150 - 28 días	14.7 MPa 28d strength ready mix concrete.	Ready mix Concrete	14.7	0.97
83	Vertua Plus Relleno Fluido - 14 - 28 días	1.4 MPa 28d strength ready mix mortar	Ready mix Mortar	1.4	2.24
84	Vertua Plus Relleno Fluido - 25 - 28 días	2.5 MPa 28d strength ready mix mortar	Ready mix Mortar	2.5	1.76

Mix Designs: 15 to 20 MPa

Table 2 Declared products with Mix designs: 15 to 20MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	7 day compressive strength, MPa	28 day compressive strength, MPa	H2O to cement ratio
4	Convencional - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.91
20	Hidratium - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.91
22	Lanzado - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.70
44	Acelerado - 200 - 7 días	19.6 MPa 7d strength ready mix concrete.	Ready mix Concrete	19.6		0.69
51	Vertua Clásico Convencional - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.87



53	Convencional - 180 - 28 días	17.7 MPa 28d strength ready mix concrete.	Ready mix Concrete		17.7	0.88
55	Ligero - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.39
74	Impercem - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.86
81	Reducrack Sin malla - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.80
87	ECO agregado deshidratado - 200 - 28 días	19.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		19.6	0.85

Mix Designs: 21 to 25 MPa

Table 3 Declared products with Mix designs: 21 to 25MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	7 day compressive strength, MPa	28 day compressive strength, MPa	H2O to cement ratio
5	Convencional - 210 - 28 días	20.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		20.6	0.82
6	Convencional - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.74
10	Estructural - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.71
14	Autocompactable - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.68
21	Hidratium - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
23	Lanzado - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.61
31	Pavicrete - MR 35 - 28 días	20.9 MPa 28d strength ready mix concrete.	Ready mix Concrete		20.9	0.61
32	Pavicrete - MR 38 - 28 días	24.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.6	0.59
37	Baja contracción - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.58



39	Baja contracción - MR 35 - 28 días	20.9 MPa 28d strength ready mix concrete.	Ready mix Concrete		20.9	0.60
40	Baja contracción - MR 38 - 28 días	24.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.6	0.59
45	Acelerado - 250 - 7 días	24.5 MPa 7d strength ready mix concrete.	Ready mix Concrete	24.5		0.62
52	Vertua Clásico Convencional - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.76
61	Reducrack - MR 35 - 28 días	20.9 MPa 28d strength ready mix concrete.	Ready mix Concrete		20.9	0.60
62	Reducrack - MR 38 - 28 días	24.6 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.6	0.58
63	Antibacteriano - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
64	Antihongo - antihalga - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
65	Antitermita - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
69	Duramax Autosellante - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.55
72	Revenimiento total - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
75	Impercem - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
82	Reducrack Sin malla - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
85	ECO pet - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.74
86	ECO llanta - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.75
88	ECO concreto triturado - 250 - 28 días	24.5 MPa 28d strength ready mix concrete.	Ready mix Concrete		24.5	0.70



Mix Designs: 26 to 30 MPa

Table 4: Declared products with Mix designs: 26 to 30MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	3 day compressive strength, MPa	7 day compressive strength, MPa	28 day compressive strength, MPa	H ₂ O to cement ratio
7	Convencional - 280 - 28 días	27.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			27.5	0.68
8	Convencional - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.66
11	Estructural - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.61
24	Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.59
33	Pavicrete - MR 40 - 28 días	27.2 MPa 28d strength ready mix concrete.	Ready mix Concrete			27.2	0.59
34	Pavicrete - MR 42 - 28 días	30 MPa 28d strength ready mix concrete.	Ready mix Concrete			30.0	0.58
38	Baja contracción - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.53
41	Baja contracción - MR 40 - 28 días	27.2 MPa 28d strength ready mix concrete.	Ready mix Concrete			27.2	0.64
42	Baja contracción - MR 42 - 28 días	30 MPa 28d strength ready mix concrete.	Ready mix Concrete			30.0	0.58



46	Acelerado - 300 - 80% a 3 días	29.4 MPa 3d strength ready mix concrete.	Ready mix Concrete	29.4			0.54
48	Reducrack - MR 40 - 28 días	27.2 MPa 28d strength ready mix concrete.	Ready mix Concrete			27.2	0.57
56	Duramax - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.55
70	Duramax Autosellante - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.56
77	Pesado - 300 - 28 días	29.4 MPa 28d strength ready mix concrete.	Ready mix Concrete			29.4	0.49
78	Pervia - MR 40 - 28 días	27.2 MPa 28d strength ready mix concrete.	Ready mix Concrete			27.2	0.25
89	Acelerado - 300 - 3 días	29.4 MPa 3d strength ready mix concrete.	Ready mix Concrete	29.4			0.49
90	Convencional - 300 - 7 días	29.4 MPa 7d strength ready mix concrete.	Ready mix Concrete		29.4		0.55

Mix Designs: 31 to 35 MPa

Table 5: Declared products with Mix designs: 31 to 35MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	3 day compressive strength, MPa	7 day compressive strength, MPa	28 day compressive strength, MPa	H2O to cement ratio
1	Aparentia - MR 45 - 28 días	34.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.5	0.50
9	Convencional - 350 - 28 días	34.3 MPa 28d strength	Ready mix Concrete			34.3	0.54



		ready mix concrete.					
12	Estructural - 350 - 28 días	34.3 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.3	0.52
35	Pavicrete - MR 45 - 28 días	34.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.5	0.56
43	Baja contracción - MR 45 - 28 días	34.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.5	0.54
47	Acelerado - 350 - 3 días	34.3 MPa 3d strength ready mix concrete.	Ready mix Concrete	34.3			0.43
49	Reducrack - MR 45 - 28 días	34.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.5	0.55
71	Duramax Autosellante - 350 - 28 días	34.3 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.3	0.45
73	Grout premezclado - 350 - 28 días	34.3 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.3	0.47
79	Contracción compensada - MR 45 - 28 días	34.5 MPa 28d strength ready mix concrete.	Ready mix Concrete			34.5	0.56
91	Convencional - 350 - 7 días	34.3 MPa 7d strength ready mix concrete.	Ready mix Concrete		34.3		0.48

Mix Designs: 36 to 40 MPa

Table 6: Declared products with Mix designs: 36 to 40MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day compressive strength, MPa	H ₂ O to cement ratio
58	Alta resistencia - 400 - 28 días	39.2 MPa 28d strength ready mix concrete.	Ready mix Concrete	39.2	0.42



Mix Designs: 41 to 45 MPa

Table 7: Declared products with Mix designs: 41 to 45MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day compressive strength, MPa	H2O to cement ratio
19	Alta resistencia - MR 50 - 28 días	42.6 MPa 28d strength ready mix concrete.	Ready mix Concrete	42.6	0.49
36	Pavicrete - MR 50 - 28 días	42.6 MPa 28d strength ready mix concrete.	Ready mix Concrete	42.6	0.48
76	Antideslave - 450 - 28 días	44.1 MPa 28d strength ready mix concrete.	Ready mix Concrete	44.1	0.32

Mix Designs: 46 to 50 MPa

Table 8: Declared products with Mix designs: 46 to 50MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day compressive strength, MPa	H2O to cement ratio
59	Alta resistencia - 500 - 28 días	49 MPa 28d strength ready mix concrete.	Ready mix Concrete	49	0.40

READY MIX CONCRETE DESIGN COMPOSITION

The mass breakdown of all the ready-mix concrete designs considered in this document of the material composition are Ordinary and Blended Portland cement, andesite, river and limestone sand, Basalt and limestone gravel, additives, polypropylene fiber, polystyrene bead, fresh and recycled water.

Table 9: Ready mix concrete composition.

Product Components	Raw Material, weight%
Cement	Proprietary
Aggregates	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.

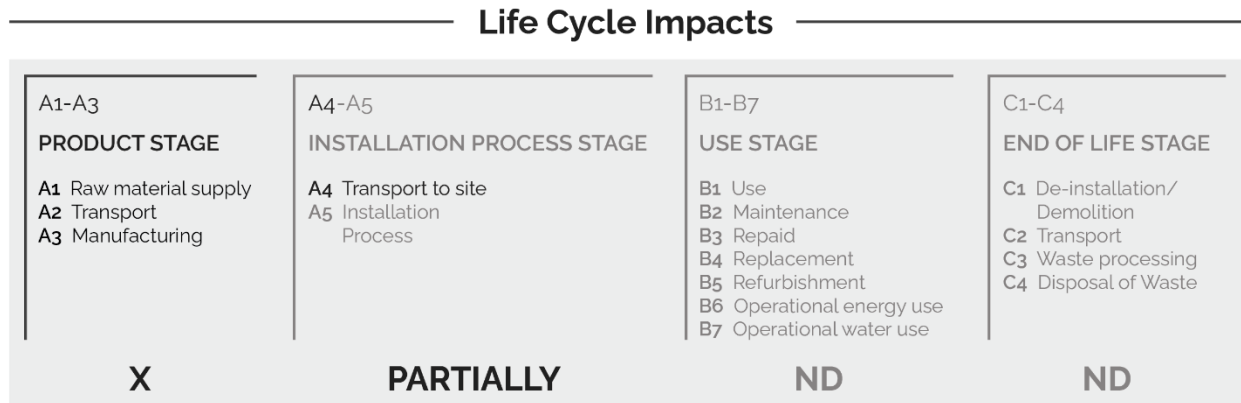


Figure 1: General life cycle phases for consideration in a construction works system

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.
- A2: Transportation - Transportation of A1 materials from the supplier to the “gate” of the manufacturing facility (i.e., A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacture the declared products and to operate the facility.
- A4: Concrete mixing and delivery to the job site

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.

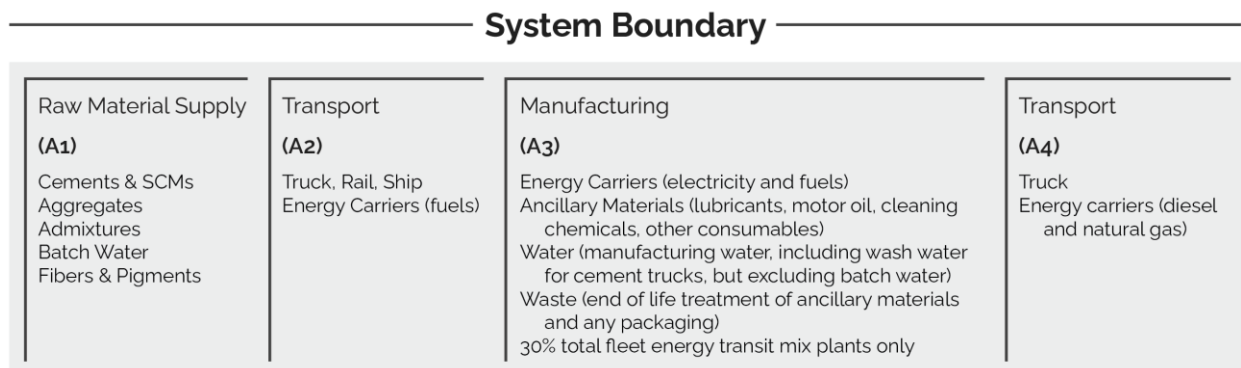


Figure 2: General system inputs considered in the product system and categorized by modules in scope

In addition, as according to the relevant PCR, the following requirements are excluded from this study:



- Production, manufacture and construction of A3 building/capital goods and infrastructure;
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment;
- Personnel-related activities (travel, furniture, office supplies);
- Energy use related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by CEMEX is located at their MX-PD0192 AEROPUERTO QRO facility in Querétaro, México. All operating data is formulated using the actual data from CEMEX'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 spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the ecoinvent v3.8 database and a local EPD database in combination with primary data from CEMEX were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality'. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report. A parameter uncertainty analysis was also performed where key statistical results (e.g., min/mean/max etc.) are provided in the detailed LCA report.

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

Raw material transport: A combination of actual mode/distance combinations were assumed for key bulk materials whereas ecoinvent default multi-modal market mix distances were assumed for other inputs where no original data could be provided.

Electricity: Electricity consumption values are for CEMEX in calendar year 2021. These values were directly reported from CEMEX records. The unit process "market for electricity, medium voltage/electricity, medium voltage/MX/kWh" was used to represent the Mexico grid electricity used by the concrete plant.

Process/space heating: Not applicable.

Fuel required for machinery: Machinery-related fuel requirements were determined from direct CEMEX information for the reference year 2021.

Waste generation: Waste generation values are directly reported from CEMEX operations for bulk waste. No Hazardous or High-level radioactive waste is generated on-site at this facility.



Recovered energy: Not applicable.

Recycled/reused material/components: The amount of returned concrete is based on CEMEX primary data for the reference year, 2021.

Module A1 material losses: Due to lack of data, default loss factors of 5% were assumed. The PCR states "A3 shall include an assumption of 5% material loss unless product specific data is available and transparently reported in the project LCA report underlying the EPD;"

Direct A3 emissions accounting: Not applicable.

Waste transport requirements: Transportation distances are using estimated values. The waste hauler cannot guarantee the exact distances traveled due to the variation of route and actual location of disposal. Most waste disposal sites are near the plant therefore the 25 km distance is a representative estimate.

Product transport requirements: Truck-related fuel requirements were determined from direct CEMEX information for the reference year 2021. The PCR states that 30% of the truck's fuel is used to mix the material and should be allocated to A3. CEMEX operations conducted several tests on their equipment to find the actual amount of fuel used for mixing the materials. The "worst scenario" produced a fuel consumption of 16.9934% of the total fuel used for mixing the material. The truck used 15.3 liters of diesel per 60 minutes at the highest mixing speed, 14 RPMs. In those 60 minutes, the mixing used 2.6 liters of fuel. As a result, 16.99% of the total fuel consumption has been used instead of the 30% as described in the PCR for concrete.

The following tables depict a list of assumed life cycle inventory utilized in the LCA modeling to generate the impact results across the life cycle modules in scope. An assessment of the quality of each LCI activities utilized from various sources is also provided.

Table 10: LCI inputs assumed for module A1 (i.e., raw material supply) *Data Quality Assessment Key Fair=1, Good=2, Very Good =3.*

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Water	tap water production, conventional with biological treatment/tap water/RoW/kg	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	1	3	3
Limestone sand	limestone production, crushed, for mill/limestone, crushed, for mill/IN/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	0	3	3



Polypropylene Fiber	market for polypropylene, granulate/polypropylene, granulate/GLO/kg	ecoinvent v3.8	Nuevo León	v3.8 in 2021	2	3	1	3	3
Limestone Gravel	limestone quarry operation/limestone, unprocessed/IN/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	0	3	3
Additives	market for chemical, organic/chemical, organic/GLO/kg	ecoinvent v3.8	Hidalgo	v3.8 in 2021	2	3	1	3	3
Basalt Gravel	basalt quarry operation/basalt/RER/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	0	3	3
Baryte	barite production/barite/RoW/kg	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	1	3	3
Polystyrene	market for polystyrene, expandable/polystyrene, expandable/GLO/kg	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	1	3	3
Cement	CPC40RS-Planta.Huichapan-CEMEX.Mexico	Program Operator: Labeling Sustainability- EPD ID: 3c812626-c01d-478a-a312-b8f2cbace476	Hidalgo	06 March 2023	3	3	3	3	3
River sand	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	1	3	3
Andesite sand	silica sand production/silica sand/DE/kg	ecoinvent v3.8	Querétaro	v3.8 in 2021	2	3	0	3	3
Recycled amorphous PET	Waste input produced off-site	See A3 inputs	Estado de México	See A3 inputs	2	A3	2	A3	A3



DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the achieved data quality relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated, or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

Completeness: All relevant specific processes, including inputs (raw materials, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. Most relevant background materials and processes were taken from ecoinvent v3.8 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs requiring key A1 inputs were also utilized where readily available.

Consistency: To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product, and co-products outputs, returned and recovered Ready mix concrete materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent v3.8 database were used across all product systems. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process levels to maintain a high level of consistency.

Reproducibility: Internal reproducibility is possible since the data and the models are stored and available in a machine-readable project file for all foreground and background processes, and in Labeling Sustainability's proprietary Ready Mix Concrete LCA calculator* for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

*Labeling Sustainability has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for ready mix concrete product designs. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e., 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions that take place in any typical LCA software like openLCA or SimaPro. The tool was tested against several LCAs performed in openLCA and the tool generated identical results to those realized in openLCA across every impact category and inventory metric (where comparisons could be readily made).

Representativeness: The representativeness of the data is summarized as follows.

- Time related coverage of the manufacturing processes' primary collected data from 2021-01-01 to 2021-12-31.

- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.8 database.
- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators.

Table 11: Life cycle impact categories and life cycle inventory metrics

ID	LCIA.indicators	Abbreviations	Units
1	environmental impact: acidification	AP	moles of H ⁺ -Eq
2	environmental impact: eutrophication	EP	kg N
3	environmental impact: global warming	GWP	kg CO ₂ -Eq
4	environmental impact: ozone depletion	ODP	kg CFC-11-Eq
5	environmental impact: photochemical oxidation	PCOP	kg NO _x -Eq
6	material resources: metals/minerals: abiotic depletion potential (ADP): elements (ultimate reserves)	ADPe	kg Sb-Eq
7	energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPf	MJ, net calorific value
Inventory metrics			
8	Total primary energy	TPE	MJ-Eq
9	Renewable energy	RE	MJ-Eq
10	Non-renewable energy	NRE	MJ-Eq
11	Non-Renewable Resources	NRR	kg
12	Renewable Resources	RR	m ³
13	Water depletion: WDP	WDP	m ³
14	Land filling: bulk waste	LFW	kg waste
15	Land filling: hazardous waste	LFHW	kg waste
16	Concrete batching water consumption	CBWC	m ³
17	Concrete washing water consumption	CW/WC	m ³
18	Concrete hazardous waste	CHW	kg
19	Concrete non-hazardous waste	CNHW	kg

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.



- Renewable primary energy resources as energy (fuel);
- Renewable primary resources as material;
- Non-renewable primary resources as energy (fuel);
- Non-renewable primary resources as material;
- Secondary Materials;
- Renewable secondary fuels;
- Non-renewable secondary fuels;
- Recovered energy;
- Abiotic depletion potential for non-fossil mineral resources.
- Land use related impacts, for example on biodiversity and/or soil fertility;
- Toxicological aspects;
- Emissions from land use change [GWP 100 (land-use change)];
- Hazardous waste disposed;
- Non-hazardous waste disposed;
- High-level radioactive waste;
- Intermediate and low-level radioactive waste;
- Components for reuse;
- Materials for recycling;
- Materials for energy recovery;

Recovered energy exported from the product system.

LIMITATIONS

This EPD is a declaration of potential environmental impact and does not support or provide definitive comparisons of the environmental performance of specific products. Only EPDs prepared from cradle-to-grave life cycle results and based on the same function and reference service life and quantified by the same functional unit can be used to assist purchasers and users in making informed comparisons between products.

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.

Table 12: **Total life cycle (across modules in scope) impact results for all mix designs, assuming the geometric mean point values on a per 1 m³ of concrete basis.**

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Acelerado - 200 - 7 días	39.3	0.0613	293	2.43e-05	0.652	0.000461	2050
Acelerado - 250 - 7 días	42.3	0.0659	323	2.6e-05	0.704	0.000485	2190
Acelerado - 300 - 3 días	48	0.0754	388	2.97e-05	0.818	0.000457	2260
Acelerado - 300 - 80% a 3 días	52	0.0758	384	2.88e-05	0.829	0.000799	3410
Acelerado - 350 - 3 días	48.5	0.0754	406	2.92e-05	0.829	0.00045	2210
Alta resistencia - 400 - 28 días	52.5	0.082	431	3.2e-05	0.897	0.000495	2470
Alta resistencia - 500 - 28 días	58.1	0.0905	490	3.52e-05	0.998	0.000532	2720
Alta resistencia - MR 50 - 28 días	43.9	0.068	343	2.63e-05	0.746	0.000409	2010
Antibacteriano - 250 - 28 días	34.5	0.0528	250	2.01e-05	0.579	0.000348	1600
Antideslave - 450 - 28 días	68.8	0.11	565	4.44e-05	1.14	0.000881	3860
Antihongo - antihalga - 250 - 28 días	34.6	0.0535	249	2.03e-05	0.58	0.000363	1620
Antitermita - 250 - 28 días	34.3	0.0527	249	2.01e-05	0.578	0.000341	1570
Aparentia - MR 45 - 28 días	46.2	0.0707	342	2.62e-05	0.759	0.000595	2470
Autocompactable - 250 - 28 días	46.9	0.0692	354	2.68e-05	0.762	0.000466	2140
Baja contracción - 250 - 28 días	33	0.0526	259	2.04e-05	0.567	0.000323	1500
Baja contracción - 300 - 28 días	40.7	0.0625	312	2.38e-05	0.693	0.00037	1810
Baja contracción - MR 35 - 28 días	34	0.0529	257	2.02e-05	0.577	0.00034	1570
Baja contracción - MR 38 - 28 días	34.7	0.0538	261	2.05e-05	0.59	0.00034	1580



Baja contracción - MR 40 - 28 días	33	0.0525	259	2.03e-05	0.567	0.000324	1500
Baja contracción - MR 42 - 28 días	34.7	0.0542	267	2.08e-05	0.593	0.000323	1540
Baja contracción - MR 45 - 28 días	34	0.0537	268	2.06e-05	0.583	0.000339	1570
Contracción compensada - MR 45 - 28 días	33.9	0.0534	267	2.05e-05	0.582	0.000336	1560
Convencional - 100 - 28 días	25.4	0.0397	169	1.57e-05	0.414	0.00028	1150
Convencional - 150 - 28 días	29.5	0.0469	201	1.86e-05	0.491	0.000318	1400
Convencional - 180 - 28 días	32	0.0483	216	1.86e-05	0.524	0.000325	1430
Convencional - 200 - 28 días	31.9	0.051	227	2.05e-05	0.532	0.000347	1550
Convencional - 210 - 28 días	30.5	0.0476	221	1.87e-05	0.505	0.00032	1390
Convencional - 250 - 28 días	33.4	0.0515	241	1.97e-05	0.563	0.000322	1500
Convencional - 280 - 28 días	34.6	0.0539	263	2.11e-05	0.579	0.000352	1580
Convencional - 300 - 28 días	36.2	0.0562	278	2.19e-05	0.605	0.000372	1680
Convencional - 300 - 7 días	43.4	0.0658	332	2.52e-05	0.728	0.000405	1940
Convencional - 350 - 28 días	40.5	0.063	322	2.45e-05	0.683	0.000398	1860
Convencional - 350 - 7 días	48.5	0.0761	393	3e-05	0.827	0.00046	2280
Duramax - 300 - 28 días	40.3	0.0646	330	2.55e-05	0.69	0.000407	1920
Duramax Autosellante - 250 - 28 días	40.9	0.0661	327	2.63e-05	0.691	0.000473	2090
Duramax Autosellante - 300 - 28 días	42.7	0.0688	345	2.72e-05	0.721	0.000497	2200
Duramax Autosellante - 350 - 28 días	49.2	0.0787	407	3.09e-05	0.832	0.000565	2530
ECO agregado deshidratado - 200 - 28 días	32.5	0.0516	237	2.07e-05	0.543	0.000344	1570
ECO concreto triturado - 250 - 28 días	33.9	0.0529	254	2.06e-05	0.571	0.000334	1560
ECO llanta - 250 - 28 días	33.9	0.0523	246	2e-05	0.572	0.000326	1520
ECO pet - 250 - 28 días	33.7	0.052	244	1.99e-05	0.569	0.000325	1510



Estructural - 250 - 28 días	33.6	0.0523	252	2.05e-05	0.56	0.000344	1530
Estructural - 300 - 28 días	37.1	0.0578	288	2.26e-05	0.624	0.000372	1700
Estructural - 350 - 28 días	44.5	0.0676	342	2.59e-05	0.747	0.000422	2020
Grout premezclado - 350 - 28 días	74.7	0.119	647	5.04e-05	1.16	0.0025	4250
Hidratium - 200 - 28 días	31.9	0.0507	224	2.03e-05	0.531	0.000341	1530
Hidratium - 250 - 28 días	35.9	0.0567	269	2.24e-05	0.605	0.000364	1690
Impercem - 200 - 28 días	34.2	0.0544	241	2.14e-05	0.559	0.000496	1660
Impercem - 250 - 28 días	37.2	0.0588	270	2.31e-05	0.611	0.000518	1800
Lanzado - 200 - 28 días	45.4	0.0703	333	2.92e-05	0.726	0.000519	2290
Lanzado - 250 - 28 días	49.1	0.076	373	3.12e-05	0.796	0.000536	2440
Ligero - 100 - 28 días	47.3	0.0764	393	3.12e-05	0.794	0.000494	2470
Ligero - 150 - 28 días	51.5	0.0822	435	3.3e-05	0.87	0.000524	2650
Ligero - 200 - 28 días	56.4	0.0906	482	3.67e-05	0.956	0.000581	2890
Mortero - 100 - 28 días	30.8	0.0502	239	2.01e-05	0.519	0.000345	1510
Mortero - 150 - 28 días	36	0.0581	291	2.31e-05	0.61	0.000389	1760
Mortero estabilizado - 100 - 28 días	45.9	0.0619	286	2.44e-05	0.664	0.000542	2130
Mortero estabilizado - 125 - 28 días	48.2	0.0654	306	2.57e-05	0.702	0.000577	2270
Mortero estabilizado - 150 - 28 días	51.4	0.0704	337	2.76e-05	0.758	0.000611	2440
Mortero estabilizado - 85 - 28 días	46.2	0.0622	285	2.45e-05	0.665	0.000562	2170
Pavicrete - 150 - 28 días	32.1	0.0514	226	2.07e-05	0.534	0.000345	1550
Pavicrete - MR 35 - 28 días	36.9	0.0567	274	2.16e-05	0.625	0.000342	1640
Pavicrete - MR 38 - 28 días	37.3	0.0574	278	2.19e-05	0.633	0.000345	1660
Pavicrete - MR 40 - 28 días	37.6	0.0578	281	2.2e-05	0.638	0.000347	1670
Pavicrete - MR 42 - 28 días	38.6	0.06	289	2.33e-05	0.652	0.000371	1770
Pavicrete - MR 45 - 28 días	39.3	0.0611	296	2.38e-05	0.665	0.000373	1790
Pavicrete - MR 50 - 28 días	46.4	0.0721	369	2.81e-05	0.791	0.000432	2140
Pervia - MR 40 - 28 días	48.4	0.0725	378	2.65e-05	0.818	0.000486	2310



Pesado - 300 - 28 días	59.4	0.0904	421	3.59e-05	0.966	0.009	2720
Reducrack - MR 35 - 28 días	38.8	0.0603	290	2.34e-05	0.654	0.000389	1820
Reducrack - MR 38 - 28 días	38.1	0.0585	285	2.22e-05	0.646	0.000359	1720
Reducrack - MR 40 - 28 días	38.4	0.0589	289	2.24e-05	0.652	0.000361	1730
Reducrack - MR 45 - 28 días	39.3	0.0602	298	2.29e-05	0.667	0.000367	1770
Reducrack Sin malla - 150 - 28 días	32.3	0.0507	224	2.02e-05	0.529	0.000405	1730
Reducrack Sin malla - 200 - 28 días	34.1	0.0529	242	2.08e-05	0.563	0.000396	1750
Reducrack Sin malla - 250 - 28 días	37.6	0.0587	276	2.32e-05	0.621	0.000447	1970
Relleno fluido - 100 - 28 días	30.9	0.05	250	2e-05	0.527	0.000312	1460
Relleno fluido - 14 - 28 días	17.3	0.0291	115	1.2e-05	0.286	0.00021	842
Relleno fluido - 25 - 28 días	19.6	0.0326	138	1.33e-05	0.326	0.000226	944
Relleno fluido - 50 - 28 días	25.7	0.0424	189	1.72e-05	0.431	0.000283	1220
Relleno fluido - 60 - 28 días	26.7	0.0433	213	1.74e-05	0.454	0.00027	1260
Revenimiento total - 250 - 28 días	34	0.0555	267	2.24e-05	0.576	0.000369	1670
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	41.5	0.0655	318	2.59e-05	0.698	0.00044	2030
Vertua Clásico Convencional - 150 - 28 días	29.5	0.0469	201	1.86e-05	0.491	0.000318	1400
Vertua Clásico Convencional - 200 - 28 días	31.5	0.0498	221	1.97e-05	0.525	0.000333	1490
Vertua Clásico Convencional - 250 - 28 días	34	0.0537	246	2.12e-05	0.57	0.000353	1600
Vertua Plus Relleno Fluido - 14 - 28 días	17.3	0.0291	115	1.2e-05	0.286	0.00021	842
Vertua Plus Relleno Fluido - 25 - 28 días	19.6	0.0326	138	1.33e-05	0.326	0.000226	944



b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NRR	RR	WDP	LFW	LFHW
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m3	m3	kg waste	kg waste
Acelerado - 200 - 7 días	2230	40.4	2180	54.4	0.000461	3.11	39.1	0.003
Acelerado - 250 - 7 días	2380	43.8	2320	58.2	0.000487	3.05	40.1	0.003
Acelerado - 300 - 3 días	2450	49	2390	59.6	0.000459	2.85	41.2	0.003
Acelerado - 300 - 80% a 3 días	3700	62.7	3630	89.4	0.000853	3.02	46.3	0.003
Acelerado - 350 - 3 días	2390	48.7	2340	57.2	0.000671	0.802	35.8	0.003
Alta resistencia - 400 - 28 días	2670	54.8	2620	65.3	0.000511	2.59	41.8	0.003
Alta resistencia - 500 - 28 días	2970	61.9	2880	71.8	0.000562	2.46	43.3	0.003
Alta resistencia - MR 50 - 28 días	2170	43.3	2140	53.5	0.000396	1.8	35.8	0.003
Antibacteriano - 250 - 28 días	1730	31.1	1690	42.5	0.000267	0.355	29	0.002
Antideslave - 450 - 28 días	4200	83.8	4120	102	0.00113	8.25	65	0.005
Antihongo - antihalga - 250 - 28 días	1750	31.8	1720	42.9	0.000293	0.356	29	0.002
Antitermita - 250 - 28 días	1700	30.7	1670	41.7	0.000255	0.353	28.9	0.002
Aparentia - MR 45 - 28 días	2690	51.4	2630	66.3	0.000639	0.416	32.4	0.003
Autocompactable - 250 - 28 días	2320	60.7	2260	58.2	0.00175	1.94	38.4	0.003
Baja contracción - 250 - 28 días	1600	24.7	1570	37.8	0	0.294	27.7	0.002
Baja contracción - 300 - 28 días	1960	38.4	1920	48	0.000308	0.368	31.1	0.002
Baja contracción - MR 35 - 28 días	1680	28.4	1650	40.5	0.000189	0.312	27.7	0.002
Baja contracción - MR 38 - 28 días	1700	29.3	1670	41.1	0.000199	0.317	27.9	0.002
Baja contracción - MR 40 - 28 días	1600	25.2	1570	37.9	0	0.296	27.3	0.002
Baja contracción - MR 42 - 28 días	1650	28.7	1630	39.9	0.000169	0.316	27.7	0.002
Baja contracción - MR 45 - 28 días	1690	26.7	1650	39.6	0	0.294	27.1	0.002
Contracción compensada - MR 45 - 28 días	1670	26.5	1640	39.4	0	0.299	26.6	0.002



Convencional - 100 - 28 días	1220	21.4	1200	29.7	0.000578	0.851	28	0.002
Convencional - 150 - 28 días	1510	25.6	1480	37.2	0.000252	2.15	32.7	0.002
Convencional - 180 - 28 días	1550	32.2	1510	38.5	0.000728	0.878	30.2	0.002
Convencional - 200 - 28 días	1670	29.6	1640	41.2	0.000319	3.23	35.9	0.002
Convencional - 210 - 28 días	1480	27.3	1450	35.8	6.00E-04	0.843	29.8	0.002
Convencional - 250 - 28 días	1610	29.4	1590	39.8	0.000237	0.34	28.4	0.002
Convencional - 280 - 28 días	1700	32.6	1670	40.8	0.000617	0.835	31.2	0.002
Convencional - 300 - 28 días	1800	34.4	1770	43.5	0.000635	0.836	31.7	0.002
Convencional - 300 - 7 días	2110	45.9	2070	52.1	0.000769	0.855	34	0.003
Convencional - 350 - 28 días	1990	39.1	1960	47.9	0.00065	0.822	33.2	0.003
Convencional - 350 - 7 días	2480	49.5	2420	60.6	0.000458	2.83	41.3	0.003
Duramax - 300 - 28 días	2070	36	2030	49.3	0.000267	1.85	35	0.003
Duramax Autosellante - 250 - 28 días	2250	39.3	2210	53.9	0.000373	2.78	38.4	0.003
Duramax Autosellante - 300 - 28 días	2370	41.6	2330	56.7	0.000411	2.72	38.7	0.003
Duramax Autosellante - 350 - 28 días	2730	50.6	2680	65.6	0.000499	2.61	41	0.003
ECO agregado deshidratado - 200 - 28 días	1700	31.3	1660	41.9	0.000335	3.23	34.7	0.002
ECO concreto triturado - 250 - 28 días	1680	30.6	1650	41.1	0.000259	0.341	30.4	0.002
ECO llanta - 250 - 28 días	1640	29.9	1600	40.2	0.000242	0.348	28.7	0.002
ECO pet - 250 - 28 días	1630	29.8	1600	40.1	0.00024	0.345	28.7	0.002
Estructural - 250 - 28 días	1650	31.2	1610	39.6	0.000614	0.837	30.9	0.002
Estructural - 300 - 28 días	1830	35.1	1790	43.9	0.00063	0.829	32.1	0.002
Estructural - 350 - 28 días	2190	47.4	2130	53.9	0.000784	0.855	34.4	0.003
Grout premezclado - 350 - 28 días	4600	92.1	4520	118	0.00117	0.715	88.6	0.006



Hidratium - 200 - 28 días	1650	29.4	1610	41	0.000314	3.12	35.4	0.002
Hidratium - 250 - 28 días	1820	33.9	1790	44.9	0.00032	2.26	35.1	0.002
Impercem - 200 - 28 días	1790	34.6	1750	44.4	0.000554	3.31	37.9	0.003
Impercem - 250 - 28 días	1930	38.1	1900	48.1	0.000585	3.2	38.7	0.003
Lanzado - 200 - 28 días	2480	60.7	2420	62.3	0.00175	7.75	54	0.004
Lanzado - 250 - 28 días	2650	64.5	2570	66.1	0.00173	7.35	54.3	0.004
Ligero - 100 - 28 días	2670	53.8	2630	65.4	0.000619	6.94	49.2	0.003
Ligero - 150 - 28 días	2880	59	2820	70	0.000652	6	47.7	0.003
Ligero - 200 - 28 días	3140	65	3100	76.4	0.000717	6.93	53.6	0.004
Mortero - 100 - 28 días	1620	25.3	1600	38.6	0	0.385	31.9	0.002
Mortero - 150 - 28 días	1890	31.9	1850	44.9	0.000243	0.414	33.9	0.002
Mortero estabilizado - 100 - 28 días	2320	84.5	2240	60.8	0.00429	4.57	47.1	0.004
Mortero estabilizado - 125 - 28 días	2490	87.9	2390	64.8	0.00436	4.59	48.2	0.004
Mortero estabilizado - 150 - 28 días	2660	91.5	2570	68.9	0.0043	4.54	49.5	0.004
Mortero estabilizado - 85 - 28 días	2370	85.9	2290	62.2	0.00437	4.63	47.6	0.004
Pavicrete - 150 - 28 días	1660	29	1630	41.1	0.000314	3.37	37	0.003
Pavicrete - MR 35 - 28 días	1780	33.3	1730	43.4	0.000266	0.347	29.7	0.002
Pavicrete - MR 38 - 28 días	1790	33.6	1760	44.1	0.000268	0.348	29.9	0.002
Pavicrete - MR 40 - 28 días	1810	34.3	1760	44.5	0.000275	0.349	30	0.002
Pavicrete - MR 42 - 28 días	1920	36.7	1870	47.2	0.000338	1.93	34.4	0.003
Pavicrete - MR 45 - 28 días	1930	37.5	1890	48	0.000341	1.93	34.7	0.003
Pavicrete - MR 50 - 28 días	2330	46.7	2280	56.9	0.000428	2.17	37.8	0.003
Pervia - MR 40 - 28 días	2520	54.1	2460	62.6	0.000576	0.348	27.2	0.002
Pesado - 300 - 28 días	2970	73.5	2870	72	0.00174	0.596	65.2	0.004



Reducrack - MR 35 - 28 días	1980	37.7	1930	48.6	0.00036 7	1.95	34.6	0.003
Reducrack - MR 38 - 28 días	1870	35.3	1830	45.7	0.00028 8	0.353	30.3	0.002
Reducrack - MR 40 - 28 días	1870	35.4	1840	46.2	0.00029 3	0.354	30.2	0.002
Reducrack - MR 45 - 28 días	1930	36.9	1880	47.2	0.00030 1	0.358	30.5	0.002
Reducrack Sin malla - 150 - 28 días	1860	31.4	1830	45.7	0.00038 5	3.28	36.7	0.003
Reducrack Sin malla - 200 - 28 días	1870	32.4	1850	46.2	0.00034 7	2.3	35.2	0.002
Reducrack Sin malla - 250 - 28 días	2130	37.9	2090	52.2	0.00043 9	3.14	38.4	0.003
Relleno fluido - 100 - 28 días	1570	25.9	1540	37	0	0.402	30.2	0.002
Relleno fluido - 14 - 28 días	881	9.63	881	21.1	0	0.303	24	0.002
Relleno fluido - 25 - 28 días	999	12.2	984	23.7	0	0.313	25	0.002
Relleno fluido - 50 - 28 días	1290	17.6	1280	30.9	0	0.353	30.6	0.002
Relleno fluido - 60 - 28 días	1340	22.1	1320	31.8	0	0.366	26.9	0.002
Revenimiento total - 250 - 28 días	1780	29.6	1760	42.7	0.00024 3	2.95	35.8	0.002
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	2200	41.8	2150	53.9	0.00044 2	2.98	39.1	0.003
Vertua Clásico Convencional - 150 - 28 días	1500	25.1	1470	37.3	0.00025 2	2.15	32.7	0.002
Vertua Clásico Convencional - 200 - 28 días	1600	27.7	1570	39.5	0.00027 2	2.12	33.3	0.002
Vertua Clásico Convencional - 250 - 28 días	1730	30.8	1690	42.6	0.00030 1	2.07	34.1	0.002
Vertua Plus Relleno Fluido - 14 - 28 días	884	0	873	21	0	0.303	24	0.002
Vertua Plus Relleno Fluido - 25 - 28 días	992	12.4	982	23.8	0	0.313	25	0.002



Indicator/LCI Metric	CBWC	CWWC	CHW	CNHW
Unit	m3	m3	kg	kg
Acelerado - 200 - 7 días	0.2	2.69E-05	0	0.05
Acelerado - 250 - 7 días	0.202	2.69E-05	0	0.05
Acelerado - 300 - 3 días	0.205	2.69E-05	0	0.05
Acelerado - 300 - 80% a 3 días	0.194	2.69E-05	0	0.05
Acelerado - 350 - 3 días	0.194	2.69E-05	0	0.05
Alta resistencia - 400 - 28 días	0.2	2.69E-05	0	0.05
Alta resistencia - 500 - 28 días	0.22	2.69E-05	0	0.05
Alta resistencia - MR 50 - 28 días	0.178	2.69E-05	0	0.05
Antibacteriano - 250 - 28 días	0.19	2.69E-05	0	0.05
Antideslave - 450 - 28 días	0.189	2.69E-05	0	0.05
Antihongo - antihalga - 250 - 28 días	0.188	2.69E-05	0	0.05
Antitermita - 250 - 28 días	0.19	2.69E-05	0	0.05
Aparentia - MR 45 - 28 días	0.173	2.69E-05	0	0.05
Autocompactable - 250 - 28 días	0.252	2.69E-05	0	0.05
Baja contracción - 250 - 28 días	0.163	2.69E-05	0	0.05
Baja contracción - 300 - 28 días	0.178	2.69E-05	0	0.05
Baja contracción - MR 35 - 28 días	0.164	2.69E-05	0	0.05
Baja contracción - MR 38 - 28 días	0.164	2.69E-05	0	0.05
Baja contracción - MR 40 - 28 días	0.164	2.69E-05	0	0.05
Baja contracción - MR 42 - 28 días	0.167	2.69E-05	0	0.05
Baja contracción - MR 45 - 28 días	0.158	2.69E-05	0	0.05
Contracción compensada - MR 45 - 28 días	0.163	2.69E-05	0	0.05
Convencional - 100 - 28 días	0.18	2.69E-05	0	0.05
Convencional - 150 - 28 días	0.182	2.69E-05	0	0.05
Convencional - 180 - 28 días	0.183	2.69E-05	0	0.05
Convencional - 200 - 28 días	0.197	2.69E-05	0	0.05
Convencional - 210 - 28 días	0.184	2.69E-05	0	0.05
Convencional - 250 - 28 días	0.183	2.69E-05	0	0.05



Convencional - 280 - 28 días	0.187	2.69E-05	0	0.05
Convencional - 300 - 28 días	0.193	2.69E-05	0	0.05
Convencional - 300 - 7 días	0.19	2.69E-05	0	0.05
Convencional - 350 - 28 días	0.19	2.69E-05	0	0.05
Convencional - 350 - 7 días	0.205	2.69E-05	0	0.05
Duramax - 300 - 28 días	0.197	2.69E-05	0	0.05
Duramax Autosellante - 250 - 28 días	0.189	2.69E-05	0	0.05
Duramax Autosellante - 300 - 28 días	0.202	2.69E-05	0	0.05
Duramax Autosellante - 350 - 28 días	0.198	2.69E-05	0	0.05
ECO agregado deshidratado - 200 - 28 días	0.197	2.69E-05	0	0.05
ECO concreto triturado - 250 - 28 días	0.183	2.69E-05	0	0.05
ECO llanta - 250 - 28 días	0.188	2.69E-05	0	0.05
ECO pet - 250 - 28 días	0.186	2.69E-05	0	0.05
Estructural - 250 - 28 días	0.186	2.69E-05	0	0.05
Estructural - 300 - 28 días	0.188	2.69E-05	0	0.05
Estructural - 350 - 28 días	0.19	2.69E-05	0	0.05
Grout premezclado - 350 - 28 días	0.273	2.69E-05	0	0.05
Hidratium - 200 - 28 días	0.193	2.69E-05	0	0.05
Hidratium - 250 - 28 días	0.205	2.69E-05	0	0.05
Impercem - 200 - 28 días	0.196	2.69E-05	0	0.05
Impercem - 250 - 28 días	0.198	2.69E-05	0	0.05
Lanzado - 200 - 28 días	0.223	2.69E-05	0	0.05
Lanzado - 250 - 28 días	0.226	2.69E-05	0	0.05
Ligero - 100 - 28 días	0.206	2.69E-05	0	0.05
Ligero - 150 - 28 días	0.21	2.69E-05	0	0.05
Ligero - 200 - 28 días	0.203	2.69E-05	0	0.05
Mortero - 100 - 28 días	0.252	2.69E-05	0	0.05
Mortero - 150 - 28 días	0.257	2.69E-05	0	0.05
Mortero estabilizado - 100 - 28 días	0.25	2.69E-05	0	0.05
Mortero estabilizado - 125 - 28 días	0.237	2.69E-05	0	0.05
Mortero estabilizado - 150 - 28 días	0.235	2.69E-05	0	0.05
Mortero estabilizado - 85 - 28 días	0.237	2.69E-05	0	0.05
Pavicrete - 150 - 28 días	0.178	2.69E-05	0	0.05
Pavicrete - MR 35 - 28 días	0.174	2.69E-05	0	0.05
Pavicrete - MR 38 - 28 días	0.173	2.69E-05	0	0.05



Pavicrete - MR 40 - 28 días	0.173	2.69E-05	0	0.05
Pavicrete - MR 42 - 28 días	0.173	2.69E-05	0	0.05
Pavicrete - MR 45 - 28 días	0.171	2.69E-05	0	0.05
Pavicrete - MR 50 - 28 días	0.189	2.69E-05	0	0.05
Pervia - MR 40 - 28 días	0.102	2.69E-05	0	0.05
Pesado - 300 - 28 días	0.205	2.69E-05	0	0.05
Reducrack - MR 35 - 28 días	0.178	2.69E-05	0	0.05
Reducrack - MR 38 - 28 días	0.173	2.69E-05	0	0.05
Reducrack - MR 40 - 28 días	0.173	2.69E-05	0	0.05
Reducrack - MR 45 - 28 días	0.173	2.69E-05	0	0.05
Reducrack Sin malla - 150 - 28 días	0.197	2.69E-05	0	0.05
Reducrack Sin malla - 200 - 28 días	0.184	2.69E-05	0	0.05
Reducrack Sin malla - 250 - 28 días	0.202	2.69E-05	0	0.05
Relleno fluido - 100 - 28 días	0.27	2.69E-05	0	0.05
Relleno fluido - 14 - 28 días	0.231	2.69E-05	0	0.05
Relleno fluido - 25 - 28 días	0.231	2.69E-05	0	0.05
Relleno fluido - 50 - 28 días	0.247	2.69E-05	0	0.05
Relleno fluido - 60 - 28 días	0.252	2.69E-05	0	0.05
Revenimiento total - 250 - 28 días	0.208	2.69E-05	0	0.05
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	0.191	2.69E-05	0	0.05
Vertua Clásico Convencional - 150 - 28 días	0.182	2.69E-05	0	0.05
Vertua Clásico Convencional - 200 - 28 días	0.184	2.69E-05	0	0.05
Vertua Clásico Convencional - 250 - 28 días	0.186	2.69E-05	0	0.05
Vertua Plus Relleno Fluido - 14 - 28 días	0.231	2.69E-05	0	0.05
Vertua Plus Relleno Fluido - 25 - 28 días	0.231	2.69E-05	0	0.05



OTHER ENVIRONMENTAL INFO

A4 Diesel Emissions

The following table below is the GWP100 for the A4 diesel emissions. These emissions were calculated from primary CEMEX data on the exact diesel usage for the mixing trucks, minus 16.99% which was allotted to A3 for mixing the concrete.

Table 13: A4 Diesel Emissions

PLANT NAME	L DIESEL NOT INCLUDING A3	GWP FACTOR kgCO ₂ / LITER	Total kg CO ₂ eq (A4)	Total kg CO ₂ eq/m ³ (A4)
MX-PD0192 AEROPUERTO QRO	179,756.10	2.596	4.67E+05	7.7

CEMEX Calculated Simplified CO₂ Emissions

Under the auspices of the Global Commitment, the Global Cement and Concrete Association (GCCA) endeavors to establish a standardized methodology for assessing carbon dioxide (CO₂) emissions with a view to facilitating effective comparative analyses. The association's computation model currently operates on a simplified premise, predominantly focusing on the efficiency of cement production within the concrete mix design.

The GCCA mandates the dual reporting of both Net Emissions and Gross Emissions, differentiating the impact of alternative fuel utilization in the cement production process. Net Emissions pertain to the CO₂ emissions generated without considering the carbon offset potential of alternative fuels used in the production process. On the other hand, Gross Emissions account for this factor, recognizing the carbon neutrality or even carbon negativity that can be achieved through the strategic use of such alternative fuels. This dual-pronged reporting approach provides a more nuanced understanding of the industry's carbon footprint, thereby better informing efforts towards emissions reduction.

These calculations do not intend to replace CO₂ footprint calculations. It is a starting point to monitor CO₂ emissions in concrete while transitioning to a more comprehensive indicator based on the Life Cycle Assessment, such as the CO₂ footprint or the Global Warming Potential indicator.

Table 14: Simplified CO₂

NEW ID	Net (kgCO ₂ /m ³)	Gross (kgCO ₂ /m ³)
Acelerado - 200 - 7 días	167	195
Acelerado - 250 - 7 días	188	219
Acelerado - 300 - 3 días	180	210
Acelerado - 300 - 80% a 3 días	207	242
Acelerado - 350 - 3 días	262	306
Alta resistencia - 400 - 28 días	271	316
Alta resistencia - 500 - 28 días	314	367

Alta resistencia - MR 50 - 28 días	210	245
Antibacteriano - 250 - 28 días	146	171
Antideslave - 450 - 28 días	335	391
Antihongo - antihalga - 250 - 28 días	145	169
Antitermita - 250 - 28 días	146	171
Aparentia - MR 45 - 28 días	198	231
Autocompactable - 250 - 28 días	213	249
Baja contracción - 250 - 28 días	162	189
Baja contracción - 300 - 28 días	192	224
Baja contracción - MR 35 - 28 días	156	182
Baja contracción - MR 38 - 28 días	159	185
Baja contracción - MR 40 - 28 días	162	189
Baja contracción - MR 42 - 28 días	165	192
Baja contracción - MR 45 - 28 días	168	196
Contracción compensada - MR 45 - 28 días	168	196
Convencional - 100 - 28 días	92	108
Convencional - 150 - 28 días	108	126
Convencional - 180 - 28 días	120	140
Convencional - 200 - 28 días	124	145
Convencional - 210 - 28 días	129	151
Convencional - 250 - 28 días	142	166
Convencional - 280 - 28 días	159	186
Convencional - 300 - 28 días	170	198
Convencional - 300 - 7 días	203	237
Convencional - 350 - 28 días	202	236
Convencional - 350 - 7 días	244	285
Duramax - 300 - 28 días	207	242
Duramax Autosellante - 250 - 28 días	198	231
Duramax Autosellante - 300 - 28 días	210	245
Duramax Autosellante - 350 - 28 días	253	295
ECO agregado deshidratado - 200 - 28 días	134	156
ECO concreto triturado - 250 - 28 días	151	176
ECO llanta - 250 - 28 días	145	169
ECO pet - 250 - 28 días	144	168
Estructural - 250 - 28 días	152	177
Estructural - 300 - 28 días	178	207



Estructural - 350 - 28 días	210	245
Grout premezclado - 350 - 28 días	332	388
Hidratium - 200 - 28 días	123	143
Hidratium - 250 - 28 días	157	183
Impercem - 200 - 28 días	132	154
Impercem - 250 - 28 días	153	178
Lanzado - 200 - 28 días	183	214
Lanzado - 250 - 28 días	213	249
Ligero - 100 - 28 días	236	275
Ligero - 150 - 28 días	268	312
Ligero - 200 - 28 días	298	348
Mortero - 100 - 28 días	143	166
Mortero - 150 - 28 días	179	209
Mortero estabilizado - 100 - 28 días	145	169
Mortero estabilizado - 125 - 28 días	157	183
Mortero estabilizado - 150 - 28 días	179	209
Mortero estabilizado - 85 - 28 días	142	166
Pavicrete - 150 - 28 días	123	144
Pavicrete - MR 35 - 28 días	165	192
Pavicrete - MR 38 - 28 días	168	196
Pavicrete - MR 40 - 28 días	170	198
Pavicrete - MR 42 - 28 días	171	200
Pavicrete - MR 45 - 28 días	176	206
Pavicrete - MR 50 - 28 días	228	267
Pervia - MR 40 - 28 días	236	275
Pesado - 300 - 28 días	242	282
Reducrack - MR 35 - 28 días	171	200
Reducrack - MR 38 - 28 días	172	201
Reducrack - MR 40 - 28 días	175	204
Reducrack - MR 45 - 28 días	181	212
Reducrack Sin malla - 150 - 28 días	117	137
Reducrack Sin malla - 200 - 28 días	133	155
Reducrack Sin malla - 250 - 28 días	155	181
Relleno fluido - 100 - 28 días	154	180
Relleno fluido - 14 - 28 días	59	69
Relleno fluido - 25 - 28 días	76	88



Relleno fluido - 50 - 28 días	108	126
Relleno fluido - 60 - 28 días	131	152
Revenimiento total - 250 - 28 días	159	185
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	187	219
Vertua Clásico Convencional - 150 - 28 días	108	126
Vertua Clásico Convencional - 200 - 28 días	122	142
Vertua Clásico Convencional - 250 - 28 días	140	164
Vertua Plus Relleno Fluido - 14 - 28 días	59	69
Vertua Plus Relleno Fluido - 25 - 28 días	76	88

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- ASTM C94 Standard Specification for Ready-Mixed Concrete //NMX-C-155-ONNCCE-2004 Construction Industry - Hydraulic Concrete - Mass dosed - Specifications and Test Methods
- ASTM C150/C150M Standard Specification for Portland Cement // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements - Specifications and Test Methods
- ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete // NMX-C-255-ONNCCE-2006 Construction Industry - Concrete Chemical Admixtures - Specifications, sampling and test methods
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- ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
- ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
- ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- ISO 14067:2018 Greenhouse Gases - Carbon Footprint of Products - Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products