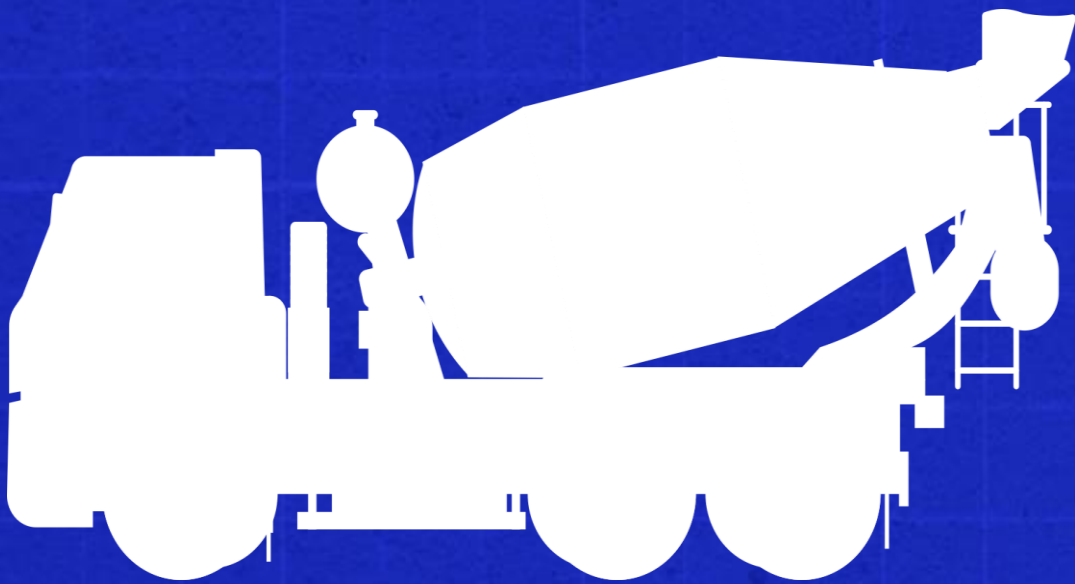




ENVIRONMENTAL PRODUCT DECLARATION



Environmental Product Declaration for ready mix concrete products produced by CEMEX México at their MX-PD-193 TEZOYUCA facility in Morelos, México.

**FUTURE IN
ACTION**



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.
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	Monterrey, Nuevo León.
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Program Operator:	Labeling Sustainability
	Address, 11670 W Sunset Blvd.
	Los Angeles, CA
	www.labelingsustainability.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.csaregistrries.ca)
Date of Issue:	29 August 2024
Period of Validity:	5 years; valid until 29 August 2029
EPD Number:	f3c5a834-9698-477f-8cbc-824398ce66b5



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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 64 concrete mixes manufactured at the CEMEX concrete facility at Tezoyuca plant, in Carretera Federal Cuernavaca – Jojutla S/N, Morelos, 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	Compressive strength MPa	Day compressive strength	H2O to cement ratio	Level of vertua lower carbon
1	Aparentia - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.84	Clasico
2	Convencional - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	0.95	Clasico
3	Convencional - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.79	Clasico
4	Ligero - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.38	
5	Mortero - 50 - 28 días	4.90 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	4.90	28	1.35	Clasico
6	Mortero estabilizado - 125 - 28 días	12.26 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	12.26	28	0.88	Clasico
7	Mortero estabilizado - 50 - 28 días	4.90 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	4.90	28	1.40	Plus

8	Relleno fluido - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	0.83	Clasico
9	Relleno fluido - 25 - 28 días	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.44	Plus
10	Revenimiento total - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.94	Clasico
11	Vertua Clásico - 25 - 28 días	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.32	Clasico
12	Vertua Materiales Reciclados - 025 - 28 días	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.40	Plus

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	Compressive strength MPa	Day compressive strength	H2O to cement ratio	Level of vertua lower carbon
13	Acelerado - 200 - 3 días	19.61 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	19.61	3	0.50	Clásico
14	Antibacteriano - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.76	Clásico
15	Convencional - 200 - 14 días	19.61 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	19.61	14	0.67	Clásico
16	Convencional - 200 - 28 días	19.61 MPa 28d strength	Ready Mix Concrete	19.61	28	0.69	Clásico



		Ready Mix Concrete					
17	Convencional - 200 - 7 días	19.61 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	19.61	7	0.63	Clásico
18	Hidratium - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.76	Clásico
19	Impercem - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.76	Clásico
20	Lanzado - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.61	Clásico
21	Materiales Reciclados Llanta - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.75	Clásico
22	Materiales Reciclados Pet - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.75	Clásico
23	Materiales Reciclados Plástico de difícil reciclado - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.75	Clásico
24	Reducrack - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.76	Clásico
25	Reducrack Sin malla - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.70	Clásico
26	Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.71	Clásico



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	Compressive Strength MPa	Day compressive strength	H ₂ O to cement ratio	Level of vertua lower carbon
27	Acelerado - 250 - 3 días	24.52 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.50	Clásico
28	Acelerado - 250 - 80% a 1 día	24.52 MPa 1d strength Ready Mix Concrete	Ready Mix Concrete	24.52	1	0.43	Clásico
29	Antihongo antialga - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
30	Antitermita - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.76	Clásico
31	Autocompactable - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.58	
32	Convencional - 250 - 14 días	24.52 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	24.52	14	0.63	Clásico
33	Convencional - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
34	Convencional - 250 - 7 días	24.52 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.60	Clásico
35	Duramax Autosellante - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.61	Clásico



36	Estructural - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.65	Clásico
37	Estructural - 250 - 7 días	24.52 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.59	Clásico
38	Hidratium - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.71	Clásico
39	Lanzado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.53	Clásico
40	Pavicrete - MR 38 - 28 días	24.58 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.58	28	0.59	Clásico
41	Pervia - MR 36 - 28 días	22.06 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	22.06	28	0.23	Clásico
42	Reducrack - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.71	Clásico
43	Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico

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	Compressive strength MPa	Day compressive strength	H ₂ O to cement ratio	Level of vertua lower carbon
44	Acelerado - 300 - 3 días	29.42 MPa 3d strength	Ready Mix Concrete	29.42	3	0.47	Clásico



		Ready Mix Concrete					
45	Baja contracción - MR 40 - 28 días	27.24 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.24	28	0.54	Clásico
46	Convencional - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.62	Clásico
47	Convencional - 300 - 7 días	29.42 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	29.42	7	0.57	Clásico
48	Duramax - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.55	Clásico
49	Duramax Autosellante - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.50	Clásico
50	Estructural - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.61	Clásico
51	Pavicrete - MR 40 - 28 días	27.24 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.24	28	0.58	Clásico
52	Pesado - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.51	



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	Compressive strength MPa	Day compressive strength	H ₂ O to cement ratio	Level of vertua lower carbon
53	Acelerado - 350 - 3 días	34.32 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	34.32	3	0.45	Clásico
54	Antideslave - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.46	
55	Baja contracción - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.53	Clásico
56	Baja contracción - MR 45 - 28 días	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	28	0.50	Clásico
57	Contracción compensada - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.54	Clásico
58	Estructural - 350 - 14 días	34.32 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	34.32	14	0.54	Clásico
59	Estructural - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.56	Clásico
60	Grout premezclado - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.42	
61	Pavicrete - MR 45 - 28 días	34.48 MPa 28d strength	Ready Mix Concrete	34.48	28	0.52	Clásico





		Ready Mix Concrete					
62	Reducrack - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.56	Clásico

Mix Designs: 41 to 45 MPa

Table 6: Declared products with Mix designs: 41 to 45MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	Compressive strength MPa	Day compressive strength	H2O to cement ratio	Level of vertua lower carbon
63	Alta resistencia - 450 - 28 días	44.13 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	44.13	28	0.45	Clásico

READY MIX CONCRETE DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each ready mix concrete design considered. Please note that the presented breakdown has been randomly altered by +/-10%, and is therefore only an approximation; this manipulation is to ensure confidentiality.

Table 7: Ready mix concrete composition.

Product Components	Product Components
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.

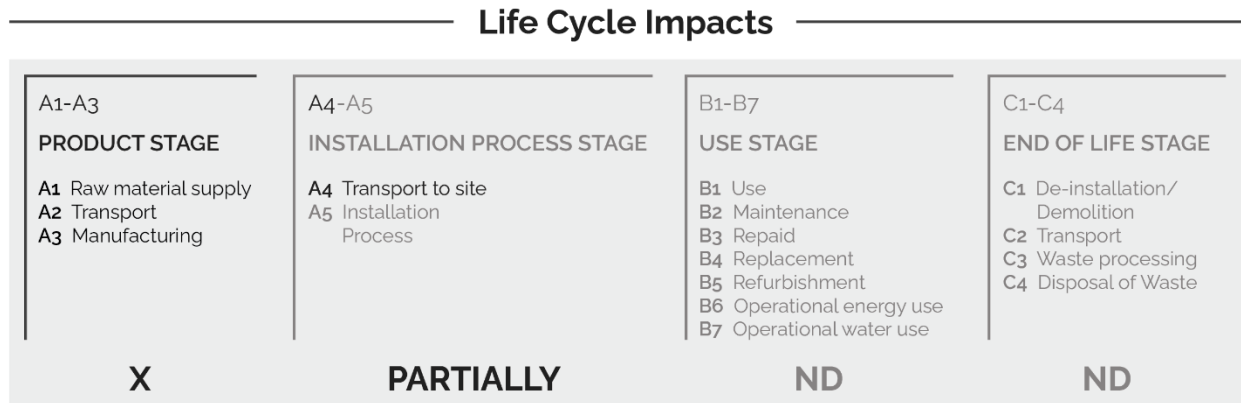


Figure 1: General life cycle phases for consideration in a construction works system

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.

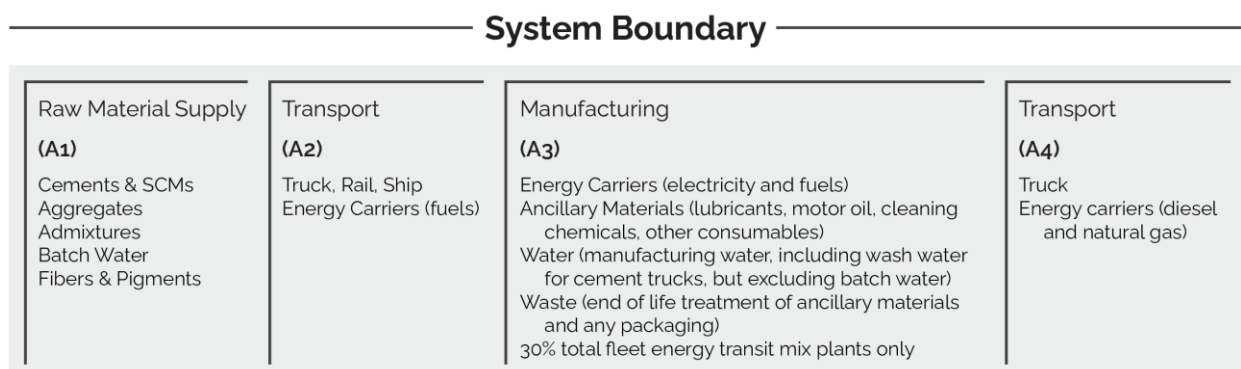


Figure 2: General system inputs considered in the product system and categorized by modules in scope

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-PD-193 Tezoyuca facility in 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 v3.10 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 2023. These values were direct 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. 92% is the wind energy.

Process/space heating: No fuel is used for space heating at this plant.

Fuel required for machinery: Machinery-related fuel requirements were determined from direct CEMEX information for the reference year 2023.

Waste generation: Not applicable

Recovered energy: There was no recovered energy on-site.



Recycled/reused material/components: The amount of returned concrete is based on CEMEX primary data for the reference year, 2023.

Module A1 material losses: Due to lack of data, default loss factors were assumed.

Direct A3 emissions accounting: Direct emissions are modeled using fuel and technology appropriateecoinvent activities. See LCI input tables for details.

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 2023. 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 8: 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	Data.source		Technology	Time	Geography	Reliability	Completeness
			Geo	Year					
Micro silica	silica sand production/silica sand/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Chihuahua	2024	2	3	1	3	3
Andesite sand	basalt quarry operation/basalt/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Morelos	2024	2	3	1	3	3
Recycled Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Morelos	2024	2	3	1	3	3
Limestone Gravel	limestone quarry operation/limestone,	ecoinvent v3.10 in 2024	Morelos	2024	2	3	1	3	3





	unprocessed/RoW/kg; Note: modifications made (see ecoinvent activity changes table)								
Additives	chemical production, organic/chemical, organic/GLO/kg	ecoinvent v3.10 in 2024	Edo. Mex.	2024	2	3	1	3	3
Hidratium	chemical production, inorganic/chemical, inorganic/GLO/kg	ecoinvent v3.10 in 2024	Hidalgo	2024	2	3	1	3	3
Cement	Gris CPC40	Progam Operator: Labeling Sustainability - EPD ID: ce509726-abc4-4437-b8ba-c99421e76fb d	Hidalgo	01 February 2023	3	3	3	3	3
Llanta kg	Waste input produced off-site	See A3 inputs	Guanajuato	See A3 inputs	3	A3	1	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 v3.10 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 v3.10 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 2023-01-01 to 2023-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.10 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 g: Life cycle impact categories and life cycle inventory metrics

ID	LCIA.indicators	Abbreviations	Units
1	Climate change: global warming potential (GWP100)	GWP100	kg CO ₂ -eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO ₂ -eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O ₃ -eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADP _{fossil}	MJ

Inventory metrics



7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	PRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	kg
11	Inventory indicators ISO21930: use of secondary material	SM	MJ
12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: recovered energy	RE	MJ
14	Inventory indicators ISO21930: use of net fresh water	FW	m3
15	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
16	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
17	Inventory indicators ISO21930: high-level radioactive waste disposed	HLRW	kg
18	Inventory indicators ISO21930: intermediate and low-level radioactive waste disposed	ILLRW	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg
20	Inventory indicators ISO21930: materials for energy recovery	MER	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 10: **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	GWP ₁₀₀	ODP	AP	EP	SFP	ADP _{fossil}
Unit	kg CO ₂ -eq	kg CFC-11-eq	kg SO ₂ -eq	kg N-eq	kg O ₃ -eq	MJ
Aparentia - 150 - 28 días	279	2.63E-06	0.389	0.41	7.4	1990
Acelerado - 200 - 3 días	360	2.69E-06	0.399	0.198	7.65	2180
Acelerado - 250 - 3 días	389	2.90E-06	0.417	0.21	7.9	2340
Acelerado - 250 - 80% a 1 día	440	3.26E-06	0.451	0.231	8.41	2620
Acelerado - 300 - 3 días	419	3.11E-06	0.437	0.223	8.2	2510
Acelerado - 350 - 3 días	469	3.45E-06	0.468	0.244	8.65	2780
Alta resistencia - 450 - 28 días	468	3.45E-06	0.469	0.245	8.67	2780
Antibacteriano - 200 - 28 días	267	2.05E-06	0.339	0.166	6.76	1680
Antideslave - 350 - 28 días	465	3.62E-06	0.495	0.315	9.12	2890
Antihongo antialga - 250 - 28 días	297	2.43E-06	0.372	0.258	7.21	1930
Antitermita - 250 - 28 días	267	2.05E-06	0.339	0.166	6.76	1680



Autocompactable - 250 - 28 días	366	2.87E-06	0.415	0.265	7.87	2280
Baja contracción - MR 40 - 28 días	357	2.69E-06	0.395	0.202	7.57	2170
Baja contracción - MR 42 - 28 días	363	2.75E-06	0.402	0.214	7.68	2220
Baja contracción - MR 45 - 28 días	382	2.83E-06	0.41	0.198	7.81	2300
Contracción compensada - MR 42 - 28 días	378	2.92E-06	0.423	0.242	7.98	2350
Convencional - 100 - 28 días	200	1.59E-06	0.293	0.138	6.04	1310
Convencional - 150 - 28 días	237	1.85E-06	0.318	0.155	6.43	1510
Convencional - 200 - 14 días	294	2.25E-06	0.354	0.181	6.95	1830
Convencional - 200 - 28 días	269	2.08E-06	0.339	0.17	6.74	1690
Convencional - 200 - 7 días	314	2.40E-06	0.369	0.191	7.18	1940
Convencional - 250 - 14 días	319	2.43E-06	0.372	0.193	7.23	1970
Convencional - 250 - 28 días	292	2.24E-06	0.355	0.18	6.97	1820
Convencional - 250 - 7 días	329	2.50E-06	0.378	0.197	7.3	2020
Convencional - 300 - 28 días	324	2.47E-06	0.375	0.196	7.27	2000
Convencional - 300 - 7 días	355	2.68E-06	0.396	0.21	7.58	2170
Duramax - 300 - 28 días	438	3.77E-06	0.5	0.253	9.41	3110
Duramax Autosellante - 250 - 28 días	354	2.92E-06	0.415	0.324	7.8	2280
Duramax Autosellante - 300 - 28 días	411	3.34E-06	0.458	0.353	8.43	2610
Estructural - 250 - 28 días	303	2.32E-06	0.36	0.185	7.03	1880
Estructural - 250 - 7 días	343	2.60E-06	0.388	0.204	7.45	2100
Estructural - 300 - 28 días	328	2.50E-06	0.378	0.198	7.31	2020
Estructural - 350 - 14 días	394	2.96E-06	0.42	0.227	7.92	2380
Estructural - 350 - 28 días	364	2.75E-06	0.402	0.214	7.67	2220
Grout premezclado - 350 - 28 días	659	5.05E-06	0.645	0.41	11.4	4050
Hidratium - 200 - 28 días	267	2.06E-06	0.343	0.169	6.79	1680
Hidratium - 250 - 28 días	287	2.21E-06	0.355	0.177	6.97	1790



Impercem - 200 - 28 días	273	2.31E-06	0.365	0.267	7.09	1820
Lanzado - 200 - 28 días	354	2.70E-06	0.404	0.227	7.73	2180
Lanzado - 250 - 28 días	414	3.10E-06	0.445	0.238	8.33	2500
Ligero - 150 - 28 días	576	4.16E-06	0.523	0.295	9.26	3330
Materiales Reciclados Llanta - 200 - 28 días	272	2.11E-06	0.345	0.173	6.86	1720
Materiales Reciclados Pet - 200 - 28 días	272	2.10E-06	0.344	0.173	6.85	1710
Materiales Reciclados Plástico de difícil reciclado - 200 - 28 días	275	2.15E-06	0.35	0.175	6.96	1750
Mortero - 50 - 28 días	195	1.52E-06	0.278	0.147	5.64	1250
Mortero estabilizado - 125 - 28 días	278	2.34E-06	0.348	0.295	6.59	1830
Mortero estabilizado - 50 - 28 días	188	1.46E-06	0.272	0.14	5.54	1210
Pavimente - MR 38 - 28 días	341	2.55E-06	0.382	0.182	7.36	2070
Pavimente - MR 40 - 28 días	347	2.61E-06	0.391	0.194	7.53	2120
Pavimente - MR 45 - 28 días	367	2.73E-06	0.397	0.188	7.58	2210
Pervia - MR 36 - 28 días	418	3.56E-06	0.451	0.418	8.11	2720
Pesado - 300 - 28 días	464	3.98E-06	0.586	0.337	11.3	3290
Reducrack - 200 - 28 días	267	2.05E-06	0.339	0.166	6.76	1680
Reducrack - 250 - 28 días	287	2.20E-06	0.352	0.175	6.94	1790
Reducrack - MR 42 - 28 días	346	2.58E-06	0.385	0.182	7.41	2100
Reducrack Sin malla - 200 - 28 días	268	1.97E-06	0.334	0.118	6.69	1640
Relleno fluido - 100 - 28 días	294	2.09E-06	0.326	0.127	6.31	1730
Relleno fluido - 25 - 28 días	186	1.37E-06	0.254	0.0991	5.18	1150
Revenimiento total - 150 - 28 días	234	1.84E-06	0.314	0.159	6.33	1500
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	289	2.22E-06	0.352	0.183	6.91	1800
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	304	2.33E-06	0.361	0.189	7.03	1890
Vertua Clásico - 25 - 28 días	201	1.47E-06	0.268	0.104	5.45	1240
Vertua Materiales Reciclados - 025 - 28 días	188	1.37E-06	0.238	0.0936	4.77	1140



b) Resource Inventory Metrics:

Indicator/LCI Metric	RPRE	PRM	NRPRE	NRPRM	SM	RSF	RE	FW
Unit	MJ	MJ	MJ	kg	MJ	MJ	MJ	m3
Aparentia - 150 - 28 días	74.5	1.58	75	796	0.424	0.00456	0.311	0.555
Acelerado - 200 - 3 días	84.2	1.58	84.7	970	0.461	0.00472	0.22	0.428
Acelerado - 250 - 3 días	89.9	1.58	90.5	1060	0.489	0.0049	0.229	0.455
Acelerado - 250 - 80% a 1 día	99.8	1.58	100	1210	0.539	0.00525	0.248	0.481
Acelerado - 300 - 3 días	95.9	1.58	96.5	1140	0.517	0.00508	0.241	0.474
Acelerado - 350 - 3 días	105	1.58	106	1290	0.565	0.0054	0.258	0.511
Alta resistencia - 450 - 28 días	105	1.58	106	1290	0.565	0.0054	0.258	0.512
Antibacteriano - 200 - 28 días	66.5	1.58	66.9	700	0.37	0.00409	0.191	0.399
Antideslave - 350 - 28 días	107	1.58	108	1270	0.611	0.00636	0.331	0.58
Antihongo antialga - 250 - 28 días	73.9	1.58	74.4	808	0.414	0.00443	0.239	0.45
Antitermita - 250 - 28 días	66.5	1.58	66.9	700	0.37	0.00409	0.191	0.399
Autocompactable - 250 - 28 días	87.3	1.58	87.9	1010	0.477	0.00485	0.254	0.492
Baja contracción - MR 40 - 28 días	83.6	1.58	84.1	965	0.459	0.0047	0.22	0.44
Baja contracción - MR 42 - 28 días	85.1	1.58	85.7	984	0.466	0.00475	0.227	0.448
Baja contracción - MR 45 - 28 días	88	1.58	88.6	1030	0.482	0.00487	0.222	0.445
Contracción compensada - MR 42 - 28 días	88.8	1.58	89.4	1020	0.504	0.00557	0.275	0.511
Convencional - 100 - 28 días	53.2	1.58	53.5	506	0.304	0.00362	0.165	0.348
Convencional - 150 - 28 días	60.6	1.58	60.9	615	0.341	0.00388	0.18	0.369
Convencional - 200 - 14 días	71.5	1.58	71.9	781	0.396	0.00425	0.2	0.411
Convencional - 200 - 28 días	66.7	1.58	67.1	708	0.373	0.0041	0.192	0.388
Convencional - 200 - 7 días	75.8	1.58	76.3	841	0.416	0.00438	0.209	0.424
Convencional - 250 - 14 días	76.8	1.58	77.3	856	0.42	0.00441	0.211	0.429



Convencional - 250 - 28 días	71.3	1.58	71.7	777	0.396	0.00426	0.2	0.402
Convencional - 250 - 7 días	78.4	1.58	78.9	886	0.431	0.0045	0.213	0.432
Convencional - 300 - 28 días	77.7	1.58	78.2	871	0.425	0.00444	0.213	0.433
Convencional - 300 - 7 días	83.7	1.58	84.2	960	0.456	0.00466	0.224	0.45
Duramax - 300 - 28 días	94.5	1.58	95.2	1040	0.856	0.00959	0.399	0.592
Duramax Autosellante - 250 - 28 días	86.2	1.58	86.7	989	0.476	0.00484	0.279	0.524
Duramax Autosellante - 300 - 28 días	97.6	1.58	98.2	1150	0.537	0.00535	0.32	0.557
Estructural - 250 - 28 días	73.3	1.58	73.7	808	0.405	0.00431	0.203	0.418
Estructural - 250 - 7 días	81.4	1.58	82	927	0.444	0.00457	0.22	0.446
Estructural - 300 - 28 días	78.5	1.58	79	883	0.429	0.00447	0.214	0.436
Estructural - 350 - 14 días	91.2	1.58	91.8	1070	0.493	0.0049	0.238	0.482
Estructural - 350 - 28 días	85.5	1.58	86	987	0.465	0.00472	0.227	0.456
Grout premezclado - 350 - 28 días	149	1.58	150	1800	0.849	0.00884	0.479	0.781
Hidratium - 200 - 28 días	66.9	1.58	67.3	700	0.373	0.00416	0.21	0.409
Hidratium - 250 - 28 días	70.8	1.58	71.2	759	0.393	0.0043	0.217	0.421
Impercem - 200 - 28 días	70.4	1.58	70.8	741	0.397	0.00439	0.259	0.466
Lanzado - 200 - 28 días	85.1	1.58	85.6	960	0.455	0.00463	0.236	0.469
Lanzado - 250 - 28 días	97.1	1.58	97.7	1130	0.513	0.00508	0.27	0.504
Ligero - 150 - 28 días	129	1.58	129	1620	0.638	0.00551	0.295	0.556
Materiales Reciclados Llanta - 200 - 28 días	67.7	1.58	68.1	716	0.38	0.00418	0.196	0.407
Materiales Reciclados Pet - 200 - 28 días	67.7	1.58	68.1	716	0.378	0.00416	0.196	0.407
Materiales Reciclados Plástico de difícil reciclado - 200 - 28 días	68.2	1.58	68.6	716	0.395	0.00438	0.204	0.412



Mortero - 50 - 28 días	54.8	1.58	55.1	502	0.272	0.00304	0.168	0.396
Mortero estabilizado - 125 - 28 días	73.3	1.58	73.7	776	0.372	0.00374	0.25	0.489
Mortero estabilizado - 50 - 28 días	53.4	1.58	53.6	482	0.265	0.00297	0.163	0.39
Pavicrete - MR 38 - 28 días	80.2	1.58	80.7	916	0.439	0.00454	0.208	0.432
Pavicrete - MR 40 - 28 días	81.8	1.58	82.3	934	0.449	0.00464	0.216	0.441
Pavicrete - MR 45 - 28 días	84.4	1.58	84.9	992	0.469	0.00479	0.213	0.438
Pervia - MR 36 - 28 días	95.7	1.58	96.3	1200	0.566	0.00561	0.319	0.495
Pesado - 300 - 28 días	110	1.58	111	1120	0.858	0.00949	0.453	0.614
Reducrack - 200 - 28 días	66.5	1.58	66.9	700	0.37	0.00409	0.191	0.399
Reducrack - 250 - 28 días	70.3	1.58	70.8	759	0.39	0.00422	0.198	0.411
Reducrack - MR 42 - 28 días	80.7	1.58	81.3	930	0.447	0.00463	0.208	0.428
Reducrack Sin malla - 200 - 28 días	65.9	1.58	66.3	690	0.366	0.0041	0.186	0.372
Relleno fluido - 100 - 28 días	72.4	1.58	72.8	781	0.355	0.00352	0.17	0.409
Relleno fluido - 25 - 28 días	51.5	1.58	51.8	473	0.251	0.00278	0.138	0.375
Revenimiento total - 150 - 28 días	59.9	1.58	60.2	609	0.337	0.00383	0.18	0.398
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	70.9	1.58	71.3	768	0.39	0.00419	0.201	0.418
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	73.5	1.58	74	813	0.406	0.00431	0.205	0.425
Vertua Clásico - 25 - 28 días	54.7	1.58	55	513	0.267	0.00293	0.146	0.381
Vertua Materiales Reciclados - 025 - 28 días	50.8	1.58	51	487	0.244	0.0026	0.128	0.368



c) Waste/output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	HLRW	ILLRW	MR	MER
Unit	kg	kg	kg	kg	kg	kg
Aparentia - 150 - 28 días	3.37	83	0.000182	0.000559	0.0293	7.13E-05
Acelerado - 200 - 3 días	2.94	70.4	0.00017	0.000578	0.0341	5.95E-05
Acelerado - 250 - 3 días	3.09	74.4	0.000179	0.000616	0.0366	6.27E-05
Acelerado - 250 - 80% a 1 día	3.37	81.3	0.000196	0.000682	0.0407	6.86E-05
Acelerado - 300 - 3 días	3.26	78.8	0.00019	0.000657	0.0391	6.61E-05
Acelerado - 350 - 3 días	3.52	85.5	0.000205	0.000721	0.0432	7.16E-05
Alta resistencia - 450 - 28 días	3.53	85.7	0.000206	0.000722	0.0432	7.17E-05
Antibacteriano - 200 - 28 días	2.47	58.9	0.000143	0.000462	0.0266	4.94E-05
Antideslave - 350 - 28 días	3.95	94.9	0.000221	0.000751	0.0437	0.00011
Antihongo antialga - 250 - 28 días	2.89	69.9	0.000163	0.000525	0.0295	5.97E-05
Antitermita - 250 - 28 días	2.47	58.9	0.000143	0.000462	0.0266	4.94E-05
Autocompactable - 250 - 28 días	3.21	78	0.000184	0.000612	0.0352	6.57E-05
Baja contracción - MR 40 - 28 días	2.92	70.2	0.000169	0.000573	0.0339	5.94E-05
Baja contracción - MR 42 - 28 días	3	72.2	0.000173	0.000587	0.0345	6.10E-05
Baja contracción - MR 45 - 28 días	3.01	72.3	0.000175	0.000601	0.0358	6.12E-05
Contracción compensada - MR 42 - 28 días	3.24	77.6	0.000181	0.000612	0.0359	1.00E-04
Convencional - 100 - 28 días	2.08	49.2	0.00012	0.000371	0.0209	4.16E-05
Convencional - 150 - 28 días	2.3	54.6	0.000133	0.000421	0.0241	4.61E-05
Convencional - 200 - 14 días	2.6	62.3	0.00015	0.000494	0.0287	5.25E-05
Convencional - 200 - 28 días	2.47	58.9	0.000143	0.000462	0.0267	4.98E-05
Convencional - 200 - 7 días	2.73	65.7	0.000159	0.000525	0.0305	5.50E-05
Convencional - 250 - 14 días	2.76	66.4	0.00016	0.000531	0.0309	5.56E-05
Convencional - 250 - 28 días	2.6	62.2	0.00015	0.000493	0.0286	5.26E-05
Convencional - 250 - 7 días	2.8	67.3	0.000162	0.000541	0.0316	5.68E-05
Convencional - 300 - 28 días	2.79	67	0.000162	0.000538	0.0313	5.62E-05



Convencional - 300 - 7 días	2.96	71.3	0.000171	0.000578	0.0339	5.98E-05
Duramax - 300 - 28 días	4.2	94.4	0.000197	0.000664	0.0404	0.000114
Duramax Autosellante - 250 - 28 días	3.35	81.9	0.000187	0.000614	0.0346	6.96E-05
Duramax Autosellante - 300 - 28 días	3.73	91.1	0.000207	0.000693	0.0394	7.87E-05
Estructural - 250 - 28 días	2.65	63.6	0.000153	0.000506	0.0295	5.36E-05
Estructural - 250 - 7 días	2.89	69.7	0.000168	0.000562	0.0329	5.84E-05
Estructural - 300 - 28 días	2.81	67.6	0.000163	0.000543	0.0317	5.67E-05
Estructural - 350 - 14 días	3.17	76.7	0.000184	0.000628	0.037	6.42E-05
Estructural - 350 - 28 días	3.01	72.6	0.000174	0.00059	0.0346	6.08E-05
Grout premezclado - 350 - 28 días	5.43	130	0.000305	0.00105	0.0609	0.000191
Hidratium - 200 - 28 días	2.53	60.5	0.000145	0.000467	0.0267	5.16E-05
Hidratium - 250 - 28 días	2.64	63.2	0.000151	0.000492	0.0284	5.39E-05
Impercem - 200 - 28 días	2.9	70.3	0.000161	0.000507	0.0279	6.07E-05
Lanzado - 200 - 28 días	3.08	74.3	0.000181	0.000597	0.0343	6.12E-05
Lanzado - 250 - 28 días	3.42	82.8	0.000201	0.000677	0.0394	6.89E-05
Ligero - 150 - 28 días	4.15	102	0.000251	0.000886	0.0525	8.10E-05
Materiales Recicladados Llanta - 200 - 28 días	2.53	60.3	0.000146	0.000471	0.0271	5.09E-05
Materiales Recicladados Pet - 200 - 28 días	2.52	60.2	0.000146	0.000471	0.0271	5.06E-05
Materiales Recicladados Plástico de difícil reciclado - 200 - 28 días	2.59	61.5	0.000148	0.000477	0.0274	5.31E-05
Mortero - 50 - 28 días	2.14	52.1	0.000132	0.000395	0.0212	3.91E-05
Mortero estabilizado - 125 - 28 días	2.96	73.2	0.000173	0.000537	0.0288	5.80E-05
Mortero estabilizado - 50 - 28 días	2.09	50.7	0.000129	0.000384	0.0206	3.80E-05
Pavicrete - MR 38 - 28 días	2.79	67	0.000162	0.000548	0.0325	5.64E-05
Pavicrete - MR 40 - 28 días	2.87	69.1	0.000167	0.000562	0.0331	5.82E-05
Pavicrete - MR 45 - 28 días	2.88	69.2	0.000165	0.000571	0.0343	5.92E-05
Pervia - MR 36 - 28 días	3.68	89.8	0.00019	0.000665	0.0388	8.31E-05
Pesado - 300 - 28 días	5.06	114	0.000269	0.000832	0.0462	0.00012
Reducrack - 200 - 28 días	2.47	58.9	0.000143	0.000462	0.0266	4.94E-05
Reducrack - 250 - 28 días	2.57	61.6	0.000149	0.000487	0.0282	5.17E-05



Reducrack - MR 42 - 28 días	2.79	67	0.000161	0.000549	0.0327	5.70E-05
Reducrack Sin malla - 200 - 28 días	2.35	55.7	0.000138	0.00045	0.0264	4.74E-05
Relleno fluido - 100 - 28 días	2.43	59.1	0.000152	0.000499	0.0289	4.46E-05
Relleno fluido - 25 - 28 días	1.88	45.8	0.000119	0.00036	0.02	3.35E-05
Revenimiento total - 150 - 28 días	2.28	54.6	0.000131	0.000416	0.0238	4.59E-05
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	2.6	62.4	0.000151	0.000492	0.0284	5.22E-05
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	2.66	64.1	0.000154	0.000508	0.0296	5.40E-05
Vertua Clásico - 25 - 28 días	1.99	48.3	0.000125	0.000383	0.0213	3.55E-05
Vertua Materiales Reciclados - 025 - 28 días	1.77	43.7	0.000111	0.000347	0.0197	3.19E-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 11: 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-PD-193 Tezoyuca	72,922	2.596	189,305.51	6.17

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 12: **Simplified CO₂**

NEW ID	Net (kgCO₂/m³)	Gross (kgCO₂/m³)
Acelerado - 200 - 3 días	230	255
Acelerado - 250 - 3 días	251	278
Acelerado - 250 - 80% a 1 día	286	316
Acelerado - 300 - 3 días	271	300
Acelerado - 350 - 3 días	306	339
Alta resistencia - 450 - 28 días	306	338
Antibacteriano - 200 - 28 días	165	183
Antideslave - 350 - 28 días	295	327
Antihongo antialga - 250 - 28 días	183	202
Antitermita - 250 - 28 días	165	183
Aparentia - 150 - 28 días	164	181
Autocompactable - 250 - 28 días	232	257
Baja contracción - MR 40 - 28 días	229	253
Baja contracción - MR 42 - 28 días	232	257
Baja contracción - MR 45 - 28 días	246	272
Contracción compensada - MR 42 - 28 días	239	264
Convencional - 100 - 28 días	119	132
Convencional - 150 - 28 días	145	160
Convencional - 200 - 14 días	184	204
Convencional - 200 - 28 días	167	185
Convencional - 200 - 7 días	198	219
Convencional - 250 - 14 días	202	223
Convencional - 250 - 28 días	183	202
Convencional - 250 - 7 días	209	231
Convencional - 300 - 28 días	205	227
Convencional - 300 - 7 días	226	250
Duramax - 300 - 28 días	246	272
Duramax Autosellante - 250 - 28 días	222	245
Duramax Autosellante - 300 - 28 días	260	288
Estructural - 250 - 28 días	191	211
Estructural - 250 - 7 días	219	242
Estructural - 300 - 28 días	208	230
Estructural - 350 - 14 días	254	280
Estructural - 350 - 28 días	233	257
Grout premezclado - 350 - 28 días	422	467
Hidratium - 200 - 28 días	165	183



Hidratium - 250 - 28 días	179	198
Impercem - 200 - 28 días	165	183
Lanzado - 200 - 28 días	225	249
Lanzado - 250 - 28 días	267	295
Ligero - 150 - 28 días	383	424
Materiales Reciclados Llanta - 200 - 28 días	169	187
Materiales Reciclados Pet - 200 - 28 días	169	187
Materiales Reciclados Plástico de difícil reciclado - 200 - 28 días	169	187
Mortero - 50 - 28 días	117	130
Mortero estabilizado - 125 - 28 días	171	189
Mortero estabilizado - 50 - 28 días	113	125
Especificación Cliente -250 -28 días	193	214
Pavicrete - MR 38 - 28 días	218	241
Pavicrete - MR 40 - 28 días	222	245
Pavicrete - MR 45 - 28 días	236	261
Pervia - MR 36 - 28 días	264	292
Pesado - 300 - 28 días	260	288
Reducrack - 200 - 28 días	165	183
Reducrack - 250 - 28 días	179	198
Reducrack - MR 42 - 28 días	222	245
Reducrack Sin malla - 200 - 28 días	168	186
Relleno fluido - 100 - 28 días	190	210
Relleno fluido - 25 - 28 días	115	127
Revenimiento total - 150 - 28 días	143	158
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	181	200
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	191	211
Vertua Clásico - 25 - 28 días	124	138
Vertua Materiales Reciclados - 025 - 28 días	118	131

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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



- ASTM C595 Standard Specification for Blended Hydraulic Cements // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements-Specifications and Test Methods
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- ASTM C979/C979M Standard Specification for Pigments for Integrally Colored Concrete // NMX-C-313-1981 Construction Industry - Cement Portland - Color of mortars and concrete
- ASTM C989/C989M Standard Specification for Slag Cement for Use in Concrete and Mortars
- ASTM C1017/C1017M Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete // NMX-C-255-ONNCCE-2006 Construction Industry - Concrete Chemical Admixtures - Specifications, sampling and test methods
- ASTM C1116/C1116M Standard Specification for Fiber-Reinforced Concrete
- ASTM C1157/C1157M Standard Performance Specification for Hydraulic Cement // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements - Specifications and Test Methods
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- ASTM G109 Standard Test Method for Determining Effects of Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments
- ASTM C330/C330M Standard Specification for Lightweight Aggregates for Structural Concrete // NMX-C-299-ONNCCE-2010 Construction Industry - Structural Hydraulic Concrete - Lightweight aggregates-specifications and test methods
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ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)
- 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

