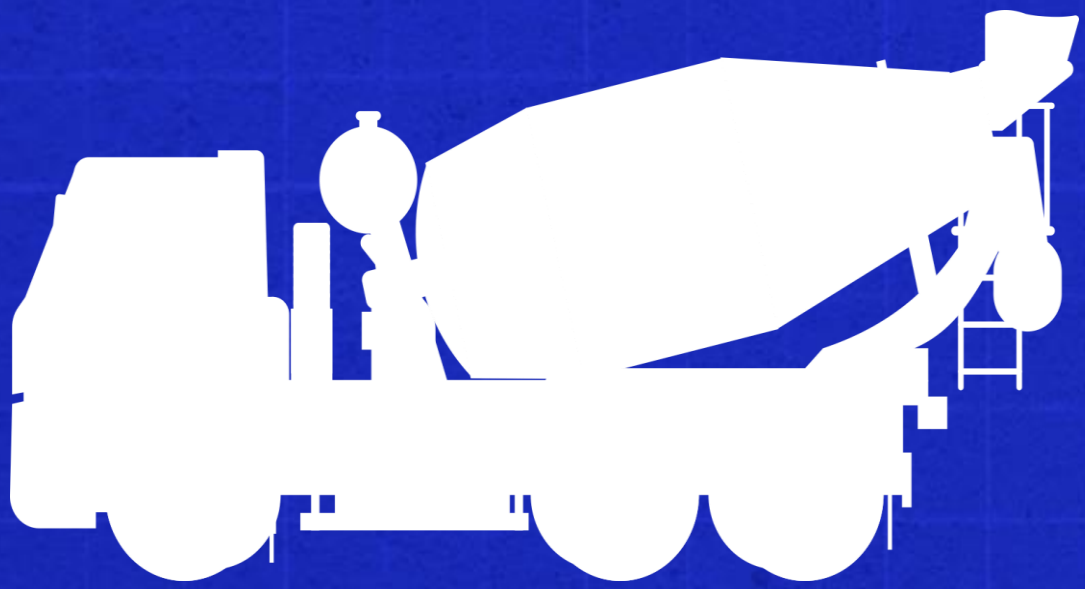
CEMEX

ENVIRONMENTAL PRODUCT DECLARATION



Environmental Product Declaration for ready mix concrete products produced by CEMEX México at their MX-PD-510 CD. VICTORIA facility in Tamaulipas, 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. 444 av. Constitución Pte, Col. Centro Monterrey, Nuevo León. www.cemexmexico.com Arturo Gaytan Covarrubias. arturo.gaytanc@cemex.com Maria Paulette Chambers Rubio mariapaulette.chambers@cemex.com
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.csaregistries.ca)
Date of Issue:	30 September 2024
Period of Validity:	5 years; valid until 30 September 2029
EPD Number:	32059f8a-9d6f-4044-9dbc-7c5728c7773d

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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 60 concrete mixes manufactured at the CEMEX MX-PD-510 CD. VICTORIA concrete facility at Avenida Lazaro Cardenas 495, Fraccionamiento Industrial Mexico, Cd. Victoria, Tamaulipas, 87010, 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	Acelerado - 150 - 30 kg a 12 horas	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	12 hrs	0.87	Plus
19	Convencional - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	0.99	Clásico
20	Convencional - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.81	Clásico
38	Mortero estabilizado - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.85	Clásico
46	Relleno fluido - 85 - 28 días	8.34 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	8.34	28	0.93	Plus
48	Trabajabilidad extendida - 100 - 28 días, trab ext 3 horas	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	1.00	Clásico
49	Trabajabilidad extendida - 100 - 28 días, trab ext 5 horas	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	1.02	Clásico

50	Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.86	Clásico
51	Trabajabilidad extendida - 150 - 28 días, trab ext 5 horas	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.88	Clásico

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
2	Acelerado - 200 - 30 kg a 12 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	12 hrs	0.76	Plus
21	Convencional - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.74	Clásico
22	Convencional - 200 - 7 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	7	0.66	Clásico
31	Impercem - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.78	Clásico
37	Mortero - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.69	Clásico
45	Reducrack Sin malla - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.77	Clásico
52	Trabajabilidad extendida - 200 - 28 días,	19.61 MPa 28d strength	Ready Mix Concrete	19.61	28	0.76	Clásico

	trab ext 3 horas	Ready Mix Concrete					
53	Trabajabilidad extendida - 200 - 28 días, trab ext 5 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.77	Clásico
60	Vertua Materiales Reciclados - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.76	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	H2O to cement ratio	Level of vertua lower carbon
3	Acelerado - 250 - 2 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	2	0.45	Clásico
4	Acelerado - 250 - 3 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.51	Clásico
5	Acelerado - 250 - 3 días, trab ext 5 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.53	Clásico
10	Antibacteriano - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico
12	Antihongo antialga - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico
13	Antitermita - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico

14	Aparentia - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.65	Clásico
15	Autocompactable - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.51	Clásico
17	Baja contracción - 250 - 3 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.52	Clásico
23	Convencional - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.65	Clásico
24	Convencional - 250 - 7 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.58	Clásico
26	Duramax - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	Clásico
27	Duramax Autosellante - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	
30	Hidratium - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.62	Plus
32	Lanzado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.47	Clásico
34	Materiales Reciclados Llanta - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico

35	Materiales Reciclados Pet - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico
36	Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico
42	Pervia - MR 36 - 28 días	22.06 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	22.06	28	0.29	
47	Revenimiento total - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.68	Clásico
54	Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.68	Clásico
55	Trabajabilidad extendida - 250 - 28 días, trab ext 5 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.68	Clásico
56	Trabajabilidad extendida - 250 - 7 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.61	Clásico
57	Trabajabilidad extendida - 250 - 7 días, trab ext 5 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.59	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	H2O to cement ratio	Level of vertua lower carbon
6	Acelerado - 300 - 3 días, trab ext 3 horas	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.2	3	0.48	Clásico
25	Convencional - 280 - 28 días	27.46 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.46	28	0.61	Clásico
33	Ligero - 280 - 28 días	27.46 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.46	28	0.28	
43	Pesado - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.43	Clásico
44	Reducrack - 300 - 1 día	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	1	0.37	Clásico
58	Trabajabilidad extendida - 300 - 28 días, trab ext 5 horas	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.55	Clásico

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	H2O to cement ratio	Level of vertua lower carbon
7	Acelerado - 350 - 3 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	3	0.45	Clásico

11	Antideslave - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.40	Clásico
18	Contracción compensada - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.64	Clásico
28	Estructural - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.51	Clásico
29	Grout premezclado - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.42	
39	Pavicrete - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.54	Plus
40	Pavicrete - MR 42 - 28 días, trab ext 5 horas	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.56	Plus
41	Pavicrete - MR 42 - 7 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	7	0.54	Plus
59	Trabajabilidad extendida - 350 - 28 días, trab ext 3 horas	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.52	Clásico

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	Compressive strength MPa	Day compressive strength	H2O to cement ratio	Level of vertua lower carbon
8	Acelerado - 400 - 3 días	39.23 MPa 28d strength	Ready Mix Concrete	39.23	3	0.39	Clásico

		Ready Mix Concrete					
9	Alta resistencia - 400 - 3 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	3	0.39	Clásico
16	Autocompactable - 400 - 28 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	28	0.46	Plus

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.

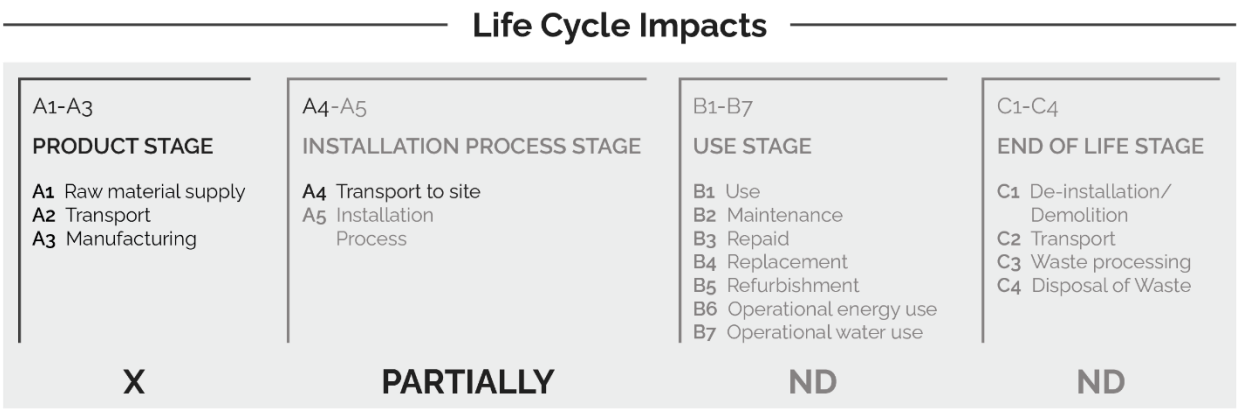

Figure 1: **General life cycle phases for consideration in a construction works system**

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.

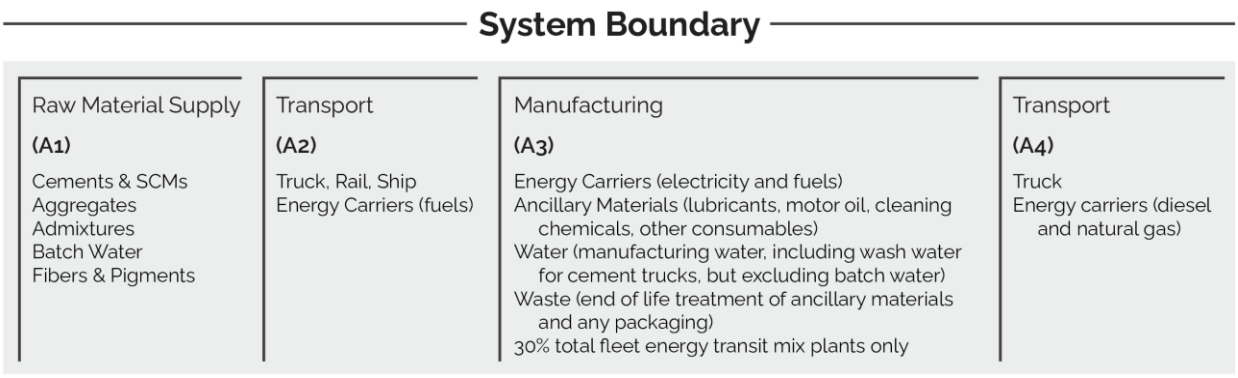

Figure 2: **General system inputs considered in the product system and categorized by modules in scope**

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-510 CD. VICTORIA 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 appropriate ecoinvent 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	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Pumice Gravel	pumice quarry operation/pumice/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Hidalgo	2024	2	3	1	3	3
Silica Sand	silica sand production/silica sand/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Mendoza	2024	2	3	1	3	3
Barite Gravel	basalt quarry operation/basalt/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Nuevo León	2024	2	3	1	3	3
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Tamaulipas	2024	2	3	1	3	3
Limestone gravel	limestone quarry operation/limestone, unprocessed/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Tamaulipas	2024	2	3	1	3	3
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 CPC 40	Progam Operator: Labeling Sustainability	San Luis Potosí	28 March 2023	3	3	3	3	3

		- EPD ID: 39ed7aa3-1369-45bc-a718-0b1088645fe3							
Ash	Waste input produced off-site	See A3 inputs	Coahuila	See A3 inputs	2	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 9: **Life cycle impact categories and life cycle inventory metrics**

ID	LCIA.indicators	Abbreviations	Units
1	Climate change: global warming potential (GWP100)	GWP100	kg CO2-eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO2-eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O3-eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPfossil	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
21	inventory indicators ISO21930: exported energy - electricity	EEel	MJ
22	inventory indicators ISO21930: exported energy - heat	EEheat	MJ

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	GWP100	ODP	AP	EP	SFP	ADPfossil
Unit	**kg CO2-eq**	**kg CFC-11-eq**	**kg SO2-eq**	**kg N-eq**	**kg O3-eq**	**MJ**
Acelerado - 150 - 30 kg a 12 horas	205	1.66e-06	0.271	0.144	5.5	1340
Acelerado - 200 - 30 kg a 12 horas	227	1.86e-06	0.294	0.159	5.92	1510
Acelerado - 250 - 2 días	378	2.91e-06	0.403	0.246	7.62	2330
Acelerado - 250 - 3 días	318	2.53e-06	0.363	0.229	6.99	2020
Acelerado - 250 - 3 días, trab ext 5 horas	334	2.65e-06	0.373	0.256	7.12	2100
Acelerado - 300 - 3 días, trab ext 3 horas	366	2.76e-06	0.389	0.213	7.42	2230
Acelerado - 350 - 3 días	397	3.06e-06	0.419	0.268	7.9	2450
Acelerado - 400 - 3 días	450	3.42e-06	0.455	0.293	8.46	2730
Alta resistencia - 400 - 3 días	450	3.42e-06	0.455	0.293	8.46	2730
Antibacteriano - 250 - 28 días	280	2.2e-06	0.33	0.163	6.51	1800
Antideslave - 350 - 28 días	391	3.18e-06	0.425	0.299	7.94	2540
Antihongo antialga - 250 - 28 días	285	2.39e-06	0.348	0.241	6.75	1910
Antitermita - 250 - 28 días	280	2.2e-06	0.33	0.163	6.51	1800
Aparentia - 250 - 28 días	324	4.53e-06	0.542	1.14	9.39	3080
Autocompactable - 250 - 28 días	347	2.63e-06	0.369	0.236	6.97	2090
Autocompactable - 400 - 28 días	386	3.04e-06	0.414	0.302	7.75	2400
Baja contracción - 250 - 3 días	339	2.63e-06	0.378	0.195	7.32	2150

Contracción compensada - MR 42 - 28 días	298	2.35e-06	0.39	0.18	7.61	1920
Convencional - 100 - 28 días	173	1.5e-06	0.258	0.136	5.36	1220
Convencional - 150 - 28 días	191	1.64e-06	0.282	0.136	5.87	1350
Convencional - 200 - 28 días	223	1.86e-06	0.295	0.169	5.93	1500
Convencional - 200 - 7 días	261	2.08e-06	0.314	0.191	6.18	1670
Convencional - 250 - 28 días	251	2.05e-06	0.314	0.186	6.24	1650
Convencional - 250 - 7 días	282	2.27e-06	0.337	0.206	6.59	1830
Convencional - 280 - 28 días	280	2.25e-06	0.334	0.204	6.53	1810
Duramax - 250 - 28 días	323	2.54e-06	0.364	0.227	7	2030
Duramax Autosellante - 250 - 28 días	373	3.25e-06	0.432	0.409	8.01	2510
Estructural - 350 - 28 días	328	2.56e-06	0.366	0.219	7.04	2060
Grout premezclado - 350 - 28 días	566	4.15e-06	0.517	0.384	9.05	3270
Hidratium - 250 - 28 días	218	1.85e-06	0.299	0.154	6.03	1510
Impercem - 200 - 28 días	235	1.93e-06	0.299	0.185	5.91	1540
Lanzado - 250 - 28 días	330	2.77e-06	0.383	0.288	7.26	2190
Ligero - 280 - 28 días	497	4.02e-06	0.492	0.339	8.82	3250
Materiales Reciclados Llanta - 250 - 28 días	281	2.21e-06	0.331	0.163	6.53	1800
Materiales Reciclados Pet - 250 - 28 días	281	2.21e-06	0.331	0.163	6.53	1810
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	283	2.24e-06	0.336	0.165	6.61	1830
Mortero - 200 - 28 días	261	1.84e-06	0.282	0.153	5.52	1460
Mortero estabilizado - 150 - 28 días	236	1.78e-06	0.263	0.191	5.08	1380
Pavicrete - MR 42 - 28 días	291	2.24e-06	0.34	0.165	6.72	1830
Pavicrete - MR 42 - 28 días, trab ext 5 horas	295	2.4e-06	0.354	0.219	6.91	1920
Pavicrete - MR 42 - 7 días	315	2.42e-06	0.357	0.176	6.98	1970
Pervia - MR 36 - 28 días	426	3.47e-06	0.453	0.314	8.37	2780
Pesado - 300 - 28 días	372	3.19e-06	0.47	0.306	9.17	2590
Reducrack - 300 - 1 día	466	3.48e-06	0.462	0.283	8.56	2790
Reducrack Sin malla - 200 - 28 días	236	1.84e-06	0.292	0.14	5.82	1500

Relleno fluido - 85 - 28 días	189	1.37e-06	0.222	0.123	4.45	1080
Revenimiento total - 250 - 28 días	279	2.21e-06	0.327	0.188	6.4	1780
Trabajabilidad extendida - 100 - 28 días, trab ext 3 horas	179	1.5e-06	0.261	0.12	5.43	1230
Trabajabilidad extendida - 100 - 28 días, trab ext 5 horas	184	1.59e-06	0.268	0.152	5.52	1290
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	205	1.68e-06	0.279	0.133	5.71	1370
Trabajabilidad extendida - 150 - 28 días, trab ext 5 horas	209	1.78e-06	0.287	0.17	5.82	1440
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	232	1.86e-06	0.297	0.147	6	1520
Trabajabilidad extendida - 200 - 28 días, trab ext 5 horas	236	1.97e-06	0.307	0.189	6.12	1580
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	264	2.08e-06	0.318	0.162	6.32	1690
Trabajabilidad extendida - 250 - 28 días, trab ext 5 horas	265	2.18e-06	0.328	0.209	6.45	1750
Trabajabilidad extendida - 250 - 7 días, trab ext 3 horas	295	2.29e-06	0.34	0.178	6.66	1860
Trabajabilidad extendida - 250 - 7 días, trab ext 5 horas	297	2.42e-06	0.352	0.231	6.83	1930
Trabajabilidad extendida - 300 - 28 días, trab ext 5 horas	328	2.51e-06	0.36	0.211	6.92	2020
Trabajabilidad extendida - 350 - 28 días, trab ext 3 horas	341	2.6e-06	0.372	0.201	7.15	2100
Vertua Materiales Reciclados - 200 - 28 días	237	1.93e-06	0.292	0.169	5.77	1560

b) Resource Inventory Metrics:

Indicator/LCI Metric	**RPRE**	**PRM**	**NRPRE**	**NRPRM**	**SM**	**RSF**	**RE**	**FW**
Unit	**MJ**	**MJ**	**MJ**	**kg**	**MJ**	**MJ**	**MJ**	**m3**
Acelerado - 150 - 30 kg a 12 horas	52.3	3.75	52.4	504	0.368	0.00442	0.182	0.377

Acelerado - 200 - 30 kg a 12 horas	56.4	3.75	56.5	552	0.417	0.00497	0.207	0.388
Acelerado - 250 - 2 días	84.3	3.75	84.6	978	0.588	0.00626	0.295	0.487
Acelerado - 250 - 3 días	73.7	3.75	73.9	815	0.522	0.00576	0.268	0.447
Acelerado - 250 - 3 días, trab ext 5 horas	77.1	3.75	77.3	877	0.523	0.00565	0.277	0.479
Acelerado - 300 - 3 días, trab ext 3 horas	81.4	3.75	81.7	939	0.566	0.00607	0.274	0.47
Acelerado - 350 - 3 días	88	3.75	88.3	1030	0.61	0.00644	0.311	0.51
Acelerado - 400 - 3 días	97.7	3.75	98.1	1190	0.665	0.00682	0.338	0.538
Alta resistencia - 400 - 3 días	97.7	3.75	98.1	1190	0.665	0.00682	0.338	0.538
Antibacteriano - 250 - 28 días	65.5	3.75	65.7	684	0.49	0.00561	0.234	0.425
Antideslave - 350 - 28 días	87.7	3.75	88	997	0.661	0.00709	0.35	0.545
Antihongo antialga - 250 - 28 días	68.3	3.75	68.4	717	0.51	0.0058	0.274	0.47
Antitermita - 250 - 28 días	65.5	3.75	65.7	684	0.49	0.00561	0.234	0.425
Aparentia - 250 - 28 días	96.9	3.75	96.7	1040	0.724	0.00783	0.725	0.962
Autocompactable - 250 - 28 días	79.1	3.75	79.3	921	0.503	0.0053	0.274	0.476
Autocompactable - 400 - 28 días	87	3.75	87.3	1030	0.583	0.0061	0.314	0.521
Baja contracción - 250 - 3 días	76.2	3.75	76.5	837	0.575	0.0064	0.276	0.456
Contracción compensada - MR 42 - 28 días	69.3	3.75	69.5	724	0.528	0.00628	0.273	0.469
Convencional - 100 - 28 días	46.5	3.75	46.5	399	0.359	0.00455	0.18	0.351
Convencional - 150 - 28 días	49.7	3.75	49.7	435	0.401	0.00509	0.196	0.35
Convencional - 200 - 28 días	56	3.75	56.1	543	0.417	0.00498	0.211	0.385
Convencional - 200 - 7 días	62.9	3.75	63.1	664	0.434	0.00494	0.222	0.416
Convencional - 250 - 28 días	61	3.75	61.2	621	0.447	0.00521	0.228	0.403
Convencional - 250 - 7 días	66.9	3.75	67.1	711	0.483	0.00547	0.247	0.425
Convencional - 280 - 28 días	66.4	3.75	66.6	704	0.478	0.00543	0.245	0.429

Duramax - 250 - 28 días	74.4	3.75	74.6	830	0.52	0.0057	0.266	0.447
Duramax Autosellante - 250 - 28 días	87.4	3.75	87.7	1000	0.623	0.00666	0.379	0.586
Estructural - 350 - 28 días	75.1	3.75	75.3	838	0.531	0.00582	0.267	0.453
Grout premezclado - 350 - 28 días	121	3.75	122	1560	0.729	0.00768	0.444	0.732
Hidratium - 250 - 28 días	54.9	3.75	55	502	0.446	0.00548	0.237	0.387
Impercem - 200 - 28 días	58.8	3.75	58.9	593	0.409	0.00479	0.23	0.423
Lanzado - 250 - 28 días	77	3.75	77.2	841	0.576	0.00635	0.316	0.509
Ligero - 280 - 28 días	107	3.75	107	1240	0.873	0.00905	0.45	0.815
Materiales Reciclados Llanta - 250 - 28 días	65.6	3.75	65.8	684	0.493	0.00566	0.235	0.426
Materiales Reciclados Pet - 250 - 28 días	65.6	3.75	65.8	684	0.494	0.00567	0.236	0.426
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	66	3.75	66.2	684	0.507	0.00583	0.242	0.43
Mortero - 200 - 28 días	62.2	3.75	62.4	715	0.326	0.00342	0.156	0.396
Mortero estabilizado - 150 - 28 días	59	3.75	59.1	662	0.305	0.00317	0.166	0.426
Pavicrete - MR 42 - 28 días	67.3	3.75	67.5	718	0.491	0.0056	0.232	0.401
Pavicrete - MR 42 - 28 días, trab ext 5 horas	69.4	3.75	69.6	741	0.511	0.00581	0.263	0.442
Pavicrete - MR 42 - 7 días	71.8	3.75	72	784	0.522	0.00586	0.248	0.429
Pervia - MR 36 - 28 días	93.9	3.75	94.2	1070	0.737	0.00788	0.386	0.495
Pesado - 300 - 28 días	88.4	3.75	88.5	879	0.727	0.00831	0.404	0.546
Reducrack - 300 - 1 día	100	3.75	101	1230	0.676	0.00688	0.336	0.531
Reducrack Sin malla - 200 - 28 días	57.9	3.75	58	583	0.403	0.00474	0.209	0.399
Relleno fluido - 85 - 28 días	49.3	3.75	49.4	518	0.246	0.00272	0.12	0.35

Revenimiento total - 250 - 28 días	65.9	3.75	66.1	700	0.47	0.00531	0.235	0.438
Trabajabilidad extendida - 100 - 28 días, trab ext 3 horas	47.2	3.75	47.2	411	0.364	0.0046	0.175	0.355
Trabajabilidad extendida - 100 - 28 días, trab ext 5 horas	48.8	3.75	48.8	432	0.374	0.00467	0.192	0.38
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	51.9	3.75	52	483	0.393	0.00482	0.189	0.371
Trabajabilidad extendida - 150 - 28 días, trab ext 5 horas	53.6	3.75	53.7	505	0.404	0.0049	0.209	0.399
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	57	3.75	57.1	560	0.423	0.00504	0.204	0.391
Trabajabilidad extendida - 200 - 28 días, trab ext 5 horas	58.6	3.75	58.7	581	0.434	0.00513	0.225	0.417
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	62.7	3.75	62.9	650	0.457	0.00527	0.22	0.413
Trabajabilidad extendida - 250 - 28 días, trab ext 5 horas	64.1	3.75	64.2	665	0.467	0.00537	0.244	0.437
Trabajabilidad extendida - 250 - 7 días, trab ext 3 horas	68.5	3.75	68.7	739	0.491	0.00553	0.237	0.431
Trabajabilidad extendida - 250 - 7 días, trab ext 5 horas	70.1	3.75	70.3	756	0.504	0.00566	0.265	0.456
Trabajabilidad extendida - 300 - 28 días, trab ext 5 horas	74.9	3.75	75.1	848	0.507	0.0055	0.252	0.457
Trabajabilidad extendida - 350 - 28 días, trab ext 3 horas	76.8	3.75	77.1	868	0.539	0.00588	0.261	0.456

Vertua Materiales Reciclados - 200 - 28 días	58.3	3.75	58.4	583	0.424	0.00491	0.213	0.4

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	**HWD**	**NHWD**	**HLRW**	**ILLRW**	**MR**	**MER**
Unit	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
Acelerado - 150 - 30 kg a 12 horas	1.9	46.2	8.72e-05	0.000293	0.0192	5.28e-05
Acelerado - 200 - 30 kg a 12 horas	2.13	51.1	9.75e-05	0.000326	0.0211	6.02e-05
Acelerado - 250 - 2 días	3.13	75.1	0.000152	0.000528	0.0329	8.58e-05
Acelerado - 250 - 3 días	2.79	67	0.000133	0.000454	0.0283	7.69e-05
Acelerado - 250 - 3 días, trab ext 5 horas	2.9	70.3	0.00014	0.000479	0.0296	7.83e-05
Acelerado - 300 - 3 días, trab ext 3 horas	2.95	70.7	0.000144	0.000502	0.0317	8.11e-05
Acelerado - 350 - 3 días	3.29	79.1	0.000161	0.000557	0.0345	8.98e-05
Acelerado - 400 - 3 días	3.61	86.8	0.000179	0.000626	0.0386	9.78e-05
Alta resistencia - 400 - 3 días	3.61	86.8	0.000179	0.000626	0.0386	9.78e-05
Antibacteriano - 250 - 28 días	2.45	58.2	0.000114	0.000389	0.0251	6.95e-05
Antideslave - 350 - 28 días	3.55	84.5	0.000168	0.000567	0.0345	9.91e-05
Antihongo antialga - 250 - 28 días	2.75	66.1	0.000127	0.000422	0.0261	7.67e-05
Antitermita - 250 - 28 días	2.45	58.2	0.000114	0.000389	0.0251	6.95e-05
Aparentia - 250 - 28 días	6.14	153	0.00027	0.000776	0.0355	0.000158
Autocompactable - 250 - 28 días	2.83	69.3	0.000139	0.000487	0.0303	7.57e-05
Autocompactable - 400 - 28 días	3.3	80	0.000161	0.000554	0.0338	8.82e-05
Baja contracción - 250 - 3 días	2.89	68.3	0.000137	0.000469	0.0298	8.2e-05
Contracción compensada - MR 42 - 28 días	2.67	62.8	0.000123	0.000416	0.0289	0.000102
Convencional - 100 - 28 días	1.81	43.2	7.91e-05	0.000256	0.0169	5.18e-05
Convencional - 150 - 28 días	1.97	46.2	8.61e-05	0.000279	0.0184	5.72e-05
Convencional - 200 - 28 días	2.15	51.5	9.79e-05	0.000325	0.0209	6.07e-05
Convencional - 200 - 7 días	2.32	56.4	0.00011	0.000373	0.0237	6.37e-05
Convencional - 250 - 28 días	2.34	56	0.000108	0.000362	0.023	6.54e-05

Convencional - 250 - 7 días	2.55	61.2	0.00012	0.000405	0.0255	7.08e-05
Convencional - 280 - 28 días	2.53	60.8	0.000119	0.000401	0.0253	7.02e-05
Duramax - 250 - 28 días	2.79	66.9	0.000133	0.000457	0.0286	7.64e-05
Duramax Autosellante - 250 - 28 días	3.73	90.5	0.000176	0.00058	0.0338	0.000101
Estructural - 350 - 28 días	2.81	67.3	0.000134	0.000462	0.029	7.74e-05
Grout premezclado - 350 - 28 días	4.33	106	0.000219	0.000783	0.0474	0.000188
Hidratium - 250 - 28 días	2.24	52.8	9.88e-05	0.000321	0.0206	6.59e-05
Impercem - 200 - 28 días	2.24	54.6	0.000103	0.000346	0.0219	6.21e-05
Lanzado - 250 - 28 días	3.16	75.7	0.000148	0.000491	0.0298	8.78e-05
Ligero - 280 - 28 días	4.49	104	0.000214	0.000717	0.0431	0.000129
Materiales Reciclados Llanta - 250 - 28 días	2.46	58.5	0.000115	0.00039	0.0252	6.99e-05
Materiales Reciclados Pet - 250 - 28 días	2.46	58.5	0.000115	0.000391	0.0252	7.01e-05
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	2.51	59.5	0.000117	0.000395	0.0254	7.19e-05
Mortero - 200 - 28 días	1.86	47.6	9.54e-05	0.000349	0.0229	4.61e-05
Mortero estabilizado - 150 - 28 días	1.87	48.7	9.43e-05	0.000335	0.0213	4.61e-05
Pavicrete - MR 42 - 28 días	2.47	58.5	0.000116	4e-04	0.0259	6.93e-05
Pavicrete - MR 42 - 28 días, trab ext 5 horas	2.7	64.5	0.000126	0.000425	0.0266	7.53e-05
Pavicrete - MR 42 - 7 días	2.64	62.6	0.000125	0.000433	0.0278	7.39e-05
Pervia - MR 36 - 28 días	3.88	90.5	0.000183	0.000615	0.0373	0.00011
Pesado - 300 - 28 días	4.02	92.7	0.000195	0.000605	0.035	0.00011
Reducrack - 300 - 1 día	3.64	87.3	0.000181	0.00064	0.0397	9.85e-05
Reducrack Sin malla - 200 - 28 días	2.09	50.6	9.7e-05	0.000331	0.0216	5.86e-05
Relleno fluido - 85 - 28 días	1.42	37.2	7.14e-05	0.000258	0.0174	3.5e-05
Revenimiento total - 250 - 28 días	2.45	59.2	0.000116	0.000394	0.0251	6.81e-05
Trabajabilidad extendida - 100 - 28 días, trab ext 3 horas	1.79	42.6	7.87e-05	0.000258	0.0173	5.15e-05
Trabajabilidad extendida - 100 - 28 días, trab ext 5 horas	1.92	46.1	8.46e-05	0.000274	0.0178	5.46e-05
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	1.95	46.6	8.77e-05	0.000291	0.0193	5.57e-05

Trabajabilidad extendida - 150 - 28 días, trab ext 5 horas	2.1	50.5	9.45e-05	0.00031	0.0199	5.93e-05
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	2.12	50.7	9.74e-05	0.000328	0.0214	6.02e-05
Trabajabilidad extendida - 200 - 28 días, trab ext 5 horas	2.29	55	0.000104	0.000346	0.022	6.4e-05
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	2.32	55.5	0.000108	0.000369	0.0238	6.51e-05
Trabajabilidad extendida - 250 - 28 días, trab ext 5 horas	2.49	59.9	0.000116	0.000386	0.0243	6.92e-05
Trabajabilidad extendida - 250 - 7 días, trab ext 3 horas	2.51	60.2	0.000119	0.00041	0.0263	7.01e-05
Trabajabilidad extendida - 250 - 7 días, trab ext 5 horas	2.72	65.4	0.000128	0.000431	0.0268	7.5e-05
Trabajabilidad extendida - 300 - 28 días, trab ext 5 horas	2.7	65.4	0.000131	0.000456	0.0288	7.36e-05
Trabajabilidad extendida - 350 - 28 días, trab ext 3 horas	2.8	67	0.000135	0.000469	0.0298	7.72e-05
Vertua Materiales Reciclados - 200 - 28 días	2.19	52.9	0.000101	0.00034	0.0218	6.16e-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 kgCO2 / LITER	Total kg CO2 eq (A4)	Total kg CO2 eq/m³ (A4)
MX-PD-510 CD. VICTORIA	85,231	2.596	221,259.68	10.88

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 ($kgCO_2/m^3$)	Gross ($kgCO_2/m^3$)
Acelerado - 150 - 30 kg a 12 horas	124	133
Acelerado - 200 - 30 kg a 12 horas	135	145
Acelerado - 250 - 2 días	241	259
Acelerado - 250 - 3 días	199	213
Acelerado - 250 - 3 días, trab ext 5 horas	212	227
Acelerado - 300 - 3 días, trab ext 3 horas	234	251
Acelerado - 350 - 3 días	254	272
Acelerado - 400 - 3 días	292	313
Alta resistencia - 400 - 3 días	292	313
Antibacteriano - 250 - 28 días	171	184
Antideslave - 350 - 28 días	241	259
Antihongo antialga - 250 - 28 días	171	184
Antitermita - 250 - 28 días	171	184
Aparentia - 250 - 28 días	157	169
Autocompactable - 250 - 28 días	226	242
Autocompactable - 400 - 28 días	247	265
Baja contracción - 250 - 3 días	209	225
Contracción compensada - MR 42 - 28 días	181	194
Convencional - 100 - 28 días	97	104
Convencional - 150 - 28 días	107	115
Convencional - 200 - 28 días	132	142
Convencional - 200 - 7 días	162	174
Convencional - 250 - 28 días	151	162
Convencional - 250 - 7 días	173	186
Convencional - 280 - 28 días	171	184
Duramax - 250 - 28 días	203	218
Duramax Autosellante - 250 - 28 días	228	245
Estructural - 350 - 28 días	206	221
Grout premezclado - 350 - 28 días	380	408

Hidratium - 250 - 28 días	124	133
Impercem - 200 - 28 días	143	154
Lanzado - 250 - 28 días	200	214
Ligero - 280 - 28 días	303	325
Materiales Reciclados Llanta - 250 - 28 días	171	184
Materiales Reciclados Pet - 250 - 28 días	171	184
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	171	184
Mortero - 200 - 28 días	178	191
Mortero estabilizado - 150 - 28 días	159	170
Pavicrete - MR 42 - 28 días	180	193
Pavicrete - MR 42 - 28 días, trab ext 5 horas	180	193
Pavicrete - MR 42 - 7 días	197	211
Pervia - MR 36 - 28 días	260	279
Pesado - 300 - 28 días	212	228
Reducrack - 300 - 1 día	304	327
Reducrack Sin malla - 200 - 28 días	146	157
Relleno fluido - 85 - 28 días	127	137
Revenimiento total - 250 - 28 días	172	185
Trabajabilidad extendida - 100 - 28 días, trab ext 3 horas	102	109
Trabajabilidad extendida - 100 - 28 días, trab ext 5 horas	104	112
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	120	129
Trabajabilidad extendida - 150 - 28 días, trab ext 5 horas	122	131
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	139	150
Trabajabilidad extendida - 200 - 28 días, trab ext 5 horas	140	150
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	162	174
Trabajabilidad extendida - 250 - 28 días, trab ext 5 horas	160	172
Trabajabilidad extendida - 250 - 7 días, trab ext 3 horas	184	197
Trabajabilidad extendida - 250 - 7 días, trab ext 5 horas	183	196
Trabajabilidad extendida - 300 - 28 días, trab ext 5 horas	209	225
Trabajabilidad extendida - 350 - 28 días, trab ext 3 horas	216	232
Vertua Materiales Reciclados - 200 - 28 días	143	153

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- ASTM C150/C150M Standard Specification for Portland Cement // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements - Specifications 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
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- 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