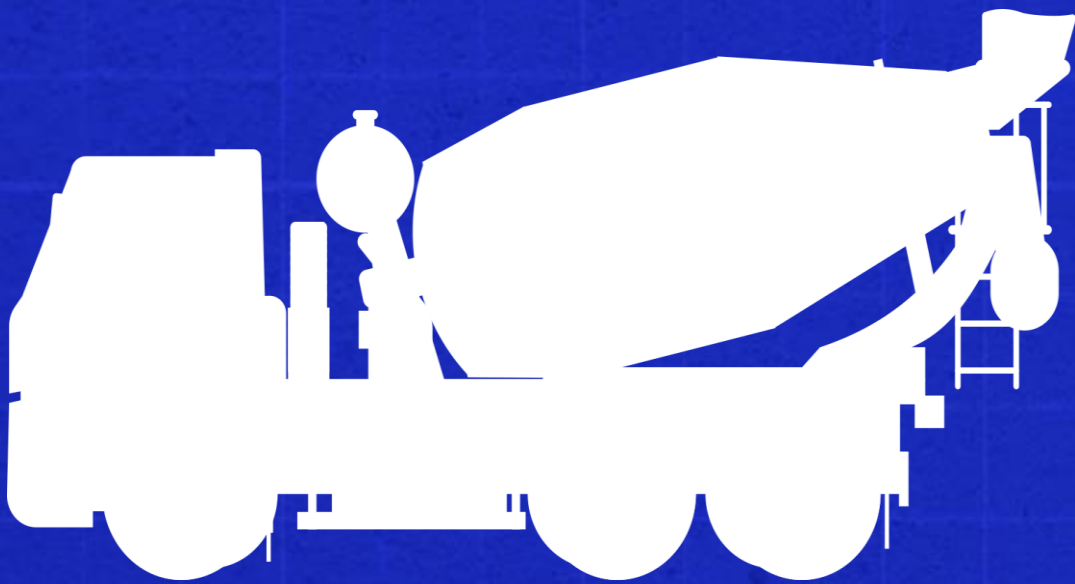




ENVIRONMENTAL PRODUCT DECLARATION



Environmental Product Declaration for ready mix concrete products produced by CEMEX México at their MX-PD0643 CELAYA facility in Guanajuato, 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:	30 September 2024
Period of Validity:	5 years; valid until 30 September 2029
EPD Number:	44bee29f-25f7-4f07-95ee-4facd6df1a9e



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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 63 concrete mixes manufactured at the CEMEX MX-PD0643 CELAYA concrete facility at Km. 3.6 Carretera San Jose, Rancho El Becerro, Celaya, 38020, 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	H ₂ O to cement ratio	Level of vertua lower carbon
16	Convencional - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	1.04	Clásico
17	Convencional - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.91	Clásico
38	Ligero - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.50	
42	Mortero - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.72	Clásico
43	Mortero estabilizado - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.72	Clásico
56	Relleno fluido - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	0.94	Clásico
57	Relleno fluido - 25 - 28 días	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.78	Plus

58	Relleno fluido - 50 - 28 días	4.90 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	4.91	28	1.19	Plus
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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
19	Convencional - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.74	Clásico
20	Convencional - 200 - 7 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	7	0.67	Clásico
36	Impercem - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.74	Clásico
52	Pervia - MR 30 - 28 días	15.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	15.32	28	0.33	
59	Revenimiento total - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.84	Clásico
62	Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.77	Clásico
64	Vertua Materiales Reciclados - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.80	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
1	Acelerado - 250 - 3 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.46	Clásico
5	Antibacteriano - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
7	Antihongo antialga - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
8	Antitermita - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
9	Aparentia - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.66	Clásico
11	Baja contracción - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.55	Clásico
21	Convencional - 250 - 14 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	14	0.66	Clásico
22	Convencional - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.72	Clásico
23	Convencional - 250 - 7 días	24.52 MPa 28d strength	Ready Mix Concrete	24.52	7	0.61	Clásico



		Ready Mix Concrete					
29	Duramax - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	Clásico
30	Duramax Autosellante - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.49	
31	Estructural - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.75	Clásico
37	Lanzado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.69	Clásico
39	Materiales Reciclados Llanta - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
40	Materiales Reciclados Pet - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
41	Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
44	Pavicrete - MR 38 - 28 días	24.58 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.58	28	0.71	Clásico
45	Pavicrete - MR 38 - 3 días	24.58 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.58	3	0.52	Clásico
54	Reducrack - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.78	Clásico



55	Reducrack Sin malla - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
60	Revenimiento total - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.69	Clásico
63	Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.72	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
2	Acelerado - 300 - 3 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	3	0.44	Clásico
12	Baja contracción - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.52	Clásico
24	Convencional - 280 - 28 días	27.46 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.46	28	0.68	Clásico
25	Convencional - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.66	Clásico
26	Convencional - 300 - 7 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	7	0.56	Clásico
32	Estructural - 300 - 28 días	29.42 MPa 28d strength	Ready Mix Concrete	29.42	28	0.64	Clásico



		Ready Mix Concrete					
33	Estructural - 300 - 7 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	7	0.55	Clásico
53	Pesado - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.47	
61	Revenimiento total - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.65	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
3	Acelerado - 350 - 3 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	3	0.41	Clásico
6	Antideslave - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.45	
10	Autocompactable - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.44	Clásico
13	Baja contracción - MR 42 - 14 días, trab ext 3 horas	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	14	0.52	Clásico
14	Baja contracción - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.55	Clásico



15	Contracción compensada - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.60	Clásico
27	Convencional - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.60	Clásico
28	Convencional - 350 - 7 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	7	0.47	Clásico
34	Estructural - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.58	Clásico
35	Grout premezclado - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.42	
46	Pavicrete - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.70	Plus
47	Pavicrete - MR 42 - 7 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	7	0.56	Clásico
48	Pavicrete - MR 45 - 14 días	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	14	0.61	Clásico
49	Pavicrete - MR 45 - 28 días, trab ext 3 horas	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	28	0.69	Plus
50	Pavicrete - MR 45 - 3 días	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	3	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
51	Pavicrete - MR 48 - 1 día	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	1	0.30	

Mix Designs: 41 to 45 MPa

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

Mix#	Unique name/ID	Short description	Product type	Compressive strength MPa	Day compressive strength	H2O to cement ratio	Level of vertua lower carbon
4	Alta resistencia - 450 - 28 días	44.13 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	44.13	28	0.39	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 8: 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.

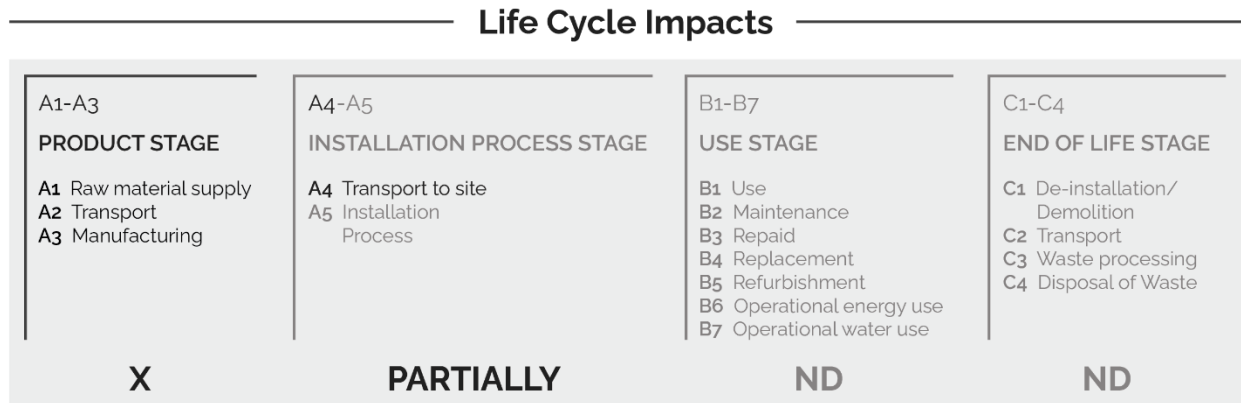


Figure 1: General life cycle phases for consideration in a construction works system

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.

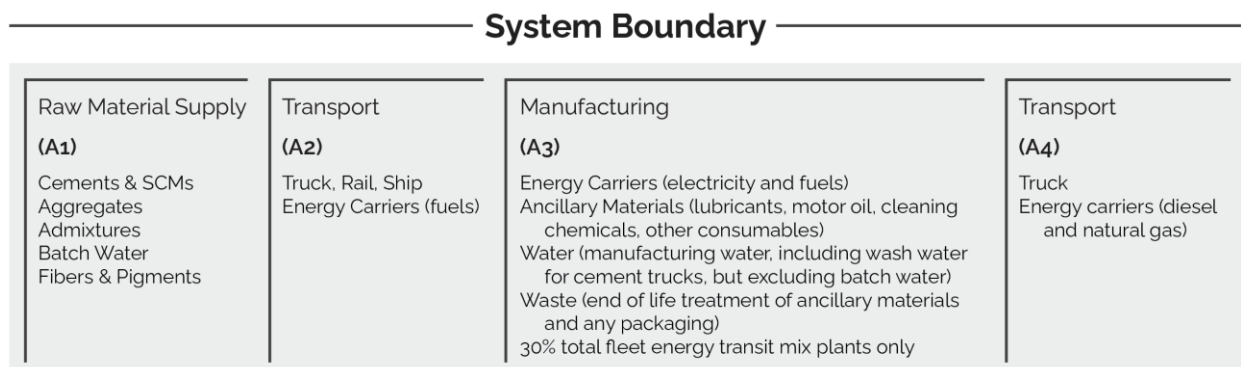


Figure 2: General system inputs considered in the product system and categorized by modules in scope

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-PD0643 CELAYA 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 9: 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
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
Basalt Sand	basalt quarry operation/basalt/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Guanajuato	2024	2	3	1	3	3
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Guanajuato	2024	2	3	1	3	3
Limestone Sand	limestone quarry operation/limestone,	ecoinvent v3.10 in 2024	Querétaro	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
Polystyrene perlite	polystyrene production, general purpose/polystyrene, general purpose/RoW/kg	ecoinvent v3.10 in 2024	Querétaro	2024	2	3	1	3	3
Fibre Metal	aluminium alloy production, Metallic Matrix Composite/aluminium alloy, metal matrix composite/RoW/kg	ecoinvent v3.10 in 2024	Edo. Méx.	2024	2	3	1	3	3
Cement	Gris CPC40	Progam Operator: Labeling Sustainability - EPD ID: c9067c84-e015-42a1-8c45-c389cb8fa0a4	Hidalgo	07 June 2023	3	3	3	3	3
Volcanic Sand	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Guanajuato	2024	2	3	1	3	3
Dehydrated Sand	Produced on-site (A3)	Original facility data	Guanajuato	4581204-11-22 to 4667310-12-22	2	3	1	3	3

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 10: 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	m ³
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	EE _{el}	MJ
22	inventory indicators ISO21930: exported energy - heat	EE _{heat}	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 11: **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	ADP _{fossil}
Unit	kg CO ₂ -eq	kg CFC-11-eq	kg SO ₂ -eq	kg N-eq	kg O ₃ -eq	MJ
Acelerado - 250 - 3 días	407	2.8e-06	0.428	0.276	8.34	2200
Acelerado - 300 - 3 días	431	2.95e-06	0.443	0.289	8.56	2320
Acelerado - 350 - 3 días	459	3.12e-06	0.46	0.305	8.82	2450
Alta resistencia - 450 - 28 días	473	3.23e-06	0.454	0.304	8.63	2520
Antibacteriano - 250 - 28 días	296	2.14e-06	0.34	0.205	6.88	1690
Antideslave - 350 - 28 días	419	3.03e-06	0.451	0.329	8.68	2360
Antihongo antialga - 250 - 28 días	301	2.34e-06	0.358	0.282	7.12	1800
Antitermita - 250 - 28 días	296	2.14e-06	0.34	0.205	6.88	1690
Aparentia - 250 - 28 días	355	3.77e-06	0.488	0.824	8.89	2610
Autocompactable - 350 - 28 días	435	3.25e-06	0.457	0.344	8.62	2520
Baja contracción - 250 - 28 días	318	2.32e-06	0.386	0.185	7.75	1890
Baja contracción - 300 - 28 días	339	2.55e-06	0.402	0.228	7.92	2050
Baja contracción - MR 42 - 14 días, trab ext 3 horas	345	2.48e-06	0.449	0.229	8.48	2060
Baja contracción - MR 42 - 28 días	318	2.35e-06	0.386	0.198	7.73	1900
Contracción compensada - MR 42 - 28 días	335	2.47e-06	0.449	0.236	8.89	1990
Convencional - 100 - 28 días	194	1.41e-06	0.25	0.14	5.2	1130
Convencional - 150 - 28 días	220	1.57e-06	0.267	0.154	5.45	1250
Convencional - 200 - 28 días	246	1.73e-06	0.284	0.167	5.71	1370
Convencional - 200 - 7 días	309	2.11e-06	0.356	0.186	7.25	1700
Convencional - 250 - 14 días	305	2.17e-06	0.362	0.218	7.35	1720



Convencional - 250 - 28 días	271	1.88e-06	0.299	0.181	5.93	1490
Convencional - 250 - 7 días	325	2.21e-06	0.368	0.193	7.45	1780
Convencional - 280 - 28 días	296	2.11e-06	0.357	0.213	7.26	1690
Convencional - 300 - 28 días	307	2.18e-06	0.363	0.219	7.36	1730
Convencional - 300 - 7 días	348	2.35e-06	0.382	0.203	7.66	1890
Convencional - 350 - 28 días	335	2.35e-06	0.381	0.235	7.62	1860
Convencional - 350 - 7 días	429	2.94e-06	0.441	0.289	8.47	2300
Duramax - 250 - 28 días	346	2.53e-06	0.401	0.204	7.92	2050
Duramax Autosellante - 250 - 28 días	353	2.85e-06	0.414	0.382	8.14	2150
Estructural - 250 - 28 días	285	2.02e-06	0.364	0.216	7.45	1620
Estructural - 300 - 28 días	331	2.32e-06	0.374	0.231	7.49	1840
Estructural - 300 - 7 días	377	2.51e-06	0.395	0.214	7.81	2010
Estructural - 350 - 28 días	362	2.51e-06	0.394	0.249	7.78	1980
Grout premezclado - 350 - 28 días	585	4.13e-06	0.516	0.39	9.28	3190
Impercem - 200 - 28 días	279	2.08e-06	0.352	0.233	7.13	1640
Lanzado - 250 - 28 días	334	2.59e-06	0.369	0.299	7.17	1990
Ligero - 150 - 28 días	397	2.72e-06	0.401	0.283	7.38	2310
Materiales Reciclados Llanta - 250 - 28 días	286	2.08e-06	0.335	0.199	6.85	1650
Materiales Reciclados Pet - 250 - 28 días	286	2.08e-06	0.335	0.199	6.85	1650
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	289	2.11e-06	0.34	0.201	6.95	1680
Mortero - 150 - 28 días	273	2.04e-06	0.276	0.194	5.49	1570
Mortero estabilizado - 150 - 28 días	276	2.15e-06	0.287	0.24	5.63	1630
Pavicrete - MR 38 - 28 días	296	2.04e-06	0.348	0.18	7.11	1640
Pavicrete - MR 38 - 3 días	402	2.66e-06	0.411	0.225	8.05	2120
Pavicrete - MR 42 - 28 días	297	2.04e-06	0.349	0.18	7.14	1650
Pavicrete - MR 42 - 7 días	342	2.36e-06	0.383	0.22	7.68	1880
Pavicrete - MR 45 - 14 días	354	2.4e-06	0.381	0.213	7.57	1910



Pavicrete - MR 45 - 28 días, trab ext 3 horas	302	2.11e-06	0.355	0.199	7.21	1690
Pavicrete - MR 45 - 3 días	413	2.8e-06	0.424	0.266	8.23	2210
Pavicrete - MR 48 - 1 día	555	3.65e-06	0.517	0.27	9.68	2920
Pervia - MR 30 - 28 días	377	2.64e-06	0.404	0.292	7.69	2050
Pesado - 300 - 28 días	392	3.01e-06	0.475	0.322	9.5	2390
Reducrack - 250 - 28 días	279	2e-06	0.344	0.197	7.03	1600
Reducrack Sin malla - 250 - 28 días	296	2.14e-06	0.34	0.205	6.88	1690
Relleno fluido - 100 - 28 días	238	1.78e-06	0.256	0.138	5.17	1410
Relleno fluido - 25 - 28 días	140	1.21e-06	0.199	0.0958	4.32	975
Relleno fluido - 50 - 28 días	187	1.49e-06	0.227	0.116	4.75	1190
Revenimiento total - 200 - 28 días	279	2e-06	0.338	0.201	6.9	1590
Revenimiento total - 250 - 28 días	332	2.43e-06	0.354	0.231	6.97	1900
Revenimiento total - 300 - 28 días	351	2.44e-06	0.383	0.241	7.58	1930
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	282	2.05e-06	0.346	0.217	7.01	1630
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	304	2.18e-06	0.357	0.228	7.19	1720
Vertua Materiales Reciclados - 200 - 28 días	246	1.73e-06	0.284	0.167	5.71	1370

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 - 250 - 3 días	83.3	0.545	83.5	922	0.492	0.00539	0.283	0.563
Acelerado - 300 - 3 días	87.6	0.545	87.7	982	0.512	0.00554	0.293	0.574
Acelerado - 350 - 3 días	92.5	0.545	92.6	1050	0.535	0.00571	0.304	0.586
Alta resistencia - 450 - 28 días	92.6	0.545	92.7	1090	0.559	0.00596	0.299	0.656
Antibacteriano - 250 - 28 días	61	0.545	61.1	645	0.415	0.00498	0.242	0.608
Antideslave - 350 - 28 días	86.5	0.545	86.6	950	0.544	0.00637	0.344	0.643



Antihongo antialga - 250 - 28 días	63.9	0.545	63.9	677	0.434	0.00516	0.282	0.652
Antitermita - 250 - 28 días	61	0.545	61.1	645	0.415	0.00498	0.242	0.608
Aparentia - 250 - 28 días	86.2	0.545	85.9	952	0.576	0.00638	0.541	0.958
Autocompactable - 350 - 28 días	85.9	0.545	86	978	0.61	0.00684	0.343	0.615
Baja contracción - 250 - 28 días	64.4	0.545	64.5	647	0.504	0.00614	0.264	0.429
Baja contracción - 300 - 28 días	68	0.545	68.1	705	0.544	0.00654	0.291	0.462
Baja contracción - MR 42 - 14 días, trab ext 3 horas	78.1	0.545	78.3	688	0.537	0.00648	0.318	0.493
Baja contracción - MR 42 - 28 días	64.7	0.545	64.8	652	0.505	0.00613	0.269	0.435
Contracción compensada - MR 42 - 28 días	70.7	0.545	70.8	701	0.508	0.00634	0.312	0.502
Convencional - 100 - 28 días	43.2	0.545	43.3	412	0.277	0.00338	0.165	0.426
Convencional - 150 - 28 días	47.8	0.545	47.9	476	0.299	0.00354	0.175	0.439
Convencional - 200 - 28 días	52.3	0.545	52.4	540	0.32	0.0037	0.186	0.45
Convencional - 200 - 7 días	65	0.545	65.1	670	0.401	0.00468	0.224	0.512
Convencional - 250 - 14 días	65.3	0.545	65.3	668	0.405	0.00475	0.241	0.522
Convencional - 250 - 28 días	56.8	0.545	56.9	604	0.341	0.00385	0.195	0.462
Convencional - 250 - 7 días	67.8	0.545	68	707	0.415	0.0048	0.231	0.51
Convencional - 280 - 28 días	63.8	0.545	63.8	647	0.398	0.0047	0.237	0.519
Convencional - 300 - 28 días	65.5	0.545	65.6	672	0.407	0.00476	0.241	0.523
Convencional - 300 - 7 días	71.9	0.545	72	766	0.434	0.00494	0.239	0.52
Convencional - 350 - 28 días	70.5	0.545	70.6	742	0.43	0.00493	0.253	0.536
Convencional - 350 - 7 días	87.3	0.545	87.4	977	0.51	0.00555	0.309	0.595
Duramax - 250 - 28 días	68.6	0.545	68.7	715	0.542	0.00649	0.279	0.45
Duramax Autosellante - 250 - 28 días	74.4	0.545	74.4	817	0.513	0.00598	0.328	0.73
Estructural - 250 - 28 días	64.2	0.545	64.3	618	0.374	0.0044	0.244	0.447



Estructural - 300 - 28 días	69.5	0.545	69.5	733	0.425	0.00487	0.249	0.548
Estructural - 300 - 7 días	76.4	0.545	76.6	836	0.455	0.00506	0.246	0.547
Estructural - 350 - 28 días	74.9	0.545	75	811	0.451	0.00506	0.261	0.563
Grout premezclado - 350 - 28 días	109	0.545	110	1340	0.748	0.00887	0.431	0.975
Impercem - 200 - 28 días	61.5	0.545	61.6	611	0.392	0.00472	0.262	0.544
Lanzado - 250 - 28 días	67.3	0.545	67.4	755	0.489	0.00567	0.28	0.704
Ligero - 150 - 28 días	77.1	0.545	77.2	1000	0.466	0.00496	0.257	0.755
Materiales Recicladados Llanta - 250 - 28 días	59.3	0.545	59.4	621	0.405	0.00487	0.222	0.582
Materiales Recicladados Pet - 250 - 28 días	59.3	0.545	59.4	621	0.406	0.00487	0.222	0.582
Materiales Recicladados Plástico de difícil reciclado - 250 - 28 días	59.8	0.545	59.9	621	0.421	0.00507	0.23	0.586
Mortero - 150 - 28 días	51.8	0.545	51.9	609	0.396	0.00468	0.19	0.685
Mortero estabilizado - 150 - 28 días	53.5	0.545	53.6	628	0.408	0.00479	0.213	0.712
Pavicrete - MR 38 - 28 días	62.8	0.545	62.9	639	0.39	0.00459	0.219	0.51
Pavicrete - MR 38 - 3 días	81	0.545	81.1	899	0.474	0.00519	0.255	0.552
Pavicrete - MR 42 - 28 días	62.9	0.545	63	639	0.39	0.0046	0.22	0.506
Pavicrete - MR 42 - 7 días	71.5	0.545	71.6	756	0.434	0.00495	0.247	0.522
Pavicrete - MR 45 - 14 días	72.6	0.545	72.7	785	0.438	0.00493	0.241	0.551
Pavicrete - MR 45 - 28 días, trab ext 3 horas	64.2	0.545	64.3	658	0.397	0.00465	0.23	0.518
Pavicrete - MR 45 - 3 días	83.9	0.545	84	936	0.489	0.00529	0.277	0.575
Pavicrete - MR 48 - 1 día	105	0.545	105	1240	0.674	0.0072	0.327	0.532
Pervia - MR 30 - 28 días	79.6	0.545	79.7	867	0.444	0.00478	0.304	0.429
Pesado - 300 - 28 días	83.1	0.545	83.2	837	0.608	0.00721	0.363	0.625



Reducrack - 250 - 28 días	60.6	0.545	60.7	602	0.385	0.00463	0.244	0.536
Reducrack Sin malla - 250 - 28 días	61	0.545	61.1	645	0.415	0.00498	0.242	0.608
Relleno fluido - 100 - 28 días	44.6	0.545	44.7	499	0.383	0.00471	0.171	0.618
Relleno fluido - 25 - 28 días	27.4	0.545	27.5	255	0.313	0.00427	0.14	0.574
Relleno fluido - 50 - 28 días	35.8	0.545	35.9	374	0.348	0.0045	0.155	0.594
Revenimiento total - 200 - 28 días	60.1	0.545	60.2	606	0.379	0.00449	0.225	0.541
Revenimiento total - 250 - 28 días	65.4	0.545	65.5	733	0.469	0.00546	0.245	0.657
Revenimiento total - 300 - 28 días	72.8	0.545	72.9	785	0.439	0.00493	0.254	0.572
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	61.5	0.545	61.5	617	0.387	0.00462	0.252	0.544
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	64.9	0.545	65	672	0.403	0.00468	0.242	0.545
Vertua Materiales Reciclados - 200 - 28 días	52.3	0.545	52.4	540	0.32	0.0037	0.186	0.45

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	HLRW	ILLRW	MR	MER
Unit	kg	kg	kg	kg	kg	kg
Acelerado - 250 - 3 días	3.61	82.5	0.000202	0.000651	0.0354	7.48e-05
Acelerado - 300 - 3 días	3.75	85.8	0.000209	0.000681	0.0372	7.78e-05
Acelerado - 350 - 3 días	92.5	0.545	92.6	1050	0.535	0.00571
Alta resistencia - 450 - 28 días	3.86	88.3	0.000209	0.000703	0.0394	8.25e-05
Antibacteriano - 250 - 28 días	2.81	64.1	0.000149	0.000478	0.026	6.19e-05
Antideslave - 350 - 28 días	86.5	0.545	86.6	950	0.544	0.00637
Antihongo antialga - 250 - 28 días	3.1	71.8	0.000162	0.000511	0.027	6.92e-05
Antitermita - 250 - 28 días	2.81	64.1	0.000149	0.000478	0.026	6.19e-05
Aparentia - 250 - 28 días	5.16	125	0.000255	0.000754	0.0349	0.000119
Autocompactable - 350 - 28 días	85.9	0.545	86	978	0.61	0.00684



Baja contracción - 250 - 28 días	3.13	68.8	0.000163	0.000511	0.0284	7.37e-05
Baja contracción - 300 - 28 días	3.35	74.2	0.00017	0.000537	0.0299	8.11e-05
Baja contracción - MR 42 - 14 días, trab ext 3 horas	78.1	0.545	78.3	688	0.537	0.00648
Baja contracción - MR 42 - 28 días	64.7	0.545	64.8	652	0.505	0.00613
Contracción compensada - MR 42 - 28 días	70.7	0.545	70.8	701	0.508	0.00634
Convencional - 100 - 28 días	2.03	46.9	0.000115	0.00035	0.0184	4.17e-05
Convencional - 100 - 28 días	2.03	46.9	0.000115	0.00035	0.0184	4.17e-05
Convencional - 150 - 28 días	2.18	50.5	0.000123	0.000382	0.0204	4.5e-05
Convencional - 150 - 28 días	2.18	50.5	0.000123	0.000382	0.0204	4.5e-05
Convencional - 200 - 28 días	2.34	54.1	0.000132	0.000415	0.0223	4.82e-05
Convencional - 200 - 7 días	2.88	65.4	0.000164	0.000514	0.0278	5.89e-05
Convencional - 250 - 14 días	2.99	68.1	0.000168	0.000522	0.0278	6.17e-05
Convencional - 250 - 28 días	2.49	57.5	0.00014	0.000446	0.0242	5.13e-05
Convencional - 250 - 7 días	2.98	67.6	0.000169	0.000535	0.029	6.1e-05
Convencional - 280 - 28 días	2.94	67	0.000165	0.000512	0.0271	6.06e-05
Convencional - 300 - 28 días	3	68.4	0.000169	0.000524	0.0279	6.19e-05
Convencional - 300 - 7 días	3.11	70.6	0.000176	0.000563	0.0307	6.37e-05
Convencional - 350 - 28 días	70.5	0.545	70.6	742	0.43	0.00493
Convencional - 350 - 7 días	87.3	0.545	87.4	977	0.51	0.00555
Duramax - 250 - 28 días	3.29	72.5	0.000168	0.000537	0.0302	7.92e-05
Duramax Autosellante - 250 - 28 días	3.66	84.6	0.000189	0.000596	0.0313	8.25e-05
Estructural - 250 - 28 días	3.02	68.9	0.000176	0.000529	0.0272	5.97e-05
Estructural - 300 - 28 días	3.11	71.3	0.000174	0.00055	0.0296	6.46e-05
Estructural - 300 - 7 días	3.24	73.8	0.000183	0.000592	0.0326	6.65e-05
Estructural - 350 - 28 días	74.9	0.545	75	811	0.451	0.00506



Grout premezclado - 350 - 28 días	109	0.545	110	1340	0.748	0.00887
Impercem - 200 - 28 días	2.97	68.2	0.000164	0.000501	0.026	6.29e-05
Lanzado - 250 - 28 días	3.2	74.3	0.000161	0.000526	0.0288	7.47e-05
Ligero - 150 - 28 días	3.32	75.3	0.000172	0.00058	0.0327	7.01e-05
Ligero - 150 - 28 días	3.32	75.3	0.000172	0.00058	0.0327	7.01e-05
Materiales Reciclados Llanta - 250 - 28 días	2.72	61.8	0.000147	0.000466	0.0254	5.89e-05
Materiales Reciclados Pet - 250 - 28 días	2.72	61.8	0.000147	0.000467	0.0254	5.89e-05
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	2.78	63	0.000149	0.000472	0.0256	6.12e-05
Mortero - 150 - 28 días	2.28	52.9	0.00011	0.000384	0.0222	5.45e-05
Mortero - 150 - 28 días	2.28	52.9	0.00011	0.000384	0.0222	5.45e-05
Mortero estabilizado - 150 - 28 días	2.46	57.5	0.000118	0.000404	0.0228	5.89e-05
Mortero estabilizado - 150 - 28 días	2.46	57.5	0.000118	0.000404	0.0228	5.89e-05
Pavicrete - MR 38 - 28 días	2.8	63.7	0.000159	0.000498	0.0268	5.73e-05
Pavicrete - MR 38 - 3 días	3.39	77.2	0.000191	0.000625	0.0346	6.94e-05
Pavicrete - MR 42 - 28 días	62.9	0.545	63	639	0.39	0.0046
Pavicrete - MR 42 - 7 días	71.5	0.545	71.6	756	0.434	0.00495
Pavicrete - MR 45 - 14 días	72.6	0.545	72.7	785	0.438	0.00493
Pavicrete - MR 45 - 28 días, trab ext 3 horas	64.2	0.545	64.3	658	0.397	0.00465
Pavicrete - MR 45 - 3 días	83.9	0.545	84	936	0.489	0.00529
Pavicrete - MR 48 - 1 día	4.31	96.4	0.00023	0.000787	0.0455	9.64e-05
Pervia - MR 30 - 28 días	3.55	81.4	0.000199	0.000632	0.0335	7.37e-05
Pesado - 300 - 28 días	4.15	92.7	0.000221	0.000676	0.0357	9.41e-05
Reducrack - 250 - 28 días	2.84	65	0.000159	0.000488	0.0258	5.97e-05
Reducrack Sin malla - 250 - 28 días	2.81	64.1	0.000149	0.000478	0.026	6.19e-05
Relleno fluido - 100 - 28 días	2.03	46.5	9.58e-05	0.000331	0.0196	5.11e-05
Relleno fluido - 100 - 28 días	2.03	46.5	9.58e-05	0.000331	0.0196	5.11e-05
Relleno fluido - 25 - 28 días	1.51	34.1	6.54e-05	0.000211	0.0123	4.1e-05
Relleno fluido - 25 - 28 días	1.51	34.1	6.54e-05	0.000211	0.0123	4.1e-05
Relleno fluido - 50 - 28 días	1.76	40	8.01e-05	0.000269	0.0159	4.59e-05



Relleno fluido - 50 - 28 días	1.76	40	8.01e-05	0.000269	0.0159	4.59e-05
Revenimiento total - 200 - 28 días	2.78	63.8	0.000156	0.000482	0.0256	5.74e-05
Revenimiento total - 250 - 28 días	2.96	67.9	0.000152	0.000502	0.0282	6.8e-05
Revenimiento total - 300 - 28 días	3.21	73.9	0.000179	0.000572	0.031	6.66e-05
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	2.9	66.8	0.000161	0.000496	0.0261	6.12e-05
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	2.98	68.5	0.000166	0.000519	0.0276	6.19e-05
Vertua Materiales Reciclados - 200 - 28 días	2.34	54.1	0.000132	0.000415	0.0223	4.82e-05

OTHER ENVIRONMENTAL INFO

A4 Diesel Emissions

The following table below is 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% of which was allotted to A3 for mixing the concrete.

Table 12: 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-PD0643 CELAYA	156,813	2.596	407,086.55	7.65

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 13: **Simplified CO₂**

NEW ID	Net (kgCO₂/m³)	Gross (kgCO₂/m³)
Acelerado - 250 - 3 días	252	294
Acelerado - 300 - 3 días	268	313
Acelerado - 350 - 3 días	287	335
Alta resistencia - 450 - 28 días	297	346
Antibacteriano - 250 - 28 días	176	205
Antideslave - 350 - 28 días	254	296
Antihongo antialga - 250 - 28 días	176	205
Antitermita - 250 - 28 días	176	205
Aparentia - 250 - 28 días	190	222
Autocompactable - 350 - 28 días	260	303
Baja contracción - 250 - 28 días	181	212
Baja contracción - 300 - 28 días	193	226
Baja contracción - MR 42 - 14 días, trab ext 3 horas	193	226
Baja contracción - MR 42 - 28 días	181	212
Contracción compensada - MR 42 - 28 días	192	224
Convencional - 100 - 28 días	113	132
Convencional - 150 - 28 días	131	152
Convencional - 200 - 28 días	148	173
Convencional - 200 - 7 días	187	218
Convencional - 250 - 14 días	182	213
Convencional - 250 - 28 días	166	193
Convencional - 250 - 7 días	197	230
Convencional - 280 - 28 días	176	206
Convencional - 300 - 28 días	183	214
Convencional - 300 - 7 días	214	249
Convencional - 350 - 28 días	202	236
Convencional - 350 - 7 días	266	311
Duramax - 250 - 28 días	199	233
Duramax Autosellante - 250 - 28 días	205	240
Estructural - 250 - 28 días	169	197
Estructural - 300 - 28 días	200	233
Estructural - 300 - 7 días	233	272
Estructural - 350 - 28 días	221	258
Grout premezclado - 350 - 28 días	363	423
Impercem - 200 - 28 días	163	190
Lanzado - 250 - 28 días	196	229
Ligero - 150 - 28 días	242	282
Materiales Reciclados Llanta - 250 - 28 días	169	198
Materiales Reciclados Pet - 250 - 28 días	169	198



Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	169	198
Mortero - 150 - 28 días	163	190
Mortero estabilizado - 150 - 28 días	163	190
Pavicrete - MR 38 - 28 días	178	208
Pavicrete - MR 38 - 3 días	251	293
Pavicrete - MR 42 - 28 días	178	208
Pavicrete - MR 42 - 7 días	208	243
Pavicrete - MR 45 - 14 días	218	254
Pavicrete - MR 45 - 28 días, trab ext 3 horas	181	212
Pavicrete - MR 45 - 3 días	257	300
Pavicrete - MR 48 - 1 día	347	405
Pervia - MR 30 - 28 días	233	271
Pesado - 300 - 28 días	224	261
Reducrack - 250 - 28 días	165	192
Reducrack Sin malla - 250 - 28 días	176	205
Relleno fluido - 100 - 28 días	138	161
Relleno fluido - 25 - 28 días	69	81
Relleno fluido - 50 - 28 días	103	120
Revenimiento total - 200 - 28 días	165	193
Revenimiento total - 250 - 28 días	198	231
Revenimiento total - 300 - 28 días	214	250
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	167	195
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	182	212
Vertua Materiales Reciclados - 200 - 28 días	148	173

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- ASTM C94 Standard Specification for Ready-Mixed Concrete //NMX-C-155-ONNCCE-2004 Construction Industry - Hydraulic Concrete - Mass dosed - Specifications and Test Methods
- ASTM C150/C150M Standard Specification for Portland Cement // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements - Specifications and Test Methods
- ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete // NMX-C-255-ONNCCE-2006 Construction Industry - Concrete Chemical Admixtures - Specifications, sampling and test methods
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- ISO 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
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