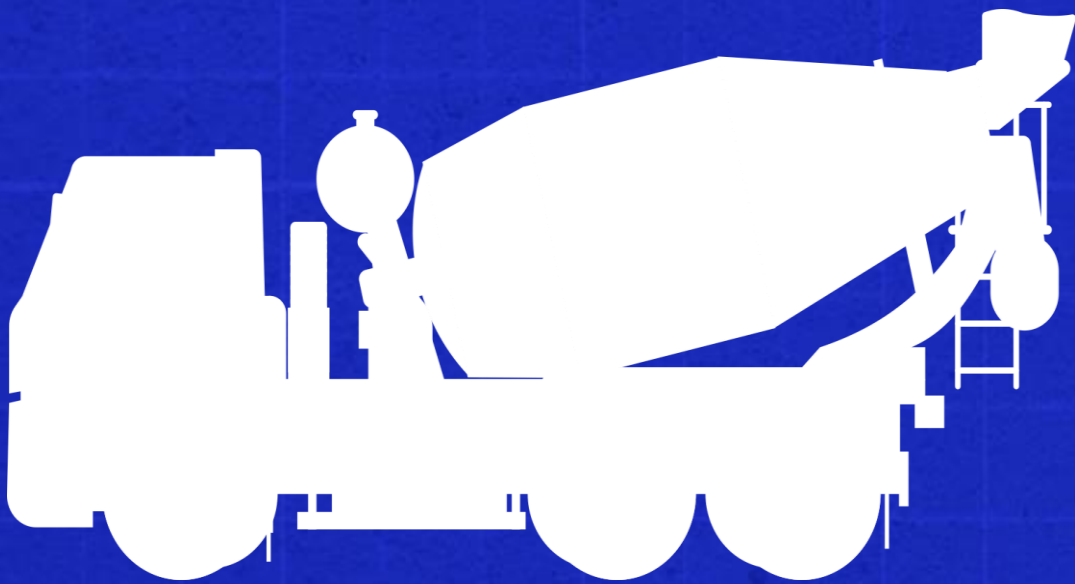




ENVIRONMENTAL PRODUCT DECLARATION



Environmental Product Declaration for ready mix concrete products produced by CEMEX México at their MX-PD0525 TUXTLA GUTIERREZ II facility in Chiapas, México.

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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:	11 October 2024
Period of Validity:	5 years; valid until 11 October 2029
EPD Number:	455b7e62-27f9-4b8d-a1c9-204911fd996c



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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 70 concrete mixes manufactured at the CEMEX MX-PD0525 TUXTLA GUTIERREZ II concrete facility at Carretera Tuxtla Chicoasen Km. 2.8, Tuxtla Gutierrez, 29025, 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 - 100 - 3 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	3	0.60	Plus
21	Convencional - 100 - 28 días	9.81 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.81	28	0.89	Clásico
22	Convencional - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.79	Clásico
23	Convencional - 150 - 7 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	7	0.62	Clásico
43	Mortero - 150 - 28 días	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.49	
60	Relleno fluido - 25 - 28 días	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.21	Plus
61	Relleno fluido - 30 - 28 días	2.94 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.94	28	1.16	Plus

63	Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	14.71 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.71	28	0.76	Clásico
65	Trabajabilidad extendida - 25 - 28 días, trab ext 3 horas	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	28	1.23	Plus
77	Vertua Materiales Reciclados - 060 - 28 días	5.88 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	5.88	28	0.91	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 - 3 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	3	0.50	Clásico
3	Acelerado - 200 - 30 kg a 12 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	12 hrs	0.70	Plus
24	Convencional - 200 - 14 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	14	0.65	Clásico
25	Convencional - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.69	Clásico
26	Convencional - 200 - 7 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	7	0.55	Clásico
36	Hidratium - 200 - 28 días	19.61 MPa 28d strength	Ready Mix Concrete	19.61	28	0.69	Clásico





		Ready Mix Concrete					
37	Impercem - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.78	Clásico
62	Revenimiento total - 200 - 28 días	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.70	Clásico
64	Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	19.61 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.61	28	0.81	

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
4	Acelerado - 250 - 3 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.48	Clásico
5	Acelerado - 250 - 3 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.44	Clásico
13	Antibacteriano - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
14	Antideslave - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	Clásico
15	Antihongo antialga - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico



16	Antitermita - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.67	Clásico
17	Aparentia - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.56	
19	Baja contracción - MR 35 - 28 días	20.86 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	20.86	28	0.50	Clásico
27	Convencional - 250 - 14 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	14	0.59	Clásico
28	Convencional - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.63	Clásico
29	Convencional - 250 - 7 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	7	0.52	Clásico
31	Duramax - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	Clásico
33	Duramax Autosellante - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.50	Clásico
34	Estructural - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.78	Clásico
38	Lanzado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.42	Clásico





39	Ligero - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.47	
40	Materiales Reciclados Llanta - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
41	Materiales Reciclados Pet - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
42	Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
44	Pavicrete - MR 36 - 28 días	22.06 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	22.06	28	0.67	Plus
45	Pavicrete - MR 36 - 3 días	22.06 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	22.06	3	0.53	Plus
46	Pavicrete - MR 38 - 28 días	24.58 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.58473	28	0.69	Plus
49	Pervia - MR 36 - 28 días	22.06 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	22.06	28	0.29	Clásico
51	Reducrack - MR 35 - 3 días	20.86 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	20.86	3	0.57	Plus
52	Reducrack - MR 38 - 28 días, trab ext 3 horas	24.58 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.58	28	0.65	Plus



66	Trabajabilidad extendida - 250 - 14 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	14	0.58	Clásico
67	Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	28	0.64	Clásico
73	Convencional - 250 - 3 días	24.52 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.52	3	0.48	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	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	3	0.43	Clásico
18	Autocompactable - 300 - 3 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	3	0.47	
30	Convencional - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.56	Clásico
50	Pesado - 300 - 28 días	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.50	Clásico
53	Reducrack - MR 40 - 3 días	27.24 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	27.24	3	0.46	Plus



68	Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	29.42 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.42	28	0.58	Clásico
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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	0.39	Clásico
20	Contracción compensada - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.52	Clásico
32	Duramax - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.40	Plus
35	Grout premezclado - 350 - 28 días	34.32 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.32	28	0.42	
47	Pavicrete - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.57	Plus
48	Pavicrete - MR 42 - 3 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	3	0.47	Plus
54	Reducrack - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.57	Plus



55	Reducrack - MR 42 - 28 días, trab ext 3 horas	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.62	Plus
56	Reducrack - MR 42 - 7 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	7	0.48	Plus
57	Reducrack - MR 45 - 3 días	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	3	0.44	Plus
58	Reducrack - MR 45 - 7 días	34.48 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.48	7	0.54	Plus
59	Reducrack Sin malla - MR 42 - 28 días	30.03 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	30.03	28	0.56	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 - 7 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	7	0.33	Clásico
9	Alta resistencia - 400 - 14 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	14	0.35	Clásico
10	Alta resistencia - 400 - 28 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	28	0.38	Clásico
11	Alta resistencia - 400 - 28 días, trab ext 3 horas	39.23 MPa 28d strength	Ready Mix Concrete	39.23	28	0.38	Clásico





		Ready Mix Concrete					
12	Alta resistencia - 400 - 3 días	39.23 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.23	3	0.32	Clásico

READY MIX CONCRETE DESIGN COMPOSITION

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

Table 7: Ready mix concrete composition.

Product Components	Product Components
Cement	Proprietary
Aggregates	30-60.00
Others	0.01-5.00
Total	100.00

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study.

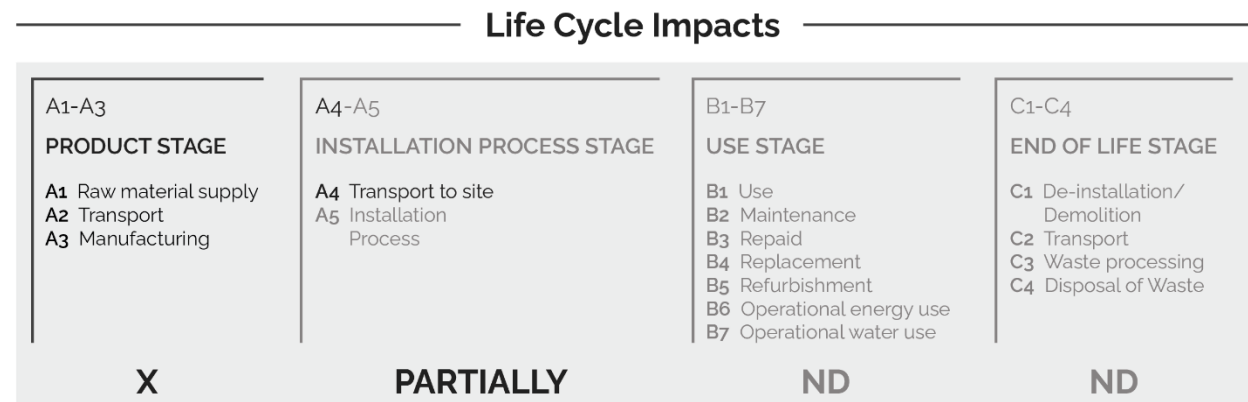


Figure 1: General life cycle phases for consideration in a construction works system

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

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.





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

According to the PCR, the following figure illustrates the general activities and input requirements for producing ready mix concrete products and is not necessarily exhaustive.

System Boundary

<p>Raw Material Supply (A1)</p> <p>Cements & SCMs Aggregates Admixtures Batch Water Fibers & Pigments</p>	<p>Transport (A2)</p> <p>Truck, Rail, Ship Energy Carriers (fuels)</p>	<p>Manufacturing (A3)</p> <p>Energy Carriers (electricity and fuels) Ancillary Materials (lubricants, motor oil, cleaning chemicals, other consumables) Water (manufacturing water, including wash water for cement trucks, but excluding batch water) Waste (end of life treatment of ancillary materials and any packaging) 30% total fleet energy transit mix plants only</p>	<p>Transport (A4)</p> <p>Truck Energy carriers (diesel and natural gas)</p>
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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-PD0525 TUXTLA GUTIERREZ II 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.

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
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 Aggregate	basalt quarry operation/basalt/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Veracruz	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	Chiapas	2024	2	3	1	3	3
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Chiapas	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
Perlita	polystyrene production, general purpose/polystyrene, general purpose/RoW/kg	ecoinvent v3.10 in 2024	Tabasco	2024	2	3	1	3	3
Cement	Gris CPC40RS	Progam Operator: Labeling Sustainability - EPD ID: 5cbc65d0-1881-4d96-9417-	Puebla	13 April 2023	3	3	3	3	3





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RIVER SAND	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Chiapas	2024	2	3	1	3	3
Llanta kg	Waste input produced off-site	See A3 inputs	Guanajuato	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 g: Life cycle impact categories and life cycle inventory metrics

ID	LCIA.indicators	Abbreviations	Units
1	Climate change: global warming potential (GWP100)	GWP100	kg CO ₂ -eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO ₂ -eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O ₃ -eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADP _{fossil}	MJ
Inventory metrics			
7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	PRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	kg
11	Inventory indicators ISO21930: use of secondary material	SM	MJ

12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: recovered energy	RE	MJ
14	Inventory indicators ISO21930: use of net fresh water	FW	m3
15	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
16	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
17	Inventory indicators ISO21930: high-level radioactive waste disposed	HLRW	kg
18	Inventory indicators ISO21930: intermediate and low-level radioactive waste disposed	ILLRW	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg
20	Inventory indicators ISO21930: materials for energy recovery	MER	kg
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	ADP _{fossil}
Unit	kg CO ₂ -eq	kg CFC-11-eq	kg SO ₂ -eq	kg N-eq	kg O ₃ -eq	MJ
Acelerado - 100 - 3 días	263	1.92e-06	0.292	0.16	5.99	1510
Acelerado - 200 - 3 días	327	2.35e-06	0.335	0.195	6.68	1840
Acelerado - 200 - 30 kg a 12 horas	245	1.82e-06	0.278	0.154	5.78	1430
Acelerado - 250 - 3 días	351	2.5e-06	0.351	0.207	6.89	1960
Acelerado - 250 - 3 días, trab ext 3 horas	384	2.72e-06	0.374	0.231	7.24	2130
Acelerado - 300 - 3 días	389	2.74e-06	0.376	0.228	7.28	2150
Acelerado - 350 - 3 días	442	3.1e-06	0.412	0.257	7.84	2420
Acelerado - 400 - 7 días	498	3.41e-06	0.447	0.257	8.47	2680
Alta resistencia - 400 - 14 días	466	3.24e-06	0.429	0.256	8.18	2540
Alta resistencia - 400 - 28 días	437	3.05e-06	0.409	0.241	7.87	2390
Alta resistencia - 400 - 28 días, trab ext 3 horas	438	3.1e-06	0.416	0.267	7.95	2420
Alta resistencia - 400 - 3 días	511	3.5e-06	0.456	0.263	8.61	2750
Antibacteriano - 250 - 28 días	277	2.01e-06	0.297	0.165	6.04	1580
Antideslave - 250 - 28 días	342	2.54e-06	0.352	0.244	6.89	1960
Antihongo antialga - 250 - 28 días	282	2.21e-06	0.315	0.242	6.29	1690
Antitermita - 250 - 28 días	277	2.01e-06	0.297	0.165	6.04	1580
Aparentia - 250 - 28 días	385	4.49e-06	0.529	1.04	9.29	3070



Autocompactable - 300 - 3 días	387	2.8e-06	0.376	0.251	7.29	2180
Baja contracción - MR 35 - 28 días	330	2.32e-06	0.332	0.173	6.65	1830
Contracción compensada - MR 42 - 28 días	328	2.41e-06	0.386	0.21	7.56	1900
Convencional - 100 - 28 días	194	1.46e-06	0.242	0.118	5.21	1160
Convencional - 150 - 28 días	226	1.67e-06	0.263	0.136	5.52	1320
Convencional - 150 - 7 días	268	1.96e-06	0.294	0.162	6.02	1540
Convencional - 200 - 14 días	272	1.97e-06	0.295	0.16	6.01	1550
Convencional - 200 - 28 días	248	1.82e-06	0.279	0.147	5.78	1430
Convencional - 200 - 7 días	300	2.17e-06	0.316	0.18	6.39	1710
Convencional - 250 - 3 días	347	2.47e-06	0.349	0.206	6.89	1940
Convencional - 250 - 14 días	301	2.16e-06	0.314	0.175	6.31	1700
Convencional - 250 - 28 días	274	1.98e-06	0.297	0.161	6.05	1560
Convencional - 250 - 7 días	323	2.32e-06	0.332	0.192	6.6	1820
Convencional - 300 - 28 días	319	2.28e-06	0.326	0.184	6.49	1790
Duramax - 250 - 28 días	345	2.48e-06	0.347	0.213	6.84	1940
Duramax - 350 - 28 días	376	2.69e-06	0.371	0.226	7.28	2100
Duramax Autosellante - 250 - 28 días	341	2.74e-06	0.371	0.342	7.16	2070
Estructural - 250 - 28 días	279	2.01e-06	0.294	0.167	5.91	1580
Grout premezclado - 350 - 28 días	586	4.42e-06	0.552	0.4	10.2	3480
Hidratium - 200 - 28 días	258	1.9e-06	0.289	0.155	5.92	1490
Impercem - 200 - 28 días	246	1.99e-06	0.292	0.235	5.88	1520
Lanzado - 250 - 28 días	420	3.04e-06	0.4	0.271	7.72	2360
Ligero - 250 - 28 días	394	2.75e-06	0.413	0.278	7.39	2530
Materiales Reciclados Llanta - 250 - 28 días	283	2.06e-06	0.303	0.167	6.15	1620
Materiales Reciclados Pet - 250 - 28 días	283	2.05e-06	0.302	0.167	6.14	1620
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	286	2.1e-06	0.309	0.17	6.26	1660
Mortero - 150 - 28 días	393	2.81e-06	0.373	0.22	7.38	2210



Pavimente - MR 36 - 28 días	251	1.85e-06	0.282	0.157	5.8	1450
Pavimente - MR 36 - 3 días	313	2.26e-06	0.325	0.192	6.48	1770
Pavimente - MR 38 - 28 días	255	1.87e-06	0.284	0.157	5.81	1470
Pavimente - MR 42 - 28 días	285	2.06e-06	0.306	0.172	6.18	1620
Pavimente - MR 42 - 3 días	369	2.61e-06	0.362	0.217	7.02	2040
Pervia - MR 36 - 28 días	415	2.95e-06	0.387	0.289	7.07	2270
Pesado - 300 - 28 días	374	2.98e-06	0.446	0.278	8.82	2390
Reducrack - MR 35 - 3 días	288	2.12e-06	0.311	0.19	6.25	1650
Reducrack - MR 38 - 28 días, trab ext 3 horas	272	1.99e-06	0.297	0.171	6.02	1560
Reducrack - MR 40 - 3 días	357	2.56e-06	0.356	0.221	6.96	2000
Reducrack - MR 42 - 28 días	300	2.19e-06	0.318	0.193	6.34	1710
Reducrack - MR 42 - 28 días, trab ext 3 horas	307	2.24e-06	0.32	0.203	6.34	1740
Reducrack - MR 42 - 7 días	349	2.51e-06	0.352	0.221	6.89	1960
Reducrack - MR 45 - 3 días	375	2.67e-06	0.369	0.231	7.15	2080
Reducrack - MR 45 - 7 días	357	2.48e-06	0.347	0.191	6.76	1950
Reducrack Sin malla - MR 42 - 28 días	321	2.32e-06	0.33	0.202	6.52	1810
Relleno fluido - 25 - 28 días	183	1.4e-06	0.215	0.104	4.73	1120
Relleno fluido - 30 - 28 días	193	1.47e-06	0.222	0.109	4.83	1170
Revenimiento total - 200 - 28 días	300	2.14e-06	0.312	0.167	6.31	1690
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	236	1.73e-06	0.269	0.137	5.62	1370
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	238	1.75e-06	0.271	0.145	5.64	1380
Trabajabilidad extendida - 25 - 28 días, trab ext 3 horas	183	1.39e-06	0.215	0.0988	4.75	1120
Trabajabilidad extendida - 250 - 14 días, trab ext 3 horas	317	2.26e-06	0.324	0.179	6.47	1780
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	265	1.95e-06	0.292	0.165	6	1530



Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	325	2.31e-06	0.329	0.183	6.54	1820
Vertua Materiales Reciclados - 060 - 28 días	217	1.65e-06	0.234	0.141	4.86	1300

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 - 100 - 3 días	51.8	1.54	52.1	618	0.363	0.00438	0.177	0.552
Acelerado - 200 - 3 días	64	1.57	64.3	782	0.429	0.00491	0.212	0.602
Acelerado - 200 - 30 kg a 12 horas	48.7	1.53	48.9	575	0.349	0.00426	0.17	0.569
Acelerado - 250 - 3 días	68.4	1.58	68.7	845	0.446	0.005	0.223	0.592
Acelerado - 250 - 3 días, trab ext 3 horas	74.7	1.6	75.1	931	0.479	0.00526	0.244	0.611
Acelerado - 300 - 3 días	75.5	1.6	75.8	941	0.482	0.00528	0.244	0.611
Acelerado - 350 - 3 días	85.6	1.63	86	1080	0.534	0.00568	0.272	0.64
Acelerado - 400 - 7 días	95.3	1.66	95.7	1210	0.593	0.00624	0.289	0.684
Alta resistencia - 400 - 14 días	89.8	1.64	90.2	1130	0.566	0.00603	0.281	0.678
Alta resistencia - 400 - 28 días	84.3	1.63	84.7	1060	0.537	0.0058	0.265	0.664
Alta resistencia - 400 - 28 días, trab ext 3 horas	85.1	1.63	85.5	1070	0.537	0.00578	0.277	0.648
Alta resistencia - 400 - 3 días	97.8	1.66	98.2	1240	0.605	0.00633	0.296	0.69
Antibacteriano - 250 - 28 días	54.5	1.54	54.8	656	0.375	0.00444	0.183	0.588
Antideslave - 250 - 28 días	67.8	1.58	68.1	833	0.449	0.00506	0.24	0.628
Antihongo antialga - 250 - 28 días	57.3	1.54	57.6	689	0.396	0.00464	0.224	0.634
Antitermita - 250 - 28 días	54.5	1.54	54.8	656	0.375	0.00444	0.183	0.588
Aparentia - 250 - 28 días	94.6	1.57	95	1140	0.652	0.007	0.652	1.11
Autocompactable - 300 - 3 días	75.8	1.6	76.2	941	0.494	0.00543	0.257	0.683



Baja contracción - MR 35 - 28 días	63.9	1.57	64.2	782	0.428	0.0049	0.202	0.599
Contracción compensada - MR 42 - 28 días	64.9	1.57	65.2	774	0.453	0.00557	0.254	0.619
Convencional - 100 - 28 días	38.7	1.5	38.9	441	0.296	0.00383	0.139	0.532
Convencional - 150 - 28 días	44.9	1.52	45.1	525	0.326	0.00405	0.155	0.55
Convencional - 150 - 7 días	52.8	1.54	53.1	633	0.367	0.0044	0.18	0.56
Convencional - 200 - 14 días	53.5	1.54	53.8	643	0.369	0.00439	0.179	0.567
Convencional - 200 - 28 días	49	1.53	49.3	581	0.347	0.00423	0.167	0.554
Convencional - 200 - 7 días	58.8	1.55	59.1	712	0.402	0.00471	0.198	0.592
Convencional - 250 - 3 días	67.6	1.58	67.9	833	0.444	0.00502	0.222	0.598
Convencional - 250 - 14 días	58.9	1.56	59.2	716	0.396	0.0046	0.194	0.581
Convencional - 250 - 28 días	53.8	1.54	54.1	647	0.371	0.00442	0.18	0.564
Convencional - 250 - 7 días	63.2	1.57	63.5	775	0.42	0.0048	0.209	0.583
Convencional - 300 - 28 días	62.3	1.57	62.6	763	0.413	0.00472	0.203	0.589
Duramax - 250 - 28 días	67.5	1.58	67.8	830	0.445	0.00502	0.226	0.617
Duramax - 350 - 28 días	73.3	1.59	73.6	907	0.48	0.00536	0.242	0.622
Duramax Autosellante - 250 - 28 días	69.9	1.57	70.3	854	0.47	0.00529	0.29	0.687
Estructural - 250 - 28 días	54.8	1.54	55.1	663	0.37	0.00431	0.183	0.601
Grout premezclado - 350 - 28 días	115	1.68	116	1380	0.848	0.0101	0.509	0.999
Hidratium - 200 - 28 días	51.3	1.53	51.5	604	0.363	0.00443	0.193	0.591
Impercem - 200 - 28 días	50.8	1.52	51.1	602	0.359	0.0043	0.21	0.606
Lanzado - 250 - 28 días	82	1.61	82.4	1020	0.536	0.00582	0.278	0.725
Ligero - 250 - 28 días	76	1.59	76.3	1140	0.464	0.00488	0.258	0.88
Materiales Reciclados Llanta - 250 - 28 días	55.5	1.55	55.8	666	0.388	0.00458	0.189	0.588



Materiales Reciclados Pet - 250 - 28 días	55.5	1.55	55.7	666	0.386	0.00456	0.188	0.587
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	56	1.55	56.3	666	0.405	0.00481	0.197	0.593
Mortero - 150 - 28 días	76.2	1.6	76.6	937	0.52	0.00578	0.25	0.789
Pavicrete - MR 36 - 28 días	49.8	1.53	50	593	0.347	0.0042	0.171	0.539
Pavicrete - MR 36 - 3 días	61.4	1.56	61.7	751	0.408	0.00468	0.205	0.566
Pavicrete - MR 38 - 28 días	50.5	1.53	50.7	603	0.35	0.00421	0.172	0.546
Pavicrete - MR 42 - 28 días	56	1.55	56.2	677	0.379	0.00446	0.188	0.544
Pavicrete - MR 42 - 3 días	71.8	1.59	72.2	894	0.458	0.00505	0.232	0.587
Pervia - MR 36 - 28 días	81.5	1.62	81.9	1040	0.476	0.00485	0.27	0.448
Pesado - 300 - 28 días	77.5	1.58	78	828	0.625	0.00739	0.351	0.581
Reducrack - MR 35 - 3 días	57	1.55	57.2	689	0.387	0.00454	0.198	0.563
Reducrack - MR 38 - 28 días, trab ext 3 horas	53.7	1.54	54	646	0.368	0.00436	0.184	0.559
Reducrack - MR 40 - 3 días	69.8	1.58	70.2	865	0.452	0.00504	0.232	0.593
Reducrack - MR 42 - 28 días	59.2	1.56	59.5	721	0.396	0.00458	0.202	0.565
Reducrack - MR 42 - 28 días, trab ext 3 horas	60.6	1.56	60.9	740	0.401	0.00458	0.208	0.587
Reducrack - MR 42 - 7 días	68.3	1.58	68.7	844	0.444	0.00498	0.229	0.589
Reducrack - MR 45 - 3 días	73.1	1.59	73.5	910	0.468	0.00515	0.241	0.594
Reducrack - MR 45 - 7 días	69.2	1.59	69.5	860	0.44	0.00486	0.215	0.587
Reducrack Sin malla - MR 42 - 28 días	63.1	1.57	63.4	774	0.415	0.00472	0.212	0.584
Relleno fluido - 25 - 28 días	36.6	1.49	36.8	406	0.3	0.00385	0.133	0.671
Relleno fluido - 30 - 28 días	38.5	1.5	38.7	433	0.309	0.00392	0.137	0.677
Revenimiento total - 200 - 28 días	58.5	1.56	58.8	710	0.398	0.00465	0.191	0.628



Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	46.7	1.52	46.9	550	0.334	0.00412	0.159	0.553
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	47.1	1.52	47.3	555	0.337	0.00414	0.163	0.573
Trabajabilidad extendida - 25 - 28 días, trab ext 3 horas	36.4	1.49	36.6	404	0.3	0.00387	0.13	0.675
Trabajabilidad extendida - 250 - 14 días, trab ext 3 horas	61.8	1.56	62.1	755	0.415	0.00476	0.201	0.608
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	52.4	1.54	52.6	625	0.369	0.00443	0.181	0.58
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	63.3	1.57	63.6	775	0.421	0.0048	0.205	0.612
Vertua Materiales Reciclados - 060 - 28 días	43.3	1.51	43.6	502	0.326	0.00392	0.157	0.634

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	HLRW	ILLRW	MR	MER
Unit	kg	kg	kg	kg	kg	kg
Acelerado - 100 - 3 días	2.03	49.4	0.000105	0.000374	0.0223	5.31e-05
Acelerado - 200 - 3 días	2.44	59.5	0.000129	0.00046	0.0275	6.38e-05
Acelerado - 200 - 30 kg a 12 horas	1.94	47.3	9.98e-05	0.000352	0.021	5.06e-05
Acelerado - 250 - 3 días	2.57	63	0.000137	0.000492	0.0293	6.72e-05
Acelerado - 250 - 3 días, trab ext 3 horas	2.8	68.6	0.00015	0.000538	0.032	7.31e-05
Acelerado - 300 - 3 días	2.81	68.8	0.000151	0.000542	0.0324	7.34e-05
Acelerado - 350 - 3 días	3.14	77	0.00017	0.000614	0.0366	8.21e-05
Acelerado - 400 - 7 días	3.4	82.9	0.000186	0.000679	0.0408	8.93e-05
Alta resistencia - 400 - 14 días	3.26	79.5	0.000177	0.000642	0.0384	8.56e-05
Alta resistencia - 400 - 28 días	3.08	75.1	0.000167	0.000603	0.0361	8.08e-05



Alta resistencia - 400 - 28 días, trab ext 3 horas	3.17	77.6	0.000171	0.000613	0.0364	8.29e-05
Alta resistencia - 400 - 3 días	3.48	84.8	0.000191	0.000696	0.0418	9.13e-05
Antibacteriano - 250 - 28 días	2.1	51.7	0.00011	0.000392	0.0235	5.5e-05
Antideslave - 250 - 28 días	2.67	65.7	0.00014	0.000494	0.029	6.96e-05
Antihongo antialga - 250 - 28 días	2.4	59.7	0.000123	0.000425	0.0244	6.25e-05
Antitermita - 250 - 28 días	2.1	51.7	0.00011	0.000392	0.0235	5.5e-05
Aparentia - 250 - 28 días	5.66	145	0.000272	0.000812	0.038	0.000144
Autocompactable - 300 - 3 días	2.9	71.3	0.000154	0.000549	0.0324	7.58e-05
Baja contracción - MR 35 - 28 días	2.37	57.7	0.000126	0.000456	0.0275	6.22e-05
Contracción compensada - MR 42 - 28 días	2.6	62.5	0.000133	0.000467	0.03	0.000103
Convencional - 100 - 28 días	1.58	38.6	7.98e-05	0.00028	0.0168	4.14e-05
Convencional - 150 - 28 días	1.78	43.6	9.15e-05	0.000323	0.0194	4.66e-05
Convencional - 150 - 7 días	2.06	50.3	0.000107	0.000381	0.0228	5.39e-05
Convencional - 200 - 14 días	2.06	50.6	0.000108	0.000385	0.023	5.4e-05
Convencional - 200 - 28 días	1.92	46.9	9.95e-05	0.000353	0.0212	5.02e-05
Convencional - 200 - 7 días	2.27	55.3	0.000119	0.000424	0.0253	5.93e-05
Convencional - 250 - 3 días	2.55	62.4	0.000136	0.000486	0.029	6.68e-05
Convencional - 250 - 14 días	2.24	55	0.000118	0.000423	0.0253	5.86e-05
Convencional - 250 - 28 días	2.08	50.8	0.000109	0.000387	0.0232	5.43e-05
Convencional - 250 - 7 días	2.4	58.8	0.000127	0.000455	0.0272	6.28e-05
Convencional - 300 - 28 días	2.35	57.7	0.000125	0.000447	0.0268	6.15e-05
Duramax - 250 - 28 días	2.57	63.1	0.000137	0.000487	0.0289	6.72e-05
Duramax - 350 - 28 días	2.77	67.3	0.000148	0.000528	0.0314	7.24e-05
Duramax Autosellante - 250 - 28 días	3.02	74.8	0.000155	0.000526	0.0296	7.82e-05
Estructural - 250 - 28 días	2.1	52.3	0.000111	0.000395	0.0236	5.48e-05
Grout premezclado - 350 - 28 días	4.85	115	0.000245	0.000845	0.0491	0.00021
Hidratium - 200 - 28 días	2.05	50.1	0.000105	0.000371	0.022	5.43e-05



Impercem - 200 - 28 días	2.21	55.2	0.000112	0.00038	0.0216	5.73e-05
Lanzado - 250 - 28 días	3.12	76.5	0.000167	0.000594	0.0349	8.19e-05
Ligero - 250 - 28 días	3.04	71.6	0.000153	0.000542	0.0321	7.43e-05
Materiales Reciclados Llanta - 250 - 28 días	2.16	52.8	0.000113	4e-04	0.0239	5.68e-05
Materiales Reciclados Pet - 250 - 28 días	2.15	52.7	0.000112	4e-04	0.0239	5.65e-05
Materiales Reciclados Plástico de difícil reciclado - 250 - 28 días	2.23	54.1	0.000115	0.000406	0.0242	5.93e-05
Mortero - 150 - 28 días	2.86	69.6	0.000153	0.000547	0.0325	7.53e-05
Pavicrete - MR 36 - 28 días	1.96	48	0.000102	0.000359	0.0215	5.11e-05
Pavicrete - MR 36 - 3 días	2.35	57.6	0.000124	0.000443	0.0264	6.13e-05
Pavicrete - MR 38 - 28 días	1.97	48.5	0.000103	0.000364	0.0218	5.15e-05
Pavicrete - MR 42 - 28 días	2.16	52.7	0.000113	0.000403	0.0241	5.63e-05
Pavicrete - MR 42 - 3 días	2.67	65.7	0.000144	0.000516	0.0308	6.98e-05
Pervia - MR 36 - 28 días	3.04	75.3	0.000165	0.000592	0.0348	7.88e-05
Pesado - 300 - 28 días	3.67	85	0.00019	0.000603	0.0338	9.82e-05
Reducrack - MR 35 - 3 días	2.24	54.8	0.000117	0.000413	0.0245	5.84e-05
Reducrack - MR 38 - 28 días, trab ext 3 horas	2.1	51.6	0.00011	0.000388	0.0231	5.48e-05
Reducrack - MR 40 - 3 días	2.64	64.9	0.000141	0.000504	0.0299	6.91e-05
Reducrack - MR 42 - 28 días	2.3	56.5	0.000121	0.000428	0.0255	5.99e-05
Reducrack - MR 42 - 28 días, trab ext 3 horas	2.35	58.3	0.000124	0.000439	0.026	6.13e-05
Reducrack - MR 42 - 7 días	2.61	64	0.000139	0.000494	0.0293	6.81e-05
Reducrack - MR 45 - 3 días	2.75	67.6	0.000147	0.000527	0.0313	7.18e-05
Reducrack - MR 45 - 7 días	2.52	62.3	0.000136	0.000494	0.0298	6.59e-05
Reducrack Sin malla - MR 42 - 28 días	2.41	59.5	0.000128	0.000456	0.0271	6.3e-05
Relleno fluido - 25 - 28 días	1.5	37	7.55e-05	0.000264	0.0157	3.96e-05
Relleno fluido - 30 - 28 días	1.56	38.5	7.91e-05	0.000277	0.0165	4.12e-05
Revenimiento total - 200 - 28 días	2.22	54.7	0.000117	0.000419	0.0252	5.8e-05
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	1.83	44.9	9.46e-05	0.000336	0.0202	4.79e-05



Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	1.86	45.9	9.61e-05	0.00034	0.0203	4.87e-05
Trabajabilidad extendida - 25 - 28 días, trab ext 3 horas	1.49	36.6	7.48e-05	0.000262	0.0156	3.92e-05
Trabajabilidad extendida - 250 - 14 días, trab ext 3 horas	2.33	57.2	0.000124	0.000443	0.0266	6.1e-05
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	2.06	50.3	0.000107	0.000378	0.0225	5.39e-05
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	2.38	58.4	0.000126	0.000454	0.0272	6.22e-05
Vertua Materiales Reciclados - 060 - 28 días	1.75	43.3	9e-05	0.000315	0.0185	4.61e-05

OTHER ENVIRONMENTAL INFO

A4 Diesel Emissions

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

Table 11: A4 Diesel Emissions

PLANT NAME	L DIESEL NOT INCLUDING A3	GWP FACTOR kgCO ₂ / LITER	Total kg CO ₂ eq (A4)	Total kg CO ₂ eq/m ³ (A4)
MX-PD0525 TUXTLA GUTIERREZ II	93.398	2.596	242,461.21	8.47

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 (kgCO ₂ /m ³)	Gross (kgCO ₂ /m ³)
Acelerado - 100 - 3 días	165	191
Acelerado - 200 - 3 días	209	241
Acelerado - 200 - 30 kg a 12 horas	153	177
Acelerado - 250 - 3 días	225	260
Acelerado - 250 - 3 días, trab ext 3 horas	248	286
Acelerado - 300 - 3 días	251	290
Acelerado - 350 - 3 días	288	333
Acelerado - 400 - 7 días	326	377
Alta resistencia - 400 - 14 días	304	351
Alta resistencia - 400 - 28 días	284	328
Alta resistencia - 400 - 28 días, trab ext 3 horas	284	328
Alta resistencia - 400 - 3 días	335	387
Antibacteriano - 250 - 28 días	175	202
Antideslave - 250 - 28 días	217	251
Antihongo antialga - 250 - 28 días	175	202
Antitermita - 250 - 28 días	175	202
Aparentia - 250 - 28 días	210	243
Autocompactable - 300 - 3 días	248	287
Baja contracción - MR 35 - 28 días	211	244
Contracción compensada - MR 42 - 28 días	205	237
Convencional - 100 - 28 días	118	136
Convencional - 150 - 28 días	140	162
Convencional - 150 - 7 días	169	195
Convencional - 200 - 14 días	172	199
Convencional - 200 - 28 días	155	180
Convencional - 200 - 7 días	190	220
Convencional - 250 - 3 días	222	257
Convencional - 250 - 14 días	191	221
Convencional - 250 - 28 días	173	200
Convencional - 250 - 7 días	207	239
Convencional - 300 - 28 días	204	236
Duramax - 250 - 28 días	220	255
Duramax - 350 - 28 días	241	279
Duramax Autosellante - 250 - 28 días	211	244
Estructural - 250 - 28 días	177	205
Grout premezclado - 350 - 28 días	362	419
Hidratium - 200 - 28 días	161	187
Impercem - 200 - 28 días	150	174
Lanzado - 250 - 28 días	269	311



Ligero - 250 - 28 días	241	279
Materiales Recicladados Llanta - 250 - 28 días	178	206
Materiales Recicladados Pet - 250 - 28 días	178	206
Materiales Recicladados Plástico de difícil reciclado - 250 - 28 días	178	206
Mortero - 150 - 28 días	251	290
Pavicrete - MR 36 - 28 días	158	182
Pavicrete - MR 36 - 3 días	200	231
Pavicrete - MR 38 - 28 días	161	186
Pavicrete - MR 42 - 28 días	180	209
Pavicrete - MR 42 - 3 días	238	276
Pervia - MR 36 - 28 días	272	314
Pesado - 300 - 28 días	217	251
Reducrack - MR 35 - 3 días	182	210
Reducrack - MR 38 - 28 días, trab ext 3 horas	171	198
Reducrack - MR 40 - 3 días	229	265
Reducrack - MR 42 - 28 días	191	221
Reducrack - MR 42 - 28 días, trab ext 3 horas	195	225
Reducrack - MR 42 - 7 días	223	258
Reducrack - MR 45 - 3 días	241	279
Reducrack - MR 45 - 7 días	232	268
Reducrack Sin malla - MR 42 - 28 días	205	237
Relleno fluido - 25 - 28 días	109	126
Relleno fluido - 30 - 28 días	116	135
Revenimiento total - 200 - 28 días	191	221
Trabajabilidad extendida - 150 - 28 días, trab ext 3 horas	147	170
Trabajabilidad extendida - 200 - 28 días, trab ext 3 horas	148	171
Trabajabilidad extendida - 25 - 28 días, trab ext 3 horas	109	126
Trabajabilidad extendida - 250 - 14 días, trab ext 3 horas	203	234
Trabajabilidad extendida - 250 - 28 días, trab ext 3 horas	166	192
Trabajabilidad extendida - 300 - 28 días, trab ext 3 horas	208	240
Vertua Materiales Recicladados - 060 - 28 días	133	154

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- ASTM C33/C33M Standard Specification for Concrete Aggregates // NMX-C-111-ONNCCE-2018 Construction Industry - Aggregates for hydraulic concrete - Specifications and Test Methods
- ASTM C94 Standard Specification for Ready-Mixed Concrete //NMX-C-155-ONNCCE-2004 Construction Industry - Hydraulic Concrete - Mass dosed - Specifications and Test Methods
- ASTM C150/C150M Standard Specification for Portland Cement // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements - Specifications and Test Methods



- ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete // NMX-C-255-ONNCCE-2006 Construction Industry - Concrete Chemical Admixtures - Specifications, sampling and test methods
- ASTM C595 Standard Specification for Blended Hydraulic Cements // NMX-C-414-ONNCCE-2017 Construction Industry - Hydraulic Cements-Specifications and Test Methods
- ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete // NMX-C-146-ONNCCE-2000 Construction Industry - Concrete additives raw or calcined natural pozzolana and fly ash for use as a mineral admixture in Portland cement concrete - Specifications
- ASTM C979/C979M Standard Specification for Pigments for Integrally Colored Concrete // NMX-C-313-1981 Construction Industry - Cement Portland - Color of mortars and concrete
- ASTM C989/C989M Standard Specification for Slag Cement for Use in Concrete and Mortars
- ASTM C1017/C1017M Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete // NMX-C-255-ONNCCE-2006 Construction Industry - Concrete Chemical Admixtures - Specifications, sampling and test methods
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- ASTM C1602/C1602M Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete // NMX-C-122-ONNCCE-2019 Construction Industry - Water for Concrete - Specifications
- ASTM G109 Standard Test Method for Determining Effects of Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments
- ASTM C330/C330M Standard Specification for Lightweight Aggregates for Structural Concrete // NMX-C-299-ONNCCE-2010 Construction Industry - Structural Hydraulic Concrete - Lightweight aggregates-specifications and test methods
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ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)
- ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures





- ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
- ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- ISO 14067:2018 Greenhouse Gases - Carbon Footprint of Products - Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products

