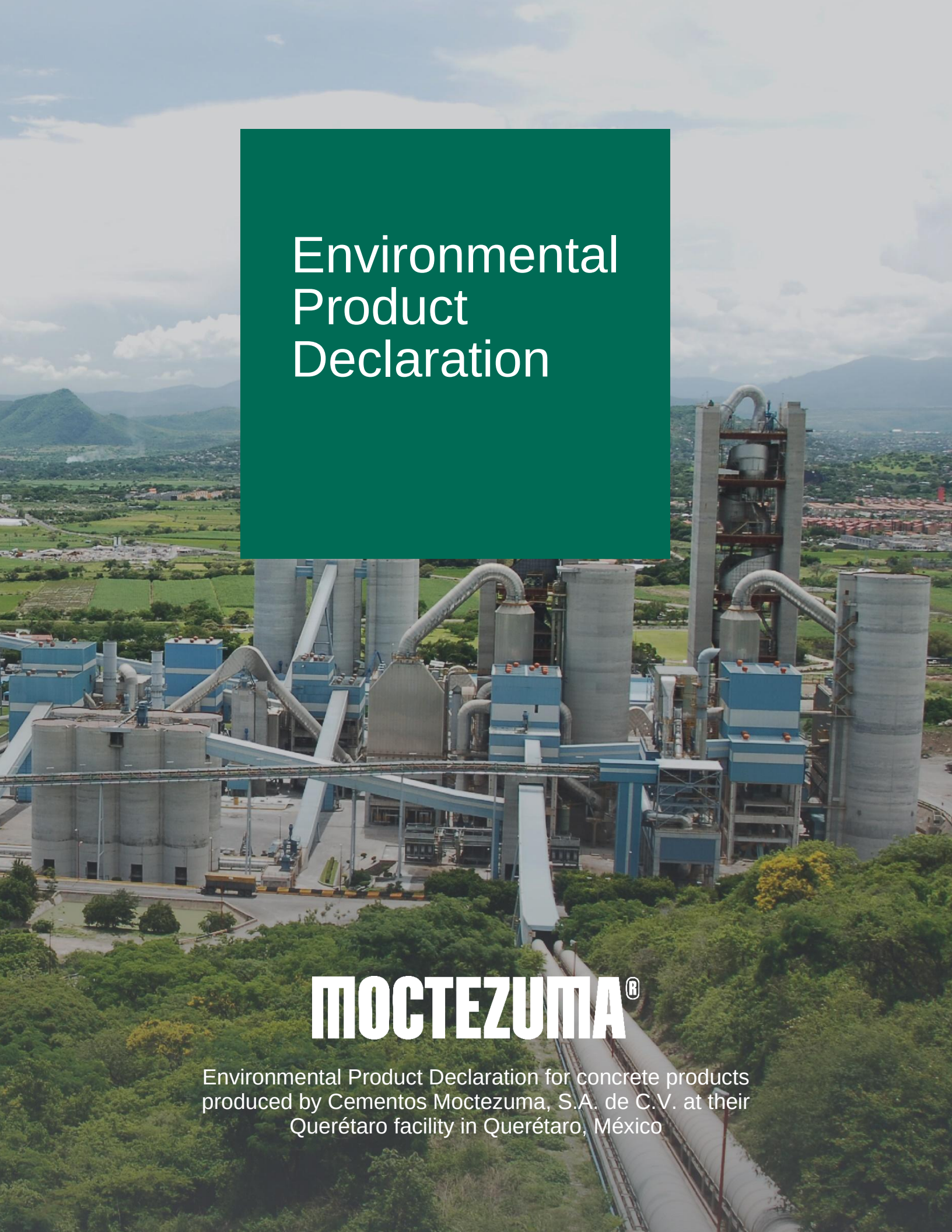

Environmental Product Declaration

MOCTEZUMA®

Environmental Product Declaration for concrete products produced by Cementos Moctezuma, S.A. de C.V. at their Querétaro facility in Querétaro, México

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers ready mix concrete products produced by Cementos Moctezuma S.A. de C.V. Declared unit: 1 m3 of concrete
Declaration Owner:	Cementos Moctezuma S.A. de C.V. 134 PH Monte Elbruz, Col. Lomas de Chapultepec Ciudad de México, México www.cmoctezuma.com.mx Jair Juan Manuel Martínez Miguel, martinez.jair@cmoctezuma.com.mx
Program Operator:	Labeling Sustainability Address, 11670 W Sunset Blvd. Los Angeles, CA www.labelingsustainability.com
Product Category Rule:	ISO 21930:2017 Sustainability in Building Construction – Environmental Declaration of Building Products: serves as the core PCR Product Category Rule of Environmental Product Declarations PCR for Concrete serves as the sub-category PCR. 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.
Independent LCA Reviewer and EPD Verifier:	This EPD was independently verified in accordance with ISO 14025 and ISO 21930. The life cycle assessment was independently reviewed in accordance ISO 14044 and the referenced PCR. Independent verification of the declaration, according to ISO 14025:2006 External Third Party Verifier Geoffrey Guest, Certified 3rd Party Verifier under the International EPD Program (www.environdec.com), CSA Group (www.csaregistries.ca)
Date of Issue:	27 January 2025
Period of Validity:	5 years; valid until 27 January 2030
EPD Number:	bbe27b4d-9e3b-4f26-8a83-f4c416a8264f

TABLE OF CONTENTS

Administrative Information **1**
Company Description **3**
Study Goal **3**
Description Of Product And Scope **4**
Ready Mix Concrete Design Summary **4**
Ready Mix Concrete Design Composition **14**
System Boundaries **15**
Cut-Off Criteria **16**
Data Sources And Data Quality Assessment **16**
- Raw Material Transport 16
- Electricity 17
- Fuel Required For Machinery 17
- Waste Generation 17
- Recovered Energy 17
- Recycled/Reused Material/Components. 17
- Module A1 Material Losses. 17
- Direct A3 Emissions Accounting 17
- Waste Transport Requirements 17
- Product Transport Requirements. 17

Data Quality Assessment **18**
Environmental Indicators And Inventory Metrics **19**
Limitations **21**
Total Impact Summary **21**
Other Environmental Info **39**
References **39**
- ASTM Standards 39
- ISO Standards 40

COMPANY DESCRIPTION

Cementos Moctezuma is a prominent Mexican company established in 1943, specializing in the production, distribution, and marketing of cement, concrete, and aggregates under the well-known brands Cementos Moctezuma and Concretos Moctezuma. Listed on the Mexican Stock Exchange since 1988, the company maintains a strong financial position characterized by discipline and zero debt.

With three cement plants boasting an annual capacity of eight million tons and 30 concrete plants producing over 590 types of concrete, Cementos Moctezuma has an extensive distribution network of more than 530 centers, covering 95% of Mexico. The company also offers value-added services, including specialized technical advice, mobile laboratories, construction supervision, and training.

Cementos Moctezuma is committed to sustainable development, aligning its operations with the United Nations' Sustainable Development Goals through a strategy focused on five pillars: Safety and health, Energy and climate change, Corporate social responsibility, Environment and biodiversity, and Circular economy. The company emphasizes technological innovation and operational efficiency to produce high-quality products while minimizing environmental impact, including reducing CO_2 emissions and optimizing water use.

A qualified team of 1,303 passionate collaborators drives Cementos Moctezuma's mission to promote the construction of a better country for families and future generations while being committed to environmental stewardship. The company also champions equity and inclusion in the construction industry through initiatives like Casco Rosa, which recognizes the contributions of women in the sector. Additionally, Cementos Moctezuma actively engages in social responsibility programs to enhance the quality of life in the communities it serves, reinforcing its status as a consolidated company with deep Mexican roots.

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. 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 differentiate Cementos Moctezuma from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Cementos Moctezuma 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; and to strengthen Cementos Moctezuma's license to operate in the community. The intended audience for this LCA report is Cementos Moctezuma'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 142 concrete mixes manufactured at Cementos Moctezuma concrete facility in Queretaro, Mexico.

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. Excluded stages include transportation of the manufactured material to the construction site; 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	Resistance strength, MPa	H2O to cement ratio
1	Convencional - f´c 100 - 7 dias	9.80 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	9.80	Proprietary
2	Convencional - f´c 100 - 3 dias	9.80 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	9.80	Proprietary
3	Convencional - f´c 100 - 28 dias	9.80 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	9.80	Proprietary
4	Convencional - f´c 100 - 14 dias	9.80 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	9.80	Proprietary
5	Convencional - f´c 150 - 7 dias	14.70 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	14.70	Proprietary
6	Convencional - f´c 150 - 3 dias	14.70 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	14.70	Proprietary
7	Convencional - f´c 150 - 28 dias	14.70 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	14.70	Proprietary

8	Convencional - f´c 150 - 14 dias	14.70 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	14.70	Proprietary
57	Relleno Fluido - f´c 30 - 7 dias	2.94 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	2.94	Proprietary
58	Relleno Fluido - f´c 30 - 3 dias	2.94 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	2.94	Proprietary
59	Relleno Fluido - f´c 30 - 28 dias	2.94 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.94	Proprietary
60	Relleno Fluido - f´c 30 - 14 dias	2.94 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	2.94	Proprietary
61	Relleno Fluido - f´c 15 - 7 dias	1.47 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	1.47	Proprietary
62	Relleno Fluido - f´c 15 - 3 dias	1.47 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	1.47	Proprietary
63	Relleno Fluido - f´c 15 - 28 dias	1.47 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	1.47	Proprietary
64	Relleno Fluido - f´c 15 - 14 dias	1.47 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	1.47	Proprietary
65	Relleno Fluido - f´c 20 - 7 dias	1.96 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	1.96	Proprietary
66	Relleno Fluido - f´c 20 - 3 dias	1.96 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	1.96	Proprietary
67	Relleno Fluido - f´c 20 - 28 dias	1.96 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	1.96	Proprietary
68	Relleno Fluido - f´c 20 - 14 dias	1.96 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	1.96	Proprietary
69	Relleno Fluido - f´c 25 - 7 dias	2.45 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	2.45	Proprietary
70	Relleno Fluido - f´c 25 - 3 dias	2.45 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	2.45	Proprietary
71	Relleno Fluido - f´c 25 - 28 dias	2.45 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	2.45	Proprietary
72	Relleno Fluido - f´c 25 - 14 dias	2.45 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	2.45	Proprietary

73	Relleno Fluido - f´c 40 - 7 dias	3.92 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	3.92	Proprietary
74	Relleno Fluido - f´c 40 - 3 dias	3.92 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	3.92	Proprietary
75	Relleno Fluido - f´c 40 - 28 dias	3.92 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	3.92	Proprietary
76	Relleno Fluido - f´c 40 - 14 dias	3.92 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	3.92	Proprietary
77	Relleno Fluido - f´c 50 - 7 dias	4.90 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	4.90	Proprietary
78	Relleno Fluido - f´c 50 - 3 dias	4.90 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	4.90	Proprietary
79	Relleno Fluido - f´c 50 - 28 dias	4.90 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	4.90	Proprietary
80	Relleno Fluido - f´c 50 - 14 dias	4.90 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	4.90	Proprietary
81	Relleno Fluido - f´c 60 - 7 dias	5.88 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	5.88	Proprietary
82	Relleno Fluido - f´c 60 - 3 dias	5.88 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	5.88	Proprietary
83	Relleno Fluido - f´c 60 - 28 dias	5.88 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	5.88	Proprietary
84	Relleno Fluido - f´c 60 - 14 dias	5.88 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	5.88	Proprietary
85	Relleno Fluido - f´c 70 - 7 dias	6.86 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	6.86	Proprietary
86	Relleno Fluido - f´c 70 - 3 dias	6.86 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	6.86	Proprietary
87	Relleno Fluido - f´c 70 - 28 dias	6.86 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	6.86	Proprietary
88	Relleno Fluido - f´c 70 - 14 dias	6.86 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	6.86	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
9	Convencional - f´c 200 - 7 dias	19.60 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
10	Convencional - f´c 200 - 3 dias	19.60 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
11	Convencional - f´c 200 - 28 dias	19.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
12	Convencional - f´c 200 - 14 dias	19.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
127	Lanzado - f´c 200 - 7 dias	19.60 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
128	Lanzado - f´c 200 - 3 dias	19.60 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
129	Lanzado - f´c 200 - 28 dias	19.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary
130	Lanzado - f´c 200 - 14 dias	19.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	19.6	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
13	Convencional - f´c 250 - 7 dias	24.50 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary

14	Convencional - f´c 250 - 3 dias	24.50 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
15	Convencional - f´c 250 - 28 dias	24.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
16	Convencional - f´c 250 - 14 dias	24.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
25	Estructural - f´c 250 - 7 dias	24.50 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
26	Estructural - f´c 250 - 3 dias	24.50 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
27	Estructural - f´c 250 - 28 dias	24.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
28	Estructural - f´c 250 - 14 dias	24.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
89	Modulo de ruptura - MR 35 - 7 dias	24.50 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
90	Modulo de ruptura - MR 35 - 3 dias	24.50 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
91	Modulo de ruptura - MR 35 - 28 dias	24.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
92	Modulo de ruptura - MR 35 - 14 dias	24.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
131	Lanzado - f´c 250 - 7 dias	24.50 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
132	Lanzado - f´c 250 - 3 dias	24.50 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
133	Lanzado - f´c 250 - 28 dias	24.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary
134	Lanzado - f´c 250 - 14 dias	24.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	24.5	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
17	Convencional - f´c 300 - 7 dias	29.40 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
18	Convencional - f´c 300 - 3 dias	29.40 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
19	Convencional - f´c 300 - 28 dias	29.40 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
20	Convencional - f´c 300 - 14 dias	29.40 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
29	Estructural - f´c 300 - 7 dias	29.40 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
30	Estructural - f´c 300 - 3 dias	29.40 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
31	Estructural - f´c 300 - 28 dias	29.40 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
32	Estructural - f´c 300 - 14 dias	29.40 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
93	Modulo de ruptura - MR 38 - 7 dias	26.60 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
94	Modulo de ruptura - MR 38 - 3 dias	26.60 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
95	Modulo de ruptura - MR 38 - 28 dias	26.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
96	Modulo de ruptura - MR 38 - 14 dias	26.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
97	Modulo de ruptura - MR 40 - 7 dias	28.00 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary
98	Modulo de ruptura - MR 40 - 3 dias	28.00 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary
99	Modulo de ruptura - MR 40 - 28 dias	28.00 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary

100	Modulo de ruptura - MR 40 - 14 dias	28.00 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary
101	Modulo de ruptura - MR 42 - 7 dias	29.40 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
102	Modulo de ruptura - MR 42 - 3 dias	29.40 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
103	Modulo de ruptura - MR 42 - 28 dias	29.40 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
104	Modulo de ruptura - MR 42 - 14 dias	29.40 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
113	Modulo de ruptura - MR 36 - 7 dias	25.20 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	25.2	Proprietary
114	Modulo de ruptura - MR 36 - 3 dias	25.20 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	25.2	Proprietary
115	Modulo de ruptura - MR 36 - 28 dias	25.20 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	25.2	Proprietary
116	Modulo de ruptura - MR 36 - 14 dias	25.20 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	25.2	Proprietary
117	Baja contracción - MR 38 - 28 dias	26.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
118	Baja contracción - MR 38 - 14 dias	26.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	26.6	Proprietary
119	Baja contracción - MR 40 - 28 dias	28.00 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary
120	Baja contracción - MR 40 - 14 dias	28.00 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	28.0	Proprietary
121	Baja contracción - MR 42 - 28 dias	29.40 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
122	Baja contracción - MR 42 - 14 dias	29.40 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
135	Lanzado - f´c 300 - 7 dias	29.40 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
136	Lanzado - f´c 300 - 3 dias	29.40 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary

137	Lanzado - f´c 300 - 28 dias	29.40 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary
138	Lanzado - f´c 300 - 14 dias	29.40 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	29.4	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
21	Convencional - f´c 350 - 7 dias	34.30 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
22	Convencional - f´c 350 - 3 dias	34.30 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
23	Convencional - f´c 350 - 28 dias	34.30 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
24	Convencional - f´c 350 - 14 dias	34.30 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
33	Estructural - f´c 350 - 7 dias	34.30 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
34	Estructural - f´c 350 - 3 dias	34.30 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
35	Estructural - f´c 350 - 28 dias	34.30 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
36	Estructural - f´c 350 - 14 dias	34.30 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
105	Modulo de ruptura - MR 45 - 7 dias	31.50 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary
106	Modulo de ruptura - MR 45 - 3 dias	31.50 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary
107	Modulo de ruptura - MR 45 - 28 dias	31.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary
108	Modulo de ruptura - MR 45 - 14 dias	31.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary

109	Modulo de ruptura - MR 48 - 7 dias	33.60 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
110	Modulo de ruptura - MR 48 - 3 dias	33.60 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
111	Modulo de ruptura - MR 48 - 28 dias	33.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
112	Modulo de ruptura - MR 48 - 14 dias	33.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
123	Baja contracción - MR 45 - 28 dias	31.50 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary
124	Baja contracción - MR 45 - 14 dias	31.50 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	31.5	Proprietary
125	Baja contracción - MR 48 - 28 dias	33.60 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
126	Baja contracción - MR 48 - 14 dias	33.60 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	33.6	Proprietary
139	Lanzado - f´c 350 - 7 dias	34.30 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
140	Lanzado - f´c 350 - 3 dias	34.30 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
141	Lanzado - f´c 350 - 28 dias	34.30 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary
142	Lanzado - f´c 350 - 14 dias	34.30 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	34.3	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
37	Alta resistencia - f´c 400 - 7 dias	39.20 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	39.2	Proprietary
38	Alta resistencia - f´c 400 - 3 dias	39.20 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	39.2	Proprietary
39	Alta resistencia - f´c 400 - 28 dias	39.20 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	39.2	Proprietary

40	Alta resistencia - f´c 400 - 14 dias	39.20 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	39.2	Proprietary

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	Resistance strength, MPa	H2O to cement ratio
41	Alta resistencia - f´c 450 - 7 dias	44.10 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	44.1	Proprietary
42	Alta resistencia - f´c 450 - 3 dias	44.10 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	44.1	Proprietary
43	Alta resistencia - f´c 450 - 28 dias	44.10 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	44.1	Proprietary
44	Alta resistencia - f´c 450 - 14 dias	44.10 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	44.1	Proprietary

Mix Designs: 46 to 50 MPa

Table 7: **Declared products with Mix designs: 46 to 50MPa considered in this environmental product declaration**

Mix#	Unique name/ID	Short description	Product type	Resistance strength, MPa	H2O to cement ratio
45	Alta resistencia - f´c 500 - 7 dias	49.00 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	49	Proprietary
46	Alta resistencia - f´c 500 - 3 dias	49.00 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	49	Proprietary
47	Alta resistencia - f´c 500 - 28 dias	49.00 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	49	Proprietary
48	Alta resistencia - f´c 500 - 14 dias	49.00 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	49	Proprietary

Mix Designs: 51 to 55 MPa

Table 7: **Declared products with Mix designs: 51 to 55MPa considered in this environmental product declaration**

Mix#	Unique name/ID	Short description	Product type	Resistance strength, MPa	H2O to cement ratio
49	Alta resistencia - f´c 550 - 7 dias	53.90 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	53.9	Proprietary
50	Alta resistencia - f´c 550 - 3 dias	53.90 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	53.9	Proprietary
51	Alta resistencia - f´c 550 - 28 dias	53.90 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	53.9	Proprietary
52	Alta resistencia - f´c 550 - 14 dias	53.90 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	53.9	Proprietary

Mix Designs: 56 to 60 MPa

Table 7: **Declared products with Mix designs: 56 to 60MPa considered in this environmental product declaration**

Mix#	Unique name/ID	Short description	Product type	Resistance strength, MPa	H2O to cement ratio
53	Alta resistencia - f´c 600 - 7 dias	58.80 MPa 7d strength Ready Mix Concrete	Ready Mix Concrete	58.8	Proprietary
54	Alta resistencia - f´c 600 - 3 dias	58.80 MPa 3d strength Ready Mix Concrete	Ready Mix Concrete	58.8	Proprietary
55	Alta resistencia - f´c 600 - 28 dias	58.80 MPa 28d strength Ready Mix Concrete	Ready Mix Concrete	58.8	Proprietary
56	Alta resistencia - f´c 600 - 14 dias	58.80 MPa 14d strength Ready Mix Concrete	Ready Mix Concrete	58.8	Proprietary

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.

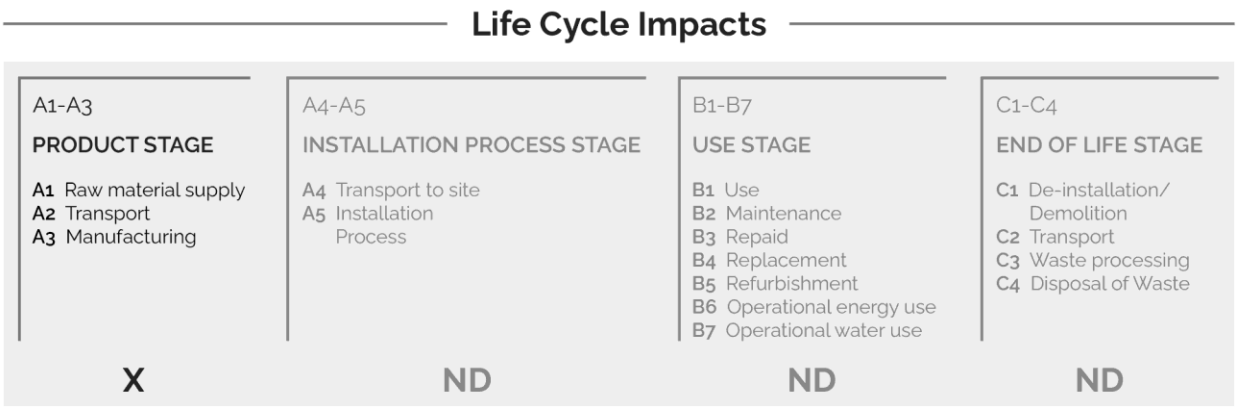

Figure 1: **General life cycle phases for consideration in a construction works system**

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.

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

Raw Material Supply (A1)	Transport (A2)	Manufacturing (A3)
Cements & SCMs Aggregates Admixtures Batch Water Fibers & Pigments	Truck, Rail, Ship Energy Carriers (fuels)	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

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

In addition, 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 is related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by Cementos Moctezuma, is located at their Querétaro facility in Quéretaro, México. All operating data is formulated using the actual data from Cementos Moctezuma'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 Cementos Moctezuma 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 Moctezuma in calendar year 2023. These values were direct reported from Moctezuma 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 cement plant.

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

Waste generation: No High-level radioactive waste is generated on-site at this facility.

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

Recycled/reused material/components: The amount of returned concrete is based on Moctezuma 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 Moctezuma information for the reference year 2023.

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
Andesite Sand	basalt quarry operation/basalt/RoW/ kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Edo. Mex	2024	2	3	1	3	3
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.10 in 2024	Edo. Mex	2024	2	3	2	3	3

Limestone Gravel	limestone quarry operation/limestone, unprocessed/RoW/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Edo. Mex	2024	2	3	1	3	3
Additives	chemical production, organic/chemical, organic/GLO/kg	ecoinvent v3.10 in 2024	Queretaro	2024	2	3	1	3	3
Cement	Gris CPC 40RS/cement/MX/tonne	Program Operator: Labeling Sustainability - EPD ID: bb72e77d-c6d2-4caa-ba9e-18cce10c7824	Morelos	23 November 2024	3	3	3	3	3
River Sand	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.10 in 2024	Morelos	2024	2	3	2	3	3

DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the data quality achieved 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 input 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 level 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 CO2-eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO2-eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O3-eq

6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPfossil	MJ
Inventory metrics			
7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	PRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	kg
11	Inventory indicators ISO21930: use of secondary material	SM	MJ
12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: recovered energy	RE	MJ
14	Inventory indicators ISO21930: use of net fresh water	FW	m3
15	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
16	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
17	Inventory indicators ISO21930: high-level radioactive waste disposed	HLRW	kg
18	Inventory indicators ISO21930: intermediate and low-level radioactive waste disposed	ILLRW	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg
20	Inventory indicators ISO21930: materials for energy recovery	MER	kg

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 this 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	ADPfossil
Unit	**kg CO2-eq**	**kg CFC-11-eq**	**kg SO2-eq**	**kg N-eq**	**kg O3-eq**	**MJ**
Alta resistencia - f´c 400 - 14 dias	462	3.64E-06	0.457	0.249	8.49	2880
Alta resistencia - f´c 400 - 28 dias	439	3.47E-06	0.44	0.237	8.22	2750
Alta resistencia - f´c 400 - 3 dias	532	4.15E-06	0.507	0.283	9.28	3280
Alta resistencia - f´c 400 - 7 dias	490	3.85E-06	0.477	0.263	8.81	3050
Alta resistencia - f´c 450 - 14 dias	494	3.87E-06	0.479	0.264	8.84	3060
Alta resistencia - f´c 450 - 28 dias	470	3.70E-06	0.463	0.253	8.58	2930
Alta resistencia - f´c 450 - 3 dias	563	4.39E-06	0.53	0.299	9.64	3470

Alta resistencia - f´c 450 - 7 dias	521	4.08E-06	0.5	0.278	9.16	3230
Alta resistencia - f´c 500 - 14 dias	522	4.09E-06	0.501	0.279	9.18	3230
Alta resistencia - f´c 500 - 28 dias	499	3.91E-06	0.484	0.267	8.91	3100
Alta resistencia - f´c 500 - 3 dias	592	4.60E-06	0.551	0.313	9.97	3630
Alta resistencia - f´c 500 - 7 dias	550	4.29E-06	0.521	0.292	9.5	3390
Alta resistencia - f´c 550 - 14 dias	567	4.42E-06	0.533	0.301	9.69	3490
Alta resistencia - f´c 550 - 28 dias	544	4.24E-06	0.516	0.289	9.42	3360
Alta resistencia - f´c 550 - 3 dias	636	4.93E-06	0.584	0.335	10.5	3890
Alta resistencia - f´c 550 - 7 dias	595	4.62E-06	0.554	0.315	10	3650
Alta resistencia - f´c 600 - 14 dias	608	4.72E-06	0.563	0.321	10.2	3730
Alta resistencia - f´c 600 - 28 dias	584	4.55E-06	0.546	0.309	9.89	3590
Alta resistencia - f´c 600 - 3 dias	677	5.23E-06	0.614	0.356	11	4130
Alta resistencia - f´c 600 - 7 dias	636	4.92E-06	0.584	0.335	10.5	3890
Baja contracción - MR 38 - 14 dias	328	2.73E-06	0.369	0.222	7.06	2150
Baja contracción - MR 38 - 28 dias	304	2.55E-06	0.352	0.207	6.78	2010
Baja contracción - MR 40 - 14 dias	338	2.81E-06	0.377	0.228	7.18	2210
Baja contracción - MR 40 - 28 dias	315	2.63E-06	0.359	0.214	6.9	2070
Baja contracción - MR 42 - 14 dias	350	2.90E-06	0.386	0.236	7.32	2280
Baja contracción - MR 42 - 28 dias	327	2.72E-06	0.368	0.221	7.04	2140
Baja contracción - MR 45 - 14 dias	370	3.05E-06	0.401	0.248	7.55	2400
Baja contracción - MR 45 - 28 dias	346	2.87E-06	0.383	0.233	7.28	2260
Baja contracción - MR 48 - 14 dias	391	3.22E-06	0.417	0.261	7.81	2530
Baja contracción - MR 48 - 28 dias	368	3.04E-06	0.399	0.247	7.52	2390
Convencional - f´c 100 - 14 dias	222	1.85E-06	0.279	0.126	5.66	1480
Convencional - f´c 100 - 28 dias	199	1.68E-06	0.262	0.115	5.39	1350
Convencional - f´c 100 - 3 dias	291	2.36E-06	0.329	0.16	6.45	1880

Convencional - f´c 100 - 7 dias	245	2.02E-06	0.295	0.138	5.93	1620
Convencional - f´c 150 - 14 dias	248	2.04E-06	0.298	0.139	5.96	1630
Convencional - f´c 150 - 28 dias	225	1.87E-06	0.281	0.128	5.69	1500
Convencional - f´c 150 - 3 dias	317	2.55E-06	0.348	0.173	6.75	2030
Convencional - f´c 150 - 7 dias	271	2.21E-06	0.314	0.15	6.22	1770
Convencional - f´c 200 - 14 dias	286	2.33E-06	0.326	0.158	6.42	1860
Convencional - f´c 200 - 28 dias	262	2.16E-06	0.309	0.146	6.15	1720
Convencional - f´c 200 - 3 dias	355	2.84E-06	0.376	0.191	7.21	2260
Convencional - f´c 200 - 7 dias	309	2.50E-06	0.343	0.169	6.68	1990
Convencional - f´c 250 - 14 dias	318	2.57E-06	0.35	0.173	6.79	2040
Convencional - f´c 250 - 28 dias	295	2.40E-06	0.333	0.162	6.53	1910
Convencional - f´c 250 - 3 dias	387	3.08E-06	0.4	0.207	7.59	2440
Convencional - f´c 250 - 7 dias	341	2.73E-06	0.366	0.184	7.05	2180
Convencional - f´c 300 - 14 dias	373	2.97E-06	0.39	0.2	7.42	2360
Convencional - f´c 300 - 28 dias	350	2.80E-06	0.372	0.189	7.15	2230
Convencional - f´c 300 - 3 dias	443	3.48E-06	0.44	0.233	8.21	2760
Convencional - f´c 300 - 7 dias	397	3.14E-06	0.406	0.211	7.68	2500
Convencional - f´c 350 - 14 dias	426	3.36E-06	0.428	0.225	8.01	2670
Convencional - f´c 350 - 28 dias	403	3.19E-06	0.411	0.214	7.75	2530
Convencional - f´c 350 - 3 dias	496	3.87E-06	0.478	0.259	8.81	3070
Convencional - f´c 350 - 7 dias	449	3.53E-06	0.445	0.237	8.29	2800
Estructural - f´c 250 - 14 dias	318	2.57E-06	0.35	0.173	6.79	2040
Estructural - f´c 250 - 28 dias	295	2.40E-06	0.333	0.162	6.53	1910
Estructural - f´c 250 - 3 dias	387	3.08E-06	0.4	0.207	7.59	2440
Estructural - f´c 250 - 7 dias	341	2.73E-06	0.366	0.184	7.05	2180
Estructural - f´c 300 - 14 dias	373	2.97E-06	0.39	0.2	7.42	2360

Estructural - f´c 300 - 28 dias	350	2.80E-06	0.372	0.189	7.15	2230
Estructural - f´c 300 - 3 dias	443	3.48E-06	0.44	0.233	8.21	2760
Estructural - f´c 300 - 7 dias	397	3.14E-06	0.406	0.211	7.68	2500
Estructural - f´c 350 - 14 dias	426	3.36E-06	0.428	0.225	8.01	2670
Estructural - f´c 350 - 28 dias	403	3.19E-06	0.411	0.214	7.75	2530
Estructural - f´c 350 - 3 dias	496	3.87E-06	0.478	0.259	8.81	3070
Estructural - f´c 350 - 7 dias	449	3.53E-06	0.445	0.237	8.29	2800
Lanzado - f´c 200 - 14 dias	414	3.24E-06	0.405	0.207	7.63	2580
Lanzado - f´c 200 - 28 dias	386	3.05E-06	0.385	0.195	7.33	2420
Lanzado - f´c 200 - 3 dias	460	3.58E-06	0.438	0.229	8.15	2840
Lanzado - f´c 200 - 7 dias	441	3.44E-06	0.425	0.22	7.94	2740
Lanzado - f´c 250 - 14 dias	441	3.44E-06	0.425	0.22	7.95	2740
Lanzado - f´c 250 - 28 dias	414	3.24E-06	0.405	0.207	7.64	2580
Lanzado - f´c 250 - 3 dias	487	3.78E-06	0.459	0.241	8.47	3000
Lanzado - f´c 250 - 7 dias	469	3.65E-06	0.445	0.233	8.26	2890
Lanzado - f´c 300 - 14 dias	474	3.68E-06	0.449	0.235	8.31	2920
Lanzado - f´c 300 - 28 dias	446	3.48E-06	0.429	0.222	8.01	2760
Lanzado - f´c 300 - 3 dias	520	4.02E-06	0.482	0.256	8.83	3180
Lanzado - f´c 300 - 7 dias	501	3.88E-06	0.469	0.248	8.63	3080
Lanzado - f´c 350 - 14 dias	526	4.07E-06	0.487	0.259	8.91	3220
Lanzado - f´c 350 - 28 dias	499	3.87E-06	0.467	0.247	8.61	3070
Lanzado - f´c 350 - 3 dias	572	4.40E-06	0.52	0.28	9.43	3490
Lanzado - f´c 350 - 7 dias	554	4.27E-06	0.507	0.272	9.22	3380
Modulo de ruptura - MR 35 - 14 dias	331	2.67E-06	0.358	0.187	6.91	2120
Modulo de ruptura - MR 35 - 28 dias	308	2.50E-06	0.341	0.175	6.64	1980
Modulo de ruptura - MR 35 - 3 dias	410	3.26E-06	0.416	0.227	7.82	2580

Modulo de ruptura - MR 35 - 7 dias	373	2.98E-06	0.389	0.208	7.4	2360
Modulo de ruptura - MR 36 - 14 dias	333	2.68E-06	0.36	0.188	6.93	2130
Modulo de ruptura - MR 36 - 28 dias	310	2.51E-06	0.342	0.176	6.66	1990
Modulo de ruptura - MR 36 - 3 dias	412	3.27E-06	0.418	0.228	7.84	2590
Modulo de ruptura - MR 36 - 7 dias	375	2.99E-06	0.39	0.209	7.41	2370
Modulo de ruptura - MR 38 - 14 dias	343	2.76E-06	0.367	0.193	7.04	2190
Modulo de ruptura - MR 38 - 28 dias	320	2.59E-06	0.35	0.181	6.77	2050
Modulo de ruptura - MR 38 - 3 dias	422	3.34E-06	0.425	0.233	7.96	2650
Modulo de ruptura - MR 38 - 7 dias	385	3.07E-06	0.398	0.214	7.53	2430
Modulo de ruptura - MR 40 - 14 dias	354	2.84E-06	0.375	0.199	7.18	2250
Modulo de ruptura - MR 40 - 28 dias	331	2.67E-06	0.358	0.187	6.9	2120
Modulo de ruptura - MR 40 - 3 dias	433	3.43E-06	0.433	0.239	8.09	2710
Modulo de ruptura - MR 40 - 7 dias	396	3.15E-06	0.406	0.22	7.66	2500
Modulo de ruptura - MR 42 - 14 dias	367	2.94E-06	0.385	0.205	7.33	2330
Modulo de ruptura - MR 42 - 28 dias	344	2.77E-06	0.368	0.194	7.05	2190
Modulo de ruptura - MR 42 - 3 dias	446	3.53E-06	0.443	0.246	8.24	2790
Modulo de ruptura - MR 42 - 7 dias	409	3.25E-06	0.416	0.227	7.81	2570
Modulo de ruptura - MR 45 - 14 dias	388	3.09E-06	0.4	0.216	7.56	2450
Modulo de ruptura - MR 45 - 28 dias	365	2.92E-06	0.383	0.204	7.29	2310
Modulo de ruptura - MR 45 - 3 dias	467	3.68E-06	0.458	0.256	8.48	2910
Modulo de ruptura - MR 45 - 7 dias	430	3.40E-06	0.431	0.237	8.05	2690
Modulo de ruptura - MR 48 - 14 dias	410	3.26E-06	0.416	0.227	7.82	2580
Modulo de ruptura - MR 48 - 28 dias	387	3.08E-06	0.399	0.215	7.55	2440
Modulo de ruptura - MR 48 - 3 dias	489	3.84E-06	0.474	0.267	8.74	3040
Modulo de ruptura - MR 48 - 7 dias	452	3.57E-06	0.447	0.249	8.31	2820
Relleno Fluido - f´c 15 - 14 dias	174	1.41E-06	0.204	0.0674	4.37	1140

Relleno Fluido - f´c 15 - 28 dias	151	1.25E-06	0.188	0.0608	4.11	1020
Relleno Fluido - f´c 15 - 3 dias	247	1.92E-06	0.255	0.0884	5.17	1550
Relleno Fluido - f´c 15 - 7 dias	201	1.60E-06	0.223	0.0753	4.67	1300
Relleno Fluido - f´c 20 - 14 dias	178	1.44E-06	0.207	0.0687	4.42	1170
Relleno Fluido - f´c 20 - 28 dias	155	1.28E-06	0.191	0.0621	4.16	1040
Relleno Fluido - f´c 20 - 3 dias	252	1.95E-06	0.258	0.0897	5.23	1580
Relleno Fluido - f´c 20 - 7 dias	206	1.63E-06	0.226	0.0766	4.72	1320
Relleno Fluido - f´c 25 - 14 dias	184	1.48E-06	0.211	0.0703	4.48	1200
Relleno Fluido - f´c 25 - 28 dias	161	1.32E-06	0.195	0.0637	4.22	1070
Relleno Fluido - f´c 25 - 3 dias	257	1.99E-06	0.262	0.0913	5.29	1610
Relleno Fluido - f´c 25 - 7 dias	211	1.67E-06	0.23	0.0782	4.78	1360
Relleno Fluido - f´c 30 - 14 dias	190	1.52E-06	0.215	0.0721	4.55	1240
Relleno Fluido - f´c 30 - 28 dias	167	1.36E-06	0.199	0.0655	4.29	1110
Relleno Fluido - f´c 30 - 3 dias	263	2.04E-06	0.267	0.0931	5.36	1650
Relleno Fluido - f´c 30 - 7 dias	218	1.72E-06	0.235	0.08	4.85	1390
Relleno Fluido - f´c 40 - 14 dias	203	1.61E-06	0.224	0.0758	4.69	1310
Relleno Fluido - f´c 40 - 28 dias	180	1.45E-06	0.208	0.0692	4.43	1180
Relleno Fluido - f´c 40 - 3 dias	276	2.13E-06	0.276	0.0968	5.5	1720
Relleno Fluido - f´c 40 - 7 dias	230	1.81E-06	0.244	0.0837	5	1460
Relleno Fluido - f´c 50 - 14 dias	219	1.73E-06	0.236	0.0805	4.87	1400
Relleno Fluido - f´c 50 - 28 dias	197	1.58E-06	0.222	0.0745	4.68	1280
Relleno Fluido - f´c 50 - 3 dias	293	2.24E-06	0.287	0.101	5.68	1810
Relleno Fluido - f´c 50 - 7 dias	247	1.92E-06	0.255	0.0884	5.18	1550
Relleno Fluido - f´c 60 - 14 dias	238	1.86E-06	0.249	0.0857	5.07	1500
Relleno Fluido - f´c 60 - 28 dias	215	1.70E-06	0.232	0.0792	4.81	1370
Relleno Fluido - f´c 60 - 3 dias	311	2.37E-06	0.3	0.107	5.87	1910

Relleno Fluido - f´c 60 - 7 dias	265	2.05E-06	0.268	0.0936	5.37	1660
Relleno Fluido - f´c 70 - 14 dias	261	2.02E-06	0.264	0.0923	5.32	1630
Relleno Fluido - f´c 70 - 28 dias	238	1.86E-06	0.248	0.0857	5.06	1500
Relleno Fluido - f´c 70 - 3 dias	334	2.53E-06	0.316	0.113	6.13	2040
Relleno Fluido - f´c 70 - 7 dias	288	2.21E-06	0.284	0.1	5.62	1780

b) Resource Inventory Metrics:

Indicator/LCI Metric	**RPRE**	**PRM**	**NRPRE**	**NRPRM**	**SM**	**RSF**	**RE**	**FW**
Unit	**MJ**	**MJ**	**MJ**	**kg**	**MJ**	**MJ**	**MJ**	**m3**
Alta resistencia - f´c 400 - 14 dias	93.4	1.16	92.3	1350	0.625	0.00618	0.267	0.57
Alta resistencia - f´c 400 - 28 dias	88.8	1.1	87.7	1270	0.601	0.00601	0.257	0.557
Alta resistencia - f´c 400 - 3 dias	107	1.35	106	1560	0.697	0.00668	0.297	0.605
Alta resistencia - f´c 400 - 7 dias	99	1.23	97.8	1430	0.654	0.00639	0.279	0.584
Alta resistencia - f´c 450 - 14 dias	99.7	1.24	98.5	1440	0.657	0.0064	0.281	0.589
Alta resistencia - f´c 450 - 28 dias	95.1	1.18	93.9	1370	0.633	0.00623	0.27	0.578
Alta resistencia - f´c 450 - 3 dias	114	1.43	112	1660	0.731	0.00693	0.312	0.626
Alta resistencia - f´c 450 - 7 dias	105	1.32	104	1530	0.687	0.00661	0.293	0.603
Alta resistencia - f´c 500 - 14 dias	105	1.32	104	1530	0.687	0.00662	0.293	0.602
Alta resistencia - f´c 500 - 28 dias	101	1.26	99.6	1460	0.663	0.00645	0.283	0.592
Alta resistencia - f´c 500 - 3 dias	119	1.51	118	1750	0.761	0.00714	0.324	0.642
Alta resistencia - f´c 500 - 7 dias	111	1.4	110	1620	0.717	0.00683	0.306	0.618
Alta resistencia - f´c 550 - 14 dias	114	1.44	113	1670	0.735	0.00696	0.313	0.628
Alta resistencia - f´c 550 - 28 dias	110	1.38	108	1600	0.71	0.00678	0.303	0.616
Alta resistencia - f´c 550 - 3 dias	128	1.63	127	1880	0.808	0.00747	0.344	0.667
Alta resistencia - f´c 550 - 7 dias	120	1.51	118	1750	0.764	0.00717	0.326	0.643
Alta resistencia - f´c 600 - 14 dias	123	1.55	121	1790	0.778	0.00726	0.331	0.649

Alta resistencia - f´c 600 - 28 dias	118	1.49	116	1720	0.753	0.00709	0.321	0.636
Alta resistencia - f´c 600 - 3 dias	136	1.73	135	2010	0.852	0.00779	0.363	0.688
Alta resistencia - f´c 600 - 7 dias	128	1.62	126	1880	0.808	0.00747	0.344	0.664
Baja contracción - MR 38 - 14 dias	67.5	0.794	66.7	938	0.491	0.00526	0.229	0.468
Baja contracción - MR 38 - 28 dias	62.7	0.732	62	866	0.467	0.00508	0.218	0.452
Baja contracción - MR 40 - 14 dias	69.6	0.822	68.7	971	0.503	0.00534	0.234	0.473
Baja contracción - MR 40 - 28 dias	64.8	0.76	64	898	0.478	0.00516	0.223	0.458
Baja contracción - MR 42 - 14 dias	72	0.854	71.1	1010	0.515	0.00542	0.24	0.481
Baja contracción - MR 42 - 28 dias	67.3	0.792	66.5	936	0.49	0.00525	0.229	0.466
Baja contracción - MR 45 - 14 dias	76	0.906	75.1	1070	0.536	0.00558	0.25	0.494
Baja contracción - MR 45 - 28 dias	71.3	0.844	70.4	997	0.512	0.0054	0.239	0.478
Baja contracción - MR 48 - 14 dias	80.4	0.963	79.4	1140	0.56	0.00575	0.261	0.507
Baja contracción - MR 48 - 28 dias	75.6	0.901	74.7	1060	0.534	0.00556	0.249	0.492
Convencional - f´c 100 - 14 dias	45.3	0.522	44.8	606	0.366	0.0043	0.157	0.447
Convencional - f´c 100 - 28 dias	40.7	0.46	40.2	535	0.342	0.00413	0.147	0.438
Convencional - f´c 100 - 3 dias	59.2	0.708	58.5	820	0.438	0.00481	0.187	0.484
Convencional - f´c 100 - 7 dias	50	0.584	49.3	678	0.39	0.00447	0.167	0.459
Convencional - f´c 150 - 14 dias	50.5	0.591	49.9	686	0.393	0.00449	0.168	0.461
Convencional - f´c 150 - 28 dias	45.9	0.53	45.3	615	0.369	0.00432	0.158	0.449
Convencional - f´c 150 - 3 dias	64.4	0.777	63.6	900	0.466	0.005	0.198	0.497
Convencional - f´c 150 - 7 dias	55.1	0.653	54.4	758	0.417	0.00466	0.178	0.473
Convencional - f´c 200 - 14 dias	58.1	0.69	57.3	800	0.437	0.00483	0.186	0.486
Convencional - f´c 200 - 28 dias	53.5	0.628	52.8	729	0.413	0.00467	0.177	0.476
Convencional - f´c 200 - 3 dias	71.9	0.876	71	1010	0.509	0.00533	0.216	0.521
Convencional - f´c 200 - 7 dias	62.7	0.752	61.9	872	0.461	0.005	0.196	0.499
Convencional - f´c 250 - 14 dias	64.5	0.777	63.7	900	0.471	0.00507	0.201	0.503

Convencional - f´c 250 - 28 dias	59.9	0.715	59.2	829	0.447	0.00491	0.191	0.492
Convencional - f´c 250 - 3 dias	78.4	0.963	77.4	1110	0.544	0.00558	0.231	0.539
Convencional - f´c 250 - 7 dias	69.1	0.839	68.3	972	0.495	0.00524	0.21	0.516
Convencional - f´c 300 - 14 dias	75.6	0.925	74.7	1070	0.529	0.00547	0.225	0.539
Convencional - f´c 300 - 28 dias	71	0.864	70.1	1000	0.504	0.00529	0.214	0.528
Convencional - f´c 300 - 3 dias	89.4	1.11	88.3	1290	0.601	0.00598	0.254	0.575
Convencional - f´c 300 - 7 dias	80.2	0.987	79.2	1140	0.553	0.00564	0.235	0.551
Convencional - f´c 350 - 14 dias	86.1	1.07	85	1230	0.583	0.00585	0.247	0.565
Convencional - f´c 350 - 28 dias	81.5	1	80.5	1160	0.559	0.00568	0.237	0.554
Convencional - f´c 350 - 3 dias	100	1.25	98.7	1450	0.656	0.00637	0.278	0.603
Convencional - f´c 350 - 7 dias	90.8	1.13	89.6	1310	0.608	0.00604	0.258	0.578
Estructural - f´c 250 - 14 dias	64.5	0.777	63.7	900	0.471	0.00507	0.201	0.503
Estructural - f´c 250 - 28 dias	59.9	0.715	59.2	829	0.447	0.00491	0.191	0.492
Estructural - f´c 250 - 3 dias	78.4	0.963	77.4	1110	0.544	0.00558	0.231	0.539
Estructural - f´c 250 - 7 dias	69.1	0.839	68.3	972	0.495	0.00524	0.21	0.516
Estructural - f´c 300 - 14 dias	75.6	0.925	74.7	1070	0.529	0.00547	0.225	0.539
Estructural - f´c 300 - 28 dias	71	0.864	70.1	1000	0.504	0.00529	0.214	0.528
Estructural - f´c 300 - 3 dias	89.4	1.11	88.3	1290	0.601	0.00598	0.254	0.575
Estructural - f´c 300 - 7 dias	80.2	0.987	79.2	1140	0.553	0.00564	0.235	0.551
Estructural - f´c 350 - 14 dias	86.1	1.07	85	1230	0.583	0.00585	0.247	0.565
Estructural - f´c 350 - 28 dias	81.5	1	80.5	1160	0.559	0.00568	0.237	0.554
Estructural - f´c 350 - 3 dias	100	1.25	98.7	1450	0.656	0.00637	0.278	0.603
Estructural - f´c 350 - 7 dias	90.8	1.13	89.6	1310	0.608	0.00604	0.258	0.578
Lanzado - f´c 200 - 14 dias	83.4	1.04	82.3	1200	0.566	0.00566	0.233	0.621
Lanzado - f´c 200 - 28 dias	77.9	0.963	76.9	1110	0.539	0.00548	0.222	0.611
Lanzado - f´c 200 - 3 dias	92.5	1.16	91.4	1340	0.613	0.00599	0.252	0.638

Lanzado - f´c 200 - 7 dias	88.9	1.11	87.7	1280	0.594	0.00585	0.245	0.632
Lanzado - f´c 250 - 14 dias	88.9	1.11	87.8	1280	0.594	0.00586	0.245	0.631
Lanzado - f´c 250 - 28 dias	83.4	1.04	82.3	1200	0.566	0.00566	0.233	0.621
Lanzado - f´c 250 - 3 dias	98.1	1.23	96.8	1420	0.642	0.00619	0.264	0.65
Lanzado - f´c 250 - 7 dias	94.4	1.19	93.2	1370	0.623	0.00605	0.256	0.643
Lanzado - f´c 300 - 14 dias	95.3	1.2	94.1	1380	0.628	0.00609	0.259	0.647
Lanzado - f´c 300 - 28 dias	89.8	1.12	88.7	1300	0.6	0.0059	0.247	0.635
Lanzado - f´c 300 - 3 dias	104	1.32	103	1520	0.675	0.00641	0.278	0.664
Lanzado - f´c 300 - 7 dias	101	1.27	99.6	1470	0.657	0.00629	0.27	0.656
Lanzado - f´c 350 - 14 dias	106	1.34	104	1540	0.683	0.00647	0.281	0.669
Lanzado - f´c 350 - 28 dias	100	1.26	99	1460	0.655	0.00629	0.27	0.657
Lanzado - f´c 350 - 3 dias	115	1.46	114	1690	0.731	0.00681	0.3	0.689
Lanzado - f´c 350 - 7 dias	111	1.41	110	1630	0.711	0.00667	0.292	0.681
Modulo de ruptura - MR 35 - 14 dias	67.4	0.814	66.5	947	0.48	0.00509	0.207	0.507
Modulo de ruptura - MR 35 - 28 dias	62.7	0.752	61.9	875	0.455	0.00492	0.197	0.496
Modulo de ruptura - MR 35 - 3 dias	83.2	1.02	82.1	1190	0.564	0.00569	0.243	0.551
Modulo de ruptura - MR 35 - 7 dias	75.7	0.925	74.8	1080	0.525	0.00542	0.226	0.531
Modulo de ruptura - MR 36 - 14 dias	67.7	0.819	66.9	952	0.482	0.00511	0.208	0.509
Modulo de ruptura - MR 36 - 28 dias	63.1	0.757	62.3	881	0.457	0.00492	0.197	0.497
Modulo de ruptura - MR 36 - 3 dias	83.5	1.03	82.5	1200	0.565	0.00569	0.243	0.551
Modulo de ruptura - MR 36 - 7 dias	76.1	0.93	75.1	1080	0.526	0.00542	0.227	0.532

Modulo de ruptura - MR 38 - 14 dias	69.8	0.846	68.9	984	0.492	0.00518	0.212	0.514
Modulo de ruptura - MR 38 - 28 dias	65.1	0.784	64.3	912	0.468	0.005	0.202	0.501
Modulo de ruptura - MR 38 - 3 dias	85.6	1.06	84.5	1230	0.576	0.00577	0.248	0.557
Modulo de ruptura - MR 38 - 7 dias	78.1	0.958	77.2	1110	0.537	0.0055	0.232	0.537
Modulo de ruptura - MR 40 - 14 dias	72	0.876	71.1	1020	0.504	0.00526	0.217	0.519
Modulo de ruptura - MR 40 - 28 dias	67.3	0.814	66.5	947	0.48	0.00509	0.207	0.508
Modulo de ruptura - MR 40 - 3 dias	87.8	1.09	86.7	1260	0.588	0.00586	0.253	0.563
Modulo de ruptura - MR 40 - 7 dias	80.4	0.987	79.4	1150	0.549	0.00558	0.237	0.543
Modulo de ruptura - MR 42 - 14 dias	74.6	0.911	73.7	1060	0.518	0.00536	0.223	0.527
Modulo de ruptura - MR 42 - 28 dias	70	0.849	69.1	987	0.494	0.00519	0.213	0.516
Modulo de ruptura - MR 42 - 3 dias	90.4	1.12	89.3	1300	0.602	0.00596	0.259	0.57
Modulo de ruptura - MR 42 - 7 dias	82.9	1.02	81.9	1190	0.562	0.00567	0.242	0.548
Modulo de ruptura - MR 45 - 14 dias	78.7	0.965	77.7	1120	0.54	0.00552	0.233	0.536
Modulo de ruptura - MR 45 - 28 dias	74	0.903	73.1	1050	0.515	0.00534	0.222	0.524
Modulo de ruptura - MR 45 - 3 dias	94.5	1.18	93.3	1370	0.624	0.00611	0.268	0.579
Modulo de ruptura - MR 45 - 7 dias	87.1	1.08	86	1250	0.585	0.00584	0.252	0.559
Modulo de ruptura - MR 48 - 14 dias	83.1	1.02	82.1	1190	0.564	0.00568	0.243	0.549

Modulo de ruptura - MR 48 - 28 dias	78.5	0.963	77.5	1120	0.539	0.00551	0.232	0.536
Modulo de ruptura - MR 48 - 3 dias	99	1.23	97.7	1430	0.648	0.00629	0.279	0.59
Modulo de ruptura - MR 48 - 7 dias	91.5	1.14	90.4	1320	0.609	0.00601	0.262	0.571
Relleno Fluido - f´c 15 - 14 dias	35	0.408	34.5	462	0.294	0.00351	0.107	0.574
Relleno Fluido - f´c 15 - 28 dias	30.5	0.346	30.1	393	0.271	0.00335	0.0992	0.565
Relleno Fluido - f´c 15 - 3 dias	49.3	0.606	48.7	684	0.37	0.00404	0.133	0.599
Relleno Fluido - f´c 15 - 7 dias	40.4	0.483	39.8	545	0.323	0.00371	0.117	0.583
Relleno Fluido - f´c 20 - 14 dias	35.9	0.421	35.4	476	0.299	0.00355	0.109	0.576
Relleno Fluido - f´c 20 - 28 dias	31.4	0.359	31	407	0.276	0.00338	0.101	0.567
Relleno Fluido - f´c 20 - 3 dias	50.2	0.619	49.5	698	0.374	0.00407	0.134	0.602
Relleno Fluido - f´c 20 - 7 dias	41.3	0.495	40.7	559	0.328	0.00375	0.118	0.586
Relleno Fluido - f´c 25 - 14 dias	37	0.435	36.5	493	0.305	0.00359	0.111	0.578
Relleno Fluido - f´c 25 - 28 dias	32.5	0.374	32.1	423	0.281	0.00342	0.103	0.57
Relleno Fluido - f´c 25 - 3 dias	51.3	0.633	50.6	715	0.38	0.00411	0.136	0.604
Relleno Fluido - f´c 25 - 7 dias	42.3	0.51	41.8	576	0.333	0.00379	0.12	0.589
Relleno Fluido - f´c 30 - 14 dias	38.2	0.453	37.7	512	0.311	0.00363	0.113	0.582
Relleno Fluido - f´c 30 - 28 dias	33.7	0.391	33.3	443	0.288	0.00347	0.105	0.573
Relleno Fluido - f´c 30 - 3 dias	52.5	0.651	51.8	734	0.387	0.00416	0.138	0.608
Relleno Fluido - f´c 30 - 7 dias	43.6	0.527	43	596	0.34	0.00383	0.123	0.593
Relleno Fluido - f´c 40 - 14 dias	40.7	0.487	40.2	551	0.325	0.00372	0.117	0.588
Relleno Fluido - f´c 40 - 28 dias	36.2	0.426	35.8	482	0.301	0.00356	0.109	0.58
Relleno Fluido - f´c 40 - 3 dias	55	0.685	54.3	773	0.4	0.00425	0.143	0.613
Relleno Fluido - f´c 40 - 7 dias	46.1	0.562	45.5	634	0.353	0.00392	0.127	0.598
Relleno Fluido - f´c 50 - 14 dias	43.9	0.532	43.4	601	0.341	0.00384	0.123	0.593

Relleno Fluido - f´c 50 - 28 dias	39.6	0.47	39.1	532	0.321	0.00373	0.116	0.592
Relleno Fluido - f´c 50 - 3 dias	58.2	0.73	57.5	823	0.416	0.00437	0.149	0.62
Relleno Fluido - f´c 50 - 7 dias	49.3	0.606	48.7	684	0.37	0.00404	0.133	0.603
Relleno Fluido - f´c 60 - 14 dias	47.5	0.581	46.9	657	0.36	0.00397	0.129	0.599
Relleno Fluido - f´c 60 - 28 dias	43	0.52	42.5	587	0.336	0.0038	0.121	0.591
Relleno Fluido - f´c 60 - 3 dias	61.8	0.779	61	879	0.435	0.00449	0.155	0.624
Relleno Fluido - f´c 60 - 7 dias	52.9	0.656	52.2	740	0.388	0.00417	0.139	0.609
Relleno Fluido - f´c 70 - 14 dias	52	0.643	51.3	726	0.383	0.00413	0.137	0.607
Relleno Fluido - f´c 70 - 28 dias	47.5	0.581	46.9	657	0.36	0.00397	0.129	0.598
Relleno Fluido - f´c 70 - 3 dias	66.3	0.841	65.4	948	0.459	0.00466	0.163	0.632
Relleno Fluido - f´c 70 - 7 dias	57.3	0.718	56.6	810	0.412	0.00433	0.147	0.617

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	**HWD**	**NHWD**	**HLRW**	**ILLRW**	**MR**	**MER**
Unit	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
Alta resistencia - f´c 400 - 14 dias	3.47	82.9	0.000184	0.000655	0.0408	7.59E-05
Alta resistencia - f´c 400 - 28 dias	3.33	79.3	0.000176	0.000624	0.0388	7.31E-05
Alta resistencia - f´c 400 - 3 dias	3.91	93.5	0.00021	0.000751	0.0467	8.45E-05
Alta resistencia - f´c 400 - 7 dias	3.65	87.2	0.000195	0.000694	0.0432	7.95E-05
Alta resistencia - f´c 450 - 14 dias	3.67	87.8	0.000196	0.000699	0.0435	7.98E-05
Alta resistencia - f´c 450 - 28 dias	3.52	84.2	0.000187	0.000667	0.0415	7.69E-05
Alta resistencia - f´c 450 - 3 dias	4.11	98.5	0.000222	0.000794	0.0494	8.86E-05
Alta resistencia - f´c 450 - 7 dias	3.84	92.1	0.000206	0.000737	0.0459	8.33E-05
Alta resistencia - f´c 500 - 14 dias	3.85	92.2	0.000207	0.000738	0.0459	8.34E-05
Alta resistencia - f´c 500 - 28 dias	3.7	88.6	0.000198	0.000706	0.044	8.05E-05
Alta resistencia - f´c 500 - 3 dias	4.29	103	0.000232	0.000834	0.0519	9.22E-05
Alta resistencia - f´c 500 - 7 dias	4.02	96.5	0.000217	0.000776	0.0483	8.70E-05

Alta resistencia - f´c 550 - 14 dias	4.13	99.1	0.000223	0.000799	0.0497	8.91E-05
Alta resistencia - f´c 550 - 28 dias	3.98	95.5	0.000215	0.000767	0.0478	8.62E-05
Alta resistencia - f´c 550 - 3 dias	4.56	110	0.000249	0.000894	0.0557	9.77E-05
Alta resistencia - f´c 550 - 7 dias	4.31	103	0.000233	0.000837	0.0521	9.26E-05
Alta resistencia - f´c 600 - 14 dias	4.39	105	0.000238	0.000855	0.0532	9.42E-05
Alta resistencia - f´c 600 - 28 dias	4.24	102	0.00023	0.000823	0.0512	9.13E-05
Alta resistencia - f´c 600 - 3 dias	4.83	116	0.000264	0.000951	0.0592	0.000103
Alta resistencia - f´c 600 - 7 dias	4.56	110	0.000249	0.000893	0.0556	9.78E-05
Baja contracción - MR 38 - 14 dias	2.79	65.9	0.000141	0.000485	0.0297	6.34E-05
Baja contracción - MR 38 - 28 dias	2.63	62.1	0.000132	0.000452	0.0276	6.02E-05
Baja contracción - MR 40 - 14 dias	2.86	67.6	0.000145	5.00E-04	0.0305	6.48E-05
Baja contracción - MR 40 - 28 dias	2.7	63.8	0.000136	0.000467	0.0285	6.16E-05
Baja contracción - MR 42 - 14 dias	2.93	69.6	0.000149	0.000517	0.0316	6.64E-05
Baja contracción - MR 42 - 28 dias	2.78	65.8	0.00014	0.000484	0.0296	6.32E-05
Baja contracción - MR 45 - 14 dias	3.07	72.9	0.000157	0.000544	0.0333	6.91E-05
Baja contracción - MR 45 - 28 dias	2.91	69	0.000148	0.000511	0.0313	6.59E-05
Baja contracción - MR 48 - 14 dias	3.21	76.5	0.000165	0.000575	0.0351	7.21E-05
Baja contracción - MR 48 - 28 dias	3.05	72.5	0.000156	0.000542	0.0331	6.87E-05
Convencional - f´c 100 - 14 dias	1.94	45.4	9.45E-05	0.000325	0.0202	4.49E-05
Convencional - f´c 100 - 28 dias	1.79	41.9	8.60E-05	0.000293	0.0183	4.21E-05
Convencional - f´c 100 - 3 dias	2.37	56	0.00012	0.000419	0.0262	5.35E-05
Convencional - f´c 100 - 7 dias	2.08	48.9	0.000103	0.000356	0.0222	4.78E-05
Convencional - f´c 150 - 14 dias	2.1	49.4	0.000104	0.00036	0.0224	4.81E-05
Convencional - f´c 150 - 28 dias	1.96	45.8	9.55E-05	0.000328	0.0205	4.53E-05
Convencional - f´c 150 - 3 dias	2.53	60	0.00013	0.000455	0.0284	5.67E-05
Convencional - f´c 150 - 7 dias	2.24	52.9	0.000113	0.000392	0.0244	5.10E-05

Convencional - f´c 200 - 14 dias	2.35	55.4	0.000118	0.000412	0.0257	5.33E-05
Convencional - f´c 200 - 28 dias	2.2	51.9	0.00011	0.000381	0.0237	5.05E-05
Convencional - f´c 200 - 3 dias	2.78	66	0.000144	0.000507	0.0316	6.18E-05
Convencional - f´c 200 - 7 dias	2.49	58.9	0.000127	0.000444	0.0277	5.62E-05
Convencional - f´c 250 - 14 dias	2.55	60.4	0.00013	0.000456	0.0284	5.74E-05
Convencional - f´c 250 - 28 dias	2.41	56.8	0.000122	0.000425	0.0265	5.45E-05
Convencional - f´c 250 - 3 dias	2.98	71	0.000156	0.000551	0.0344	6.60E-05
Convencional - f´c 250 - 7 dias	2.69	63.9	0.000139	0.000488	0.0304	6.02E-05
Convencional - f´c 300 - 14 dias	2.89	69	0.000151	0.000532	0.0332	6.42E-05
Convencional - f´c 300 - 28 dias	2.75	65.4	0.000142	5.00E-04	0.0312	6.12E-05
Convencional - f´c 300 - 3 dias	3.32	79.5	0.000176	0.000627	0.0391	7.27E-05
Convencional - f´c 300 - 7 dias	3.04	72.5	0.000159	0.000564	0.0352	6.70E-05
Convencional - f´c 350 - 14 dias	3.22	77	0.00017	0.000604	0.0377	7.06E-05
Convencional - f´c 350 - 28 dias	3.08	73.5	0.000162	0.000573	0.0357	6.78E-05
Convencional - f´c 350 - 3 dias	3.65	87.7	0.000196	0.000699	0.0436	7.93E-05
Convencional - f´c 350 - 7 dias	3.37	80.6	0.000179	0.000636	0.0397	7.36E-05
Estructural - f´c 250 - 14 dias	2.55	60.4	0.00013	0.000456	0.0284	5.74E-05
Estructural - f´c 250 - 28 dias	2.41	56.8	0.000122	0.000425	0.0265	5.45E-05
Estructural - f´c 250 - 3 dias	2.98	71	0.000156	0.000551	0.0344	6.60E-05
Estructural - f´c 250 - 7 dias	2.69	63.9	0.000139	0.000488	0.0304	6.02E-05
Estructural - f´c 300 - 14 dias	2.89	69	0.000151	0.000532	0.0332	6.42E-05
Estructural - f´c 300 - 28 dias	2.75	65.4	0.000142	5.00E-04	0.0312	6.12E-05
Estructural - f´c 300 - 3 dias	3.32	79.5	0.000176	0.000627	0.0391	7.27E-05
Estructural - f´c 300 - 7 dias	3.04	72.5	0.000159	0.000564	0.0352	6.70E-05
Estructural - f´c 350 - 14 dias	3.22	77	0.00017	0.000604	0.0377	7.06E-05
Estructural - f´c 350 - 28 dias	3.08	73.5	0.000162	0.000573	0.0357	6.78E-05

Estructural - f´c 350 - 3 dias	3.65	87.7	0.000196	0.000699	0.0436	7.93E-05
Estructural - f´c 350 - 7 dias	3.37	80.6	0.000179	0.000636	0.0397	7.36E-05
Lanzado - f´c 200 - 14 dias	3.07	73.7	0.000163	0.000582	0.0364	6.69E-05
Lanzado - f´c 200 - 28 dias	2.91	69.6	0.000153	0.000545	0.034	6.38E-05
Lanzado - f´c 200 - 3 dias	3.35	80.6	0.00018	0.000645	0.0403	7.26E-05
Lanzado - f´c 200 - 7 dias	3.24	77.8	0.000173	0.00062	0.0387	7.03E-05
Lanzado - f´c 250 - 14 dias	3.24	77.8	0.000173	0.00062	0.0387	7.03E-05
Lanzado - f´c 250 - 28 dias	3.07	73.7	0.000163	0.000582	0.0364	6.69E-05
Lanzado - f´c 250 - 3 dias	3.52	84.8	0.00019	0.000683	0.0427	7.60E-05
Lanzado - f´c 250 - 7 dias	3.41	82	0.000183	0.000658	0.0411	7.37E-05
Lanzado - f´c 300 - 14 dias	3.44	82.8	0.000185	0.000664	0.0415	7.43E-05
Lanzado - f´c 300 - 28 dias	3.27	78.6	0.000175	0.000627	0.0391	7.10E-05
Lanzado - f´c 300 - 3 dias	3.72	89.7	0.000202	0.000727	0.0454	7.98E-05
Lanzado - f´c 300 - 7 dias	3.61	87	0.000195	0.000702	0.0439	7.77E-05
Lanzado - f´c 350 - 14 dias	3.76	90.7	0.000204	0.000736	0.046	8.07E-05
Lanzado - f´c 350 - 28 dias	3.6	86.6	0.000194	0.000698	0.0436	7.75E-05
Lanzado - f´c 350 - 3 dias	4.05	97.7	0.000221	0.000798	0.0499	8.64E-05
Lanzado - f´c 350 - 7 dias	3.93	94.9	0.000214	0.000773	0.0484	8.41E-05
Modulo de ruptura - MR 35 - 14 dias	2.64	62.6	0.000136	0.000476	0.0296	5.88E-05
Modulo de ruptura - MR 35 - 28 dias	2.49	59	0.000127	0.000444	0.0276	5.58E-05
Modulo de ruptura - MR 35 - 3 dias	3.14	75	0.000165	0.000585	0.0363	6.89E-05
Modulo de ruptura - MR 35 - 7 dias	2.9	69.2	0.000151	0.000534	0.0332	6.42E-05
Modulo de ruptura - MR 36 - 14 dias	2.65	63	0.000136	0.000479	0.0298	5.91E-05
Modulo de ruptura - MR 36 - 28 dias	2.5	59.3	0.000128	0.000447	0.0277	5.60E-05
Modulo de ruptura - MR 36 - 3 dias	3.15	75.2	0.000166	0.000587	0.0365	6.90E-05
Modulo de ruptura - MR 36 - 7 dias	2.91	69.5	0.000152	0.000536	0.0333	6.43E-05

Modulo de ruptura - MR 38 - 14 dias	2.71	64.5	0.00014	0.000493	0.0306	6.03E-05
Modulo de ruptura - MR 38 - 28 dias	2.57	60.9	0.000131	0.000461	0.0286	5.73E-05
Modulo de ruptura - MR 38 - 3 dias	3.21	76.8	0.00017	0.000601	0.0374	7.03E-05
Modulo de ruptura - MR 38 - 7 dias	2.98	71.1	0.000156	0.000551	0.0342	6.57E-05
Modulo de ruptura - MR 40 - 14 dias	2.78	66.2	0.000144	0.000508	0.0316	6.17E-05
Modulo de ruptura - MR 40 - 28 dias	2.64	62.6	0.000136	0.000476	0.0296	5.88E-05
Modulo de ruptura - MR 40 - 3 dias	3.28	78.6	0.000174	0.000617	0.0383	7.18E-05
Modulo de ruptura - MR 40 - 7 dias	3.05	72.8	0.00016	0.000566	0.0352	6.71E-05
Modulo de ruptura - MR 42 - 14 dias	2.87	68.3	0.000149	0.000526	0.0327	6.34E-05
Modulo de ruptura - MR 42 - 28 dias	2.72	64.7	0.000141	0.000494	0.0307	6.05E-05
Modulo de ruptura - MR 42 - 3 dias	3.37	80.7	0.000179	0.000635	0.0394	7.35E-05
Modulo de ruptura - MR 42 - 7 dias	3.13	74.8	0.000165	0.000583	0.0363	6.86E-05
Modulo de ruptura - MR 45 - 14 dias	3	71.5	0.000157	0.000554	0.0344	6.60E-05
Modulo de ruptura - MR 45 - 28 dias	2.85	67.8	0.000148	0.000522	0.0324	6.30E-05
Modulo de ruptura - MR 45 - 3 dias	3.5	83.8	0.000186	0.000663	0.0412	7.61E-05
Modulo de ruptura - MR 45 - 7 dias	3.26	78	0.000172	0.000612	0.038	7.14E-05
Modulo de ruptura - MR 48 - 14 dias	3.14	75	0.000165	0.000585	0.0363	6.88E-05
Modulo de ruptura - MR 48 - 28 dias	2.99	71.3	0.000156	0.000553	0.0344	6.59E-05
Modulo de ruptura - MR 48 - 3 dias	3.64	87.3	0.000195	0.000694	0.0431	7.90E-05
Modulo de ruptura - MR 48 - 7 dias	3.41	81.5	0.000181	0.000643	0.0399	7.43E-05
Relleno Fluido - f´c 15 - 14 dias	1.41	33.8	6.99E-05	0.000245	0.0155	3.19E-05
Relleno Fluido - f´c 15 - 28 dias	1.29	30.6	6.21E-05	0.000215	0.0135	2.94E-05
Relleno Fluido - f´c 15 - 3 dias	1.82	43.8	9.50E-05	0.00034	0.0216	4.00E-05
Relleno Fluido - f´c 15 - 7 dias	1.57	37.5	7.93E-05	0.000281	0.0178	3.49E-05
Relleno Fluido - f´c 20 - 14 dias	1.44	34.4	7.15E-05	0.000251	0.0158	3.24E-05
Relleno Fluido - f´c 20 - 28 dias	1.31	31.3	6.37E-05	0.000221	0.0139	2.99E-05

Relleno Fluido - f´c 20 - 3 dias	1.85	44.4	9.66E-05	0.000346	0.022	4.05E-05
Relleno Fluido - f´c 20 - 7 dias	1.59	38.2	8.09E-05	0.000287	0.0182	3.55E-05
Relleno Fluido - f´c 25 - 14 dias	1.47	35.2	7.34E-05	0.000258	0.0163	3.30E-05
Relleno Fluido - f´c 25 - 28 dias	1.34	32	6.56E-05	0.000228	0.0144	3.05E-05
Relleno Fluido - f´c 25 - 3 dias	1.88	45.2	9.85E-05	0.000353	0.0225	4.11E-05
Relleno Fluido - f´c 25 - 7 dias	1.63	38.9	8.28E-05	0.000294	0.0186	3.61E-05
Relleno Fluido - f´c 30 - 14 dias	1.51	36.1	7.56E-05	0.000266	0.0169	3.37E-05
Relleno Fluido - f´c 30 - 28 dias	1.38	32.9	6.77E-05	0.000236	0.0149	3.12E-05
Relleno Fluido - f´c 30 - 3 dias	1.92	46.1	0.000101	0.000362	0.023	4.18E-05
Relleno Fluido - f´c 30 - 7 dias	1.66	39.8	8.50E-05	0.000302	0.0192	3.68E-05
Relleno Fluido - f´c 40 - 14 dias	1.58	37.8	8.00E-05	0.000283	0.0179	3.51E-05
Relleno Fluido - f´c 40 - 28 dias	1.45	34.7	7.21E-05	0.000253	0.016	3.26E-05
Relleno Fluido - f´c 40 - 3 dias	1.99	47.8	0.000105	0.000379	0.0241	4.32E-05
Relleno Fluido - f´c 40 - 7 dias	1.73	41.6	8.94E-05	0.000319	0.0203	3.82E-05
Relleno Fluido - f´c 50 - 14 dias	1.67	40.1	8.56E-05	0.000304	0.0193	3.69E-05
Relleno Fluido - f´c 50 - 28 dias	1.55	37.2	7.82E-05	0.000275	0.0174	3.48E-05
Relleno Fluido - f´c 50 - 3 dias	2.08	50.1	0.000111	4.00E-04	0.0255	4.50E-05
Relleno Fluido - f´c 50 - 7 dias	1.82	43.8	9.50E-05	0.00034	0.0216	4.00E-05
Relleno Fluido - f´c 60 - 14 dias	1.77	42.6	9.19E-05	0.000328	0.0209	3.89E-05
Relleno Fluido - f´c 60 - 28 dias	1.64	39.4	8.40E-05	0.000298	0.0189	3.64E-05
Relleno Fluido - f´c 60 - 3 dias	2.18	52.5	0.000117	0.000424	0.0271	4.69E-05
Relleno Fluido - f´c 60 - 7 dias	1.93	46.3	0.000101	0.000364	0.0232	4.20E-05
Relleno Fluido - f´c 70 - 14 dias	1.9	45.7	9.97E-05	0.000358	0.0228	4.14E-05
Relleno Fluido - f´c 70 - 28 dias	1.77	42.5	9.18E-05	0.000328	0.0209	3.89E-05
Relleno Fluido - f´c 70 - 3 dias	2.31	55.7	0.000125	0.000454	0.029	4.96E-05
Relleno Fluido - f´c 70 - 7 dias	2.05	49.4	0.000109	0.000394	0.0251	4.45E-05

OTHER ENVIRONMENTAL INFO

- Certificado SIG Calidad
- Certificado SIG Medio Ambiente
- Certificado SIG Seguridad y Salud en el Trabajo
- ONNNCE
- EMA
- Industria Limpia
- Empresa Segura

REFERENCES

ASTM Standards:

- ASTM A36/A36M Standard Specification for Carbon Structural Steel
- ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
- ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- ASTM A184 Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
- ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
- ASTM A416/A416M Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
- ASTM A555/A555M Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods
- ASTM A615/A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
- ASTM A706/A706M Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- ASTM A767/A767M Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- ASTM A775/A775M Standard Specification for Epoxy-Coated Steel Reinforcing Bars
- ASTM A820/A820M Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
- ASTM A884/A884M Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
- ASTM A934/A934M Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
- ASTM A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- ASTM C33/C33M Standard Specification for Concrete Aggregates
- ASTM C94 Standard Specification for Ready-Mixed Concrete

- ASTM C150/C150M Standard Specification for Portland Cement
- ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete
- ASTM C595 Standard Specification for Blended Hydraulic Cements
- ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- ASTM C979/C979M Standard Specification for Pigments for Integrally Colored 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
- ASTM C1116/C1116M Standard Specification for Fiber-Reinforced Concrete
- ASTM C1157/C1157M Standard Performance Specification for Hydraulic Cement
- ASTM C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
- ASTM C1602/C1602M Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
- 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
- ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete

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