GCC Environmental Product Declaration

CEMENT

GENERAL INFORMATION

This document is a cradle-to-gate Environmental Product Declaration (EPD) for the **Rapid Set Cement, Blended (CPC30, CPC40, and Type IL), Portland Cement (Type III), and Masonry Cement** produced at **the Samalayuca plant** located in Juárez City. The Life Cycle Assessment (LCA) and this subsequent EPD follow the guidelines from ISO 21930 [1], ISO 14025 [6], ISO 14040 [7], and ISO 14044 [8]. This EPD is intended for business-to-business audiences.

DECLARATION HOLDER	GCC S.A.B. de C.V. Avenida Vicente Suárez y Sexta Chihuahua, Chih. 31105
PROGRAM OPERATOR	Labeling Sustainability 11670 W Sunset Blvd. Los Angeles, CA www.labelingsustainability.com
DECLARATION NUMBER	GCC03032501
DATE OF ISSUE	03 March 2025
VALID UNTIL	03 March 2030
EPD AND LCA PREPARED BY	GCC S.A.B. de C.V. Avenida Vicente Suárez y Sexta Chihuahua, Chih. 31105
PRODUCT GROUP & NAME	Cement, UN CPC 3744

ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products: serves as the core PCR
NSF PCR for Portland, Blended, Masonry, Mortar, And Plastic (Stucco) Cements
V3.2 serves as a guidance document only. The Rapid Set Cement does not meet the requirements set forth in the PCR [2].

Subcategory PCR review was conducted by:

Thomas P. Gloria, Ph. D. • Industrial Ecology Consultants • 35 Bracebridge Rd. Newton, MA

Independent verification of the declaration and data, according to ISO 21930:2017 [1] and ISO 14025: 2006 [6]

☐ internal ☑external

Third-party verifier: Denice Viktoria Staaf • Labeling Sustainability

Notes: The EPD results are computed using the N.A. version of the GCCA Industry EPD tool for Cement and Concrete (https://concrete-epd-tool.org) [1], [3].

For additional explanatory material: Ana Lucía Vázquez Rodriguez avazquez@gcc.com
This EPD was created using the GCCA Industry EPD Tool for cement and concrete.

COMPANY PRESENTATION

GCC operates across a strategic corridor that extends from northern Mexico through the United States to Canada. The company specializes in producing, marketing, and distributing a wide range of construction materials, including cement, ready-mix concrete, and aggregates.

In the United States, GCC is a key player in the cement and ready-mix concrete markets. The company owns eight cement plants, five in the U.S. with a combined annual production capacity of approximately 3.5 million tons. These plants are in Odessa, Texas; Pueblo, Colorado; Rapid City, South Dakota; Trident, Montana; and Tijeras, New Mexico. Additionally, GCC operates three plants in Mexico, with a total annual production capacity of approximately 2.5 million tons, in Chihuahua, Juarez, and Samalayuca.

GCC also operates 95 ready-mix plants and a fleet of over 970 mixer and haul trucks dedicated to transporting cement, concrete, aggregates, and coal. The company's extensive distribution network includes 23 rail-served cement distribution terminals, two distribution centers, and transfer stations.

In the state of Chihuahua, GCC holds a leading position in several markets, including cement, ready-mix concrete, aggregates, concrete blocks, and prefabricated products. This dominance is bolstered by owning the only cement plant in the state. GCC's market leadership is driven by the company's commitment to offering high-quality products, exceeding customer expectations, and leveraging state-of-the-art technology in production and distribution.

PRODUCT DESCRIPTION, COMPONENTS, & STANDARDS

This EPD reports environmental information for seven cement products **produced by GCC at its Samalayuca, Juárez plant.** Cement is a fine material powder with hydraulic, aesthetic, and durability properties that are very useful for the construction industry. In addition, cement acts as a binding agent that produces ready-mix concrete when mixed with aggregates and water. Concrete is one of the most attractive construction materials because of its great compressive strength and its shape-ability. The tables below provide information on each cement type evaluated, its constituents and applicable standards:

Input	CEMRS	CPC30	CPC40	Type IL	Type III	MAS01	MAS03
Clinker	85 - 90 %	70 - 75 %	80 - 85 %	85 - 90 %	90 - 95 %	50 - 55 %	45 - 50 %
Gypsum	5 - 10 %	1 - 2 %	1 - 3 %	5 - 8 %	5 - 10 %	5 - 10%	0 - 5 %
Limestone	-	15 - 20 %	5 - 10 %	5 - 8 %	0 - 5 %	35 - 40 %	40 - 45 %
Other	0 - 5 %	5 - 8 %	5 - 8 %	0 - 1 %	-	0 - 5 %	5 - 10 %

Product code	Product name	Standards
CEMRS	Rapid Set Cement	• ASTM C1600/C1600M-23 • ASTM C309-19 • ASTMC191-21
CPC30	Cemento Portland Compuesto 30R	• NMX-C-414-ONNCCE-2010
CPC40	Cemento Portland Compuesto 40R	• NMX-C-414-ONNCCE-2010
Type IL	Cement Type IL	• ASTM C595/C595M-23 • ASTM C1157/C1157M-23 • AASHTO M 240 • CSA A3000
Type III	Cement Type III	• ASTM C150/C150M-22 • ASTM C1157/C1157M-23
MAS01	Masonry Cement	• ASTM C91/C91M-23
MAS03	Mortero Chiviscar Optimo	• NMX-C-021-ONNCCE

All cements in this EPD are sold in bulk.

- ASTM C1600/C1600M-23 – Standard Specification for Rapid Hardening Hydraulic Cement [9].
- ASTM C309-19 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete [10].
- ASTM C191-21 – Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle [11].
- NMX-C-414-ONNCCE-2010 – Construction Industry - Hydraulic Cements - Specifications and Test Methods [12].
- ASTM C595/C595M-23 – Standard Specification for Blended Hydraulic Cement [13].
- ASTM C1157/C1157M-23 – Standard Performance Specification for Hydraulic Cement [14].
- AASHTO M 240 – Standard Specification for Blended Hydraulic Cement [15].
- CSA A3000 – Cementitious Compendium [16].
- ASTM C150/C150M-22 – Standard Specification for Portland Cement [17].
- ASTM C91/C91M-23 – Standard Specification for Masonry Cement [18].
- NMX-C-021-ONNCCE – Construction Industry – Cement for Masonry (Mortar) - Specifications and Test Methods [19].

DECLARED UNIT

The declared unit is one metric ton of **cement.**

SYSTEM BOUNDARY

Life Cycle Stages

This EPD is a cradle-to-gate EPD covering the production stage (A1-A3).

PRODUCT STAGE	CONSTRUCTION PROCESS STAGE	USE STAGE	END-OF-LIFE STAGE
A1 Extraction and upstream production **A2** Transport to factory **A3** Manufacturing	**A4** Transport to site **A5** Installation	**B1** Use **B2** Maintenance **B3** Repair **B4** Replacement **B5** Refurbishment **B6** Operational Energy Use **B7** Operational Water Use	**C1** De-installation/Demolition **C2** Transport **C3** Waste Process **C4** Disposal of Waste
X	MND	MND	MND

***Note**: MND = module not declared; X = module included*

Exclusion and Cut-off Criteria

Items excluded from the system boundary include:

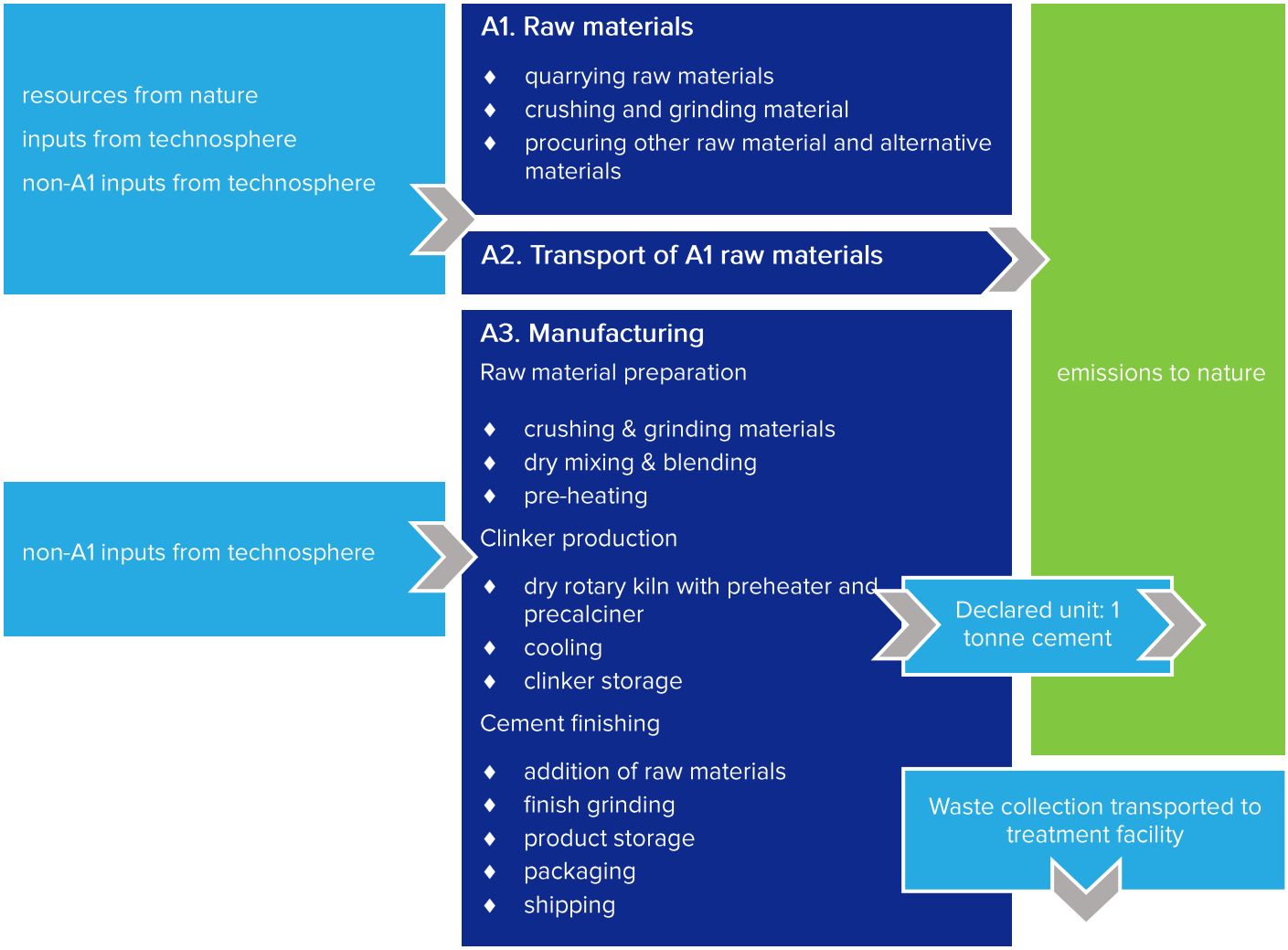
- Production, manufacture, and construction of manufacturing capital goods and infrastructure.
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment.
- Personnel-related activities (travel, furniture, and office supplies).
- Energy and water use related to company management and sales activities may be located within the factory site or at another location.

Allocation Approach

Allocation follows the requirements and guidance of ISO 14044 Clause 4.3.4 [8], NSF PCR [2], and ISO 21930 section 7.2 [1]. Recycling and recycled content are modeled using the cut-off rule.

This subcategory PCR recognizes fly ash, silica fume, granulated blast furnace slag, cement kiln dust, flue gas desulfurization (FGD) gypsum, and post-consumer gypsum as recovered materials, and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a cement material input.

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



DATA SOURCES AND QUALITY ASSESSMENT

Gate-to-gate input and output flow data have been collected for the specified processes during the reference year 2023. This data encompasses limestone quarrying, clinker production, and cement manufacturing at the Samalayuca, Juárez plant.

The primary data was sourced directly from the **Samalayuca, Juárez** plant, covering all clinker production and cement manufacturing activities. Secondary data, which is not specific to GCC, was obtained from the ecoinvent v.3.5 databases for U.S. and global data from 2018, as well as the U.S. LCI Database [3].

The reference year for the collected data is **2023**.

It is important to note that EPDs based on a cradle-to-gate scope should not be used for comparisons. Similarly, EPDs based on a declared unit are not suitable for comparisons. EPDs are only comparable if

they use the same sub-category Product Category Rules (PCR), include all relevant information modules, and are based on equivalent scenarios within construction works.

Raw material transport: mode of transport was assumed for key bulk materials where no original data could be provided. Distances were determined based on the location of quarries and cement sites.

Electricity: electricity generation and consumption were based on monthly utility bills. This facility purchased electricity from CFE and generates it from solar panels installed at the plant. Since CFE didn't provide their energy mix, the GCCA default mix was used.

Process/space heating: all fuel consumed from process/space came from utility bills and primary information from the plant. GCC follows the "Cement CO2 and Energy Protocol" for all its calculations.

Fuel required for machinery: diesel and/or gasoline has been used for emergency plants, utility cars, and construction machinery.

Transportation: The GCCA EPD Tool accounts for transportation emissions, including empty backhauls, based on predefined methodologies and transportation data. This ensures a comprehensive assessment of environmental impacts associated with the delivery of raw materials and products, adhering to relevant LCA standards.

Waste generation: waste generation values are directly reported from Samalayuca plant operations.

Recovered energy: not applicable

Recycled/reused material/components: not applicable.

Module A1 material losses: due to a lack of data, a default 2% loss factor was used.

Direct A3 emissions accounting: all direct emissions were entered using emission calculations from GCC´s yearly GHG plant level emission report.

Waste transport requirements: transportation distances were estimated using plant location and final processing plant location, this was an estimation because we cannot guarantee exact distances due to several variations.

LIFE CYCLE ASSESSMENT RESULTS

CORE ENVIRONMENTAL IMPACT INDICATORS								
Indicator	Unit	CEMRS	CPC30	CPC40	Type IL	Type III	MAS01	MAS03
Global warming potential (GWP)	kg CO_2 eq.	545.6 **	636.8 **	747.7 **	764.5 **	822.6 **	489.0 **	446.4 **
Depletion potential of the stratospheric ozone layer (ODP)	Kg CFC 11 eq.	1.793E-5	1.289E-5	1.515E-5	1.565E-5	1.94E-5	1.058E-5	1.026E-5
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP)	kg N eq.	1.718E-3	2.454E-3	1.297	2.659E-3	3.055E-3	2.089E-3	1.930-3
Acidification potential, accumulated exceedance (AP)	mol H+ eq	1.519	1.110	1.297	1.334	1.481	0.8875	0.8465
GWP, total	kg CO_2 eq.	545.6 *	636.5 *	747.7 *	764.5 *	822.6 *	489.0 *	446.4 *
GWP, fossil fuels	kg CO_2 eq.	545.3 *	636.5 *	747.3 *	764.1 *	822.2 *	488.8 *	446.2 *
GWP, biogenic	kg CO_2 eq.	0.1490 *	0.1457 *	0.1707 *	0.1728 *	0.2000 *	0.1216 *	0.1187 *
GWP, land use and land use change	kg CO_2 eq.	0.1720	0.1457	0.1723	0.1670	0.2103	0.1316	0.1278
EP, fraction of nutrients reaching freshwater end compartment	kg P eq.	1.712E-2	3.143E-2	3.659E-2	3.320E-2	3.743E-2	2.624E-2	2.395E-2
EP, accumulated exceedance	mol N eq.	3.233	2.374	2.739	2.766	3.024	1.918	1.824
Formation of potential of tropospheric ozone	kg NMVOC eq.	0.7800	0.5541	0.6406	0.6492	0.7170	0.4486	0.4311
Abiotic depletion potential for non-fossil resources	kg Sb eq.	1.642E-4	1.472E-4	1.718E-4	1.709E-4	1.947E-4	1.332E-4	1.280E-4
Abiotic depletion potential for fossil resources	MJ, net calorific value	3,935	3,151	3,701	3,816	4,198	2,468	2,312
Water (user) deprivation potential, deprivation-weighted water consumption	m^3 world eq. deprived	31.49	29.96	34.85	37.02	43.22	26.72	26.33
ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS								
Potential incidence of disease due to PM emissions	Disease incidence	9.515E-6	6.997E-6	8.083E-6	8.370E-6	9.171E-6	5.641E-6	5.466E-6
Potential human exposure efficiency relative to U235	kBq U235 eq.	5.349	4.689	5.497	5.723	6.594	3.791	3.877
Potential comparative toxic unit for ecosystems	CTUe	157.8	111.7	131.0	136.8	149.6	87.09	83.40

Potential comparative toxic unit for humans – cancer	CTUh	2.690E-6	2.139E-6	2.507E-6	2.526E-6	2.775E-6	1.744E-6	1.615E-6
Potential comparative toxic unit for humans – non-cancer	CTUh	1.838E-5	1.455E-5	1.708E-5	1.754E-5	1.925E-5	1.145-5	1.075E-5
Potential soil quality index	dimensionless	1,172	970.5	1,137	1,095	1,308	840.5	806.2
PARAMETERS DESCRIBING RESOURCE USE								
Use of renewable primary energy excluding renewable primary energy resources used as raw materials [1]	MJ, net calorific value	310.0	252.8	299.8	284.5	369.2	236.8	225.3
Use of renewable primary energy resources used as raw materials [1]	MJ, net calorific value	0	0	0	0	0	0	0
Total use of renewable primary energy resources [1]	MJ, net calorific value	310.0	252.8	299.8	284.5	369.2	236.8	225.3
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [1]	MJ, net calorific value	3,935	3,151	3,701	3,816	4,198	2,468	2,312
Use of non-renewable primary energy resources used as raw materials [1]	MJ, net calorific value	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources [1]	MJ, net calorific value	3,935	3,151	3,701	3,816	4,198	2,468	2,312
Use of secondary materials [1]	kg	0.4903	28.57	33.99	40.16	42.67	20.24	19.67
Use of renewable secondary fuels [1]	MJ, net calorific value	72.19	72.99	85.32	82.62	87.74	56.51	49.68
Use of non-renewable secondary fuels [1]	MJ, net calorific value	62.35	94.75	110.2	100.0	106.2	75.10	64.27
Net use of fresh water	m^3	0.8206	0.7877	0.9179	0.9748	1.138	0.6954	0.6880
OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES								
Hazardous waste disposed [1]	kg	1.650E-2	1.317E-2	1.548E-2	1.606E-2	1.706E-2	9.915E-3	8.994E-3
Non-hazardous waste disposed [1]	kg	0.1289	0.1028	0.1209	0.1254	0.1332	7.745E-2	7.025E-2
Radioactive waste disposed [1]	kg	ND	ND	ND	ND	ND	ND	ND
ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS								
Components for reuse	kg	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0

Materials for energy recovery	kg	0	0	0	0	0	0	0
Exported energy	MJ per energy carrier	0	0	0	0	0	0	0
EXTRA INDICATORS								
Emissions from calcination and removals from carbonation	kg CO_2 eq.	264.3	381.4	448.4	465.2	494.1	287.3	260.6
Emissions from combustion of secondary fuels from renewable sources used in production processes	kg CO_2 eq.	0.1311	0.1020	0.1199	0.1238	0.1315	7.700E-2	6.969E-2
Emissions from combustion of secondary fuels from non-renewable sources used in production processes	kg CO_2 eq.	6.474	9.131	9.481	8.901	9.452	6.368	5.525
Removals and emissions associated with biogenic carbon content and the bio-based product	kg CO_2	0	0	0	0	0	0	0
Removals and emissions associated with biogenic carbon content and the bio-based packaging	kg CO_2	0	0	0	0	0	0	0

** The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production.*

*** The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production.*

[1] The following 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 these categories.

ADDITIONAL ENVIRONMENTAL INFORMATION

Sustainability Strategy

GCC's Science Based Targets initiative (SBTi) CO2 target for 2027 is set well below the two-degree Celsius curve, aiming for 605 gross kgCO2 per ton of cementitious material for scope 1 emissions. Achieving this target by 2027 will ensure validation for the next five years on the 1.5-degree Celsius curve. Additionally, GCC's SBTi 2030 target of 538 gross kgCO2 per ton of cementitious material is supported by a comprehensive CO2 reduction roadmap. This roadmap focuses on four key levers: blended cement, fuel switching, energy efficiency, and biogenic fuels. Our long-term goal for 2050 will be achieved through the implementation of transformational technologies.

To meet our environmental objectives, GCC has established a set of emission reduction targets and commitments, supported by a strategic program designed to achieve these goals. We have also put in place an effective governance structure to oversee the execution of our program. Many of the actions required to implement our strategic roadmap up to 2030 are based on established technologies.

Renewable Energy Initiatives

GCC is committed to enhancing its use of renewable energy as part of our sustainability strategy. We are focusing on the installation of solar distributed generation energy systems in Mexico. Our Samalayuca plant currently has a 1% substitution capacity from solar energy, which began operation in December 2022. This initiative represents our initial step towards increasing the share of renewable energy in our operations. We plan to expand our renewable energy capacity in the coming years, further reducing our carbon footprint and supporting our overall sustainability goals.

Community Engagement

GCC was recognized in Mexico as a Socially Responsible Company for the 18th consecutive year. Our goal is to contribute to the well-being of our communities through active investment in community development projects. For example, our Juárez, Samalayuca, and Chihuahua plants have collectively donated over 1,000 plants and trees. This initiative is part of our broader environmental and social responsibility strategy, which aims to enhance local green spaces, support biodiversity, and foster a sense of community pride.

REFERENCES

[1] GCCA Industry EPD Tool for Cement and Concrete. Version 4.2. User Guide, International version. 18 December 2023.
[2] NSF International, Product Category Rule Environmental Product Declarations, PCR for Portland, Blended, Masonry, Mortar, and Plastic (Stucco) Cements, V3.2, September 2021.
[3] GCCA's Industry EPD Tool for Cement and Concrete (v4.2). LCA Database, International + North American versions. 1 December 2023.
[4] ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.
[5] ISO 14020:2000 Environmental labels and declarations — General principles
[6] ISO 14025:2006 Environmental labeling and declarations - Type III environmental declarations – Principles and procedures.
[7] ISO 14040:2006/Amd1:2020 Environmental management - Life cycle assessment -Principles and framework.
[8] ISO 14044:2006/Amd1:2017/Amd2:2020 Environmental management - Life cycle assessment - Requirements and guidelines.
[9] ASTM C1600/C1600M-23 – Standard Specification for Rapid Hardening Hydraulic Cement
[10] ASTM C309-19 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
[11] ASTM C191-21 – Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle
[12] NMX-C-414-ONNCCE-2010 – Construction Industry - Hydraulic Cements - Specifications and Test Methods
[13] ASTM C595/C595M-23 – Standard Specification for Blended Hydraulic Cements
[14] ASTM C1157/C1157M-23 - Standard Performance Specification for Hydraulic Cement
[15] AASHTO M 240 – Standard Specification for Blended Hydraulic Cement
[16] CSA A3000 – Cementitious Compendium
[17] ASTM C150/C150M-22 - Standard Specification for Portland Cement
[18] ASTM C91/C91M-23 – Standard Specification for Masonry Cement
[19] NMX-C-021-ONNCCE-2015 – Construction Industry – Cement for Masonry (Mortar) - Specifications and Test Methods