Environmental Product Declaration

In accordance with ISO 14025 and 21930

Certification page

This document is a cradle-to-gate Environmental Product Declaration (EPD) for the **Portland Cement, Type IL** produced at **the Tijeras plant**. The Life Cycle Assessment (LCA) and this subsequent EPD follow the guidelines from ISO 21930 [4], ISO 14025 [6], ISO 14040 [7], and ISO 14044 [8]. This EPD is intended for business-to-business audiences.

Declaration Holder	**GCC of America** **600 S. Cherry Street, Suite 1000** **Glendale CO 80246**
Program Operator	National Ready Mixed Concrete Association 900 Spring Street Silver Spring, MD 20910 https://www.nrmca.org/
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EPD and LCA prepared by	GCC of America 600 S. Cherry Street, Suite 1000 Glendale CO 80246
Product Group and 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 the subcategory 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	☐ internal ☑external

ISO 21930:2017 [4] and ISO 14025: 2006 [6]	
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].
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Company presentation

GCC operates in the corridor extending from northern Mexico through the United States to Canada. GCC produces, markets, and distributes cement, ready-mix concrete, aggregates, and other construction materials.

In the United States, GCC successfully participates in the cement and ready-mix concrete markets. The Company owns five cement plants with an aggregate annual production capacity of approximately 3.5 million tons in Odessa, Texas; Pueblo, Colorado; Rapid City, South Dakota; Trident, Montana; and Tijeras, New Mexico. GCC also has 24 cement distribution terminals and transferring stations in Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, Wyoming, and West Texas. Furthermore, GCC is one of the leading ready-mix concrete producers, supplying regional markets in Texas, New Mexico, Arkansas, Oklahoma, Iowa, South Dakota, Minnesota, and North Dakota. GCC has 47 ready-mix concrete plants, a fleet of 307 ready-mix concrete mixer trucks and 183 haul trucks, 3 asphalt plants, 23 aggregates locations, and approximately 2,726 railcars used to transport bulk cement.

In Mexico, GCC operates in the state of Chihuahua, where it owns three cement plants with a total annual production capacity of approximately 2.5 million tons in the cities of Chihuahua and Juarez and the town of Samalayuca. GCC´s operations in Mexico also include 49 ready-mix concrete plants, 299 mixer trucks, 6 concrete block plants, 4 aggregates plants, 2 precast plants, and a transportation fleet that consists of 250 cement and aggregates trucks, and 2 building materials distribution centers. In the state of Chihuahua, GCC is the leader in most of the markets

in which it participates (cement, ready-mix concrete, aggregates, concrete blocks, and prefabricated products) as it owns the only cement plant in the state. This leadership position is the result of offering high-quality products, providing service beyond customers' expectations, and having state-of-the-art technology for production and distribution.

Product description, components, and standards

The product under evaluation is **Portland Cement, Type IL, produced by GCC at its Tijeras, New Mexico 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. Aggregates are geological materials such as stone, sand, or gravel, essential for manufacturing concrete, mortar, and asphalt.

Input	Type IL
Clinker	80 - 90 %
Gypsum	3 - 6 %
Limestone	5 - 10 %

The **Portland Cement, Type IL** meets the following standards:

- ASTM C595 / C595M – 21 Standard Specification for Blended Hydraulic Cement [9]
- ASTM C1157 / C1157M – 2Oa Standard Performance Specification for Hydraulic Cement [10]
- AASHTO M 240M/M 240-20 Standard Specification for Blended Hydraulic Cement (ASTM C595/C595M-20) [11]

Declared unit

The declared unit is one metric ton of **Portland Cement, Type IL.**

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

The criteria for exclusion were based on data availability, relevance to the product system, and significance to the life cycle stages assessed. The following processes were excluded from the system boundary due to their negligible contribution to the overall environmental profile and/or lack of reliable data:

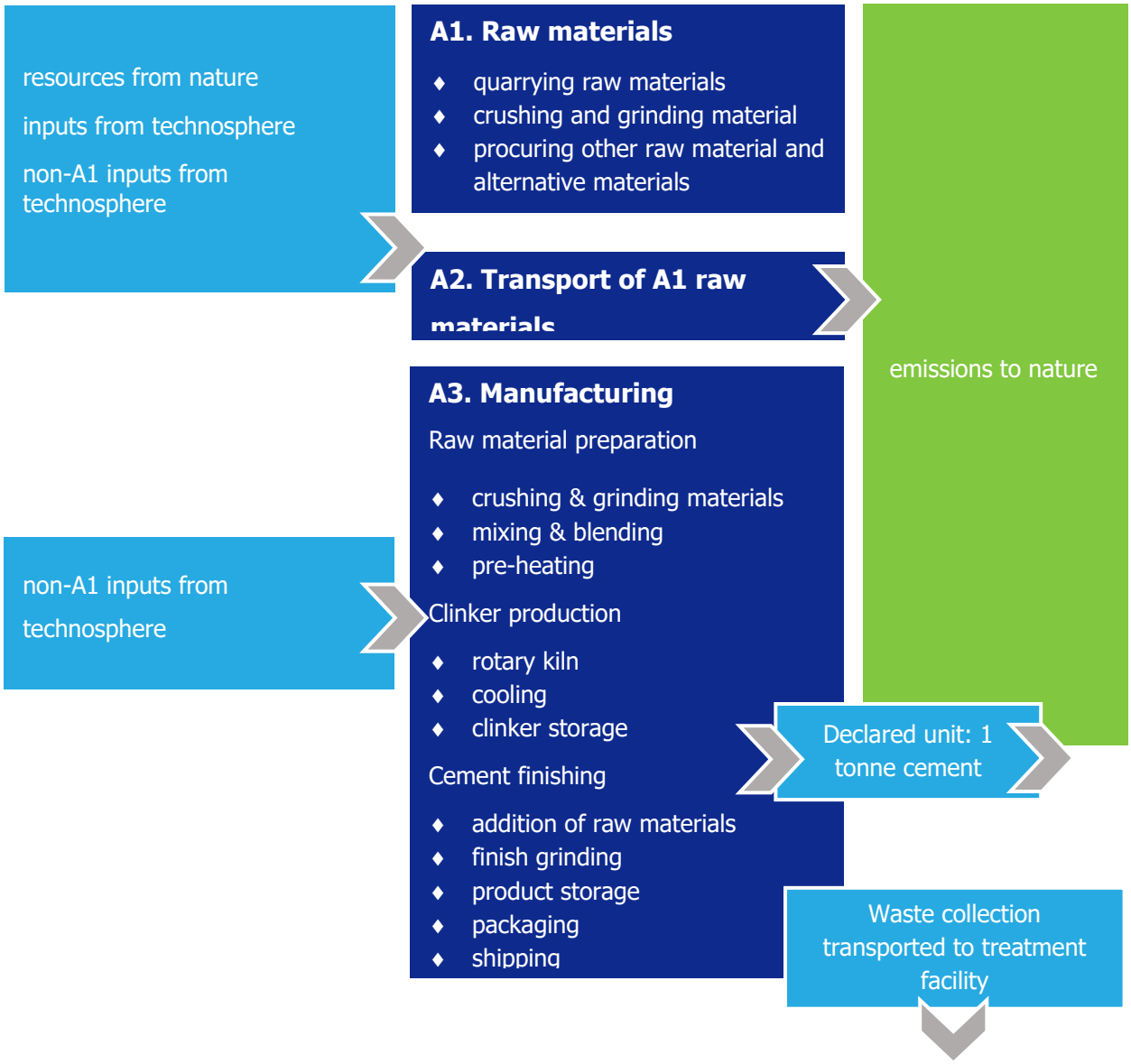
- Production, manufacture, and construction of manufacturing capital goods and infrastructure.
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment.
- Personnel-related activities (travel, furniture, and office supplies).
- Energy and water use related to company management and sales activities that may be located either 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 [4]. 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 collection and sources

Gate-to-gate input and output flow data have been collected for the specified processes during the reference year 2024. This data encompasses limestone quarrying, clinker production, and cement manufacturing at the Tijeras, New Mexico plant.

The primary data was sourced directly from the Tijeras, New Mexico 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 2024.

Raw material transport: The mode of transport and distance information was provided by primary information from the plant.

Electricity: Electricity generation and consumption were based on monthly utility bills. Since an energy mix wasn't provided, the GCCA default mix was used.

Process/space heating: All fuel consumed for process/space heating 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 have been used for 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 Tijeras 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.

Assumptions and limitations

This Environmental Product Declaration (EPD) is based on a Life Cycle Assessment (LCA) conducted in accordance with ISO 14025, ISO 14040/44 standards. The following assumptions and limitations apply:

This EPD includes average or estimated data where specific measurements were unavailable, and results may vary due to future changes in production processes or regional differences. It is not intended for comparative assertions unless all compared products are evaluated using the same Product Category Rules (PCR) and verified under equivalent conditions.

These assumptions and limitations are necessary to ensure consistency and transparency in the absence of complete primary data and to comply with the applicable PCR.

It is important to note that EPDs based on a cradle-to-gate scope or declared unit are not suitable for product comparisons. Comparability is only valid when EPDs follow the same sub-category PCR, include all relevant life cycle modules, and are based on equivalent scenarios within construction works.

Life Cycle Assessment results

Core environmental impact indicators		
Global warming potential (GWP 100)	1,017 *	kg CO_2 eq.
Depletion potential of the stratospheric ozone layer (ODP)	2.009E-5	kg CFC 11 eq.
Eutrophication potential (EP)	1.565	kg N eq.
Acidification potential of soil and water sources (AP)	2.341	kg SO_2 eq.

Global warming potential, biogenic	0.8491 *	kg CO_2 eq.
Photochemical oxidant creation potential	55.56	kg O_3 eq.
Abiotic depletion potential for non-fossil mineral resources	1.601E-4	kg Sb eq.
Abiotic depletion potential for fossil resources	5,473	MJ, net calorific value

Additional environmental impact indicators

Potential incidence of disease due to PM emissions	ND	kg PM2.5 eq.
Potential Comparative Toxic Unit for ecosystems	ND	CTUe
Potential Comparative Toxic Unit for humans - cancer	ND	CTUh
Potential Comparative Toxic Unit for humans - non-cancer	ND	CTUh
Potential soil quality index	ND	dimensionless

Parameters describing resource use

Use of renewable primary energy excluding renewable primary energy resources used as raw materials [1]	268.2	MJ, net calorific value
Use of renewable primary energy resources used as raw materials [1]	0	MJ, net calorific value
Total use of renewable primary energy resources [1]	268.2	MJ, net calorific value
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [1]	5,473	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials [1]	0	MJ, net calorific value
Total use of non-renewable primary energy resources [1]	5,473	MJ, net calorific value
Use of secondary materials [1]	93.96	kg
Use of renewable secondary fuels [1]	0	MJ, net calorific value
Use of non-renewable secondary fuels [1]	0	MJ, net calorific value

Net use of fresh water	0.8392	m³
Other environmental information describing waste categories		
Hazardous waste disposed [1]	0	kg
Non-hazardous waste disposed [1]	0.1106	kg
Radioactive waste disposed [1]	ND	kg
Environmental information describing output flows		
Components for re-use	0	kg
Materials for recycling	2.001E-2	kg
Materials for energy recovery	0	kg
Exported energy	0	MJ per energy carrier
Extra indicators		
Emissions from calcination and removals from carbonation	456.8	kg CO_2 eq.
Emissions from combustion of secondary fuels from renewable sources used in production processes	0	kg CO_2 eq.
Emissions from combustion of secondary fuels from non-renewable sources used in production processes	0	kg CO_2 eq.
Removals and emissions associated with biogenic carbon content of the bio-based product	0	kg CO_2
Removals and emissions associated with biogenic carbon content of the bio-based packaging	0	kg CO_2

* The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production. The net GWP-tot (excluding the emissions from the incineration of secondary fuels at clinker production) is 1236 kg CO_2–eq. The net GWP-bio is 0.8507 kg CO_2-eq.

[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.

"-" Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete. Use caution when interpreting data in these categories.

References

[1] GCCA Industry EPD Tool for Cement and Concrete. Version 3.2. User Guide, North American version. 21 November 2022. https://demo.gcca.quantis.solutions/us

[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 (v3.2). LCA Database, International + North American versions. 21 November 2022.

[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 C595 / C595M – 21

[10] ASTM C1157 / C1157M – 20a Standard Performance Specification for Hydraulic Cement

[11] AASHTO M 240M/M 240-20 Standard Specification for Blended Hydraulic Cement (ASTM C595/C595M-20)