Environmental Product Declaration

NRMCA
NATIONAL READY MIXED CONCRETE ASSOCIATION

in accordance with ISO14025 & ISO21930

Type I ■ Type III ■ Type IL ECO-MENT SPEC® ■ Type IL ECO-MENT ENDURE® ■ Type S

CAPITOL AGGREGATES INC

NRMCA Certified Environmental Product Declaration

This is a business-to-business Type III environmental product declaration for cement products as manufactured by Capitol Aggregates Inc. in San Antonio, Texas. This declaration has been prepared in accordance with ISO 14025:2006 and ISO 21930:2017, the NSF cement product category rules [9] and NRMCA EPD Program Operator Instructions.

PROGRAM OPERATOR
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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 V2: serves as the sub-category PCR
Sub-category PCR review was conducted by Thomas P. Gloria, PhD. (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants
Independent verification of the declaration, according to ISO 21930:2017 and ISO 14025:2006.: ☐ internal ☑ external
Third party verifier • Denice Viktoria Staaf • Labeling Sustainability
For additional explanatory material Manufacture Representative: Rusty Winters (Rusty.Winters@CapitolAggregates.com) This EPD was prepared using the pre-verified GCCA Tool by: Athena Sustainable Materials Institute
EPDs are comparable only if they comply with ISO 21930 (2017), use the same, sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

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NRMCA EPD #: 20084

ABOUT CAPITOL AGGREGATES INC.

With its humble beginnings as a sand and gravel producer in Austin, Texas, Capitol Aggregates has grown into a strong regional supplier of construction materials. With the ability to produce a wide variety of aggregates and cement, Capitol Aggregates truly has been A Texas Tradition since 1957.

Our long, rich history has been made possible by dedicated, hard working people committed to doing great things together. Located across South, Central, and West Texas, Capitol Aggregates is poised to serve your material needs. Whether large or small, our highly competent team of dedicated professionals is ready to assist you with developing a customized solution to meet your material requirements.

PRODUCT IDENTIFICATION

This EPD reports environmental information for the five cement products noted below as produced by Capitol Aggregates Inc. at their facility in San Antonio, Texas.

Capitol Aggregates Cement Products

Product Name	Product Description	Product Code	Type
Type I	ASTM C 150 Type I	026-071-000	Portland Cement
Type III	ASTM C 150 Type III	030-071-000	Portland Cement
ECO-MENT ENDURE®	ASTM C 595 Type IP (25)	031-071-000	Blended Hydraulic Cement
ECO-MENT SPEC®	ASTM C 595 Type IL (15)	045-071-000	Blended Hydraulic Cement
Type N & S	ASTM C 91 Type N ASTM C 91 Type S	034-071-000 024-071-000	Masonry Cement

Applicable product standards for portland, blended hydraulic, and masonry cements (UN CPC 3744) include:

Portland Cement

- ASTM C150 – Standard Specification for Portland Cement
- ASTM C1157 – Standard Performance Specification for Hydraulic Cement
- AASHTO M 85 – Standard Specification for Portland Cement (Chemical and Physical)
- CSA A3001 – Cementitious Materials for Use in Concrete

Blended Hydraulic Cement

- ASTM C595 – Standard Specification for Blended Hydraulic Cements
- ASTM C1157 – Standard Performance Specification for Hydraulic Cement
- AASHTO M 240 – Standard Specification for Blended Hydraulic Cement

Masonry Cement

- ASTM C91 – Standard Specification for Masonry Cement

Cements are primarily used as binding agents in concrete and mortar, or used for other purposes such as engineered soils, fiber cement board, and solidification/stabilization of contaminated materials and wastes.

DECLARED UNIT

The declared unit is 1 metric ton of cement.

MATERIAL CONTENT

The below table presents the average material content by input material for the five cement products, as derived from the facility LCI data for the year 2021.

Material Content of Capitol Cement Products (%)

Material Inputs	Type I	Type III	ECO-MENT SPEC (IL)	ECO-MENT ENDURE (IP)	Type S
Clinker	90%	92%	80%	70%	50%
Gypsum, natural	6%	8%	6%	5%	3%
Limestone	2%	0%	12%	0%	45%
Gypsum, synthetic	2%	0%	2%	1%	2%
Fly ash	0%	0%	0%	24%	0%
Processing aids	<1%	<1%	<1%	<1%	<1%
	100%	100%	100%	100%	100%

SYSTEM BOUNDARY

This EPD is a cradle-to-gate EPD covering A1-A3 stages of the life cycle.

PRODUCTION STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE			
Extraction and upstream production	Transport to Factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / Demolition	Transport	Waste Processing	Disposal of Waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

CUT-OFF

Items excluded from 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); and
- energy and water use related to company management and sales activities that may be located either within the factory site or at another location.

No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this EPD.

DATA COLLECTION AND SOURCES

Gate-to-gate input/output flow data were collected for the following processes for the reference year 2021: Limestone quarry, clinker production and cement manufacture – San Antonio, TX

All applicable North American background LCI data are publicly available in the GCCA LCA Database [4].

ALLOCATION PROCEDURE

Allocation follows the requirements and guidance of ISO 14044:2006, Clause 4.3.4; NSF PCR:2020; and ISO 21930:2017 section 7.2. Recycling and recycled content is modeled using the cut-off rule [5].

This sub-category 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.

REFERENCES

1. ASTM C150 / C150M – 20 Standard Specification for Portland Cement.
2. ASTM C595 / C595M – 21 Standard Specification for Blended Hydraulic Cements
3. Global Cement and Concrete Association (GCCA) 2021. N.A. version of Industry EPD tool for Cement and Concrete – v3.1. https://concrete-epd-tool.org/
4. Global Cement and Concrete Association (GCCA) 2021. LCA Database, North American version – v3.1, Prepared by Quantis. https://demo.gcca.quantis.solutions/
5. Global Cement and Concrete Association (GCCA) 2021. LCA Model, North American version – v3.1, Prepared by Quantis https://demo.gcca.quantis.solutions/
6. ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
7. ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
8. ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
9. NSF 2020: PCR for Portland, Blended, Masonry, Mortar and Plastic (Stucco) Cements v3.2, September 2021
10. USLCI: 2015 The U.S. Life Cycle Inventory Database
11. WBCSD CSI 2013: CO2 and Energy Protocol Version 3.1 of 9 December 2013; https://www.cement-co2-protocol.org/en/

LIFE CYCLE IMPACT ASSESSMENT RESULTS PER METRIC TON

Impact Assessment	Unit	Type I	Type III	Type IL	Type IP	Type S
Global warming potential (GWP)[1]	kg CO_2 eq	846	859	759	674	510
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	2.05E-05	2.04E-05	1.96E-05	1.87E-05	1.76E-05
Eutrophication potential (EP)	kg N eq	1.43	1.44	1.32	1.21	1.01
Acidification potential of soil and water sources (AP)	kg SO_2 eq	2.05	2.07	1.86	1.66	1.36
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	28.4	28.8	25.7	22.4	18.3
Resource Use						
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	2.37E-04	2.34E-04	2.21E-04	2.06E-04	1.96E-04
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	270	269	258	234	236
Renewable primary energy resources as energy (fuel), (RPRE)*	MJ, NCV	209	182	173	164	177
Renewable primary resources as material, (RPRM)*	MJ, NCV	58	0.00	0.00	0.00	58
Non-renewable primary resources as energy (fuel), (NRPRE)*	MJ, NCV	4764	4803	4373	4003	3329
Non-renewable primary resources as material (NRPRM)*	MJ, NCV	0.00	0.00	0.00	0.00	0.00
Consumption of fresh water	m3	0.71	0.69	0.65	0.60	0.55
Secondary Material, Fuel and Recovered Energy						
Secondary Materials, (SM)*	kg	77	59	71	292	49
Renewable secondary fuels, (RSF)*	MJ, NCV	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuels (NRSF)*	MJ, NCV	0.00	0.00	0.00	0.00	0.00
Recovered energy, (RE)*	MJ, NCV	0.00	0.00	0.00	0.00	0.00
Waste & Output Flows						
Hazardous waste disposed*	kg	0.14	0.14	0.14	0.14	0.14
Non-hazardous waste disposed*	kg	15.7	16.0	14.0	12.3	8.9
High-level radioactive waste*	kg	n/c	n/c	n/c	n/c	n/c
Intermediate and low-level radioactive waste*[2]	kg	n/c	n/c	n/c	n/c	n/c
Components for reuse*	kg	0.00	0.00	0.00	0.00	0.00
Materials for recycling*	kg	0.14	0.14	0.12	0.10	0.07
Materials for energy recovery*	kg	0.00	0.00	0.00	0.00	0.00
Recovered energy exported from the product system*	MJ, NCV	0.00	0.00	0.00	0.00	0.00
Additional Inventory Parameters for Transparency						
CO_2 emissions from calcination and uptake from carbonation*	kg CO_2 eq	474	482	420	36	261
Biogenic CO_2, reporting the removals and emissions associated with biogenic carbon content contained within biobased products*	kg CO_2 eq	0.00	0.00	0.00	0.00	0.00

[1] GWP 100; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5).
CO2 from biomass secondary fuels (agriculture waste) used in kiln are climate-neutral (CO2 sink = CO2 emissions), ISO 21930, 7.2.7.

[2] Not calculated by GCCA Tool

* 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 these categories.
Only EPDs prepared from cradle-to-grave life-cycle results and based on the same function, quantified by the same functional unit, and taking account of replacement based on the product reference service life (RSL) relative to an assumed building service life, can be used to assist purchasers and users in making informed comparisons between products.

ADDITIONAL ENVIRONMENTAL INFORMATION

Eco-Ment

Capitol Aggregates, Inc is committed to developing green products. Our EcoMent® line of cement has a lower carbon footprint while delivering the same consistent, high-quality performance our customers have come to expect.

Capitol Skymine

The SkyMine® process is a technology patented by Skyonic Corporation (http://skyonic.com/) that removes carbon dioxide and other emissions from industrial waste streams.

The first SkyMine® facility opened October 2014 at the Capitol Aggregates cement plant; it is expected to capture 75,000 tons annually of CO_2 and also remove mercury, metals, sulfur dioxide, nitrogen oxides and particulates from flue emissions. Capitol SkyMine draws on the captured emissions to produce the commercially saleable products hydrochloric acid, baking soda (sodium bicarbonate) and bleach.