



Chanute Cement Plant

Environmental Product Declaration

LIFE CYCLE ASSESSMENT

This cradle to gate Environmental Product Declaration covers bulk cement products produced at the Chanute Cement Plant. The Life Cycle Assessment (LCA) was prepared in conformity with ISO 21930, ISO 14025, ISO 14040, and ISO 14044.
This EPD is intended for business-to-business (B-to-B) audiences.

Ash Grove

11011 Cody St.
Overland Park
Kansas 66210

PROGRAM OPERATOR

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428
610-832-9500
<https://www.astm.com>



EPD # 1058
August 21th, 2025
Valid for 5 years

LCA/EPD DEVELOPER

Climate Earth, Inc.
137 Park Place, Suite 204
Pt Richmond, CA 94801

415-391-2725



<https://www.climateearth.com>

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 V3.1 serves as the sub-category PCR Inclusion of API SPEC 10A under the scope of PCA PCR effective 9/11/2020 per NSF Deviation #2020-037
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.: <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier Thomas P. Gloria, PhD. (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants
For additional explanatory material Manufacture Representative: Norma Job (norma.job@ashgrove.com) This LCA EPD was prepared by: Melissa Díaz Segura, LCA and EPD Project Manager • Climate Earth (www.climateearth.com)
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.

LIFE CYCLE ASSESSMENT

PRODUCER

Ash Grove Cement Company (“AGC,” “Ash Grove”), a CRH company, is the second largest cement company in North America with nearly 2,000 employees, 12 cement plants, and 48 distribution terminals across the United States and Canada. Our vision is to develop sustainable solutions that build, connect, and improve our world, and to this end AGC continually pursues a sustainable approach to business through our deployment of industry best practices, innovative products and services, and emissions reduction and monitoring technology. For over 142 years, Ash Grove has provided cementitious materials to construct highways, bridges, commercial and industrial complexes, homes, and other structures fundamental to the nation’s economic vitality and quality of life. In 2023, AGC sold approximately 14.5 million tons of cement and 0.8 million tons of supplementary cementitious materials (SCMs). Our company has committed to an industry-leading 30% reduction target in absolute CO₂ emissions by 2030, certified by the SBTi and aligned with our ambition to become a net-zero business by 2050.

PRODUCTS

The cement products covered in this EPD meet UN CPC 3744 classification and the following standards:

Product Type	Applicable Standard	Standard Designation
Portland (General Use) Cement	ASTM C150/C150M	Type I/II
Portland Cement	ASTM C150, AASHTO M85	Type III
Portland Limestone Cement	ASTM C595 or AASHTO M 240	Type 1L

This EPD reports environmental transparency information for four cement types produced by Ash Grove at its Chanute, KA plant.

Type I/II: Type I-II meets the specification requirements for both ASTM C150 Type I and Type II, the most widely used cement for many kinds of concrete construction

Type III: This cement provides high strengths at an early age. It is chemically and physically similar to Type I cement, except that its particles have been ground finer. It is used when forms need to be stripped as soon as possible or when the structure must be put into service quickly.

Type 1L: Portland-limestone cement (PLC) Type 1L is formulated with a higher limestone content and manufactured with less embodied energy than ordinary Portland cement (OPC). Portland-limestone cement (PLC) Type 1L is governed by ASTM C595 or AASHTO M 240 Standard Specification for Blended Hydraulic Cements. It is a blended cement manufactured with a limestone content between 5% and 15%. Optimized particle packing and enriched nucleation sites allow PLCs to match the performance of ASTM C150 Standard Specification for Portland Cement Types I and II.

LIFE CYCLE ASSESSMENT

PRODUCT COMPONENTS

Inputs	Type I/II	Type III	Type IL
Clinker	90.58%	92.19%	84.7%
Limestone	4.11%	1.60%	9.61%
Gypsum	5.40%	6.20%	5.67%
Grinding aids	0.05%	0.05%	0.00%
Fly ash	0.00%	0.00%	0.00%

DECLARED UNIT

The declared unit is one metric tonne of Type I/II, III, and IL cements.

SYSTEM BOUNDARY

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

PRODUCTION Stage (Mandatory)			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	De-construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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

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.

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.

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. Recycled and recovered materials with fuel content and used as fuels, such as scrap tires and agricultural waste, are considered nonrenewable or renewable secondary fuels. Impacts allocated to these fuels are limited to the treatment and transport required for their use from point of generation along with all emissions from combustion.

LIFE CYCLE INVENTORY (LCI)

Primary Sources of LCI Data:

Diesel: US-EI (2021) "Diesel, combusted in industrial equipment/US"

Coal: ecoinvent 3.8 (2021): "Hard coal {RNA}| hard coal mine operation and hard coal preparation"

Pet coke: ecoinvent 3.8 (2021): "Petroleum coke, at refinery/kg/US"

Electricity: US-EI (2021) "Electricity, high voltage, at grid, eGrid (2023), MRO/US US-EI U"

Limestone: Manufacture specific primary data (2023)

Natural gas: ecoinvent 3.8 (2021): "Natural gas, high pressure {US}| natural gas production"

Truck transport: USLCI (2015) "Transport, combination truck, long-haul, diesel powered, South /tkm/RNA"

Truck transport: USLCI (2015) "Transport, combination truck, short-haul, diesel powered South /tkm/RNA"

Train Transport: USLCI (2015) Transport, train, diesel powered/US

Electricity grid mix includes: 23.10% Natural Gas, 27.30% Coal, 38.20% Wind, 6.20% Nuclear, 1.20% Solar, 0.00% Geothermal, 3.10% Hydro, 0.60% Biomass, 0.10% oil, 0.10 pet coke, with a global warming potential of 0.499 kg CO₂eq/kWh.

LIFE CYCLE IMPACT ASSESSMENT RESULTS

Ash Grove Products, bulk shipped: Type I/II, Type III; and Type IL cements per 1 metric tonne

Impact Assessment	Unit	Type I/ II	Type III	Type IL
Global warming potential (GWP) ¹	kg CO ₂ eq	1002	1004	921
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	3.98E-06	3.59E-06	3.32E-06
Eutrophication potential (EP)	kg N eq	5.12E-01	4.78E-01	4.35E-01
Acidification potential of soil and water sources (AP)	kg SO ₂ eq	1.20E+00	1.15E+00	1.05E+00
Formation potential of tropospheric ozone (POCP)	kg O ₃ eq	24.7	24.5	22.5
Resource Use				
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	6.67E-06	6.67E-06	6.14E-06
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	4073	3954	3621
Renewable primary energy resources as energy (fuel), (RPRE ²) *	MJ, NCV	281	228	204
Renewable primary resources as material, (RPRM ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00
Non-renewable primary resources as energy (fuel), (NRPRE ²) *	MJ, NCV	4270	4120	3769
Non-renewable primary resources as material, (NRPRM ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00
Consumption of fresh water, (FW ²)	m ³	2.57	2.21	2.00
Secondary Material, Fuel and Recovered Energy				
Secondary Materials, (SM ²) *	kg	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels, (RSF ²) *	MJ, NCV	2.75	2.80	2.57
Non-renewable secondary fuels (NRSF ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00
Recovered energy, (RE ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00
Waste & Output Flows				
Hazardous waste disposed, (HW ²) *	kg	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed, (NHWD ²) *	kg	5.12E-02	5.12E-02	5.12E-02
High-level radioactive waste, (HLRW ²) *	m ³	1.06E-07	8.97E-08	8.07E-08
Intermediate and low-level radioactive waste, (ILLRW ²) *	m ³	5.29E-07	4.50E-07	4.05E-07
Components for reuse, (CRU ²) *	kg	0.00E+00	0.00E+00	0.00E+00
Materials for recycling, (MR ²) *	kg	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery, (MER ²) *	kg	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported from the product system, (EE ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00
Additional Inventory Parameters for Transparency				
CO ₂ emissions from calcination and uptake from carbonation ³	kg CO ₂ eq	534	543	499

* 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.

¹ GWP 100; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5).

CO₂ from biogenic secondary fuels used in kiln are climate-neutral (CO₂ sink = CO₂ emissions), ISO 21930, 7.2.7.

² Calculated per ACLCA ISO 21930 Guidance.

³ Calcination emissions were calculated based on the Cement CO₂ and Energy Protocol detailed output method (B2) published by the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative (CSI).

References

ACLCA. (2019). ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017.

ASTM. (April 2020). General Program Instructions.

ecoinvent. (2021). The ecoinvent Database v.3.8. Zurich, Switzerland: The Swiss Centre for Life Cycle Inventories.

ISO 14020. (2000). Environmental labels and declarations – General principles.

ISO 14025. (2006). Environmental labels and declarations, Type III environmental declarations, Principles and procedures.

ISO 14040. (2006). ISO 14040: Environmental Management – Life Cycle Assessment – Principles and Framework.

ISO 14044. (2006/Amd 1:2017/Amd 2:2020). Environmental management – Life cycle assessment – Requirements and guidelines

ISO 21930. (2017). ISO 21930; Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.

Long Trail Sustainability. (2021). DATASmart (ES-EI Database). Huntington, VT: Long Trail Sustainability.

National Renewable Energy Laboratory. (2015). U.S. Life-Cycle Inventory (LCI) database.

NSF International. (February 2025). PCR for Concrete. V.2.3. (including deviation) - extension

NSF International. (May 2025). PCR for Portland, Blended, Masonry, Mortar and Plastic (Stucco) Cements v.3.2.

PRé Sustainability. (2020). SimaPro Vers. 9.1.0.8. www.pre-sustainability.com/simapro.

US EPA. (2014). Tool for the Reduction of Assessment of Chemical and Other Environmental Impacts (TRACI).

US EPA. (2023). Emissions & Generation Resource Integrated Database (eGRID).