CARBONBUILT

EPD
ENVIRONMENTAL PRODUCT DECLARATION

Concrete Masonry Units Produced By: CarbonBuilt

FACILITY: CarbonBuilt Danielson

STRENGTH: 3000 psi @ 28 days

MIX NAME: SRW 40% Reversa

DESCRIPTION: Scope 3 attributes have been sold to finance the deployment of these products. As such, the buyer of CarbonBuilt products may not reduce their Scope 3 emissions inventory based on their purchase.

IMPACT INDICATOR		A1-A3 Total
Global Warming Potential	kg CO2e	1.57E+02
Ozone Depletion	kg CFC11e	7.46E-06
Acidification	kg SO2e	8.49E-01
Eutrophication	kg Ne	2.34E-01
SFP (Smog)	kg O3e	1.94E+01
Non-renew. energy	MJ, NCV	1.50E+03

GENERAL INFORMATION

Declared Product	1 M3 of Concrete Masonry Product (CMU) produced by CarbonBuilt	
Date of Issue	November 05, 2026	
Period of Validity	5 years; September 30, 2030	
EPD Holder	CarbonBuilt 42 Junior Ave Danielson, CT 06239	CARBONBUILT
Program Operator	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428	ASTM INTERNATIONAL Helping our world work better
LCA and EPD Developer	WAP Sustainability Consulting 1701 Market Street Chattanooga, TN 37408	WAP SUSTAINABILITY CONSULTING
Core PCR	ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products	
Sub-category PCR	UL PCR Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements, V1.1, March 2022.	
Independent LCA Reviewer and EPD Verifier	Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006 ☐ Internal ☒ External Thomas P. Gloria, PhD Industrial Ecology Consultants	
For Additional Explanatory Material	Manufacturer Representative: Cindy McLaughlin (cmclaughlin@carbonbuilt.com) Software Tool: theta by WAP Sustainability Consulting V.1.0.	

The declared product meets the following product specifications:

- ACI 211: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- ACI 318: Building Code Requirements for Structural Concrete.
- CSA A165.1-14 - Concrete block masonry units
- CSI MasterFormat Division 4-22-00 .
- UNSPSC 30131502,

Disclaimer:
EPDs are comparable only if they comply with this document, use the same sub-category PCR where applicable, include all relevant information modules, use the same functional unit and are based on equivalent scenarios with respect to the context of construction works. This EPD is intended for business-to-business communications.

This EPD was calculated using industry average cement data. Cement LCA impacts can vary depending upon manufacturing process, efficiency and fuel source by as much as 50% for some environmental impact categories. Cement accounts for as much as 90% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation of as much as 45%.

METHODOLOGICAL FRAMEWORK

DECLARED UNIT

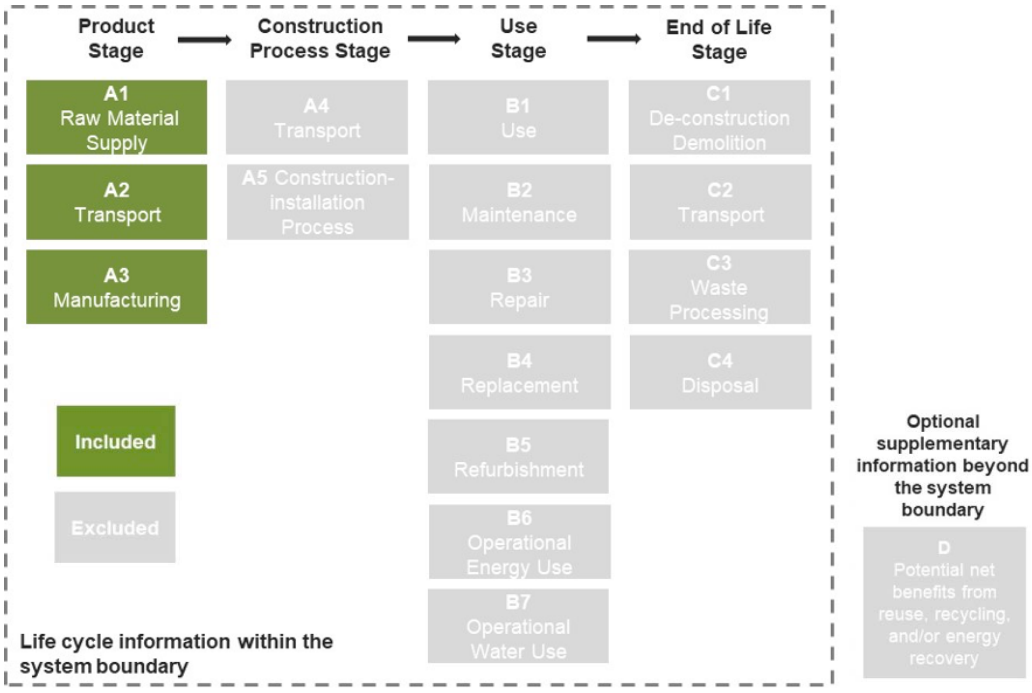
The declared unit is 1 cubic meter of concrete formed into manufactured concrete masonry product (CMU). The defined concrete mix is intended for commercial applications developed and produced by CarbonBuilt. Key product variables include:

- The reference service life of block CMU is dependent on its end-use and its service environment which can vary dramatically and therefore is not declared herein. Per the PCR, we recommend a default reference service life of 75 years for concrete masonry products.
- Water to cementitious materials ratio (w/cm) – Varies but generally lower for a higher strength non-air entrained mix design (above 5,000 psi (34.5 MPa)) in accordance with ACI 211.1 recommendations.
- SCM use – various mix designs call for Portland cement displacement by incorporating fly ash (FA) and/or slag cement (SL).
- Admixtures use – Admixtures used was specified for the mix design that was modeled. These admixtures can include an air-entraining admixture, water reducing and accelerating admixtures, and high range water reducer admixtures
- No hazardous substances are present in the declared product.
- The concrete masonry products represented in this EPD are comprised of in order of greatest mass :
  Natural Fine Aggregate (ASTM C33), Natural Coarse Aggregate (ASTM C33), Portland Limestone Cement (ASTM C595), Batch W ater (ASTM C1602), Fly Ash (ASTM C618), Slag Cement (ASTM C989), Waterproofing Admixture (ASTM C494)

SYSTEM BOUNDARY

A summary of life cycle stages included in the EPD is identified in the figure below. This EPD covers A1-A3 life cycle stages (Cradle-to-Gate). A summary of activities excluded from the EPD is as follows:

- 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.



ALLOCATION

All input/output flow data reported by the facility were included in the LCI modelling. Allocation procedures observed the requirements and guidance of ISO 14044:2006, clause 4.3. and those specified in UL PCR. Block CMU plant LCI environmental flows (inputs and outputs) were allocated on a per-m3 basis.

CUT-OFF RULES

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty (e.g., portland cement and admixtures) are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.
- Proxy data was used for admixtures used that did not align with any of the admixture categories published in the European Federation of Concrete Admixtures Associations (EFCA) EPDs. In those cases, the Water Reducing Admixture data was selected as a conservative assumption as per the UL PCR.

CALCULATED RESULTS PER 1 M3

CORE MANDATORY IMPACT INDICATOR	UNIT	Module A1	Module A2	Module A3	Total A1-A3
Global warming potential	kg CO2e	1.46E+02	2.28E+01	-1.19E+01	1.57E+02
Depletion potential of the stratospheric ozone layer	kg CFC11e	5.48E-06	8.87E-10	1.98E-06	7.46E-06
Acidification potential of soil and water sources	kg SO2e	3.95E-01	4.14E-01	3.93E-02	8.49E-01
Eutrophication potential	kg Ne	1.91E-01	2.29E-02	2.03E-02	2.34E-01
Formation potential of tropospheric ozone	kg 03e	7.25E+00	1.19E+01	2.53E-01	1.94E+01
Abiotic depletion potential for fossil resources	MJ, NCV	7.68E+02	3.00E+02	1.33E+02	1.20E+03
Abiotic depletion potential for non-fossil mineral resources	kg Sbe	7.60E-05	0.00E+00	1.52E-05	9.12E-05
Fossil fuel depletion	MJ Surplus	7.62E+00	4.46E+01	1.95E+01	7.17E+01
USE OF PRIMARY RESOURCES					
Renewable primary energy carrier used as energy	MJ, NCV	3.80E+01	0.00E+00	2.64E+01	6.44E+01
Renewable primary energy carrier used as material	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable primary energy carrier used as energy	MJ, NCV	8.96E+02	3.18E+02	2.83E+02	1.50E+03
Non-renewable primary energy carrier used as material	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
USE OF SECONDARY RESOURCES					
Secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuel	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuel	MJ, NCV	7.48E+01	0.00E+00	0.00E+00	7.48E+01
Recovered energy	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MANDATORY INVENTORY PARAMETERS					
Consumption of freshwater resources	m3	1.72E+00	0.00E+00	3.58E-01	2.08E+00
Calcination and carbonation emissions	kg CO2e	6.87E+01	0.00E+00	-2.10E+01	4.77E+01
WASTE AND OUTPUT FLOWS					
Hazardous waste disposed	kg	1.95E-03	0.00E+00	0.00E+00	1.95E-03
Non-hazardous waste disposed	kg	9.94E-01	0.00E+00	0.00E+00	9.94E-01
High-level radioactive waste, conditioned	m3	9.15E-04	0.00E+00	1.70E-07	9.15E-04
Intermediate- and low-level radioactive waste	m3	2.17E-07	0.00E+00	6.05E-07	8.22E-07
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported from the product system	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**Some LCA impact categories and inventory items are still under development and can have high levels of uncertainty. To promote uniform guidance on the data collection, calculation, and reporting of results, the ACLCA methodology (ACLCA 2019) was used.*
**The reported value of -21 kg CO_2e in A3 indicates carbon uptake (carbonation) during the manufacturing stage of the concrete blocks*

DATA SOURCES

This EPD is based on foreground LCI data collected from the participating company's production facilities for the calendar year 2024. All upstream material, resource and energy carrier inputs have been sourced from various industry-average datasets and literature. Many of these data sets are defaulted to those specified for use in the UL PCR. The following Table describes each LCI data source and includes the data quality assessment.

MATERIALS	LCI DATA SOURCE	YEAR	GEOGRAPHY	DATA QUALITY ASSESSMENT
Portland Cement and Limestone Cement, ASTM C595, AASHTO M240, or CSA A3001	Portland Cement Association EPD of Portland Cement and Portland Limestone Cement (2021)	2021	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Slag Cement, ASTM C989	Slag Cement Association EPD of North America Slag Cement (2021)	2021	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Fly Ash, ASTM C618	None, no incoming burden, only inbound transport is considered*	N/A	N/A	N/A
Silica Fume, ASTM C1240	None, no incoming burden, only inbound transport is considered*	N/A	N/A	N/A
Crushed Aggregates, coarse and fine, ASTM C33	ecoinvent 3.4: "Gravel, crushed {RoW}| production | Cut-off, U" (2018), modified with US average electricity	2001	World/US	Technology: very good, Time: poor Geography: good, Completeness: very good, Reliability: very good
Natural Aggregates, coarse and fine, ASTM C33	ecoinvent 3.4: "Gravel, round {RoW}| gravel and sand quarry operation | Cut-off, U" (2018), modified with US average electricity	2001	World/US	Technology: very good, Time: poor, Geography: good, Completeness: very good, Reliability: very good
Manufactured Lightweight Aggregates, ASTM C330	ecoinvent 3.4: Expanded clay {RoW}| production | Cut-off, U (2018), modified with US average electricity	2000	World/US	Technology: good, Time: poor, Geography: good, Completeness: very good, Reliability: very good
Admixtures, ASTM C494	EFCA EPDs for Air Entrainers, Plasticisers and superplasticisers, Hardening Accelerators, Set Accelerators, Water Resisting Admixtures, and Retarders (2015)	2015	North America	Technology: very good, Time: very good, Geography: fair, Completeness: very good, Reliability: very good
Batch and Wash Water, ASTM C1602	ecoinvent 3.4: Tap water {RoW}| market for | Cut-off, U (2018), modified with US average electricity	2011	World/US	Technology: very good, Time: good, Geography: fair, Completeness: very good, Reliability: very good
Road Transport	USLCI 2014: Transport, combination truck, short-haul, diesel powered/tkm/RNA (2014) Adjusted for Back-hauls.	2010	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Rail Transport	USLCI 2014: Transport, train, diesel powered /US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: good, Reliability: very good
Ocean Transport	USLCI 2014: Transport, ocean freighter, average fuel mix/US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Electricity	ecoinvent 3.4: Electricity, low voltage {XX}| market for | Cut-off, U (2018)	2015	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Diesel	USLCI 2014: Diesel, combusted in industrial boiler / US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Gasoline	USLCI 2014: Gasoline, combusted in equipment/ US "U" (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Liquefied Propane Gas	USLCI 2014: Liquefied petroleum gas, combusted in industrial boiler /US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability:
Hazardous Solid Waste	ecoinvent 3.4: Hazardous waste, for incineration {RoW}| treatment of hazardous waste,hazardous waste incineration | Alloc, Rec, U 2018), modified with US electricity	2011	World/US	Technology: very good, Time: good, Geography: good, Completeness: very good, Reliability: very good
Non-Hazardous Solid Waste	ecoinvent 3.4: Inert waste {RoW}| treatment of, sanitary landfill | Alloc Rec, U (2018), modified with US average electricity	2011	World/US	Technology: very good, Time: good, Geography: good, Completeness: very good, Reliability: very good

** The product category rules for this EPD recognize fly ash, silica fume and slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a concrete material input.*

REFERENCES

ASTM International General Program Instructions (2020) V8.0

CSA A165.1-14 - Concrete block masonry units

ISO 21930: 2017 Building construction – Sustainability in building construction – Environmental declaration of building products.

ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.

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

ISO 14040: 2006 Environmental management - Life cycle assessment - Principles and framework. Amd 1:2020

ISO 14021:1999 Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling)

ISO 14048:2002. Environmental management — Life cycle assessment — Data documentation format

UL PCR Part A: Product Category Rule (PCR) Guidance for Building-Related Products and Services, Part A Life Cycle Assessment Calculation Rules and Report Requirements; UL 10010,Version 3.2

UL PCR Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements ULE 10010-29 v.1.1

Walloch et al: (in press) Conceptual Test Protocols for Measuring Carbon Sequestration of Manufactured Dry-Cast Concrete Products.