

**CANAL BLOCK**

Made with



Environmental Product Declaration for  
**CarbiCrete Concrete Masonry Unit (CMU)**  
Canal Block



Valid from  
09/28/2026 - 09/28/2031



## General Information

This Environmental Product Declaration (EPD) reports the impacts for one cubic meter (m<sup>3</sup>) of concrete formed into manufactured concrete products meeting the following specifications:

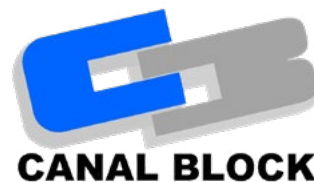
CSA A165.1, Concrete Masonry Unit, Load-Bearing

### Limitations

Environmental declarations from different programs (ISO 14025) may not be comparable. EPDs are comparable only if they use the same PCR (or sub-category PCR where applicable), include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. However, variations and deviations are possible. Example of variations: different LCA software and background LCI datasets may lead to different results for the life cycle stages declared.

### Environmental Attributes

Carbon credits, including any and all current and future greenhouse gas emission reduction credits, greenhouse gas offsets, verified carbon equivalent units including value chain interventions and adjusted emission factors, allowances and allowance payments or similar items, attributable to CarbiCrete's manufactured concrete and masonry products are being registered and sold separately to others. The end user shall not make any claim of such carbon credits, including toward its own greenhouse gas emission reduction targets or inventory.



**CANAL BLOCK**

Production Facility

**Canal Block**

3562 Nugent Rd

Port Colborne, Ontario L3K 5V4

**CarbiCrete**

1730 55th Avenue,

Lachine, Quebec H8T 3J5

514-636-3614



Program Operator

**ASTM International**

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West Conshohocken, PA 19428

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[astm.org](http://astm.org)

Valid from:

09/28/2026 - 09/28/2031

|                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Program Instructions                                                                                                                                                                                                                                                                                                                                                                               | ASTM Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions. Version 8.0, revised April 29, 2020. |
| Reference PCR                                                                                                                                                                                                                                                                                                                                                                                              | Part B: Concrete Masonry and Segmental Concrete Paving<br>Product EPD Requirements, March 1 2022. V1.1                                                                    |
| The sub-category PCR review was conducted by:                                                                                                                                                                                                                                                                                                                                                              | Jack Geibig, Ecoform, LLC, Terrie Boguski, Harmony Environmental, LLC, Christine Subasic, P.E., LEED AP, Consulting Architectural Engineer                                |
| Product RSL                                                                                                                                                                                                                                                                                                                                                                                                | N/A                                                                                                                                                                       |
| Markets of Applicability                                                                                                                                                                                                                                                                                                                                                                                   | North America                                                                                                                                                             |
| EPD Type                                                                                                                                                                                                                                                                                                                                                                                                   | Product Specific                                                                                                                                                          |
| Declared Unit                                                                                                                                                                                                                                                                                                                                                                                              | One cubic meter (m <sup>3</sup> ) of concrete formed into manufactured concrete products                                                                                  |
| Dataset Variability                                                                                                                                                                                                                                                                                                                                                                                        | N/A                                                                                                                                                                       |
| EPD Scope                                                                                                                                                                                                                                                                                                                                                                                                  | Cradle to Gate                                                                                                                                                            |
| Year(s) of Reported Manufacturer Primary Data                                                                                                                                                                                                                                                                                                                                                              | 01/01/2024 - 12/31/2024                                                                                                                                                   |
| LCA Software                                                                                                                                                                                                                                                                                                                                                                                               | CarbonCLARITY Suite, Concrete Block EPD Generator                                                                                                                         |
| LCI Database(s)                                                                                                                                                                                                                                                                                                                                                                                            | Ecoinvent, USLCI, US-EI                                                                                                                                                   |
| LCIA Methodology                                                                                                                                                                                                                                                                                                                                                                                           | TRACI 2.1 v1.04                                                                                                                                                           |
| This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL environment Part A Enhancement (2017).<br>( ) internal (*) external | Thomas P. Gloria (t.gloria@industrial-ecology.com)<br>Industrial Ecology Consultants                                                                                      |
| This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:                                                                                                                                                                                                                                                                                                            | Climate Earth Inc.<br>137 Park Place, Suite 204. Pt Richmond, CA 94801<br>415-391-2725 support@climateearth.com                                                           |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:                                                                                                                                                                                                                                                                                               | Thomas P. Gloria (t.gloria@industrial-ecology.com)<br>Industrial Ecology Consultants                                                                                      |



# General Information

## Products

CarbiCrete™ is a cement-free concrete technology company developing scalable building solutions that reduce embodied carbon in the built environment. The company's groundbreaking technology eliminates the use of cement as the binder in concrete by replacing it with steel slag, a steel-making byproduct, and uses carbon mineralization to permanently lock away CO<sub>2</sub> in concrete products. The technology involves injecting CO<sub>2</sub> into a curing chamber where it reacts with the steel slag present in the concrete. This reaction results in the permanent conversion of CO<sub>2</sub> into stable calcium carbonates. By replacing cement with steel slag and using captured CO<sub>2</sub> during curing, CarbiCrete is using two waste streams to create decarbonized concrete that reduces emissions, removes CO<sub>2</sub> and lowers the embodied carbon of any project where the CMUs are specified.

## CarbiCrete cement-free, decarbonized CMU

- Uses locally-sourced materials: recycled steel slag and captured biogenic CO<sub>2</sub>
- Reduces landfill waste
- Conserves water
- Reduces primary material consumption
- Reduces a project's embodied carbon
- Reduces carbon emissions
- Permanently removes CO<sub>2</sub>
- Contributes to LEED points

## Declared Unit

The declared unit is one cubic meter (m<sup>3</sup>) of concrete formed into manufactured concrete products.

## System Boundary

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

## Products

This EPD reports environmental information for the products produced by Canal Block, using CarbiCrete technology, at Canal Block's masonry and hardscape facility, located in Port Colborne, Ontario. The products covered in this EPD meet the following standards:

### Product Name

**CarbiCrete CMU**

### Description

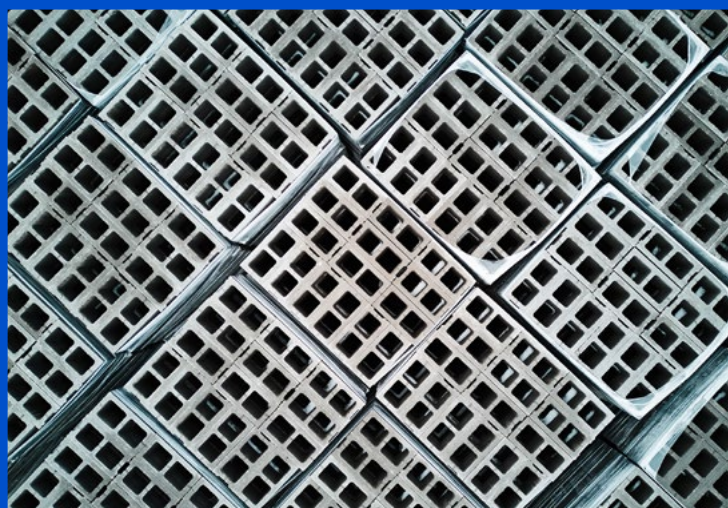
Normal weight CMUs made with steel slag binder, regular (stone and sand) aggregates, and mineralized CO<sub>2</sub>. Produced by Canal Block using CarbiCrete's cement-free, decarbonized concrete technology. Dimensional properties as defined by ASTM C90.

### Applicable Standard

ASTM C90, CSA A165.1

### Product SKU

CC 15



| PRODUCTION Stage<br>(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 of 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               |

MND: Module not declared, X: Module included

The production stages and primary unit processes included in the study by product stage are

| SYSTEM BOUNDARY |  | Raw Material Supply (A1)                                              | Transport (A2)                           | Manufacturing (A3)                                                                                                                                                                                                                                                          |
|-----------------|--|-----------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |  | Steel Slag<br>Sand/Eco-Sand<br>Aggregates<br>Admixture<br>Batch water | Truck<br>Rail<br>Energy Carriers (fuels) | Energy Carriers (electricity and fuels)<br>Ancillary Materials (oils, lubricants, and greases, other consumables)<br>Packaging Materials<br>Water (manufacturing water, and water used for dust suppression)<br>Waste (end-of-life treatment of ancillary material & waste) |

Relevant Information for product stages not included in system boundary (A4-C4):

- Other products not included in assessment needed for the product to serve intended function in the construction work can include mortar, grout, and reinforcement for concrete masonry product; Product packaging waste per declared unit include: 51 kg pallet waste, 0.211 kg stretch wrap waste.
- Typical end of life treatment is unknown but can include landfill or crushing and then re-use as a recycled aggregate or as road base; The reference service life for concrete masonry is 75 years and for segmental concrete paving is 50 years.

## 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 known flows were deliberately excluded from this EPD.

## Allocation Procedure

Allocation follows the requirements and guidance Part A: Life Cycle Assessment Calculation Rules and Report Requirements, section 3.3.

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.



# Primary Sources of LCIA Data

- Admixture (plasticisers and superplasticisers): EFCA EPD, Europe, 2021
- Aggregate (crushed): US-EI (2020): "Gravel, crushed, at mine/US", 2001
- Aggregate (natural): US-EI (2020): "Gravel, round, at mine/US", 2001
- Carbonation: Supplier specific primary data, 2026
- Electricity (SERC): Ecoinvent 3.4: "Electricity, medium voltage, market for, cut-off", 2015
- Municipal Water: US-EI (2020): "Tap water, at user/US", 2000
- Natural gas: USLCI (2015): "Natural gas, combusted in industrial boiler/NREL/US", 2007
- Slag Cement: Supplier specific primary data, 2023
- Truck transport: USLCI (2015): "Transport, combination truck, short-haul, diesel powered/tkm/RNA", 2010

## Interpretation

Life cycle impact assessment (LCIA) results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks (ISO 14044, ISO 14040). 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

## Declaration of environmental indicators derived from LCA

**Declared Unit: one cubic meter (m<sup>3</sup>) of concrete formed into manufactured concrete products**

| IMPACT ASSESMENT                                                            | UNIT                  | A1       | A2       | A3        | TOTAL    |
|-----------------------------------------------------------------------------|-----------------------|----------|----------|-----------|----------|
| Global warming potential (GWP)                                              | kg CO <sub>2</sub> eq | 1.45E+01 | 2.53E+01 | -6.28E+01 | -2.3E+01 |
| Depletion potential of the stratospheric ozone layer (ODP)                  | kg CFC-11 eq          | 1.06E-06 | 1.07E-09 | 7.74E-06  | 8.8E-06  |
| Eutrophication potential (EP)                                               | kg N eq               | 3.9E-02  | 1.77E-02 | 6.34E-02  | 1.2E-01  |
| Acidification potential of soil and water sources (AP)                      | kg SO <sub>2</sub> eq | 6.31E-02 | 2.96E-01 | 3.8E-01   | 7.39E-01 |
| Formation potential of tropospheric ozone (POCP)                            | kg O <sub>3</sub> eq  | 1.09E+00 | 7.5E+00  | 1.68E+00  | 1.03E+01 |
| <b>Resource Use</b>                                                         |                       |          |          |           |          |
| Abiotic depletion potential for non-fossil mineral resources (ADPelements)* | kg Sb eq              | 2E-06    | 0E+00    | 2.75E-06  | 4.75E-06 |
| Abiotic depletion potential for fossil resources (ADPfossil)                | MJ                    | 1.81E+02 | 3.63E+02 | 9.59E+02  | 1.5E+03  |
| Renewable primary energy resources as energy (fuel), (RPRE)*                | MJ                    | 1.02E+02 | 0E+00    | 1.07E+02  | 2.08E+02 |
| Renewable primary resources as material, (RPRM)*                            | MJ                    | 8.97E-02 | 0E+00    | -         | 8.97E-02 |
| Non-renewable primary resources as energy (fuel), (NRPRE)*                  | MJ                    | 2.19E+02 | 3.63E+02 | 1.53E+03  | 2.11E+03 |
| Non-renewable primary resources as material (NRPRM)*                        | MJ                    | 4.43E+00 | 0E+00    | -         | 4.43E+00 |
| Consumption of fresh water                                                  | m <sup>3</sup>        | 2.68E+00 | 0E+00    | 6.64E-01  | 3.34E+00 |
| <b>Secondary Material, Fuel and Recovered Energy</b>                        |                       |          |          |           |          |
| Secondary Materials, (SM)*                                                  | kg                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Renewable secondary fuels, (RSF)*                                           | MJ                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Non-renewable secondary fuels (NRSF)*                                       | MJ                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Recovered energy, (RE)*                                                     | MJ                    | 0E+00    | 0E+00    | -         | 0E+00    |
| <b>Waste and Output Flows</b>                                               |                       |          |          |           |          |
| Hazardous waste disposed*                                                   | kg                    | 1.03E-08 | 0E+00    | -         | 1.03E-08 |
| Non-hazardous waste disposed*                                               | kg                    | 2.14E-02 | 0E+00    | -         | 2.14E-02 |
| High-level radioactive waste*                                               | m <sup>3</sup>        | 2.26E-08 | 0E+00    | 7.14E-07  | 7.37E-07 |
| Intermediate and low-level radioactive waste*                               | m <sup>3</sup>        | 1.24E-07 | 0E+00    | 2.52E-06  | 2.64E-06 |
| Components for reuse*                                                       | kg                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Materials for recycling*                                                    | kg                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Materials for energy recovery*                                              | kg                    | 0E+00    | 0E+00    | -         | 0E+00    |
| Recovered energy exported from the product system*                          | MJ                    | 0E+00    | 0E+00    | -         | 0E+00    |
| <b>Additional Inventory Parameters for Transparency</b>                     |                       |          |          |           |          |
| Emissions from calcination and uptake from carbonation*                     | kg CO <sub>2</sub> eq | 0E+00    | 0E+00    | 0E+00     | 0E+00    |
| <b>Carbonation Carbon Removals</b>                                          |                       |          |          |           |          |
| Carbon Sequestration via Mineralization**                                   | kg CO <sub>2</sub> eq |          |          | -126.8    | -126.8   |

\* 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.

- 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

No substances required to be reported as hazardous are associated with the production of this product.

\*\* Natural carbon sequestration within 28 days of manufacture (which is considered as part of the A3 module for concrete production) are included in the Global Warming Potential (GWP) calculation.



## References

- ISO 14025: 2006 – Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 14040: 2006 – Environmental management – Life cycle assessment – Principles and framework
- ISO 14044: 2006/Amd 2:2020 – Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
- Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL Environment (December 2018, version 3.2)
- Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements UL Environment (March 2022, v1.1)
- Walloch, Craig, et al. (2022). Conceptual Test Protocols for Measuring Carbon Sequestration of Manufactured Dry-Cast Concrete Products. Masonry Symposium: Advancing Masonry