



Industrial Ecology Consultants

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Tim Brooke
Vice President, Laboratory Services | ASTM International
100 Barr Harbor Drive | West Conshohocken, PA 19428

Verification Report: Update to Carbon Clarity/EPD Generator – Concrete Masonry v1.0.0

ASTM International commissioned Industrial Ecology Consultants to perform an external independent verification of the **Carbon Clarity/EPD Generator – Concrete Masonry v1.0.0** in accordance with:

ASTM International. (2016). *ASTM Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions*. Version 7.0, revised June 14, 2016.

European Committee for Standardization. (2013). *Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products*. (EN 15804:2012+A1:2013)

International Organization for Standardization. (2000). *Environmental labels and declarations -- General principles* (ISO 14020:2000).

International Organization for Standardization. (2006). *Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures* (ISO 14025:2006).

International Organization for Standardization. (2020). *Environmental management -- Life cycle assessment -- Requirements and guidelines* (ISO 14044:2006/Amd 2:2020).

International Organization for Standardization. (2014). *Environmental management -- Life cycle assessment -- Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006*. (ISO/TS 14071:2014).

International Organization for Standardization. (2017). *Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services*. (ISO 21930:2017).

UL Environment (2018). *Product Category Rules for Building-Related Products and Services-Part A: Life Cycle Assessment Calculation Rules and Report Requirements*, ULE 10010 v.3.2.

UL Environment (2020). *Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements*. ULE 10010-29 v.1.0.



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The independent verification was conducted by:

Thomas P. Gloria, Ph.D.
Founder, Chief Sustainability Engineer
Industrial Ecology Consultants

REVIEW SCOPE

The Carbon Clarity EPD Generator has the capacity to generate self-declared EPD results for concrete masonry products based on user provided technosphere and emission flows in accordance with the UL Environment PCR for concrete masonry and segmental concrete paving products. The scope of this review involved reviewing the Carbon Clarity / EPD Generator – Concrete Masonry Calculation Methodology report v.1.0, 2/4/2021; the Master LCA Project Report and LCI Addendum, v.1.0.0. 3/2/21; and sample EPD generator results from the Bridge View Block facilities in Atlanta, GA, and Vancouver, BC.

REVIEW PROCESS

The review involved the generation of review matrices based on the requirements set forth by the applicable standards, UL Environment PCRs, and ASTM International GPIs. The first review matrix was used to assess the conformance of the update to the life cycle assessment calculation system, and the other to verify the system generated EPD output by way of examining six sample EPDs from the Bridge View Block. The two review matrices served as documentation that all requirements had been identified and addressed upon completion of this review. As per ISO 14025, Clause 8.1.4, this report shall be made available to any interested party upon request.

Supporting drafts and final documents reviewed include the following:

Climate Earth. (2021). *Carbon Clarity / EPD Generator – Concrete Masonry – Application Documentation*. V1.0, February 4th.

Climate Earth. (2021). *Carbon Clarity / EPD Generator – Concrete Masonry – Master LCA Project Report*. V1.0.0. March 2nd.

Climate Earth. (2021). *Carbon Clarity / EPD Generator – Concrete Masonry – Master LCA Project Report LCI Addendum*. V1.0.0. March 2nd.

Climate Earth. (2021). *Carbon Clarity Ready Mix Life Cycle Inventory and Impact Factors*. V1.0 (excel spreadsheet).



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Climate Earth. (2021). Verification EPDs:

| Bridge View Block EPDs | Item Tested |
|------------------------|-----------------------------------|
| Verification EPD 1 | CMU: NW1234-1PA • Atlanta Plant |
| Verification EPD 2 | CMU: NW1234-2PA • Atlanta Plant |
| Verification EPD 3 | CMU: NW1234-3PA • Atlanta Plant |
| Verification EPD 4 | CMU: NW1234-1PA • Vancouver Plant |
| Verification EPD 5 | CMU: NW1234-2PA • Vancouver Plant |
| Verification EPD 6 | CMU: NW1234-3PA • Vancouver Plant |

The review covered more than 500 identified requirements specified by the PCR, GPIs, and applicable ISO standards. All items were checked and determined to be satisfied. Moreover, considerable effort went into verifying that when used properly, the EPD generator system and associated databases generate consistent and plausible results for clinker, cements and concrete products as well as conform to the applicable PCR.

VERIFICATION STATEMENT

Based on the independent verification objectives, the update to the **Climate Clarity Environmental Product Declaration (EPD) Generator for Concrete Masonry** was determined to be *in conformance* with ASTM International's General Program Instructions, core and subcategory product category rules and applicable ISO standards. The plausibility, quality, and accuracy of the LCA-based data and supporting information as captured in the generator tool are confirmed.

I confirm that I have sufficient knowledge and experience of cement and concrete products, the relevant core PCR, subcategory PCR for cement, ISO standards and the geographical areas intended to generate EPDs to carry out this verification.

Sincerely,

Thomas P. Gloria, Ph.D.
Founder, Chief Sustainability Engineer
Industrial Ecology Consultants