



## Industrial Ecology Consultants

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### Verification Report: CarbonCLARITY™ EN 15804 EPD Generator-Concrete

ASTM International commissioned Industrial Ecology Consultants to perform an external independent verification of the **CarbonCLARITY™ EN 15804 EPD Generator-Concrete** in accordance with:

ASTM International. (2020). *ASTM Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions*. Version 8.0, revised April, 29<sup>th</sup>.

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 1:2017/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).

EN 15804+A2. (2019). *Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*.

EN 16757. (2017). *Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements*.

The independent verification was conducted by:

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



### REVIEW SCOPE

The **CarbonCLARITY™ (CC) EN 15804 EPD Generator for Concrete** has the capacity to generate self-declared EPD results for concrete based on user provided technosphere and emission flows, in accordance with the EN 15804+A2 and EN 16757. The scope of this review involved reviewing the following documents:

- CarbonCLARITY™ / EN15804 EPD Generator – Concrete: Software Calculation Methodology v.1.0.0;
- CarbonCLARITY™ Master LCA Project Report v.1.0.0;
- CarbonCLARITY™ LCI Addendum v.1.0.0;
- CarbonCLARITY™/ EN 15804 EPD Generator-Concrete Pan United LCA Project Report, Aug. 15, 2022; and
- Sample EPD generator results from the Pan United East Coast 6 plant in Marina East, Singapore.

### REVIEW PROCESS

The review involved the creation of two review matrices based on the requirements set forth by the applicable standards, EN 15804+A2 core PCR, EN 16757 PCR for concrete and concrete elements, 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 the Pan United Marina East sample EPD. The two review matrices serve as documentation that all nonconformance issues identified have been 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.

The review covered more than 400 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 **CarbonCLARITY™ EN 15804 EPD Generator for Concrete** 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.



***Industrial Ecology Consultants***

Sincerely,

A handwritten signature in black ink that reads "Thomas P. Gloria".

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