

Product Category Rules for Segmental Concrete Pavement

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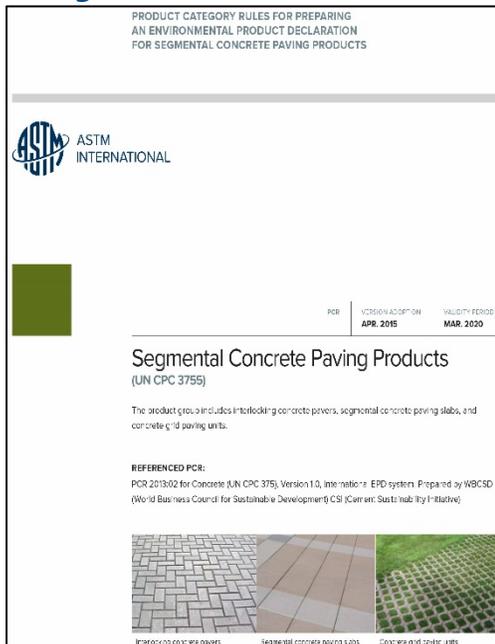
Fact Sheet 5



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Background and Need



A life-cycle assessment (LCA) is an environmental impact statement. An LCA attempts to quantify impacts from all phases of a product's life cycle which includes manufacturing, construction, use, and end-of-life/disposal. LCAs were originally developed within private sector industries to identify pollution and waste and then reduce it through more efficient and cost-effective technologies.

An LCA documents energy and material flows and resulting pollutant emissions data. Two ISO standards, ISO 14040 *Environmental management -- Life cycle assessment -- Principles and framework* and ISO 14044 *Environmental management—Life cycle assessment—Requirements and guidelines*, govern how this data is formed into an LCA for a product or product group. The LCA process is preceded by writing Product Category Rules or a PCR for a product or product group. PCRs include requirements and guidelines for developing environmental product declarations or EPDs from

LCAs. EPD requirements are articulated in ISO 21903 *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*. To create an EPD, one must first develop an LCA based on the rules in a PCR.

LEED® and the Sustainable SITES® Initiative have popularized EPDs, as have other environmental assessment frameworks. Some public agencies and private sector companies are requesting EPDs to assess and compare environmental impacts among various products. Global warming potential from carbon dioxide emissions is often viewed as the most important environmental impact.

Objectives

This project followed ISO standards for developing a PCR for segmental concrete paving products. The program operator was ASTM who formed a small committee consisting of consultants, industry representatives and users. The PCR covers segmental concrete paving products including interlocking concrete pavers, paving units for permeable applications, paving slabs and concrete grids. The PCR is valid for five years and expires in March 2020 at which time the PCR is reviewed and updated based on current ISO standards. (ASTM no longer provides this service.)

The project deliverables included a 33-page guidance document for manufactured concrete product companies entitled EPDs for Segmental Concrete Paving Products: Background Information including LCI, LCA, and PCR - A Road Map for EPD Creation for ICPI. This report assists manufacturers in

understanding PCRs, LCAs and EPDs, and assists in identifying consultants to create LCAs and EPDs. In addition, deliverables included a life cycle inventory Excel sheet that ICPI member manufacturers can complete and provide to a consultant to develop an LCA. This sheet provides a time- and money-saving resource for concrete product manufacturers.

The ASTM PCR for segmental concrete paving products only covers the manufacturing phase sometimes referred to as the cradle-to-gate phase. It does not include impacts from construction, use or disposal. Assessing environmental impacts from these three phases can be complex due to a range of variables. For manufacturing, all impacts are quantified based on a cubic meter of manufactured concrete. In the LCA sphere, this is called a functional unit.

The segmental concrete paving products PCR Table of Contents are as follows:

- 1.0 General Information
 - 1.1 Goal and Scope
 - 1.2 EPD Ownership/Responsibility
- 2.0 Period of Validity
- 3.0 Definitions
- 4.0 Informed Comparison
- 5.0 Company/Organization, Product, and Product Category
 - 5.1 Description of Company/Organization
 - 5.2 Definition of Product Category
 - 5.3 Description of Product
- 6.0 Requirements for the Underlying LCA
 - 6.1 Functional and Declared Unit
 - 6.2 System Boundaries
- 7.0 Life-Cycle Inventory Analysis
 - 7.1 Data Collection and Description of Data
 - 7.2 Cutoff Rules
 - 7.3 Data Quality Requirements
 - 7.4 Units
 - 7.5 Allocation Rules
- 8.0 Impact Categories and Characterization Factors
- 9.0 Additional Environmental Information
- 10.0 EPD Supporting Data
- 11.0 Content of the EPD
- 12.0 References

Outcomes

With the guidance document on LCAs and EPDs now available to ICPI producer members, the basic rules, PCR, are in place for creating these two assessments on environmental impacts from manufacturing segmental concrete paving products. EPDs will become increasingly important in product selection and the PCR provide the first step to increasing the market position of manufacturers by demonstrating low environmental impacts compared to other pavement materials.