



Product Category Rule (PCR) Guidance for Building-Related Products and Services

Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements

www.ul.com

Product Category Rules for Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements, UL 10010–29

Second Edition, Dated March 1, 2022

Summary of Topics

The First Version of the Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements, UL 10010–29 has been issued.

Subject to these terms and conditions and those in any other agreements between you and UL Environment, Underwriters Laboratories Inc. (UL) and/or their representatives, you are hereby granted a limited, non-exclusive, non-transferable license to use the Product Category Rules (PCR) solely for your internal, non-commercial business purposes. The PCR is not being sold, and other than the limited license

granted herein UL retains all rights, title and interest (including exclusive ownership) in the PCR and all copyright therein. UL reserves the right to regain possession of the PCR from you at any time. When no longer needed, you agree to destroy the PCR (if in hardcopy form) or delete and purge the PCR from your

files (if in electronic form). No part of the PCR may be reproduced, modified, stored in a retrieval system, or transmitted in any form by any means, whether electronic, mechanical photocopying, recording, or otherwise without prior written permission of UL or UL Environment. You further agree not to create any derivative works from the PCR or remove or alter any copyright or other proprietary notices in the PCR. The limited license to use the standard shall automatically terminate upon your breach of any of the terms and conditions herein or any other agreement between you and UL, UL Environment and/or their representatives.

UL Environment provides this PCR “as is” without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL Environment, UL or any of their affiliates be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this PCR, even if UL Environment or UL or their authorized representative has been advised of the possibility of such damage. In no event shall UL Environment’s or UL’s liability for any damage ever exceed the price paid for the license to use this PCR, regardless of the form of the claim.

Users of the electronic versions of UL Environment’s Product Category Rules agree to defend, indemnify, and hold UL Environment, ULI, their affiliates and each of their respective trustees, officers, employees, agents and representatives harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney’s fees) resulting from any error or deviation introduced while purchaser is storing an electronic PCR on the purchaser’s computer system.

Publisher:
UL Environment

Tracking of versions

Version	Comments	History
1.0	UL Environment with input from a committee	November 11, 2020
1.1	Updated Appendix	March 1, 2022

© UL Environment

I. Background Information and Acknowledgements

These sub-category Product Category Rules (PCR) were developed to address the rules for the creation of Environmental Product Declarations (EPD) for Manufactured Concrete Masonry and Segmental Concrete Paving Products (MCPs) and includes all commercially available concrete masonry units, segmental retaining wall units, articulating concrete block, concrete pavers, segmental concrete paving slabs, concrete grid paving units, and related units, collectively referenced throughout this PCR as “concrete products”. When used to self-reference this document, “PCR” refers to “sub-category PCR.” This PCR is intended for creation of business-to-business (B2B) EPDs.

This PCR is consistent with and conforms with the mandatory requirements contained within the following normative references:

- ISO 21930:2017 - Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
- EN 15804:2012+A1:2013 - Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products
- Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL Environment (December 2018, version 3.2)
- 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.
- ISO 14040: 2006, Environmental management – Life cycle assessment –Principles and framework.

In addition to the above normative references, the following are noted guidance references used in the development of this PCR:

- Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for Manufactured Concrete and Concrete Masonry Products, UN CPC 3755. ASTM. December 2014.
- Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for Segmental Concrete Paving Products UN CPC 3755. ASTM. April 2015.
- PCR 2013:02 for Concrete (UN CPC 375), Version 2.2, International EPD system. Prepared by WBCSD (World Business Council for Sustainable Development) CSI (Cement Sustainability Initiative)
- Product Category Rules for Environmental Product Declarations. PCR for Concrete. NSF. February 2019.
- EN 16757:2017 Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements.

Period of Validity

This PCR is valid for a period of five (5) years, set to expire November 2025.

Interested Parties

This Part B has been prepared with input from the following stakeholders:

- The National Concrete Masonry Association and companies: Jandris Block, Anchor Block Company, Taylor Concrete Products, Big River Industries an Oldcastle Company, Nicolock, Brampton Brick, and Canada Masonry Design Centre.
- Interlocking Concrete Pavement Institute
- Concrete Masonry Association of California and Nevada
- Laurel McEwen, Climate Earth

Governance

There are a number of trade associations and representatives of concrete product manufacturers participating in the update of this Product Category Rule (“PCR”) for MCPs. These parties represent a majority of the companies within the manufactured concrete products industry. Moreover, the parties with a manufacturing interest participating in the PCR update represent the vast majority of the concrete products sold in North America. The very purpose and function of a trade association is to inform its members of important industry developments and to represent their interests in projects such as the update of a PCR affecting their products. This is important because it effectively demonstrates that a large percentage of the manufactured concrete product industries is represented in the effort to renew the PCR.

The role of participants is to establish requirements and procedures to be applied in the development of EPDs for MCPs. This is an update to an existing PCR, and therefore, this effort begins with vetting suggested changes in scope and structure. Where potential conflicts exist, ISO 14025:2006 and ISO 21930:2017 shall apply.

Involvement of Interested Parties

UL Environment is responsible for producing the PCR document by establishing an open consultation process that includes the involvement of interested parties and “reasonable efforts to achieve a consensus throughout the process” have been made (ISO 14027, Section 5.2).

UL Environment posted an open call for participation in this PCR October 2019 via its standards website, social media outlets, and outreach to original committee stakeholders.

Update Process

The PCR shall be revised five (5) years from the publication date. The PCR may be revised before the five year date if the following occurs in the industry (including but not limited to): major regulatory change that alters the requirements for MCPs; major shift in the markets such that a new material or system predominates that can no longer be characterized adequately by the definitions in this PCR, or if new LCI data becomes available. The process for updating a PCR shall follow the following procedure:

1. A stakeholder approaches the Program Operator about the need for a PCR revision.
2. The Program Operator shall communicate with the original committee and any new EPD participants to assess a consensus for a PCR update.
3. If the Program Operator determines a consensus exists, a new public call for interested parties is issued and a PCR committee shall be convened and engaged to make the necessary updates.
4. The Program Operator shall publish the updated PCR that addresses version history and changes implemented.

Review

The review process of this Part B PCR included a review through public consultation from xxxxxxx - xxxxxxx 2020 and a panel review.

This Part B was reviewed by the following panel:

Jack Geibig
Ecoform, LLC

Terrie Boguski
Harmony Environmental, LLC

Christine A. Subasic, P.E., LEED AP
Consulting architectural engineer

Public Consultation

Public consultation was utilized during the PCR review process. The public consultation of the completed draft PCR included a minimum 30-calendar-day period for comments to be submitted to UL Environment. After public comments

were submitted, the PCR committee reviewed and developed responses for all comments. All comments from the review panel and public consultation were addressed and satisfactorily resolved by the PCR committee prior to the publication of this PCR.

II. Terms and Definitions

For the purposes of this document, the definitions given in ISO 6707-1, ISO 14025, ISO 14044, ISO 14050, ISO 15686-1, ISO 21930 and the following apply.

ADHERED MANUFACTURED STONE MASONRY VENEER

A non-load bearing masonry unit that is produced by wet-cast blending of cementitious material, lightweight and other aggregates, pigments, and admixtures, designed to be applied with a cementitious mortar to a backing surface, complying with ASTM C1670/C1670M.

ALLOCATION

Partitioning the environmental flows (input and output flows) of a process or a product system between the product system under study and one or more other product systems (adapted from ISO 14044).

ANCILLARY MATERIAL

Material input that is used by the unit process producing the product or during the construction or use stage but does not constitute part of the product (adapted from ISO 14044).

ARTICULATING CONCRETE BLOCK (ACB)

A dry-cast concrete unit manufactured for use in articulating concrete block revetment systems, where a matrix of interconnected concrete block are used for erosion protection, complying with ASTM D6684.

BUILDING PRODUCT

Item used during the life cycle of a building or any other type of construction works (adapted from ISO 6707-1 and ISO 14021).

CAST STONE

An architectural precast concrete building unit intended to simulate natural cut stone, complying with ASTM C1364.

CHARACTERIZATION FACTOR

Factor derived from a characterization model which is applied to convert an assigned life-cycle inventory analysis (LCI) to the common unit of the impact category indicator (adapted from ISO 21930).

CONCRETE BUILDING BRICK

A concrete masonry unit, with a maximum width of four (4) inches (102 mm) and a weight that typically permits it to be lifted and placed with one hand, that is manufactured for general use in non-facing, utilitarian applications, complying with ASTM C55 or CSA A165.2.

CONCRETE FACING BRICK

Concrete masonry unit, with a maximum width of four (4) inches (102 mm) and a weight that typically permits it to be lifted and placed with one hand, that is manufactured to be typically used in an application where one or more faces of the unit is intended to be exposed, complying with ASTM C1634.

CONCRETE GRID PAVING UNITS

These are defined in ASTM C1319 as having a maximum length and width of 24 in. (600 mm); a minimum thickness of 3.125 in. (80 mm); and a maximum of 50% open area.

CONCRETE MASONRY UNIT

A manufactured masonry unit made of concrete in which the binder is a combination of water and cementitious materials falling under CSI division 04 22 00.

CONCRETE MASONRY UNIT FOR CATCH BASINS AND MANHOLES

Concrete masonry units manufactured for use in constructing catch basins and manholes, complying with ASTM C139.

CONCRETE MASONRY UNIT, LOAD-BEARING

A concrete masonry unit suitable for non-load-bearing and load-bearing applications, complying with ASTM C90 or CSA A165.1.

CONCRETE MASONRY UNIT, NON-LOADBEARING

A concrete masonry unit suitable only for non-load-bearing application, complying with ASTM C129.

CONCRETE ROOF PAVER

A concrete masonry unit produced for use in roof ballast applications, complying with ASTM C1491.

CUT-OFF CRITERIA

Specification of the amount of material or energy flow or the level of environmental significance associated with unit processes of a product system to be excluded from an LCA study (adapted from ISO 14044).

DECLARED UNIT

Quantity of a building product for use as a reference unit, e.g. mass (kilogram), volume (cubic meter), for the expression of environmental information needed in information modules. Note: The declared unit is used in instances where the function and the reference scenario for the whole life cycle of an MCP cannot be stated (adapted from ISO 21930).

ENVIRONMENTAL DECLARATION/LABEL

A claim that indicates the environmental impacts of a product (adapted from ISO 14020:2000).

FEEDSTOCK ENERGY

Heat of combustion of a material input that is not used as an energy source to a product system, expressed in terms of lower heater value (net calorific value) (adapted from ISO 14044).

FUNCTION

Purpose for which a building product is designed, used or required to be used (adapted from ISO 15686-10).

FUNCTIONAL UNIT (FU)

Quantified performance of a product system for a building or paving product for use as a reference unit (adapted from ISO 14044).

IMPACT CATEGORY

A class representing environmental impacts of concern to which life cycle inventory analysis results may be assigned (ISO 14044).

IMPACT CATEGORY INDICATOR

A quantifiable representation of an impact category (ISO 14044).

INFORMATION MODULE

Compilation of data to be used as a basis for an EPD covering a unit process or a combination of unit processes that are part of the life cycle of a product (ISO 21930).

INTERESTED PARTY

An individual or group concerned with or affected by the environmental performance of a product system, or by the results of the life cycle assessment (ISO 14044).

INTERLOCKING CONCRETE PAVERS

In the US, these are defined in ASTM C936/C936M as units with an exposed face area $\leq 101 \text{ in.}^2$ (0.065 m^2), and their overall length divided by thickness ≤ 4 . The minimum specified thickness is 2.36 in. (60 mm).

In Canada, these are defined in CSA A231.2 Precast Concrete Pavers as having a surface area less than or equal to 139.5 in.^2 (0.09 m^2); overall length divided by its thickness ≤ 4 for pedestrian applications and ≤ 3 for vehicular applications; and a minimum nominal thickness of 2.36 in. (60 mm).

LIFE CYCLE

Consecutive and interlinked stages related to a product, from raw material acquisition or generation from natural resources to end-of-life (adapted from ISO 14044).

LIFE CYCLE ASSESSMENT (LCA)

Assessment aimed at compiling and evaluating the inputs, outputs and the potential environmental impacts of a product system throughout the life cycle of a product (adapted from ISO 14044).

LIFE CYCLE INVENTORY ANALYSIS (LCI)

Phase of LCA involving the compilation and quantification of input and output flows for a product throughout its life cycle (ISO 14044).

NOTE In the case of 'input flows', products and materials include raw materials, intermediate products and co-products, while in the case of 'output flows' it also includes releases (emissions to air and discharges to water and soil).

LIFE CYCLE IMPACT ASSESSMENT (LCIA)

Phase of an LCA aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts for a product system throughout the life cycle of a product (ISO 14044).

PREFACED CONCRETE MASONRY UNIT

A concrete masonry unit with the exposed-to-view-in-place surfaces covered at the point of manufacture with resin, resin and inert filler, or cement and inert filler to produce a smooth resinous tile facing, complying with ASTM C744.

PRODUCT CATEGORY

Group of building products that can fulfill equivalent functions (adapted from ISO 14025).

PRODUCT CATEGORY RULES (PCR)

Set of specific rules, requirements and guidelines for developing of Type III environmental declarations for one or more product categories (ISO 14025).

PCR REVIEW

Verification of the PCR by a third-party panel (adapted from ISO 21930).

PRODUCT SYSTEM

Collection of unit processes with elementary product flows (i.e., smallest element considered in the life cycle inventory analysis), performing one or more defined functions, and which models the life cycle of a product (adapted from ISO 14044).

RECOVERED MATERIAL

Material that would have otherwise been disposed as waste or used for energy recovery but has instead been collected and recovered as a material input, in lieu of new primary material, for a recycling or a manufacturing process. (ISO 14021)

SEGMENTAL CONCRETE PAVING SLABS

In the US, these are defined in ASTM C1782 as having a surface area greater than 101 in.² (0.065 m²); overall length divided by thickness >4; a minimum nominal thickness of 1.2 in. (30 mm); and a maximum overall length or width of 48 in. (1.22 m). Paving slabs are typically used in pedestrian at-grade and roof deck applications and in at-grade applications exposed to limited vehicular traffic.

In Canada, these are defined in CSA A231.1 Precast Concrete Paving Slabs as having a surface area greater than 139.5 in.² (0.09 m²); overall length divided by its thickness >4; a minimum nominal thickness of 1.2 in. (30 mm); and a maximum overall length or width of 39.4 in. (1 m).

SEGMENTAL RETAINING WALL UNIT

Unit manufactured of dry-cast concrete for the construction of dry-stacked earth retaining walls, complying with ASTM C1372.

TYPE III ENVIRONMENTAL DECLARATION/ENVIRONMENTAL PRODUCT DECLARATION (EPD)

Environmental declaration that provides quantified environmental data of a product, using predetermined parameters and, where relevant, additional environmental information (adapted from ISO 14025).

III. Scope

This document contains the Product Category Rule (PCR) requirements for Manufactured Concrete and Concrete Masonry Product Environmental Product Declarations (EPDs) published in accordance with the ISO 21930 and EN 15804 standards. The requirements for the background Life Cycle Assessment (LCA) project report used to inform the EPD are contained in UL Environment's Part A: Life Cycle Assessment Calculation Rules and Report Requirements. This Part B document, coupled with the Part A, conforms to the ISO 21930, EN 15804, and ISO 14025 European and international standards for EPD reporting.

General Guidance

The scope of this PCR applies to the product group "manufactured concrete masonry and paving products" and includes products produced using concrete manufacturing equipment and mechanical vibration and compaction to form individual units. Examples include (but are not limited to) concrete masonry units (CMU), segmental retaining wall (SRW) units, interlocking concrete pavers, segmental concrete paving slabs, and concrete grid paving units.

The applicable products are shown in Table 1; other applicable products are those similar to the products in Table 1 as well as secondary building products made from those products.

This PCR covers all commercially available manufactured concrete masonry and paving products according to the standards or technical approvals shown under Section 9.

Applicable Products

Table 1 describes the building products covered within the scope of this Part B, along with their relevant Construction Specification Institute (CSI) MasterFormat numbers. This list is non-exhaustive, and the CSI numbers provided reflect

common applications, which can include multiple uses; other applications may exist. Applicable UNSPSC codes and UNCP codes include:

UNSPSC:

- 30120000 Road and landscape
- 30121800 Landscape architecture materials
- 30131502 Concrete blocks
- 30131510 Concrete blocks for revetment
- 30131603 Concrete bricks
- 30151500 Roofing materials

UNCP:

- 3754
- 3755

TABLE 1. CONCRETE PRODUCT CATEGORIES, CSI NUMBERS AND DESCRIPTIONS

Building product	CSI code(s) ¹	CSI descriptions
ADHERED MANUFACTURED STONE MASONRY VENEER (ASTM C1670/C1670M)	04 43 13.16	Adhered Stone Masonry Veneer
ARTICULATING CONCRETE BLOCK (ACB) (ASTM D6684)	35 31 19.16	Concrete Unit Masonry Revetments
CAST STONE (ASTM C1364)	04 72 00	Cast Stone Masonry
CONCRETE GRID PAVING UNITS (ASTM C1319)	32 14 13	Precast Concrete Unit Paving
INTERLOCKING CONCRETE PAVERS (ASTM C936/C936M, CSA A231.2)	32 14 13.13	Interlocking Precast Concrete Unit Paving
SEGMENTAL CONCRETE PAVING SLABS (ASTM C1782, CSA A231.1)	32 14 13.16	Precast Concrete Unit Paving Slabs
	32 14 13.19	Porous Precast Concrete Unit Paving
CONCRETE MASONRY UNIT	04 22 00	Concrete Unit Masonry
CONCRETE MASONRY UNIT, LOAD-BEARING (ASTM C90 or CSA A165.1)	04 22 00.13	Concrete Unit Veneer Masonry
	04 22 00.16	Surface-Bonded Concrete Unit Masonry
CONCRETE MASONRY UNIT, NON-LOADBEARING (ASTM C129)	04 22 19	Insulated Concrete Unit Masonry
	04 22 23	Architectural Concrete Unit Masonry
CONCRETE BUILDING BRICK (ASTM C55 or CSA A165.2)	04 22 23.13	Exposed Aggregate Concrete Unit Masonry
	04 22 23.16	Fluted Concrete Unit Masonry
CONCRETE FACING BRICK (ASTM C1634)	04 22 23.19	Molded-Face Concrete Unit Masonry
	04 22 23.26	Sound-Absorbing Concrete Unit Masonry
CONCRETE ROOF PAVER (ASTM C1491)	04 22 23.29	Split-Face Concrete Unit Masonry
	04 22 33	Interlocking Concrete Unit Masonry

¹ Bold headings correspond with major CSI categories; non-bold are sub-categories.

CONCRETE MASONRY UNIT FOR CATCH BASINS AND MANHOLES (ASTM C139)	33-44-00	Storm Utility Water Drains
PREFACED CONCRETE MASONRY UNIT (ASTM C744, CSA A165.3)	04 22 23.23	Prefaced Concrete Unit Masonry
SEGMENTAL RETAINING WALL UNIT (ASTM C1372)	32 32 23.13	Segmental Concrete Unit Masonry Retaining Walls

Non-Applicable Products

Products excluded from the scope of this PCR include:

- 30111500 Concrete and mortars
 - Product Category Rules For Preparing An Environmental Product Declaration For Portland, Blended Hydraulic, Masonry, Mortar, And Plastic (Stucco) Cements. ASTM. Sept. 2014
 - Product Category Rule for Environmental Product Declarations. PCR for Concrete. NSF. February 2019.
- 30103619 Precast concrete element
 - Product Category Rules For Preparing An Environmental Product Declaration For Precast Concrete. ASTM. March 2015.
- Quarried stone

System Boundary

The system boundary for EPDs created using this PCR is either:

- Cradle to gate (required modules A1-A3),
- Cradle to gate with options (required modules A1-A3, optional modules A4, A5, B2, B4², and/or C1-C4), or
- Cradle to grave (required modules A1-C4).

See Part A, Section 2.8 for further discussion of the required and optional information modules included in each EPD type. Module D is not a life cycle stage like the information modules A1 to C4 and is outside the system boundary of the studied product system and construction works system. Supplementary environmental information may be provided in Module D that addresses potential loads and benefits beyond the product system boundary.

At this time, there is no industry consensus for assumptions behind the reported scenarios for information modules A4, A5, B2, or C1 – C4 across each of the subcategories of concrete products included in this PCR.

The EPD requirements include:

- Requirements of the ISO 21930:2017 standard
- Requirements of the EN 15804 standard for consistency between declarations in Europe and the United States.
- The calculation rules for the Life Cycle Assessment and Requirements on the Project Report are specified in a separate document as Part A of the Product Category Rules, available at <https://ul.com/offering/product-category-rules-pcrs>. At the time of writing this document, version 3.2 is the most current.

² Module B4 is only optional for segmental paving products, as their default Reference Service Life is 50 years.

