NATIONAL SLAG ASSOCIATION
SINCE 1918

Construction Aggregate Product Category Rule (PCR)

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Topics for Discussion

- What is a PCR?
- Why do we need a PCR?
- Current efforts
- Differences between old and new.
- Life Cycle Analysis (LCA)
- What's Next?

Product Category Rule (PCR)

- A PCR is a set of product category-specific requirements / rules / **guidelines for developing life cycle assessment** and reporting these findings in an Environmental Product Declaration for one or more product categories. Product category rules are reviewed and improved periodically over time (5-years).
- Product Category Rule (PCR) development can be sponsored by a **group of stakeholders, including associations, manufacturers,** or other interested parties.
- While PCRs must be prepared **in accordance with the requirements set forth in ISO 14025**, additional work may be needed to improve harmonization. PCRs for construction products must **additionally comply with ISO 21930.**
- Copies of the ISO standards can be downloaded from ANSI: http://www.webstore.ansi.org.

Why do we need to develop a PCR/EPD?

Requirements

Year introduced	Source	Bill
2017	California Legislature	Buy Clean California Act
2019	Minnesota Legislature	HF 2204
2020	New York State Senate	S542 (Original)
2021	California Legislature	AB-1365, SB-778
2021	Colorado State Assembly	HB 21-1303
2021	Oregon State Legislature	HB 2688
2021	New Jersey Assembly	AB 5223
2021	Washington State Legislature	HB 1103
2021	House of Representatives, 117th Congress	H.R.1512 CLEAN Future Act – Subtitle C – Federal Buy Clean Program
2022	Government Accountability Office (GOA)	Inflation Reduction Act

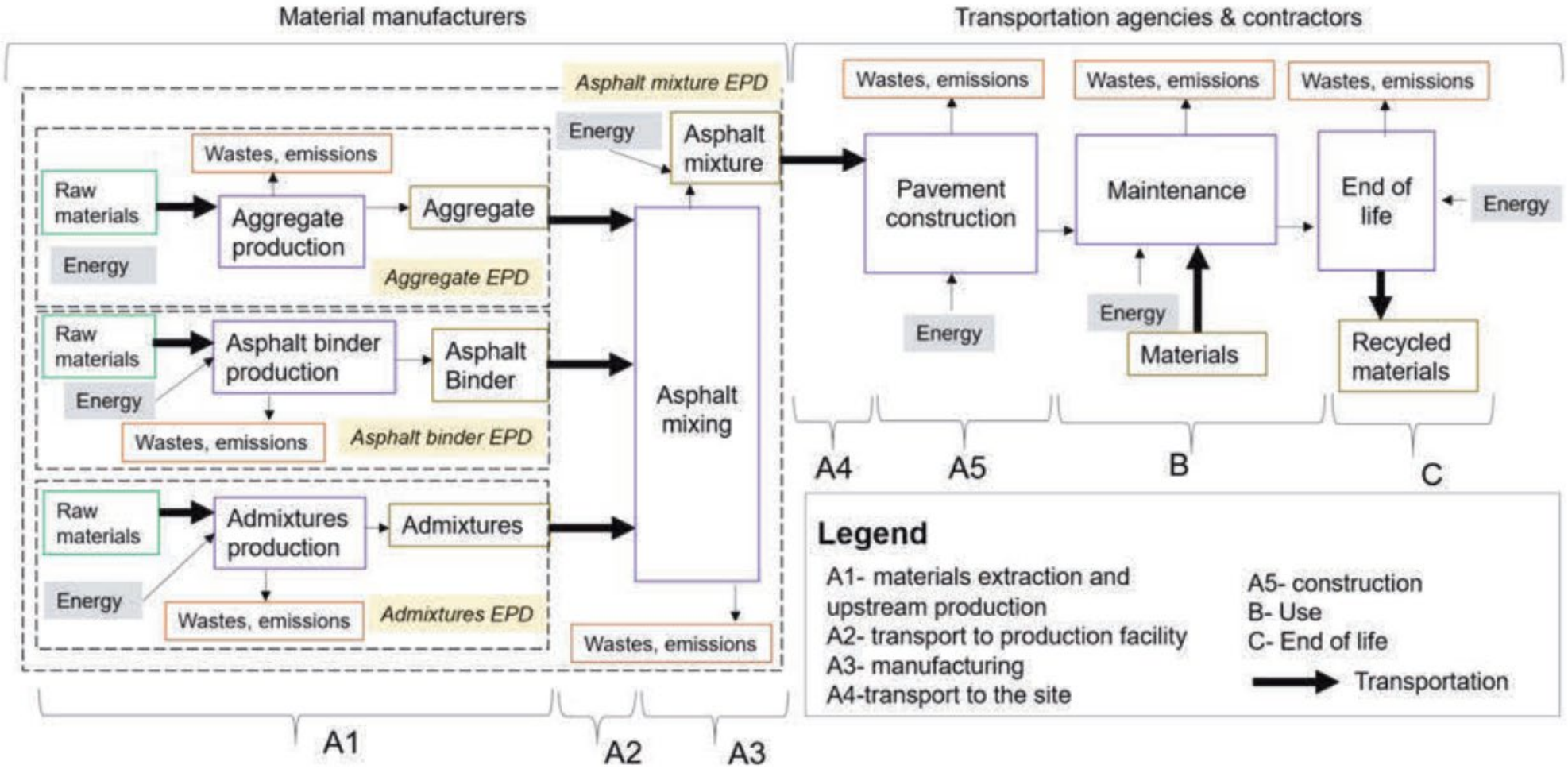
FHWA: Sustainable Pavements Group

- Actively Promoting the utilization of EPD's
  - Asphalt Pavement (NAPA)
  - Cement (PCA)
    - Slag Cement (SCA)
  - Concrete Pavement (NRMCA)
  - Construction Aggregates (NSSGA)
- Developing best practice guidelines for PCR's to facilitate harmonization.
- FHWA LCA Development Program

Inflation Reduction Act (IRA)

- The Inflation Reduction Act will bring the U.S. Department of Transportation additional funds to reinforce low-carbon construction material advocacy and technical support measures under way at the Federal Highway Administration. Environmental Product Declarations are the principal tools FHWA aims to standardize over the next two years.

Asphalt LCA product system.



FHWA

2017 versus 2022 Renewal

PCR	VERSION ADOPTION	VALIDITY PERIOD
	JAN. 2017	DEC. 2022

Construction Aggregates: Natural Aggregate, Crushed Concrete, and Iron/Steel Furnace Slag UNCPC 1532

Construction Aggregate, which can be defined as any combination of sand, gravel, crushed stone, crushed concrete, iron and / or steel slag, sold to or used by the construction industry.

Product Category Rule
for Environmental Product Declarations

PCR for Construction Aggregates

Program Operator

NSF International

National Center for Sustainability Standards

Valid through March 31, 2025

ncss@nsf.org

Differences: Old versus New.

Up-Dates

This product category rule for “construction aggregates” is Version 2 of the Product Category Rules (PCR) for ISO 14025:2006 Type III Environmental Product Declarations (EPDs) of natural aggregates, crushed concrete, and iron/steel furnace slag updating Version 1 dated January 2017, published by ASTM. The following changes have been included in this document:

Key Changes

- The PCR has been renewed and updated to include conformance with ISO 21930 (2017).
- Unbound asphalt (RAP) is included in Version 2 of this PCR
- The title of the PCR has been modified to “PCR for Construction Aggregates”
- Allocations have been added.
- Addition of LCA
- Carbonation Discussion

Integrated Steel Mill – Slag Allocation

The allocation method used here was developed by the World Steel Association and EUROFER to be in line with CEN EN 15804 /EN 15804/. The methodology is based on physical allocation and takes into account which changes in inputs and outputs affect the production of co-products. The method also takes account of material flows that carry specific inherent properties. This method is deemed to provide the most representative partitioning of the processes involved. Economic allocation was considered, as slag is considered a low-value co-product under EN 15804. However, as neither hot metal nor slag are tradable products upon leaving the blast furnace, economic allocation would most likely be based on estimates. [World Steel Association in 2014: A methodology to determine the LCI of steel industry co-products].

7.1.5.2 Co-Product Allocation

7.1.5.2: Slag aggregate is a co-product of steel. For each ton of feedstock ore or scrap entering the steelmaking process, about 0.15 tons of slag are created, the rest becoming steel. Significant economic differences exist between these coproducts. Those parts of slag aggregate production that are shared with steel shall be economically allocated (e.g. melting), using the factor given in Annex A. Other operations not shared with steel production (e.g. crushing, washing) shall be directly attributed to slag.

*Note on harmonization:

The current steel PCR is based on the UL two-part PCR system. In Part B: Designated Steel Construction Product EPD Requirements, section 3.3 Allocation, the requirement is for mass-based allocation, but with the stipulation, "Allocation methods deemed more appropriate than on the basis of mass (e.g., economic allocation) may be used but only when justified." In Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Section 3.3 Allocation, the requirement is that allocation should be based on economic values when the difference in revenue from co-products is not low. It defines a difference in revenues of more than 25% as high. Historically the slag revenue per ton of feedstock are 1-3% the steel revenue.

DATA ANNEX:

The revenue of slag aggregate per short ton of feedstock ore or scrap was $4.38, while steel was $629.83 (revenues averaged from 2017-2021). Or, stated in terms of steel produced: For each short ton of steel produced, the revenue is $740.97, and an average of 0.18 tons of slag is generated for a revenue of $4.68.This results in a relative revenue of <1%. As a result, the economic allocation factor for slag as a coproduct for steel shall be 0.01.

Carbonation (RCA)

Method 1: Apply a singular, conservative carbonation coefficient of -0.69 kgCO2e / cy or -0.35 kgCO2e / short ton of recycled concrete aggregate (RCA), regardless of site conditions.

Method 2: Calculate carbonation coefficient based on a limited set of unique conditions present at the RCA producer facility using the current version of the free, open source, MIT Whole Lifecycle Carbon Uptake Tool is only to be used as end-of-life carbon uptake .

Method 3: Quantify average carbonation rate in RCA stockpile through field sampling and lab tests for carbonation.

Sampling Methodology: This PCR recognizes that RCA stockpiles will be heterogeneous and dynamic in nature as additions to the stockpile will be made over time, and that the source of recycled/demolished concrete will vary. As such, a consistent approach to sampling methodology is critical.

What's Next?

- PCR
  - Editorial Review
  - Committee Review
  - Technical Review
  - Resolve Issues
  - Committee Approval
  - Publishing
- EPD (Environmental Product Declaration) – Trisight
  - Questionnaire
  - Development

Environmental Product Declaration (EPD)

- A **verified report used to communicate the environmental impacts of a specific material** (e.g., asphalt binder, portland cement) or product (e.g., asphalt mix, concrete mix).
- EPDs promote more **sustainable use** of finite resources and create less stress on the environment.
- **EPDs are a life-cycle assessment developed by product manufacturers** following the Product Category Rules (PCR) that are developed with industry stakeholders and LCA experts and subjected to a critical review process.
- EPDs can be issued for a **specific product from a specific producer** but may also be issued for a **generic product from a group of manufacturers** (such as an association) that reflects the results of an industry-average LCA.
- EPDs using the same product category rules can be compared to identify materials with improved environmental performance in terms of various environmental and resource use impacts (e.g., energy use, air pollution, global warming, ozone layer depletion).

https://www.fhwa.dot.gov/pavement/sustainability/pubs/hif19027.pdf

EPD
Trisight Engineering
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Questions?

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