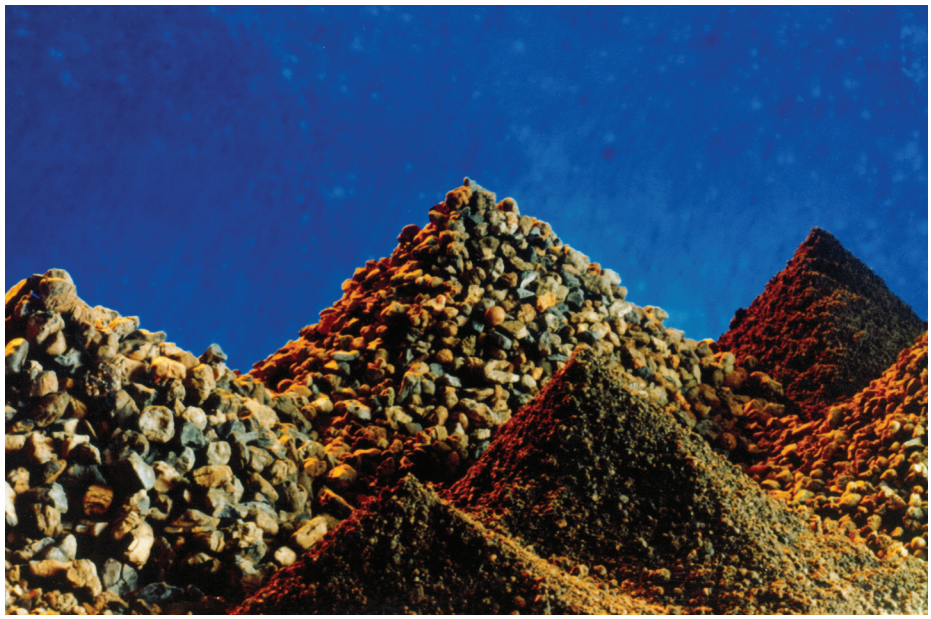
PRODUCT CATEGORY RULES FOR PREPARING AN ENVIRONMENTAL PRODUCT DECLARATION FOR EXPANDED SHALE, CLAY, AND SLATE LIGHTWEIGHT AGGREGATE

ASTM INTERNATIONAL

PCR	VERSION ADOPTION	VALIDITY PERIOD
	APR. 2015	**MAR. 2020**

Expanded Shale, Clay, and Slate Lightweight Aggregate (UN CPC 3756 and 1532)

This product group includes expanded shale, clay, and slate lightweight aggregate in all applications but primarily in masonry, concrete, asphalt pavement, lightweight geotechnical fills, horticulture, soil amendment, and water treatment.



Expanded Shale, Clay, and Slate Lightweight Aggregate

Scope of Validity of these PCR

This product group includes expanded shale, clay, and slate lightweight aggregate in all applications but primarily in masonry, concrete, asphalt pavement, lightweight geotechnical fills, horticulture, soil amendment, and water treatment.

Program Operator

ASTM International

Interested Parties

Representatives of the following organizations participated in development of the PCR:

Expanded Shale, Clay, and Slate Institute (ESCSI) and representatives of its member companies: Big River Industries, Carolina Stalite Company, DiGeronimo Aggregates, Hydraulic Press Brick Company, Norlite Corporation, Trinity, and Utelite Corporation.

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PCR VERSION HISTORY

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1.0 General Information

These product category rules (PCR) have been developed under the general program instructions for ASTM International's Environmental Product Declaration (EPD) Program. The PCR are intended for use by North American organizations for preparing EPDs for expanded shale, clay, and slate (ESCS) lightweight aggregate.

All efforts were made to harmonize with existing PCR in this particular product category but no applicable PCR were found.

1.1 | GOAL AND SCOPE

This PCR document specifies rules, requirements, and guidelines for developing EPDs for ESCS lightweight aggregate and underlying requirements of related life-cycle assessments (LCAs). These PCR are valid for, and provide requirements for, Business-to-Business (BtoB) EPDs. A BtoB EPD covers the cradle-to-gate production stage with the product packaged and ready for shipment at the plant gate.

An EPD prepared under these PCR shall present results for the following phases of the life cycle:

- raw materials acquisition,
- transportation, and
- manufacturing.

These PCR are consistent with and comply with the mandatory requirements contained in the following standards:

- International Organization for Standardization (ISO) 21930:2007—*Sustainability in building construction—Environmental declaration of building products*.
- ISO 14025:2006 *Environmental labels and declarations—Type III environmental declarations—Principles and procedures*.
- ISO 14040:2006 *Environmental management—Life cycle assessment—Principles and framework*.
- ISO 14044:2006 *Environmental management—Life cycle assessment—Requirements and guidelines*.

While not necessarily complying with the EN 15804 standard, it is referenced in Section 12 and has been consulted with regard to selected requirements and presentation details that go beyond or expand on the above-noted ISO standards.

1.2 | EPD OWNERSHIP/RESPONSIBILITY

The producers or group of producers who develop an EPD following these PCR maintain sole ownership and have responsibility and liability for their EPD.

2.0 Period of Validity

This PCR document is effective for five (5) years from the latest date of publication. If after five years, relevant changes in the product category or other relevant factors have occurred (for example, LCA methodology), the document will be revised. Revisions may also be made to these PCR during the period of validity; however such changes do not have to be reflected in existing EPDs during their validity period unless the EPD owners choose to do so.

An EPD created under these PCR shall be valid for a five (5) year period from the date of issue after which it shall be reviewed and verified. An EPD shall be reassessed and updated after five years as necessary to reflect changes in technology or other circumstances that could alter the content and accuracy of the declaration. The process for verification and establishing the validity of an EPD shall be in accordance with ISO 14025 and ISO 21930.

3.0 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.

Expanded shale, clay, and slate (ESCS), n | a lightweight, ceramic material produced by expanding and vitrifying select shale, clay, or slate in a rotary kiln (ASTM E2788)

Lightweight aggregate, n | see low-density aggregate (ASTM C125)

Low-density aggregate, n | aggregate with bulk density less than 1120 kg/m3 [70 lb/ft3], such as: pumice, scoria, volcanic cinders, tuff, and diatomite; expanded or sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, or slag; and end products of coal or coke combustion (ASTM C125)

NOTE: With the exception of expanded shale, clay, and slate, the low-density aggregates listed above are not covered by these PCR.

4.0 Informed Comparison

EPDs may enable comparison between products but do not themselves compare products, as stated in ISO 14025, Sections 4 and 6.7.2. It shall be stated in EPDs created using these PCR that only EPDs prepared from cradle-to-grave life-cycle results and based on the same function, reference service life, and quantified by the same functional unit, and meeting all the conditions in ISO 14025, Section 6.7.2 can be used to assist purchasers and users in making informed comparisons between products. EPDs based on cradle-to-gate information modules shall not be used for comparisons unless using a functional unit and complying with all of the requirements set out in ISO 14025, Section 6.7.2, and ISO 21930, Section 5.6 when the product is used in buildings. EPDs based on a declared unit shall not be used for comparisons.

Because an EPD prepared using these PCR only covers BtoB, the following shall be stated in the EPD: This EPD covers only the cradle-to-gate impacts of expanded shale, clay, and slate lightweight aggregate using a declared unit and the results cannot be used to compare between products.

5.0 Company/Organization, Product, and Product Category

5.1 | DESCRIPTION OF COMPANY/ORGANIZATION

The name of the company/organization as well as the place(s) of production shall be provided in the EPD. The EPD may also include general information about the company/organization such as the existence of quality systems, an environmental management system according to ISO 14001, or any other environmental management systems in place.

5.2 | DEFINITION OF PRODUCT CATEGORY

These PCR address ESCS lightweight aggregate products shown in Table 1, which also shows the ASTM and AASHTO standards that provide detailed descriptions and specifications for each product. The scope of these PCR only includes expanded shale, clay, and slate, as defined as low-density aggregates in Section 3.0.

TABLE 1: Expanded Shale, Clay, and Slate Lightweight Aggregate

Product	Specification
Lightweight Aggregates for Structural Concrete+	ASTM C330/C330M or AASHTO M195
Lightweight Aggregates for Concrete Masonry Units+	ASTM C331/C331M
Lightweight Aggregates for Insulating Concrete+	ASTM C332

\+ Note: Although these standards apply to low-density aggregate (per ASTM C125), the scope of these PCR only includes expanded shale, clay, and slate.

5.3 | DESCRIPTION OF PRODUCT

The EPD shall provide a narrative description of the product that will enable the user to clearly and unambiguously identify the product. This description shall include, where relevant:

- Product identification by brand name, material type, and simple example visual representation, which may be by photograph or graphic illustration;
- List of the standards and other product specifications to which the products comply;
- Flow diagram illustrating main unit processes by life-cycle stage according to the scope of the declaration;
- Materials and substances to be declared; and
- Any additional information that will assist in identifying the product.

Material contents of the finished product, including packaging, shall be declared in terms of the main components. Intentionally added substances officially classified as hazardous according to relevant national or international regulations shall be stated. Product specific data that is confidential because of the competitive business environment, intellectual property rights, or similar legal restrictions need not be declared.

6.0 Requirements for the Underlying LCA

The underlying LCA shall be conducted in accordance with ISO 14040 and ISO 14044.

6.1 | FUNCTIONAL AND DECLARED UNIT

The functional unit of a product provides the quantitative normalization for comparing products of equivalent function (functional unit) or equivalent specification. A functional unit is defined for EPDs covering the complete cradle-to-grave life cycle or the cradle-to-gate life cycle with a use stage scenario.

A declared unit is defined for EPDs covering only the cradle-to-gate or cradle-to-gate plus end-of-life stages (see Section 6.2). If the intended use of the EPD is for comparison purposes between different products, the entire life cycle shall be included, including the use and end-of-life stages. In such situations the functional unit shall be used as the reference unit, not the declared unit.

Since these PCR for ESCS lightweight aggregate only cover the cradle-to-gate stages, a declared unit shall be used. The declared unit shall be 1 m^3 (cubic meter) of ESCS lightweight aggregate that is ready for shipment. Data may additionally be presented per cubic yard of ESCS lightweight aggregate.

6.2 | SYSTEM BOUNDARIES

Figure 1 shows the life-cycle stages and individual modules that shall be included within the LCA system boundary, depending on whether the EPD is BtoB or Business-to-Consumer.

FIGURE 1 Life-Cycle Stages and Modules

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE			
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4

Cradle-to-Gate or "Information Module" (BtoB EPDs) | The life-cycle activities and related processes shall include modules A1, A2, and A3—the product stage—as defined below, with scenarios for other life-cycle stages as appropriate.

Cradle-to-Grave (mandatory for BtoC EPDs) | A complete cradle-to-grave LCA shall be developed for the product, including all life-cycle stages and modules, for a specified defined function and service life, inclusive of maintenance and replacement and end-of-life effects.

Any site-generated energy and purchased electricity shall be included in the system boundary. The extraction, processing, and delivery of purchased primary fuels, for example natural gas and primary

fuels used to generate purchased electricity, shall also be included within the boundaries of the system. Regionally specific inventory data on electricity shall be based on subnational U.S. and Canadian consumption mixes that account for power trade between the regions. If such regional data are not available, production mixes of the three continental interconnections (East, West, Texas) as well as those of Hawaii and Alaska may be used. A comparable approach shall be taken for electricity consumption in the case of materials or input products imported from outside the U.S. and Canada. The sources for electricity (calculation procedure) shall be documented.

In the case of EPDs based on these PCR, modules A1 to A3 (highlighted in Figure 1) apply. The following factors are to be taken into account for each life-cycle stage.

Modules A1-A3, the Product Stage

- A1 - This module includes the following:
    - Extraction and processing of raw materials (e.g. mining processes) and biomass production and processing (e.g. agricultural or forestry operations);
    - Reuse of products or materials from a previous product system;
    - Processing of secondary materials used as input for manufacturing the product, but not including those processes that are part of the waste processing in the previous product system;
    - Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport; and
    - Energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system.
- A2 - Average or specific transportation of raw materials (including recycled materials) from extraction site or source to manufacturing site (including any recovered materials from source to be recycled in the process), and including empty backhauls and transportation to interim distribution centers or terminals;
- A3 - Manufacturing of the product, including all energy and materials required and all emissions and wastes produced. This includes, but is not limited to:
    - Packaging, including transportation and waste disposal, to make product ready for shipment;
    - If packaging is purchased from multiple suppliers, then a weighted average of the transportation distances by mode from all suppliers shall be included in the LCA modeling;
    - Average or specific transportation from manufacturing site to recycling/reuse/landfill for pre-consumer wastes and unutilized by-products from manufacturing, including empty backhauls; and
    - Recycling/recovering/reuse/energy recovery of pre-consumer wastes and by-products from production.

Modules A1, A2, and A3 may be declared as one aggregated module A1-A3.

All assumptions from the LCA shall be described in detail. Any transportation data other than identified above shall be indicated. If transportation information is included in other stages than indicated, or if no transportation information exists and assumptions are made, this shall be noted.

Excluded from System Boundary | A summary of items that may be excluded in the primary product stages include:

- Production, manufacture, and construction of machinery or other manufacturing capital goods and infrastructure;
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
- Personnel-related activities (travel, furniture, and office supplies); and
- Energy and water use related to company management and sales activities located either within the factory site or at another location.

7.0 Life-Cycle Inventory Analysis

7.1 | DATA COLLECTION AND DESCRIPTION OF DATA

The data shall be representative according to temporal, geographical, and technological requirements.

Temporal | The obtained information from the manufacturing process shall be annual values from the previous twelve-month period or calendar year, unless accompanied by a statement attesting to the validity of older data. Average background or secondary data shall not be older than ten years unless accompanied by a statement attesting to the validity of older data.

Geographical | The geographic region of the relevant life-cycle stages included in the calculation of representative data shall be documented.

Technological | Data shall represent technology in use.

The following specific or generic background data shall be documented with regard to data sources:

- Extraction and/or production of raw materials (specific or average background);
- Manufacturing of the product (specific);
- The fuel mix and calculation procedures for electricity generation;
- Hazardous waste according to applicable U.S. and/or Canadian federal or state/provincial regulations (or appropriate regulations for materials imported from outside North America);
- Proxies for upstream products where specific or generic data is not available; and
- Weighted averages based on volume or mass used to assign transport distance and mode if multiple suppliers are used for one material.

For generic data, national databases shall be used to the extent that they are applicable (for example, U.S. Life Cycle Inventory Database, *www.nrel.gov/lci*). If appropriate national data are not available, sources for similar technology adjusted for national boundary conditions (for example, energy mix) may be used. Data from other regions are acceptable if it is determined and justified that those data are the best available.

All data sources shall be specified, including database and year of publication (reference). Sources of data for transport models (including transport mode, distances, and quantities to be transported) and thermal energy production shall be documented. Where proxy data is used in the absence of specific data for chemicals or other inputs, the source and justification for selection of the proxies shall be documented in the LCA report.

When preparing an average EPD for an identical product manufactured at multiple facilities, the LCI data for each site shall be weighted to determine the average. Weighting shall be by annual product production. Data reported in the declarations shall be as production-weighted averages of multiple facilities.

The product content will be described in the declaration. Product specific data that is confidential because of the competitive business environment, intellectual property rights, or similar legal restrictions need not be declared. In such cases, a notation that the information is confidential shall be made along with a description of the function of the component.

7.2 | CUTOFF RULES

Criteria for the exclusion of inputs and outputs (cutoff rules) in the LCA and information modules and any additional information are intended to support an efficient calculation procedure. They shall not be applied in order to hide data. All inputs and outputs of a unit process for which data are reasonably available shall be included in the calculation. Any application of the criteria for the exclusion of inputs and outputs shall be documented. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices shall be documented.

If data are not reasonably available, the cutoff criteria for flows to be considered within the system boundary shall be as follows:

Mass | If a flow is less than 1% of the cumulative mass of the unit processes, it may be excluded, provided its environmental relevance is minor.

Energy | If a flow is less than 1% of the cumulative energy of the system model, it may be excluded, provided its environmental relevance is minor.

Environmental relevance | Material and energy flows known or expected to have the potential to cause environmentally relevant emissions into air, water, or soil related to the environmental indicators of these PCR shall be included unless justification for exclusion is documented.

At least 95% of the energy usage and mass flow shall be included and the life-cycle impact data shall contain at least 95% of all elementary flows that contribute to each of the declared category indicators.

All hazardous and toxic materials and substances shall be included in the inventory and the cutoff rules do not apply to such substances.

7.3 | DATA QUALITY REQUIREMENTS

Any secondary data source used in the underlying life-cycle inventory shall be complete and representative of the applicable North American region in terms of its geographic and technological coverage and of a recent vintage, which is typically less than ten years old. Any deviations from these requirements for secondary data shall be documented, and the following apply.

- All data shall be accurate and representative of the production process, current technology, and current measurement capability.
- The information obtained from the manufacturing process shall be annual average values.
- Average background data shall not be older than ten years for industry average data or five years for producer specific data, unless justification is provided.

- When the owner of the EPD is not the owner of all upstream processes, the owner shall contact its suppliers within the system boundary. If the suppliers do not supply data, the owner shall use the best-available data in the literature based on data quality requirements of this PCR.
- Data shall be identified as direct (for example, measurements or purchasing records), indirect (based on calculations), estimated, or other.

7.4 | UNITS

SI units shall be used with conversions as shown in the table below as necessary. Preferred power and energy units are as follows:

- kWh or MJ for electric energy
- kW or MW for power

TABLE 3: Conversion Factors to be Used to Report in IP Units (Imperial)

Convert from	To	Multiply by
Square meter (m^2)	Square foot (ft^2)	1.076391E+01
Kilogram (kg)	Pound (lb)	2.204622
Mega joule (MJ)	British Thermal Unit (Btu)	9.478170E+02
Degree Celsius (°C)	Degree Fahrenheit (°F)	(°C * 9/5) +32
Cubic meter (m^3)	Cubic foot (ft^3)	3.531466E+01
Meter (m)	Foot (ft)	3.281
m^2K/W	ft^2Fhr/Btu	5.6783
Metric tonne	Ton	1.102

Source: NIST: *http://physics.nist.gov/Pubs/SP811/appenB9.html*; *http://www.nist.gov/pml/wmd/metric/temp.cfm*; and *http://www.nist.gov/pml/wmd/metric/common-conversion-b.cfm*

7.5 | ALLOCATION RULES

In a production process in which more than one type of product is generated, it is necessary to allocate the environmental flows (inputs and outputs) from the process to the different products to get product-based inventory data. Allocation, if required, shall follow the requirements and guidance of ISO 14044, Section 4.3.4.

Recycled and recovered materials shall be considered raw materials. Only the materials, water, energy, emissions, and other elemental flows associated with reprocessing, handling, sorting, and transportation from the generating industrial process to their use in the production process need to be considered. Any allocations before reprocessing shall be allocated to the original product. Recycled and recovered materials with fuel content and used as fuels, such as used tires, shall be considered alternative energy.

Allocation related to transport shall be based on the mass of transported material or product.

When a product's original function is no longer needed or possible, the product can be processed further in a waste management system. For example, it can be recycled, reused, or energy recovered. Emissions from downstream recycling or combustion after the end-of-waste state will be allocated to the new downstream products, such as heat and electricity. In the case of incineration of wastes for energy production at the primary production site, the combustion emissions shall be allocated to the product unless the energy is exported.

Recycling processes shall be treated as closed loop recycling, as long as no change occurs in the inherent properties of the recycled material. In such cases, the need for allocation is avoided since the use of secondary material displaces the use of virgin (primary) materials.

If different allocation options are relevant and a deviation of greater than 20% is a foreseen outcome, a sensitivity analysis shall be initiated. These different allocation approaches and data sets shall be documented and declared.

In cases where several similar products are produced by a site or company, these PCR offer the possibility for similar products to be grouped as an average product in the same EPD provided that the difference between their environmental impacts is less than 5% for each environmental impact category. In cases where the difference is greater than 5%, it is still possible to include average products in the same EPD (for example, in separate columns in a table). If a single value is chosen for each impact category for all products, the value reported should be the worst performance within the range of variation. It is also permissible to show arithmetically weighted 'averaged data' in an EPD as supplementary information if found relevant.

During the manufacture of ESCS lightweight aggregate, it is common to produce a by-product in the form of ESCS fines. These fines may be diverted from the waste stream and used as a pre-consumer recycled material in another manufacturing process. Because these fines are a by-product, emissions shall be allocated using an appropriate allocation procedure. Because these fines are a potentially valuable by-product, impacts shall be allocated using mass allocation if the average revenue from the lightweight aggregate versus fines over a one- to three-year period is within ±20%. Otherwise economic allocation shall be used.

8.0 Impact Categories and Characterization Factors

Environmental impact category indicators shall be taken from Table 4 for declaring environmental aspects in accordance with ISO 21930, Section 8.2 and ISO 14044.

TABLE 4: Declaration of Environmental Category Indicator Results, Use of Resources, and Generation of Waste

Category Indicator	Unit
Global warming potential (GWP)	kg CO_2 equiv
Acidification potential	kg SO_2 equiv
Eutrophication potential	kg N equiv
Smog creation potential	kg O_3 equiv
Ozone depletion potential	kg CFC-11 equiv
Total primary energy consumption	
Nonrenewable fossil	MJ (HHV)
Nonrenewable nuclear	MJ (HHV)
Renewable (solar, wind, hydroelectric, and geothermal)	MJ (HHV)
Renewable (biomass)	MJ (HHV)
Material resources consumption	
Nonrenewable material resources	kg
Renewable material resources	kg
Net fresh water (inputs minus outputs)	L
Non-hazardous waste generated	kg
Hazardous waste generated	kg

Notes for Table 4:

1. Fresh water is naturally occurring water on the earth's surface and underground as groundwater in aquifers and underground streams. The term specifically excludes seawater and brackish water, but does include fresh water that has been treated to make it potable. Energy use and other impacts associated with fresh water treatment are not included.
2. Recovered or recycled materials are neither nonrenewable nor renewable resources under ISO definitions. The use of such materials can be reported as additional environmental information as per Section 9.
3. Primary energy is an energy form found in nature that has not been subjected to any conversion or transformation process. Examples of primary fuels are coal, natural gas, and biomass.
4. Recycled and recovered materials with fuel content and used as fuels shall be considered alternative energy. Examples of such secondary fuels recovered from previous use or as waste are solvents, wood, tires, and animal fat. Emissions from secondary fuels shall be included in the calculation of the relevant environmental impacts.
5. Energy consumption shall be reported in Higher Heating Values (HHV) mega joules.
6. Where applicable, feedstock energy shall be declared and shown separately.

The impact categories of life-cycle impact assessment (LCIA) shall be calculated using characterization factors specified in version 2.1 of TRACI (Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts). *http://www.epa.gov/nrmrl/std/traci/traci.html*

9.0 Additional Environmental Information

An EPD shall include, where relevant, additional information, such as given in the points below, related to environmental issues, other than the environmental information derived from LCA, LCI, or information modules. This information shall be separated from the information described in ISO 21930, Sections 7.2.2 and 7.2.3. Identification of the significant environmental aspects should, as a minimum, take into consideration the following:

- Information on environmental issues, such as
    - Impact(s) and potential impact(s) on biodiversity,
    - Toxicity related to human health or the environment or both, and
    - Geographical aspects relating to any stages of the life cycle (for example, a discussion on the relation between the potential environmental impact(s) and the location of the product system);
- Data on product performance, if environmentally significant;
- Organization's adherence to any environmental management system, with a statement on where an interested party can find details of the system;
- Any other environmental certification program applied to the product and a statement on where an interested party can find details of the certification program;
- Other environmental activities of the organization, such as participation in recycling or recovery programs or renewable energy credits (REC), provided details of these programs are readily available to the purchaser or user and contact information is provided;
- Information that is derived from LCA but not communicated in the typical LCI- or LCIA-based formats;
- Instructions and limits for efficient use;
- Hazard and risk assessment on human health and the environment;
- Information on absence or level of presence of a material in the product that is considered of environmental significance in certain areas (see ISO 14021, Sections 5.4 and 5.7);
- Preferred waste management option for used products; and
- Potential for incidents that can have impact(s) on the environment, such as recycled content or recycling rates.

Additional information shall only be related to environmental issues. Information and instructions on product safety unrelated to the environmental performance of the product shall not be part of a Type III environmental declaration.

10.0 EPD Supporting Data

A project report shall be prepared in accordance with the requirements and guidance of ISO 14044, Section 6, for third-party reports. This information shall document the LCA study and additional environmental information in a systematic, comprehensive way, and shall be made available to the verifier in order to demonstrate that the requirements of this PCR document and ISO 21930 have been met. The project report shall include, where relevant:

- The name of the organization that commissioned the report, the contact information of the report author, and the date of the report;
- The input and output environmental data of the unit processes that are used for the LCA calculations;
- The documentation (measurements, calculations, estimates, sources, correspondence, traceable references to origin, and so forth) that provides the basis from which the process data for the LCA is formulated;
- The specification used to create the manufacturer's products;
- Energy consumption figures;
- Emission data to air, water, and soil;
- Waste production;
- Data that demonstrates that the information is complete–in specific cases, reference can be made to, for instance, standards or quality regulations;
- Referenced literature and databases from which data have been extracted;
- Data used to carry out sensitivity analyses;
- Documentation that demonstrates that the chosen processes and scenarios in the flow chart satisfy the requirements set in ISO 21930;
- Documentation and substantiation of the percentages and figures (number of cycles, prices, and so forth) used for the calculations in the allocation procedure;
- Information showing how averages of different reporting locations have been calculated to obtain generic data;
- Documentation used to substantiate any qualitative information in the additional environmental information;
- Procedures used to carry out the data collection (questionnaires, instructions, informative material, confidentiality agreements, and so forth);
- The characterization factors used;
- The criteria and substantiation used to determine the system limits and the selection of input and output flows;
- Documentation that demonstrates consistency when using information modules; and
- Documentation used to substantiate the other choices and assumptions.

11.0 Content of the EPD

The following demonstration of verification shall be completed and included with the EPD. Note that third-party verification is optional for BtoB EPDs.

Demonstration of Verification

PCR review, was conducted by: < name and organization of the chair, and information on how to contact the chair through the programme operator >
Independent verification of the declaration and data, according to ISO 14025: internal external
(Where appropriate[1]) Third party verifier: <name of third party verifier>

All Type III environmental declarations in a product category shall follow the format and include the parameters as identified in this PCR. The following general information shall be declared in the EPD:

- Name and address of the manufacturer(s);
- Product identification by name (including, for example, production code) and a simple visual representation of the product;
- Description of the product's use and the declared unit of the product to which the data relates;
- Description of the application (installation) of the product where relevant;
- List of the substances, by weight, that make up the product, taking into account cutoff rules and confidentiality;
- Data from LCA or LCI or information modules, as per ISO 14025, Section 7.2.2;
- Additional environmental information (see Section 9);
- Statement that the EPD is cradle-to-gate;
- Statement that EPDs from different programs (using different PCR) may not be comparable;
- Statement that the EPD represents an average performance in cases where an EPD declares an average performance for a number of products, in addition, with the range of the products' performance with respect to the average stated;
- Information on where explanatory material may be obtained;
- Description or diagram of the life-cycle stages included in the LCA and system boundaries;
- Name of the program and the program operator's address and, if relevant, the logo and website URL;
- Identification of the PCR document on which the EPD is based;
- Date the EPD was issued and period of validity;

1 Optional for business to business communication, mandatory for business to consumer communication.

- Site(s), manufacturer, or group of manufacturers or those representing them for whom the results of the LCA are representative;
- Name of PCR review panel chair;
- Whether the independent review of the EPD and data was conducted by an internal or external verifier; and
- Name, address, phone number, fax number, and e-mail of the third-party verifier and logo of the verification body, if applicable.

12.0 References

AASHTO Standards:[2]

AASHTO M195 Specification For Lightweight Aggregates For Structural Concrete

ASTM Standards:[3]

ASTM C125 Standard Terminology Relating to Concrete and Concrete Aggregates

ASTM C330/C330M Standard Specification for Lightweight Aggregates for Structural Concrete

ASTM C331/C331M Standard Specification for Lightweight Aggregates for Concrete Masonry Units

ASTM C332 Standard Specification for Lightweight Aggregates for Insulating Concrete

ISO Standards:[4]

ISO 6707-1: 014 Buildings and Civil Engineering Works — Vocabulary — Part 1: General Terms

ISO 14021:1999 Environmental Labels and Declarations — Self-declared Environmental Claims (Type II Environmental Labeling)

ISO 14025:2006 Environmental Labels and Declarations — Type III Environmental Declarations — Principles and Procedures

ISO 14040:2006 Environmental Management — Life Cycle Assessment — Principles and Framework

ISO 14044:2006 Environmental Management — Life Cycle Assessment —Requirements and Guidelines

ISO 14050:2009 Environmental Management — Vocabulary

ISO 15686-1:2011 Buildings and Constructed Assets — Service life planning — Part 1: General Principles and Framework

ISO 21930:2007 Sustainability in Building Construction — Environmental Declaration of Building Products

Other References:

BS EN 15804 Sustainability of construction works—*Environmental product declarations—Core rules for the product category of construction products*[5]

2 Available from the American Association of State Highway and Transportation Officials (AASHTO), 444 N Capitol St. NW-Suite 249,Washington, DC USA 20001, *www.transportation.org*

3 Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, *http://www.astm.org*.

4 Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, *http://www.iso.org*.

5 European Committee for Standardization (CEN), Avenue Marnix 17, B-1000 Brussels, Belgium, *www.cen.eu*