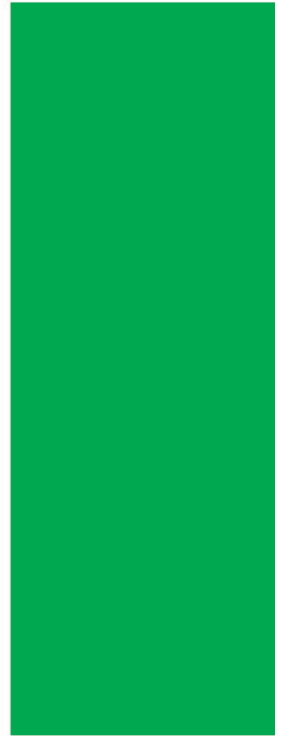


Product Category Rule for Environmental Product Declarations

Flooring: Carpet, Resilient, Laminate, Ceramic, Wood
Version 2



Program Operator

NSF International

National Center for Sustainability Standards

Valid through June 23, 2019

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Product Category Rule for Environmental Product Declarations

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Version 2*

Prepared by
The NSF PCR Flooring Committee

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The National Center for Sustainability Standards will continue to add to its growing portfolio while providing education, outreach, and innovative support to private industry, trade associations, government and academia to foster a consensus-based approach toward conformity assessment in the sustainability field.

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To initiate your LCA, receive your EPD verification, or have questions on where to start, contact NSF Sustainability at sustainability@nsf.org or 734-476-2543.



Product Category Rule for Environmental Product Declarations

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PRODUCT CATEGORY RULES

For preparing an Environmental Product Declaration (EPD) for installed flooring products including, but not limited to:

- **Carpet** floor coverings including broadloom, carpet tile, and flocked
- **Resilient** floor coverings including vinyl, linoleum, cork, rubber, and polymeric
- **Laminate** floor coverings
- **Ceramic** tile including glass, mosaic, porcelain, pressed floor tile, and quarry tile
- **Wood** flooring including engineered wood flooring and solid wood (pre-finished or unfinished)



1 GENERAL INFORMATION

This document specifies the requirements for format and content of Environmental Product Declarations (EPD) in accordance with ISO 14025 and ISO 21930. This was developed in an open consultative process of 21 organizations in various interest categories.

This Product Category Rule (PCR) is based upon the existing PCR issued by the Institut Bauen und Umwelt e.V. 2008. The development of this PCR was informed by multiple proprietary LCAs. The extension of coverage to the hardwood and ceramic flooring categories is required to prevent proliferation of multiple flooring category rules for each individual flooring category. Additionally, concepts around recycled content, end of life, building service life, and use phase have been further refined and updated to more current thought on the topics.

The country of the manufacturing facilities for the product group shall be specified. For these facilities, ISO 9001 or other ISO standards, the level of certification and applicable facilities shall be declared.

The EPD can be developed for:

- Single, individual products
- Product groups
- Representative products

Single product is clearly described by its construction or composition data (e.g., relevant product standard, trade name, product code). Single product represents one stock keeping unit (SKU).

Product group contains a number of single/individual products with similar characteristics (e.g., similar and comparable manufacturing processes, same classification, etc.). The variation for the environmental impact shall be described and the minimum and maximum level for the products environmental performance (e.g., environmental impact) shall be given. Product group represents the average of a family or category of products which may have multiple stock keeping units, but common structural composition. A product group may consist industry average product data from multiple manufacturers or weighted average data from one manufacturer.



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Representative product is a typical floor covering whose characteristics such as material content, product, weight, or manufacturing process are calculated based on market share or geographical coverage. A representative product is data for one specific product, not averaged, but assumed to be representative of other products.

A functional unit shall be defined as 1 m² of floor covering for a specified time period (see *Description of functional unit*, section 6.2 and *Impact declaration and use stage normalization*, section 6.8).

The EPD shall consider all life cycle stages. The EPD shall include name and address of the company responsible for the declaration, and the following information about the program operator:

- address;
- logo;
- contact information; and
- website address.

The EPD shall provide the following information:

PCR review was conducted by:	
<i>Example:</i>	
Name of the chair, organization, and means by which to contact the chair through the program operator	
Independent verification of the declaration and data, according to ISO 14025	
<input type="checkbox"/> internal	<input type="checkbox"/> external
(Where appropriate) third party verifier:	
<i>Example:</i> Name of third party verifier	

NOTE - Sections contain examples; information and data provided in the examples are not necessarily complete, and other responses are feasible.

The EPD shall report all information required in sections 1 through 5 of this PCR.



1.1 Goal and scope requirements for the LCA study

The goal of this PCR is to specify the guidelines for developing a Type III Environmental Product Declaration in conformance with ISO 14025 based on an ISO 14040 and ISO 14044 compliant LCA. The goal and scope statements shall not be of a comparative nature. The goal of the LCA is to allow understanding and improvement of the environmental impact of the product. The user of the EPD should take care when comparing EPDs from different companies. Assumptions, data sources, and assessment tools may all impact the uncertainty of the final results and make comparisons misleading. Without understanding the specific variability, the user is therefore, not encouraged to compare EPDs. Even for similar products, differences in use and end-of-life stage assumptions, and data quality may produce incomparable results¹.

¹ WRI Product Life Cycle Accounting and Reporting Standard (second draft - English) October 2011 *Copyright* © World Resources Institute & World Business Council for Sustainable Development, September 2011<<http://wri.org>>



2 PRODUCT DESCRIPTION

2.1 Product classification and description

The floor covering product shall be clearly identified which may include a picture of the product, trade name, product number, pattern number or other information.

Product groups and average products shall be clearly defined.

The product description should include an illustrative picture or technical figure documenting the main characteristics and structure of the floor covering.

The product description shall state the reference service life.

2.2 Applicability

The typical application and suggested use of floor covering shall be specified.

The recommended areas of use for the flooring product shall be stated. Achieving the environmental performance indicated in the EPD requires that the flooring be installed in accordance with manufacturer requirements and that remediation of singular effects (fire, water, etc) follow manufacturer guidance.

Example:

This may include the wear rating system for a carpet flooring product or recommended use areas (e.g., CRI TARR (texture, appearance, retention, ratings) for this carpet product is “heavy”).

This PCR is valid for all flooring coverings in accordance with the standards shown below or as appropriate or applicable:



Carpet

Specification of carpet properties varies by the intended application. The intended application and the performance to the specifications of the following tests shall be declared.

AATCC2 Test Method 134-2011 Electrostatic Propensity of Carpets (Normative value ≥ 3.5 KV)

AATCC2 Test Method 16-2004 Colorfastness to Light (minimum grade 4 at 40 AFU)

ASTM6 E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

ASTM6 E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

ASTM6 D5252 Standard Practice for the Operation of the Hexapod Tumble Drum Tester

ASTM6 D7330 Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales

ISO 2551/ASTM6 D7570 Dimensional Stability (Modular Tiles Only)

Resilient Floor Coverings

ASTM6 F1066 Specification for Vinyl Composition Tile

ASTM6 F1303 Specification for Sheet Vinyl Floor Covering with Backing

ASTM6 F1344 Specification for Rubber Floor Tile

ASTM6 F1700 Specification for Solid Vinyl Floor Tile

ASTM6 F1859 Specification for Rubber Sheet Floor Covering Without Backing

ASTM6 F1860 Specification for Rubber Sheet Floor Covering With Backing

ASTM6 F1913 Specification for Vinyl Sheet Floor Covering Without Backing

ASTM6 F2034 Specification for Sheet Linoleum Floor Covering

ASTM6 F2195 Specification for Linoleum Floor Tile

ASTM6 F2982 Standard Specification for Polyester Composition Floor Tile.



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Laminate Floor Covering

ANSI - NALFA5 LF 01 Laminate Flooring Specification and Test Methods

NALFA5 UL 01 Underlayment Pad Specification and Test Methods

Ceramic Tile

ANSI3 A137.1 American National Standard Specifications for Ceramic Tile

ANSI3 A137.2 American National Standard Specifications Glass Tile

Wood Flooring

ANSI / HPVA4 EF American National Standard for Engineered Wood Flooring

ANSI / HPVA4 HP American National Standard for Hardwood and Decorative Plywood

NWFA/NOFMA International Standards for Factory Finished Solid Wood Flooring

NWFA/NOFMA Official Flooring Grading Rules for Unfinished Solid Wood Flooring



3 PRODUCT CHARACTERISTICS

The product characteristics shall be described. Basis for the description shall be the appropriate product specifications. Where such standards are not available, equivalent descriptions shall be given.

Carpet

Example:

Type of manufacture		
Yarn type		
Additional characteristics according to NSF/ANSI 140		
Sustainable certifications	Certified to NSF/ANSI 140	
VOC emissions test method		
CRI- TARR rating		
Characteristics	Nominal Value	Unit
Total thickness		mm (inch)
Product weight		g/m ² (oz/ft ²)
Surface pile thickness		mm (inch)
Number of tufts or loops /dm ²		dm ⁻² (ft ⁻²)
Surface pile weight		g/m ² (oz/ft ²)
Pile fiber composition		%
Secondary backing		



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Resilient Floor Coverings

Example:

Characteristics			Average Value	Unit	Maximum Value	Minimum Value
Product thickness				mm (inch)		
Wear layer thickness (where relevant)				mm (inch)		
Product weight				g/m ² (oz/ft ²)		
Product form:	Rolls	Width Length		mm (inch) M (feet)		
	Tiles			mm (inch)		
VOC emissions test method						
Additional characteristics according to NSF/ANSI 332						
Sustainable certifications	Certified to NSF/ANSI 332					



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Laminate Floor Coverings

Example:

Characteristics	Nominal Value	Unit
Thickness		mm (inch)
Length		M (feet)
Width		mm (inch)
Product weight		g/m ² (oz/ft ²)
Use rating		Commercial
Core type		HDF
Density		
Underlayment Weight		g/m ² (oz/ft ²)
Additional characteristics according to NALFA LF 02		underlayment composition
VOC emissions test method		



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Ceramic Tile

Example:

Characteristics	Nominal Value	Unit
Class	P1-P4, E1-E4, or O1-O4	N/A
Tile type	Porcelain, pressed floor, mosaic, quarry, or glass	N/A
Grade	Standard or second	N/A
Nominal facial area	Range of sizes	mm ² (in ²)
Nominal thickness	Thickness range	mm (inch)
Product weight		g/m ² (oz/ft ²)
Dimensional categories	Natural, calibrated, or rectified	N/A
Sustainable certification	Certified conformance to ANSI/A138.1 Green Squared SM	N/A



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Wood Flooring

Example:

Solid Wood Flooring

Characteristic	Nominal Value	Unit
Thickness	Typical range from 5/16" up to 1"	mm (inch)
Width	Typical range from 1 1/2" to 10", occasionally wider	mm (inch)
Product weight		g/m ² (oz/ft ²)
Hardness	Range from Douglas Fir at 660 to Brazilian Walnut at 3680, others may vary outside that range	Range
Moisture content	6 - 9% moisture content at time of manufacture, unless specified different	Percentage
Finish thickness (Factory Finished)	thickness of the finish will vary from manufacturers	mils (thousandths of an inch)
VOC emissions test method		
Sustainable certifications		



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Example:

Engineered Wood Flooring

Characteristic	Nominal Value	Unit
Thickness	Typical range from ¼ to ¾”	mm (inch)
Width	Typical range from 2” to 8”, occasionally wider	mm (inch)
Product weight		g/m ² (oz/ft ²)
Hardness	Range from Douglas Fir at 660 to Brazilian Walnut at 3680, others may vary outside that range	Range
Moisture content	Normal moisture content at time of manufacture is 5 – 9%, unless specified differently	Percentage
Finish or mill finish	Verify desired color and gloss	mils (thousandths of an inch)
VOC emissions test method		
Sustainable certifications		

Formaldehyde emissions for wood composite products shall be required to be reported in accordance with California Air Resource Board (CARB).



4 MATERIAL CONTENT

A declaration covering materials and substances contained in the product in delivery condition shall be given as a mass % in accordance with the cut-off rules of 1% (see section 6.3, *Cut-off Rules*). Statements on the general availability and the materials origin shall be given for the main materials.

4.1 Material Content of the product

Materials and substances used in the manufacture of a flooring product which, according to government regulations adversely affects human health and the environment, shall be declared independently of the cut-off rules.

Any processes or activities can be omitted from the inventory analysis if they do not contribute to more than 1% of the total mass or 1% of the total energy or 1% of total environmental impacts used to manufacture the product except as noted below.

Use of raw material(s) in the manufacture of a flooring product that shall be reported or is identified under any of the criteria 1-6 listed below, shall be included in the EPD as Chemical Name and Chemical Abstract Registry Number (CASRN) regardless of the ingredient amount used.

1. Any material or chemical agent that is required to be disclosed on a raw material safety data sheet (MSDS) as required by OSHA's Hazard Communication Standard, or other applicable national regulation.
2. Any material or chemical agent emitted to the atmosphere during manufacture and subject to the requirements of US EPA regulation or equivalent including Criteria Air Pollutants and Hazardous Air Pollutants emitted at levels requiring an Air Operating Permit.
3. Any material or chemical agent discharged to a waterway subject to the requirements or regulations of local, state and/or federal permits.



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4. Any material or chemical agent which requires disclosure to the US EPA including:
 - Emergency Planning and Community Right-to-Know Act (EPCRA) Section 302 Extremely Hazardous Substances (EHSs);
 - EPCRA Section 313 Toxic Chemicals;
 - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazardous Substances; and
 - Clean Air Act (CAA) 112(r) Regulated Chemicals for Accidental Release Prevention.
5. Any waste material or agent meeting the requirements of a Resource Conservation and Recovery Act (RCRA) waste (including chemicals listed as a P-listed; K-listed; and U-listed).
6. Any material or chemical agent which has been identified by the Stockholm Convention as a Persistent Organic Pollutant (POP) .

Examples of potential components that may be included are provided below.



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Carpet

Example of typical wool nylon 6 blend carpet

Component	Material	Mass %	Availability			Origin of raw materials
			Renewable	Non-renewable	Recycled	
Pile material	80% wool	30%	abundant			New Zealand
	20% Polyamide 6 (nylon)	8%		fossil limited		global
Primary backing	PES	8%		fossil limited		global
Precoat	X-SBR	30%		fossil limited		global
	Filler: chalk			mineral abundant		Germany
Back coating	x-SBR	20%		fossil limited		global
	Filler: chalk			mineral abundant		Germany
Secondary backing	PP	4%		fossil limited		global



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Resilient Floor Coverings

Example of a product meeting ASTM F2034 Standard Specification for Sheet Linoleum Floor Covering:

Component	Material	Mass %	Availability			Origin of raw materials
			Renewable	Non-renewable	Recycled	
Binder	Linseed oil	24%	bio-based crop			US
Binder	Gum rosin	7%	sustainable harvested			China
Filler	Wood flour	36%	waste product from wood processing			Europe
Filler	Cork	9%	sustainable harvested			Portugal
Filler	Calcium carbonate	20.4%		mineral abundant		global
Pigment	Titanium dioxide	1.6%		mineral limited		global
Backing	Jute felt	2%	bio-based crop			India/Bangladesh



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Laminate Floor Coverings

Example of ANSI/NALFA LF 01

Component	Material	Mass %	Availability			Origin of raw materials
			Renewable	Non-renewable	Recycled	
Core: HDF	75-85% wood 25-15% resin	92%	abundant			global
Surface layer	Printed, impregnated paper (Décor)	1%	abundant			global
	Impregnated overlay	3%	abundant			global
	Corundum	1%	abundant			global
Backing	Impregnated kraft paper	3%	abundant			global



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Ceramic Tile

Example of typical ceramic tile

Component	Material	Mass %	Availability			Origin of raw materials
			Renewable	Non-renewable	Recycled	
Body	Clay	50%		mineral perpetual		global
	Quartz	10%		mineral perpetual		global
	Feldspar	40%		mineral perpetual		global
Glaze	Frit	< 0.1%		mineral limited		global
	Clay	< 0.1%		mineral perpetual		global
	Misc. minerals	< 0.1%		minerals limited and perpetual		global



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Wood Flooring

Example of Natural Wood

Component	Material	Mass % by weight	Availability			Origin of raw materials
			Renewable	Non- renewable	Recycled	
Unfinished solid wood	Wood	100%	abundant			global
Factory finished wood	Wood Stain/finish	≥ 98% < 2%	abundant			global

Example of Engineered Hardwood ANSI/HPVA EF

Component	Material	Mass* % by weight	Availability			Origin of raw materials
			Renewable	Non- renewable	Recycled	
EF flooring	Wood veneer	93%	abundant			global
	Wood adhesive	5%	abundant			global
	Finish	< 2%	abundant			global

*All numbers under mass are approximate numbers, will vary slightly due to the number of plies and the manufacturer.



4.2 Production of main materials

A short description of the main materials (1% by cut off) and manufacturing process shall be given.

Examples:

Calcium carbonate

An abundant mineral found in all parts of the world as the chief substance in rocks (i.e., marble and limestone). It can be ground to varying particle sizes and is widely used as filler in formulated flooring systems.

Chalk

Chalk is a soft, white, porous, sedimentary rock; a form of limestone composed of the mineral calcite, and is added as filler to latexes.

Clay

A sedimentary material produced by the natural weathering of rock, comprised primarily of alumina-silicate.

High density fiberboard (HDF)

High density fiberboard (HDF) or core board panel is used as a core layer in the production of laminate flooring, or other products such as furniture. The panel is composed of wood fibers, bound with a resin that is compressed under high heat and pressure to form the panels, that have a density generally greater than 800 Kg/cu m (106.8 oz/gal).

Linseed oil

Yellow oil extracted from seeds of the flax plant. It has great drying qualities and is used in making oil paints, printer's ink, linoleum, etc.

Polyethersulfone (PES)

A polymer in which the monomer units are linked together by the group --COO-- , usually formed by polymerizing a polyhydric alcohol with a polybasic acid: used primarily in the manufacture of resins, plastics, and textile fibers. Commonly used to refer to polyethylene terephthalate (PET).

Silica

Any of a variety of naturally occurring sands containing silicon dioxide. Also referred to as quartz.



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Styrene Butadiene Rubber (SBR)

A synthetic copolymer that is used as a primary cross-linkable binder in the manufacture of rubber flooring products and tires.

Titanium Dioxide

A white pigment produced from the mineral rutile, a naturally occurring form of titanium dioxide. The production of the pigment is a large-scale chemical process.

Wood

A cellulose material based resourced from forestry products.

Wool

Wool is a textile fiber derived from sheep. Before the wool can be used for commercial purposes it must be scoured and cleaned.



5 LIFE CYCLE ASSESSMENT STAGES AND REPORTED EPD INFORMATION

5.1 Sourcing/extraction (raw material acquisition) stage

This includes extraction of virgin materials from the earth (pre-consumer supply chain) or extraction of materials from post-consumer sources (post-consumer supply chain). This includes the growth or extraction of all raw materials and their delivery to the production site. Packaging materials are included. The sourcing and extraction stage shall be described in the EPD.

5.2 Manufacturing stage

The manufacturing process of the product shall be described (i.e., process flow diagram and/or short description).

5.3 Delivery and installation stage

5.3.1 Delivery and transport

Statements on the delivery (e.g., estimated vehicle, distances to the typical markets) shall be provided.

5.3.2 Installation

A general description of installation methods shall be provided, including ancillary materials used for installation (e.g., adhesives or other setting materials). For full details on installation recommendations, a reference to the manufacturer's instructions may be provided.

5.3.3 Health, safety and environmental aspects during installation

Location of MSDS and/or other information needed to protect health, safety, or regarding environmental aspects during installation should be made available upon request.



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Carpet

Example:

Adhesives meet the requirements of California South Coast Air Quality Management District Rule #11688, or are in accordance with the emissions requirements of California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 20107 (also known as CA 01350, or may be referenced as FloorScore or Green Label Plus approved).

Resilient floor coverings

Example:

During installation, water based acrylic adhesives are recommended. Adhesives that meet the requirements of California South Coast Air Quality Management District Rule #11688 , or comply with the emissions requirements of California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 20107 (also known as CA 01350, or may be referenced as FloorScore or Green Label Plus approved).

Laminate floor coverings

Example:

Appropriate personal protective equipment (PPE) guidance shall be followed regarding the need for protection against saw dust when cutting, working, or manipulating planks and panels.

Follow manufacturer's recommended handling and installation procedures.

When cutting, sawing, sanding, machining or otherwise altering wood and wood composite products, that may cause wood dust to be generated; use proper PPE (i.e., a dust mask).

Ceramic Tile

Example:

Cement-based mortars and grouts with polymer additives, mastic adhesives and reactive resin adhesives meet emissions requirements of California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 20107 and/or VOC content requirements in California South Coast Air Quality Management District Rule



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#11688. Cement-based mortars and grouts without polymers (unmodified mortars and grouts) are not expected to have VOC content or emissions.

Wood flooring

Example:

Appropriate personal protective equipment (PPE) guidance shall be followed regarding the need for protection against saw dust when cutting, working, or manipulating flooring planks or panels.

Proper PPE should be worn when installing, sanding, and/or finishing wood products including ear, eye and respiratory protection to avoid excess exposure to wood dust. Other suggested protection includes knee pads and rubber gloves. Finishes and adhesives, if applicable should meet low VOC requirements.

5.3.4 Waste

Recommended collection and separation of waste accumulated at the construction site shall be documented including any take back system in place for post installation floor covering waste or packaging.

Carpet

Example:

Post installation carpet waste may be recycled into new carpet or other new products. Other post installation carpet waste may be thermally recycled in a waste incineration plant or thermally and materially recycled in the cement industry.

Resilient floor coverings

Example:

Post-installation resilient floor coverings waste may be recycled as floor covering through manufacturers' facilities. Post installation wastes are collected and forwarded back to factories through the manufacturers.

Laminate floor coverings

Example:

Laminate is considered nonhazardous waste and should be disposed of in accordance with local requirements.



Ceramic Tile

Example:

Post installation tile waste may be recycled as floor covering through some manufacturer's facilities or may be considered for other beneficial reuse projects. In lieu of demolition or disposal, tile may serve as a flooring substrate for future tile installations (e.g., tile over tile) or other types of floor covering installations. Alternatively, a tiled floor may be cleaned, and salvaged or reused as a non-structural building element in a major building renovation.

Wood flooring

Example:

Wood flooring is considered nonhazardous waste and should be disposed of in accordance with local requirements.

5.3.5 Packaging

Kind and material of packaging shall be documented.

Example:

Material	Example
paper	wrapping, labels, cores
cardboard	boxes, cores
wood	pallets
plastics	foils, etc.



5.4 Use stage

5.4.1 Use of the floor covering

Statements on the use stage of a floor covering should contribute to a modeling of the use of the floor covering throughout its life span and over the duration of common periods of use.

5.4.2 Cleaning and maintenance

Details on how to clean and maintain the floor covering based on the manufacturer's recommendations shall be documented. See Table B in 6.10.

5.5 End of life stage

5.5.1 Recycling, reuse, or repurpose

Provide guidance relative to opportunity to recycle, reuse, or repurpose the flooring product. If available, statements on the transport (e.g., estimated vehicle, distance to the recycling/reuse site) shall be provided.

Examples:

- Wood plank from one building to another
- Flooring is ground and used as soil stabilizer
- Wood plank is used in furniture

5.5.2 Disposal

Disposal methods for the floor covering should be documented. If available, statements on the transport (e.g., estimated vehicle, distance to the recycling/reuse site) shall be provided.



6 LIFE CYCLE ASSESSMENT (LCA)

A life cycle assessment (LCA) shall be conducted in accordance with ISO 14040 and 14044. The LCA shall be characterized using the information listed in *Life cycle impact assessment*, section 6.10. If assumptions are necessary for the LCA, they shall be clearly documented in the LCA Report.

6.1 General

The manufacturing life cycle stage shall be included in the LCA. If one or more of the life cycle stages described in *System Boundaries* (section 6.7) are not included, justification shall be provided (e.g., if different use or disposal scenarios are possible). Double counting shall be avoided.

6.2 Description of the functional unit

A functional unit shall be defined as 1 m² of floor covering for a specified time period (see *Impact declaration and use stage normalization*, section 6.8).

Examples:

- For 1 m² of floor covering for specified applications and use areas according to ASTM6 F1303 and reference service life. If only the manufacturing stage is included, a declared unit shall be defined.
- For 1 m² of floor covering with specified construction and composition parameters.

6.3 Cut-off criteria

Criteria for the inclusion of inputs and outputs (cut-off rules) in the LCA, and additional information shall support an efficient calculation procedure. They shall not be applied in order to conceal data.

Mass and energy flows, and environmental impacts that consist of less than 1% may be omitted from the inventory analysis. Cumulative omitted mass or energy flows or environmental impacts shall not exceed 5 %. This does not apply to background data. For additional information on cut-off rules, see *Material content*, section 4.



6.4 Allocation

According to ISO 14040, allocation is defined as “Partitioning the input or output flow of a unit process to the product system under study”. Allocation shall follow guidance of ISO 14044, clause 4.3.4.

Examples:

CO ₂ locked in wood	CO ₂ emitted through combustion or decompose wood	Balance
negative value: A	positive value: B	A+B

Multi-input: Multi-input allocation applies to systems in which processing of the inputs is the primary purpose of the process. Allocation is based on physical causal relationships (i.e., relationship between the pollutant emission from the process and modified input flows).

Closed-loop: Closed-loop allocation applies to closed-loop product systems. It also applies to open-loop product systems where no changes occur in the inherent properties of the recycled material, but the use of secondary material displaces the use of virgin (primary) materials; therefore, allocation is not required.

Open-loop: Open-loop allocation applies to open-loop product systems where the material is recycled into other product systems, and the inherent properties of the material are modified. Inputs of recycled materials or energy to a product system shall be included without adding data about environmental impact caused in “earlier” life cycles, but data about impacts caused by the collection, transport, and recycling process should be included. Outputs of materials subject to open-loop allocation shall be regarded as inputs to the “next” life cycle.

6.5 Background data

All life cycle inventory database(s) shall be referenced within the EPD. Examples of databases include, but are not limited to:

- European Reference Life Cycle Data System (ELCD);
- US Life Cycle Inventory (USLCI) database;



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- EcolInvent; and
- GaBi databases.

Example:

Data Sources		
Wood products	US Life Cycle Inventory Database	2009
Plastics	LCA of 9 Plastics Resins, Franklin Associates	February 2011
Nylon 6	ELCD/Plastics Europe	2006
Linseed oil	CML LCI dataset9	1994
Portland cement	Gabi extension database XIV: construction materials	2001
Melamine	EcolInvent data V2.2	2007

Data submitted to any database should be declared, specifically what data type and to which database. It is not necessary to report proprietary information.

6.6 Data quality and data quality assessment

All data shall be accurate, complete, and representative of the manufacturing process, current technology and current measurement capability. The source of the input data shall be transparent. The data shall be consistent with the following requirements:

1. The information obtained from the manufacturing process(es) shall be annual average values with the year values averaged and documented and shall not be more than 5 years of age.
2. When secondary data is used as outlined in section 6.7, it shall be less than 10 years old unless no significant changes have occurred in the manufacturing processes over periods greater than 10 years.



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If data older than 10 years and is from a secondary source, reason(s) shall be documented as to why newer data are not available.

3. Data should represent the technology(ies) and process(es) in current use.
4. Data quality assessment shall conform to ISO 14044, clause 4.2.3.6.
5. Data quality assessment shall address the following:
 - a) time-related coverage: age of data and the minimum length of time over which data should be collected;
 - b) geographical coverage: geographical area from which data for unit processes should be collected to satisfy the goal of the study;
 - c) technology coverage: specific technology or technology mix; and
 - d) data quality assessments examples include (but not limited to):
 - i. USLCI; and
 - ii. ILCD.
6. Table 8.2 of Criteria to Evaluate the Data Quality Indicators, WRI product standard
7. Representative data should be used in the upstream phases (extraction, processing and production). Information from databases may be regarded as representative data, if they fulfill the following requirements:
 - a) Representative of the geographical area, i.e., data from the same country, or from areas with the same energy supply mix;
 - b) Technological equivalence;
 - c) Boundaries towards nature; and
 - d) Boundaries towards technical systems shall be of best equivalence.

If representative data are not available, use of a specific proxy is allowed (subject to the requirements of Section 6.7). The user shall document and justify the decision to use the specified proxy.



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Example:

Process	Type of data	Period	Country of data collection	Data source	Completeness	Accuracy
Tufting	input-output analysis	2006	Germany	Vertical integrated large scale plant	ok	good
Paper impregnation	input-output analysis	2005	Europe	Small and medium sized enterprises (SME)	ok	good
Dyeing	input-output analysis	2007	Belgium	Laboratory	ok	very good

6.7 System boundaries

The life cycle for floor coverings shall be subdivided into the stages as outlined in section 5: sourcing/extraction; manufacturing; delivery and installation; use; and end of life. All these stages in section 5 shall be reported in the LCA and the EPD.

Primary Data shall be used for processes under the operational control of the reporting organization. Operational control is defined as any facility that the reporting organization has control over or an operation if it has the full authority to introduce and implement its operating policies at the operation. Primary data shall also be used for all other processes when available. When primary data are not available, secondary data may be used for processes that occur in facilities outside of the operational control of the reporting organization.

6.8 Impact declaration and use stage normalization

The estimated service life of a floor covering and references thereof depend on the type of floor covering, its application, the user, and required maintenance of the product. For this purpose, LCA impacts shall be reported separately for 1 m² of floor covering (sourcing/extraction, manufacturing, delivery and installation, and end-of-life), the average 1-year use stage impacts, and the final results for the expected life of the building (60 years).



6.9 Results of the assessment

The LCA results shall be documented separately for the stages using the boundaries defined in section 5:

1. Sourcing/extraction (raw material acquisition) stage for growth and extraction of raw materials to include transportation to the production site
2. Manufacturing stage to include transportation within this gate and to delivery or installation
3. Delivery and installation stage which captures transportation for delivery and fitting
4. Use stage including cleaning, maintenance, and transportation.
5. End of life stage covering reuse, disposal, and transportation

6.10 Life cycle impact assessment

The following parameters of the life cycle impact assessment, based on CML (current version) and its associated reporting units shall be declared in the EPD per functional unit per RSL. The impact categories shall also be divided up per functional unit into quantity of each impact category for each life cycle stage. The methodology shall be the sum of all impacts in a category (e.g., GWP) within each life cycle stage and shall be reported.

1. Abiotic resource depletion potential - Elements

2. Abiotic resource depletion potential - Fossil

3. Global warming potential (GWP 100 years); Biomass CO₂ emissions shall be reported separately.

4. Acidification potential (AP)

5. Photochemical ozone creation potential (POCP, or "Smog")

6. Eutrophication potential (EP)

7. Ozone depletion potential (ODP) – Steady State / Infinite

8. Non-renewable material resources such as abiotic resource depletion potential (ADP), not including primary energy



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8. Primary energy demand of non-renewable resources (MJ).

9. Primary energy demand of renewable resources (MJ).

In addition to (but not in place of) the CML impacts, corresponding US EPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (current version) impact units may be declared with their associated reporting units.

The LCIA impacts shall be declared in the following tables.

- **Table A:** The impacts for 1 m² of floor covering shall be given for each of the following life cycle stages: sourcing/extraction, manufacturing, delivery and installation, and end-of-life.
- **Table B:** The impacts for the use stage for 1 m² of floor covering shall be given for an average one year use.
- **Table C:** The total impacts of all life cycle stages based on the estimated replacement schedule for 1 m² of floor covering over a 60-year reference service life (RSL) of a building.
- The purpose of Table A is to disclose the total impacts associated with the activities necessary to bring the product to market, and including end-of-life impacts, regardless of the amount of time that the product is used by the customer. Results for this table shall be calculated based on the Sourcing/Extraction Stage, the Manufacturing Stage, Delivery and Installation Stage and the End-of-Life Stage. Use and Maintenance activities shall not be included in this table (these shall be disclosed in Table B).
 - i. Table A Calculation Method = Sourcing / Extraction Stage Impacts + Manufacturing Stage Impacts + Delivery and Installation Stage Impacts + End-of-Life Stage Impacts
 - ii. Note: These impacts shall not be normalized to the user defined RSL of product.
- The purpose of Table B is to disclose the average 1-year impacts associated with use and maintenance of the product. Since some products require maintenance activities that occur less frequent than one year, total of all maintenance activities over the entire RSL of the product shall be considered. The resulting total impact value of all maintenance activities over the RSL of the product shall then be divided by the RSL of



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the product. This calculation results in the average 1-year use impacts associated with the product. These average 1-year use impacts shall be reported in Table B.

- i. Table B Calculation Method = $[(\text{total of all maintenance activity impacts over user defined RSL of product}) / \text{user defined RSL of product}]$
 - ii. A list of use and maintenance activities shall accompany Table B as stated in 5.4.2.
 - iii. The list of use and maintenance activities shall clearly declare the user defined RSL of product
- The purpose of Table C is to disclose the total impacts associated with all stages of the product, including use stage, over the entire life of a building. The building RSL is defined as 60 years. Since most products are replaced over a 60-year time frame, Table C considers a product's replacement schedule based on both the RSL of the product and the RSL of the building. For instance, if a product has a RSL of 10 years, then Table C considers that the product is installed in the building 6 times (i.e., 60 year RSL of building divided by 10 year RSL of product equals 6 installations).
 - i. Table C shall clearly state the product's RSL. This value shall be the same as the RSL used in Table B.
 - ii. Table C calculation Method = $[\text{Table A total Results} \times (60 / \text{RSL of Product})] + (\text{Table B results} \times 60)$
 - For end-users that will own the product for a different length of time than the user defined RSL of product, the impacts should be calculated using the following:
End-user specific impacts = $(\text{Table A total Results}) + (\text{Table B results} \times \text{number of years})$
Building service life impacts = $[\text{Table A total Results} \times (60 / \text{end-user defined RSL of Product})] + (\text{Table B results} \times 60)$



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Table A. Life cycle stage impacts
Cradle to Install and End of life for 1 m² flooring

Impact Category	Life Cycle Stages				
	Sourcing and Extraction	Manufacturing	Delivery and Installation	End of life	Total
Abiotic resource depletion potential - Elements					
Abiotic resource depletion potential - Fossil					
Acidification potential					
Eutrophication potential					
Global warming potential					
Ozone depletion potential					
Photochemical oxidant formation potential					
Primary energy – non renewable					
Primary energy – renewable					



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Table B. Average 1 year use stage impacts for 1 m² flooring

Impact Category	Average 1 year Use and Maintenance Impacts
Abiotic resource depletion potential - Elements	
Abiotic resource depletion potential - Fossil	
Acidification potential	
Eutrophication potential	
Global warming potential	
Ozone depletion potential	
Photochemical oxidant formation potential	
Primary energy – non renewable	
Primary energy – renewable	



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List of Use and Maintenance Activities to accompany Table B

Maintenance Activity	Frequency over user defined RSL of product
Activity A	X times over user defined RSL of product
Activity B	Y times over user defined RSL of product
Activity C	Z times over user defined RSL of product
Activity D	ZZ times over user defined RSL of product



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Table C Life Cycle Stage Impacts

Cradle to grave impacts over the 60 year building service life for 1 m² flooring

Impact Category	Life Cycle Stages					
	User Defined Reference Service Life** of product = (insert user defined RSL of product here)					
	Number of Installations over 60 years = (insert # of replacements here)					
	Sourcing and Extraction	Manufacturing	Installation delivery	Use	End of life	Total
Abiotic resource depletion potential - Elements						
Abiotic resource depletion potential - Fossil						
Acidification potential						
Eutrophication potential						
Global warming potential						
Ozone depletion potential						
Photochemical oxidant formation potential						
Primary energy – non renewable						
Primary energy – renewable						

** RSL is the reference service life defined in *Definitions*, section 9.



7 ADDITIONAL ENVIRONMENTAL INFORMATION

EPDs developed using this PCR should include, where relevant, additional information 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 14025, clause 7.2.2. Identification of the significant environmental aspects should conform to ISO 14025, clause 7.2.3 and 7.2.4. These may include information on waste minimization structural damage and repairs or means utilized to protect health, safety, and the environment during production such as:

- Environmental management systems (e.g., ISO 14001)
- Worker safety management system
- Use of certain production equipment (e.g., additional filter, etc.)



8 REFERENCES

All referenced documents contain provisions that, through reference, constitute provisions of this PCR. All documents are subject to revision, and parties are encouraged to investigate the possibility of applying the recent editions of the documents indicated below. The most recent published edition of the document shall be used for undated references.

AATCC² Test Method 134-2011 Electrostatic Propensity of Carpets (Normative value ≥ 3.5 KV)

AATCC² Test Method 16-2004 Colorfastness to Light (minimum grade 4 at 40 AFU)

ANSI³ A137.1 American National Standard Specifications for Ceramic Tile

ANSI³ A137.2 American National Standard Specifications Glass Tile

ANSI³/A138.1 Green Squared SM

ANSI / HPVA⁴ EF American National Standard for Engineered Wood Flooring

ANSI / HPVA⁴ HP American National Standard for Hardwood and Decorative Plywood

ANSI - NALFA⁵ LF 01 Laminate Flooring Specification and Test Methods

² American Association of Textile Chemists and Colorists, Research Triangle Park, N.C., USA <www.aattcc.org>

³ American National Standards Institute (ANSI), 1899 L Street, NW, 11th Floor, Washington, DC 20036 <www.ansi.org>

⁴ Hardwood Plywood and Veneer Association (HPVA), 1825 Michael Faraday Drive Reston, Virginia 20190 <www.hpva.org>

⁵ North American Laminate Flooring Association (NALFA), 1747 Pennsylvania Avenue, NW, Suite 1000 Washington, DC 20006 <www.nalfa.com>



ASTM⁶ E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

ASTM6 D5252 Standard Practice for the Operation of the Hexapod Tumble Drum Tester

ASTM6 D7330 Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales

ASTM6 E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

ASTM6 F1066 Specification for Vinyl Composition Tile

ASTM6 F1303 Specification for Sheet Vinyl Floor Covering with Backing

ASTM6 F1344 Specification for Rubber Floor Tile

ASTM6 F1700 Specification for Solid Vinyl Floor Tile

ASTM6 F1859 Specification for Rubber Sheet Floor Covering Without Backing

ASTM6 F1860 Specification for Rubber Sheet Floor Covering With Backing

ASTM6 F1913 Specification for Vinyl Sheet Floor Covering Without Backing

ASTM6 F2034 Specification for Sheet Linoleum Floor Covering

ASTM6 F2195 Specification for Linoleum Floor Tile

California Department of Public Health Standard Method for Testing and Evaluation of VOC emissions from indoor sources using environmental chambers, version 1.1, February 2010 (also known as CAL 01350)⁷

California South Coast Air Quality Management District⁸

CML Life cycle inventory⁹

EcoInvent¹⁰

European Commission – Joint Research Center, European Life Cycle Database¹¹

GaBi 5. Software-System and Databases for Life Cycle Engineering Copyright, TM. Stuttgart, Echterdingen¹²

Guinée, J.B. (Hrsg.) (2002). *Handbook on Life Cycle Assessment-Operational-Guide to the ISO standards*. Boston Kluwer Academic Publishers

⁶ ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA <www.astm.org>

⁷ CDPH/EHLB/Standard Method v1.1-2010, California Department of Public Health, Division of Environmental and Occupational Disease Control, Environmental Health Laboratory Branch, Indoor Air Quality Section, Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.1, 2010, <<http://www.cal-iaq.org/vocs/standard-method>>

⁸ South Coast Air Quality Management District, Rule 1168, ADHESIVE AND SEALANT APPLICATIONS <<http://www.aqmd.gov>>

⁹ University of Leiden Institute of Environmental Sciences (CML), *Handbook on LCA* <<http://cml.leiden.edu>>

¹⁰ <<http://www.ecoinvent.org/>>

¹¹ European Commission – Joint Research Centre, European Life Cycle Database <<http://lca.jrc.ec.europa.eu>>

¹² GaBi Software <<http://www.gabi-software.com>>



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Institut Bauen und Umwelt e.V, Environmental Product Declarations Harmonised Rules for Textiles, Laminates, and Resilient Floor Coverings¹³

ISO 9001: Quality management systems - Requirements

ISO 14001: Environmental management systems - Requirements with guidance for use

ISO 14024: Environmental labels and declarations - Type I environmental labeling - Principles and procedures

ISO 14025: Environmental labels and declarations – Type III environmental declarations – Principles and procedure

ISO 14040: Environmental management - Life cycle assessment – Principles and framework

ISO 14044: Environmental management - Life cycle assessment – Requirements and guidelines

ISO 15686-1: Building and constructed assets – Service life planning Part 1 General Principles¹⁴

ISO 21930 Sustainability in Building Construction – Environmental declaration of building products

ISO¹⁴ 2551/ASTM6 D7570 Dimensional Stability (Modular Tiles Only)

NALFA5 UL 01 Underlayment Pad Specification and Test Methods

NSF/ANSI 140 Sustainability assessment for carpet¹⁵

NSF/ANSI 332 Sustainability assessment for resilient flooring

NWFA/NOFMA¹⁶ International Standards for Factory Finished Solid Wood Flooring

NWFA/NOFMA Official Flooring Grading Rules for Unfinished Solid Wood Flooring

OSHA Hazard Communication Standard¹⁷

Photochemical ozone creation potentials for a large number of reactive hydrocarbons under European conditions¹⁸

Stockholm Convention, Persistent Organic Pollutants¹⁹

US EPA Clean Air Act 1990²⁰

US EPA Comprehensive Environmental Response, Compensation, and Liability Act 1980²¹

¹³ <www.bau-umwelt.com>

¹⁴ International Organization for Standardization (ISO), Case postale 56, CH-1211 Geneve 20, Switzerland <www.iso.org>

¹⁵ NSF International <<http://www.nsf.org/>>

¹⁶ National Wood Flooring Association, 111 Chesterfield Industrial Boulevard, Chesterfield, Missouri 63005 <www.nwfa.org>

¹⁷ 29 CFR Part 1910, Occupational Safety and Health Standards, Toxic and Hazardous Substances, 1910.1200, Hazard Communication. <www.gpo.gov>

¹⁸ R.G. Derwent, M.E. Jenkin, S.M. Saunders Received 21 January 1995. Accepted 25 July 1995. Available online 16 December 1999.

¹⁹ Secretariat of the Stockholm Convention, 11-13 Chemin des Anémones - 1219 Châtelaine, Switzerland. <<http://www.chm.pops.int>>

²⁰ US EPA Clean Air Act 1990 <<http://epa.gov/air/caa>>

²¹ US EPA Comprehensive Environmental Response, Compensation, and Liability Act 1980 <<http://www.epa.gov/superfund/policy/cercla.htm>>



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US EPA criteria air pollutants²²

US EPA Emergency Planning and Community Right-to-Know Act 1986²³

US EPA Resource Conservation and Recovery Act 1986²⁴

US EPA Tool for the reduction and assessment of chemical and other environmental impacts (TRACI)²⁵

US Life Cycle Inventory (USLCI) database²⁶

World Resources Institute (WRI), *Draft Product Life Cycle Accounting and Reporting Standard*.²⁷

²² US EPA criteria air pollutants, <<http://www.epa.gov/airquality>>

²³ US EPA Emergency Planning and Community Right-to-Know Act 1986 <<http://www.epa.gov/oem/content/epcra>>

²⁴ US EPA Resource Conservation and Recovery Act 1986 <<http://www.epa.gov/lawsregs/rcra.html>>

²⁵ US EPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI) <<http://www.epa.gov/nrmrl/std/sab/traci/>>

²⁶ National Renewable Energy Laboratory, US Life Cycle Inventory Database <<http://www.nrel.gov/lci>>

²⁷ WRI Product Life Cycle Accounting and Reporting Standard (second draft - English) October 2011 *Copyright © World*



9 DEFINITIONS

background data: information on the energy and materials delivered to the foreground system as aggregated data sets in which individual plants and operations are not identified.

cradle: extraction and processing of abiotic (nonliving, e.g., zinc ore, crude oil, wind energy) and biotic (living, e.g., agricultural, forestry, animals) raw materials or resources.

cradle to gate: assessment of a partial product life cycle from extraction of resources (“cradle”) to the gate; downstream processes are not included.

cradle to grave: assessment of the full product life cycle from extraction of resources (“cradle”) through use phase and to disposal phase (“grave”); upstream and downstream processes are included.

impact category: class representing environmental issues of concern to which life cycle inventory analysis results may be assigned.

input: material or energy that enters a unit process.

life-cycle assessment (LCA): compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle (ISO 14044).

life-cycle impact assessment (LCIA): phase of the LCA whose goal is to evaluate the significance of potential environmental impacts using life-cycle inventory (LCI) results of a product system (ISO 14040).

life-cycle inventory (LCI): quantification of the environmental inputs and outputs associated with a product, or each individual unit process.

main materials: all materials present in the product above 1% by weight for non-hazardous components and 0.1% by weight for hazardous components.

primary data: data measured (e.g., stack test emissions) or collected (e.g., waste generation) by the owner of the EPD, or data gathered directly from other entities in the value chain.



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reference service life (RSL): service life of a building product that is documented or determined using a particular set, that is, a reference set, of in-use conditions and can form the basis of estimating the service life under alternative sets of in-use conditions (ISO 15686-1).