

**PRODUCT CATEGORY RULES FOR PREPARING
AN ENVIRONMENTAL PRODUCT DECLARATION
FOR SINGLE PLY ROOFING MEMBRANES**



PCR

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VALIDITY PERIOD
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Single Ply Roofing Membranes

The product group includes thermoplastic or thermoset membrane of compounded synthetic materials manufactured in a factory for use in roofing and waterproofing.

REFERENCE PCRS:

Institute Bauen and Umwelt e.V., PCR for “Plastic and elastomer roofing and sealing sheet system”, July 2012



PCR for Single Ply Roofing Membranes

Scope of Validity of this PCR

The product group “single ply roofing membranes” includes thermoplastic polyolefin (TPO), ketone ethylene ester (KEE), poly(vinyl chloride) (PVC), and ethylene propylene diene monomer (EPDM).

Program Operator

ASTM International

Interested Parties

This PCR has been prepared by members of the Single Ply Roofing Industry (SPRI, Inc.) association in collaboration with ASTM International staff.

Review Panel

The PCR peer review report is available upon request at: cert@astm.org

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 and other interested parties for preparing EPDs for single ply roofing membranes.

The referenced PCR are the German Institute for Construction and Environment (IBU) PCR for plastic and elastomer roofing and sealing sheet systems. The following key aspects make the document inappropriate for direct adaptation to the North American situation and for direct use as PCR for North American single ply roofing membranes.

- The IBU PCR document is a template to be used in generating EPDs for the relevant products under IBU's program;
- The calculation rules for Life-Cycle Assessment (LCA) and requirements for the Background Report are specified in a separate IBU document referred to as Part A of the Product Category Rules, which is not applicable to North America.
- The IBU PCR requirements are based primarily on the EN 15804 standard for a European core PCR, whereas the North American PCR is based primarily on the ISO 14025 and ISO 21930 standards referenced below.
- Technical data and standards listed or referred to in the IBU PCR are European and not directly applicable to North America.
- The impact measures listed reflect European characterization models and units of measure rather than those specified in the Tool for the Reduction and Assessment of Chemical and other Environmental Impacts (TRACI) system used in North America.

1.1 GOAL AND SCOPE

This PCR document specifies rules, requirements, and guidelines for developing EPDs for single ply roofing membranes and underlying requirements of related LCAs. These PCR are valid for, and provide requirements for, both Business-to-Business (BtoB) and Business-to-Consumer (BtoC) EPDs.

An EPD prepared under these PCR will present data that has been aggregated over some or all of the following phases of the life cycle depending on whether the EPD is BtoB or BtoC:

- raw materials acquisition,
- manufacturing,
- transportation,
- installation,
- use and maintenance, and
- disposal/reuse/recycling.

A reference service life (RSL) shall be stated in a BtoC EPD to take account of the maintenance and replacement impacts over an assumed building service life. A RSL may be stated for a BtoB EPD if a use phase scenario is included in the EPD. A RSL must be based on a verifiable performance history as per Section 7.2.

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

- ISO 21930: 2007 Building construction – Sustainability in building construction – Environmental declaration of building products.
- ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
- ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines.
- ISO 14040: 2006 Environmental management - Life cycle assessment - Principles and framework.
- ISO 15686: 2011 Buildings and constructed assets – Service life planning, Parts -1, -2, -7 and -8

As indicated in Section 12, References, the CEN EN15804 standard has been consulted with regard to selected requirements and presentation details that go beyond or expand on the above-noted ISO standards.

1.2 OWNERSHIP/RESPONSIBILITY/ACCOUNTABILITY OF EPD

The roofing membrane producer or a group of producers who develop an EPD following this PCR maintain sole ownership and have responsibility and liability for their EPD.

2.0 Period of Validity

This PCR document is effective for five years from the latest date of publication. If relevant changes in the product category occur (for example, LCA methodology), the document will be revised.

An EPD created under these PCR shall be valid for a 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.

Single ply roofing membranes | thermoplastic or thermoset membranes of compounded synthetic materials manufactured in a factory for use in roofing.

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, quantified by the same functional unit, and taking account of replacement based on the product RSL relative to an assumed building service life, can be used to assist purchasers and users in making informed comparisons between products. The basis of a comparison shall include the product application in accordance with ISO 21930

and clearly defined and justified scenarios for modules A4, A5, B1-B7 and C1-C4 (see Table 2).

EPDs based on cradle-to-gate information modules shall not be used for comparisons unless such comparisons are made in a building context using a functional unit, and comply with all of the requirements set out in ISO 14025, section 6.7.2. EPDs based on a declared unit shall not be used for comparisons.

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 system in place.

5.2 | DEFINITION OF PRODUCT CATEGORY

These PCR address the specific single ply membrane products produced for use in roofing and waterproofing from the materials shown in Table 1, which also shows the ASTM standards that provide detailed descriptions and specifications for each product.

TABLE 1: Single Ply Roofing Membrane Materials

Material	Description/Specification
Poly(vinyl chloride) (PVC)	ASTM D4434
Ethylene-propylene-diene terpolymer (EPDM)	ASTM D4637
Ketone ethylene ester (KEE)	ASTM D6754
Thermoplastic polyolefin (TPO)	ASTM D6878

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 will include:

- Product identification by brand name, material type, and simple visual representation, which may be by photograph or graphic illustration;
- Appropriate ASTM, ANSI, ICC-ES, or other product specifications, including pertinent physical properties and technical information (for example, fire resistance standards that are met);
- Details regarding reinforcement, thicknesses and colors;
- Flow diagram illustrating main unit processes by life-cycle stage according to the scope of the declaration; and
- Materials and substances to be declared.

Material contents of the finished building product, including packaging, shall be declared in terms of the main components. 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 except where such data involves regulated hazardous substances, which must always be disclosed.

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)

For single ply roofing membranes, the declared unit shall be 1 m² for a stated product thickness. A weighted average thickness of the product shall be stated when the EPD deals with a generic or representative product group with different thicknesses. The weights shall reflect the relative production volumes for the relevant materials.

The functional unit shall be 1000 m² of installed building product with stated performance requirements such as waterproofing and square meters of constructed area using the product, including seams, or other units as appropriate (see Section 6.2 and 6.3). Explanation of the selected functional unit shall be stated clearly, including the reference service life, installation methods and all ancillary materials such as ballasting, fasteners and adhesives.

The reference service life shall refer to the declared technical and functional quality of the product in the building. It shall be established in accordance with the ISO 15686-1, -2, -7, and -8 standards.

6.2 | SYSTEM BOUNDARIES

Table 2 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 BtoC.

TABLE 2 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 production 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.

The system boundaries for both cradle-to-gate and cradle-to-grave LCA will include the average transportation of major inputs to (and within) each life-cycle stage. The cradle-to-grave LCA also includes shipment of products to building site locations by common modes as well as average transportation to a landfill or other disposition at the end of the service life for each application.

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. The sources for purchased electricity will be based on published U.S. government sources for regional grids that are either self-sufficient or net exporters, if available. If the relevant grid is not in either category the grid fuel mix shall include the next largest NERC region. If such site-specific or regional data are not available, regional averaged grid mix values for major grids that are not connected (for example, East, West, and Texas) shall be used. The sources for electricity (calculation procedure) will be documented.

The following are factors to be taken into account for each life-cycle stage.

Modules A1-A3, the Production Stage:

- Extraction and processing of raw materials, including fuels used in product production;
- 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;
- Manufacturing of the product;
- Packaging with product ready for shipment;
- 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/reuse/energy recovery of pre-consumer wastes and by-products from production.

Modules A4-A5, the Construction Stage:

- Average or specific transportation of product from manufacturing site to building site, including empty backhauls;
- Installation on the building site including all ancillary materials taking account of whether the roofing product is fully adhered or mechanically attached; and
- Waste produced on the building site.

Modules B1-B7, the Use Stage: They are treated as a typical scenario, which shall be described in detail:

- Reference service life of the building shall be assumed to be 60 years and the maintenance regime and number of replacements of the building product shall be declared accordingly (note that an assumed 60-year reference service life for the building is an accepted time period for the purpose of comparative analysis);
- Include any maintenance/replacement of the building product required to attain the reference service life of the building; and
- Maintenance/replacements are to be modeled according to manufacturers' guidelines regarding the reference service life of the product, which must be based on a verifiable product performance history.
- When the product reference service life is less than the assumed building service life (60 years), the aggregated product stage, construction process stage and end of life stage impacts (modules A1 – A5 and C1 – C4) associated with the number of changeovers necessary to equal the service life of the building shall be included.
- The combined impacts of the original product and any replacements shall be determined by dividing the building service life (60 years) by the service life of the product, and the impacts multiplied by the result. For example, if the expected service life of a component is 25 years, the impacts would be multiplied by 2.40, thus normalizing the changeovers to be equivalent to the assumed 60-year building service life.
- Water impacts should be considered if relevant.

Modules C1-C4, the End-of-Life Stage: They are treated as a typical scenario, which shall be described in detail:

- Dismantling/demolition;
- Average or specific transport from building site to recycling/reuse/landfill, including empty backhauls; and
- Disposal.

All assumptions from LCA shall be described in detail.

LCA results for production, installation, use, and end-of-life stages shall be declared separately in the EPD.

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 should be noted.

Summary of EPD types and related requirements

Table 3 summarizes the unit and reference service life requirements by life cycle stages and related modules.

TABLE 3: Summary of the unit and reference service life requirements by life cycle stages and related modules

EPD-Type	Life Cycle Stages and modules	Declared unite (DU) or functional Unit (FU)	Reference Service Life (RSL)	Primary audience
Cradle to shipping gate	Product stage; modules A1 to A3	DU	Not specified	BtoB
Cradle to building	Product and construction stages; modules A1 to A5	DU	Not specified	BtoB
Cradle to building-with EOL stage	Product, construction and EOL stages; modules A1 to A5 and C1 to C4	DU	Not specified	BtoB
Cradle to building-with use stage	Product, construction and use stages; modules A1 to A5 and B1 to B5	FU	RSL is required	BtoB
Cradle to grave	Product, construction, use and EOL stages; modules A1 to C4	FU	RSL is required	BtoB and/or BtoC

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

- Production, manufacture, and construction of manufacturing capital goods and infrastructure;
- Production and manufacture of membrane 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 that may be 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 should be annual values, preferably from the previous twelve-month period. Average background 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 use of specific or generic background data shall be documented. As a rule, the following distribution will be applied:

- Extraction or production or both of raw materials (specific or average background or both);
- Manufacturing of the product (specific);
- Data sources and any calculation procedures for the fuel mix for electricity generation shall be documented; and
- Hazardous waste shall be specified according to regulations such as U.S. EPA Hazardous Waste Regulations or the Canadian Federal Hazardous Waste Regulations, or both as appropriate.

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 is not available, sources for similar technology adjusted for national boundary conditions (for example, energy mix) may be used.

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.

The product content will be described in the declaration. Information protected under law as confidential does not have to be disclosed. In such cases, a notation that the information is confidential will be made along with a description of the function of the component.

In the case of BtoC EPDs, the amount of material used as input to enable the product to meet the functional unit requirements shall include related accessories and other materials (that is, ancillary materials) unless the reason for the omission of these is explained.

7.2 | CUTOFF RULES

The cutoff criteria for flows to be considered within each system boundary are as follows:

Mass | If a flow is less than 1 % of the cumulative mass of the model flows, it may be excluded, provided its environmental relevance is minor, based on a sensitivity analysis.

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, based on a sensitivity analysis.

Environmental relevance | If a flow meets the above two criteria, but is determined to contribute 2 % or more to the selected impact categories of the products underlying the EPD, based on a sensitivity analysis, it is included within the system boundary.

At least 95 % of the 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.

A list of 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.

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 (MJ) for electric energy
- kW (MW) for power

TABLE 4: Conversion Factors to be Used if Reporting in IP Units (Imperial)

Convert from	To	Multiply by
Square meter (m ²)	Square foot (ft ²)	1.076391E+01
Kilogram (kg)	Pound (lb.)	2.204622E+00
Mega joule (MJ)	British Thermal Unit (BTU)	9.478170E+02
Degree Celsius (°C)	Degree Fahrenheit (°F)	(°C x 9/5) + 32
Cubic meter (m ³)	Cubic foot (ft ³)	3.531466E+01
Meter (m)	Foot (ft.)	3.281E+00
m ² K/W	ft ² Fhr/Btu	5.6783E+00

Source: NIST: <http://physics.nist.gov/Pubs/SP811/appenB9.html>

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 shall follow the requirements and guidance of ISO 14044:2006, Clause 4.3.4.

Non-renewable energy flows used as feedstock to produce materials (for example, plastic) should be counted and reported under the non-renewable fossil energy (MJ).

Allocation related to transport should be based on the mass of transported product.

When the 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. The 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 building product unless the energy is exported.

Recycling processes should 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 should be initiated. These different allocation approaches and data sets shall be documented and declared.

8.0 Impact Categories and Characterization Factors

Environmental impact category indicators shall be taken from Table 5 for declaring environmental aspects in accordance with ISO 21930:2007, Section 8.2 and ISO 14044:2006.

TABLE 5: 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
Nonrenewable nuclear	MJ
Renewable (solar, wind, hydroelectric, and geothermal)	MJ
Renewable (biomass)	MJ
Material resources consumption	
Nonrenewable materials	kg
Renewable materials	kg
Fresh water	l
Waste generated	kg

Notes for Table 5:

- The impact categories of Life Cycle Impact Assessment (LCIA) shall be calculated using characterization factors specified in version 2.1 of US EPA TRACI (Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts). <http://www.epa.gov/nrmrl/std/sab/traci/index.html>

- Life cycle inventory parameters to be reported shall conform to ISO 21930:2007, section 8.2 and ISO 14044:2006.
- Waste should be declared as either hazardous or non-hazardous.

9.0 Additional Environmental Information

A Type III environmental declaration shall 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, 7.2.2. 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;
- The organization's adherence to any environmental management system, with a statement on where an interested party may find details of the system;
- Any other environmental certification program applied to the product and a statement on where an interested party may find details of the certification program;
- Other environmental activities of the organization, such as participation in recycling or recovery programs, 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 14021:1999, 5.4 and 5.7); and
- Potential for incidents that can have impact(s) on the environment such as energy-saving improvements (see ISO 21930, 8.2.4 (k)).

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

10.0 EPD Supporting Data

Information shall be made available to the verifier to demonstrate that the requirements of ISO 21930 have been met. This includes documentation on:

- 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 building products can fulfill the desired function(s) and performance;
- Documentation that demonstrates that the chosen processes and scenarios in the flow chart satisfy the requirements set in ISO 21930;
- Documentation that substantiates the chosen life cycle of the building products;
- Documentation and substantiation of the percentages or figures used for the calculations in the end-of-life stage;
- 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, but mandatory for BtoC 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 program operator >	
Independent verification of the declaration and data, according to ISO 14025:	
<input type="checkbox"/> internal	<input type="checkbox"/> external
(Where appropriate ^a) Third party verifier: <name of third party verifier>	

^a Optional for business to business communication, mandatory for business to consumer communication.

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 building product's use and the functional or declared unit of the product to which the data relates;
- Description of the application (installation) of the building product where relevant;
- Detailed list of the substances, by weight, that make up the building product;
- Data from LCA or LCI or information modules;
- Additional environmental information;
- Statement of whether the EPD is cradle to gate or cradle to grave;
- 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, with the standard deviation of the product's performance with respect to the average stated;
- Information on where explanatory material may be obtained;
- Diagram of the life-cycle stages included in the LCA subdivided into production, construction, use and end-of-life stages, and system boundaries;
- When the EPD includes the use stage, a description of the nature of the processes and ancillary materials that are required for installing the building product in the building or other type of construction works and their replacement and maintenance according to the cutoff criteria;

- 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;
- 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 (third-party verification is mandatory for BtoC EPDs);
- Name, address, phone number, fax number, and e-mail of the third-party verifier and logo of the verification body, if applicable; and
- ISO 14025:2006 9.2.2 states that, "Type III environmental product declarations intended for business-to-consumer communication shall be available to the consumer at the point of purchase."

12.0 References

ASTM D4434, Standard Specification for Poly(Vinyl Chloride) Sheet Roofing¹

ASTM D4637, Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane¹

ASTM D6754, Standard Specification for Ketone Ethylene Ester Based Sheet Roofing¹

ASTM D6878, Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing¹

Athena Sustainable Materials Institute, *A Cradle-to-Gate Life Cycle Inventory of PVC Roofing Membrane Product*, Prepared for Chemical Fabrics and Film Association, Inc., September, 2011²

EN 15804, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, January 2012³

ISO 21930: 2007 Building construction – Sustainability in building construction – Environmental declaration of building products.⁴

ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.⁴

ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines.⁴

ISO 14040: 2006 Environmental management - Life cycle assessment - Principles and framework.⁴

ISO 15686: 2011 Buildings and constructed assets – Service life planning, Parts -1, -2, -7 and -8⁴

The GreenTeam Inc., *EPDM Roofing Association Life Cycle Inventory & Assessment*, August 2009⁵

1 ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
www.astm.org.

2 Athena Sustainable Materials Institute, 119 Ross Avenue, Suite 100, Ottawa, Ontario K1Y0N6
www.athenasmi.org.

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

4 International Organization for Standardization (ISO), 1 ch. de la Voie-Creuse, Case postale 56,
CH-1211 Geneva, Switzerland. www.iso.org.

5 The GreenTeam Inc., 136 East 18th Street, Tulsa, OK 74119 www.thegreenteaminc.com