

# PRODUCT-CATEGORY RULES (PCR)

for preparing an Environmental Product  
Declaration (EPD) according to ISO 14025  
for

ROOF WATERPROOFING with  
bitumen flexible sheets (EN 13707)

Version 1.0

Final Document – 12 July 2007

## Summary

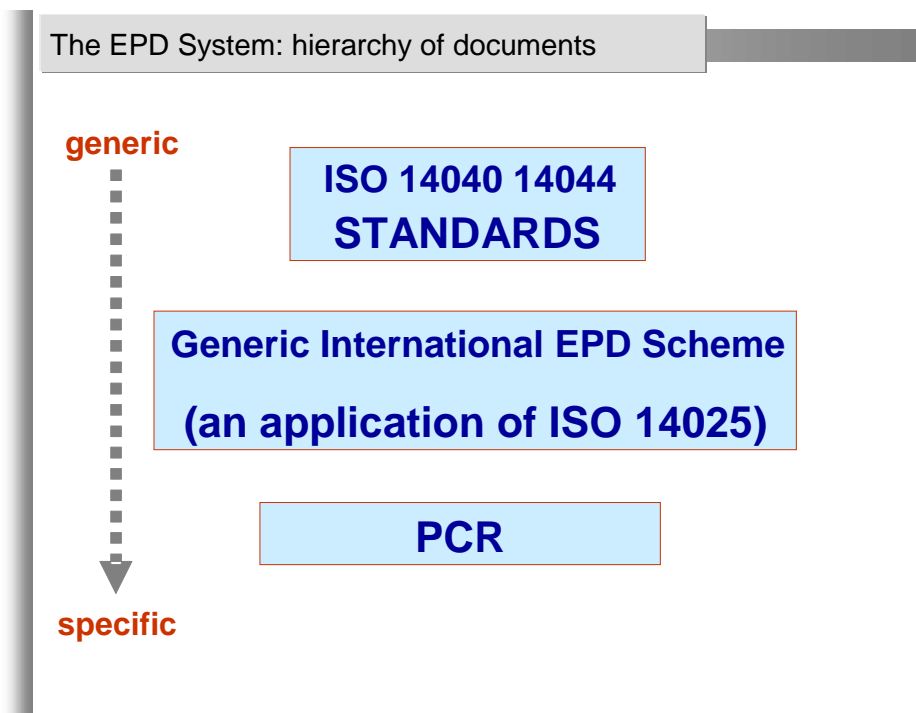
<b>1. Introduction and general information .....</b>	<b>3</b>
1.1 EPD standardisation.....	3
1.2 General PCR requirements.....	4
<b>2. Definition of the company/organisation and product .....</b>	<b>4</b>
2.1 Description of the company/organisation .....	5
<b>2.1.1 How to define in a strict way the rules to make a cluster declaration</b>	<b>5</b>
2.2 Description of the product.....	5
<b>3. Functional unit .....</b>	<b>5</b>
<b>4. System boundaries.....</b>	<b>6</b>
4.1 Production stage .....	6
4.2 Installation stage (waterproofing system) .....	7
4.3 Use phase .....	7
4.4 End of life.....	7
<b>5. Lifespan resistance (durability) .....</b>	<b>7</b>
<b>6. Cut off rules .....</b>	<b>8</b>
<b>7. Allocation rules .....</b>	<b>8</b>
7.1 General rules .....	8
7.2 Cogeneration .....	8
<b>8. Units .....</b>	<b>8</b>
<b>9. Data quality requirements.....</b>	<b>8</b>
<b>10. Parameters to be declared in the EPD .....</b>	<b>9</b>
<b>11. Other (additional) environmental information .....</b>	<b>10</b>
<b>12. References (to be included in the EPD) .....</b>	<b>10</b>
<b>13. Appendix .....</b>	<b>11</b>

## 1. Introduction and general information

This document has been prepared in compliance with ISO 14025 standard.

This PCR is also in compliance with the ISO DIS 21930, Building construction – Sustainability in building construction – Environmental declaration of building products and is prepared as input for the European harmonization activities within CEN TC 350 (see Point 1.1 for further details).

Scope of this document is to cover any relevant product/service/process during the life cycle of **roof waterproofing with bitumen flexible sheets**, as defined under point 2. This to provide LCA studies, besides the ISO 14040:2006 and 14044:2006 standards, of specific procedures and product category rules (Figure 1.1).



**Figure 1.1** – Hierarchy of documents for any EPD System according ISO 14025.

### 1.1 EPD standardisation

Today, the global market is increasingly demanding science-based, verified and comparable information about environmental performance of products and services, mainly originating from several market-based applications, such as information in the supply chain, within the context of environmental management systems and for green purchasing and procurement (i.e. GPP – Green Public Procurement).

Adopting the ISO 14020 classification, the EPD System is a Type III environmental claiming label: ISO 14025 is expressly devoted to this kind of environmental claims. Currently, a number of activities are undertaken in different countries to increase the awareness of EPD, to harmonise and standardise procedures for EPD, to implement and operate EPD programmes and to carry out projects related to EPD. Besides a number of established EPD programmes as well as emerging programmes around the world, there also exist "EPD-like" programmes mostly related to the building sector.

In this context, it is relevant to spend some few words about EPD standardisation and what is already possible to take into consideration for the goal of this PCR.

This overview is useful to grant the need to add specific requirements in this PCR document as well as to take into account the possibility for future updates of the LCA Model to include an eventual European standardised EPD scheme.

Within ISO, two main activities are going on focusing on EPDs:

- A generic standard (ISO 14025) by ISO TC 207 that has been already used as main reference for the International EPD Scheme driven by the Swedish Environmental Management Council first and then by Gednet members.
- A sector-specific standard for building products (ISO 21930) by ISO TC 59 used by main manufacturing associations and some national EPD schemes to complete the ISO 14025 standard indications.

It is then important to draw attention to the European Standardisation Body, CEN, that has recently initiated a work launching a Technical Committee (CEN/TC 350) following a mandate given by the European Union for standardisation in the field of integrated environmental performance of buildings. One part of this work covers the development of a European PCR for building products.

Finally, as yet anticipated, the role of GEDnet, the Global Type III Environmental Product Declarations Network, that has been founded 1999 and now holds representatives from more than 10 countries. The overall purpose of the network is to cooperate in the field of information exchange and harmonisation of PCRs and EPD programmes. Currently representatives from Japan, Canada, Germany, Norway, Denmark, Republic of South Korea, China, USA and Sweden are participating within GEDnet

## **1.2 General PCR requirements**

In summary, these PCR requirements are issued to give rules:

- to establish the minimum requirements for technical and functional identification of the group of products that ensures the waterproofing protection of flat roofs which this PCR document refers to;
- to define the criteria to be used in LCA studies performed on products within that group;
- to give information that is to be reported in the Environmental Product Declaration document.

EPD is intended to give information in the context of a product's application in a building system during all life cycle stages defined in this PCR. EPDs without considering all life cycle stages (e.g. the use stage) as defined in this document are not comparable. EPDs from different EPD Program Operators may not be comparable.

This PCR draft has been submitted by the Bitumen Waterproofing Association (BWA - UK) in co-operation with Life Cycle Engineering (Italy).

If delivered to the International EPD System ([www.environdec.com](http://www.environdec.com)), this PCR is valid for three (3) years.

## **2. Definition of the company/organisation and product**

This PCR defines the requirements on information, data and environmental parameters to be included in an Environmental Product Declaration (EPD) for products/systems intended for roof waterproofing used in normal service conditions and intended use.

A **waterproofing system** is an assembly of one or more layers of sheets in its applied and jointed form, to prevent durable the passage of water from one plane to another over a roof system.

## 2.1 Description of the company/organisation

The name of the company/organisation as well as the place(s) of production shall be indicated.

In case of an average EPD made by a cluster (Association of manufacturers – “cluster EPD”), all participating production locations have to be listed according to the rules that are indicated in point 2.1.1.

A brief description of the company/organisation may also be given here (for additional information such as awards or in place environmental management systems refer to point 11).

When a cluster EPD is used, it must be distributed in a complete way (not extracting single parts) and must be clearly indicated that it refers to an average sector situation, not to a single company.

### 2.1.1 How to define in a strict way the rules to make a cluster declaration

The sample size has to take into account the scale of the site involved: minimum 30% small sites (1 line per product location), minimum 30% mid sized (2-3 lines) and minimum 30% large sized (> 3 lines).

However, an annual review of data collection concerning the sample is recommended.

## 2.2 Description of the product

The description of the product shall enable the identification of the waterproofing product by means of the following parameters:

- commercial name and type description. In case of a “cluster EPD”, a statement that the EPD represents an average performance shall be included (see 2.1.1). In detail, if an average cluster product is examined, the specific protocol described in 2.1. must be adopted.
- Specifications according EN 13707 (with particular attention to substances officially classified as hazardous)
- a simple visual description of the waterproofing product for which the EPD is developed.

About the manufacturing activities, a process description shall be provided, including a detailed flow chart with a description of inputs and outputs.

All materials with more than 2% WT, including packaging and substances that are used both by the production process and by installation activities shall be stated listed in terms of main components.

## 3. Functional unit

This PCR is valid for all roof waterproofing systems with flexible sheets for roofing (according to EN 13707) installed on flat roofs

The functional unit (cradle to grave) provides the quantitative normalisation for comparing systems of equivalent function.

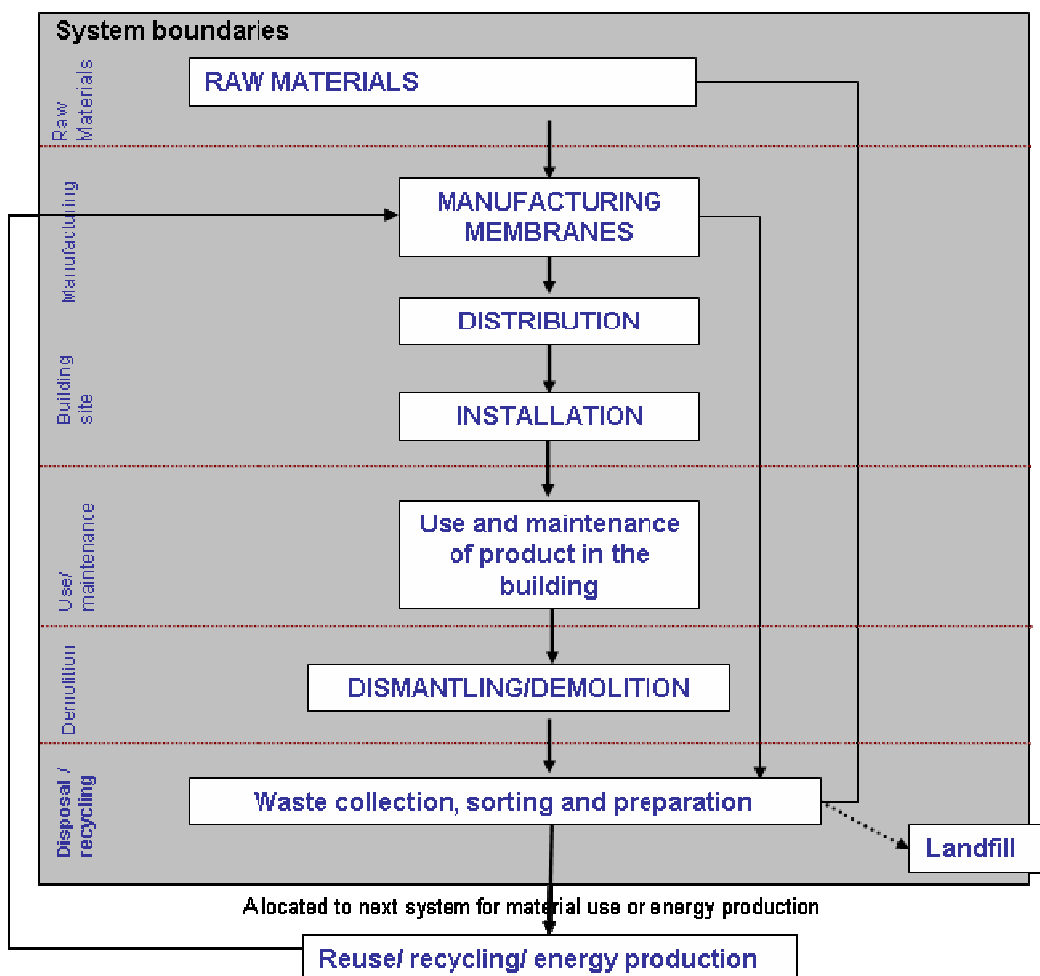
The functional unit (cradle to grave) is 1000 m<sup>2</sup> (40x25 m<sup>2</sup> roof) installed roof waterproofing with flexible sheets for roofing, with a durability and total expected life time defined in Chapter 5, including details expressed in terms of m<sup>2</sup> of installed roof waterproofing system per year service life time (according to the renewals are therefore to be included in the calculations).

## 4. System boundaries

The LCA study shall include any activity within the “cradle to grave” system. The EPD shall include:

- Reference service life – durability - used for the calculations (see Point 4.3 and Chapter 5).
- Packaging.
- Additional description of the waterproofing system according to 4.2.
- A roof lay-out shall be provided according to a typical 40x25 m<sup>2</sup> roof.
- Any maintenance activity, including replacement, during the roof reference service life (see Point 5).

The life cycle stages for installed roof waterproofing on flat roofs with flexible sheets for roofing are shown in Figure 4.1.



**Figure 4.1.** System boundaries.

The system boundaries encompass the following processes:

### 4.1 Production stage

This includes operations “from cradle to gate”.

- ⇒ Raw materials extraction and/or production.
- ⇒ Average transports raw materials to the plant (see the Appendix: real distances are recommended, in case default distances are available).
- ⇒ Manufacturing of the waterproofing membranes.

- ⇒ Energy production and delivery. The electricity mix shall be stated and documented: it is recommended to use the official one in the country of manufacture.
- ⇒ Recycled materials and their transports.
- ⇒ Manufacturing activities of specified additional materials (upstand flashing. ..).
- ⇒ Packaging of the waterproofing membranes.

## **4.2 Installation stage (waterproofing system)**

The installation procedures of the waterproofing system shall be described in detail. The listing consist minimal the following:

- Type of energy and consumption for installation of the membrane(s).
- Mechanical fasteners in case of mechanically fastened system (recommended average: 5 per m<sup>2</sup>).
- For loose laid with ballast systems calculate with gravel ballast (65 kg/m<sup>2</sup>).
- Average transport distance of the membranes to the building location shall be indicated (recommended average: 200 km). Transport of other additional materials may be neglected.
- Amount and treatment of cut of waste should be specified.
- Statement of real consumption of membrane.

## **4.3 Use phase**

The reference service life of the building must be accounted for according to Chapter 5 indications. Maintenance of the roof, cleaning and eventual replacements shall be declared and accounted for.

- Durability of the system should be declared according to Chapter 5.
- Detailed description re-roofing/maintenance according to the roof system layout.
- Leaching.

## **4.4 End of life**

End of life scenarios have to be described including dismantling/demolition and transport operations before the waterproofing product is addressed to landfill, incineration or recycling.

A scenarios approach shall be applied with a detailed description of each possible solution.

More in detail, the following parameters shall be declared:

- average transport distance (recommended average distance: 50 km);
- Energy for demolition shall be excluded.
- Theoretical end of life treatment are acceptable, however working scenario's are preferable.

## **5. Lifespan resistance (durability)**

The durability of a roofing system is depending of a lot of factors: product, design, installation, maintenance, slope, substrate, climate among the others.

Only internationally recognised sources of information has to be used to declare the durability. An average declared durability may be of 30 years with a total expected lifetime of 90 years (2 renewals are therefore to be included in the calculations).

## **6. Cut off rules**

Capital equipments, humans work can be omitted, as well as any process/activities that all together do not contribute more than 5% to all main impact categories (sensitivity analysis requested).

Omissions from the inventory that do not fulfil any here defined criteria must be documented and justified.

## **7. Allocation rules**

### **7.1 General rules**

Whenever it would be necessary to partitioning the system inputs and outputs, mass criteria will be used. Any other allocation procedures based on physical or chemical characteristics must be specified in the EPD. It is excluded the possibility of applying economic allocation criteria because of its sensitivity to market specific conditions.

Ancillary activities shall be allocated on the overall service production.

### **7.2 Cogeneration**

In case the manufacturing process is supplied with electricity from a specific combined heat and power generation plant, it is recommended to use the PCR for Electricity, Steam, and Hot and Cold Water Generation and Distribution ([www.environdec.com](http://www.environdec.com)).

## **8. Units**

The following units shall be used:

- SI units.
- Preferred power and energy units:
  - kW (MW) for power
  - kWh (MWh) for electric energy

## **9. Data quality requirements**

According to the "Requirements for an International EPD system", data coming from available databases (both pay-database and free database) can be used as specific data if the following rules are demonstrated:

1. representativity of the geographical area
2. technological equivalence
3. boundaries towards nature
4. boundaries towards technical systems.

The demonstration of the compliance to these 4 rules shall be clearly described into the LCA study report.

## 10. Parameters to be declared in the EPD

The following parameters shall be declared :

### Resource use

- Use of non-renewable resources
  - without energy content
  - with energy content
- Use of renewable resources
  - without energy content
  - with energy content

Pollutant emissions expressed as potential environmental impact (it is mandatory to declare the source):

Impact category	Indicator	Source
Global warming (greenhouse gases)	kg of CO <sub>2</sub> equivalents, 100 years - IPCC	IPCC (Intergovernmental Panel on Climate Change)
Ozone depletion	kg of CFC11 equivalents, 20 years - WMO	WMO (World Meteorological Organisation)
Acidification of land and water sources	mol H <sup>+</sup>	To be declared
Eutrophication (emission of substances contributing to eutrophication potential)	kg of O <sub>2</sub>	To be declared
Photochemical oxidant formation (emissions of gases that contribute to the creation of ground-level ozone)	kg of C <sub>2</sub> H <sub>4</sub> equivalents	To be declared

The global warming should be calculated both for fossil and non-fossil (biologic) emissions. The two sources shall be reported separately.

### Additional information

- Direct Electricity consumption in the membrane production process plant.
- Feedstock energy (higher heating value) of the membrane.
- Use of drinkable water.
- Waste to landfill (of which):
  - Hazardous waste (kg)
  - Other waste (kg) according to the definition available in the last EU Directive on waste (CER code)
- release of essential metals and organics during the life phase (leaching using recognised standard)

Information on where explanatory additional material can be obtained.

Material and chemical substances to be declared

- List of all materials included in the roofing membranes as well as used for the roof construction ( $\geq 2\%$  weight).
- List all materials/substances hazardous to health and the environment , being allergic, carcinogenic, mutagenic or toxic to reproduction if present in such a concentration in the product that it meets requirements for being subjects to labeling according to the Substances and Preparation Directive (please note that this list is already included in EN 13707). It is therefore mandatory to provide a declaration that the product is in compliance with EN 13707
- The lists can be separated for materials/products or for materials per functional unit

## **11. Other (additional) environmental information**

It is possible to insert other environment information that are considered important in order to describe environmental performances of the product: the only allowed documents/certifications are ISO 9001, ISO 14001, EMAS.

## **12. References (to be included in the EPD)**

The EPD shall refer to:

- This PCR document, to be identified in the EPD as well as in the LCA study
- The underlying LCA report

### 13. Appendix

<b>Raw materials</b>	<b>distance (km)</b>
Bitumen	200
Cardboard	100
Coloured ceramics	150
Coloured slates	150
Diesel (use)	50
EPDM	200
Gasoline (use)	50
Glass mat, glass grid, glass fabric	800
Hot melts	100
Kraft Paper	100
Limestone	150
LPG	50
Oxidised bitumen	200
Pallets	50
Paper	100
PE (film, granules, recycled)	200
Polyester	800
PP (granule, film, recycled)	200
Sand	100
SBS	800
Slate dust	150
Talcum flakes	200
tape	50
Thin Aluminium	1000
Thin Stainless steel	1000
Thin Copper	1000