



## PRODUCT CATEGORY RULES

CPC SUBCLASS 32153

CARTONS, BOXES, CASES, RECORD SLEEVES AND OTHER  
PACKING CONTAINERS (EXCEPT BAGS) OF PAPER

PCR 2010:09

VERSION 1.0

2010-09-24

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## GENERAL INTRODUCTION

The international EPD® system is based on a hierarchic approach following the international standards:

- ISO 9001, Quality management systems
- ISO 14001, Environmental management systems
- ISO 14040, LCA - Principles and procedures
- ISO 14044, LCA - Requirements and guidelines
- ISO 14025, Type III environmental declarations
- ISO 21930, Environmental declaration of building products.

The General Programme Instructions are based on these standards, as well as instructions for developing Product Category Rules (PCR).

The documentation to the International EPD® system includes three separate parts ([www.environdec.com](http://www.environdec.com)):

- Introduction, intended uses and key programme elements
- General Programme Instructions
- Supporting annexes

This PCR document specifies further and adds additional minimum requirements on EPDs of the product group defined below complementary to the above mentioned general requirement documents.

Principle programme elements concerning the Product Category Rules (PCR) included in the International EPD® system are presented below.

<b>Purpose</b>	<b>Element identification and principal approach</b>
Complying with principles set in ISO 14025 on modularity and comparability	1. "Book-keeping LCA approach" 2. A Polluter-Pays (PP) allocation method
Simplifying work to develop Product Category Rules (PCR)	3. PCR Module Initiative (PMI) in order to structure PCR in modules according to international classification 4. PCR moderator for leadership and support of the PCR work
Secure international participation in PCR work	5. Global PCR Forum for open and transparent EPD stakeholder consultation
Facilitating, identification and collection of LCA-based information	6. Selective data quality approach for specific and generic data

DOCUMENT NAME	Product Category Rules (PCR) Cartons, boxes, cases, record sleeves and other packing containers (except bags) of paper
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Product Category Rules (PCR) are specified for specified information modules “gate-to-gate”, so called core modules. The structure and aggregation level of the core modules are defined by the United Nation Statistics Division - Classification Registry CPC codes (<http://unstats.un.org>). The PCR also provides rules for which methodology and data to use in the full LCA, i.e. life cycle parts up-streams and down-streams the core module. The PCR also has requirements on the information given in the EPD, e.g. additional environmental information. A general requirement on the information in the EPD is that all information given in the EPD, mandatory and voluntary, shall be verifiable.

In the EPD, the environmental performance associated with each of the three life-cycle stages mentioned above are reported separately.

## 1 GENERAL INFORMATION

<b>Date and registration no:</b>	2010-09-24, PCR 2010:17
<b>This PCR was developed by:</b>	IVL Swedish Environmental Research Institute & the European Carton Makers Association (ECMA)
<b>Appointed PCR moderator:</b>	Kristian Jelse, IVL Swedish Environmental Research Institute, kristian.jelse@ivl.se
<b>Open consultation period at the Global PCR Forum (<a href="http://www.environdec.com">www.environdec.com</a>):</b>	2010-05-18 – 2010-06-22
<b>Valid within the following geographical area:</b>	Globally
<b>PCR valid until:</b>	2013-09-24

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of UN CPC 32153 (Containers of paper and paperboard) and the declaration of this performance by an EPD. It may also be used for single-issue EPD:s such as climate declarations.

This PCR is based on the requirements and guidelines given in the draft version of “PCR Basic Module, CPC Division 32: Pulp, paper and paper products; printed matter and related articles”. The system boundaries, etc., of PCR:s covering UN CPC 32132, 32133 and 3214, have also been considered during the development of this PCR.

There are a number of existing guidelines on carbon footprints relating to paper and paperboard. The following documents have been considered during the development of this PCR:

- CEPI (2007): Framework for the development of carbon footprints for paper and board products.
- CITPA: Guidelines for CO<sub>2</sub> footprints for paper based packaging
- BSI Standards Solutions (2008): PAS 2050, Specification for the assessment of the life cycle greenhouse gas emissions of goods and services.

Please note, however, that the rules and guidelines may differ between the documents and that the General Programme Instruction of the International EPD system has been followed where such differences existed.

Any comments to this PCR document may be given on the Global PCR Forum or directly to the PCR moderator during the period of validity.

The PCR document is a living document. If relevant changes in the LCA methodology or in the technology for the product category occur, the document will be revised and any changes will be published on the international website: [www.environdec.com](http://www.environdec.com).

The EPD shall refer to a specific PCR version number. The production of new PCR versions does not affect the EPD certification period.

## 2 DEFINITION OF THE PRODUCT GROUP

The product groups covered by this PCR include:

- Cartons, boxes, cases, record sleeves and other packing containers of paper, paperboard, cellulose wadding or webs of cellulose fibres
- Box files, letter trays, and similar articles, of paper or paperboard of a kind used in offices, shops or the like

This PCR should not be used for the creation of EPDs only for paperboard or other types of raw materials for containers of paper and paperboard. The production of these materials is, however, included in the core module of products covered by this PCR (see Section 6.2).

For PCR:s covering these product categories, consider CPC 3213, 3214, 32151 and 32152. See <http://unstats.un.org> for further information on the CPC codes covered by this PCR and related CPC codes.

The product group and CPC code shall be specified in the EPD.

### 2.1 SPECIFICATION OF MANUFACTURING COMPANY

The EPD shall include the following information about the manufacturing company (mandatory information):

- Name of the manufacturing company
- Production site(s)
- Issuer and contacts
- Information on environmental management system

It is voluntary to include other information about the manufacturing company, such as:

- Specific aspects regarding the production
- Environmental policy
- Manufacturer's logotype

### 2.2 SPECIFICATION OF THE PRODUCT

The EPD shall include a description of the product, its intended use and its classification number according to the UN CPC classification system (<http://unstats.un.org>).

The grammage of the product (weight per unit of area, e.g. g/m<sup>2</sup>) shall be declared. Other relevant functional properties of the product may be included as part of the specification of the product or in relation to the functional unit.

### 3 FUNCTIONAL / DECLARED UNIT

The functional unit (FU) shall be one tonne (1000 kg) of product. The use of the product as well as guidance on how to translate the functional unit into a packaged volume and/or amount shall be declared.

The functional unit shall be declared in the EPD. The environmental impact shall be given per functional unit.

### 4 CONTENT OF MATERIALS AND CHEMICAL SUBSTANCES

The EPD shall include a content declaration of the product covering relevant materials and substances. The gross weight of material shall be declared in the EPD at a minimum of 99 %.

The content declaration does not apply to proprietary materials and substances such as those covered by exclusive legal rights including patent and trade marks (See General Programme Instructions, available at [www.environdec.com](http://www.environdec.com)).

### 5 UNITS AND QUANTITIES

SI units shall be used. For power and energy, the preferred units are:

- kW (or MW) for power
- kWh (or MWh) for energy

A maximum of three value numbers shall be used when reporting LCA results

## 6 GENERAL SYSTEM BOUNDARIES

Figure 1 gives an overview of the system boundary and the division into the upstream, core and downstream modules.

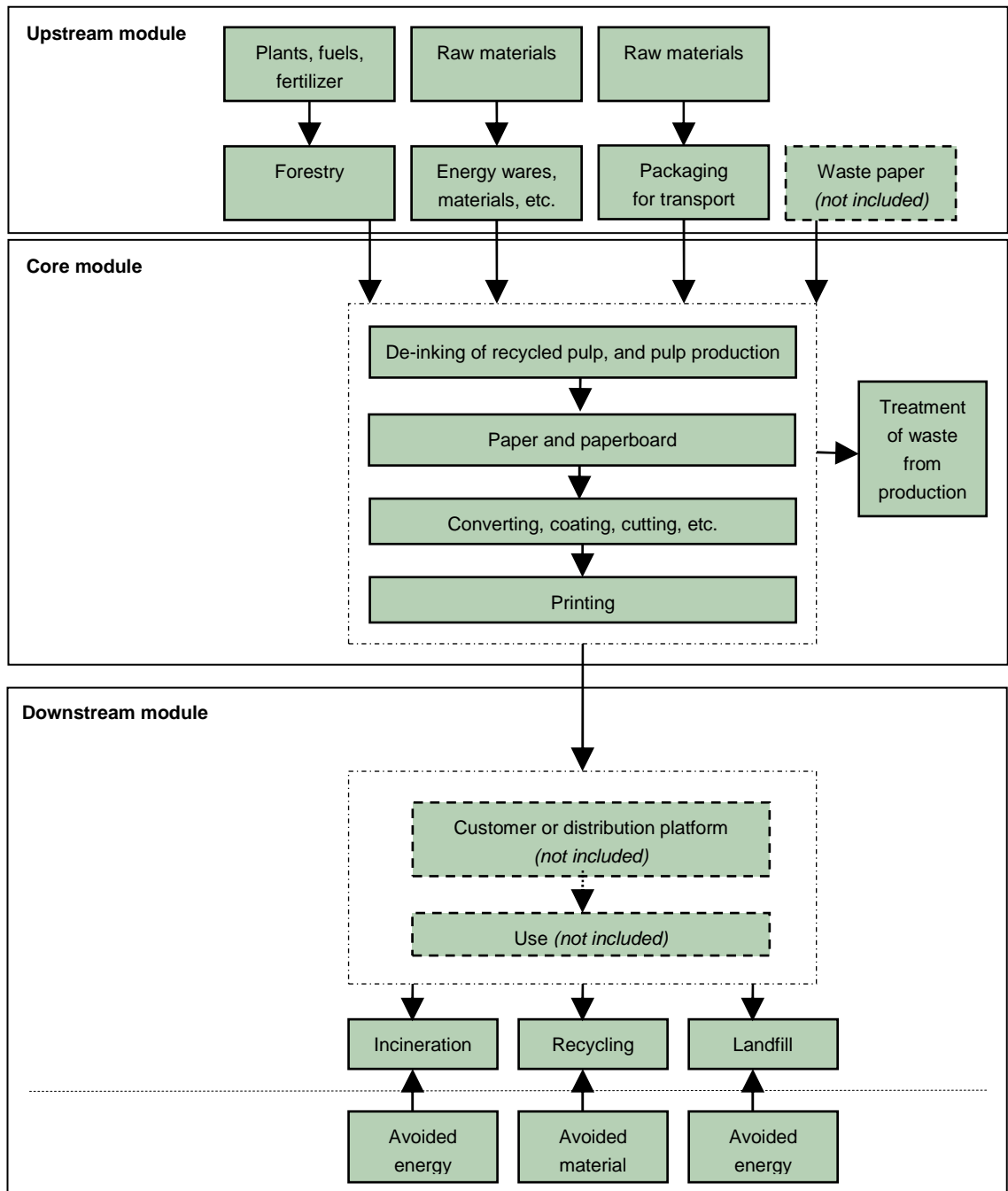


Figure 1. Illustration of the upstream, core and downstream modules and processes. Please note that transports may be included in the system boundaries even if they are not included in the figure (see text for details).



## 6.1 UPSTREAM PROCESSES

The upstream processes include the following inflow of raw materials and energy wares needed for the manufacture of the product:

- Forestry. The included activities are seedling production, silviculture (cut over clearing, soil preparation, planting, cleaning and fertilisation), logging (thinning/final felling and extraction of timber), internal transports and new seedling production. The cradle is soil preparation.
- Production of fertilisers used in the forest.
- Production processes of the energy wares used in forestry and in manufacturing.
- Production of auxiliary products used such as detergents for cleaning, etc.
- Production of pigments, additives and other chemicals used in the core processes.
- Production of other raw materials, such as plastics and paint.
- Production of packaging for transport.

It is recommended to include information about net sequestration of biogenic carbon dioxide (CO<sub>2</sub>) at forestry in the EPD as additional information (see Section 10.4).

## 6.2 CORE PROCESSES

The core processes include:

- External transportation to the core processes, including the transport of logs.
- Recycling process of purchased recycled paper and the transport from the recycling process to where the material is used.
- Production of pulp (produced internally or purchased).
- Production of paper and paperboard.
- Production of packaging container: converting, coating, lamination, folding, cutting, packing, etc.
- Printing. If the EPD concerns a product without print, this should be clearly communicated.
- Treatment of waste generated from the production processes.

Please note that this is a general description and that not all processes are relevant for every type of product included in this PCR.

## 6.3 DOWNSTREAM PROCESSES

The downstream processes include:

- Transportation from final manufacturing to an average customer or distribution platform.
- Waste management of transport packaging waste (based on scenarios)

- Waste management of paperboard materials after use (based on scenarios). The environmental impact of these processes should be presented separately (see Section 9.3).

In the EPD, the environmental performance associated with each of the three life-cycle stages above are reported separately.

## 7 CORE MODULE

### 7.1 SYSTEM BOUNDARIES

#### 7.1.1 TECHNICAL SYSTEM

The processes listed Section 6.2 for the production of the final product shall be included. Manufacturing processes not listed may be included. However, the production of the raw materials used for production of all ingredients shall be included in the upstream module.

A minimum of 99% of the total weight of the declared product including packaging shall be included.

The manufacturing of production equipment, buildings and other capital goods shall not be included.

Business travel of personnel should not be included. Travel to and from work by personnel should not be included.

#### 7.1.2 GEOGRAPHICAL BOUNDARIES

The data for the core module shall be representative for the actual production processes and representative for the site/region where the respective process is taking place.

#### 7.1.3 TIME BOUNDARIES

The data shall be representative for the year/time frame for which the EPD is valid (maximum three years).

#### 7.1.4 BOUNDARIES TO NATURE

Boundaries to nature are defined as flows of material and energy resources from nature into the system. Emissions to air, water and soil cross the system boundary when they are emitted from or leaving the product system.

#### 7.1.5 BOUNDARIES TO OTHER PRODUCT LIFE CYCLES

If there is an inflow of recycled paper or other material to the production system in the production/manufacturing phase, the recycling process and the transportation from the recycling process to where the material is used shall be included. If there is an outflow of material to recycling, the transportation of the material to a sorting facility/recycling process shall be included. The material intended for recycling is then an outflow from the production system. (See General Programme Instructions Annex A, available at [www.environdec.com](http://www.environdec.com))

## 7.2 CUT OFF RULES

Life Cycle Inventory data for a minimum of 99% of total inflows to the core module shall be included. Inflows not included in the LCA shall be documented in the EPD.

If data on production processes of the inflows are not available approximations and assumptions may be used if justified and explained.

## 7.3 ALLOCATION RULES

Allocation should be avoided, if possible, by dividing unit processes into sub-processes for which environmental data can be collected separately. The method of system expansion to avoid allocation is not applicable in the International EPD<sup>®</sup> system. See the General Programme Instructions for further information (available at [www.environdec.com](http://www.environdec.com)).

If allocation cannot be avoided and physical relationships cannot be identified between different inputs and outputs, allocation between products and co-products in the core module shall be based on economic allocation. Mass allocation may also be used, when relevant, but this should be clearly stated and that the use must be justified.

## 7.4 DATA QUALITY RULES

Specific data (often called site specific data), gathered from the sites where specific processes are carried out, shall be used for the core module. The requirement for specific data also includes actual product weights, amounts of raw materials used and amounts of waste, etc.

Specific data for the generation of electricity bought shall be used if possible. The data should be verifiable by invoice or similar. If specific data are not available or if the purchased electricity is not specified for parts of the core module, the electricity mix used in those parts shall be approximated as the official electricity mix in the country of manufacture. For Sector EPD:s and in cases where it is considered relevant, a sector average electricity mix, such as EU-27, may be used. The mix of energy shall be documented.

# 8 UPSTREAM MODULE

## 8.1 SYSTEM BOUNDARIES

All elementary flows at resource extraction shall be included, except for the flows that fall under the general 1% cut off rule.

It is recommended to include information about net sequestration of biogenic carbon dioxide (CO<sub>2</sub>) at forestry in the EPD as additional information (see Section 10.4).

## 8.2 DATA QUALITY RULES

Specific data is recommended to use, if possible, for the following activities in forestry:

- Silviculture (cut over clearing, regeneration, cleaning and fertilisation)
- Logging (thinning/final felling and extraction of timber)

If relevant, data may be calculated as an average of multiple years. For activities taking place more than five years in the past or if data is not available, non-specific data from databases or literature may be used and documented.

Site-specific and selected generic data shall be used for other parts of the LCI, i.e. data from commonly available data sources such as commercial databases and free databases, describing specific raw materials or processes usually referring to the system under study or to other systems equivalent from a technical point of view.

For allowing the use of selected generic data, a number of pre-set characteristics must be fulfilled and demonstrated:

- Representativeness of the geographical area should adhere to “Data deriving from areas with the same legislative framework and the same energetic mix,”
- Technological equivalence adhere to “Data deriving from the same chemical and physical processes or at least the same technology coverage (nature of the technology mix, e.g. weighted average of the actual process mix, best available technology or worst operating unit),”
- Boundaries towards nature adhere to “Data shall report all the quantitative information (resources, solid, liquid, gaseous emissions; etc.) necessary for the EPD,” and
- Boundaries towards technical systems adhere to “The boundaries of the considered life cycle stage shall be equivalent.”

The following free and commercial databases are recommended for generic data:

Database / Literature source	Data	Geographical area	Publication date / Version
Ecoinvent	Miscellaneous	Global	2.0 or later
European Aluminium Association	Aluminium	Europe	2008 or later
European Life Cycle Database (ELCD)	Miscellaneous	Europe	2009 or later
FEFCO	Packaging	Europe	2006 or later
Forestry Research Institute of Sweden (Skogforsk)	Forest operations	Sweden	2002 or later
Metsäteho	Forest operations	Finland	2001 or later
Nätverket för transporter och miljön (NTM)	Transport	Europe	2007 or later
VTT/LIPATSO	Transport	Finland	2008 or later
Plastics Europe	Plastics	Europe	2005 or later

### 8.3 RULES FOR GENERIC DATA

If these data sources do not supply the necessary data, other generic data may be used and documented. The environmental impact of the processes where the other generic data are used must not exceed 10% of the overall environmental impact from the product system.

## 9 DOWNSTREAM MODULE

### 9.1 DISTRIBUTION SCENARIO

The EPD may include the transport from manufacture to an average customer or distribution platform. The type of transport and transport distance should be representative to actual conditions on the market for which the EPD is valid. It should be transparent whether or not the distribution is included or not in the EPD.

### 9.2 USE PHASE SCENARIO

For most products covered by this PCR, the use phase is not relevant and should not be included in the calculations.

Delayed emission due to products with a long life span may be included using the approach of the upcoming ISO 14067 standard.

### 9.3 RECYCLING AND WASTE MANAGEMENT SCENARIOS

The potential environmental impact and benefit of recycling and waste management of paperboard materials (based on average scenarios for the intended market or markets, e.g. EU-27) is recommended to include in the EPD, but optional. If included, this should be presented separately from other results.

Waste management of transport packaging shall be included in the downstream module, based on scenarios for the relevant market.

## 10 ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION (CPC 32)

### 10.1 USE OF RESOURCES

The consumption of natural resources and resources per functional unit shall be reported in the EPD. Input parameters, extracted resources:

- Non-renewable resources
  - Material resources
  - Energy resources (used for energy conversion purposes)
- Renewable resources
  - Material resources
  - Energy resources (used for energy conversion purposes)
- Water use<sup>1</sup>
- Electricity (electricity consumption during manufacturing)

Resources which contribute for 5% or more should be listed for each category.

### 10.2 POTENTIAL ENVIRONMENTAL IMPACT

The environmental impact per functional unit for the following environmental impact categories shall be reported in the EPD, divided into core, upstream and, if relevant, downstream module:

- Emissions and removals of greenhouse gases (expressed in global warming potential, GWP, in a 100 year perspective).
- Emissions of ozone-depleting gases (expressed as the sum of ozone-depleting potential in CFC-11-equivalents, 20 years).
- Emissions of acidification gases (expressed as the sum of acidification potential expressed in SO<sub>2</sub> equivalents).
- Emissions of gases that contribute to the creation of ground level ozone (expressed as the sum of ozone-creating potential, ethene-equivalents).
- Emissions of substances to water contributing to oxygen depletion (expressed as PO<sub>4</sub><sup>3-</sup> equivalents).

The tables from General Programme Instructions, Annex B: Conversion and characterisation factors shall be used (available at [www.environdec.com](http://www.environdec.com)).

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<sup>1</sup> Water consumption can be calculated according to the methodology developed by CEPI.

### 10.3 OTHER INDICATORS

The following indicators shall also be reported in the EPD per functional unit:

- Material subject for recycling. Unit: kg
- Hazardous waste (as defined by regional directives). Unit: kg
- Other waste. Unit: kg
- Emissions of toxic substances. Unit: kg. As an alternative, a declaration of compliance with the European packaging waste directive may be included in the EPD.

### 10.4 ADDITIONAL ENVIRONMENTAL INFORMATION

It is recommended to include information about net sequestration of biogenic carbon dioxide (CO<sub>2</sub>) at forestry in the EPD as additional information. This should, however, be presented separately from fossil CO<sub>2</sub> and other greenhouse gases (expressed in global warming potential, GWP, in 100 year perspective).

The link between biogenic carbon dioxide uptake in forests and products sold in the market may be calculated using the total uptake in a long-term sustainably managed forest divided by total output (see for instance Carbon Footprint of Cartons in Europe for methodology and data<sup>2</sup>). Three criteria must, however, be met in order to allocate the net biogenic CO<sub>2</sub> sequestration to products produced from harvested wood:

- Double counting should be avoided.
- The current forestry and the prognosis for the next coming years should be sustainable.
- A national/regional system for surveillance of a sustainable forestry should be in place.

In addition to this, additional emissions in the form of life cycle inventory data, such as COD, may be presented in the EPD per functional unit and divided into upstream, core and downstream module. It should, however, be clearly stated that the environmental impact of these emissions is already included in the environmental impact categories in Section 10.2.

## 11 CONTENT OF THE EPD

### 11.1 PROGRAMME RELATED INFORMATION

The programme related part of the EPD shall include:

- Name of the programme and programme operator
- The reference PCR document
- Registration number
- Date of publication and validity

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<sup>2</sup> See the report "Carbon Footprint of Cartons in Europe – Carbon Footprint methodology and biogenic carbon sequestration" by IVL Swedish Environmental Research Institute & ECMA, available at [www.ecma.org](http://www.ecma.org) or [www.procarton.com](http://www.procarton.com).

- Geographical scope of application of the EPD if deviating from an international coverage
- Information about the year or reference period of the underlying data to the EPD
- Reference to the homepage — [www.environdec.com](http://www.environdec.com) — for more information.

## 11.2 PRODUCT RELATED INFORMATION

### 11.2.1 SPECIFICATION OF THE MANUFACTURING COMPANY

See Section 2.1.

### 11.2.2 SPECIFICATION OF THE PRODUCT

See Section 2.2.

### 11.2.3 FUNCTIONAL UNIT

See Section 3.

### 11.2.4 CONTENT OF MATERIALS AND CHEMICAL SUBSTANCES

See Section 4.

### 11.2.5 COMPARISONS OF EPDS WITHIN THIS PRODUCT CATEGORY

To be able to compare EPDs within this product category, they have to be based on this particular PCR. The user of the EPD information should be made aware of this by the inclusion of this statement in the EPD:

“EPDs from different programmes may not be comparable”

### 11.2.6 VALIDITY OF THE EPD

The geographical area and the time during which the EPD is valid shall be reported in the EPD.

## 11.3 ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

### 11.3.1 ENVIRONMENTAL PERFORMANCE DECLARATION — MINIMUM SET OF PARAMETERS FROM THE LCA STUDY, REPORTED PER FUNCTIONAL UNIT

Upstream module, core module and downstream module shall be reported separately for the resource use, potential environmental impact and other indicators such as waste.

### 11.3.2 USE OF RESOURCES

In this category the consumption of natural resources and resources per functional unit shall be reported

See Section 10.1.



### 11.3.3 POTENTIAL ENVIRONMENTAL IMPACT

In this category the potential environmental impact per functional unit shall be reported.  
See Section 10.2.

### 11.3.4 OTHER INDICATORS

In this category relevant indicators shall be reported per functional unit.  
See Section 10.3.

### 11.3.5 ADDITIONAL ENVIRONMENTAL INFORMATION

See Section 10.4.

## 11.4 DIFFERENCES VERSUS PREVIOUS VERSIONS OF THE EPD

The main causes of changes in the environmental performance in comparison with previous EPD versions shall be described shortly.

## 11.5 VERIFICATION

The EPD shall give the following information about the verification process:

PCR review conducted by:	<i>Name and organisation of the chair, and information on how to contact the chair through the programme operator</i>
Independent verification of the declaration and data, according to ISO 14025:	<i>Internal (EPD process certificate) or external, if external name of the third party verifier</i>
Accredited or approved by (if relevant):	<i>Name of the organisation</i>

## 11.6 REFERENCES

The EPD shall, if relevant, refer to:

- The underlying LCA
- The PCRs used
- Other documents that verify and complement the EPD
- Instruction for recycling
- Programme instructions
- Sources of additional information
- Methodology for calculations of net sequestration of biogenic CO<sub>2</sub>

## 12 VALIDITY OF THE EPD

If changes in any of the environmental impacts are larger than  $\pm 5\%$  the EPD shall be adjusted. Regardless, the EPD shall be reviewed every three years.

## 13 LIST OF ABBREBIATIONS

BSI	British Standards Institution
CEPI	Confederation of European Paper Industry
CFC	Chlorofluorocarbon
CITPA	International Confederation of Paper and Board Converters in Europe
CPC	See <i>UN CPC</i>
ECMA	European Carton Makers Association (ECMA)
EPD	Environmental Product Declaration
GWP	Global Warming Potential
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PAS	Publically Available Specification
PCR	Product Category Rules
UN CPC	United Nations' Central Product Classification

## 14 CHANGES IN THIS DOCUMENT

VERSION 1.0

Original document

