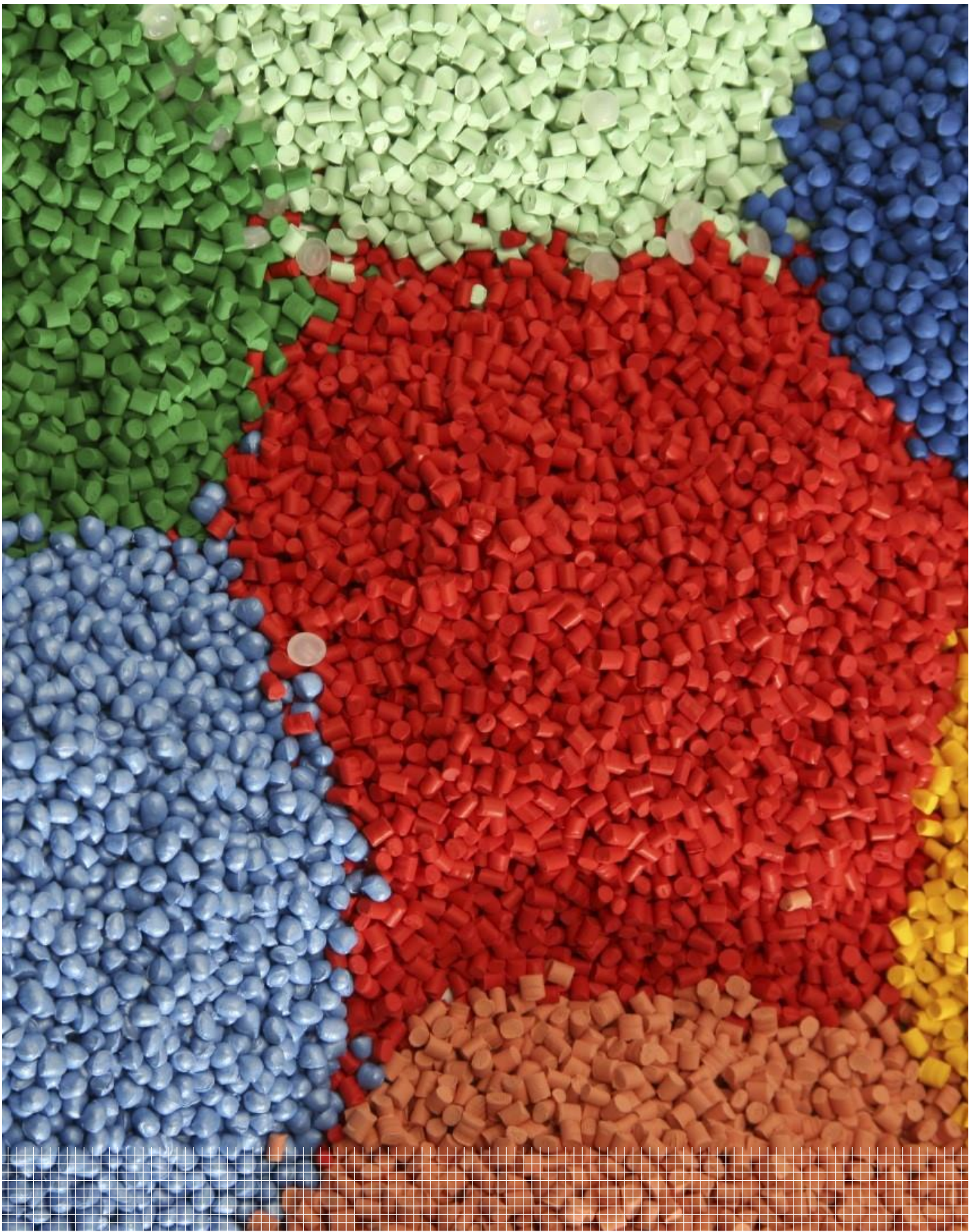
PRODUCT CATEGORY RULES (PCR)
DATE 2022-08-17

PLASTICS IN PRIMARY FORMS

PRODUCT CATEGORY CLASSIFICATION: UN CPC 347

VERSION 3.0.2

VALID UNTIL: 2023-06-21



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1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent information about the life cycle environmental impact for their goods or services.

The rules for the overall administration and operation of the programme are the General Programme Instructions, publicly available at www.environdec.com. A PCR complements the General Programme Instructions and the standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

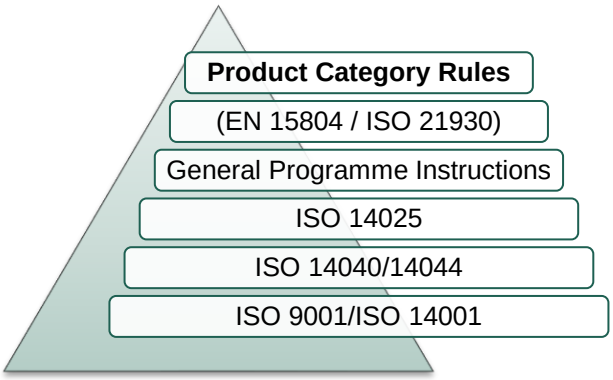

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible

For the definition of terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available via www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR document may be given via the PCR Forum at www.environdec.com or sent directly to the PCR moderator during its development or during the period of validity.

Any references to this document should include the PCR registration number, name and version.

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update when necessary, and available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Type III environmental declarations in the International EPD® System are referred to as EPD, Environmental Product Declarations.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Plastics in primary forms
Registration number and version:	2010:16, version 3.0.2
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR moderator:	Anna Bortoluzzi, anna.bortoluzzi@quotasette.it Maurizio Fieschi, fieschi@studiofieschi.it
PCR Committee:	Quota Sette S.r.l. and Studio Fieschi
Date of publication and last revision:	2022-08-17 (Version 3.0.2) Version 1.0 was published 2010-08-12. A version history is available in Section 8.
Valid until:	2023-06-21
Schedule for renewal:	A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. When the PCR is about to expire the PCR moderator shall initiate a discussion with the Secretariat how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 3.0, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 34 Basic chemicals, version 2.5, dated 2015-12-22
PCR language(s):	This PCR was developed and is available in English. In case of translated versions the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Plastic in primary and the declaration of this performance by an EPD. The product category corresponds to UN CPC -Group 347 Plastics in primary forms.

The term “Plastic” is to be intended as defined by ISO 472:2013, as a *“material which contains as an essential ingredient a high polymer and which at some stage of its processing into finished products can be shaped by flow”.*

This PCR document takes into consideration both Thermoplastic and Thermosetting materials.

The term “Thermoplastic” is to be intended as defined by ISO 472:99, as a *“plastic capable of being softened repeatedly by heating and hardened by cooling, through a temperature range characteristic of the plastic and, in the softened state, of being shaped by flow repeatedly into articles by moulding, extrusion or forming”* – see also the definition of ASTM D883-2017

The term “Thermosetting” is to be intended as defined by ISO 472:2013, as a *“plastic capable of being changed into a substantially infusible and insoluble product when cured by heat or by other means such as radiation, catalysts, etc*.” – see also the definition of ASTM D883-2017.

In particular the ISIC-CPC’s classification is:

- Division 34 Basic chemicals
  - **Group 347 Plastics in primary forms**
    - Class 3471 Polymers of ethylene, in primary forms
    - Class 3472 Polymers of styrene, in primary forms
    - Class 3473 Polymers of vinyl chloride or other halogenated olefins, in primary forms
    - Class 3474 Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
    - Class 3479 Other plastics in primary forms; ion exchangers

For more details about the products covered by this PCR document, see the *HS[2] 2017* and *CPV[3] 2007* classifications reported in Annex A.

Primary forms are intended as before any conversion process, i.e. extrusion, injection moulding. Typical primary forms are for example granules, chips, pellets, powder, gel or analogous forms.

Are also included:

- Plastics from renewable resources
- Recycled plastics
- Compounds from thermoplastics polymers
- Thermoplastic elastomers (TPE) as defined by ISO 472:2013

  NOTE 1 - Elastomeric materials, which also are shaped by flow, are not considered as Plastics and are covered by 348 CPC code.

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

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid from its registration and publication at www.environdec.com and for a five year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

- an increase of 10% or more of any of the indicators listed in Section **Fel! Hittar inte referenskälla.**,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD.

[2] The International Convention on the Harmonized Commodity Description and Coding Systems
[3] Common Procurement Vocabulary

3 PCR REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the process described in the General Programme Instructions of the International EPD® System, including PCR review and open consultation.

3.1 PCR REVIEW

3.1.1 VERSION 1.0 AND 2.0

Versions 1.0 and 2.0 was reviewed by the Technical Committee of the International EPD® System.

3.1.2 VERSION 3.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee, and were excused from the review.
Chair of the PCR review:	Paola Borla
Review dates:	2018-05-04 until 2018-06-08

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

Version 1.0 was available for open consultation 2010-04-28 until 2010-06-28.

3.2.2 VERSION 2.0

Version 2.0 was available for open consultation 2012-10-24 until 2012-11-23.

3.2.3 VERSION 3.0

This PCR was available for open consultation from 2017-09-18 until 2017-11-18, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

Stakeholders were invited via e-mail or other means to take part in the open consultation, and were encouraged to forward the invitation to other relevant stakeholders.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs were considered in order to avoid overlaps in scope. The existence of such documents was checked in the public PCR listings of the following programmes based on ISO 14025 or similar:

- International EPD® System. www.environdec.com.

No PCRs with overlaps in scope have been found in other programmes,

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed in order to enable publication of Environmental Product Declarations (EPD) for this product category based on ISO 14025, ISO 14040/14044 and other relevant standards to be used in different applications and target audiences.

3.5 UNDERLYING STUDIES

The methodological choices made during the development of this PCR (functional unit/declared unit, system boundary, allocation methods, impact categories, data quality rules, etc.) in this PCR were primarily based on the following underlying studies:

- C. Bastioli – 2005 – Handbook of biodegradable polymers – Smithers
- Environmental Product Declarations, Plastics Europe. URL accessed 07/09/2017

4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

4.1 FUNCTIONAL UNIT/DECLARED UNIT

The declared unit shall be 1 kg of product in the form of granules powder or gel, including its packaging (the weight of the packaging is not included in this 1 kg).

Plastics can be sold in bulk or in different types of packaging such as bags, big-bags and octabins. If the product is sold in different types of packaging, the results shall be assessed considering a weighted mean of the packaging used in the reference period based on the total quantity of the sold product.

The reference flow in the LCA shall be defined at the point where the product arrives at the customer gate, i.e. any losses occurring before then must be taken into account.

This PCR uses a declared unit instead of a functional unit as all functional and qualitative aspects are not possible to capture in the same unit. These aspects should be taken into consideration when comparing EPDs based on this PCR.

4.2 REFERENCE SERVICE LIFE (RSL)

Not applicable for this product category.

4.3 SYSTEM BOUNDARY

The International EPD® System uses an approach where all attributional processes from “cradle to grave” should be included using the principle of “limited loss of information at the final product”. This is especially important in the case of business-to-consumer communication.

The scope of this PCR and EPDs based on it is cradle-to-grave, but some downstream processes are voluntary to include.

4.3.1 LIFE CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of products is divided into three different life cycle stages:

- Upstream processes (from cradle-to-gate);
- Core processes (from gate-to-gate)
- Downstream processes (from gate-to-grave)

In the EPD, the environmental performance associated with each of the three life-cycle stages above shall be reported separately. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.3.

4.3.1.1. Upstream processes

The following attributional processes are part of the product system and classified as upstream processes:

- Extraction of non-renewable resources (e.g. operation of oil platforms and pipelines)
- Growing and harvesting of renewable resources (e.g. agricultural planting)
- Refining, transfer and storage of extracted or harvested resources into feedstock for production (e.g. starches, cellulose)
- Monomers production
- Intermediate raw materials production (e.g. pre-polymers, etc.) – if the EPD is made for a compound, this phase includes all the stages of base polymer/s production as it represents an upstream process of compounding.

- Additives and activators production processes (e.g. fibre glass, carbon black, titanium dioxide, lubricants, fillers, pigments, etc.)
- Solvent (used in polymerization) production process (e.g. hexane, methylene chloride, chloroform, sulphuric acid, trichloroethane, methanol, etc.)
- Maintenance products and materials production
- All relevant transportation (transport of raw materials, fuels and products at all stages)
- Treatment of waste and wastewater generated by all upstream processes shall be included
- The production processes of energy wares used in the extraction and refinement
- Impacts due to the production of electricity and fuels used in the upstream module
- Manufacturing of primary and secondary packaging

Upstream processes not listed may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.2. Core processes

The following attributional processes are part of the product system and classified as core processes:

- External transportation to the core processes
- Production processes
- Polymer production according to process technology and plastic type:
  - Preparation of monomers and polymerization
  - Separation and purification of organic solvents
  - Recovery and purification of unreacted monomers
  - Separation of polymerization by-products
  - Extrusion and pelletizing of polymer
  - Pellets washing
  - Pellets drying
  - Dry mixing
  - Half-processed product transportation
- Compounding:
  - Extrusion and pelletizing
  - Half-processed product transportation
- Plastics waste and scraps recovery/recycling processes: (*)
  - Collection and selection of post-consumer and post industrial waste
  - Washing of post-consumer waste
  - Grinding of scraps and/or post-industrial feedstock
  - Mechanical or chemical recycling process (e.g. mechanical and/or chemical treatment, depolymerisation, etc.)
- Storage and handling of materials, storage and packaging of final product (see note 3)
- Maintenance (e.g. of the machines)
- Production of additives used in auxiliary core processes (e.g. chemicals for water treatment internal plant)
- Waste treatment of waste generated during manufacturing;
- Impacts due to the production of electricity and fuels used in the core module

NOTE - all handling and storage operations for the materials/products shall be considered, including mechanical activities (e.g. pneumatic conveying systems) and thermic activities (e.g. storage in controlled temperature of intermediate and final products)

(*) In case of production chain, this PCR document can be potentially connected to the PCR *Plastic waste and scrap recovery (recycling) services (CPC 8942)*

Manufacturing processes not listed may also be included. The production of the raw materials used for production of all product parts shall be included. A minimum of 99% of the total weight of the declared product including packaging shall be included.

The technical system shall not include:

- Manufacturing of production equipment, buildings and other capital goods
- Business travel of personnel
- Travel to and from work by personnel.
- Research and development activities

4.3.1.3. Downstream processes

The following attributional processes are part of the product system and classified as downstream processes:

- Transportation from preparation to an average retailer/distribution platform
- End-of-life processes of packaging waste

Optionally, an EPD may provide environmentally relevant information pertaining to:

- Polymer/compound processing (**)
- Use phase
- End of life of product

(**) In case of production chain, this PCR document can be potentially connected to the PCR Man made fibres – synthetic (CPC 355)

This optional information shall be reported separated from the mandatory downstream information (to make comparisons between EPDs possible).

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards 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.

4.3.2.2. Boundaries in the life cycle

See Section 4.3.1. The EPD may present the information divided into additional sub-divisions.

4.3.2.3. Boundaries towards other technical systems

See Section 4.6.2.

4.4 SYSTEM DIAGRAM

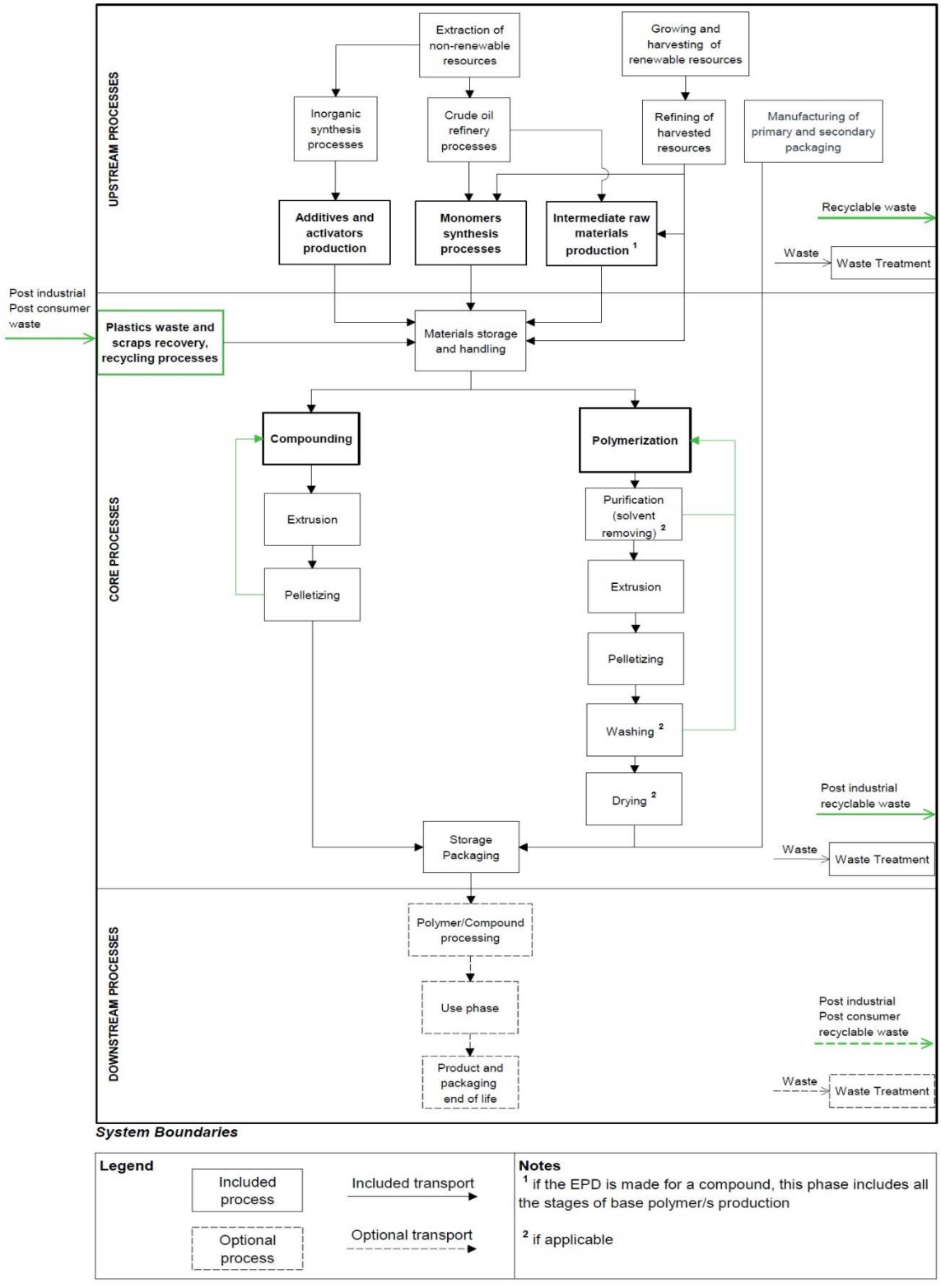

Figure 2 *System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.*

4.5 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in Section 4.3).

The check for cut-off rules in a satisfactory way is through the combination of expert judgment based on experience of similar product systems and a sensitivity analysis in which it is possible to understand how the un-investigated input or output could affect the final results.

4.6 ALLOCATION RULES

4.6.1 CO-PRODUCT ALLOCATION

The following step-wise procedure shall be applied for multifunctional products and multiproduct processes:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. Where physical relationships alone cannot be established or used as the basis for allocation (or they are too time consuming), the inputs should be allocated between the products and functions in a way that reflects other relationships between them. For example, input and output data might be allocated between co-products in proportion to the economic value of the products. If the economical allocation has been used, a specific sensitivity analysis shall be provided to the verifier and the monitoring of the relationship between results and current economic value shall be documented and updated. The allocation method shall be justified and described in the LCA report. In case an allocation different from the physical relationship allocation is used, it shall be declared in the EPD..

4.6.2 REUSE, RECYCLING, AND RECOVERY

In the framework of the International EPD® System, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in the "earlier" life cycles. See General Programme Instruction for further information and examples.

4.7 DATA QUALITY REQUIREMENTS

An LCA calculation requires two different kinds of information:

- data related to the **environmental aspects** of the considered system (such materials or energy flows that enter the production system). These data usually come from the company that is performing the LCA calculation.
- data related to the **life cycle impacts** of the material or energy flows that enter the production system. These data usually come from databases.

Data on environmental aspects shall be as specific as possible and shall be representative of the studied process.

Data on the life cycle of materials or energy inputs are classified into three categories – specific data, selected generic data, and proxy data, defined as follows:

- **specific data** (also referred to as "primary data" or "site-specific data") – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under study, e.g. materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.,
- **generic data** (sometimes referred to as "secondary data"), divided into**:**

- **selected generic data** – data from commonly available data sources (e.g. commercial databases and free databases) that fulfil prescribed data quality characteristics for precision, completeness, and,
- **proxy data** – data from commonly available data sources (e.g. commercial databases and free databases) that do not fulfil all of the data quality characteristics of "selected generic data".

As a general rule, specific data shall always be used, if available, after performing a data quality assessment. It is mandatory to use specific data for the core processes as defined above. For the upstream processes, downstream processes, and infrastructure, generic data may also be used if specific data are not available.

Any data used should preferably represent average values for a specific reference year. However, the way these data are generated could vary, e.g. over time, and in such cases they should have the form of a representative annual average value for a specified reference period. Such deviations should be declared.

4.7.1 RULES FOR USING GENERIC DATA

The attributional LCA approach in the International EPD® System forms the basic prerequisites for selecting generic data. To allow the classification of generic data as "selected generic data", they shall fulfil selected prescribed characteristics for precision, completeness, and representativeness (temporal, geographical, and technological), such as:

- the reference year must be as current as possible and preferably assessed to be representative for at least the validity period of the EPD,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of the impact categories, and
- the representativeness of the resulting inventory in the given temporal, technological, and geographical reference should, as a general principle, be better than ±5% of the environmental impact of fully representative data.

Section 4.8 provides a list of recommended databases/data sets to be used for generic data.

If selected generic data that meets the requirements of the International EPD® System are not available as the necessary input data, proxy data may be used and documented. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact from the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data for the environmental impacts.

4.8 RECOMMENDED DATABASES FOR GENERIC DATA

No specific database is recommended.

4.9 IMPACT CATEGORIES AND IMPACT ASSESSMENT

The EPD shall declare the default impact categories as described in the General Programme Instructions. The characterisation models and factors to use for the default impact categories are available on www.environdec.com and shall be updated on a regular basis based on the latest developments in LCA methodology and ensuring the market stability of EPDs. The source and version of the characterisation models and the factors used shall be reported in the EPD. Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

4.10 OTHER CALCULATION RULES AND SCENARIOS

4.10.1 UPSTREAM PROCESSES

The following requirements apply to the upstream processes:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site. specific data shall be used for the following upstream processes, if they are carried out within the company who develops the EPD:
  - Monomers production
  - Intermediate raw materials production (e.g. pre-polymers, etc.) – if the EPD is made for a compound, this phase includes all the stages of base polymer/s production as it represents an upstream process of compounding.
  - The requirement for specific data also includes actual product weights, amounts of raw materials used and amounts of waste etc.

  The requirement for specific data also includes actual product weights, amounts of raw materials used and amounts of waste etc.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- The transport of main parts and components along the supply chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place based on the actual transportation mode, distance from the supplier, and vehicle load.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the upstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream processes:
  1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[4]
  2. National residual electricity mix or residual electricity mix on the market
  3. National electricity production mix or electricity mix on the market.

  The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.
- Packaging: specific data shall be used for the consumer packaging production if it is under the direct control of the organization or if the environmental impact related to the consumer packaging production is more than 10% of the total product environmental indicators. In other cases, generic data may be used. When consumer packaging shows the organization's logo, the LCA report should report the exerted/non exerted direct control on the production of consumer packaging by the organization.

4.10.2 CORE PROCESSES

The following requirements apply to the core processes:

- Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant. However, selected generic data (see note 4) may be used for the following core processes if they are carried out outside the company who develops the EPD and the suppliers do not accept to share specific data with the customer:
  - Plastics waste and scraps recovery/recycling processes (for more details see *§3.2.2*)

  NOTE – Selected generic data refer to 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 the electricity used in the core processes, electricity production impacts shall be accounted for in this priority:
  1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.5

[4] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

2. National residual electricity mix or residual electricity mix on the market
3. National electricity production mix or electricity mix on the market.

The mix of electricity used in the core processes shall be documented in the EPD, where relevant.

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.10.3 DOWNSTREAM PROCESSES

- The downstream module shall be based on relevant scenarios for the geographical area in which the EPD® is valid.
- Distribution scenario

  - Transport to retailer/distribution platform (distribution scenario)

  The distribution scenario shall be defined and declared in the EPD. It has to be described taking into consideration average transports scenario.

  Data have to be provided in the EPD according to the following scenario:

  - Average transport scenario inside the production country
  - Average transport scenario from the production country to the country where the products are used

  In the case of inter-continental transports the following scenario may be used:

  - Average transport scenario from the production country to the continents where the products are used

  The means have to be calculated as weighted means on the base of per cent of purchased products.
- End of life of packaging

  With regard to data quality requirements for the packaging end-of-life stage based on scenarios, the following shall apply for the information being:

  - technically and economically practicable, and
  - compliant with current regulations in the relevant geographical area.

  Key assumptions regarding the end-of-life stage shall be documented.
- Use phase

  Optionally, an EPD may provide environmentally relevant information pertaining to the conversion processes of primary form plastics as additional information. In this case shall be provided the following information:

  - Conversion process(es) considered (e.g. extrusion, injection moulding, press moulding, thermoforming, calendaring, blow forming, rotational casting, etc.)
  - Main product applications
  - Main process parameters (e.g. T, P, specific energy, etc.)
  - Environmental performance-related information

[5] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available via www.environdec.com

As a general rule the EPD content:

- shall be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations - General principles),
- shall be verifiable, accurate, relevant and not misleading, and
- shall not include rating, judgements or direct comparison with other products.

An EPD should be made with a reasonable number of pages for the intended audience and use.

5.1 EPD LANGUAGES

EPDs should be published in English, but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and thus subject to the same verification procedure.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
- Three significant figures[6] should be adopted for all results, The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.
- The result tables shall:
  - Only contain values or the letters “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.[7]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).

[6] Significant figures are those digits that carry meaning contributing to its precision. For example with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as $1.2*10^2$ and $1.2*10^{-2}$.

[7] This requirement does not intend to give guidance on what indicators are mandated (“shall”) or voluntary.

- Use the value 0 only for parameters that have been calculated to be zero.
- Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains, wildlife that are not related to the declared product should therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section 5.4.4)
- Environmental performance (see Section 5.4.5)
- Additional environmental information (see Section 5.4.6)
- References (see Section 5.4.9)

The following information shall be included, when applicable:

- Information related to Sector EPDs (see Section 5.4.7)
- Differences versus previous versions (see Section 5.4.8)
- Executive summary in English (see Section 5.4.10)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image,
- Name and logotype of EPD owner,
- The text “Environmental Product Declaration” and/or “EPD”
- *Programme: The International EPD® System, www.environdec.com,*
- *Programme operator: EPD International AB*
- Logotype of the International EPD® System,
- EPD registration number as issued by the programme operator[8],
- *Date of publication (issue): 20XX-YY-ZZ,*
- *Date of revision: 20XX-YY-ZZ*, when applicable,
- *Date of validity; 20XX-YY-ZZ*
- A note that “*An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*.”

[8] The EPD shall not include a “registration number” if such is provided by the certification body, as this may be confused with the registration number issued by the programme operator.

- A statement of conformity with ISO 14025,

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following mandatory statement from ISO 14025: "*EPDs within the same product category but from different programmes may not be comparable*."
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[9] and reference PCR in a table with the following format and contents:

Product category rules (PCR): *<name, registration number, version and UN CPC code(s)>*
PCR review was conducted by: *<name and organisation of the review chair, and information on how to contact the chair through the programme operator>*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification
Third party verifier: *<name, organisation and signature of the third party verifier>* *In case of certification bodies:* Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☐ No

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Address and contact information to EPD owner,
- Description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- Name and location of production site,
- Product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- Identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),

[9] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

- Classification of Products by Activity (NACE/CPA) or
- Australian and New Zealand Standard Industrial Classification (ANZSIC),

- Description of the product, its application/intended use and technical functions, e.g. expected service life time,
- Geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- Functional unit or declared unit,
- Reference service life (RSL), if applicable,
- Declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- Reference to the main database(s) for generic data and LCA software used, if relevant,
- System diagram of the processes included in the LCA, divided into the life cycle stages,
- Description if the EPD system boundary is "cradle-to-gate", "cradle-to-gate with options" or "cradle-to-grave",
- Information on which life cycle stages are not considered (if any), with a justification of the omission,
- Relevant websites for more information or explanatory materials.
- ISO code for polymers (EN ISO 1043-1:2011 Plastics. Symbols and abbreviated terms. Basic polymers and their special characteristics)
- IUPAC[10] name
- CAS[11] Number
- The classification of the polymer according to GHS[12]
- The technical description of the product, as follows, in terms of functional characteristics and performances.

Mandatory Information on properties characterizing polymers, if relevant for the product application.

Technical specification	**Test method**
Density	ISO 1183-2:2004
Melt Flow Rate	ISO 1133-1:2011 ISO 1133-2:2011
Mechanical properties: Tensile	ISO 527-1-2: 2012
Melting temperature (or glass transition temperature for amorphous polymers)	ISO 11357-1:2016 ISO 11357-2:2013 ISO 11357-5:2013
Deflection Temperature under load	ISO 75f:2004

Voluntary Information on characteristic properties of the application field.

Technical specification	**Test method**
Mechanical properties: Impact	ISO 179: 2010

[10] International Union of Pure and Applied Chemistry
[11] Chemical Abstract Service
[12] Globally Harmonized System of Classification and Labelling of Chemicals

Vicat softening temperature	ISO 306:2013
Thermal conductivity	ISO 22007-1:2009
Volume resistivity	IEC 62631-3-1:2016
Flame behaviour	UL 94 (rev.2006)

NOTE - The values presented in the EPD shall be the typical values of the plastic material under consideration, where for "typical value" it is intended the average value measured over at least 10 lots of production. If a lower number of lots or a different method is used to determine the typical value this shall be detailed.

NOTE - The mandatory information relative to the material does not have to be reported if the material is not included in the application field of the above mentioned technical specifications.

NOTE – The voluntary information shall be coherent with the corresponding Technical Data Sheet.

For plastics with special performances/properties, intended for a specific purpose/application (for example: UV-resistant, flame retardant, electrically or thermally conductive grades, grades designed for high resistance to long term heat ageing, etc.), the most significant technical characteristics related to its peculiarity shall be detailed at the same level of the corresponding Technical Data Sheet.

NOTE - Equivalent standard methods, other than those indicated, may be used (e.g. ASTM). The company who develops the EPD can use the latest version of the standards if it verifies that the content is equivalent to the standards listed above.

If the IUPAC name or CAS number are considered by the applicant as Confidential Business Information, the use of generic product names is admitted. If such generic names are used, the polymeric family shall be stated (polyester, polyolefin, polyamide etc.) jointly with a description of the kind of polymer according to the level of disclosure accepted by the producer.

In applicable cases information about the concentration of the product shall be included.

Other specifications are voluntary.

This section may also include:

- Name and contact information of organisation carrying out the underlying LCA study,
- Additional information about the underlying LCA-based information, such as assumptions, cut-off rules, data quality and allocation.

5.4.4 CONTENT DECLARATION

The content declaration shall have the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of material shall be declared in the EPD at a minimum of 99 % of one unit of product.

The product components shall be declared by IUPAC names or CAS numbers or GHS (if applicable). If such information is considered by the applicant as Confidential Business Information, the use of generic descriptions, indicating the functionality of the substances rather than the chemical composition, is admitted.

An exception to the 99% rule is that all materials/substances hazardous to health and the environment, being carcinogenic, mutagenic or toxic to reproduction (CMR), allergic, PBT5 or vPvB6 shall be listed as such. Even if a substance does not have a classification, but is suspected to fall under any of these categories, it shall be listed as well.

The verifier will check the compliance of all materials/substances to legal requirements and customer demands related to legal requirements.

5.4.4.1. Information about recycled materials

Recycled material content, in percentage of post-industrial and post-consumer recycled materials shall be declared per declared unit

5.4.4.2. Information about packaging

As packaging is strongly connected with the product, the producer shall provide information about packaging in the EPD, when applicable. Packaging may be classified as:

- Distribution Packaging: packaging designed to contain one or more articles or packages, or bulk materials, for the purposes of transport, handling and/or distribution (ISO 21067-1:2016, Par. 2.2.6)
- Consumer Packaging: packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail (ISO 21067-1:2016, Par. 2.2.7).

Consumer packaging is generally the outcome of eco-design processes, or other activities, under direct control of the organisation. Many critical categories with strict legal requirements belong to consumer packaging category like food contact packaging and pharmaceutical packaging.

The type and function of packaging shall be reported in the EPD.

A statement of the source of the materials (pre-consumer or post-consumer) shall be presented in the EPD when the packaging is made in whole or in part by recycled materials.

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The EPD shall declare the environmental impact indicators, per declared unit and per life cycle stage, using the default impact categories, characterisation models and factors available on www.environdec.com/indicators. The source and version of the characterisation models and the factors used shall be reported in the EPD. Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

5.4.5.2. Use of resources

The EPD shall declare the indicators for resource use listed at www.environdec.com/indicators per declared unit, per life-cycle stage and in aggregated form.

5.4.5.3. Waste production and output flows

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the GPI. The EPD shall declare the indicators for waste production and output flows as listed at www.environdec.com/indicators per declared unit, per life-cycle stage and in aggregated form.

5.4.5.4. Other environmental indicators

The following indicators per declared unit shall be reported in the EPD, divided into core, upstream and downstream module:

- The “energy content of product” shall be declared in MJ: its estimation shall be made considering the gross calorific value of the product. Only the energy that is suitable for an eventual energy recovery at the end-of-life shall be considered (energy content of steel due to its carbon content for example shall not be considered since it is not practically recoverable);
- Primary energy demand (gross energy requirement, GER) of the plastic in primary form, measured as upper heating value (UHV) in MJ differentiate into
  - Non-renewable primary energy resources, measured as upper heating value (UHV) in MJ
  - Renewable primary energy resources, measured as harvested energy in MJ
- The bio-based material content shall be declared as percentage. It shall be evaluated using a radiocarbon and isotope ratio mass spectrometry analysis (EN 16640:2017Standard test methods for determining the bio-based content of natural range material using radiocarbon and isotope ratio mass spectrometry analysis). Any deviation shall be specified.
- With reference to the production of recycled plastic materials in the Core Module (related to both post-industrial and post-consumer waste) shall be declared:

- the technologies applied
- the per cent of recovered materials with respect to the total waste treated
- the destinations of the fractions not recovered (e.g. incineration with energy recovery, landfill)

An estimation of the avoided impacts related to the material recovery could be made and declared separately as additional environmental indicator (see 4.6). Estimation methods used for calculating the avoided impacts shall be presented in the LCA report

5.4.6 ADDITIONAL INFORMATION

Additional information related to environmental and health issues other than derived from LCA may be optionally provided.

Material Safety Data Sheet (MSDS) information may be used as a basis for risk communication

5.4.7 INFORMATION RELATED TO SECTOR EPDS

For sector EPDs, the following information shall also be included:

- a list of the contributing manufacturers that the Sector EPD covers,
- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market.

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall also be included:

- a description of the differences versus previously published versions, e.g. a description of the percentage change in results and the main reason for the change;
- a revision date on the cover page

5.4.9 REFERENCES

This section shall include a list of references, including the General Programme Instructions (including version number), standards and PCR (registration number, name and version).

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

For EPDs published in another language than English, an executive summary in English shall be included.

The executive summary should contain relevant summarised information related to the programme, product, environmental performance, additional information, information related to sector EPDs, references and differences versus previous versions.

6 GLOSSARY

CO_2	Carbon dioxide
CPC	Central product classification
EPD	Environmental product declaration
ISO	International Organization for Standardization
kg	kilogram
LCA	Life cycle assessment
PCR	Product Category Rules
SI	The International System of Units
SO_2	Sulphur dioxide
UN	United Nations

7 REFERENCES

CEN (2013), EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com

ISO (2000), ISO 14020:2000, Environmental labels and declarations – General principles

ISO (2004), ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times

ISO (2006a), ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework

ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines

ISO (2013), ISO/TS 14067:2013, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication

ISO (2014), ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines

ISO (2017), ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services

8 VERSION HISTORY OF PCR

VERSION 1.0, 2010-08-12

Original version.

VERSION 2.0, 2012-12-15

Added technical details, specific for the category, in the chapters 2 and 6.

VERSION 2.1, 2013-10-30

- Editorial changes and use of the latest PCR template
- Added link to UN CPC home page
- Update of the document to General Programme Instructions, version 2.01
  - General introduction and General information
  - Electricity production (data quality rules)
  - Indicators for environmental performance
  - EPD Validity
  - Content of the EPD

VERSION 2.11, 2015-01-27

- Editorial changes by the Secretariat

VERSION 2.2, 2017-12-21

- Validity extended with 8 months based on Section 5.5.2.1 in the General Programme Instructions version 3. The extension is done due to an urgent market need, and to allow the ongoing update of the PCR to be aligned with the latest programme instructions

VERSION 3.0, 2018-06-21

- Compliance with to the General Programme Instructions, Version 3.0.
- Major editorial changes and use of PCR template by the Guidance for PCR development

VERSION 3.01, 2019-09-06

- Clarified terms of use
- Editorial changes

VERSION 3.0.2, 2022-08-17

- The validity of this PCR has been extended until 2023-06-21, as an updating process has been initiated.
- The PCR Moderator from Quota Sette Srl has changed.
- Editorial changes in Sections 5.4.5.1 to 5.4.5.3, to clarify the indicator list at www.environdec.com applies also for the indicators of resource use, waste production and other output flows.

ANNEX A - HS[13] 2017 and CPV[14] 2007 classifications for plastics in primary form

The products under the following codes are included in the purposes of this PCR document:

HS 2017 Code(s)

- 3901 - polymers of ethylene, in primary forms
- 3902 - polymers of propylene or of other olefins, in primary forms
- 3903 - polymers of styrene, in primary forms
- 3904 - polymers of vinyl chloride or of other halogenated olefins, in primary forms
- 3905 - polymers of vinyl acetate or of other vinyl esters, in primary forms; other vinyl polymers in primary forms
- 3906 - acrylic polymers in primary forms
- 3907 - polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
- 3908 - polyamides in primary forms
- 3909 - amino-resins, phenolic resins and polyurethanes, in primary forms
- 3910 - silicones in primary forms
- 3911 - petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones
- 3912 - cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms
- 3913 - natural polymers (for example, alginic acid) and modified natural polymers (for example, hardened proteins, chemical derivatives of natural rubber), not elsewhere specified or included, in primary forms
- 3914 - ion-exchangers based on polymers of headings Nos. 39.01 to 39.13, in primary forms

CPV 2007 Code(s)

- 24500000-9 – Plastics in primary forms
- 24510000-2 - Primary-form polymers of ethylene
- 24520000-5 - Primary-form polymers of propylene
- 24530000-8 - Primary-form polymers of styrene
- 24540000-1 - Primary-form of vinyl polymers
- 24541000-8 - Primary-form polymers of vinyl acetate
- 24542000-5 - Primary-form acrylic polymers
- 24550000-4 - Primary-form of polyesters
- 24560000-7 - Primary-form polyamides
- 24570000-0 - Primary-form urea resins
- 24580000-3 - Primary-form amino-resins
- 24590000-6 - Primary-form silicone

[13] The International Convention on the Harmonized Commodity Description and Coding Systems

[14] Common Procurement Vocabulary

