PRODUCT CATEGORY RULES (PCR)
DATE 2022-09-30

SOLID WASTE COLLECTION, TREATMENT AND DISPOSAL SERVICES

PRODUCT CATEGORY CLASSIFICATION: UN CPC 942-943.

PCR 2022:05
VERSION 1.0.1

VALID UNTIL 2026-09-28

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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, ISO 14040:2006, ISO 14044:2006, and product-specific standards such as EN 15804 and ISO 21930 for construction products. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent, consistent and verifiable information about the environmental performance of their products (goods or services).

The rules for the overall administration and operation of the programme are the General Programme Instructions (GPI), publicly available at www.environdec.com. A PCR complements the GPI and the normative 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.

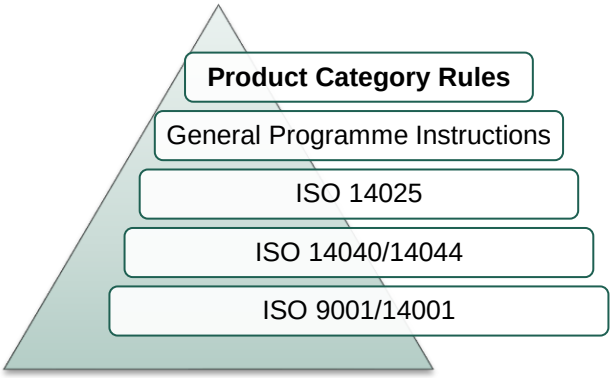

Figure 1 The hierarchy between PCRs, standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory, i.e. a requirement.
- The term “should” is used to indicate a recommendation, rather than a requirement. Any deviation from a “should” requirement shall be justified in the PCR development process.
- The terms “may” or “can” is used to indicate an option that is permissible.

For definitions of further 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 at www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR may be sent directly to the PCR Moderator and/or the Secretariat during its development or during its period of validity.

Any references to this document shall 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, and make it 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 EPDs, Environmental Product Declarations.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Solid waste collection, treatment and disposal services
Registration number and version:	2022:05, version 1.0.1
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:	Adriana Del Borghi (adriana.delborghi@unige.it), CE.Si.S.P, TETIS Institute Srl , University of Genoa, Italy
PCR Committee:	▪ CE.Si.S.P. (Centre for the Development of Product Sustainability), www.cesisp.unige.it ▪ TETIS Institute Srl, Spin Off of the University of Genoa, Italy (www.tetisinstitute.org)
Date of publication and last revision:	2022-09-30 (version 1.0.1) Version 1.0 was published 2022-09-28. See Section 8 for a version history.
Valid until:	2026-09-28
Schedule for renewal:	A PCR is valid for a pre-determined time period 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 PCR and renewing its validity. A PCR may be also be updated without prolonging its period of validity, provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for the latest version of the PCR. When there has been an update of the PCR, the new version should be used to develop EPDs. The old version may however be used for 90 days after the publication date of the new version, as long as the old version has not expired.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 4.0, based on ISO 14025 and ISO 14040/14044 ▪ PCR Template to GPI 4.0, version 2021-06-21
PCR language(s):	At the time of publication, this PCR was available in English. If the PCR is available in several languages, these are available at www.environdec.com. 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 Waste collection, treatment, and disposal services and the declaration of this performance by an EPD. The product category corresponds to UN CPC 942 (Waste collection services) and UN CPC 943 (Waste treatment and disposal services).

The product category is defined under UN CPCs classification:

Section: 9 – Community, social and personal services

- Division: 94 – Sewage and waste collection, treatment and disposal and other environmental protection services
- Groups:
    - **942 - Waste collection services**
    - **943 - Waste treatment and disposal services**

This PCR is applicable to solid waste, including but not limited to the following waste list:

- Municipal Solid Waste (MSW)
- Medical waste
- Textile waste
- Biowaste
- End-of-life vehicles (in Europe as defined by Directive 2000/53/EC of the European Parliament and of the Council)
- Batteries and accumulators (in Europe as defined by Directive 2006/66/EC of the European Parliament and of the Council)
- Waste of Electric and Electronic Equipment (WEEE) (in Europe as defined by EU WEEE Directive 2012/19/EU)

For the scope of this PCR, “treatment” means the set of processes that can lead to subsequent disposal, recycling or to the processes of preparation for reuse (to reach the end-of-waste state), according to the allocation rules described in Section 4.6.2 (processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached).

For example, this PCR is valid for:

- Treatments to reduce, eliminate, or transform hazardous waste held in the WEEE waste and in the batteries and accumulators.
- Mechanical, biological (e.g. anaerobic digestion), chemical, and/or physical procedures or incineration that may lead to a disposable residual or result in the recovery of a recyclable material.
- Treatments that allow the chemical conversion of carbon and hydrogen contained in waste (non-recyclable plastics, Refused-derived fuel (RDF) and dry fraction) by partial oxidation and subsequent purification.

This PCR is not applicable for recycling processes. Such processes are instead covered by the PCR for Waste and scrap recovery (recycling) services, covering UN CPC 894 (Materials recovery (recycling) services, on a fee or contract basis), which is under development. This PCR will replace PCR 2018:07 Waste washing processes for production of aggregates and PCR 2013:08 Plastic waste and scrap recovery (recycling) services. The latter is applicable until the new PCR has been published, but only for recycling of plastics.

This PCR is not applicable to UN CPC 94312 (Ship-breaking and other dismantling of wrecks services).

This PCR is not applicable for the electricity and/or heat generated from waste incineration (for which PCR 2007:08 Electricity, steam and hot/cold water generation and distribution shall be used), for captured landfill gas, or biogas from anaerobic digestion.

This PCR excludes construction-sector services (e.g. demolition and disposal of construction waste), for which PCR 2019:14 Construction products should be used.

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

See *https://unstats.un.org/unsd/classifications/Family/Detail/1074* for additional information on the UN CPC classification system.

2.2.2 GEOGRAPHICAL SCOPE

This PCR may be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid for a 5-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 declared indicators of environmental impact,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental, social or economic information.

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

During the validation maintenance procedure, at least the following parameters should be monitored:

- Quantity of waste treated
- Waste provenance
- Waste composition
- Electricity consumption
- Fuel consumption
- Raw material consumption
- Waste production
- Air and water emissions: quantity and quality
- Transportation/handling/treatment/storage of process related emissions and waste

3 PCR REVIEW AND BACKGROUND INFORMATION

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

3.1 OPEN CONSULTATION

3.1.1 VERSION 1.0

This PCR was available for open consultation from 2022-02-07 until 2022-04-06, during which any stakeholder was able to provide comments by contacting the PCR Moderator and/or the Secretariat.

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. The following stakeholder provided comments during the open consultation and agreed to be listed as contributors in the PCR and at www.environdec.com:

- Luca Rigamonti, Politecnico di Milano, Department of Civil and Environmental Engineering

3.2 PCR REVIEW

3.2.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at 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 Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	Lars-Gunnar Lindfors
Review dates:	2022-05-02 until 2022-06-10

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs and other internationally standardized methods that could potentially act as PCRs were considered to avoid unnecessary overlaps in scope and to ensure harmonisation with established methods of relevance for the product category. The existence of such documents was checked among the following EPD programmes and international standardisation bodies:

- International EPD® System. www.environdec.com.
- PEP ecopassport®. http://www.pep-ecopassport.org/create-a-pep/produce-a-lca/
- Japan Environmental Management Association for Industry (JEMAI). http://www.ecoleaf-jemai.jp/eng/pcr.html
- UL Environment. https://industries.ul.com/environment/transparency/product-category-rules-pcrs#uledev
- EPD Italy https://www.epditaly.it/pcr-in-via-di-sviluppo/
- European Commission Product Environmental Footprint (PEF) initiative, Single Market for Green Products - Environment - European Commission (europa.eu)

No existing PCRs or other relevant internationally standardized methods with overlapping scope were identified. This PCR document is, however, related to the following PCRs in the International EPD® System:

- PCR 2018:07 Waste washing processes for production of aggregates (CPC 89420), and
- PCR 2013:08 Plastic waste and scrap recovery (recycling) services,

because recycling is usually the alternative service to the disposal in landfill considered in this PCR. The above two PCRs will be replaced by a new PCR on waste and scrap recovery (recycling services), for any materials, that is under development in the International EPD® System. This new PCR, and the present PCR, will complement each other as they cover different processes in within waste management.

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed to enable publication of EPDs for this product category based on ISO 14025 and ISO 14040/14044. The PCR enables different practitioners to generate consistent results when assessing the environmental impact of products and services of the same product category, and thereby it supports comparability of products and services within a product category.

The motivation to develop this PCR is based on the harmonization of methodological rules for the LCA studies regarding the solid waste collection, treatment and disposal services and the declaration of the environmental performances with an EPD.

3.5 UNDERLYING STUDIES USED FOR PCR DEVELOPMENT

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

- Christensen T. H, Damgaard A, Levis J., Zhao Y, Björklund A, Arena U, Barlaz M. A, Starostina V, Boldrin A, Astrup T. F., Bisinella V. (2020), Application of LCA modelling in integrated waste management, Waste Management 118: 313-322
- Clift R, Doig A, Finnveden G (2000) The application of life cycle assessment to integrated solid waste management, part I-methodology.Trans Inst Chem Eng, Part B: Process Saf Environ 78(B4):279–287
- Del Borghi A, Binaghi L, Del Borghi M, Gallo M (2007) The application of the environmental product declaration to waste disposal in a sanitary landfill—four case studies. Int J Life Cycle Assess 12(1):40–49
- Del Borghi A, Gallo M, Del Borghi M, (2009) A survey of life cycle approaches in waste management. Int J Life Cycle Assess 14: 597-610
- European Commission—DG Joint Research Centre (2008) Life cycle guidelines for the management of the organic fraction of municipal waste (biowaste), JRC contract n.382460
- Finnveden G (1999) Methodological aspects of life cycle assessment of integrated solid waste management systems. Resour Conserv Recycl 26:173–187
- Laurent A, Bakas I, Clavreul J, Bernstad A, Niero M, Gentil E, Hauschil M. Z, Christensen T. H., (2014), Review of LCA studies of solid waste management systems – Part 1: Lessons learned and perspectives, Waste Management 34:573-588

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

The functional unit is the management of 1000 kg of solid waste.

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

For the landfill, the reference flow is defined at the inbound gate of the waste management service operator.

Even if the FUs are identical, it should still be stated that there are functional differences between the services covered by different EPDs, which shall be accounted for when comparing EPDs.

4.2 TECHNICAL SPECIFICATION, LIFESPAN AND REFERENCE SERVICE LIFE (RSL)

The Reference Service Life (RSL) is not applicable for this product category.

The technical lifespan of the landfill site, defined as the useful life of the landfill, from opening up to a defined time period after closure, shall be declared. For Europe, this post-closure period is at least 30 years, according to the landfill directive 1999/31/EC amended by EU 2018/85.

4.3 SYSTEM BOUNDARY

The scope of this PCR and EPDs is based on it is cradle to grave.

All environmentally relevant processes from cradle to grave should be included, so that at minimum 99% of the total energy use, mass of product content, and environmental impact is accounted for (see Section 4.5).

4.3.1 LIFE-CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of the product/service is divided into three 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 and in aggregated form. 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 unit processes are part of the product/service system and shall be classified as upstream processes.

If the EPD is on a waste treatment and/or disposal service (including or excluding a waste collection service), the **upstream processes** include cradle-to-gate environmental information on waste collection and transport to the treatment and/or disposal plant:

- Operation of waste discharging from litter bins.
- Waste transfer to waste transfer stations (when applicable) and to the waste treatment plants (including any sanitization of vehicles).

If the EPD is on a waste treatment and/or disposal service (including or excluding a waste collection service), the upstream **infrastructure** shall be excluded, unless it is about management and incineration of sanitary/infectious waste. In this case, the following infrastructure shall be included in upstream module:

- Production of litter bags/bins/containers.
- Transportation and delivery of containers for sanitary/infectious waste.
- Regeneration and end-of-life of litter bags/bins/containers.

If the EPD is on a waste collection service only, the **upstream processes** include:

- Production of litter bags/bins/containers.

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 unit processes are part of the product system and shall be classified as core processes.

If the EPD is on a waste treatment and/or disposal service (including or excluding a waste collection service), the **core module** represents the “carrying out the service” and comprises gate-to-gate environmental information on the operation stage and on the handling of process-related emissions of treatment and/or disposal plant and waste (e.g. air emissions, wastewater, sludge, ash, biogas, leachate):

- Operation stage (including waste pre-treatment and advanced treatments, preparation for re-use, treatments to produce Solid Secondary Fuels (SSF) and, for infectious waste, emptying and sanitization of containers).
- Transportation of process-related waste treated off-site (leachate, fuel related waste, Solid Secondary Fuels (SSF)).
- Handling/treatment/storage of process-related emissions of treatment and/or disposal plant and waste (biogas, leachate, fuel related waste).

If the EPD is on a waste treatment and/or disposal service (including or excluding a waste collection service), the core infrastructure shall be excluded, unless it is about a landfill site. In this case, the following infrastructure shall be included in core module:

- Construction of the landfill (including maintenance with periodicity of less than three years).
- Landfill post-closure (including rehabilitation of the site).
- Transportation of inputs and outputs.

If the EPD is on a collection service only, the core processes include:

- Operation of waste discharging from litter bins.
- Waste transfer to waste transfer stations (when applicable) and to the waste treatment plants.
- Sanitization of vehicles and litter bags/bins/containers

Core processes not listed may also be included. Manufacturing of a minimum of 99% of the total weight of the declared product including packaging shall be included.

The following processes shall not be included:

- Recycling of solid waste constituents’ materials/components (only preparation for re-use is included).
- Energy recovery due to the incineration of solid waste.
- Business travel of personnel.
- Travel to and from work by personnel.
- Research and development activities.

Any deviation from these rules must be declared in the LCA and in the EPD.

4.3.1.3. Downstream processes

If the EPD is on a waste treatment and/or disposal service (including or excluding a waste collection service, the **downstream processes** include the production of by-products (e.g. electricity/heat by biogas, electricity/heat lost by burning excess biogas, stabilized waste, dry fraction for RDF production, residuals to recycling):

- Electricity and/or heat is produced by biogas combustion or by burning excess biogas (quantitative information only). For energy production see PCR 2007:08 Electricity, steam and hot/cold water generation and distribution.
- Stabilized waste.
- Dry fraction for RDF production.
- Residuals to recycling.
- Any other relevant by-product.

The environmental impact connected to the further processing of the waste after it has become a by-product is allocated to its user, according to the Polluter Pays Principle.

If the EPD is on a collection service only, the downstream processes include:

- End-of-life of litter bins/containers.

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

Boundaries to nature are defined as where the flows of material and energy resources leaves nature and enters the technical system (i.e. the product system). Emissions cross the system boundary to nature when they are emitted to air, soil or water.

4.3.2.2. Boundary towards other technical systems

Boundaries towards other technical systems define the flow of materials and components to/from the product system under study and from/to other product systems. If there is an inflow of recycled material to the product system in the production/manufacturing stage, the transport from the scrapyard/collection site to the recycling plant, the recycling process, and the transportation from the recycling plant to the site where the material is being used shall be included. If there is an outflow of material or component to recycling, the transportation of the material to the scrapyard/collection site shall be included. The material or component going to recycling is then an outflow from the product system.

See Section 4.6 for further guidance.

4.3.2.3. Temporal boundary

The temporal boundary defines the time period for which the life cycle inventory data is recorded, e.g. for how long emissions from waste deposits are accounted. As default, the time period over which inputs to and outputs from the product system is accounted for shall be 100 years from the year that the LCA model best represents, considering the representativeness of the inventory data. This year shall, as far as possible, represent the year of the publication of the EPD.

Leachate and landfill gas production, associated with landfilling 1 000 kg of waste, shall be modelled until a defined time period since landfill closure (see Section 4.3).

4.3.2.4. Geographical boundary

The geographical boundary defines the geographical coverage of the LCA. This shall reflect the physical reality of the product under study, accounting for the representativeness of technology, input materials and input energy.

4.3.2.5. Boundaries towards risk assessment

Environmental impacts due to accidents and undesired events are not part of the LCA but part of the environmental risk assessment that may be reported under Additional environmental information.

Environmental burdens in conjunction with mishaps occurring more often than once in three years are considered to belong to normal operation and are part of the LCA. In order to allocate burdens, it is recommended to use an average of three years.

4.4 SYSTEM DIAGRAM

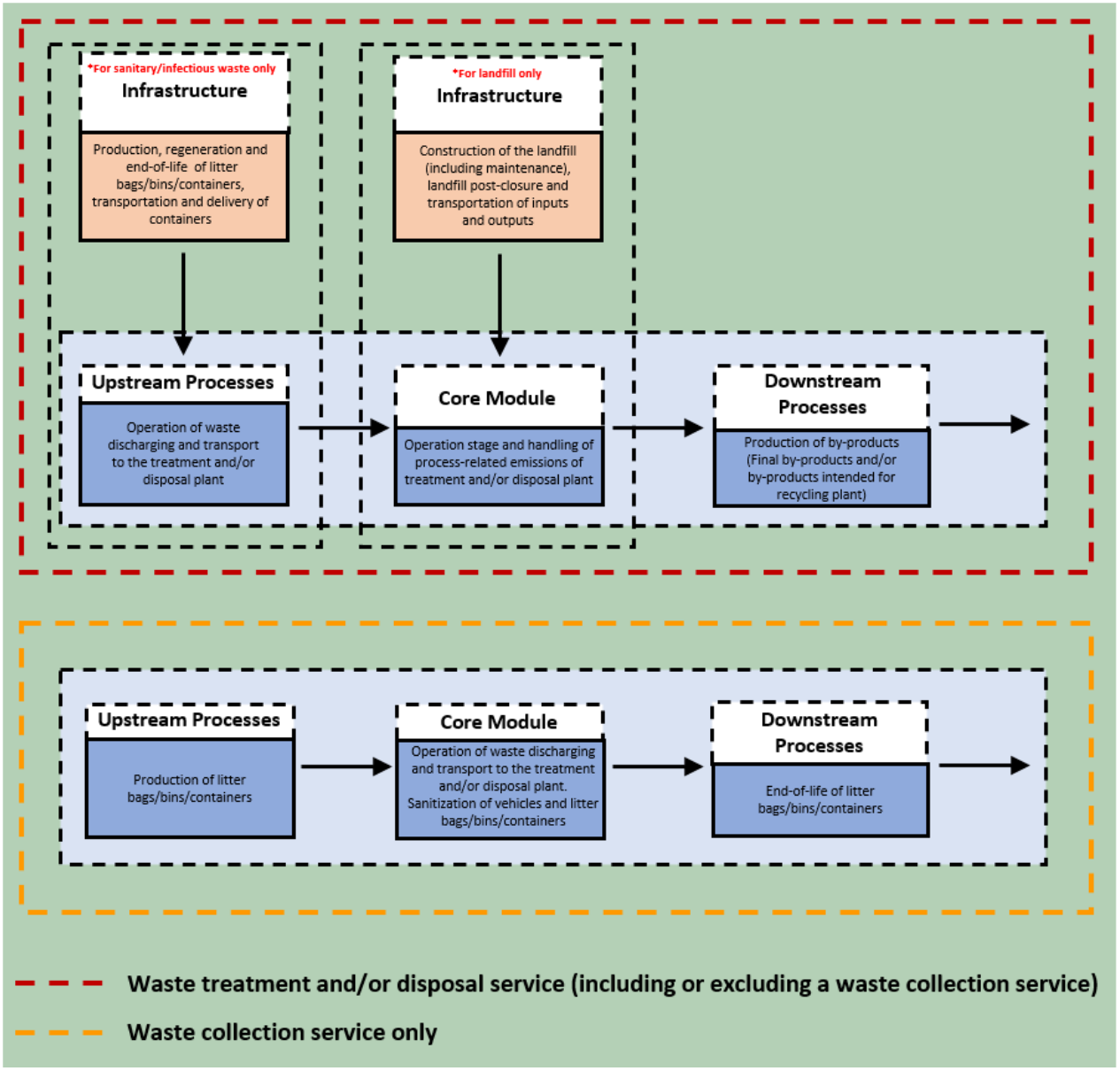

Figure 2 *System diagram illustrating the processes that shall be included in the product system, divided into upstream, core and downstream processes. The illustration of processes to include may not be exhaustive.*

The figure illustrates that all relevant unit processes taking place in the upstream-, core- and downstream processes shall be included.

4.5 CUT-OFF RULES

A cut-off rule of 1% shall be applied. In other words, the included inventory data (not including inventory data of processes that are explicitly outside the system boundary as described in Section 4.3) shall together give rise to at least 99% of the results of any of the environmental impact categories. Also, 99% of the mass of the product content and 99% of the energy use of the product life cycle shall be accounted for. The cut-off of inventory data should, however, be avoided, and all available inventory data shall be used.

The cut-off of inventory data, based on the above cut-off rule, should be an output of a sensitivity analysis, alone or in combination with expert judgment based on experience of similar product systems. Further, the cut-off shall be possible to verify in the verification process, hence the exclusion of inventory data based on the cut-off rule shall be documented in the LCA report, and the EPD developer shall provide the information the verifier considers necessary to verify the cut-off.

4.6 ALLOCATION RULES

Allocation can be divided into allocation of co-products, i.e. allocation of unit processes that generate several products, and allocation of waste, i.e. allocation of unit processes that generate materials that are, for example, landfilled, recovered, recycled or reused, and which require further processing to cease to be waste and become products (see criteria for end-of-waste state in Section 4.6.2).

The principles for allocation of co-products and allocation of waste are described separately in the following subsections.

4.6.1 CO-PRODUCT ALLOCATION

The following hierarchy of allocation methods shall be followed for co-product allocation:

1. Allocation shall be avoided, if possible, by dividing the process to be allocated into sub-processes and collecting the inventory data for each sub-process.
2. If allocation cannot be avoided, the inventory data should be partitioned between the different co-products in a way that reflects the underlying physical relationships between them, i.e. allocation should reflect the way in which the inventory data changes if the quantities of delivered co-products change.
3. If a physical relationship between the inventory data and the delivery of co-products cannot be established, the inventory data should be allocated between the co-products in a way that reflects other relationships between them. For example, inventory data might be allocated between co-products in proportion to their economic values. If economic allocation is used, a sensitivity analysis exploring the influence of the choice of the economic value shall be included in the LCA report.

4.6.2 ALLOCATION OF WASTE TREATMENT PROCESSES

Allocation of waste shall follow the polluter pays principle and its interpretation in EN 15804: “processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached.” The end-of-waste state is reached when all the following criteria for the end-of-waste state are fulfilled (adapted from EN 15804):

- the recovered material, component or product is commonly used for specific purposes;
- a market or demand, identified e.g. by a positive economic value, exists for such a recovered material, component or product;
- the recovered material, component or product fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- the use of the recovered material, product or construction element will not lead to overall adverse environmental or human health impacts.

The above outlined principle means that the generator of the waste shall carry the full environmental impact until the point in the product life cycle in which the end-of-waste criteria are fulfilled. Waste may have a negative economic market value, and then the end-of-waste stage is typically reached after (part of) the waste processing and further refinement, at the point at which the waste no longer has a negative market value. This allocation method is (in most cases) in line with a waste generator’s juridical and financial responsibilities.

In particular, the following rules apply:

- The allocation of treatment/handling of process-related emissions and waste follows the general rules (see General Programme Instructions).

For integrated waste management system, only the environmental impacts of dry-wet separation that are connected to the treatment shall be included. E.g., for waste incineration occurring after the dry-wet separation, only the operation on the dry fraction – produced for a subsequent RDF – shall be considered, while for waste stabilizing, only the operation on the wet fraction shall be considered.

- Allocations of energy use and emissions in the manufacturing of the waste pre-treatment shall be based on mass.
- The burdens of collecting and transporting the waste to the incineration plant as well as the incineration process shall be allocated to the waste treatment service (according to the Polluter Pays allocation method). For energy production by waste incineration, see PCR 2007:08 Electricity, steam and hot/cold water generation and distribution

- For landfill, leachate treatment in external wastewater treatment plant shall be included and waste produced during this phase (i.e. sludge) shall be declared without assigning the environmental impact of their subsequent treatment.
- The environmental impact of the processing of by-products that have reached the end-of-waste state (e.g. recycled materials (metals etc.), stabilized waste (compost etc.), and dry fraction of waste, is allocated to the subsequent user.
- By-products shall be considered as output of the system.

See Section A.5.2 (Allocation of waste) of GPI for further information and examples.

4.7 DATA QUALITY REQUIREMENTS AND SELECTION OF DATA

Life cycle inventory data are classified into specific data and generic data, where the latter can be selected generic data or proxy data. The data categories are 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;
  - actual data from other parts of the life cycle traced to the product under study, for example site-specific data on the production of materials or generation of electricity provided by contracted suppliers, and transportation data on distances, means of transportation, load factor, fuel consumption, etc., of contracted transportation providers; and
  - LCI data from databases on transportation and energyware that is combined with actual transportation and energy parameters as listed above.
- generic data (sometimes referred to as “secondary data”), divided into:
  - selected generic data: data (e.g. commercial databases and free databases) that fulfil prescribed data quality requirements for precision, completeness, and representativeness (see below Section 4.7.1),
  - proxy data: data (e.g. commercial databases and free databases) that do not fulfil all of the data quality requirements of “selected generic data”.

Specific data shall be used for the core processes (Section 4.3.1.2). Specific data shall be used for upstream and downstream processes, when available, otherwise generic data may be used. Generic data should be used in cases in which they are representative for the purpose of the EPD, e.g. for bulk and raw materials on a spot market, if there is a lack of specific data on the final product or if a product consists of many components.

4.7.1 RULES FOR USING GENERIC DATA

For generic data to be classified as “selected generic data”, the following requirements apply:

- datasets shall be based on attributional LCA modelling (e.g., not be based on marginal data and not include credits from system expansion),
- the reference year shall be as current as possible and should be representative for the validity period of the EPD,
- the 1% cut-off rule (as described in Section A.3.3) shall be met on the level of the product system,
- datasets shall represent average values for a specific reference year; however, how data are generated could vary, e.g. over time, and then they should have the form of a representative annual average value for a specified reference period (such deviations shall be justified and declared in the EPD), and
- the representativeness of the data shall be assessed to be better than ±5%, in terms of the environmental impact calculated on the basis of the data, of data that is fully representative for the given temporal, technological and geographical context.

If selected generic data that meets the above data quality requirements are not available, proxy data may be used. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact of the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data contributing to the results of the environmental impact indicators.

4.7.2 EXAMPLES OF DATABASES FOR GENERIC DATA

Table 1 lists examples of databases and datasets to be used for generic data. Please note that a data quality assessment shall be performed also for data listed in the table, and that other data that fulfil the data quality requirements may also be used.

PROCESS	GEOGRAPHICAL SCOPE	DATASET	DATABASE
Waste management	Global	-	European Reference Life Cycle Data System (ELCD), http://lca.jrc.ec.europa.eu/ Ecoinvent 3.8 (or latest version), https://ecoinvent.org/ WRATE (Waste and Resources Assessment Tool for the Environment), http://www.wrate.co.uk/
Electricity	Global	-	European Reference Life Cycle Data System (ELCD) http://lca.jrc.ec.europa.eu/ Data combined with IEA (International Energy Agency) statistics on electricity generation mixes for nations, regions, etc. http://www.iea.org/statistics/
Transports	Global	-	European Reference Life Cycle Data System (ELCD), http://lca.jrc.ec.europa.eu/ Ecoinvent 3.8 (or latest version), https://ecoinvent.org/

Table 1 Examples of databases and datasets to use for generic data.

4.7.3 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE PER LIFE-CYCLE STAGE

Below are further data quality requirement per life-cycle stage. Exceptions to the requirements may be accepted, if justified in the EPD; such exceptions are subject to the approval by the verifier on a case-to-case basis.

4.7.3.1. Upstream processes

- Specific data should be used for amounts of inputs and outputs of the following activities:
  - waste transport (fuel use and emissions in conjunction with transportation), and
  - distances from transportation within the municipalities and to the waste treatment plant and type of vehicles.

If specific data cannot be retrieved, selected generic data (also referred to as secondary data) are allowed to be used to substitute specific data providing they fulfil prescribed characteristics according to the Section 4.7.1 and the Annex A of General Programme Instruction.

- Selected generic data may be used for:
  - waste collection
  - resource use and emissions in conjunction with electricity used in suppliers' processes
  - resource use and emissions in conjunction with production of auxiliary materials and chemicals used in suppliers' processes

- resource use and emissions in conjunction with treatment of operational waste from suppliers' processes.

- For upstream processes modelled with specific data, generation of electricity used 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 as provided by the electricity supplier.
    2. Residual electricity mix of the electricity supplier on the market.
    3. Residual electricity mix on the market.
    4. Electricity consumption mix on the market.

    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 consumption mix.

    "The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

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

For the upstream phase concerning to **infrastructures** (for sanitary/infectious waste)**:**

- Specific data shall be used for:
    - material composition of the litter bins/containers and of the plastic bags.
- Selected generic data may be used for:
    - manufacture of materials and chemicals,
    - transportation distances,
    - transportation services (fuel use and emissions in conjunction with transportation),
    - construction activities (electricity consumption and fuel use during assembly operations),
    - reinvestments (electricity consumption and fuel use during maintenance operations),
    - dismantling (electricity consumption and fuel use during dismantling operations), and
    - waste treatment processes.

4.7.3.2. Core processes

- Specific data shall be used for amounts of inputs and outputs of the following activities:
    - operation of waste treatment plant,
    - waste pre-treatment e.g. sorting, dry-wet separation,
    - emptying and sanitization of containers, for infective waste,
    - waste compacting and covering (for landfill),
    - distances for the transportation of process-related emissions and waste and type of vehicles, and
    - handling/treatment/storage of process-related emissions and waste, specifically:
        - Leachate and biogas quantity and quality (leachate and biogas produced, collected and dispersed shall be considered).
        - Quantity, quality and depuration efficiency of the leachate produced shall be evaluated as a function of the age of landfill. Data about the fraction of the leachate lost to soil shall be included and the amount should be declared. Any assumption shall be fully documented.
        - Data concerning biogas production (quantity and quality) versus time shall be calculated using predicting-type mathematical models which start from the amount of waste disposed in landfill and their composition. This includes the fraction of biogas that is captured for energy production, the one that is lost and the one that is burnt in flares. Energy loss through the burning of excess biogas shall be included.
- For electricity used in the core processes, generation of electricity used 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 as provided by the electricity supplier.
2. Residual electricity mix of the electricity supplier on the market.
3. Residual electricity mix on the market.
4. Electricity consumption mix on the market. This option shall not be used for electricity used in processes over which the manufacturer (EPD owner) has direct control[2].

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 consumption mix.

"The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

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

- For the landfills, as regards the **infrastructure** associated with the core module specific data shall be used for:
  - material composition of the landfill site and
  - areas (m^2) subject to rehabilitation.

4.7.3.3. Downstream processes

Specific data shall always be used if available. Selected generic data and other generic data may – according to GPI – also be used if specific data are not available.

Some data quality requirements to be used are shown below:

- If electricity and/or heat is produced by biogas combustion, actual data about the efficiency of the electric and/or thermal generation/co-generation plant and the amount of electricity and/or heat produced.
- If biogas is flared, actual data about the energy lost by burning excess biogas.
- If stabilized waste is produced, actual data about their possible use (e.g. agricultural uses, landscape activities, landfill daily covering).
- Actual data about the management of residues.
- For waste stabilizing, if a dry fraction is produced for a subsequent RDF, actual data about their use.

4.7.4 DATA QUALITY DECLARATION

EPDs may include a declaration of the quality of data used in the LCA calculations.

4.7.5 OTHER CALCULATION RULES

The following rules apply for the landfill:

- **Core module**

  The reference flow shall be calculated as the total amount of waste (expressed in kg) treated during technical lifespan of the landfill (see 4.2).

- **Core infrastructure**

  The reference flow for infrastructure shall be calculated as the reference flow calculated for the core module divided by the total amount of waste treated during the technical lifespan. Regarding the core infrastructure, the material composition can be gathered e.g. from the documentation of the construction process, such as plans, invoices, project reports, environmental impact assessments, etc.

[2] For electricity markets without trade of Guarantees of Origin (or similar), the residual mix will, however, be identical to the consumption mix.

The need for reinvestments during the technical service life shall be estimated and documented.

Unless specific data are available, the following typical values (based on the authors' experience) can be used as reference for the following parameters:

Parameter	**Value**
Defined time period after post-closure (for Europe)	30 years
Landfill Gas Production	200 m^3 from 1 t of municipal solid waste (for 30 years)
Landfill Gas Composition	50% CH_4 50% CO_2 (v/v)
Landfill Gas Collection	60% landfill gas collected, 40% landfill gas lost
Waste Feedstock	10 MJ for 1 kg of municipal solid waste
Leachate Production (for a Mediterranean Climatic Zone)	150 l from 1 t of municipal solid waste (for 30 years). This common value has to be used with particular care as leachate production is very variable and depends on different parameters.
Content of Organic Fraction	0.4 t for 1 t of municipal solid waste

Table 2 Reference values in case of lack of specific data for some parameters.

4.8 ENVIRONMENTAL PERFORMANCE INDICATORS

The EPD shall declare the default environmental performance indicators and their methods as described at the website (www.environdec.com/indicators), which includes both inventory indicators and indicators of potential environmental impact. The source and version of the impact assessment methods and characterisations factors used shall be reported in the EPD. Alternative regional impact assessment methods and characterisation factors may 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.

If the default list of environmental performance indicators and methods at the website is updated, the previous version of the list is valid in parallel to the new version during a transition period of at least 90 days, as described at the website.

Apart from the required inventory indicators, other inventory data may also be declared in the EPD, if relevant and useful for EPD users. Such data shall not be declared in the main body of the EPD, but in an annex.

See Section 5.4.6.4 for the other indicators to be declared in the EPD.

4.9 SECTOR EPD

The International EPD® System allows for an industry association to develop an EPD in the form of a Sector EPD. A Sector EPD declares the average product of multiple companies in a clearly defined sector in a clearly defined geographical area. Products covered in a sector EPD shall follow the same PCR and the same functional unit shall be applied.

Any communication of the results from a Sector EPD should contain the information that the results are based on averages obtained from the sector as defined in the EPD. The communication shall not claim that the sector EPD results are representative for a certain manufacturer or its product.

The following information shall also be included in a Sector EPD:

- 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 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 at www.environdec.com.

The EPD content shall:

- be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations – General principles),
- be verifiable, accurate, relevant and not misleading, and
- not include rating, judgements or direct comparison with other products[3].

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

The content of EPDs published in machine-readable format shall correspond with the content of the underlying EPD.

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, also subject to the verification process.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used where available, 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.
  - Results of the environmental performance indicators shall be expressed in the units prescribed by the impact assessment methods, e.g. kg CO_2 equivalents.
- Three significant figures[4] should be adopted for all results. The number of significant digits shall be appropriate and consistent.
- Scientific notation may be used, e.g. 1.2E+2 for 120, or 1.2E-2 for 0.012.
- 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.

[3] Therefore, results of normalization are not allowed to be reported in the EPD.

[4] 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 $1.2*10^{-2}$.

- The result tables shall:
  - Only contain values or the letters “ND” (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.[5]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “ND”).
  - 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 shall 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)
- Waste treatment technology (see Section 5.4.5)
- Environmental performance (see Section 5.4.6)
- Additional environmental information (see Section 5.4.7)
- Additional social and economic information (see Section 5.4.8)
- References (see Section 5.4.10)

The following sections shall be included, if relevant:

- Differences versus previous versions (see Section 5.4.9)
- Executive summary in English (see Section 5.4.11)

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[6]

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

[6] 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.

- 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."*
- A statement of conformity with ISO 14025.
- For EPDs covering multiple products: a statement that the EPD covers multiple products and a list of all products covered by the EPD.
- For Sector EPDs: a statement that the EPD is a Sector EPD.
- For construction product EPDs:

In the case of EPDs registered through a regional hub (a regional or national programme based on and fully aligned with the International EPD® System through an agreement with the programme operator), "Programme", "Programme operator", and "Logotype" shall be expanded to include a reference to the regional programme and the organisation responsible for it.

Where applicable, the cover page shall also include the following information:

- Information about dual registration of EPD in another programme, such as registration number and logotype.
- A statement of conformity with other standards and methodological guides.

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 statement on the requirements for comparability of EPDs, adapted from ISO 14025: *"EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison."*
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[7] and the 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 ☐ Pre-verified tool

[7] 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.

In case of certification bodies: Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* *<Name, and organisation of the individual verifier. The signature may also be included>* Approved by: The International EPD® System
The procedure for follow-up during EPD validity, as defined in the GPI, 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 of the service provider
- name and location of waste treatment site(s),
- 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),
  - Classification of Products by Activity (NACE/CPA),
  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or
  - Global Trade Item Number (GTIN).
- description of the service provided,
- information on environmental management system,
- a description of the background system, including the main technological aspects,
- 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,
- technical service life (TSL) of the infrastructures
- 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, and
- references to any relevant websites for more information or explanatory materials.

This section may also include:

- name and contact information of organisation carrying out the underlying LCA study,

- any additional information about the underlying LCA-based information, such as cut-off rules, data quality, allocation methods, and other methodological choices and assumptions,
- specific aspects regarding the service,
- environmental policy,
- a description of the waste components and waste fraction analysis

5.4.4 CONTENT DECLARATION

Waste shall be described through waste codes (e.g. European Waste Catalogue, EWC) and through its list of components.

The gross weight/ volume of waste components shall be declared in the EPD at a minimum of 99 % of waste disposed. At least the following fractions shall be listed:

- Organic, metals, plastic, glass, textiles, paper-paperboard, wood for municipal waste
- Materials/substances submitted to legal requirements and customer demands
- Materials/substances hazardous to health and the environment, being allergenic, carcinogenic, mutagenic or toxic to reproduction if present in such a concentration in the product that it meets requirements for being subjects to labelling according to the legislation (e.g. the European Directives on substances and preparations).

The list can be separated for materials/products or for materials per functional unit.

Primary data coming from specific campaigns shall be used. If they're not available average data coming from local or national waste statistics could be provided.

The content declaration does not apply to proprietary materials and substances covered by exclusive legal rights including patent and trademarks. In general, an indication that a product is "free" of a specific hazardous material or substance should be done with caution and only when relevant, following the rules in ISO 14021 on self-declared environmental claims.

Information on the hazardous properties of materials and chemical substances should follow the requirements given in the latest revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS),[8] issued by the United Nations or national or regional applications of the GHS. As an example, the following regulations should be used for EPDs intended to be used in the European Union:

- Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH); and
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling, and packaging of substances and mixtures.

5.4.5 WASTE TREATMENT TECHNOLOGY

The technology used for waste treatment shall be presented briefly, including a technical characterization with reference at least to:

- **Landfill** - Total landfill surface area, Total closed surface area, Minimum and maximum landfill elevations, Average waste compacting degree, Landfill gas extraction wells, Energy recovery from landfill gas, Leachate treatment, installed capacity, Technical lifespan.
- **Waste stabilizing** - Waste selection lines (No.), Type (e.g. mechanical selection, screening and demetallization, pre-fermentation, bio-stabilization, fermentation), Waste flow rate, Sludge flow rate, Air treatment, Wastewater treatment, Covered surface, Installed capacity.
- **Waste incineration** - Maximum electric power, Operating hours a year, Input fuel (where relevant), Hourly disposing rate, Emissions analysis system, Energy annual generation during defined reference period, Conversion efficiency, Full load hours (or other information so that full load hours can be calculated), Flue gas abatement line.
- **WEEE treatment plant -** Treatment capacity, expressed in kg / h, Category of WEEE, Type and quantity of recovered materials (i.e metals, pastic, glass, ecc), Selection lines (No.) and type of machines involved.

[8] The GHS document is available at www.unece.org.

- **Packaging material sorting plant –** Sorting capacity, expressed in kg / h, Process stages (e.g. Transport, storage and loading, washing, detection of foreign materials ecc.), Type of sorting technique used (i.e. magnetic separation, sensor technology, ballistic separation, waste screening, ecc), Type and quantity of sorted packaging materials (i.e metals, pastic, glass, paper and cardboard ecc)

5.4.6 ENVIRONMENTAL PERFORMANCE

5.4.6.1. Environmental impacts

The EPD shall declare the environmental impact indicators, per functional unit, per life-cycle stage and in aggregated form, using the default impact categories, impact assessments methods and characterisation factors available at www.environdec.com/indicators. The source and version of the impact assessment methods and characterisation factors used shall be reported in the EPD.

Alternative regional life cycle impact assessment methods and characterisation factors may 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.

5.4.6.2. Use of resources

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

5.4.6.3. Waste generation 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 generation and output flows as listed at www.environdec.com/indicators per functional unit, per life-cycle stage and in aggregated form.

5.4.6.4. Other indicators

The following indicators shall be reported in the EPD, divided into the three life-cycle stages (if applicable):

- **Land use (landfill only)**: m^2a (in case of land occupation)
  - Volume and/or surface used of specified land category (e.g. according to Corine Land Cover Classes level one at a minimum - 5 classes) before and after the use of land
  - Number of years the area will be occupied, from opening up to a defined time period after closure (corresponding he technical lifespan of the landfill)
- **Toxic emissions**:
  - LCI emission data for waste incineration plant: micro-pollutants (Polychlorodibenzodioxins (PCDD), Polychlorodibenzofurans (PCDF) expressed in terms of Equivalent toxicity (ET) and Polycyclic Aromatic Hydrocarbons (IPA))

Indicators of the below issues may be included. If included, the methods chosen for calculating/assessing the indicators shall be described in the EPD and justified in the LCA report.

- **Odours**
- **Noise**
- **Impacts on biodiversity**: direct regional impacts concerning nature conservation issues like biodiversity and visual impact connected to land use.
- **By-products**, in kg (e.g. electricity/heat by biogas, electricity/heat lost by burning excess biogas, stabilized waste, dry fraction for RDF production, residuals to recycling)

5.4.7 ADDITIONAL ENVIRONMENTAL INFORMATION

An EPD should declare additional environmentally relevant information not derived from the LCA-based calculations, such as:

- the release of dangerous substances into indoor air, soil, and water during the use stage,
- health impact,
- a more detailed description of an organisation's overall environmental work, in addition to the information listed under Section 5.4.3, such as:
  - the existence of any type of organised environmental activity, and
  - information on where interested parties may find more details about the organisation's environmental work.

Any additional environmental information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

5.4.8 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

The EPD may also include other relevant social and economic information as additional and voluntary information. This may be product information or a description of an organisation's overall work on social or economic sustainability, such as activities related to supply chain management or social responsibility.

Any additional social and economic information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product.

5.4.9 DIFFERENCES VERSUS PREVIOUS VERSIONS

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

- a description of the differences versus previously published versions, and
- a revision date on the cover page.

5.4.10 REFERENCES

A reference section shall be included, including a list of all sources referred to in the EPD, including the GPI (including version number), and PCR (registration number, name, and version) used to develop the EPD.

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

5.4.11 EXECUTIVE SUMMARY IN ENGLISH

The executive summary, if included (see Section 5.1), shall contain relevant summarised information related to the programme, product, environmental performance, information related to pre-certified EPDs, and information related to sector EPDs. Besides this, further information may be added such as additional environmental, social or economic information, references as well as differences versus previous EPD versions.

6 LIST OF ABBREVIATIONS

ANZSIC	Australian and New Zealand Standard Industrial Classification
CPC	Central product classification
CPV	Common procurement vocabulary
EPD	Environmental product declaration
EWC	European Waste Catalogue
GPI	General Programme Instructions
GTIN	Global trade item number
ISO	International Organization for Standardization
LCA	Life cycle assessment
LCI	Life cycle inventory
NACE/CPA	Classification of products by activity
ND	Not declared
PCR	Product category rules
RDF	Refuse-derived fuel
REACH	Restriction of chemicals
RSL	Reference service life
SI	The International System of Units
TSL	Technical service life
UN	United Nations
UNSPSC	United Nations standard products and services code
WEEE	Waste of Electric and Electronic Equipments

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.

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Clift R, Doig A, Finnveden G (2000) The application of life cycle assessment to integrated solid waste management, part I-methodology.Trans Inst Chem Eng, Part B: Process Saf Environ 78(B4):279–287

Del Borghi A, Binaghi L, Del Borghi M, Gallo M (2007) The application of the environmental product declaration to waste disposal in a sanitary landfill—four case studies. Int J Life Cycle Assess 12(1):40–49

Del Borghi A, Gallo M, Del Borghi M, (2009) A survey of life cycle approaches in waste management. Int J Life Cycle Assess 14: 597-610

Directive 1999/31/EC of the Council of 26 April 1999 on the landfill of waste Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles - Commission Statements

Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2022-09-28

Original version of the PCR.

VERSION 1.0.1, 2022-09-30

Cover image added.