ELECTRONIC AND ELECTRIC EQUIPMENT, AND ELECTRONIC COMPONENTS (NON-CONSTRUCTION)

PCR REGISTRATION NUMBER
VERSION NUMBER, PUBLICATION DATE

VALID UNTIL 20XX-YY-ZZ

DRAFT FOR OPEN CONSULTATION

INTRODUCTION TO OPEN CONSULTATION

This draft PCR document is available for open consultation until 2023-05-22. Feel free to forward the draft to any other stakeholder you might think is relevant, including colleagues and other organisations.

We are interested in comments from stakeholders on:

- General
  - Alignment with PCRs available in other programmes for type III environmental declarations, industry-specific LCA guidelines or similar.
- Scope of PCR
  - Product category definition and description
  - Classification of product category using CPC codes
- Goal and scope, life cycle inventory and life cycle impact assessment
  - Functional unit/declared unit
  - System boundary
  - Allocation rules
  - Data quality requirements
  - Recommended databases for generic data
  - Impact categories and impact assessment methodology
- Additional information

Comments shall be sent directly to the PCR Moderator (contact details available in Section 1). There is a template for comments on www.environdec.com that may be used.

For questions about the PCR, please contact the PCR moderator. For general questions about the International EPD® System, EPD or PCR development, please contact the Secretariat via pcr@environdec.com.

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1 INTRODUCTION

1.1 GENERAL

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. 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.

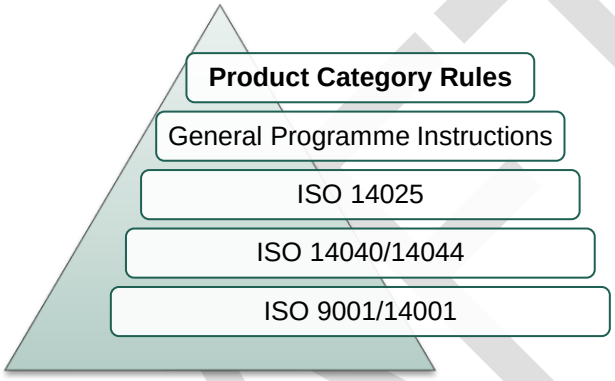

Figure 1 The hierarchy between PCRs, standards and other documents.

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.

1.2 ROLE OF THIS DOCUMENT AND COMPLEMENTARY PCRS

This main PCR allows for an EPD to be produced either by:

- directly using this PCR document if the EPD uses a declared unit. Any product in the scope of this PCR (see Section 2.2) is allowed to implement such an EPD, or

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

- using this PCR document together with a complementary PCR (c-PCR) available at www.environdec.com. An EPD based on this PCR, together with such a c-PCR, may use a functional unit and may have any product scope that is allowed by the c-PCR.

See Figure 2 for illustration.

When a complementary PCR exists in the International EPD® System for a more specific product category, such a c-PCR shall be used together with this main PCR. Future c-PCRs related to this PCR can be found at www.environdec.com.

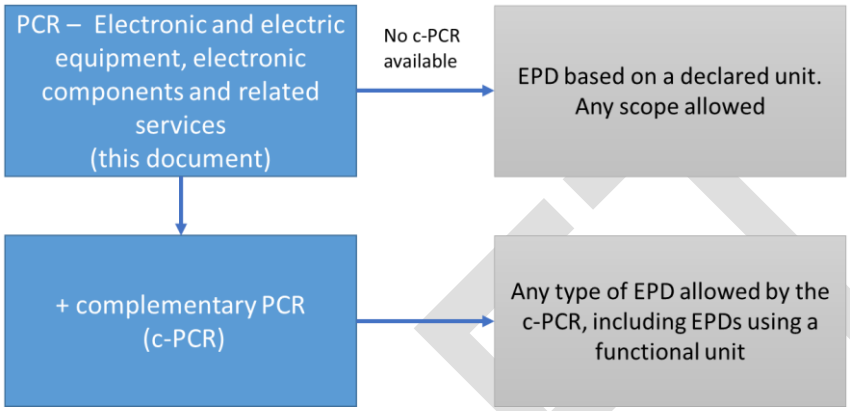

Figure 2 Overview of how this PCR document can be used directly, or together with a c-PCR, to develop an EPD.

1.2 DEVELOPMENT OF A C-PCR

A complementary PCR (c-PCR) may be developed for a specific category of electronic and electric equipment and components, e.g., servers or portable electronic devices. A c-PCR shall be developed within the framework of the International EPD® System using the normal PCR development procedure. Please contact the Secretariat for further information.

A c-PCR should contain:

- general information, e.g., scope of the c-PCR, programme-related information and information about its development;
- further specification of types of EPD allowed, if relevant;
- further specifications regarding goal of scope, LCI and LCIA, e.g., system boundaries, declared and functional unit, and other calculation rules, if relevant;
- further specifications on EPD contents, e.g., environmental indicators and additional information, if relevant.

All c-PCRs currently available and under development are displayed at www.environdec.com.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Electronic and electric equipment, and electronic components (non-construction)
Registration number and version:	*Added by the Secretariat*
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:	Diaa Gab-Allah, United Environmental Consultants, diaa.gaballah@gmail.com
PCR Committee:	Sonia Valdivia - World Resources Forum Matias Correa - Wallbox Phoebe Whattoff - Minviro Robert Pell – Minviro Bastian Wittstock – Ramboll Maria Hernandez – PMI Andrea Casas – Cic energiGune Vito D'Incognito – Take Care International Meixiong Liao – Huawei Dong Yan - Midea
Date of publication and last revision:	*Added by the Secretariat*
Valid until:	*Added by the Secretariat*
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 and documents conformance:	▪ General Programme Instructions of the International EPD® System, version 4.0, based on ISO 14025 and ISO 14040/14044 ▪ ISO 15686 series. These standards are referenced in regard to service life general principles and estimation.

	▪ EN 15804. This standard is referenced in regard to the modular structure of the life cycle stages and optional inclusion of benefits and loads from reuse and recycling of the product.
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 Electronic and electric equipment, and electronic components (non-construction), and the declaration of this performance by an EPD. The product category corresponds to UN CPC divisions 43-48, 84 and HS codes - category 85 - Electrical machinery and equipment and parts thereof. Any electronic and electric equipment that classifies as construction product[2], is excluded from the scope of this PCR.

The UN CPC divisions can be consulted at https://unstats.un.org/unsd/classifications/unsdclassifications/cpcv21.pdf.

Harmonized System (HS) Codes can be consulted at https://www.trade.gov/industry-classification-systems.

Non-exhaustive list of products falling under the scope of this PCR are:

- Electric Vehicle Conductive Charging systems, HS code 8504, or UN CPC code 461
- Power electronic converter systems and equipment, HS code 8504, or UN CPC code 461
- Electric accumulators, including separators therefor; whether or not rectangular (including square), HS code 8507
- Audio, Video and IT Products, UN CPC code 451, 452, 473, 476, 478
- Electrical appliances for household and similar purposes, UN CPC code 448
- Electricity metering equipment, UN CPC 4824
- Low-voltage switchgear and control gear assemblies, part of UN CPC 462
- Servers, part of UN CPC 452
- Electrical machines and apparatus; having individual functions, not specified or included elsewhere in this chapter, HS code 8543

Parts and accessories of computing machines (e.g., laser printer cartridges), UN CPC 45290, are currently covered by PCR 2014:04. Upon its expiration 2026-03-10, the product category will instead be covered by the present PCR.

The following product categories are excluded. Where applicable, PCRs or c-PCR covering them are listed:

- Bearings and parts thereof, UN CPC 433, PCR under development.
- Lifts, skip hoists, escalators and moving walkways, UN CPC 43540. A c-PCR for escalators and moving walkways is being developed under PCR 2019:14 (Construction products).
- Electrical motors and generators and parts thereof covered by PCR 2022:06 and PCR 2019:11, UN CPC 46112 and UN CPC 46131. Electrical motors and generators not covered by PCR 2022:06 and PCR 2019:11 are in scope of this PCR.
- Air-conditioning machines, part of UN CPC 43912, covered by PCR 2021:02.
- Refrigerating and freezing equipment and heat pumps, except household type equipment, covered by PCR 2019:14.

[2] "'Construction product' means any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works". Source: European construction product regulation.

- Other special-purpose machinery and parts thereof, UN CPC 449, covered by PCR 2010:08.
- Machines for filling and packaging of liquid food, UN CPC 439211, covered by PCR 2012:18.
- Machine-tools for drilling, boring or milling metal, UN CPC 44214, covered by PCR 2012:02.
- Machine-tools for material working by removal of material, UN CPC 44211, covered by PCR 2021:10.
- Electrical cables and wires for construction sector, UN CPC 463, UN CPC 41513, UN CPC 41533, covered by PCR 2019:14 and c-PCR-019.

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.

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 is available for open consultation from 2023-03-23 until 2023-05-22 during which any stakeholder is able to provide comments by contacting the PCR Moderator and/or the Secretariat.

Add information about any physical or web-based meetings held during the open consultation phase, if applicable.

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

- *List of stakeholder names and affiliation to be added after the open consultation*

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:	*To be added by the Secretariat*
Review dates:	*To be added by the Secretariat*

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.
- European Standard (EN) - https://www.cencenelec.eu/european-standardization/european-standards/
- GlobalEPD
- EPD Italy
- EPD Norway
- IBU
- PEP ecopassport®
- EarthSure
- EDF

- KEITI Environmental Declaration of Products
- JEMAI EcoLeaf
- JEMAI CFP Program
- UL Environment
- ASTM International EPD Program
- NSF International National Center for Sustainability Standards EPD
- SM Transparency Report Program
- FPInnovations EPD Program on wood building products
- ICC Evaluation Service Environmental Product Declaration Program
- Carbon Leadership Forum PCRs
- BRE Global EN EPD Verification Scheme
- DAPcons®
- SCS Global Services
- European Commission PEF category rules (PEFCR)

Table 1 lists the identified PCRs and other standardized methods.

Table 1 Existing PCRs and other internationally standardized methods that were considered to avoid overlap in scope and to ensure harmonisation with established methods.

NAME OF PCR/STANDARD	PROGRAMME/ STANDARDISATION BODY	REGISTRATION NUMBER, VERSION NUMBER/DATE OF PUBLICATION	SCOPE
EN 15804+A2 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products	CEN	Publication date: Nov 1, 2019	Construction products
EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems	CENELEC	Publication date: Sep 1, 2019	Electric and electronic products and systems
PCR 2019:14 Construction products (1.2.3)	International EPD® System	Publication date: June 22, 2022	Construction products
EPD – Electronic and Electrical products and systems	EPDItaly	Publication date: January 21, 2020	Electronic and Electrical products and systems
PCR Product Category Rules for Electrical, Electronic and HVAC-R Products	PEP ecopassport®	Publication date: September 06, 2021	Electrical, Electronic and HVAC-R Products
EU – PEFCR for IT equipment (Storage)	EU Commission	Publication date: April 20, 2018	IT equipment
EU – PEFCR for High Specific Energy Rechargeable Batteries for Mobile Applications	EU Commission	Publication date: February, 2018	Rechargeable Batteries for Mobile Applications
EU – PEFCR for Uninterruptible Power Supply	EU Commission	Publication date: February 15, 2019	Uninterruptible Power Supply

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 of the same product category, and thereby it supports comparability of products within a product category.

3.5 UNDERLYING STUDIES USED FOR PCR DEVELOPMENT

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

- Reale, F, Castellani, V, Hischier, R, Corrado, S, Sala, S, Consumer Footprint - Basket of Products indicator on Household appliances, EUR 29758 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-05003-2, doi:10.2760/964701, JRC116704,
- Bovea MD, Ibáñez-Forés V, Pérez-Belis V. Repair vs. replacement: Selection of the best end-of-life scenario for small household electric and electronic equipment based on life cycle assessment. Journal of Environmental Management 254:109679, 2019, doi: 10.1016/j.jenvman.2019.109679
- M. Mobeen Shaukat, Hammad Masood, Necar Merah, Fadi A. Al-Badour, Abdul Qadeer & Soban Afzal (2021) Comparative Life Cycle Assessment of Two Different Models of a Home Appliance, International Journal of Sustainable Engineering, 14:6, 1658-1664, DOI: 10.1080/19397038.2021.1945162
- Andersen O., et al., Life Cycle Assessment of Electronics, Proceedings of 2014 IEEE Conference of technologies for Sustainability, 24-26 July 2014, Portland, OR, USA, DOI: 10.1109/SusTech.2014.7046212

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 DECLARED/FUNCTIONAL UNIT

In an LCA, the declared unit or the functional unit provides a reference, by means of which, the material flows (input and output data), the environmental performance and other information, is normalized. This normalization enables data and results to be expressed using a common basis, which at the same time allows the comparison of different products or services, while they use the same reference unit. For this reason, it is important that any declared or functional unit is clearly defined and well documented, so that it can be considered when comparing EPDs.

At the same time, electric and electronic equipment can have a large variety of functions, depending on their technical characteristics, features, applications or use environment, and so it is not possible to establish at the level of this main PCR one or several functional units that covers all functional and qualitative aspects of such equipment. Instead, EPDs based only on this PCR shall use a declared unit, as specified below. EPDs based on this PCR together with a c-PCR shall use a functional unit. For information about c-PCRs, see Section 1.2.

4.1.1 DECLARED UNIT

EPDs using this PCR shall make use of a declared unit equivalent to **1 item, or assembly of items**, of the product under study. The declared unit shall be specified in the EPD and shall be further detailed by the following technical properties, when relevant: item size (m3), item weight (kg), specific unit of operation, rated input and rated output. Rated input and rated output will be defined in terms of voltage (V), frequency (Hz), current (A), and power (W). An example of the technical properties and further specifications to be detailed, for an electric device, is provided in Annex 1. The environmental impact shall be given per declared unit.

The assessment shall be based on the declared unit. Where possible, the relation of the declared unit to the functional unit shall be stated. The relation between declared unit and functional unit can explained as part of Section 5.4.6.

In a c-PCR it may be possible to precise and describe unequivocally the function of the product in its scope. In such cases a specific functional unit may be used, capturing the identified functions of the electric and electronic product in a quantitative way. When developing such C-PCRs, the guidance for establishing functional units in Section 4.1.2 can be used.

4.1.2 FUNCTIONAL UNIT

The functional unit refers to the quantified performance of a product system, to be used as a reference unit[3]. C-PCRs shall identify the function(s) applicable to the product category addressed and shall define a functional unit, by capturing the identified functions of the product in a quantitative way. C-PCRs shall as well require EPDs to use and declare the functional unit of the system under study.

When developing c-PCRs the following aspects of the functional unit shall specified:

- the function(s) provided to the user by the product
- the reference or performance level(s) related to the functional unit
- the period of time during the function(s) of the product are met, under reference use conditions.

Examples of functional unit that can be applicable to electric and electronic equipment are:

- Battery - 1 kWh of delivered energy to the battery terminals for number of cycles during the battery lifetime.
- Commercial refrigerator - the supply of 230 L of cooling space (4 ◦C) and 110 L of refrigeration space (−18 ◦C) for food storage for 10 years of refrigerator use.
- Desktop computer display - one desktop computer LCD display that meets the functional unit specifications:

[3] "Functional Unit" – Source: ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework

- Display size: 15 inches; Resolution: 1024 x 768 colour pixels; Brightness: 200 cd/m2.

4.2 LIFESPAN AND REFERENCE SERVICE LIFE (RSL)

The term lifespan refers to the period of time during which product functions are expected to be operative. In electric and electronic devices, the lifespan is directly linked to the durability of the hardware. In electronic devices the proper functioning of the firmware and software, often ensured by the availability of updates, also plays a key role in the lifespan of the product. The lifespan is often calculated as an average value for each product category, and it is commonly expressed units such as years, operating hours, or kilometres travelled.

As for the functionality of electric and electronic equipment, it is not possible to establish a single typical expected lifespan that covers all devices in scope of this PCR, as these ones depend on the properties of the product, its conditions of use, maintenance planning, and other internal and external influencing factors. Within these product families, these reference values can vary greatly, typically between 2 and 10 years. For reference, the variability of average lifespans in years for different product categories of electric and electric equipment can be seen in Table 2.

When an EPD is developed based on this PCR, an expected lifespan of the product shall be defined based on the declared technical performance of the product, as well as to any maintenance or repair necessary to provide the declared performance during this lifespan. The manufacturer of the electric or electronic equipment shall clearly state the lifespan applied, together with the properties of the product and its reference use conditions*. The environmental performance results declared in the EPD shall be reported for the whole declared unit, rather than a fraction of it, during the defined expected lifespan.

*Reference use condition can refer for example to:

- external environment, (for outdoor applications), e.g., weathering, pollutants, UV and wind
- exposure, building orientation, shading, temperature;
- internal environment (for indoor applications), e.g., temperature, moisture, chemical exposure;
- usage conditions, e.g., frequency of use, mechanical exposure;
- foreseen maintenance, e.g., required frequency, type and quality and replacement of replaceable components.

In the development of a c-PCR, additional requirements and conditions for defining the expected lifespan may be considered.

Table 2. Average product lifespan for different electric and electronic equipment

Average lifespans (years)	1-2	3-4	5-6	7-10	>10
Product categories	Small electrical appliances, (e.g., tooth- brushes, toys) mobile/smart phones	Portable devices, personal computers, bicycles	Cameras, lighting, power tools, vacuum cleaners, washing machines	TVs, kitchen appliances, refrigerators	Appliances attached to house (boiler, sunroof, etc.), kitchen and bathroom

Source: EU Parliament, Directorate-General for Internal Policies. A Longer lifespan for Products: Benefits for Consumers and Companies. Doi: 10.2861/052065 (2016)

The reference service life (RSL) refers to a reference period of time, during which the product is in use and meets or exceeds the required performance, under reference operational and ambient use conditions. In other words, the RSL is the period of time to which the performance of the product may be related to in a functional unit.

In the development of a c-PCR, a specific RSL can be provided for the specific product category in question. C-PCRs should consider the following when establishing a RSL for a product category:

- The RSL should be established in accordance with any specific rules given in relevant harmonized European product standards, when available,
- The RSL of a product can be based upon empirical, probabilistic, statistical or scientific data and shall always take into account the intended use,

- The data needed to determine the RSL can be based on testing of a particular property, or set of properties, directly linked to the durability of the product (e.g., abrasion, fatigue, wear and tear, impact tests), or it can be based on direct data, collected from the use environment, or indirect data from products of similar type and function, and
- The RSL of a product declared in the EPD is dependent on the service life of its individual components and may be determined by the component with the lowest service life. It also depends on whether the single components of the product are replaceable or repairable.

In EPDs based on a c-PCR that requires the use of functional unit that includes a RSL, the RSL used shall be declared together with the properties of the product and its reference use conditions.

Further guidance on RSL general principles, prediction, performance evaluation and estimation can be found in ISO 15686 series. The standard series can be used as guidance during the development of a c-PCR.

4.3 SYSTEM BOUNDARY

The system boundary of the product life cycle determines the processes to be included or excluded in the LCA. The scope of this PCR and EPDs based on it is *cradle-to-grave.*

The expression "cradle to grave" means that the following processes are included within the system boundaries, when applicable:

- Raw material extraction
- Production of components
- Manufacturing
- Transport
- Installation process
- Use of the product
- Calibrations / Maintenance / Repair
- Waste management, Reuse, Refurbishment, Recycling, energy recovery, landfilling

For more details on the product life cycle stages included in EPDs based on this PCR, see Section 4.3.1

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 is divided into three stages:

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

EPDs based on this PCR shall in addition be divided into information modules (A1 – C4), which are generally aligned to EN 15804. Module D can be included in the EPD on an optional basis.

Table 3 shows the relevant life cycle stages and information modules.

Table 3. Life cycle stages and information modules to be included when applicable.

Life cycle stage	**Information module**	**Module**
Upstream	Material and components supply	A1

Core	Transport of raw materials and components to to manufacturing site	A2
	Manufacturing of the product	A3
Downstream	Transport from gate to site/point of sale	A4
	Installation at point of use	A5
	Use	B1
	Maintenance	B2
	Repair	B3
	Reuse	No corresponding module in EN15804 (New module B4)
	Refurbishment	B5
	Operational energy use	B6
	Operational water use	B7
	De-installation at point of use	C1
	Transport	C2
	Waste processing	C3
	Disposal	C4
	Benefits and loads from recovery activities	D (Optional)

In the EPD, the environmental performance associated with each of the applicable life cycle stages and information modules above shall be reported separately and in aggregated form for modules A to C. Information module D shall not be added to the aggregated results for the product life cycle.

The processes included in the scope of the PCR and belonging to each life-cycle stage and information module are described in Sections **Fel! Hittar inte referenskälla.**–3. This includes upstream, core and downstream processes.

For electronic and electric *equipment*, the EPD shall include at least the equipment manufacturing (modules A1 to A3), its use (module B1, B6 and B7) when applicable, and end-of-life (modules C2 to C4).

For electric and electronic *components*, the EPD shall include at least the component manufacturing (modules A1 to A3) and end-of-life (modules C2 to C4). The remaining downstream processes (A4 to C2) can be included on an optional basis, when applicable, and when data that fulfils data quality requirements of Section 4.7 are available.

To accommodate the life cycle processes relevant to both equipment and components, the word “product”, in sections 4.3.1.1-3, should be understood as both a full product or a component, depending on the scope of the EPD. The terms “parts” and “components” should be understood as parts and components of a full product, or parts and sub-components of a component, similarly, depending on the scope of the EPD.

4.3.1.1 Upstream processes

The following unit processes are part of the product system and shall be classified as upstream processes:

Module A1: material and components supply

- Extraction and processing of raw materials (e.g., mining process) for all main parts and components (to be refined at c-PCR level when applicable)
- Collection of used components used as input for manufacturing/assembling of the final product
- Reuse of components and processing of secondary materials and their depollution used as input for manufacturing/assembling of the final product

- Production of components and all the materials used for their manufacturing, e.g., printed circuit board, electric components, batteries, plastic connectors, antennas and wires. For electronic devices, the components of the printed circuit board shall be included
- Production of auxiliary products used for the manufacturing of the product, such as solvents and lubricants
- Generation of electricity and production of fuels, steam and other energy carriers used in upstream processes.

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.

For modelling of infrastructure and capital goods, see Section 4.3.2.

4.3.1.2 Core processes

The following unit processes are part of the product system and shall be classified as core processes:

Module A2: Transport

- Relevant services, such as transport of raw materials and components along the upstream supply chain to a distribution point (e.g., a stockroom or warehouse), including energy inputs for warehouse storage
- Transportation of materials and components to the manufacturing site
- Internal transport of the product within the manufacturing site
- End-of-life treatment of transportation waste, even if carried out by third parties

Module A3: Manufacturing

- Manufacturing of the product
- Maintenance and consumables of manufacturing equipment
- Storage of finished products
- End-of-life treatment of manufacturing waste, even if carried out by third parties including transport to end – of – life treatment facility.
- Generation of electricity and production of fuels, steam and other energy carriers used in core processes
- Production of distribution and consumer packaging.

The presentation of results from Module A1, A2 and A3 can be done in an aggregated form.

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:

- building, maintenance, decommissioning and disposal of service facilities,
- business travel of personnel,
- travel to and from work by personnel, and
- research and development activities, marketing, and advertisement (including design activities).

For modelling of infrastructure and capital goods, see Section 4.3.2.

4.3.1.3 Downstream processes

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

Module A4: Transport from gate to site/point of sale

- Transportation from manufacturing site to the specific or an average point of sale or use site, (module A4)

Module A5: Installation at point of use

- Installation at point of use.

Module B1: Use

- Product use causing direct emissions and production and use of consumables
- Waste treatment of consumables.

Module B2: Maintenance

Definition: Combination of all technical and management actions intended to retain an item in a state in which it can perform as required

Note 1 to entry: Management is assumed to include supervision activities.

Source: Adapted from ISO 14009:2020(en) - Environmental management systems — Guidelines for incorporating material circulation in design and development

Examples of actions involved in maintenance could include inspection, adjustments, emptying, cleaning, lubrication, testing, software update and replacement of a wear-out part, if applicable.

This module includes:

Maintenance activities, expected during the lifespan, including the production, transportation, and waste management of any resources (e.g., materials, replacement parts, energy, water) necessary for the maintenance operation.

Module B3: Repair

Definition: Action to restore a product to a condition needed for the product to function according to its original purpose

Note 1 to entry: Actions can include renewal or replacement of worn, damaged, or degraded parts of the product.

Source: ISO/CD 59004:2022 - Circular Economy – Terminology, Principles and Guidance for Implementation

This module includes:

Repair process, of a part or component, expected during the lifespan, including the production, transportation, and waste management of any resources (e.g., materials, replacement parts, energy, water) necessary for the repair process.

Module B4: Reuse

Definition: Utilization of a product after its initial utilization intended by the original design

Note 1 to entry: Utilization intended by design can involve either single-use or multiple-uses over time.

Note 2 to entry: Minor treatment of the product may be needed by the user to allow for reuse.

Note 3 to entry: In some cases, resources, like water, are considered as a product. In these cases, design is not applicable.

Source: ISO/CD 59004:2022 - Circular Economy – Terminology, Principles and Guidance for Implementation

This module includes:

Reuse process of a product expected during the lifespan, including the production, transportation, and waste management of any resources (e.g., materials, replacement parts, energy, water) necessary for the reuse process.

Module B5: Refurbishment

Definition: Process (or combination of processes) applied during the expected service life to restore a product to a condition of safety and performance according to the specification of the manufacturer.

Note to entry: Refurbishment can include activities such as repair, rework, replacement of worn parts, and update of software or hardware but does not include activities that result in the need of a new certification of the product and a legal manufacturer status of the refurbisher.

Source: Adapted from ISO/CD 59004:2022 - Circular Economy – Terminology, Principles and Guidance for Implementation.

This module includes:

Refurbishment process of a product, expected during the lifespan, including the production, transportation, and waste management of any resources (e.g. materials, replacement parts, energy, water) necessary for the refurbishment.

Module B6: Operational energy use

- Use of energy during product operation, including generation of electricity and production of fuels, steam and other energy carriers

Module B7: Operational water use

- Use of water during product operation
- Waste treatment of used water

Module C1: De-installation at point of use

- De-installation at point of use.

Module C2: Transport

- Transportation of the product, product parts and packaging waste to end-of-life treatment facility (e.g., recycling facilities)

Module C3: Waste processing

- Dismantling and any physical pre-treatment and management for processing at the disposal site

Module C4: Disposal

- End-of-life processes the product, any wasted part of the product and packaging.

Module D: Benefits and loads from recovery activities – Optional

Benefits and loads from recovery activities can be included as an option in an EPD published under this PCR. This information shall be declared under Module D as per the European standard EN 15804. This module assesses the benefits and loads beyond the system boundary from the reuse, recovery or recycling of materials and/or energy, including the processes avoided or substituted due to these practices. If module D is to be declared, the calculation procedure shall follow the provisions of EN 15804 and EN 50693, Annex G, Section G3. According to this procedure, any declared net benefits and loads from net flows (considering both inputs to, and outputs from, the product system) leaving the product system that have passed the end-of-waste state shall be included in module D, except those which have been allocated as co-products. Further information can be found in EN 15804 and EN 50693, Annex G, Section G3.

For modelling of infrastructure and capital goods, see Section 4.3.2.

4.3.2 INFRASTRUCTURE AND CAPITAL GOODS

In general, the production and end-of-life processes of infrastructure or capital goods used in the product system should not be included within the system boundaries. They may be included when infrastructure and capital goods are known to be relevant in terms of their environmental impact, or when a generic LCI dataset includes infrastructure/capital goods, and it is not possible, within reasonable effort, to subtract the data on infrastructure/capital goods from this dataset. If an infrastructure/capital good is produced with the intention to be used one or a few times only (e.g., a manufacturing plant or machinery constructed to produce only one product), this infrastructure/capital good shall be included.

The inclusion or exclusion of infrastructure/capital goods shall be transparently described for upstream, core and downstream processes in the LCA report and in the EPD.

If infrastructure/capital goods are included, the following disclaimer shall be included in the results sections of the LCA report and in the EPD (land use and toxicity indicators shall only be mentioned if declared in the EPD):

The impact categories of "abiotic depletion of minerals and metals", "land use", "human toxicity, cancer", "human toxicity, non-cancer" and "ecotoxicity, freshwater" may be invalid in LCAs that include capital goods and infrastructure based generic datasets. This is because the LCI data of infrastructure and capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

4.3.3 OTHER BOUNDARY SETTING

4.3.3.1 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.

4.3.3.2 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.

4.3.3.3 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.

4.3.3.4 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.

4.4 SYSTEM DIAGRAM

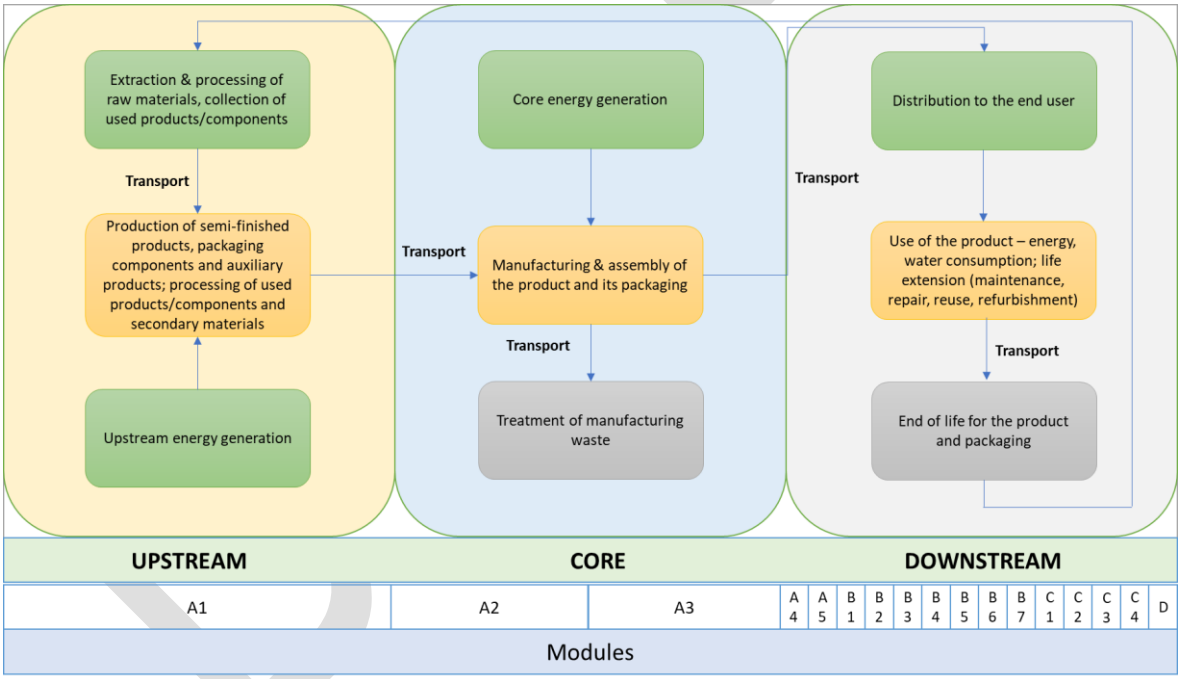

Figure 3 *System diagram illustrating the processes that shall be included in the product system, divided into upstream, core and downstream processes. The illustration of processes to include may not be exhaustive.*

4.5 CUT-OFF RULES

When applying a cut-off rule,1% shall be used.

This means that the included inventory data (not including inventory data of processes that are explicitly outside the system boundary as described in Section 4.3) cannot be excluded from the scope of the assessment if:

- it contributes to more than 1% of the environmental impact in any impact category,

- it contributes to more than 1% of the total product mass, and
- it contributes to more than 1% of the total energy use.

4.3The cut-off of inventory data should, however, be avoided, and all available inventory data shall be used. To satisfy the cut-off rule, specific data should be used (when available). Generic data can be used in the absence of specific data to ensure that cut-off rules are respected.

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 and justified 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 being 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 component 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. See the 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 energy ware 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. 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.5) 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

When conducting an EPD, database providers should be referenced, and an explanation given to why these databases have been used. Table 4 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.

Table 4 Examples of databases and datasets to use for generic data.

PROCESS	GEOGRAPHICAL SCOPE	DATABASE
Electricity	Worldwide	Data combined with IEA (International Energy Agency) statistics on electricity generation mixes for nations, regions, etc., www.iea.org/statistics/ Electricity residual mixes for European countries can be sourced from the Association of Issuing Bodies (AIB), www.aib-net.org
Plastics	Europe	Plastics Europe, www.plasticseurope.org
Transport	Europe	European Reference Life Cycle Data System (ELCD), http://eplca.jrc.ec.europa.eu/ELCD3/
Waste management	Europe	European Reference Life Cycle Data System (ELCD), http://eplca.jrc.ec.europa.eu/ELCD3/
Electronic components	Worldwide	Ecoinvent (latest version)
Packaging materials	Worldwide	Ecoinvent (Latest version) EMPA, Swiss Packaging Institute

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. The quality of used data shall be documented in the LCA report according to ISO 14044 and shall address the following aspects:

- Precision;
- Completeness;
- Representativeness;
  - time-related coverage: datasets should be based on 1-year averaged data; they should have been updated within the last 10 years for generic data and 5 years for specific data;
  - geographical coverage: the specifics of the location shall be reflected in term of the different life cycle stages
  - technological coverage: the LCA shall reflect the physical reality of the referent product or product family;
- Consistency
- All used datasets shall be in line with the defined system boundaries. Any deviations shall be justified in the LCA report.

4.7.3.1 Upstream processes

- Data referring to processes and activities upstream in a supply chain over which the EPD owner direct management control shall be specific and collected on site.
- 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.
- Data on 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, should be specific and 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 (see Section 4.7).
- 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.

- 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.

4.7.3.2 Core processes

- 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.
- Goods: 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.
- Services: Specific data shall be used for the consumption of materials, chemicals, steam, heat, electricity, etc., necessary for execution of the service
- 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].
    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, as long as the composition of the residual grid mix has been publicly disclosed[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 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.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.7.3.3 Downstream processes

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

[5] If the composition of the residual grid mix has not been publicly disclosed, the second or third options in the above hierarchy are not feasible and thus the fourth option is the only remaining option (if the first option is not chosen).

- Specific data, showing the actual use method for the product, should be used when available and relevant. In this absence of specific data, the data describing the use method recommended or set by default by the manufacturer should be used.
- Data on the emissions from the use stage should be based on documented tests, verified studies in conjunction with average or typical product use, or recommendations concerning suitable product use. Whenever applicable, test methods shall be internationally recognised.
- The use of electricity in the region/country where the product is used (as specified in the geographical scope of the EPD) shall be accounted for in the following priority:
    1. Residual electricity mix on the market.
    2. 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 production 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 downstream processes shall be documented in the EPD, where relevant.
- The transport of the product to the customer shall be described in the EPD, where relevant, and be accounted for in this priority:
    1. Actual transportation modes and distances to specific a customer or market, representing the geographical scope of the EPD.
    2. A weighted average of transportation modes and distances, based on transportation to several customers or markets, representing the geographical scope of the EPD.
- Scenarios for the end-of-life stage shall be technically and economically practicable and compliant with current regulations in the relevant geographical region based on the geographical scope of the EPD. Key assumptions regarding the end-of-life stage scenario shall be documented in the LCA report.
- The potential benefits and loads of recycling and waste treatment of the products according to the specified scenarios may be presented in the EPD module D (see Section 4.3.1.3).

Energy consumption during product use

The following section describes considerations that can be used in the estimation on energy consumption of electric and electronic equipment. This section is not applicable for EPD of electric and electronic components.

Electric and electronic equipment depend on the energy input from the mains power source in order to work as intended. Certain equipment remains constantly connected to the mains power while others do so only at certain time intervals.

While connected to the mains power, electric and electronic equipment can have different modes, such as on-mode or active mode[6], off-mode[7], standby mode[8] and networked standby mode[9] (as per Commission Regulation (EC) No 1275/2008[10] and (EU) No

[6] 'active mode(s)' means a condition in which the equipment is connected to the mains power source and at least one of the main function(s) providing the intended service of the equipment has been activated

[7] 'off mode' means a condition in which the equipment is connected to the mains power source and is not providing any function; the following shall also be considered as off-mode:

(a) conditions providing only an indication of off-mode condition;

(b) conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC of the European Parliament and of the Council

[8] 'standby mode(s)' means a condition where the equipment is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time:

— reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or

— information or status display;

[9] "networked standby" means a condition in which the equipment is able to resume a function by way of a remotely initiated trigger from a network connection

[10] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008R1275&from=EN

801/2013[11]), which draw power from the grid at different levels, depending on the functions delivered at each mode, and the energy efficiency strategies implemented on the design of the equipment. Battery operated devices draw power from the mains for the charging of the battery in the device, and also draw power in an idle mode once the battery in fully charged.

The EPD should include an evaluation of the availability of different modes, other than on-mode, in the equipment and when available, include the energy consumption associated to such mode(s) into the calculation of energy consumption during of use stage. This energy consumption should be reflected during the entire reference service life specified for the equipment, according to section 4.2.

Other modes available in the equipment, which do not correspond exactly to the definitions offered in (EC) No 1275/2008 and (EU) No 801/2013, should also be included into the calculation of total energy consumption.

As reference, for electric and electronic equipment intended to maintain a continuous connection to the mains power, the following equation can be taken into consideration for the calculation of total energy consumption (TEC) for the equipment:

$$TEC = [(Pon\ x\ Ton) + (Poff\ x\ Toff) + (Pstandby\ x\ Tstandy) + (Pnet\ standby * Tnet\ standby) + (Pother\ x\ Tother)]\ x\ 365\ days\ x\ RSL$$

Where,

TEC = total energy consumption

P = power consumed by the device in the available modes (i.e. on mode, off mode, standby mode, networked standby mode, and other available modes)

T = time spend by the device in each of the modes. The sum of the time the device spends in each of the modes should equal 24 hours.

RSL = reference service life, as defined in section 4.2

The mix of time spend in each of the modes should correspond to the normal operating conditions of the equipment.

The use method or use settings recommended by the manufacturer, often set by default, should be used to determine the energy consumption of the equipment in its active mode. In case documented evidence is available, showing an actual use method that is different from the one recommended by the manufacturer, the actual use method should be used.

European standards EN 50564:2011 and EN 50643:2018 and their amendments can be used, when suitable, to measure energy consumption in the different modes. Other reliable, accurate, reproducible and recognized state-of-the-art methods can also be used for the measurement of power consumption.

Complementary-PCRs, based on this PCR, shall refine the calculation methods and aspects to be taken into consideration for an accurate estimation of energy consumption in the use phase, according to the nature, use profile and functionalities of the equipment.

4.7.4 DATA QUALITY DECLARATION

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

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. Also other indicators may be declared, if justified, see Section 5.4.5.

If the default list of environmental performance indicators and methods at the www.environdec.com/indicators 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.

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0801&from=EN

Apart from inventory indicators (such as the required and optional inventory indicators listed at www.environdec.com/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.

Specific additional indicators that shall be declared, related to the specific type of product and or application, are provided in the c-PCRs, when applicable.

4.9 INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

4.9.1 MULTIPLE PRODUCTS FROM THE SAME COMPANY

Several sets of results, reflecting different products, are not allowed to be declared in the same EPD. However, similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be grouped and thereby included in the same EPD. For such an EPD, there are three options:

- For each indicator, declare the average results of the included products. This average shall be weighted according to the production volumes of the included products, if relevant. In this option, the average content shall be declared in the content declaration.
- Declare the results of one of the included products – a representative product. The choice of the representative product shall be justified in the EPD, using, where applicable, statistical parameters. For example, the choice may be based on production volumes. In this option, the content of the representative product shall be declared in the content declaration.
- For each indicator, declare the highest result of the included products (i.e., the results of a “worst-case product”, which may be the results of one or several of the included products). In this option, the content declaration shall include the lowest amounts of recycled and biogenic content of the included products and their packaging, respectively, and the information on environmental and hazardous properties of substances shall reflect the highest share and most hazardous such substances contained in the any of the included products.

The first two options are only possible if none of the declared environmental impact indicator results differ by more than 10% between any of the included products. The third option is possible also if variations are larger than 10%.

4.9.2 SECTOR EPDS

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 declared/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 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[12].

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[13] 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.

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

[13] 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.[14]
  - 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 □)
- Environmental performance (see Section 5.4.5)
- Additional environmental information (see Section 5.4.6)
- Additional social and economic information (see Section **Fel! Hittar inte referenskälla.**)
- References (see Section 5.4.9)

The following sections shall be included, if relevant:

- 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[15]
- Date of publication (issue): 20XX-YY-ZZ

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

[15] 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 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.

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 declared/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[16] and the PCR in a table with the following format and contents:

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
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>*
Life cycle assessment (LCA)
LCA accountability: *<name, organization>*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☐ EPD verification by individual verifier

[16] 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.

Third-party verifier: <*name, organisation, and signature of the third-party verifier*> Approved by: The International EPD® System
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☐ EPD verification by accredited certification body Third-party verification: <*name, organisation*> is an approved certification body accountable for the third-party verification The certification body is accredited by: <*name of accreditation body & accreditation number, where applicable*>
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006 via: ☐ EPD verification by EPD Process Certification* Internal auditor: <*name, organisation*> Third-party verification: <*name, organisation*> is an approved certification body accountable for third-party verification Third-party verifier is accredited by: <*name of accreditation body & accreditation number, where applicable*> *For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI v4, Section 7.5.
Procedure for follow-up of data during EPD validity involves third-party verifier[17]: ☐ 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).
- 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),
    - Classification of Products by Activity (NACE/CPA),

[17] Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period (see Sections 7.3.2 and 7.4.9 of the GPI). The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update (see Section 6.5 of the GPI) is identified, the EPD shall be re-verified by a verifier.

  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or
  - Global Trade Item Number (GTIN).
- a description of the product,
- a description of the technical purpose of the product, including its application/intended use,
- a description of the background system, including the main technological aspects,
- for EPDs covering multiple products: a description of the selection of products/sites, a list of contributing manufacturers (if Sector EPD), etc. (see Section 4.9),
- 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,
- declared/functional unit,
- reference service life (RSL) and/or technical/actual lifespan, if relevant,
- 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, limitations, and assumptions,
- a description of the material properties of the product with a declaration of relevant physical or chemical product properties, such as density, etc., and

5.4.4 CONTENT DECLARATION

The content declaration section shall declare the weight of one unit of product, as purchased, and contain information about the content of the product in the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of each material/substance shall be declared, including a minimum of 99% of the materials/substances in one unit of product.

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),[18] 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.

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

5.4.4.1 Information about recycled materials

When a product is made in whole or in part with recycled materials, the provenience of the materials (pre-consumer or post-consumer) shall be presented in the EPD as part of the content declaration.

To avoid any misunderstanding about which material that may be considered "recycled material", the guidance given in ISO 14021 shall be considered. In brief, the standard states that:

- only pre-consumer or post-consumer materials (scraps) shall be considered in the accounting of the recycled materials, and
- materials coming from scrap reutilization (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) shall not be considered as recycled content.

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, Section 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, Section 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 weight of the packaging per product, and the type and function of the 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, per life-cycle stage and in aggregated form, as well as the information modules and in aggregated form, using the default impact categories, impact assessments methods and characterisation factors available at www.environdec.com. 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.

5.4.5.2 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.

5.4.6 ADDITIONAL ENVIRONMENTAL INFORMATION

An EPD may declare additional environmentally relevant information, in addition to the LCA results of the section on environmental performance results. The additional environmental information may cover various aspects of specific relevance for the product, for example:

- the release of dangerous substances into indoor air, soil, and water during the use stage,
- instructions for proper use of the product, e.g., to minimise energy or water consumption or to improve the durability of the product,
- instructions for proper maintenance and service of the product, e.g., to minimise energy or water consumption or to improve the durability of the product,
- information on key parts of the product that determine its durability,
- information on recycling including, e.g., suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained,
- information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle,
- information regarding disposal of the product, or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts, and
- 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.

The additional environmental information shall not include LCA results, with some exceptions:

- If the EPD owner wants to display results of several scenarios for use or end-of-life stages, the most representative scenario (for the geographical scope of the EPD) shall be declared in the section on environmental performance results, and the other scenarios shall be declared in the section on additional environmental information.
- The LCA results of an alternative modelling approach may be declared as additional environmental information, if such an alternative modelling approach is explicitly allowed by the applicable PCR or the GPI. According to this PCR, alternative GWP-biogenic results may be declared, which considers the effect of long-term storage of biogenic carbon (see next bullet point).
- The additional environmental information may include information on permanent (more than 100 years) storage of biogenic carbon, either in the product, in a landfill, or as a consequence of applying carbon capture and storage (CCS) to the incineration of biogenic carbon, and how this would influence GWP-biogenic results if the GWP-biogenic indicator would allow consideration of such storage.

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5.4.7 INFORMATION RELATED TO A SECTOR EPD

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

- a list of the contributing manufacturers that the Sector EPD covers, 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.

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

- a description of how the selection of the sites/products has been done and how the average has been determined.

5.4.8 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.

5.4.9 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.

5.4.10 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
EEE	Electronic and Electric Equipment
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
REACH	Restriction of chemicals
RSL	Reference service life
SI	The International System of Units
UN	United Nations
UNSPSC	United Nations standard products and services code

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.

CEN (2019) EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

CEN (2022) EN 50693:2022 Product category rules for life cycle assessments of electronic and electrical products and systems.

EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0, dated 2021-03-29. 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 (2015a) ISO 14001:2015, Environmental management systems – Requirements with guidance for use.

ISO (2015b) ISO 9001:2015, Quality management systems – Requirements.

ISO (2016a) ISO 21067-1:2016, Packaging – Vocabulary – Part 1: General terms.

ISO (2016b) ISO 14021:2016, Environmental labels and declarations - Self-declared environmental claim (Type II environmental labelling).

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

ISO (2018) ISO 14024:2018, Environmental labels and declaration – Type I environmental labelling – Principles and procedures.

8 VERSION HISTORY OF PCR

VERSION 1.0, 20ZZ-XX-YY

Add description of the PCR version, e.g. "Original version of the PCR".

ANNEX 1: EXAMPLE OF A DECLARED UNIT FOR AN EXTERNAL POWER SUPPLY

When a general functional unit cannot be given, it is important to clearly define and state the declared unit of the product under study, as this one provides a reference for defining relevant inputs and outputs, as well as a basis for comparing alternative products or services. The specification of the declared unit contains a description of the product and its technical characteristics by means of mass, volume, area, power, and other pertinent units. More details on defining a declared unit are laid out in section 4.1.

This Annex presents an example of a declared unit for an external power supply.

In this example, an external power supply is defined as:

A device which meets all of the following criteria:

(a) it is designed to convert alternating current (AC) power input from the mains power source input into one or more lower voltage direct current (DC) or AC outputs;

(b) it is used with one or more separate devices that constitute the primary load;

(c) it is contained in a physical enclosure separate from the device or devices that constitute the primary load;

(d) it is connected to the device or devices that constitute the primary load with removable or hard-wired male/female electrical connections, cables, cords or other wirings; and

(e) it has nameplate output power not exceeding 250 watts;

Source: Adapted from COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009

The declared unit is one external power supply unit, having the following technical properties:

- Size (cm3): 37.5
- Weight (kg): 0.03
- Rated input: 100-240V; 200mA; 50-60Hz;
- Rated output: 5V; 1500mA; 7.5W
- Specific unit of operation: power delivered in watts (W)
- Designed for operation with a smartphone

ELECTRONIC AND ELECTRIC EQUIPMENT, AND ELECTRONIC COMPONENTS (NON-CONSTRUCTION)
PRODUCT CATEGORY CLASSIFICATION: UN CPC XX, YY, ETC.