PRODUCT CATEGORY RULES (PCR)
DATE 2022-04-04

OTHER SPECIAL- AND GENERAL-PURPOSE MACHINERY AND PARTS THEREOF

PRODUCT CATEGORY CLASSIFICATION: UN CPC 449

PCR 2010:08
VERSION 4.0.1

VALID UNTIL: 2026-10-04

TABLE OF CONTENTS

1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006, ISO 14040:2006, ISO 14044:2006, and product-specific standards such as EN 15804 and ISO 21930 for construction products. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent, consistent and verifiable information about the environmental performance of their products (goods or services).

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

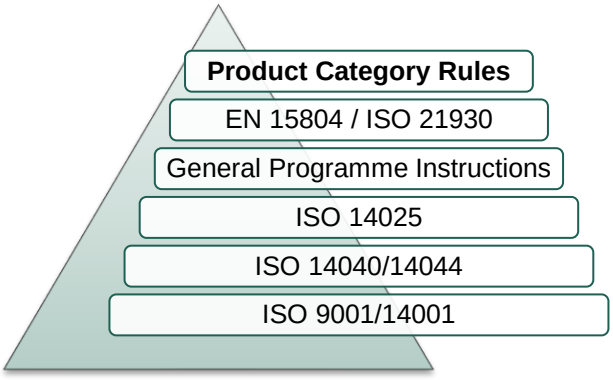

Figure 1 The hierarchy between PCRs, standards and other documents. EN 15804 and ISO 21930 are normative standards for construction products only.

Within the present PCR, the following terminology is adopted:

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

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

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

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

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

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

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Other special- and general-purpose machinery and parts thereof.
Registration number and version:	2010:08, version 4.0.1
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR Moderator:	Marcel Gómez, Marcel Gómez Consultoria Ambiental, info@marcelgomez.com
PCR Committee:	Marcel Gómez Consultoria Ambiental, CDEI-UPC, Engloba Consulting, Representatives of the sector of Spanish manufacturers of flexible packaging printers have been involved in the development process. For the previous versions, the PCR committee consisted of AfidampFAB, Studio Fieschi & soci Srl with involvement by representatives of the sector of Italian manufacturers of the professional cleaning machines sector. Annex A was developed by Genís Riba, Centre de Desenvolupament d'Equips Industrials (CDEI-UPC), genis.riba@cdei.upc.edu
Date of publication and last revision:	2025-12-12 (version 4.0.1) Version 1.0 was published in 2010. See Section 8 for a version history.
Valid until:	2026-10-04
Schedule for renewal:	A PCR is valid for a pre-determined time period to ensure that it is updated at regular intervals. When the PCR is about to expire, the PCR Moderator shall initiate a discussion with the Secretariat how to proceed with updating the PCR and renewing its validity. A PCR may be also be updated without prolonging its period of validity, provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for the latest version of the PCR. When there has been an update of the PCR, the new version should be used to develop EPDs. The old version may however be used for 90 days after the publication date of the new version, as long as the old version has not expired.
Standards conformance:	General Programme Instructions of the International EPD® System, version 4, based on ISO 14025 and ISO 14040/14044.
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

The document provides Product Category Rules (PCR) for the assessment of the environmental performance of UN CPC group 449 (Other special-purpose machinery and pats thereof) and underlying classes, as well as machines designed for a general purpose, as defined by the UN CPC group 439 (Other general-purpose machinery and parts thereof) and underlying classes. Product group also includes machines under class 44221 and class 44629.

The hierarchical structure is:

- **Division 44 – Special purpose machinery**
  - Group 442 - Machine-tools and parts and accessories thereof
    - Class 44221- Machine tools for working stone, ceramics, concrete, asbestos, cement or like mineral materials or for cold working glass
  - Group 446 – Machinery for textile, apparel and leather production, and parts thereof
    - Class 44629 - Other machinery for textile and apparel production n.e.c.
  - Group 449 - Other special-purpose machinery and parts thereof
    - Class 4491 - Other special-purpose machinery
    - Class 4492 - Parts n.e.c. for special-purpose machinery
- **Division 43 – General purpose machinery**
  - Group 439 Other general-purpose machinery and parts thereof
    - Class 4391 – Gas generators, distilling plant, air conditioning and refrigerating equipment, filtering equipment, filtering machinery with the exception of subclass 43912 and 43913.
    - Class 4392 – Machinery for cleaning bottles, packing, and weighing, spraying machinery with the exception of subclass 43921.
    - Class 4393 – General-purpose machinery n.e.c.
    - Class 4394 – Parts for the goods of classes 4391 to 4393

If you wish to include other machinery not included in the above product group, contact the moderator of this PCR or the Secretariat. Before doing this, check so the machinery is not already covered by another PCR (existing or under development) of the International EPD® System

For more information see https://unstats.un.org/unsd/classifications/.

This PCR excludes machinery covered by other CPC groups and classes, such as:

- Agricultural or forestry machinery
- Machine-tools with the exception of subclass 44221: Machine tools for working stone, ceramics, concrete, asbestos, cement or like mineral materials or for cold working glass
- Machinery for metallurgy
- Machinery for mining, quarrying and construction
- Machinery for food, beverage and tobacco processing
- Machinery for textile, apparel and leather production with the exception of subclass 44629: Other machinery for textile and apparel production
- Weapons and ammunition
- Domestic appliances
- Engines and turbines
- Pumps, compressors, hydraulic and pneumatic power engines and valves
- Bearings, gears, gearing and driving elements

- Ovens and furnace burners
- Lifting and handling equipment
- Machinery for cleaning or drying bottles or other containers, machinery for filling, closing, sealing, capsulating or labelling bottles, cans, boxes, bags or other containers; machinery for aerating beverages; other packing or wrapping machinery.
- Refrigerating and freezing equipment and heat pumps.
- Air conditioning machines
- Parts and accessories of computing machines (e.g. laser printer cartridges).

Examples of special-purpose machinery included in the PCR are:

- Flexible packaging printers
    - Flexographic printers
    - Offset printers
    - Rotogravure printers
    - Flexible packaging laminating and coating machines
    - Flexible packaging slitting and rewinding machines
- Ice production machine
- Digital glazing machine for tiles
- Washing, bleaching or dyeing machines for textiles or textile yarns
- Professional cleaning machines, including:
    - Sweepers
    - Scrubber dryers
    - Single disk
    - Wet and dry vacuum cleaners
    - Carpet cleaners
    - Steam cleaners
    - High pressure washers

Example of general-purpose machinery included in the PCR are:

- Industrial dishwashing machines.
- Weighing machinery (excluding balances of a sensitivity of 5 cg or better)
- Fire extinguishers, spray guns and similar appliances
- Steam or sand blasting machines and similar jet projecting machines
- Gaskets of metal sheeting

This PCR has a broad scope and therefore includes relatively general guidance and requirements, allowing EPDs based on a generally defined declared unit (1 unit of product, see Section 4.1). However, if an annex with more specific guidance and requirements is available, the rules in that annex shall be followed and supersedes other rules in this PCR in case of discrepancies. For example, such an annex may provide a functional unit to be used instead of the aforementioned declared unit. Currently, the following annex is available:

- Annex A: Flexible printing machinery

If there is an interest to develop more annexes, providing more specific guidance for further sub-categories of products, these may instead be developed as complementary PCRs (c-PCRs); then this PCR needs to be updated to a main PCR. More information about main PCRs and c-PCRs is available in the GPI. If you are interested in developing an annex or a c-PCR, please contact the Secretariat at pcr@environdec.com.

For other types of machines not included in the scope of this PCR, please see other PCRs of the International EPD® System, for example, PCR 2012:02 Machine tools for drilling, boring or milling metal (v3.02) and PCR 2021:02 Air-conditioning machines.

2.2.2 GEOGRAPHICAL SCOPE

This PCR may be used globally.

When conducting an EPD, any geographical limitations should be stated and should correspond to the geographical scenarios used in the LCA model.

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, 2.0

Version 1.0 and 2.0 were available for open consultation via www.environdec.com.

3.1.2 VERSION 3.0

Version 3.0 of this PCR was available for open consultation from 2013-09-12 until 2013-11-12 via www.environdec.com.

3.1.3 VERSION 4.0

Version 4.0 of this PCR was available for open consultation from 2020-03-03 until 2020-05-01, via www.environdec.com, during which any stakeholder was able to provide comments by contacting the PCR Moderator and/or the Secretariat.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation and agreed to be listed as contributors in the PCR and at www.environdec.com.

- CTME

3.2 PCR REVIEW

3.2.1 VERSION 1.0, 2.0, 3.0

Version 1.0, 2.0 and 3.0 were reviewed by the Technical Committee of the International EPD® System.

3.2.2 VERSION 4.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	Lars-Gunnar Lindfors
Review dates:	2021-03-16 until 2021-05-03

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.
- Global EPD.
- PEP Ecopassport.

- EDF.
- KEITI.
- JEMAI Ecoleaf.
- UL Environment.
- ASTM International EPD Programme.
- NSF International Center for Sustainability Standards EPD.
- Product Environmental Footprint.

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
Machines for filling and packaging of liquid food	International EPD® System	PCR 2012:18, version 2.02, 2020-09-04	Machines for filling and packaging of liquid food
Instant boiling and chilled drinking water dispensers (Permanently installed)	International EPD® System	PCR 2012:01-Sub-PCR-J, 2021-11-08	Refrigerating and freezing equipment and heat pumps, except household type equipment
Air conditioning machines	International EPD® System	PCR 2021:02, version 1.0	Air-conditioning machines

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed to enable publication of EPDs for this product category based on ISO 14025, ISO 14040/14044 and. 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:

- COMEXI, 2017. Life Cycle Assessment of Comexi F2 MC Flexographic printer.
- Erumban, A. A. (2008). Lifetimes of Machinery and Equipment: Evidence from Dutch Manufacturing. *Review of Income and Wealth, 2*(54), 237-268.

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

The declared unit (DU) shall be one (1) product unit, unless an applicable annex or c-PCR states otherwise. The environmental impact shall be given per declared unit. A description of the function of the product shall be included in the EPD. The EPD must include a statement saying that the function of the product must be comparable for the results to be compared. To be able to compare EPDs, it is recommended that the machines compared with each other have a similar output.

If there is an accepted market standard for a specific class or subclass of machinery (see Section 2.2.1) a complementary functional unit (FU) may be defined as a specific number of units delivered by the machinery under the Reference Service Life (RSL; see below for more details). If a FU is used, it shall be clearly described in the EPD and it shall be justified according to market standards, as appropriate. The results per this complementary FU shall be declared under Additional environmental information (see Section 5.4.6) but may be referred to in the results section (where results are shown per DU).

Note that even if a DU is used, the product use stage shall be included.

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

The EPD shall declare the technical or actual lifespan of the product, as well as its function and its use pattern, if relevant. The use pattern for the product must be declared in each case as appropriate: hours per day, number of operation shifts, days of use per year, years of use or others.

The lifespan of these machines can vary between 10 and 30 years or more[2], with the right maintenance and operation. The selected technical or actual lifespan shall be justified using binding documents such as product guarantees or technical data sheets.

The Reference Service Life (RSL) is a theoretical time period used for LCA calculations, to enable comparisons of a function provided during a set time (the RSL). As such, RSL is necessary in EPDs using a complementary FU (see above) or using FU instead of DU (which is possible if a FU is defined in an annex or a c-PCR). If a FU is used, RSL should be 15 years. If another RSL is selected, it shall be declared and justified according to market standards, as appropriate. For the RSL of flexographically printer machinery, see Annex A.

Note that RSL is not the same as the minimum, average, technical or actual service life of the product. The RSL of a product is the reference time to which the performance of all products of a product category shall be related if a FU is used. In contrast, the technical lifespan of a product is the average time for which the product has been designed or proven to last (which may not be identical to the guarantee time), while the actual lifespan is the average time for which the product has been shown to be in use. For example, the RSL of a product category may be 10 years (e.g. because that is a typical technical lifespan for that product category) and the functional unit may be defined as fulfilling a certain function over that RSL. If a product then has a (proven) technical/actual lifespan of 5 years, two products are needed to fulfil the FU.

If a FU is used, the list of the spare parts replaced throughout the RSL and its replacement frequency must be included. See section 5.4.3, for more details on what technical properties to declare.

4.3 SYSTEM BOUNDARY

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

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

[2] The considered categories for the estimation of the defined RSL, include Textile and Leather products, Paper and paper products, Publishing and printing, Fabricated metal products, Ice machinery, Machinery and Equipment n.e.c., Electrical machinery n.e.c.

4.3.1 LIFE-CYCLE STAGES

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

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

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

4.3.1.1. Upstream processes

The The following attributional processes are part of the product system and classified as upstream processes: *(CPC 44 and 43)*

- Extraction and production of raw materials for all main parts and components.
- Production of electricity and fuels used in the upstream module.
- Production of semi products used in the core process, if applicable.
- Manufacturing of primary and secondary packaging.
- Transport between raw material extraction and processing of materials.

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.

The following processes can be excluded:

- Recycling processes of product components (see section 4.3.1.4)
- Travel to and from work by personnel.

Any exclusion of unit processes shall be justified.

4.3.1.2. Core processes

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

- External transportation to the core processes.
- Manufacturing process for main parts and components.
- Internal transports within the manufacturing plant.
- Assembly/preparation of the final product.
- Maintenance (e.g., of the manufacturing machines).
- Pollutant emissions (to air, soil and water) produced in the factory
- Waste treatment of waste generated during manufacturing, including waste transport to waste manager.
- Production of electricity and fuels used in the core module.

Core processes not listed may also be included. The production of the raw materials used for production of all product parts shall 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:

- Manufacturing of production equipment, buildings and other capital goods.
- Building, maintenance, decommissioning and disposal of service facilities.
- Business travel of personnel.
- Travel to and from work by personnel.

- Research and development activities.

4.3.1.3. Downstream processes

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

- Energy used for product operation (shall be evaluated by physical measurements).
- Consumption of chemicals and consumables used during the normal use of the machine and for the cleaning and maintenance of the equipment, including the consumption of maintenance and spare parts.

  Consumption of chemicals and consumables specified by the manufacturer of the machinery shall be included. Other consumed chemicals and consumables not identified by the manufacturer and used during the use stage are not included within the limits of the system.
- Production of maintenance and spare parts.
- Production of chemicals and consumables.
- Waste generation from maintenance materials, consumables and spare parts.
- Waste generation from test runs and other unusable outputs.
- Transport of chemicals, consumables and waste. An average distance of 50km can be assumed.
- Disassembling of the product, including the impact of the disassembling process (if existent), transport to waste management and waste treatment.

Use scenarios for the chemicals and consumables used during the use stage shall be justified and declared. Technical specifications for said chemicals and consumables shall be included.

Any exclusion of life cycle stages and unit processes shall be justified.

4.3.1.4. Module D

The inclusion of module D is optional and limited to the availability of the necessary information as the case may be.

Module D is a concept taken from the norm EN 15804, which includes the benefits and loads beyond the system boundary through the reuse, recovery or recycling of materials and/or energy, including the processes avoided or substituted due to these practices.

Module D assesses the impact of the net flows of recovered materials (recycled or reused) and/or useful energy carriers from the life cycle modules Upstream, Core and Downstream. Any declared benefits and loads from flows leaving the product system that have passed the end-of-life scenario shall be included in module D, except those that have been allocated as co-product in Core module, as Module D recognises the potential benefits of avoided future use of primary materials and fuels while taking into account the loads associated with the recycling and recovery processes beyond the system boundary.

Any secondary material or fuel that substitutes another in subsequent processes and thereby generates potential benefits or avoided loads, can be included in module D and said benefits can be calculated based on a specified scenario which is consistent with any other scenario for waste processing and is based on current average technology or practice.

If today's average is not available for the quantification of potential benefits or avoided loads, a conservative approach shall be used.

In module D, the net impacts are calculated as follows:

- By adding all output flows of a secondary material or fuel and subtracting all input flows of this secondary material or fuel from each sub-module first (e.g., B1-B5, C1-C4, etc.), then from the modules (e.g., B, C), and finally from the total product system thus arriving at net output flows of secondary material or fuel from the product system.
- By adding the impacts connected to the recycling or recovery processes from beyond the system boundary (after end-of-waste state) up to the point of functional equivalence where the secondary material or energy substitutes primary production and subtracting the impacts resulting from the substituted production of the product or substituted generation of energy from primary sources.
- By applying a justified value-correction factor to reflect the difference in functional equivalence where the output flow does not reach the functional equivalence of the substituting process.

Module D modelling does not belong to the attributional approach since it is based on consequential modelling, by including potential environmental benefits or loads beyond the product system, which is not consistent with the approach used to model the Upstream,

Core and Downstream modules. Therefore, all Module D information and results must be separately declared and not included in the total results figure.

If information on the reuse, recovery or recycling of materials or energy and/or related substituted processes is not included, the non-inclusion of module D shall be stated and its absence shall be justified.

The methodology followed must be described both in the EPD and the LCA report.

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

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

4.3.2.2. Boundaries in the life cycle

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

4.3.2.3. Boundary towards other technical systems

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

See Section 4.6 for further guidance.

4.3.2.4. 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.

4.3.2.5. 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

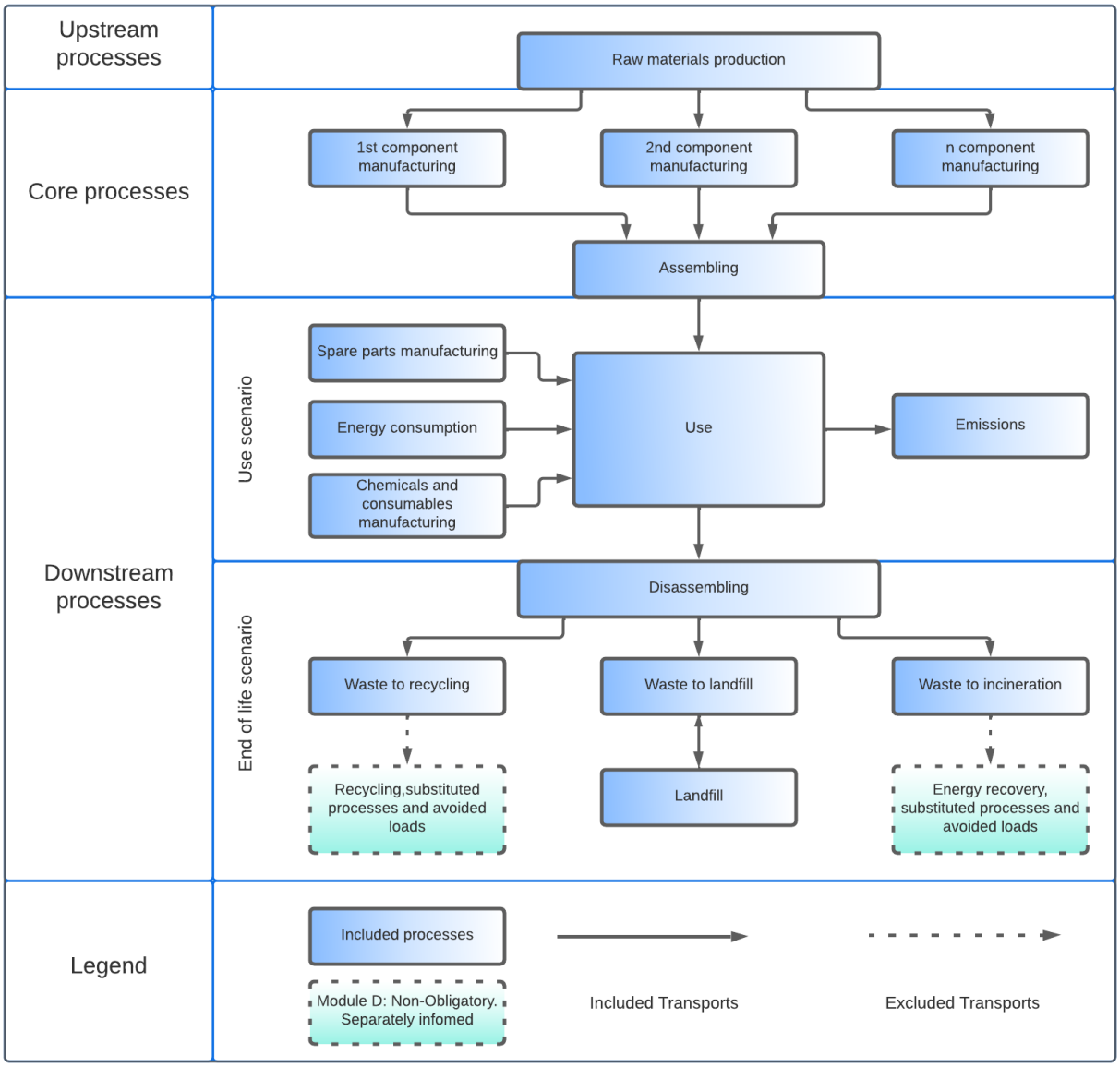

Figure 2 *System diagram illustrating only foreground processes that are included in the product system, divided into upstream, core and downstream processes. The illustration of processes is not exhaustive. The steps with important emissions are shown in the figure.*

4.5 CUT-OFF RULES

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

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

4.6 ALLOCATION RULES

Allocation can be divided into allocation of co-products, i.e., allocation of unit processes that generate several products, and allocation of waste, i.e., allocation of unit processes that generate materials that are, for example, landfilled recovered, recycled or reused, and which require further processing to cease 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 unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e., they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system. Allocation based on physical properties can be done when the difference of the economic value of the coproducts is low.
3. Where physical relationships alone cannot be established or used as the basis for allocation (or they are too time consuming), the inventory data should be allocated between the co-products in a way that reflects other relationships between them. For example, inventory data might be allocated between co-products in proportion to their economic values. If economic allocation is used, a sensitivity analysis exploring the influence of the choice of the economic value shall be included in the LCA report.

4.6.2 ALLOCATION OF WASTE TREATMENT PROCESSES

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

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

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

4.7 DATA QUALITY REQUIREMENTS AND SELECTION OF DATA

An LCA calculation requires two different kinds of information:

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

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

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

- **specific data** (also referred to as “primary data” or “site-specific data”) – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under

study, e.g., materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.,

- **generic data** (sometimes referred to as "secondary data"), divided into**:**
  - **Selected generic data** – data from commonly available data sources (e.g., commercial databases and free databases) that fulfil prescribed data quality characteristics for precision, completeness, and,
  - **Proxy data** – data from commonly available data sources (e.g., commercial databases and free databases) that do not fulfil all of the data quality characteristics of "selected generic data".

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

Specific data shall be used for the number of raw materials used in the product and packaging, the amount of energy used, transportation distances and emissions in the factory.

Generic data can be used to assess the elementary flows of raw materials or energy consumption, transportation, or waste treatments.

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

4.7.1 RULES FOR USING GENERIC DATA

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

- 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 preferably assessed to be representative for at least the validity period of the EPD,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- 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),
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of the impact categories, and
- the representativeness of the 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

No specific databases are recommended. Any data that fulfil the above prescribed data quality rules may be used. Any database or dataset to use as selected generic data for specific unit processes shall meet the requirements of the International EPD® System for data quality, representativeness, review, scope of documentation, geographical scope, etc.

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

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

4.7.3.1. Upstream processes

The following requirements apply to the upstream processes:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- The transport of main parts and components along the supply chain to a distribution point (e.g., a stockroom or warehouse) where the final delivery to the manufacturer can take place based on the actual transportation mode, distance from the supplier, and vehicle load.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the upstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream processes:

    1. Specific electricity mixes as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[3]
    2. National residual electricity mix or residual electricity mix on the market
    3. National electricity production mix or electricity mix on the market.

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

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

A product-specific EPD is valid for a defined declared product and should be the first choice (which means there is no variation in the results that need to be accounted for). When the EPD is instead based on an average or representative composition of products (in a so-called average EPD) the results for Upstream module shall as first not differ by more than +/-10% for the GWP indicator. When the results differ more than 10% the variability must be indicated and one of the next two choices must be followed:

- The different products must be grouped in groups where its impact on GWP in Upstream module differs by less than 10%.
- To select a worst-case product, resulting in the largest environmental impact per Declared or Functional unit, as part of a product group or assortment.

4.7.3.2. Core processes

The following requirements apply to the core processes:

- Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- For the electricity used in the core processes, electricity production impacts shall be accounted for in this priority:

    1. Specific electricity mixes as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[4]
    2. National residual electricity mix or residual electricity mix on the market
    3. National electricity production mix or electricity mix on the market.

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

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

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

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

4.7.3.3. Downstream processes

The following requirements apply to the downstream processes:

- Data for the use stage are usually based on scenarios, but specific data should be used when available and relevant.
- Data on the pollutant 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. National residual electricity mix or residual mix on the market
  2. National electricity production mix or electricity mix on the market

  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 reference PCR, which should reflect the actual situation to the best extent possible. The following priority should be used:

  1. Actual transportation distances and types.
  2. Calculated as the average distance of a product of that product type transported by different means of transport modes.
  3. Calculated as a fixed long transport, such as 1 000 km transport by lorry or 10 000 km by airplane or boat, according to product type.

In the case that transportation distances (of raw materials to the factory and/or of the product to the customer) are unknown, the following default distances shall be assumed as necessary:

- Truck or train transportation: 1.000 km
- Ship or plane transportation: 10.000 km

Both or either one of the transportation distances specified above shall be assumed as the case may be.

If transportation distance of the product to the waste management in the end-of-life stage is unknown, 50 km truck transportation shall be assumed.

- 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. An end-of-life scenario shall be defined as example and declared into the EPD. The potential benefit of recycling and waste treatment of the products according to the specified scenarios shall be presented in the EPD as Module D.

4.7.3.4 Module D

Information about module D can be found in Section 4.7.3.4.

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 impact categories as described in the General Programme Instructions. The characterisation models and factors to use for the default impact categories are available on www.environdec.com/indicators and shall be updated on a regular basis based on the latest developments in LCA methodology and ensuring the market stability of EPDs. The source and version of the characterisation models and the factors used shall be reported in the EPD. Alternative regional life cycle impact assessment methods

and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

Additional factors to the default list provided at https://environdec.com/resources/indicators may be calculated and reported on the EPD if required. Criteria as to why these factors are relevant or necessary shall be included in the EPD as appropriate.

Impact indicators like Emission of Ozone depleting gases shall be reported for machinery such as ice production machines, air conditioning machines or any other equipment that uses refrigerant gases regardless of its purpose. The emission of Ozone depleting gases shall be expressed as the sum of ozone depleting potential in mass of CFC-11 equivalents, in a period of 20 years.

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

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

4.9 INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

4.9.1 PRODUCTS FROM THE SAME COMPANY

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 included in the same EPD if none of the declared environmental performance indicators differ by more than 10% between any of the included products. The results for the environmental performance indicators of one representative product shall be declared according to Section 5.4.5. The choice of representative product shall be justified in the EPD, using, where applicable, statistical parameters.

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.

Sector EPDs from, for example, trade associations or any other group of companies shall describe what company production sites the EPD represents. Such an EPD shall declare the variation in results between the production sites, as well as variation in the composition of the product compared with the average product declared in the EPD. Information about variation shall be given in the EPD if the GWP indicator results differ by more than +/- 10% for Upstream module. The variation and its origin shall then be reported in the EPD, either qualitatively and quantitatively, of the range of results that are likely for the products covered by the average EPD.

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[5].

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[6] 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.
- The result tables shall:

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

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

- 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.[7]
- 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 5.4.7)
- References (see Section 5.4.10)

The following sections shall be included, if relevant:

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

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image
- Name and logotype of EPD owner
- The text “Environmental Product Declaration” and/or “EPD”
- Programme: The International EPD® System, www.environdec.com
- Programme operator: EPD International AB
- Logotype of the International EPD® System
- EPD registration number as issued by the programme operator[8]
- Date of publication (issue): 20XX-YY-ZZ
- Date of revision: 20XX-YY-ZZ, when applicable
- Date of validity; 20XX-YY-ZZ

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

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

- A note that *"An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com."*
- A statement of conformity with ISO 14025.
- For EPDs covering multiple products: a statement that the EPD covers multiple products and a list of all products covered by the EPD.
- For Sector EPDs: a statement that the EPD is a Sector EPD.
- For construction product EPDs:

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

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

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

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following statement on the requirements for comparability of EPDs, adapted from ISO 14025: *"EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical 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[9] and the PCR in a table with the following format and contents:

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

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

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

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

The EPD shall specify the technical performance and other information on the product as reported in Table 2 and Table 3. The information is mandatory when applicable.

Table 2 Machine description.

Information	**Examples/explanations**
Commercial name	
Functions	
Main components	Body
	Engine
	Tanks
	Pollution prevention and control apparatus
	Electric power accumulator
	Movement system
	Electronic components
	Others
Spare parts	As described into the use and maintenance manuals
Used fuels or energy vectors	Gasoline, diesel fuel, LPG (Liquid Petroleum Gas), CNG (Compressed Natural Gas), electric energy
Size and dimension	Length, width, height (m)
Weight	kg

Table 3 Technical information.

Information	**Examples/explanations**
Functional performance (productivity)	Productivity on time base (e.g., m^2/hour)
Power	W
Energy consumption	Electric energy (J or Wh)
	Fuels (l/hour)
Spare parts consumption	As described into the use and maintenance manuals
Chemical products and other consumables consumption	As described into the use and maintenance manuals

The EPD shall specify information on the attended service life of the product(s).

This section may also include:

- name and contact information of organisation carrying out the underlying LCA study,
- any additional information about the underlying LCA-based information, such as cut-off rules, data quality, allocation methods, and other methodological choices and assumptions,
- a description of the material properties of the product with a declaration of relevant physical or chemical product properties, such as density, etc., and
- if end-of-life treatment is not included, the EPD shall contain a statement that it shall not be used for communicating environmental information to consumers/end users of the product.

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 must be divided by type of material according to the types reported in the Table 5. The information is mandatory if applicable.

Table 5 Material content to declare.

Type of material	kg of material
Plastic materials by category (e.g., PP or ABS)	
Metals by category (e.g., aluminium or steel)	
Rubber	
Textile and fibres	
Wood	
Paper	
Glass	
Ceramic materials	
Other materials	

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),[10] 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, Authorization, and Restriction of Chemicals (REACH); and
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling, and packaging of substances and mixtures.

5.4.4.1. 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 reutilisation (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:

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

- 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 functional unit and per life cycle stage and in aggregated form, using the default impact categories, characterisation models and factors available on https://environdec.com/resources/indicators. The source and version of the characterisation models and the factors used shall be reported in the EPD.

Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

5.4.5.2. Use of resources

The indicators for resource use based on the life cycle inventory (LCI) listed at www.environdec.com/indicators shall be declared per functional unit or declared unit, and 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 General Programme Instructions. The indicators at www.environdec.com/indicators for the amount of waste or the output flows shall be reported per functional unit or declared unit, and per life cycle stage and in aggregated form.

5.4.6 ADDITIONAL ENVIRONMENTAL INFORMATION

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

- Noise emissions (dBA) for the use phase only, reporting the methodology used to evaluate them (e.g., IEC 60704- 1) when considered necessary
- Vibration emissions (Hz) for the use phase only, reporting the methodology used to evaluate them (e.g., ISO 5349- 1:2001) when considered necessary.
- Electromagnetic wave emissions (μT) for the use phase only, reporting the methodology used to evaluate them (e.g., IEC 61000-4-6) when considered necessary.
- The time availability of spare parts, declared in years.
- 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.

5.4.7 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

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

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

5.4.8 INFORMATION RELATED TO SECTOR EPDS

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

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

5.4.9 DIFFERENCES VERSUS PREVIOUS VERSIONS

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

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

5.4.10 REFERENCES

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

5.4.11 EXECUTIVE SUMMARY IN ENGLISH

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

6 LIST OF ABBREVIATIONS

ANZSIC	Australian and New Zealand Standard Industrial Classification
CO_2	Carbon dioxide
CPC	Central product classification
CPV	Common procurement vocabulary
EPD	Environmental product declaration
GPI	General Programme Instructions
GTIN	Global trade item number
ISO	International Organization for Standardization
kg	Kilogram
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.

EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0, dated 2021-03-29. www.environdec.com.

Erumban, A. A. (2008). Lifetimes of Machinery and Equipment: Evidence from Dutch Manufacturing. Review of Income and Wealth, 2(54), 237-268.

Guidance for Product Category Rule Development (2013), Ingwersen, W., Subramanian, V., editors. Product Category Rule Guidance Development Initiative. Version 1.0. http://www.pcrguidance.org

PCR 2012:18 Machines for filling and packaging of liquid food (2.02), Machinery for cleaning or drying bottles or other containers; machinery for filling, closing, sealing, capsuling or labelling bottles, cans, boxes, bags or other containers; machinery for aerating beverages; other packing or wrapping machinery, Ecoclean.

PCR 2012:01-Sub-PCR-J Sub-PCR-J Instant boiling and chilled drinking water dispensers (permanently installed) (2021-11-08), *Zip Industries, thinkstep Pty, IVL Swedish Environmental Research Institute.*

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 2010-04-19

Original version published

VERSION 2.0 2010-05-12

Updated template

VERSION 3.0 2014-01-24

- Compliance with General Programme Instructions 2.01.
- Recommendation to use regional or national databases, where data quality rules are respected.
- Clarification that the use phase should be based on 1.200 hours in the declared unit.
- Clarification that indicators such as noise is only applicable to the use phase.
- Recommendation to use regional or national databases, where data quality rules as respected.

VERSION 3.01 2015-01-27

Editorial changes by the secretariat, without changes to LCA methodology.

VERSION 4.0 2022-03-25

- Compliance with General Programme Instructions 4.0.
- EPD validity has been updated.
- 2.2.1 Product category definition and description: scope has been updated to include UN CPC group 449 (Other special-purpose machinery and pats thereof) and underlying classes, as well as machines designed for a general purpose, as defined by the UN CPC group 439 (Other general-purpose machinery and parts thereof) and underlying classes. Inclusion of Annex A Flexible printing machinery.
- 3.3 Existing PCR for the product category: List of other PCRs available has been updated.
- 4.1 Functional unit/declared unit: modification from 1200 working hours (Reference service life) to 1 product unit, including the proportional impact of the raw materials production, manufacturing, transportation and end of life. The function of the product shall de declared to allow comparability of results.
- 4.3.1 Life cycle stages have been updated including consumption of chemicals and consumables during use phase. Module D explanation has been included
- 4.3.1.2 Core processes system boundaries: the description of the manufacturing parts to be included has been eliminated. Process waste that is deposited in landfill is included in the system boundaries. In this PCR version is not mandatory to declare waste that is deposited in landfill as hazardous waste.
- 4.4 System Diagram: Diagram was updated including processes described in life cycle stages. Module D reference has been included.
- 4.6 Allocation rules: co-product allocation rules have been clarified.
- 4.10.3 Other calculation rules and scenarios; Downstream module: modification of the processes included in the Downstream module.
- 4.7 Recommended databases for generic data: modification of the recommendation of the LCA databases to be used.
- 4.8 Specific impact indicators were removed. Reference to https://environdec.com/resources/indicators has been included.
- 5.4.6 Additional Environmental Performance: More comprehensive guidance has been included.
- Annex A: FU, RSL and System diagram were updated to provide specific guidance, based on market standards.

OTHER SPECIAL- AND GENERAL-PURPOSE MACHINERY AND PARTS THEREOF
PRODUCT CATEGORY CLASSIFICATION: UN CPC 449, 44221 AND 43935

VERSION 4.0.1 2025-12-12

Validity was extended for 6 months until 2026-10-04 as a new version was being developed and to ensure stability in the market.

9 ANNEX A: FLEXIBLE PACKAGING PRINTING MACHINERY

This Annex provides additional details for a subset of UN CPC 44914 “Bookbinding machinery; machinery for type-setting and the like; printing machinery and machines for uses ancillary to printing (except office type sheet-fed offset printing machinery)”, namely **Flexible Packaging Printing Machines.**

The product group includes machines designed for a special-purpose, as defined by the UN CPC group 449 and underlying classes. The hierarchical structure is:

- Division 44 – Special purpose machinery
  - **Group 449 - Other special-purpose machinery and parts thereof**
    - Class 4491 - Other special-purpose machinery
      - Class 44914 - Bookbinding machinery; machinery for type-setting and the like; **printing machinery** and machines for uses ancillary to printing (except office type sheet-fed offset printing machinery)

The products included in this PCR are Flexible Packaging Printers intended for professional use.

Examples of included printer types are:

- Offset printing machinery, reel-fed.
- Other offset printing machinery, except office type sheet-fed machinery
- Letter press printing machinery, whether or not reel-fed.
- Flexographic printing machinery.
- Gravure printing machinery.
- Digital printing machinery

9.1 FUNCTIONAL UNIT

This section supersedes Section 4.1 of the main document.

The functional unit is 1 working hour (1 h), during which the machine is working.

The machinery setting and other in-use conditions of relevance for the use-stage shall be based on the parameters defined in section 9.4. This collection of reference parameters for the use-stage shall be known as “Base Settings”.

In addition to operational impacts, impacts related to upstream processes, maintenance and decommissioning shall be allocated into one hour of use according to the reference service life (see 9.2).

The functional unit shall be related with the productivity (e.g. m2/hour, kg/hour) and the expected lifetime production of the machine (daily operating hours, annual operating days and total operating years).

The use-stage scenario for the flexible packaging printer machines applied for calculations, shall be modelled after the base settings specified in section 9.4 and shall be included in the EPD®, e.g., (see time diagram in section 9.4).

9.2 REFERENCE SERVICE LIFE (RSL)

This section supersedes Section 4.2 of the main document.

The base settings and RSL defined in this PCR shall be used as a reference point to assess compatibility between claims.

The RSL for flexible packaging printing machines is calculated as follows:

$$24\frac{h}{day}\ (3 - operation\ shift, 8\ h\ per\ shift)\ \cdot 330\frac{days}{year} \cdot 15\ years = 118\,800\ h$$

9.3 SYSTEM DIAGRAM

This section supersedes Section 4.4 of the main document.

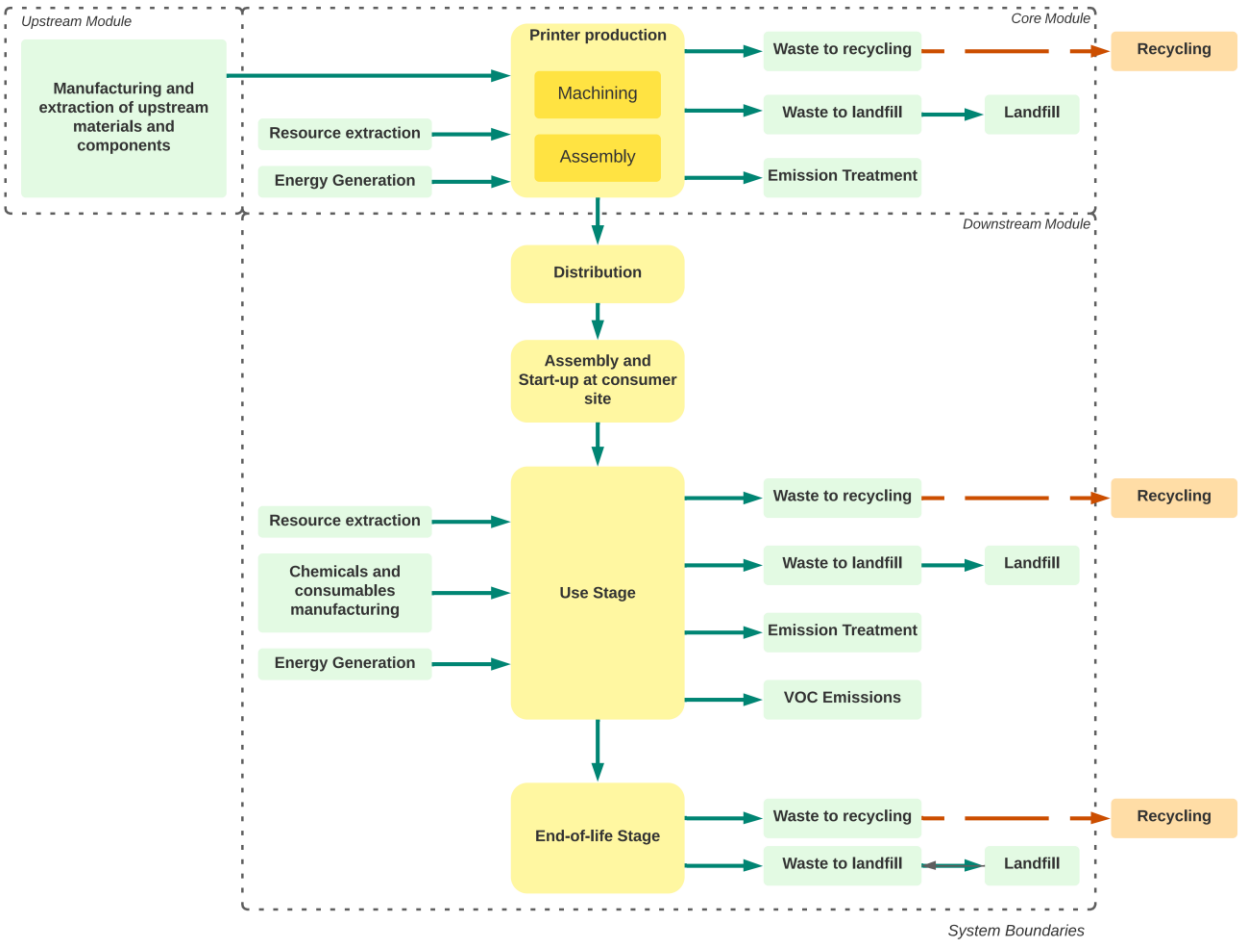

Figure 3 System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.

9.4 OTHER CALCULATION RULES AND SCENARIOS

In addition to the provisions described in Section 4.7 of the main document, these requirements apply to the downstream processes:

In cases where intercontinental transportation is relevant, the following scenario may be used:

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

The mean has to be calculated as weighted mean on the base of percent of purchased products.

The “Base Settings” for flexible printing machines are defined as:

- Printing speed: 300 m/min
- Colour coverage: 50%
- Number of colours: 6
- Job length: 5,000 m
- Reel width: 800 mm
- All set-up processes (cleaning, lining up, test run…) shall be included as part of the job.

Energy consumption shall be measured during the printing operations and when preparing the work piece. It is recommended to measure energy consumption at the entrance of the machine, taking into account the time of measure and the operating states.

Experimental data for the modelling of the use-stage in the LCI shall be obtained using printing parameters as close as possible to the “Base settings”.

Printing parameters used to obtain experimental data shall be declared in the EPD.

Information on the average power factor, active power (W), as well as electrical current (A) of experimental data shall be reported in the LCA study.

The number of activity hours has to be declared in the LCA and the EPD. The time interval during which the performance of the printer is considered can be divided into the following phases (Figure 4):

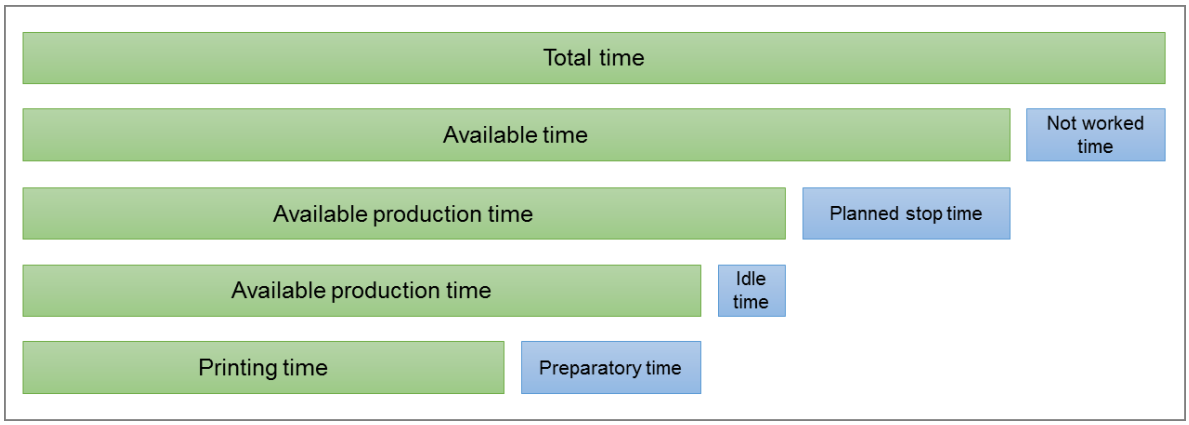

Figure 4 Accumulated Time Diagram. Indicative shares for the time during which the performance of the machine.

Time Period	Definition
Lifetime	The theoretical total net production time of a flexible packaging printing machine during its life if the suggest maintenance is performed.
Total time	The continuous time interval during which the performance of the equipment is considered.
Not worked time	The time interval during which the equipment is not used.
Available time	Time scheduled for production, from start of shift to end of shift.
Planned stop time	The accumulated time interval during which a Planned Stop occurs. It is the sum of the time dedicated to preparation phase, after production phase and planned maintenance.
Available production time	The time during which the equipment could have been performing a required function if an unplanned stop has not occurred.
Idle time	The accumulated time interval from when the equipment becomes idle until the equipment is back in the same state as it was before the stop occurred.
Possible production time	Time period during which the equipment could have been performing a required function without stops.
Printing time	The time during which the equipment reaches its primary required function, printing on flexible packaging.

Table 6 Accumulated Time Diagram legend

A use scenario for the consumption of chemicals and consumables during the use-stage must be defined and justified. All chemicals and/or consumables defined and specified by the manufacturer shall be included.

The use of water and chemicals (such as ink) by the machine during the use-stage shall be calculated based on the defined use scenario.

Data on the pollutant 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.

For the electricity used in the upstream/core/downstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream/core/downstream processes:

1 Specific electricity mixes as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.

2 National residual electricity mix or residual electricity mix on the market

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

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

Spare/ware parts during its lifetime shall be included (material & secondary processing) in the LCA scope. Information on planned maintenance over the life time of the machine should be used as the basis.

The following downstream processes shall be included:

- Energy use for product operation and its production.
- Consumption of chemicals and consumables used during the normal use of the machine and for the cleaning and maintenance of the equipment, including the consumption of maintenance and spare parts.
- Production of spare parts
- Production of chemicals and consumables
- Waste generation from maintenance materials, consumables and spare parts
- Waste generation from test runs and other unusable printing outputs
- Transport of chemicals, consumables and waste according to the scenarios presented in section 4.7

The following items and processes shall be excluded

- Building, maintenance, decommissioning and disposal of service facilities
- Exhaust gas extraction

OTHER SPECIAL- AND GENERAL-PURPOSE MACHINERY AND PARTS THEREOF
PRODUCT CATEGORY CLASSIFICATION: UN CPC 449, 44221 AND 43935