ESPRESSO COFFEE

PRODUCT CATEGORY CLASSIFICATION: UN CPC 23912

VERSION 1.01
2018:03
VALID UNTIL: 2022-05-31

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1 INTRODUCTION

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

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

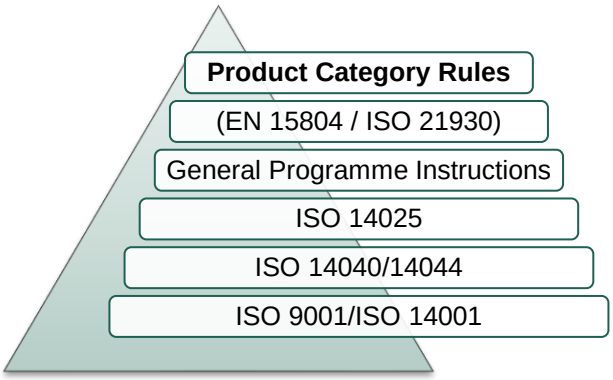

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

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

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

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

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

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

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

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Espresso coffee
Registration number and version:	2018:03 version 1.01
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:	Leo Breedveld, 2B Srl, breedveld@to-be.it
PCR Committee:	Luigi Lavazza SpA, illycaffè SpA, 2B Srl
Date of publication and last revision:	2019-09-06 (version 1.01)
Valid until:	2022-05-31
Schedule for renewal:	A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. When the PCR is about to expire the PCR moderator shall initiate a discussion with the Secretariat how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 3.0, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 23 Grain mill products, starches and starch products; other food products, version 3.0, dated 2018-05-03
PCR language(s):	This PCR was developed and is available in English. In case of translated versions the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Espresso coffee and the declaration of this performance by an EPD. The product category corresponds to a sub-set of UN CPC 23912 “Coffee substitutes containing coffee; extracts, essences and concentrates of coffee, and preparations with a basis thereof or with a basis of coffee; roasted chicory and other roasted coffee substitutes, and extracts, essences and concentrates thereof”. For additional information on UN CPC classification hierarchy: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25.

This product group is limited to the coffee preparation Espresso coffee. Espresso is coffee brewed by forcing a small amount of nearly boiling water under pressure through finely ground coffee beans. Espresso is generally thicker than coffee brewed by other methods, has a higher concentration of suspended and dissolved solids, and has a foam with a creamy consistency on top.

The coffee beverage espresso coffee has been defined by the "Comitato Italiano del Caffè" (COMITCAF - Italian coffee committee http://comitcaf.it), who adopted a specific disciplinary on espresso coffee on July 20th 2017 (COMITCAF, 2017). The disciplinary has been defined in an inclusive way, recognizing a broad international panorama of espresso beverages, but necessarily does differentiate espresso coffee from other coffee beverages (like for instance filter coffee). It is possible to download this document by following link: http://comitcaf.it/wp-content/uploads/2017/11/Disciplinare-Caff%C3%A8-Espresso-20-luglio-2017.pdf.

For the classification as espresso coffee in this PCR, the coffee beverage shall meet the criteria according to the disciplinary as defined by the COMITCAF (2017) and indicated in Table 1.

Criteria	Unit	Lower limit value	Upper limit value	Type of criteria
Extraction pressure	bar	≥ 5	n.a.	Physical
Extraction flow	ml/s	0.5	3.0	Physical
Extraction temperature, in cup	˚C	70	85	Physical
Weight of coffee grounds	g	5	10	Physical
Strength (soluble concentration)	%	≥ 3.5	n.a.	Chemical
Dose in one cup	g	13	50	Physical
Persistence of the crema	s	Visual assessment of the uniformity and persistency of the crema within 120 seconds.		Physical
Qualitative criteria	n.a.	Only beverages prepared with roast and ground coffee are suitable, excluding soluble products		Physical

Table 1. Criteria for the classification of the coffee beverage as 1 cup of espresso coffee (all criteria shall be met).[2]

Definition and further clarification of the criteria for espresso coffee:

- **Extraction pressure (bar)**: pressure measured upstream of the coffee pat, that is at the entrance of hot water in the infusion unit, without further restrictions or hydraulic load losses. Particularly, a manometer is used by inserting a three way connection in the entrance tube of the infusion room. The maximum value obtained during the beverage preparation shall be registered.
- **Extraction flow (ml/s)**: ratio between the beverage volume and the brewing time of the beverage, measured from the first droplet.
- **Extraction temperature, in cup (°C)**: temperature measured an immersion thermometer using a glass container of 50 cc isolated with polystyreneThe measurement is done by immerging the temperature probe in the beverage, stirring at least three times in order to homogenise the temperature, and register the first stable temperature in the cup. The temperature probe needs to be positioned approximately at half height of the beverage.
- **Weight of coffee grounds (g)**: weight of coffee grounds per single beverage before the coffee preparation, measured with a precision balance (precision of two decimal digits).
- **Strength (%)**: The measurement is done by filtering the beverage with a Faltenfilter as requested by DIN 12448 – B 150-2° (for instance VWR retention 8-12 µm). After drying of the beverage in an oven at a fixed temperature of 103 ± 2 °C until invariable weight, the ratio is calculated between the obtained soluble solids and the beverage.
- **Dose in one cup (g)**: weight of prepared sample, measured with a precision balance (precision of two decimal digits).
- **Persistence of the crema**: the crema shall be uniform and persistent for a period of 2 minutes after the preparation of the beverage, without blending the beverage. At the end of the 2 minutes, any gap on the surface that allows the view of the underlying liquid is not allowed.

This PCR refers to espresso coffee for the home market concerning the non-professional domestic market as defined in EN 60661, excluding the professional and commercial/industrial market of espresso coffee as defined in EN 11668.

[2] The measurement of the criteria in Table 1 is organized by the EPD applicant and can be done either by an internal laboratory or an external laboratory and shall be reported in the EPD.

Espresso coffee can be made by different systems (e.g. capsules, pods, roast & ground, roasted beans), but the PCR remains only applicable to the beverage espresso coffee, as defined in Table 1.

Other coffee preparations or products that do not meet the criteria (e.g. moka coffee, filter coffee, instant coffee; non exhaustive examples) are excluded from this product group due to different physical and chemical characteristics.

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

2.2.3 EPD VALIDITY

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

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

- an increase of 10% or more of any of the indicators listed in Section 5.4.5.1,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental information.

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

3 PCR REVIEW AND BACKGROUND INFORMATION

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

3.1 PCR REVIEW

3.1.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee, and were excused from the review.
Chair of the PCR review:	Filippo Sessa
Review dates:	2018-03-26 until 2018-04-19

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

This PCR was available for open consultation from 2017-08-02 until 2017-10-02, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

Stakeholders were invited via e-mail or other means to take part in the open consultation, and were encouraged to forward the invitation to other relevant stakeholders. Two stakeholders provided comments during the open consultation, but did not agree to be listed as contributors to the PCR and at www.environdec.com.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

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

- International EPD® System. www.environdec.com.
- PEF pilot project, an initiative of the European Commission.

For the product category Espresso coffee no other PCRs have been identified in other programmes based on ISO 14025. However, the following existing PCRs are relevant:

PCR NAME	PROGRAMME	REGISTRATION NUMBER	SCOPE
CFP-PCR on Green coffee	International EPD® System	2013:21	Green coffee
PCR on Moka coffee	International EPD® System	under development	Moka coffee
Draft PEFCR on coffee	PEF initiative of the EC	discontinued pilot project	Variety of coffee beverages

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed in order to enable publication of Environmental Product Declarations (EPD) for this product category based on ISO 14025, ISO 14040/14044 and other relevant standards to be used in different applications and target audiences. This document is built on other relevant PCR, as mentioned in section 2.3. Any future PCR CPC 23912 that will be developed for other coffee based product than Espresso coffee, shall be aligned with this PCR (e.g. PCR CPC 23912 Moka coffee).

3.5 UNDERLYING STUDIES

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

- Luigi Lavazza S.p.A., 2014. Carbon Footprint of one cup of espresso coffee made with the A Modo Mio system. CFP External Communication Report according ISO/TS 14067:2013, December 10th 2014 (critical review performed by Certiquality)
- Luigi Lavazza S.p.A., 2014. Carbon footprint of one cup of espresso coffee prepared with the A Modo Mio system. Underlying LCA report, December 10th 2014 (critical review performed by Certiquality) .
- EN 60661:2014-05. Methods for measuring the performance of electric household coffee makers. CENELEC, 2014.

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

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

4.1 FUNCTIONAL UNIT/DECLARED UNIT

The declared unit shall be defined as 1 cup of espresso coffee, without any additional ingredients (e.g. sugar, milk), following the standard recommended instructions of the producer. For the classification as espresso coffee, the coffee beverage shall meet the criteria as indicated in Table 1. The reference flow in the Life Cycle Assessment is defined as 1 cup of espresso coffee at serving and refers to the at-home market and/or non-professional market.

The declared unit shall be stated in the EPD, specifying the criteria of Table 1. The environmental impact shall be given per declared unit. Also the preparation method shall be specified in the EPD.

4.2 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 from cradle-to-grave. The perspective of the PCR is the coffee roaster, however this does not exclude any other perspective as long as the environmental indicators are reported in the defined Upstream, Core and Downstream processes.

4.2.1 LIFE CYCLE STAGES

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

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

In the EPD, the environmental performance associated with each of the three life-cycle stages above shall be reported separately. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.2.1.1–4.2.1.3.

4.2.1.1. Upstream processes

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

- Agriculture phase represented by the green coffee cultivation. This includes e.g. air and water emissions and emissions from energy wares used in the agriculture as well as emissions of nitrous gases. The cradle for the agriculture is soil preparation and cultivation.
- Transformation of land use considering direct Land Use Change and associated carbon dioxide emissions according to the land use tool of Blonk (2017), in case the crop is less than 20 years of age.
- Nursery activities concerning the production of coffee seeds, cuttings or plants (seedlings) for the cultivation.
- Production of fertilizers (including manure, compost and organic fertilizers produced off-farm) and other agro-chemicals (e.g. pesticides) used in the production system or processing.
- Emissions from the growing of the coffee cherry, such as cultivation, pruning, fertilization, plant protection and irrigation. This includes emissions to air, soil and water for the growing and processing (wet, semi-dry or dry) phases, as well as from the energy and raw materials used in this process. Also biogenic methane emissions during coffee cultivation and post-harvest processing shall be taken into account.

- Any farming operations, like planting, application of fertilizers, plant protection operations, pruning activities, mechanical and chemical weed controls, irrigation and harvesting.
- Transport of materials to the plantation (e.g. fertilizers, pesticides, fuels) and any internal transportation.
- Manufacturing of the primary and secondary packaging and packaging operations related to green coffee (e.g. jute sacks).
- Production processes of energy wares (fuel and electricity) used in the production system, at the farm and in processing the product to achieve the green coffee.
- Production of auxiliary products used such as detergents for cleaning.
- Post-harvest processing (wet, semi-dry and/or dry milling).
- Waste and waste water management (e.g. husks or water from wet processing) at the plantation or at the mill. Transportation from agriculture and /or processing to either port of origin or domestic warehouse.
- Manufacturing of primary and secondary packaging, during various life cycle stages (e.g. packaging of roasted coffee like multilayer film or capsules), packaging of the espresso machine).

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 4.4.

4.2.1.2. Core processes

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

- External transportation to the core processes (e.g. green coffee transport from port of origin to the coffee roaster).
- Manufacturing of the final product (the mill or similar, roasting, grinding, degassing, filling and packing of the final product).
- Maintenance, if relevant according to the general 1% cut-off rule (e.g. maintenance of the machines).
- Waste treatment of waste generated during manufacturing.
- Impacts due to the production of electricity and fuels used in the core module.

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

The technical system shall not include:

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

4.2.1.3. Downstream processes

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

- Transportation from preparation to an average retailer/distribution platform and transport to home: distribution of the product includes transport from manufacturer to distribution centre, sales point and transport to home.
- Customer or consumer use of the product: the use stage includes both the espresso machine life cycle (e.g. production, packaging and end-of-life) and the espresso preparation (e.g. energy and water consumption).
- End-of-life processes of any wasted part of the product (e.g. disposal of spent coffee grounds).
- End-of-life processes of (primary and secondary) packaging waste.

The technical system shall not include the life cycle of the cup and neither the dishwashing of the cup. Also the process of decalcification of the espresso machine shall be excluded from the analysis.

4.2.2 OTHER BOUNDARY SETTING

4.2.2.1. Boundary towards nature

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

4.2.2.2. Boundaries in the life cycle

See Section 4.2.1. The EPD may present the information divided into additional sub-divisions.

4.2.2.3. Boundaries towards other technical systems

See Section 4.5.2.

4.3 SYSTEM DIAGRAM

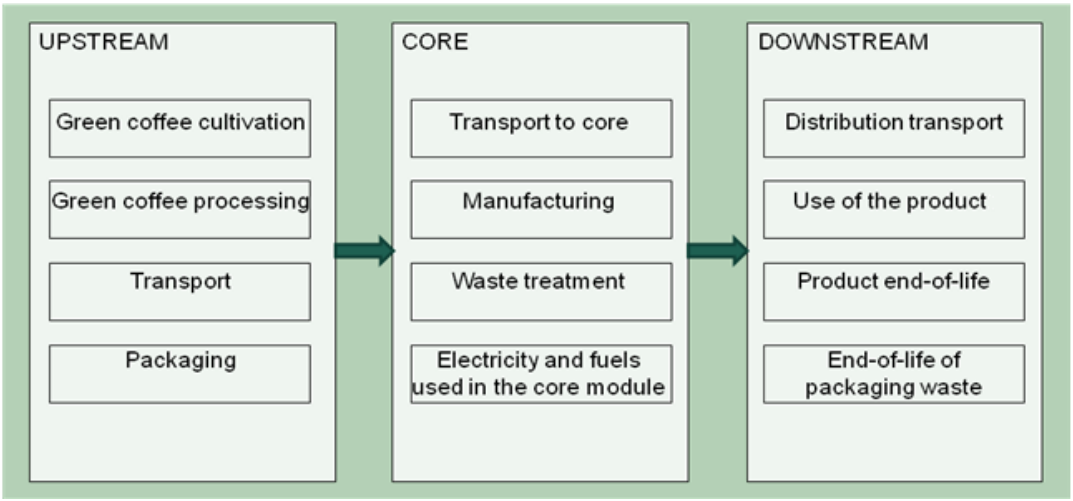

Figure 2 System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.

4.4 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in Section 4.2).

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

4.5 ALLOCATION RULES

4.5.1 CO-PRODUCT ALLOCATION

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

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. Where physical relationships alone cannot be established or used as the basis for allocation (or they are too time consuming), Table 1 shall be consulted for key processes. For processes not listed the most suitable allocation procedure shall be used and documented.

In case of polyculture green coffee plantations, multi-output allocation can be applied according to the rules as defined in the Green coffee PCR (International EPD System, 2013), which specifies allocation approaches that are to be implemented for both allocation of input quantities and processes between the different crops in polycultures and allocation of GHG emissions from multi-output systems. In case of monoculture green coffee plantations, the problem of allocation does not occur and consequently all consumptions and emissions of the plantation are related to the production of green coffee.

PROCESS	MAIN PRODUCT AND CO-PRODUCTS	ALLOCATION INSTRUCTION
Green coffee from polyculture plantations	Green coffee and other fruits	Allocation instruction as defined in the Green coffee PCR.

Table 1 Allocation procedure for key processes in the product system, if steps 1 and 2 are not possible.

4.5.2 REUSE, RECYCLING, AND RECOVERY

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

4.6 DATA QUALITY REQUIREMENTS

An LCA calculation requires two different kinds of information:

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

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

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

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

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

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

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

4.6.1 RULES FOR USING GENERIC DATA

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

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

Section 4.7 provides a list of recommended databases/data sets to be used for generic data.

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

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

4.7 RECOMMENDED DATABASES FOR GENERIC DATA

Table 2 lists recommended databases for generic data. Please note that this listing does not imply that other data that fulfil the data quality requirements may not be used and that data quality assessment shall also be performed for the data sets in the recommended database by an LCA practitioner.

PROCESS	GEOGRAPHICAL SCOPE	RECOMMENDED DATASET	DATABASE
Green coffee	Country specific (Brazil, Colombia, Honduras, India, Indonesia, Vietnam, Rest of the World) and type specific (arabica or robusta)	Country and type specific dataset for green coffee, if available in Ecoinvent v3.4	Ecoinvent v3.4
Green coffee	Global	Coffee, green bean {GLO}| market for coffee, green bean | Cut-off, S	Ecoinvent v3.4

Table 2 Recommended databases for generic data.

4.8 IMPACT CATEGORIES AND IMPACT ASSESSMENT

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

In order to better characterise the environmental performance of the product category espresso coffee, the following additional impact categories shall be calculated and reported in the EPD®:

- Human toxicity, cancer effects, according to USEtox (recommended + interim), expressed in Comparative Toxic Unit for humans (CTUh), (Rosenbaum, 2008).
- Human toxicity, non-cancer effects, according to USEtox (recommended + interim), expressed in Comparative Toxic Unit for humans (CTUh), (Rosenbaum, 2008).
- Fresh water ecotoxicity, according to USEtox (recommended + interim, expressed in Comparative Toxic Unit for ecosystems (CTUe), (Rosenbaum, 2008).
- Land use, according to Mila i Canals et al. 2007, expressed in kg C/m2/a, based on changes in Soil Organic Matter (SOM), (Mila i Canals, 2007).

The default impact categories have been included as they constitute the minimum set of indicators for EPDs of all product categories in the International EPD® System. Additional impact indicators have been selected in order to better characterise the environmental performance of espresso coffee. The choice of the additional impact indicators has been based on underlying LCA studies (Lavazza, 2014; TS, 2016), selecting additionally those impact categories that appeared to be more significant after normalisation (human toxicity, cancer effects; human toxicity, non-cancer effects; fresh water ecotoxicity; land use).

4.9 OTHER CALCULATION RULES AND SCENARIOS

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

[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.

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

- Green coffee cultivation and processing shall differentiate between Arabic green coffee and Robust green coffee. Green coffee cultivation has to be assessed through data related to the geographical area in which the green coffee is cultivated. Ideally, the time boundary for green coffee data collection is the most recent three consecutive years averaged. With the knowledge that it will take time to generate primary data on green coffee, initially periods of less than three years (e.g. 1 year) are also allowed.
- Specific data referring to green coffee cultivation should consider the PCR CPC 01610 on Green coffee (International EPD System, 2013). Green coffee modelling shall include: land use change; nursery; fertilizers and other agro-chemicals (production, application and associated emissions); planting, irrigation, harvesting and any other farm operations; fuel and electricity and transport.
- Land use transformation and land use occupation shall be included in the analysis and indicated as inputs from nature in the LCA model.
- Carbon stock changes due to land use change (LUC) within the last 20 years in order to establish the coffee plantation shall be included in the calculation. If LUC happened within the last 20 years of undertaking the assessment, then LUC is to be included on the basis of equal allocation to each year of that period. In case the crop is less than 20 years of age, carbon dioxide emissions due to direct Land Use Change shall be calculated with the land use tool of Blonk (2017). The 'Direct Land Use Change Assessment Tool' is an Excel tool, which provides a predefined way of calculating greenhouse gas emissions from land use change (Blonk, 2017).
- Fertilizer emissions of carbon dioxide and nitrous oxide to air shall be calculated using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2006). Ammonia and nitrogen oxide emission to air and nitrogen, phosphorus and heavy emissions to water shall be included and evaluated using established scientific models that shall be specified.
- Biogenic methane emissions during coffee cultivation and post-harvest processing shall be taken into account. In order to calculate the biogenic methane emissions during post-harvest processing (due to the green coffee pulp decomposition) the following data shall be assumed: 576 kg cherry pulp/tonne green coffee beans; 70% water in coffee cherries; 54% C in coffee cherries (FNC, 2015). This leads a total C-content in pulp of 93.3 kg C/t green coffee beans. It shall be assumed that 5% of this carbon is emitted as CH_4 (Hermann, 2011).
- Unproductive years of the coffee plantation shall be taken into account. The consumptions and emissions of unproductive years of the coffee plantation shall be spread out over the productive years considering the yearly yields and entire lifetime of the plantation. Similar to productive years, data inventory for unproductive years shall include all relevant upstream activities related to green coffee cultivation.
- Specific data referring to green coffee processing should consider the PCR CPC 01610 on Green coffee. Green coffee processing shall consider all relevant post-harvest activities until port of origin, including wet and/or dry milling; waste and waste water management; fuel and electricity; transport; packaging of green coffee.
- The PCR CPC 01610 on Green coffee states that representativeness of data is respected if specific data has been described by the square root of a homogenous population size (i.e. number of supplying green coffee plantations). If this is the case, green coffee cultivation and processing shall be described solely with primary data. In case limited or no specific data is available on green coffee cultivation and processing, proxy data based on country specific data of the Ecoinvent v3.4 database shall be used. In case no statistics are available on the countries of green coffee origin, the Ecoinvent v3.4 process "Coffee, green bean (GLO), market for coffee, green bean, Alloc Rec, S" (Ecoinvent, 2017) shall be used. The mix of specific and proxy data is proportional to the number of supplying green coffee plantations involved in the data collection:
    - Fictive example in case of random sampling for plantations that are homogeneous in nature: assuming that the manufacturer has 100 supplying green coffee plantations, and only 3 plantations have been involved in the data collection, than 30% (3 divided by the square root of 100) shall be described by specific data while the other 70% shall be based on proxy data (Ecoinvent, 2017).
    - Fictive example in case of stratified sampling for plantations that are heterogeneous in nature but can be divided in homogeneous subgroups: assuming that the manufacturer has 2 homogeneous subgroups of 100 supplying green coffee plantations each, and only 3 plantations have been involved in the data collection, than 15% (3 divided by the square root of 100 + the square root of 100) shall be described by specific data while the other 85% shall be based on proxy data based on Ecoinvent (Ecoinvent, 2017). In this example, the calculation of primary data shall be based on a weighted average of the subgroups (in terms of green coffee production) of 3 plantations. Furthermore, the analysed plantations in the sample shall be selected from both subgroups, in order to obtain a representative sample.

- Packaging: Manufacturing of primary and secondary packaging shall be included, comprising the production of raw materials and transformation processes. A minimum of 99% of the total weight of primary and secondary packaging shall be included. 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. Furthermore, for primary and secondary packaging specific data on composition shall be used, while raw materials and converting processes for packaging production can be assessed by using secondary data.

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

  The mix of electricity used in the core processes shall be documented in the EPD, where relevant.
- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.
- For the modelling of the core processes primary data shall be used, it is not allowed to use default data/proxy data. The core processes shall include all relevant ground coffee manufacturing processes (e.g. roasting, grinding, degassing, filling and packing) and auxiliary consumptions of electricity, thermal energy and water, waste treatment and wastewater treatment. The ground coffee scraps generated during coffee processing shall be taken into account. Repartition of the manufacturing plant data shall be based on annually product volumes, resulting in average consumptions expressed per kg of processed ground coffee.

4.9.3 DOWNSTREAM PROCESSES

The following requirements apply to the downstream processes:

- The downstream module shall be based on relevant scenarios for the geographical area in which the EPD® is valid. The downstream scenario (distribution, use and disposal) shall be based on the actual product sales figures.
- 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.
- Transport of the product to customer shall, as a first option be based on the actual transportation distances. Transport processes shall take the load rate and eventual empty return trips into account. As a second option, it could be calculated as

[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.

the average distance of a product of that product type transported with different means of transport or, if also such data is not available be calculated as a fixed long transport, e.g.1000 km distance transport with lorry or 10000 km by airplane, according to product type. The way transportation shall be calculated shall be described in the reference PCR, which should reflect the actual situation to the best extent possible. In case proxy data is used to describe transport of the product to the consumer, the following distribution scenario shall be used:

- Transport from manufacturing plant to distribution centre: 1000 km distance transport by lorry (>32 t)
- Transport from distribution centre to sales point: 50 km distance transport by lorry (16-32 t)
- Transport from sales point to home: 1 km distance transport by gasoline car, attributing 1% of the grocery shopping's to the coffee package (with one coffee package multiple coffee beverages can be prepared)

- Use phase:
  - Data on the consumptions (e.g. of energy and water) and 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 the energy mix in the region/country where the product is sold and then used shall be approximated with OECD electricity mix statistics. For non-OECD countries, in order to adopt a suitable region- or country-specific electricity mix (reflecting approximately the region(s)/countries' share) a similar precision will be required. The mix used shall be documented. Espresso coffee prepared at-home market and/or non-professional market generally applies a low voltage energy mix.
  - The electricity shall be determined according to standard EN 60661:2014-05, "Methods for measuring the performance of electric household coffee makers" (CENELEC, 2014). Figure 2 illustrates an example of a 40 g cup of espresso coffee[5]. The procedure for pressure coffee makers consists of the following steps (Figure 2):
    - The first brewing cycle starts 1 minute after the maker is ready for brewing. This is a 40 g coffee; If the amount of coffee used per cup can be adjusted, the settings shall be as close to 40 g as possible (e.g. if the standard espresso coffee ranges from 25 g to 30 g, the setting of the measurement shall be a 30 g coffee), The chosen settings shall be reported.
    - The second brewing cycle is done after 1 minute after the maker has finished the first brewing cycle. Two cups of the same size are brewed[6]. After that, the energy measurement shall continue without any further interaction until minute 30;
    - 30 min from the start, the third brewing is made, a 2 x 40 g coffee is made[3]. After that, the energy measurement shall continue without any further interaction. In case the maker can only make single coffees, the double coffees are replaced by singles of the same weight to be made immediately in sequence;
    - 40 min from the start, the accumulated energy consumption is measured and to be reported (E_{40}). 100 min from the start, the accumulated energy consumption is measured and to be reported (E_{100}). The electricity consumption that shall be attributed to the functional unit is equal to E_{100} divided by the number of coffees made in 100 minutes (5 cups of coffee).

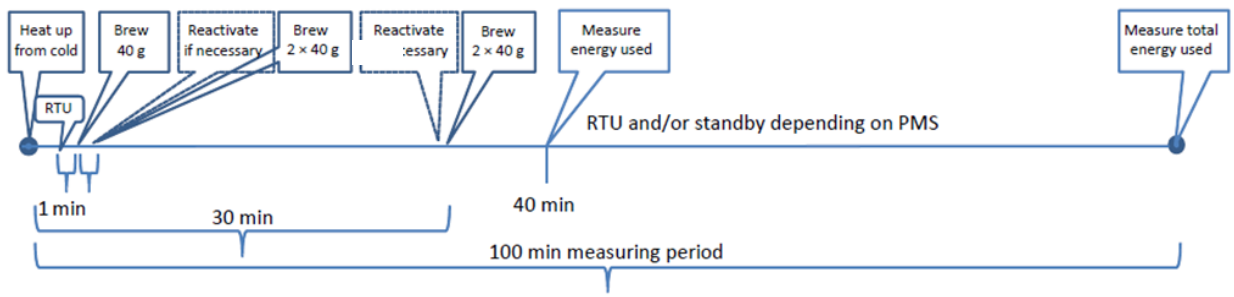

Figure 2. Procedure to measure the electricity consumption according to EN 60661:2014-05, example for a cup of 40 g.

[5] According to Table 1 the dose of the cup of espresso coffee can vary between 13 g and 50 g.

[6] If the amount of coffee used per cup can be adjusted, the settings shall be as close to 40 g as possible (e.g. if the standard espresso coffee ranges from 25 g to 30 g, the setting of the measurement shall be a 30 g coffee).

- The water consumption is assumed to be the amount of processed water in the coffee beverages (e.g. 40 ml) plus 50% extra in order to account for residual water (e.g. 40 + 20 = 60 ml)[3].
- Ground coffee losses during the coffee distribution and coffee preparation is assumed to be 0%.
- The energy consumption relative to the grounding of the roast coffee shall be included in the analysis.
- The espresso machine life cycle processes shall be based on primary data considering the actual bill of materials of the espresso machine and packaging, and the actual consumptions of coffee grounds, electricity and water. The life cycle stages of the espresso machine shall include raw materials and raw material processing, supply transportation, components and machine manufacturing and associated consumptions and emissions, distribution, use (coffee preparation), coffee machine and packaging end of life. A minimum of 99% of the total weight of the espresso machine and packaging shall be included. For the espresso machine and its packaging, specific data on composition shall be used, while raw materials and transformation processes can be assessed by using secondary data. The partition of the espresso machine life cycle to one espresso coffee shall be based on the number of beverages that one espresso machine is supposed to produce in its entire life-time, according its standard product specifications. The number of beverages shall be reported in the underlying LCA study.
- 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.
- The modelling of disposal processes for spent coffee grounds shall be based on primary data related to the chemical composition (e.g. water content, carbon content) and the landfill degradation rate of spent coffee grounds. Disposal processes shall be modelled using established scientific models that shall be specified.

5 CONTENT AND FORMAT OF EPD

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

As a general rule the EPD content:

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

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

5.1 EPD LANGUAGES

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

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
- Three significant figures[7] should be adopted for all results, The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.

[7] 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 “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.[8]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).
  - Use the value 0 only for parameters that have been calculated to be zero.
  - Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

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

5.4 EPD REPORTING FORMAT

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

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

The following information shall be included, when applicable:

- Information related to Sector EPDs (see Section 5.4.6)
- 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[9],

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

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

- *Date of publication (issue): 20XX-YY-ZZ,*
- *Date of revision: 20XX-YY-ZZ*, when applicable,
- *Date of validity; 20XX-YY-ZZ*
- A note that "*An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*."
- A statement of conformity with ISO 14025,

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following mandatory statement from ISO 14025: "*EPDs within the same product category but from different programmes may not be comparable*."
- Based on the requirements for comparability according to ISO 14025, section 6.7.2, the following statement shall be added in the EPD: "*EPDs based on the same PCR are comparable if the requirements for comparability according to ISO 14025, section 6.7.2 have been met. In practice, this is not always the case and therefore different EPDs based on the same PCR are not always comparable*".
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[10] and reference PCR in a table with the following format and contents:

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

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Address and contact information to EPD owner,

[10] 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.

- 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) or
  - Australian and New Zealand Standard Industrial Classification (ANZSIC),
- Description of the product, its application/intended use and technical functions, e.g. expected service life time,
- Geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- Functional unit or declared unit,
- Reference service life (RSL), if applicable,
- Declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- Reference to the main database(s) for generic data and LCA software used, if relevant,
- System diagram of the processes included in the LCA, divided into the life cycle stages,
- Description if the EPD system boundary is "cradle-to-gate", "cradle-to-gate with options" or "cradle-to-grave",
- Information on which life cycle stages are not considered (if any), with a justification of the omission,
- Relevant websites for more information or explanatory materials.

This section may also include:

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

5.4.4 CONTENT DECLARATION

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

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)[11], issued by 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)
- 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

[11] The GHS document is available on www.unece.org.

5.4.4.1. Information about recycled materials

Not relevant for this product category.

5.4.4.2. Information about packaging

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

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

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

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

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

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The indicators related to potential environmental impact listed in Table 3 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER		UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.				
	Biogenic	kg CO_2 eq.				
	Land use and land transformation	kg CO_2 eq.				
	TOTAL	kg CO_2 eq.				
Acidification potential (AP)		kg SO_2 eq.				
Eutrophication potential (EP)		kg PO_4^{3-} eq.				
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.				
Abiotic depletion potential – Elements		kg Sb eq.				
Abiotic depletion potential – Fossil fuels		MJ, net calorific value				
Water scarcity potential		m^3 eq.				

Table 3 Indicators describing potential environmental impacts[12].

Notes:

- Abiotic depletion potential is calculated and displayed as two separate indicators. ADP-fossil fuels include all fossil resources, while ADP-elements include all non-renewable material resources.

[12] Please check www.environdec.com for the latest list of default impact categories, units and characterisation factors as they may have been updated compared to this table.

5.4.5.2. Use of resources

The indicators for resource use based on the life cycle inventory (LCI) listed in Table 4 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER		UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Secondary material		kg				
Renewable secondary fuels		MJ, net calorific value				
Non-renewable secondary fuels		MJ, net calorific value				
Net use of fresh water		m^3				

Table 4 Indicators describing use of primary and secondary resources.

Notes:

- In order to identify the primary energy used as an energy carrier (and not used as raw materials), the parameter may be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.
- Energy content of biomass used for feed or food purposes shall not be considered.
- The net use of fresh water does not constitute a “water footprint” as potential environmental impacts due to the water use in different geographical locations is not captured. For this indicator:
  - Evaporation, transpiration, product integration, release into different drainage basins or the sea, displacement of water from one water resource type to another water resource type within a drainage basin (e.g. from groundwater to surface water) is included.
  - In-stream water use is not included.
  - For water used in closed loop processes (such as cooling system) and in power generation only the net water consumption (such as reintegration of water losses) should be considered.
  - Seawater shall not be included
  - Tap water or treated water (e.g. from a water treatment plant), or wastewater that is not directly released in the environment (e.g. sent to a wastewater treatment plant) are not elementary water flows, but intermediate flows from a process within the technosphere.
  - Additional transparency in terms of geographical location, type of water resource (e.g. groundwater, surface water), water quality and temporal aspects may be included as additional information.

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 Genera. When the amount of waste or the output flows is from the life cycle inventory (LCI) are declared, the indicators in Table 5 and Table 6 shall be reported per functional unit or declared unit, and per life cycle stage.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Hazardous waste disposed	kg				
Non-hazardous waste disposed	kg				
Radioactive waste disposed	kg				

Table 5 Indicators describing waste production.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for reuse	kg				
Material for recycling	kg				
Materials for energy recovery	kg				
Exported energy, electricity	MJ				
Exported energy, thermal	MJ				

Table 6 Indicators describing output flows.

Notes:

- The parameters are calculated on the gross amounts leaving the system boundary of the product system in the LCI. If e.g. there is no gross amount of “exported energy, electricity” leaving the system boundary, this indicator is set to zero,
- The parameter “Materials for energy recovery” does not include materials for waste incineration. Waste incineration is a method of waste processing, when R1<60% (European Guideline on R1 energy interpretation), and is allocated within the system boundary.
- In case there are never any flows of these types leaving the system boundary for a product category, the indicators may be removed by the PCR.

5.4.5.4. Other environmental indicators

The reference PCR may add other environmental indicators to include for the product category from the inventory or impact assessment. Such indicators should be based on international standards or similar methodologies developed in a transparent procedure. Reference to the chosen indictors and methodologies shall be reported.

The following additional impact categories shall be calculated and reported in the EPD®:

- Human toxicity, cancer effects, according to USEtox (recommended + interim), expressed in Comparative Toxic Unit for humans (CTUh), (Rosenbaum, 2008).
- Human toxicity, non-cancer effects, according to USEtox (recommended + interim), expressed in Comparative Toxic Unit for humans (CTUh), (Rosenbaum, 2008).
- Fresh water ecotoxicity, according to USEtox (recommended + interim, expressed in Comparative Toxic Unit for ecosystems (CTUe), (Rosenbaum, 2008).
- Land use, according to Mila i Canals et al. 2007, expressed in kg C/m2/a, based on changes in Soil Organic Matter (SOM), (Mila i Canals, 2007).

The other environmental indicators are listed in Table 37 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Human toxicity, cancer effects	CTUh				
Human toxicity, non-cancer effects	CTUh				
Fresh water ecotoxicity	CTUe				
Land use	kg C/m2/a				

Table 7 Indicators describing other environmental indicators.

5.4.6 ADDITIONAL INFORMATION

Not applicable for this product category.

5.4.7 INFORMATION RELATED TO SECTOR EPDS

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

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

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

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

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

5.4.9 REFERENCES

This section shall include a list of references, including the General Programme Instructions (including version number), standards and PCR (registration number, name and version). The EPD® shall, if relevant, refer to:

- The underlying LCA
- The name, CPC code and version number of the PCR used
- Other documents that verify and complement the EPD®
- Instruction for recycling, if relevant
- The General Programme instructions of the International EPD® System

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

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

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

6 GLOSSARY

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

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2018-05-31

Original version of this PCR.

VERSION 1.01, 2019-09-06

- Clarified terms of use
- Editorial changes

