



PRODUCT-CATEGORY RULES (PCR)

for preparing an environmental product
declaration (EPD) for

NATURAL SINGLE-PIECE CORK STOPPER

PCR 2004:x

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This PCR-document is in compliance with the “Requirements for an International EPD Scheme” managed by the INTEND project. Information about the EU Life Environment funded INTEND project at www.intendproject.net

Comments on the PCR-document, please E-mail to: intend@macroscopio.it



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1. General information

This document has been prepared in compliance with "Requirements for an international EPD scheme", managed by the INTEND project (www.intendproject.net).

The objective of the document is to give the Product Categories Rules for the Environmental Product Declaration and the underlying LCA study.

The PCR draft has been prepared by Company Cork sas (Italy), supported by EHS gestione srl¹ (Italy).

The PCR is valid for three (3) years.

2. Definition of the product group

This PCR defines the requirements on environmental parameters to be included in an Environmental Product Declaration (EPD) for the product **Natural single-piece Cork Stopper**, with diameter ranging from 23 mm to 28 mm and length ranging from 38 mm to 60 mm (from now on it will be used the general term "cork stopper").

Natural single-piece Cork Stopper is made of a unique piece of cork (i.e. not agglomerated) and it is used for quality wines and liquors.

2.1 Manufacturing description

The primary source of cork is from natural forest, where after the first harvest (at about 25 years and not used for production), each 10-15 years later (this period, together with the minimum diameter of the tree, can be subject to legislative requirements) - the tree can be harvested for cork to be used for stoppers. Usually, the forest does not need any chemical treatment and irrigation. The harvest is carried out in the summer months when the tree easily releases its bark without harming the underneath vegetal tissue. Skilled workers carefully separate manually the bark from the tree with the traditional cork axe, though there are also mechanical means for cork extraction.

The stripped bark is sorted, sent to manufacturers and stacked for at least 6 months, in the form of cork planks, before starting the transformation process to cork stoppers. The cork planks are therefore boiled for at least one hour to make the cork more pliable, as well as to remove impurities and water-soluble substances. The boiling process give the cork the shape and features necessary to be transformed into stoppers. The water is changed regularly to prevent organic contamination. After boiling, the cork planks are sorted, packed and stored in well-ventilated and clean conditions in preparation for the transformation to cork stoppers.

Cork planks are trimmed into strips of suitable length for the desired stopper production. These strips are then punched either manually or automatically. Skilled workers, or sophisticated electronic equipment, make final grading determinations: products failing the grade for cork stoppers are discarded to be used in other productions. Cork stoppers are therefore rectified to reach the desired size and washed in order to achieve uniform appearance and sanitization. Treatment processes using Ethanol, H₂O₂, peracetic acid, sulfamic acid and Ozone can be applied to achieve this goal.

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Final phases before commercialization consist of branding of the cylindrical surface and lubrication, through which a thin layer of paraffin, silicone or other similar substance is applied both to ensure a good seal in the bottle and permit graceful extraction from the bottle. The final product is then sealed in plastic bags with the possible addition of SO₂ and packed in paperboard boxes to provide healthy conditions during the transportation to the client (i.e. wine producers). The use phase of the product consists of the application on the bottle of wine or liquor until it is consumed.

3. Functional unit

The functional unit of the LCA study shall be **1000 pieces of natural single-piece cork stopper**, with diameter ranging from 23 mm to 28 mm and length ranging from 38 mm to 60 mm.

All data shall be referred at least to a 12-month period of production activity at normal conditions. This referenced period shall be clearly stated in the EPD.

The functional unit (1000 pieces) shall be based on the average production of natural single-piece cork stoppers in the reference year by the organisation elaborating the EPD. The following information shall be reported in the EPD regarding the composition of the functional unit:

- a) distribution (%) of the dimensions (diameter and height) of the cork stoppers produced in the reference year)
- b) average weight (g) of each dimension of the cork stoppers produced in the reference year
- c) equivalent weight of the functional unit, based on information required in clause a) and b, see example A)

Example A – Definition of the functional unit

If the production of natural single-piece cork stoppers by the organisation preparing the EPD for the considered year is the following:

Size of the stopper	Quantity (n° pieces)
24x39	200.000
24x44	550.000
26x39	150.000
26x49	100.000
Total	1.000.000

the composition of the functional unit (1000 pieces) to be reported according to paragraph 3 is:

Composition of FU	Size distribution (a)	Average weight (b)	Equivalent FU weight (c)
24x39	20%	3 g	$0,20 \times 3 = 0,6$
24x44	55%	3,5 g	$0,55 \times 3,5 = 1,925$
26x39	15%	4 g	$0,15 \times 4 = 0,6$
26x49	10%	4,5 g	$0,10 \times 4,5 = 0,45$
Total	100%	-	3,575

4. System boundaries

The LCA study for cork stopper shall include the following life cycle phases (see the flow chart in fig.1 - production phase):

- **Managing of the cork forest and Harvesting;**
- **Transportation of cork bark to the stacking area;**
- **Transportation of cork planks to the productive plant(s);**
- **Production of cork stopper (ready to use product);**

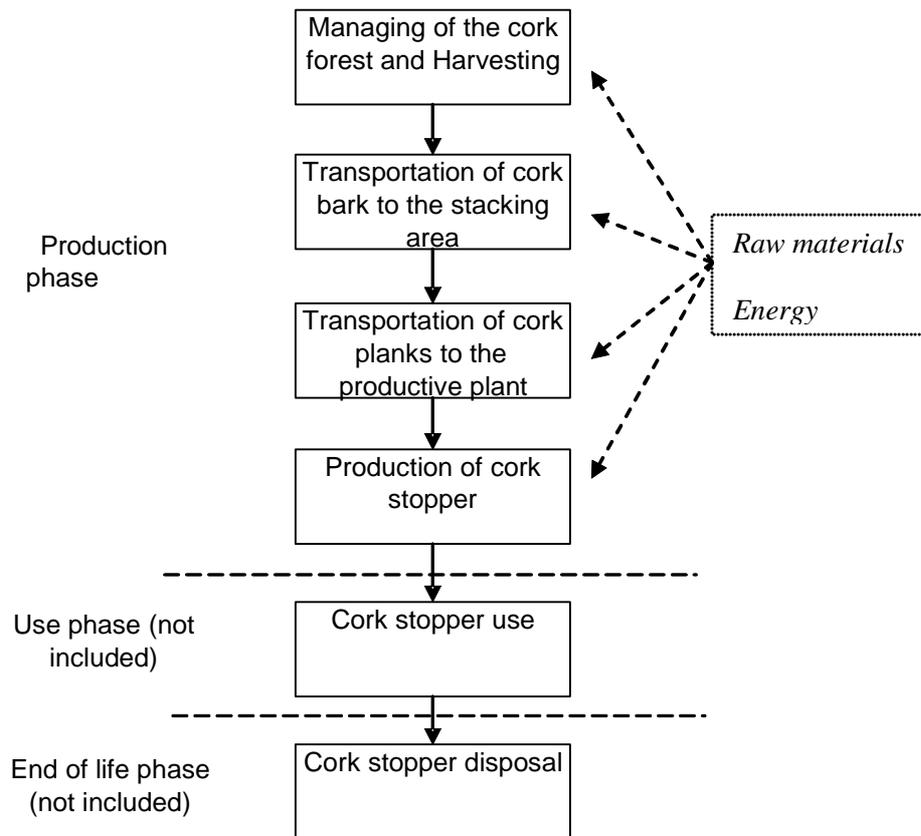


Fig.1 – Life cycle diagram – System boundaries

The environmental impacts of Managing of the cork forest and Harvesting to be included in the LCA study shall be the following :

- use of chemical products in the period between two harvests (kg of chemical products per year per functional unit)

Production of cork stopper includes also the production of the additives used in the process.

The conversion factor used (whenever needed) to shift from number of pieces of cork stoppers to the relative cork mass shall be the related to the functional unit.

The LCA study for cork stopper is to be considered as “cradle to gate”.

For the **use phase**, since the traceability of the cork stopper from the productive plant to the final consumer is quite hard to define, only qualitative information is required, such as :

- a description of means of transportation actually used to deliver the product to the purchaser (wine producers, etc.)

Possible actual scenarios can be defined for the use phase, provided the following functional unit is used : **1000 pieces of natural single-piece cork stopper** (with diameter ranging from 23 mm to 28 mm and length ranging from 38 mm to 60 mm) **per km covered** (from the productive plant to the purchaser).

For the **end of life phase** the environmental impacts produced by technological waste disposal scenarios can be evaluated (incineration, landfill, recycling, composting and other treatments). The chosen scenarios should be both technically and economically viable and comply with all existing legislation on waste management.

4.1 Boundary toward nature

The boundaries towards nature shall describe the flow of material and energy resources from nature into the system and emissions from the system to air and water and waste out of the system.

4.2 Boundary in the life cycle

The boundaries in the life cycle are illustrated in the flow chart in Figure 1.

Building and maintenance of capital equipment site, personnel activities as well as the contribution of travel to work shall not be included.

5. **Cut off rules**

Processes and activities that do not contribute to more than 1% of the total environmental impact for each impact category can be omitted from the inventory. Omissions from the inventory must be documented and justified.

6. **Allocation rules**

6.1 General rules

Whenever it would be necessary to partitioning the system inputs and outputs, mass

criteria will be used. Any other allocation procedures based on physical or chemical characteristics must be specified in the EPD. It is excluded the possibility of applying economic allocation criteria because of its sensitivity to market specific conditions.

6.2 Use of recycled materials or waste

Recycled materials or waste (for energy recovery) enter the system without any environmental burden (except the impacts related to the possible recycling process and transportation to the productive plant).

6.3 Scrap cork and discarded cork planks

Scrap cork sent to other cork productions (i.e. granulate for other types of stoppers) and discarded cork planks sent to other cork productions (i.e. cork panels, etc.) are not considered as (recyclable) waste, but as by-products.

6.4 End-of-life

No allocation for recycling, no allocation for incineration.

7 Units

The following units shall be used:

- SI units.
- Preferred power and energy units:
 - kW (MW) for power
 - kWh (MWh) for electric energy

8 Calculation rules and data quality requirements

As a general rule specific data should always be used. The definition of specific data is given in the "Requirements for an International EPD scheme".

According to the "Requirements for an International EPD scheme", data coming from available databases (both pay-database and free database) can be used as specific data if the following rules are demonstrated:

1. representativity of the geographical area
2. technological equivalence
3. boundaries towards nature
4. boundaries towards technical systems

The demonstration of the compliance to these 4 rules shall be clearly described into the LCA study report.

As a general reference, the list of available data sources attached to the "Requirements for an International EPD scheme" can be used.

The environmental impact associated to other generic data must not exceed 10% of each impact category.

Data quality requirements for the production phase

- Specific data shall be used for data relative to processes inside the production company sites
- Sources for specific data are according to 8. Calculation Rules
- The mix of electricity used during the manufacturing phase can be approximated as the official one in the country of manufacture if specific data can not be obtained. The mix of electricity shall be documented.
- Hazardous waste is defined by EU Directives 91/689/EEC and 75/442/EEC.
- Transportation to manufacturer with actual transportation means and distance from the supplier shall be included.

9 Parameters to be declared in the EPD

The following parameters shall be declared:

Resource use

- Use of non-renewable resources
 - without energy content
 - with energy content
- Use of renewable resources
 - without energy content
 - with energy content
- Electricity consumption

Pollutant emissions expressed as potential environmental impact

Impact category	Indicator
Global warming	kg CO ₂ eq.
Ozone depletion	g CFC eq.
Acidification	mol H ⁺
Eutrophication	kg O ₂
Photochemical oxidant formation	kg ethene eq.

The characterisation factors to use for converting data from the life cycle inventory analysis into impact categories for global warming (emissions of green-house gases), stratospheric ozone depletion (emissions of ozone-depleting gases), acidification (emissions of acidifying gases), photochemical oxidant emissions (emissions of gases contributing to ground-level ozone) and eutrophication (emissions of substances to water contributing to oxygen depletion) are listed in paragraph 3.8 of "Requirements for an international EPD scheme", managed by the Intend project (www.intendproject.net)

The global warming shall be calculated both for fossil and non-fossil (biologic) emissions. The two carbon sources shall be reported separately. CO₂ absorption by plants and forests (often reported with minus sign) shall not be counted in the GWP indicators and can be reported separately.

Additional information (mandatory)

- Waste
 - Hazardous waste

- Other waste

The optional phases, dealing with the above mentioned compulsory ones, that are possibly analysed (distribution phase and end of life phase) shall be presented separately.

All quantity results reported on the Environmental Product Declaration shall refer to the chosen functional unit, namely 1000 pieces of natural single-piece cork stopper (with diameter ranging from 23 mm to 28 mm and length ranging from 38 mm to 60 mm).

For each fuel or energy-bearing material included in the LCA study, the conversion factor used to shift from mass (or volume) to its energy content (i.e. high calorific value) shall be reported in the EPD.

10 Material and chemical substances to be declared

- List all materials $\geq 0.5\%$ weight
- List all materials/substances that are submitted to legal requirements

11 Other environmental information

It is possible to insert other information that are important in order to describe environmental performance of the cork stopper (recycling properties of the product, etc.).

12 References (to be included in the EPD)

The EPD shall refer to:

- "Requirements for an international EPD scheme", managed by the Intend project (www.intendproject.net)
- This PCR document
- The underlying LCA report
- ISO 2569:1994 "Cork stoppers - Vocabulary"
- ISO 633:1986. Cork – Vocabulary. ⁽¹⁾
- CE-Liège. (2002). International Code of Practices for Cork Stopper Production – 4th edition. Ed. Confédération Européenne du Liège.