



## ENVIRONMENTAL PRODUCT DECLARATION (EPD)



**SINGLE PIECE NATURAL CORK STOPPER**  
**COMPANY CORK of Bocchio G. & C. S.a.s.**



## 1. SCOPE OF DECLARATION

In this EPD (Environmental Product Declaration), all those who are interested in knowing and verifying the environmental impact related to “single piece natural cork stopper” can find a qualitative description and a quantification (reliable and certified) of its performances according to a life cycle approach.

## 2. DESCRIPTION OF THE COMPANY

Since last century Company Cork is an Italian company leader in the production of cork stoppers. Our plant is located in an area of about 2500 m<sup>2</sup> close to Alessandria.

Company Cork imports cork coming from Mediterranean forests and can rely on qualified suppliers which help the company to satisfy any market demand. Our products include all range of cork closures for bottling of non-sparkling, sparkling, vintage wines for small and large-scale retail trade.

In order to satisfy our heterogeneous customers needs, Company Cork has been carrying out, in the last decade, a strategic process of innovation aimed at stressing the “quality” of the organisation and of the products.

Therefore Company Cork is supported by a modern laboratory and by qualified technicians to control physical and technical features of cork closures and to prevent from contamination of external substances which may harm the wine. Moreover, great importance has been attached to the improvement of every single factor affecting the performance of the company in order to constantly satisfy the customer: actually, in 1997 Company Cork, among the first companies of its sector, was been awarded ISO 9001 certification for its Quality Management System.

## 3. DESCRIPTION OF THE PRODUCT

### 3.1 Features and functions

Natural single-piece Cork Stopper is obtained from a single piece of cork directly extracted from natural cork planks, suitably sorted and worked in order to give it the typical cylindrical shape.

The size of the cork stopper may range between 23 mm and 28 mm (diameter) and between 38 mm and 60 mm (length). Nowadays, natural single-piece Cork Stopper is mainly used for bottling vintage wines for medium/long ageing inside the bottle. The advantages of cork are straightforward : it is natural, elastic, but also waterproof and airtight, it fits perfectly the bottle neck performing as an excellent sealant since its microscopic cells sticks to the glass of the bottle by assuring, at the same time, a long lasting minimum oxidation which plays an important role in the evolution of the wine. Cork stopper took its origins in the XVII century, when cork bark was seen as a flexible, long lasting and scentless material suitable for bottles or containers which before were closed with different materials such as : wicker, clay, chalk, tow, wood and also fruit.

The technical, dimensional, chemical, physical features which determine stopper quality and the necessary requirements for a good performance are regulated (in Italy) by “Disciplinare sulla produzione ed utilizzo del tappo in sughero in enologia” (Ed.1996) which during years has become a reference for the user for a correct evaluation, both from a qualitative point of view and to prevent irregularities which may harm the wine (microbiologic and bacterial concentration limits, size tolerance, sampling procedures, organoleptic properties, visual classifications, release of oxidant substances deriving from washing...).

Though it is not a specific “ecologic” feature, cork stopper meets customers hygienic and health needs and requirements, as a material suitable for food.

### 3.2 Functional Unit

The functional unit, to which all the results reported in the present EPD will be referred, is 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 , as stated in the PCR “Natural single-piece cork stopper”. The equivalent weight of the functional unit, measured according the PCR is 3,50 kg.

Size	Size distribution (%)	Average weight (g)	Equivalent weight (g)
24/38	22,2	3,2	0,71
24/39	20,7	3,2	0,66
24/44	9,3	3,6	0,34
24,5/44	4,0	3,7	0,15
25/45	3,0	3,8	0,11
25/49	0,7	4,2	0,03
26/39	14,1	3,4	0,48
26/44	24,3	3,9	0,95
26/49	1,5	4,3	0,06
28/40	0,2	3,9	0,01
<b>Functional Unit Equivalent weight (1000 stoppers)</b>			<b>3,50</b>

The functional unit refers to the product in accordance with the following technical/performance characteristics:

Parameters	Unit	Tolerance
Size <sup>a</sup>	mm	Length : $\pm 0,5$ Diameter: $\pm 0,4$
Humidity <sup>b</sup>	%	3%-8%

- a) Tolerance indicated by ISO 3863:1989 "Cylindrical cork stoppers -- Dimensional characteristics, sampling, packaging and marking"
- b) Tolerance indicated by "Disciplinare sulla produzione ed utilizzo del tappo in sughero in enologia" Ed. 1996

### 3.3 Declaration of content

Cork stopper stands out for being a product mainly consisting of a natural and totally biodegradable material such as cork. Actually natural single-piece cork stopper consists of :

- 99,4 % cork
- 0,6 % silicone-based lubricant (polidimetylsiloxan)

This composition shows how cork stopper is a product with a low environmental impact, as better described in the following sections.

### 3.4 Description of the productive process

The primary source of cork is from natural forest, where after the first harvest (at about 25 years and not used for stopper production but in the building sector), each 10-12 years later the tree can be harvested for cork to be used for stoppers. Cork bark is therefore totally renewable. The main forests which supply Company Cork with the material for natural single-piece cork stopper lie in Sardinia, in the province of Nuoro and Sassari, where this vegetation is typical. 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 semi-manufactured cork stoppers, which takes place at Company Cork suppliers' plants. 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.

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. Semi-manufactured cork stoppers are therefore washed in order to achieve uniform appearance and sanitization, and sent to Company Cork plant for final treatment, where they are rectified to reach the desired size, branding of the cylindrical surface and lubrication, through which a thin layer of silicone is applied both to ensure a good seal in the bottle and permit graceful extraction from the bottle.

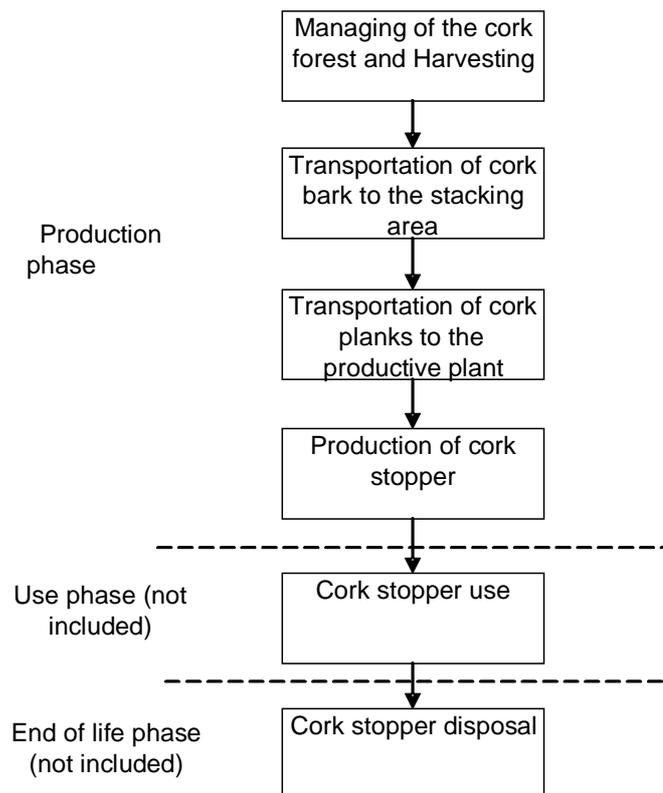
The final product is then sealed in suitable containers in order to provide healthy conditions during the transportation to the client (i.e. wine producers).

### 3.5 System boundaries

System boundaries, according to the PCR “Natural single-piece cork stopper”, include all life cycle phases of natural single-piece cork stopper production process, from cork extraction to the cork stopper ready to use. The production process of substances and materials used in the production process of the stopper (i.e. washing and lubricating additives, etc.), transport related to cork from forests to Company Cork final plant fall within the boundaries.

The use phase of the product consists of the application on the bottle of wine or liquor until it is consumed: this phase is not included in the study. Figure 1 shows the system boundaries.

**Figure 1 - System boundaries**



### 3.6 Time boundaries

The comparability between EPDs of different products with the same functional unit shall be granted also on a time basis. The LCA study which originated the present EPD refers to the production of natural single-piece cork stoppers at Company Cork plant in one calendar year. The reference year for all data and indicators reported in this EPD is 2005.

## 4. DECLARATION OF ENVIRONMENTAL PERFORMANCE

### 4.1 Production phase

All quantitative data reported below refer to the functional unit : 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.

The boundaries for production phase are those shown in figure 1.

### RESOURCE USE

#### ➤ Natural resources with energy content

Type of resource	MJ / 1000 stoppers
<b>Total (Gross Energy Requirement)</b>	<b>217,62</b>
of which <b>Renewable</b> :	<b>107,84</b>
wood (included cork)	102,58
of which <b>Non renewable</b> :	<b>109,78</b>
oil	49,31
gas	44,35
coal	9,83
nuclear	6,07

**NOTE:** the table reports only those resources which account at least for 5% of the total of each subcategory

**The calorific values used in the LCA study are the following :**

Resource with energy content	High calorific value (MJ/kg)
Crude oil	45,00
Gas/condensate	54,11
Coal	28,80
Metallurgical coal	28,80
Lignite	15,00
Peat	8,85
S (elemental)	9,26
Biomass (including water)	8,85
Cork	16,59
Wood	8,84

- ① It is evident that almost a half of the resources with energy content are represented by renewable energy (49,6%), mainly contained in the cork composing the stopper and potentially recoverable at the end of its life by incineration.
- ① Non renewable energy consumed is due for about a quarter to electric energy production necessary for production processes. At present Company Cork is bound to its energy supplier and it has little possibility to influence its supplier choice of technology and energy source.

➤ **Natural resources without energy content**

Type of resource	kg / 1000 stoppers
<b>Total</b>	<b>0,111</b>
of which <b>Renewable</b> :	<b>0,004</b>
Plastic scrap	0,004
of which <b>Non renewable</b> :	<b>0,107</b>
Clay	0,059
Sodium chloride (NaCl)	0,016
Sand (SiO <sub>2</sub> )	0,015
Limestone (CaCO <sub>3</sub> )	0,007
Fe	0,006

**NOTE:** the table reports only those resources which account at least for 5% of the total of each **subcategory**, excluded water and atmospheric gases.

- ① The main non renewable resource consumed is clay, used for paper boxes in packaging. The figure (about 59 g) is nevertheless quite little if compared to the weight of the functional unit (1000 stoppers = 3,50 kg)

➤ **Water consumption**

Resource	kg / 1000 stoppers
Water	48,426

- ① Cork forests, differently from other cultivations, do not need water, so the above mentioned consumption are associated mainly to the boiling and washing of the product

➤ **Electricity consumption**

	kWh / 1000 stoppers
Electricity	13,67

**NOTE :** the figures related to primary energy sources used to produce the electricity consumed are already counted in table "Natural resources with energy content"

**POTENTIAL IMPACT**

IMPACT CATEGORY	Indicator	Indicator / 1000 stoppers
Emission of greenhouse gases (Global Warming Potential – GWP 100 years)	kg CO <sub>2</sub> equivalent – fossil	6,977
	kg CO <sub>2</sub> equivalent – biol.	1,756
Emission of ozone-depleting gases	kg of CFC 11-equivalents	1,94 E-07
Emission of acidifying gases	kg SO <sub>2</sub> -equivalents	0,079
Emission of gases that contribute to the creation of ground-level ozone	kg C <sub>2</sub> H <sub>4</sub> -equivalents	4,63 E-03
Emission of substances to water contributing to oxygen depletion	kg PO <sub>4</sub> <sup>3-</sup> -equivalents	0,453

**NOTE:** kg CO<sub>2</sub> equivalent absorption = -10,744. This negative value represents the quantity of CO<sub>2</sub> absorbed during plants growth and does not contribute to the indicators reported in the above table

① The above table is very useful for comparisons, in order to evaluate the possible environmental advantages attached to sparkling wine cork stopper use with regard to other substitute products. To make a fair comparison of environmental performance the above reported indicators must be compared with those of competitor product belonging to the same category (referring to the same PCR – Product Category Rules).

## **WASTE PRODUCTION**

Type of waste	g / 1000 stoppers
<b>Total</b>	<b>285,103</b>
of which non hazardous	270,639
of which hazardous	14,464

As shown in the above table, non hazardous waste stands for about 95% of the total. Hazardous waste are for 92% oil-bearing drilling mud, deriving partly from diesel production used for boiling (33% of the total oil-bearing drilling mud), from the production of hydrogen peroxide used for washing (31%), from the production of the adhesive used for packaging (10%).

In any case, the production of 3,5 kg of natural single-piece cork stoppers generates only 14,46 g of hazardous waste in the entire life cycle. This impressive result is achieved because cork scrap are immediately recovered or used in other processes or to produce energy.

## **5. INFORMATION FROM THE ORGANISATION**

Cork stopper is largely composed of biodegradable substances. For this reason, many Local Public Authorities classify cork waste as organic waste promoting its recover and reuse as “compost” fertilizer. The Organisation’s advice, for those who want to behave in a sustainable way, is to check if the Local Public Authority supports this option. This advice is directed both to private citizens and to wine producers, with reference to possible waste deriving from the bottling process. Some Countries collect separately cork stoppers waste and use this material in the building sector.

All information and data related to the environmental performance of “natural single-piece cork stopper” reported in this EPD refer to a detailed and complete *Life Cycle Assessment study*, performed in accordance with the ISO 14040 requirements.

For further details please contact:

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## **6. INFORMATION FROM THE CERTIFICATION BODY**

The present EPD and the evaluation of the relevant life cycle have been approved by the certification body RINA S.p.A ([www.rina.org](http://www.rina.org)), accredited by Swedish Environmental Management Council (SEMC) (Registration Number 1812), for the validation in accordance with the standard of reference MSR 1999:2 and PCR “Natural single-piece cork stopper” issued by SEMC.

Registration Number : S-P-00104

Validity Time : 31/10/08

## 7. GLOSSARY

**LCA**: Life Cycle Assessment (LCA) is a method regulated by ISO 14040 standards, developed to evaluate the mass balance of inputs and outputs of the entire life cycle of a product, a service or an activity to organize and convert those inputs and outputs into environmental categories relative to resource and energy use, human health and ecological areas

**PCR**: Product Category Rules: technical documents containing common rules to perform LCA study for a specific homogeneous product category

**INTEND**: LIFE demonstration project co-financed by the European Commission bound to test in Italy and Sweden an international EPD system according to ISO 14025

**LIFE ENVIRONMENT**: LIFE Program is the financial instrument for the environment introduced in 1992 by Regulation n. 1973/92 adopted by the EU Parliament and Council

**UNITA' FUNZIONALE**: The functional unit is a measure of the function of the studied system and it provides a reference to which the results reported in the EPD can be related. This enables comparison of two essential different systems, that is two EPDs of products belonging to the same PCR

**GLOBAL WARMING**: the progressive gradual rise of the Earth's surface temperature thought to be caused by the greenhouse effect. Global warming may be responsible for changes in global climate patterns

**ACIDIFICATION**: the lowering of soil and water pH due to acid precipitation and deposition; this process disrupts ecosystem nutrient flows and may kill freshwater fish and plants dependent on more neutral or alkaline conditions (i.e. "acid rain")

**EUTROPHICATION**: over-enrichment of a water body with nutrients, resulting in excessive growth of organisms and depletion of oxygen concentration

**OZONE LAYER DEPLETION**: the reduction in the density of the ozone in the Earth's stratosphere. The ozone layer protects life on earth from harmful ultra-violet radiation from the sun. The use of chlorofluorocarbons (see CFCs) and other compounds has been identified as the major cause of ozone layer depletion

**PHOTOCHEMICAL SMOG**: air pollution containing ozone and other reactive chemical compounds formed by the reaction of nitrogen oxides and hydrocarbons in the presence of sunlight. This phenomenon is dangerous for living organisms and it is often present in urban areas

**GROSS ENERGY REQUIREMENT (GER)**: it is an indicator, expressed in MJ or kWh, of the total energy taken from the environment during the whole life cycle of a functional unit of a product/service. It is composed of the energy consumed for the production process, for transport, for fuel production, and the energy content of materials which may be used as fuels