

Natural Cork Flooring

Product Selection and Description

Natural Cork is a U.S. supplier of cork flooring and wall coverings. It distributes products manufactured by Granorte, a Portuguese company that recycles cork waste from the production of cork bottle stoppers. The energy used to produce the cork tiles comes mainly from waste cork powder. Natural Cork provided data on two of its products: cork parquet tile and cork floating floor plank.

Flow Diagram

The flow diagrams below show the major elements of the production of these products as they are currently modeled for BEES.

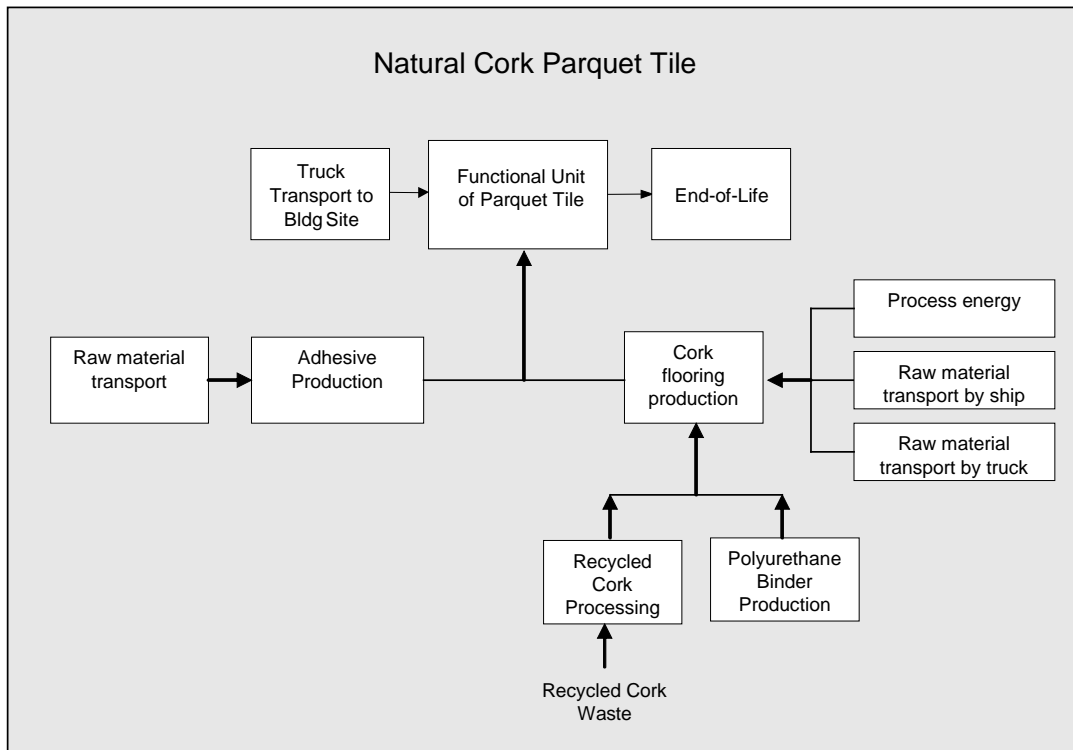


Figure 1: Natural Cork Parquet Floor Tile System Boundaries

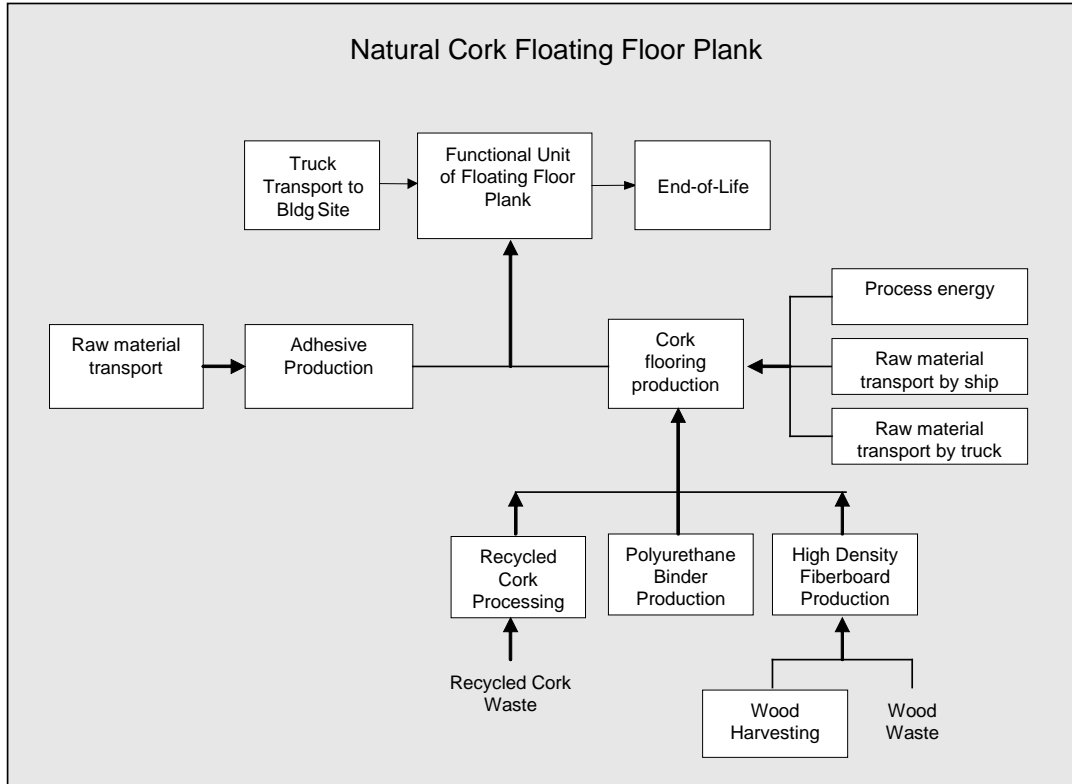


Figure 2: Natural Cork Floating Floor Plank System Boundaries

Raw Materials

Both Natural Cork floor products use a cork sheet made from a combination of recycled cork waste and urethane binder. The floating floor plank also includes a layer of High Density Fiberboard (HDF) cut into a tongue-and-groove pattern. The mixture of the main constituents of each floor product is listed in the Table below.

Table 1: Natural Cork Flooring Constituents

Constituent	Parquet Floor Mass Fraction	Floating Floor Mass Fraction
Recycled Cork Waste	93 %	58 %
Binder	7 %	3 %
High Density Fiberboard (HDF)	--	39 %

Since the cork constituent is a waste product, the environmental burdens from virgin production of the cork are not included. The energy used to grind the cork, however, is included, as is its transportation to the manufacturing facility. HDF is produced mostly from recovered wood waste – only 14 % of the wood going into HDF is harvested directly. In the absence of available data, HDF manufacturing is represented, by proxy, with oriented strand board (OSB) production data provided by the U.S. LCI Database and described in more detail under Generic Oriented Strand Board Sheathing.

The binder for Natural Cork flooring is a moisture-cured urethane, produced from a reaction between polyisocyanate and moisture present in the atmosphere. Isocyanate production data is based on publicly

available plastics data in the U.S. LCI Database.

Manufacturing

Energy Requirements. The manufacturing processes for the two cork floor products are essentially the same. Cork waste is ground and blended with the urethane binder, then cured. For the floating floor plank, the HDF is sandwiched between two cork sheet layers and then cured.

Electricity and an on-site boiler are used to blend and cure both products. The boiler uses cork powder generated during the production process to produce steam and electricity. Manufacturing the parquet flooring requires about 0.8 MJ (0.02 kWh) of both thermal and electrical energy per unit produced (0.09 m², or 1 ft²); the floating floor plank requires about 1 MJ (0.28 kWh) of electricity and 0.9 MJ (0.25 kWh) of thermal energy per unit. Water is also used in the production process, but it is recycled and recovered by the plant. Producing each unit of product generates about 1 kg (2.2 lb) of waste, 94 % of which is used to produce energy and 3 % of which is recycled. The recycled material is accounted for in the BEES life cycle inventory.

Transportation. Transportation distances for shipment of the raw materials from the suppliers to the manufacturing plant were provided by Natural Cork. The materials were transported by diesel truck, based on the U.S. LCI Database.

Transportation

The finished cork products are shipped first from the manufacturing facility in Portugal to the Natural Cork warehouse in Georgia—a distance of about 6 437 km (4 000 mi). Environmental burdens from this leg of the journey are built into the manufacturing portion of the BEES life-cycle inventory and are evaluated based on transport by ocean tanker using fuel oil. The transportation distance from the Natural Cork warehouse in Augusta, Georgia to the building site is modeled as a variable in BEES. Both products are shipped from Augusta by diesel truck; the quantity of transportation emissions allocated to each product depends on the overall mass of the product, as given in the Table below.

Table 2: Natural Cork Flooring Density

<i>Product</i>	<i>Mass per Applied Area in kg/m² (lb/ft²)</i>	<i>Density in kg/ m³ (lb/ft³)</i>
Cork Parquet Tile	2.56 (0.51)	516.67 (34.18)
Cork Floating Floor	7.44 (1.48)	563.33 (37.26)

Installation

Natural Cork parquet tile is installed using a water-based contact adhesive. The average application requires about 0.009 kg (0.020 lb) of adhesive per unit of flooring (0.09 m², or 1 ft²). The EcoInvent data set for acrylic binder was used for this adhesive. The Natural Cork floating floor requires only a minimal amount of tongue-and-groove adhesive to bond the individual planks together. On average, 5 % of the adhesive is wasted during installation, but none of the flooring is lost.

Use

Based on information from Natural Cork, its flooring does not require replacement over the 50-year BEES use period.

End of Life

At end of life, the used flooring is sent to a landfill, since according to the manufacturer none is currently being recycled.

References

Life Cycle Data

National Renewable Energy Laboratory (NREL): *U.S. Life-Cycle Inventory Database*. 2005. Golden, CO.

Found at: <http://www.nrel.gov/lci/database>.

PRé Consultants: *SimaPro 6.0 LCA Software*. 2005. The Netherlands.

EcoInvent Centre: *EcoInvent data v2.0* (Dübendorf: Swiss Centre for Life Cycle Inventories, 2007). Found at: www.ecoinvent.org.

Industry Contacts

Phillipe Erramuzpe, Natural Cork (2002)