DAPHabitat System

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ENVIRONMENTAL PRODUCT DECLARATION

[according to ISO 14025, EN 15804:2012+A1:2013 and EN 15942]

DECLARATION NUMBER: DAP 013:2022

CORK UNDERLAYS

ISSUE DATE: 25/10/2022 VALID UNTIL: 24/10/2027

SEDACOR – Sociedade Exportadora de Artigos de Cortiça, Lda.

VERSION 1.1. EDITION JULY 2015

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1. GENERAL INFORMATION

1.1. The DAPHabitat System

Program operator:	Associação Plataforma para a Construção Sustentável www.centrohabitat.net centrohabitat@centrohabitat.net
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@centrohabitat.net
Telephone number:	(+351) 234 401576
Website:	www.daphabitat.pt
Logo:	

1.2. EPD OWNER

Name of the owner:	Sedacor – Sociedade Exportadora de Artigos de Cortiça, Lda.
Production site:	São Paio de Oleiros; Rio Meão e Ponte de Sôr
Address (head office):	São Paio de Oleiros
Telephone:	227470590
E-mail:	sedacor@sedacor.com; isabel.carvalho@sedacor.com
Website:	https://www.jpscorkgroup.com/
Logo:	
Information concerning the applicable management Systems:	FSC® Certification
Specific aspects regarding the production:	NACE (Rev3) 16294 – Production of cork stoppers NACE (Rev3) 16295 - Production of cork products
Organization's environmental policy:	Protect the environment, through the prevention of pollution, the sustainable use of resources, and the minimization of environmental impacts resulting from the activity in a perspective of the life cycle of manufactured products, aiming for continuous improvement of environmental performance. Promote the circular economy, through recycling of industrial waste derived from cork and its incorporation into new products. Comply with the applicable legislation and regulations and other requirements assumed by the organization.

1.3. Information concerning the EPD

Authors:	citeve Centro Tecnológico das Indústrias têxteis e do Vestuário de Portugal-CITEVE
Contact of the authors:	Rua Fernando Mesquita, nº 2785, 4760-034 Vila Nova de Famalicão T: + 351 252 300300 | F. + 351 252 300317 Website: www.citeve.pt E-mail: lramos@citeve.pt; ecoelho@citeve.pt
Issue date:	25/10/2022
Registration date:	31/10/2022
Registration number:	DAP 013:2022
Valid until:	24/10/2027
Representativity of the EPD (location, manufacturer, group of manufacturers):	Cradle-to-gate EPD, of one (1) product, manufactured in three (3) industrial units, which belong to a single (1) producer (Sedacor - Sociedade Exportadora de Artigos de Cortiça, Lda).
Where to consult explanatory material:	https://www.jpscorkgroup.com/
Type of EPD:	EPD from cradle-to-gate

1.4. Demonstration of the verification

External independent verification, accordingly with the standard ISO 14025:2009 and EN 15804:2012+A1:2013

Certification Body	**Verifier**
(CERTIF – Associação para a Certificação)	(Ricardo Mateus)

1.5. EPD Registration

Program Operator

(Plataforma para a Construção Sustentável)

1.6. PCR of reference

Name:	PCR – basic module for construction products and services
Issue date:	19-01-2016
Number of registration on the data base:	RCP-mb001
Version:	Version 2.1, november 2020
Identification and contact of the coordinator (s):	José Dinis Silvestre | jose.silvestre@tecnico.ulisboa.pt Luís Arroja | arroja@ua.pt Marisa Almeida | marisa@ctcv.pt
Identification and contact of the authors:	Ana Cláudia Dias António Baio Dias Cristina Rocha Fausto Freire Helena Gervásio José Dinis Silvestre Luís Arroja Marisa Almeida Paula Duarte Ricardo Mateus Victor Ferreira
Composition of the Sectorial Panel:	N/A
Consultation period:	18/11/2015 to 18/01/2016
Valid until:	January 2022

1.7. Information concerning the product/product class

Identification of the product:

Agglomerated Cork Rolls (Underlays) with an average density of 220 kg/m^3

Illustration of the product:

Brief description of the product:

- Natural and recyclable product, made from a renewable raw material;
- Good thermal and acoustic insulation, reducing sound propagation, impact noise, and energy consumption;
- High durability and excellent dimensional stability, even when subject to temperature variations;
- Anti-static and hypoallergenic.

This EPD presents the results for 1 m^2 of product with a density of 220 kg/m^3 and thickness of 2,0 mm. Since several references of Underlays follow the same production process, it is possible to use the results of this EPD for those references, with different densities and thicknesses, using the conversion factors presented in table 1.

Table 1 – Conversion factors to apply to the results presented in this EPS for different densities and thicknesses

	Reference	12AS	12PL	15BS	15KBS	15MS	25MS	51AS	51PL	52PL
	Density (kg/m^3)	180	220	200	220	220	200	200	230	220
Thickness (mm)	0,8	0,33	0,40	0,36	0,40	0,40	0,36	0,36	0,42	0,40
	1,0	0,41	0,50	0,45	0,50	0,50	0,45	0,45	0,52	0,50
	1,2	0,49	0,60	0,55	0,60	0,60	0,55	0,55	0,63	0,60
	1,5	0,61	0,75	0,68	0,75	0,75	0,68	0,68	0,78	0,75
	1,6	0,65	0,80	0,73	0,80	0,80	0,73	0,73	0,84	0,80
	1,8	0,74	0,90	0,82	0,90	0,90	0,82	0,82	0,94	0,90
	2,0	0,82	1,00	0,91	1,00	1,00	0,91	0,91	1,05	1,00
	2,7	1,10	1,35	1,23	1,35	1,35	1,23	1,23	1,41	1,35
	3,0	1,23	1,50	1,36	1,50	1,50	1,36	1,36	1,57	1,50
	4,0	1,64	2,00	1,82	2,00	2,00	1,82	1,82	2,09	2,00
	5,0	2,05	2,50	2,27	2,50	2,50	2,27	2,27	2,61	2,50
	5,5	2,25	2,75	2,50	2,75	2,75	2,50	2,50	2,88	2,75
	5,8	2,37	2,90	2,64	2,90	2,90	2,64	2,64	3,03	2,90
	6,0	2,45	3,00	2,73	3,00	3,00	2,73	2,73	3,14	3,00
	8,0	3,27	4,00	3,64	4,00	4,00	3,64	3,64	4,18	4,00
	9,5	3,89	4,75	4,32	4,75	4,75	4,32	4,32	4,97	4,75
	10,0	4,09	5,00	4,55	5,00	5,00	4,55	4,55	5,23	5,00

Main technical characteristics of the product:

The main technical characteristics of the considered Underlays are presented in tables 2, 3 and 4 (average values or values of the bestselling reference – ref. 15MS) in accordance with EN 12103:1999 and 16354:2018.

Table 2: Technical characteristics of the product according to standard EN 12103:1999

Characteristics (EN 12103:1999)	Declared value	Test standard
Thermal resistance [1]	2 mm – 0.04 m^2.K/W 4 mm – 0.08 m^2.K/W 6 mm – 0.12 m^2.K/W	ISO 8302
Thermal conductivity 1	0.049W/m.k	ISO 8302
Granulometry	0,5-5 mm	NP ISO 2030
Thickness	1 a 12 ± 0.2 mm	EN 428
Density	200 – 240 Kg/m3	EN 672
Compression	20 – 40%	NP ISO 7322
Recovery	≥ 65%	NP ISO 7322
Tensile strength	≥ 200 kPa	NP ISO 7322
Flexibility	Factor 5: Pass	EN 435/A
Reduction of impact noise	17dB (indicative value for thicknesses from 2 to 4 mm) 18dB (indicative value for thicknesses from 5 to 6 mm)	ISO 140-8
Sound absorption coefficient 1	0.05 (indicative value for thicknesses from 2 to 4 mm)	EN ISO 11654
Fire resistance	Class E – Cork is a fire inhibitor that does not proliferate and does not release toxic gases upon combustion	EN 13501-1

Table 3: Technical characteristics of the product according to standard EN 16354_2018 (values corresponding to the underlay references)

Reference	Density (kg/m^3)
12AS	160-200
12PL	200-240
15BS	180-220
15KBS	200-240
15MS	200-240
25MS	180-220
51AS	180-220
51PL	210-250
52PL	180-220

[1] Reference values 15MS

	Table 4: Technical characteristics of the product according to EN 15354:2018 (values corresponding to reference 15MS) Characteristics (EN 16354:2018) / Declared value / Class Punctual conformability (PC) / ≥1.2 mm / PC2 Compressive Strength (CS) / ≥200 kPa / CS3 Compressive Creep (CC) resistance / ≥50 kPa / CC3 Dynamic load (DL) resistance / ≥250.000 cycles / DL3
Description of the products application:	Cork underlays are used as an intermediate layer between the floor and the floor covering, mainly in the installation of floating floors, as they have good thermal and acoustic insulation, reducing the propagation of impact noise and energy consumption. They also have high durability and excellent dimensional stability, even when subjected to temperature variations. They are preferably used in the residential, commercial and services sectors.
Reference service life:	Not Specified
Placing on the market / Rules of application in the market / Technical rules of the product:	Technical rules of the product: • EN 12103:1999 - Resilient floor coverings; Agglomerated cork underlays; Specification. • EN 16354:2018 – Laminate floor coverings; Underlays; Specification, requirements and test methods.
Quality control:	The existing quality management system is not yet formalized. However, the products are subject to quality control according to the technical rules of the product.
Special delivery conditions:	The rolls of agglomerated cork (Underlay) have a variable thickness between 1 mm and 12 mm (the most common thicknesses are 2, 4 and 6 mm). Rolls marketed with a maximum width of 1 meter and variable are usually individually wrapped in plastic (LDPE). They are placed on wooden pallets and cardboard tops, and the pallets are packed with plastic (LDPE). According to customer requirements, the rolls can be supplied with other dimensions or can be packed in cardboard instead of LDPE and with a paper label/brochure.
Components and substances to declare:	Not Applicable
History of the LCA studies:	No previous studies are available.

2. ENVIRONMENTAL PERFORMANCE OF THE PRODUCT

2.1. Calculation rules of the LCA

Declared unit:	One square meter (1 m^2) of agglomerated cork rolls (Underlay) with an average density of 220 kg/m3 and thickness of 2 mm
Functional unit:	N/A
System boundaries:	This is a "cradle to gate" EPD for 2020 data, the last year with complete and representative data at the study's start date. The border encompasses all stages from cork production to the product at the factory gate, ready to ship.
Criteria for the exclusion:	Since this is a cradle to gate EPD, modules A4 and A5, as well as steps B, C and D of the life cycle, foreseen in the standard EN15804:2012+A1:2013, were not considered in this study. Additionally, the construction stages of the infrastructures necessary for the production of the materials used and the transportation of those materials were not included. Regarding modules A1, A2 and A3, they include all known data related to resource consumption and emissions, resulting from the production of the agglomerate cork rolls. The consumption of water not associated with the production process, namely consumption of water in the toilets and emission of domestic effluents, were not considered as well as the consumption of office consumables used in the installations where the manufacture of the product in study takes place.
Assumption and limitations:	This EPD represents the Underlay references identified above and produced at Sedacor's facilities, and these may present different densities, thicknesses and percentages of binder glue. For processes on which the producer has no influence or specific information, such as raw material extraction, generic data from the ecoinvent v3.7.1 and GaBi (Sphera) databases were used.
Quality and other characteristics about the information used in the LCA:	As indicated in EN 15804:2012+A1:2013, the data used for the life cycle inventory were, for the processes controlled by the company Sedacor, specific data from the production process of the facilities where the transformation of raw materials into final products occurs, from the year 2020, which is considered representative of the company's normal operating situation. Additionally, secondary data from the most widely used and credible LCA databases - Sphera (GaBi) and ecoinvent v3.7.1 - were used for the upstream processes (extraction and production of raw materials, production of electricity and fuels, production of chemicals, among others) and downstream (processing and disposal of waste generated) of the company's production process. The quality criteria set out in EN 15804:2012+A1:2013 for primary and secondary data was assured, particularly in terms of their time coverage.
Allocation rules:	The product agglomerated cork rolls has a production process that passes through three industrial installations, each one carrying out a different production stage. Whenever possible, the productive flow of the product under study was isolated from the other productive flows realized in the same installations. Whenever this was not possible, mass allocation was carried out taking into account the productions of the different products produced in the facilities/sections.
Comparability of EPD for construction products:	The EPDs of construction products and services cannot be comparable if they are not produced in accordance with EN 15804 and EN 15942 and in accordance with the comparability conditions determined by ISO 14025.

2.1.1. Flow diagram of input and output of the processes

The production flow to obtain the agglomerated cork roll product begins with the production and extraction of the necessary cork, followed by the transport to the industrial installations of the company where the raw material is transformed into the final product. The productive flow is represented in the scheme of Figure 1.

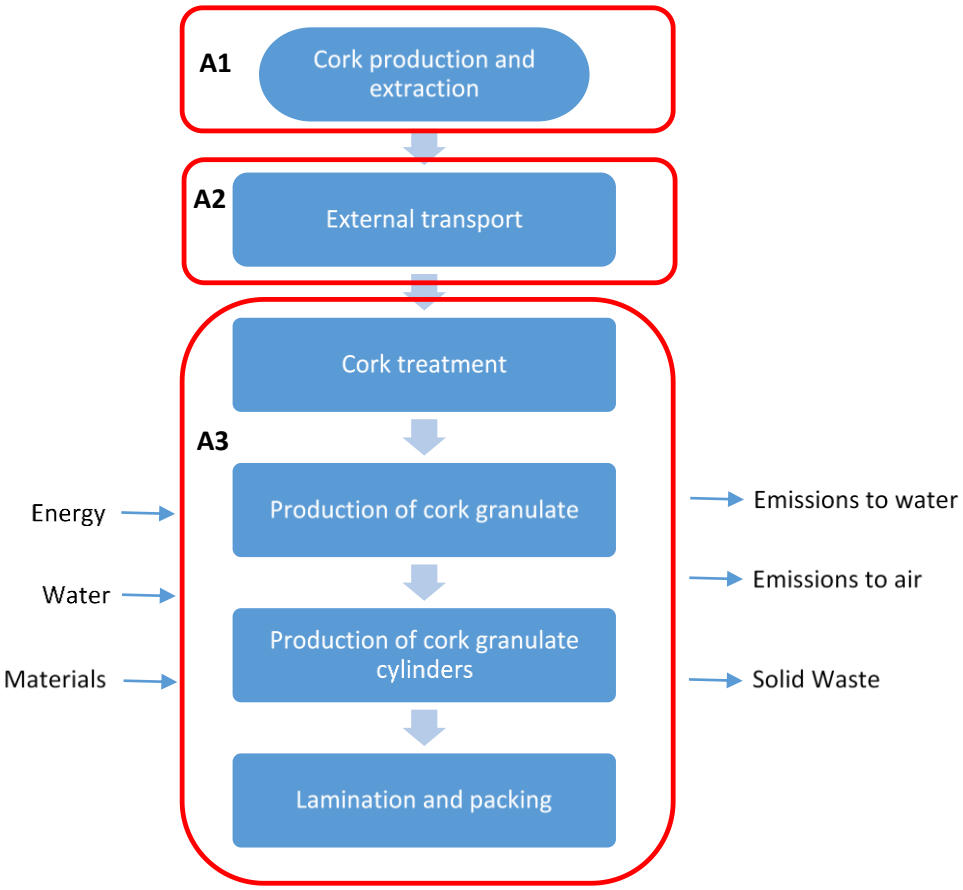

Figure 1: Example of the life cycle stages and unit processes of the product

2.1.2. Description of the system boundaries

(✓= included; ✖= module not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-constructions, demolition	Transport	Waste processing	Disposal	Re-use, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖

The production and extraction of cork, module A1, is a process that occurs upstream of Sedacor, which the company does not control, so the environmental impacts associated with this phase of the process are based on data series available in databases, and for the case in question the database used was ecoinvent (version 3.7.1).

The transportation of cork to Sedacor's facilities, module A2, is a process that also occurs upstream of the company and that is not controlled by it. The data used to determine the environmental impacts of this phase of the production process are also secondary data from databases, in this case, the Professional database of the LCA software GaBi, owned by Sphera.

After the transportation of the raw material to Sedacor's facilities, the production process of the cork agglomerate rolls, module A3, begins.

The first stage of the process is the cork treatment, which consists in placing the cork planks, scraps and pieces immersed in boiling water, in order to extract water-soluble substances, and increase thickness and elasticity. This stage is carried out at the Sedacor III facility in Ponte de Sor. During this stage, electric energy, biomass for heating water up to a boiling point is consumed, both directly with the use of firewood and indirectly with the use of cork powder for steam production in the company's boiler. In terms of resource usage, water is also used. Concerning the generated emissions, the emission of waste water with some organic load is highlighted. This waste water is subjected to a pre-treatment in the company's waste water pre-treatment plant where some chemicals are consumed.
Na figura 2 é apresentado o fluxograma do processo de tratamento da cortiça, bem com a indicação qualitativa dos principais recursos consumidos e emissões geradas.

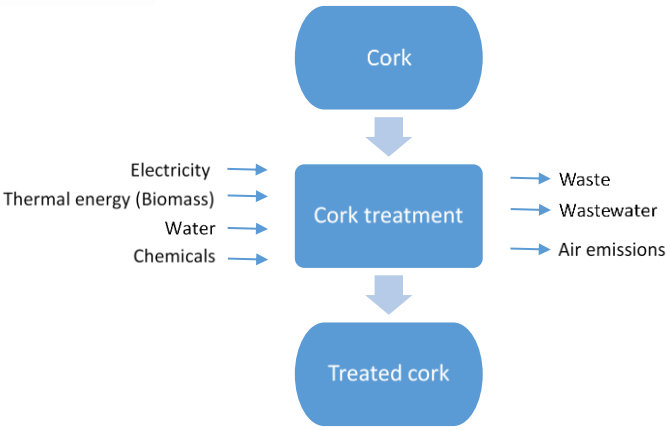

Figura 2 – Production flowchart of the cork treatment process

After the cork treatment, the process continues in Sedacor II facility, where the granulation processes and production of cylinders are carried out. The transport between the two facilities is considered in module A2, since it is external transport to the company. Each of these processes is subdivided into several steps. Figure 3 shows the flowchart of the granulation process as well as a qualitative indication of the main resources consumed and emissions generated. A brief description of each of the stages follows:

- **Shredding:** The incoming shavings (drill shavings, special shavings, rejects and bits) are shredded in a shredder mill;
- **Drying:** The shredded chips then go to the dryer to reduce the moisture content;
- **Granulometric Separation (vibrating sieve):** The shredded products of different dimensions are sifted through a vibrating sieve;
- **Grinding:** The shredded products are subjected to grinding in mills;
- **Drying**: The shredded products are then transferred to the dryer to reduce the moisture content;
- **Granulometric selection (in Rotex):** The granules are classified by sieves (according to thickness);
- **Densimetric separation:** The granulate is classified using densimetric tables (by specific weight);
- **Drying:** The granules then go into the dryer to reduce the moisture content.

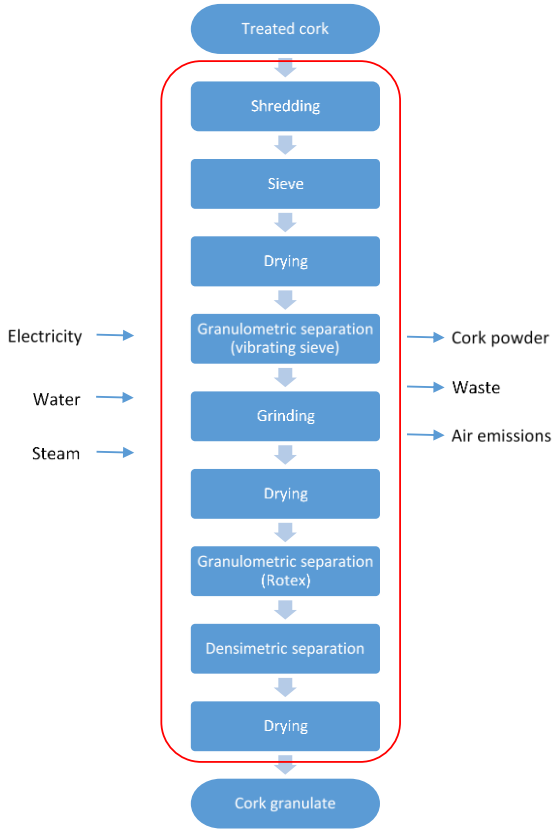

Figure 3 – Production flowchart of the granulation process

Figure 4 shows the flowchart of the cork granulate cylinders production process as well as a qualitative indication of the main resources consumed and emissions generated. Below is a summarized description of each of the stages:

- **Agglomeration:** a mixture of the cork granules with the glue in a mixer. Afterward, the mixture is pressed in molds;
- **Drying:** the molds (cylindrical) are placed in an oven in order to promote the polymerization of the glue and a perfect aggregation of the granules;
- **Demolding:** the cylinders are removed and demolded after cooling.

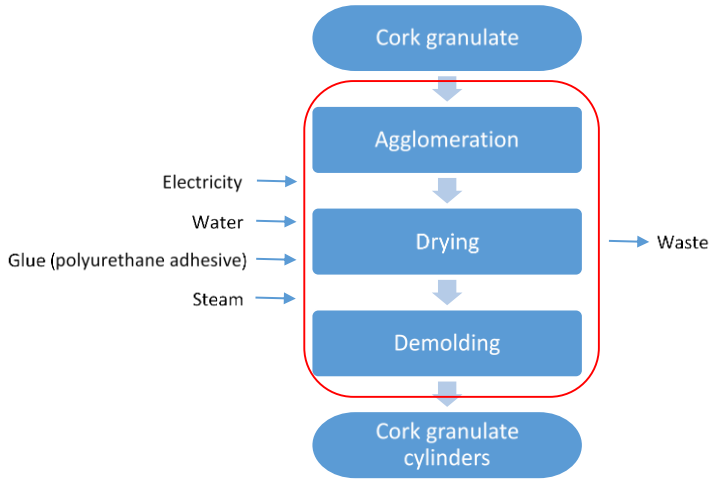

Figure 4– Productive flowchart of the cylinder production process

The cylinders produced at the Sedacor I facility are sent to the Sedacor II facility for the lamination and packaging process. The company's internal fleet carries out the transport between these two facilities, so its consumption is already considered in the diesel consumption of the Sedacor I facility. Figure 5 shows the flowchart of the cylinder production process and a qualitative indication of the main resources consumed and emissions generated. The following is a summarized description of each of the stages:

- **Lamination:** the cylinders are laminated to the desired thickness by using a knife;
- **Mini-rolls:** Meter counting and packaging of the rolls with plastic film and label placement;
- **Packing:** Packing of the roll pallets.

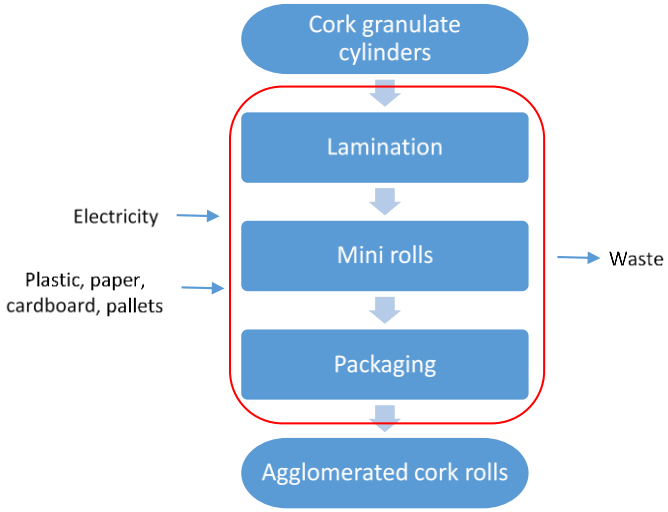

Figure 5– Production flowchart of the roll production process

2.2. Parameters describing environmental impacts

		Global warming potential; GWP kg CO_2 equiv.	Depletion potential of the stratospheric ozone layer; ODP kg CFC 11 equiv.	Acidification potential of soil and water, AP kg SO_2 equiv.	Eutrophication potential, EP kg $(PO_4)^{3-}$ equiv.	Formation potential of tropospheric ozone, POCP kg C_2H_4 equiv.	Abiotic depletion potential for non-fossil resources kg Sb equiv.	Abiotic depletion potential for fossil resources MJ, P.C.I.
Raw material supply	**A1**	-3.79E+00	8.89E-10	2.92E-05	2.31E-05	4.31E-05	8.19E-09	7.01E-02
Transport	**A2**	1.87E-03	2.95E-10	4.84E-05	5.57E-06	2.69E-06	2.20E-09	2.39E-02
Manufacturing	**A3**	6.87E-01	3.97E-08	2.05E-03	1.17E-03	4.85E-04	3.39E-06	7.33E+00
Total	**Total**	**-3.11E+00 (*)**	**4.09E-08**	**2.12E-03**	**1.20E-03**	**5.31E-04**	**3.40E-06**	**7.42E+00**

LEGEND:

Product stage

Values expressed by declared unit (1 m^2 de Underlay)

(*) Global warming potential value considers biogenic carbon, otherwise the global warming potential of A1-A3 modules would be 0.429 kg CO_2 eq.

2.3. Parameters describing resource use

		Primary energy						Secondary materials and fuels, and use of water			
		EPR MJ, P.C.I.	RR MJ, P.C.I.	TRR MJ, P.C.I.	EPNR MJ, P.C.I.	RNR MJ, P.C.I.	TRNR MJ, P.C.I.	MS kg	CSR MJ, P.C.I.	CSNR MJ, P.C.I.	Net use of fresh water m^3
Raw material supply	**A1**	0.00E+00	4.11E+01	4,11E+01	0.00E+00	7.17E-02	7.17E-02	NA	NA	NA	5.45E-05
Transport	**A2**	1.43E-04	0.00E+00	1,43E-04	2.40E-02	0.00E+00	2.40E-02	NA	NA	NA	1.23E-06
Manufacturing	**A3**	2.90E+00	1.63E-01	3,07E+00	6.22E+00	1.70E+00	7.92E+00	NA	NA	NA	1.01E-02
Total	**Total**	**2.90E+00**	**4.13E+01**	**4,42E+01**	**6.24E+00**	**1.77E+00**	**8.02E+00**	**NA**	**NA**	**NA**	**1.02E-02**

LEGEND:

Product stage

EPR = use of renewable primary energy excluding renewable primary energy resources used as raw materials;
RR = use of renewable primary energy resources used as raw materials;
TRR = total use of renewable primary energy resources (EPR + RR);
EPNR = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
RNR = use of non-renewable primary energy resources used as raw materials;
TRNR = total use of non-renewable primary energy resources (EPRN + RNR);
MS = use of secondary material;
CSR = use of renewable secondary fuels;
CSNR = use of non-renewable secondary fuels.

Values expressed by declared unit (1 m^2 de Underlay)

2.4. Other environmental information describing different waste categories

		Hazardous waste disposed kg	Non-hazardous waste disposed kg	Radioactive waste disposed ** kg
Raw material supply	**A1**	0.00E+00	0.00E+00	0.00E+00
Transport	**A2**	0.00E+00	0.00E+00	9.93E-10
Manufacturing	**A3**	3.42E-05	2.00E-02	1.10E-06
Total	**Total**	**3.42E-05**	**2.00E-02**	**1.10E-06**

LEGEND:

Product stage

Values expressed by declared unit (1 m^2 de Underlay)

** Radioactive waste is not produced in Sedacor facilities but in the production of electricity

2.5. Other environmental information describing output flows

Parameters	Units*	Results
Components for re-use	kg	0.00E+00
Materials for recycling	kg	5.94E-04
Radioactive waste disposed	kg	1.10E-06
Materials for energy recovery	kg	0.00E+00
Exported energy	MJ per energy carrier	0.00E+00
* expressed by functional unit or declared unit		

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

This DAP represents only the cork Underlay production stage, including modules A1 to A3. Therefore, the following scenarios referring to the construction stages (modules A4 and A5), use (B1 to B7) and end-of-life (C1 to C4), are not applicable.

3.1. Additional information on release of dangerous substances to indoor air, soil and water during the use stage

The product has no known toxic effects. Due to its properties, no danger to the environment is expected.

3.2. Certifications

FSC®156004

APCER-COC-150762

APCER-CW-150762

3.3. End-of-life management

The product can be treated together with other construction waste, following the national and/or local regulations. The applicable LoW (European List of Waste) is 200301. Packaging not contaminated with other types of materials can be recycled.

REFERENCES

- ✓ General Instructions of the DAPHabitat System, Version 1.0, Edition March 2013 (in www.daphabitat.pt);
- ✓ **PCR – basic module for construction products and services.** DAPHabitat System. Version 1.0, 2013 (in www.daphabitat.pt);
- ✓ **ISO 14025:2009** Environmental declarations and labels – Type III environmental declarations – Principles and procedures;
- ✓ **EN 15804:2012+A1:2013** Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products;
- ✓ **EN 15942:2011** Sustainability of construction works – Environmental product declarations – Communication format business-to-business;
- ✓ **EN 12103:1999**. *Resilient floor coverings - Agglomerated cork underlays - Specification.* 1999;
- ✓ **EN 16354:2018**. *Laminate floor coverings - Underlays - Specification, requirements and test methods.* 2018.
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