DAPHabitat System

www.daphabitat.pt

ENVIRONMENTAL PRODUCT DECLARATION

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

DECLARATION NUMBER: DAP 001:2015

Insulation Cork Board (ICB)/ Thermal Insulation

ISSUE DATE: 02/06/2015 **VALID UNTIL: 01/06/2020**

SOFALCA - SOC. CENTRAL DE PRODUTOS DE CORTIÇA, LDA.

SOFALCA

centroHabitat
Plataforma para a Construção Sustentável

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
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Email address:	deptecnico@centrohabitat.net
Telephone number:	(+351) 234 401576
Website:	www.daphabitat.pt
Logo:	

1.2. EPD owner

Name of the owner:	SOFALCA - Soc. Central de Produtos de Cortiça, Lda.
Production site:	Telhado - EN n.º2 - Km 413.2 |2205-213 Bemposta, Abrantes
Address (head office):	Telhado - EN n.º2 - Km 413.2 |2205-213 Bemposta, Abrantes
Telephone:	241 732 165
E-mail:	sofalca@mail.telepac.pt;info@sofalca.pt; pribeiro.sofalca@sapo.pt
Website:	http://www.sofalca.pt/
Logo:	
Information concerning the applicable management Systems:	*Operador Licenciado de Gestão de Resíduos – Autorização Prévia CCDRLVT* *FSC certification* (*Forest Stewardship Council*) (CU-COC-82 3898)
Specific aspects regarding the production:	NACE: Section C – Transformer Industry Main NACE 16295 – Fabrication of other cork products. Secondary NACE 02300 - Cork extraction, resin and other forest products, excluding wood
Organization's environmental policy:	---

1.3. Information concerning the EPD

Authors:	CEIFA *ambiente*, Lda.
Contact of the authors:	Address: Rua dos Carvalhais, 19 |Casal Frade | 2530-082 Lourinhã Contactos telefónicos: +351 213920094; +351 261413986 Website: www.ceifa-ambiente.net E-mail: geral@ceifa-ambiente.pt; suhita@ceifa-ambiente.pt; vera.durao@ceifa-ambiente.pt
Emission date:	02/06/2015
Registration date:	07/07/2015
Registration number:	DAP 001:2015
Valid until:	01/06/2020
Representativity of the EPD (location, manufacturer, group of manufacturers):	Site specific
Where to consult explanatory material:	www.sofalca.pt
Type of EPD:	Cradle-to-gate EPD, with options

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 (s)**
(CERTIF – Associação para a certificação)	(Marisa Almeida | José Dinis Silvestre)

1.5. EPD Registration

Program Operator

(Plataforma para a Construção Sustentável)

1.6. PCR of reference

Name:	Thermal Insulation - V.1.0 (2013)
Emission date:	10/02/2014
Number of registration on the data base:	RCP004:2014
Version:	New ☒ Update☐
Identification and contact of the coordinator (s):	José Dinis Silvestre |jose.silvestre@ist.utl.pt Manuel Duarte Pinheiro |manuel.pinheiro@ ist.utl.pt
Identification and contact of the authors:	José Dinis Silvestre |jose.silvestre@ist.utl.pt Manuel Duarte Pinheiro |manuel.pinheiro@ ist.utl.pt
Composition of the Sector Panel:	Amorim Isolamentos Sofalca - Soc. Central de Produtos de Cortiça, Lda. Argex – Argila Expandida, S.A. Sonae Industria, SGPS, S.A. IberFibran – Poliestireno Extrudido, S.A. MasterBlock Termolan – Isolamentos termo-acústicos, S.A. Eurofoam – Indústria de poliestireno extrudido, Lda KnaufInsulation
Consultation period:	01/08/2013 to 30/11/2013
Valid until:	February 2019

1.7. Information concerning the product/product class

Identification of the product: Insulation Cork Board (ICB)

Illustration of the product:

Brief description of the product:

The insulation Cork Board, usually known as black granulate cork, is a thermal insulation, which the use falls in the following NACE classification: Section F, Class 4329 – "Outras instalações em construções".

The ICB is a product manufactured from expanded cork in the form of insulation slabs, used in buildings, construction equipment and industrial installations. The assemblage of the cork granules is the result of the volumetric expansion and exudation of cork natural resins, by the action of temperature transmitted by a thermal fluid (steam). The granulate produced does not contain any other type of adhesives and additives and is solely made of cork. For this reason it is called also for pure agglomerated cork. The ICB is produced in blocks that suffer a finishing process by sawing - the blocks are trimmed and sawn. The finished product presents on slabs with various thickness, in accordance with the intended function of each application.

Main technical characteristics of the product:

Table 1: Technical characteristics

2. Designation	3. ICB	4. Units
5. Geometry	6. slabs:1000 * 500 * (10 to 300)	7. mm
8. Density	9. 100-130	10. kg/m^3
11. Thermal conductivity	12. 0,040	13. W/(m.◦C)
14. Operating temperatures	15. -180 - +110	16. ◦C
17. Compression stress at 10% relative deformation	18. Greater than 110?	19. kPa
20. Maximum pressure under flexible conditions	21. Greater than 50	22. kPa
23. Stress rupture	24. >110 to >50mm >140 between 10mm and 50mm	25. kPa
26. Steam permeance	27. 386,1	28. ng/Pa.s.m
29. Resistance factor to diffusion of steam (μ)	30. 10,7	31. ….
32. Fire resistance class	33. Euroclass E	34. ….

Description of the products' application:	The cork-based insulation products are distinguished by excellent thermal insulation properties and the vibration sound isolation. The typical application areas for ICB include thermal, acoustic insulation and vibration at: • Industrial buildings (including insulation of cold rooms , pipelines , heating lines, boilers) ; • Agriculture and agricultural buildings ; • Buildings accessories, attachments and provisional facilities; • Sports halls ; • Airports ; • Special structures and large spans ; • Administrative and school buildings ; • Housing.
Reference service life:	Not specified (cradle-to-gate EPD)
Placing on the market / Rules of application in the market / Technical rules of the product:	The ICB has a CE marking in accordance with the harmonized European standard EN 13170: 2008 - Thermal insulation products for buildings - manufactured products of expanded cork (ICB). Specification.
Quality control:	The existing quality control system is not formalized. However, the products are subjected to a quality control. The ICB is subject to a Compliance Statement and therefore the external quality assurance with regard to compliance with the respective European standard: • Control by the CSTB (*Centre Scientifique et Technique du Bâtiment, France*) and LGAI (*Technological Center AS, in Spain*) –initial marking CE in 2004; • LNEC (Laboratório Nacional de Engenharia Civil) – made on a quarterly basis; • Quality control, internal factory (main focus on geometric control) – daily.
Special delivery conditions:	ICB slabs are flat and parallel surfaces slabs with variable thickness between 10 mm and 300 mm (more common between 40 mm and 80 mm). The shape of the slabs is 1000 mm long by 500 mm width and is usually packaged in plastic (LDPE). According to customer requirements, the slabs can be supplied with other dimensions or can be packed in cardboard instead of LDPE.
Components and substances to declare:	Not applicable
History of the LCA studies:	There were no identified Life Cycle Assessment (LCA) studies for similar products. Previously were conducted related LCA studies, namely: • Cork stoppers - PricewaterhouseCoopers / ECOBILAN 2008 "Analysis of the life cycle of Cork, Aluminium and Plastic Wine Closures"; This study aimed to compare the environmental performance throughout its life cycle of 3 different types of stoppers. • Other insulating materials with similar functions and act as a competitor in the market - EPDs of insulation materials made from plastic foams, registered in EPD registration system of the IBU (Germany).

35. ENVIRONMENTAL PERFORMANCE OF THE PRODUCT

2.1. Calculation rules of the LCA

Declared unit:	Cubic meter (1m^3) of thermal insulation ICB, packed, at the gate of the factory, with a density of 115kg/m^3. The environmental impacts (x) of a square meter of product with a certain thickness y cm are obtained through the conversion by the following formula : x = (relating Impacts to m^3) * y / 100
System boundaries:	This is an EPD "cradle-to-gate, with options" regarding the data of 2010, the last year with complete and representative data of the beginning of the study. The cork used for the production of ICB products comes from other systems (sub product from other activities , external to SOFALCA), the studied system is limited upstream by pruning of cork oak and the extraction of raw materials for the other inflows (border with nature). Downstream the system limit is the factory gate. The declared modules are A1 , A2 and A3 , and the module D.
Criteria for the exclusion:	Once the EPD follows an approach "from cradle to gate, with options", the life cycle stages of products after they leave the factory are excluded from the scope of the study, except for the potential for reuse, recycling and recovery (module D). The information about the extraction of raw materials, production and processing of biomass (e.g., processes of culture or afforestation) weren't considered for the cork entries, the cork processed to ICB results from residual materials from other manufacturing processes. For this study the infrastructures were excluded. Thus, the information related to the plant construction and other infrastructure involved in the production and production of the equipment were not considered. According to the requirements of the guidelines, there should be included at least 95% of the total weight of the declared product, including the packing. In this study efforts were made to include as many materials as possible. In practice, the information related to the production stage of some of the products used for the treatment of water to the boiler was excluded, since it wasn't specific information available for these products (1.6 tons, which represents 0.01% by mass of the total of inputs and less than 0.1% of product output).
Assumption and limitations:	The LCA results are based on the following assumptions : • The selected year (2010) is representative of the product system; • The transport of raw materials or secondary materials are calculated according to the means of transport and the Ecoinvent database; • The potential for reuse , recycling and recovery (Module D) was assumed to be thermal use from a waste incinerator and it was modelled a burn according to LHV (Lower Heating Value) of biomass and respective gaseous emissions , based on IPCC information, and assuming that the product is used worldwide (locally can be reused and reintroduced into its own production system); • The results of the life cycle inventory and impact assessment are specific of the product.
Quality and other characteristics about the information used in the LCA:	All data for the primary processes (controlled by the manufacturer in its industrial unit) were collected in the unit, based on internal records of SOFALCA. Secondary data for the Ecoinvent database was the main source of information; for estimating fuel consumption emissions (diesel) in internal processes, for which it was known the quantity of diesel used, were used emission factors from IPCC database (http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_main.php). With respect to the data used from Ecoinvent, the database used was "Ecoinvent V2.1 - result processes without infrastructures."
Allocation rules:	In the present study the allocation of resources and impacts were applied only once between the ICB and the co-product black cork regranulate, based on physical principles - mass allocation.

Comparability of EPD for construction products:	The EPD of construction products and services may not be comparable if not produced in accordance with EN 15804 and EN 15942 and in accordance with the comparability with the conditions determined by ISO 14025. In this EPD were applied the referred standards and the rules of DAPHABITAT the registration system.

2.1.1. Flow diagram of input and output of the processes

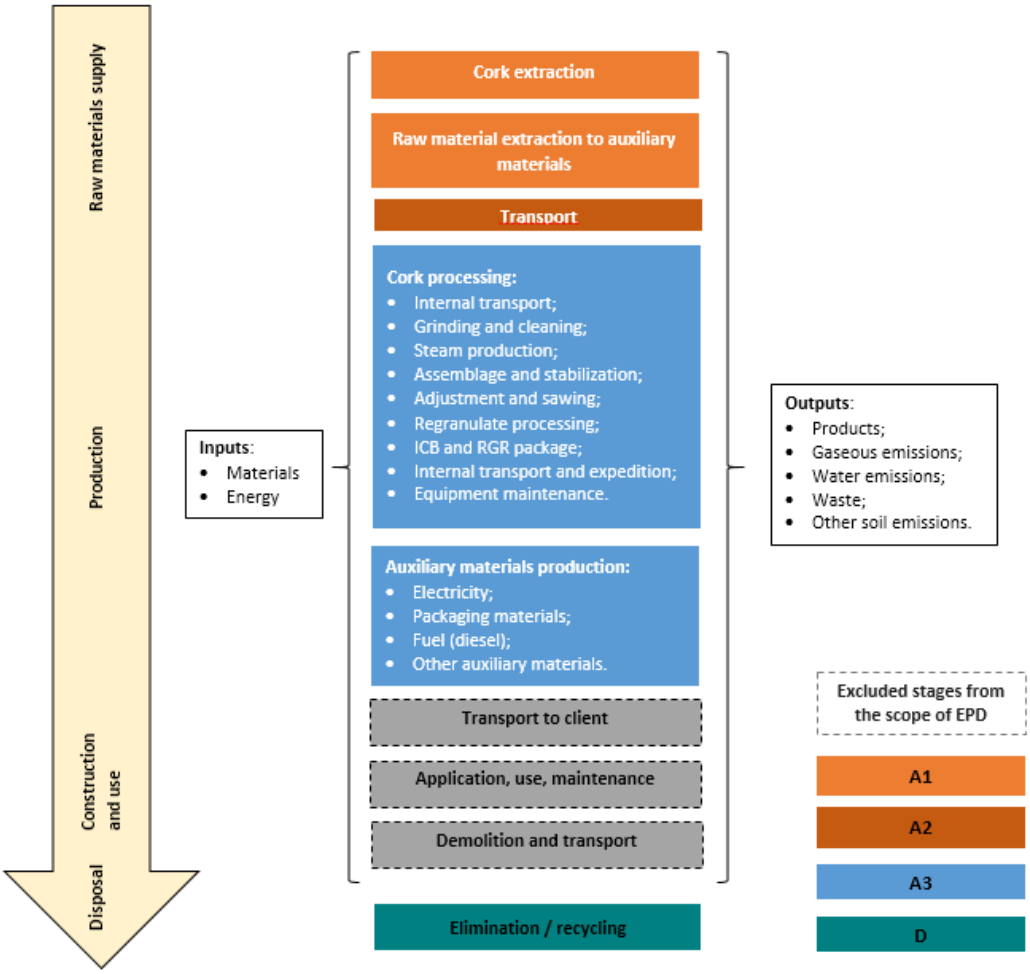

Figure 1. Life cycle stages and unit processes of the product

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 following paragraphs describe the life cycle stages studied for the development of this EPD and the information sources used.

Pruning of cork oaks

For modelling this process was considered that the cork oaks are pruned with mechanic equipment (chainsaw). One sampling was made with the suppliers to gauge the equipment consumption and how to calculate the emissions based on emission factors available on IPCC guidelines agriculture gasoline equipment.

Peel (Separation of the Cork from wood)

For modelling this process was considered that the cork is separated from branches using a diesel stationary machine. A sampling was made with the suppliers to verify the equipment consumption and the emissions were calculated based on the emission factors available on IPCC for diesel stationary machine.

Transportation of the Raw materials to the factory (suppliers)

Raw materials (sub products from other product systems) are delivered by suppliers in the factory, from two means of transportation (modelling with information from Ecoinvent database).

- By tractor, by small local producers of cork , coming from a maximum distance of 10 km;
- By truck with 16-32 tons, coming from producers with higher existing scale at an average distance of 30 km; the transportation process used was a lorry with a EURO 3 class (conservative assumption), ("transport, lorry 16-32t, EURO3").

Diesel production

The fuel used in various processes in the factory is diesel. The information of the diesel production comes from the Ecoinvent database ("diesel, at regional storage [RER]", which is the European average for the production of diesel and transport to the regional level storage).

Production of packaging materials and transportation to SOFALCA

For the production processes of packaging materials was used information from the Ecoinvent database. This information represents the materials at the gate of the factory, for the following materials:

- LDPE packaging film (Low Density Polyethylene), at the factory (LDPE packaging film, at plant [RER]);
- European wood pallet (flat pallet EUR);
- Corrugated cardboard box factory (Packaging, corrugated board, mixed fibre, single wall, at plant).

From this database was also used information regarding the transport from the factory to the packaging material to SOFALCA. The transport process used was again a lorry of EURO 3 class (conservative assumption), within the transport dimensions commonly used ("transport, lorry 16-32t, EURO 3").

Waste management and licensed operator transportation

For the waste management process (namely, metal, paper and plastic recycling) there wasn't information available on the database used. Therefore, was considered an alternative scenario that was the hypothesis of all waste is landfilled instead of recycled. Being the environmental impacts calculated with the same database for all landfilled materials, was selected from the Ecoinvent database the process of card package landfilled in a landfill (disposal, packaging cardboard 19.6 % water, to sanitary landfill).

From the same database was also used information for the transport from SOFALCA to the more distant expected operator (national steel mill). The transportation process used was again a lorry of class EURO 3 3 (conservative assumption), within the transport dimensions commonly used ("transport, lorry 16-32t, EURO 3").

Medium voltage electricity, in the system

For the production of electricity was used information from the Ecoinvent database specific to Portugal, for medium voltage of electricity (consumed at SOFALCA), in the system.

Production of metallic elements used in the maintenance of the saws (grinding and sawing)

The production of these metallic elements was modelled with information from Ecoinvent database for the steel production ("Chromium steel 18/8, at plant") and the process of product production ("Steel product manufacturing, average metal working").

The ICB production process at the SOFALCA plant has the following processes, which description is available after this list.

- Internal transport- 1
- Grinding and cleaning
- Internal transport - 2
- Steam Production
- Internal transport - 3
- Autoclaves - Bonding and stabilization
- Internal transport – 4
- Rectification and Cutting
- Dedusting
- Packaging ICB
- Internal transport - 5 (expedition ICB)
- Maintenance of equipment (included in Rectification and sawdust)

Internal transport – 1

The cork is transported from the cork park (where the suppliers leave the cork) until the grinding. The transport is made with a small mechanical digger. The fuel consumption is registered by SOFALCA and the emissions are calculated with the emission factors available by the IPCC for diesel construction equipment (construction and industry equipment that works with diesel oil).

Grinding and cleaning

In this stage the cork (raw material) is up to the production process and runs a several crushers and screeners. This process consumes cork and electricity and produces:

- Granulate cork which follows the production process,
- Biomass that is burned during the production process,
- Land / sands that are deposited on surrounding soils.

All data is specific of SOFALCA. All inputs and outputs are allocated just to the main flow, of granulate, since the biomass impacts are only counted when it is burned (gaseous emissions). The energy consumption is calculated according to the installed power and the usage time of each equipment. The same is applied to all processes that consume electricity.

Internal transport – 2

The sand transport for deposition on the ground is made with a tractor. The fuel consumption is registered by SOFALCA and the emissions are calculated with the emission factor from IPCC for diesel agriculture equipment (farm equipment that works with diesel oil).

Steam Production

For the bonding of cork granules, steam is necessary. This is produced in a boiler with double heating. The furnace is fed with biomass registered internally ("dark dust" produced in the rectification and sawing stage and "cork dust" produced in the grinding and cleaning stage). The emissions are monitored in a biannual base by an independent lab. The ash, other of the outputs of the furnace, are also weight and registered internally by SOFALCA, and are these the information sources.

Internal transport – 3

Similar to the "Internal Transport 2" but for the transport of the ash from the furnace.

Autoclaves - Bonding and stabilization

The autoclaves are fed with cork granules from the previous stages. Steam is injected about 380◦C. When the autoclave is open, the outputs are agglomerate cork blocks and gaseous emissions. These emissions are monitored similar to the ones from the boiler. The blocks are sawed in two and cooled with a water bath (autoclave recirculation). Later they are manually positioned in an outhouse to cool and stabilized for at least 15 days.

The inputs of this process are cork granulates, steam and electricity. The outputs are dry and stabilized blocks, cooling water and gaseous emissions.

Internal transport – 4

After stabilization, the aggregated blocks are transported with a tractor for the sawing zone. The process is similar to that of transport 2 and 3.

Rectification and Cutting

In this stage, the blocks are rectified to have the measures of 1000 mm x 500 mm x 300 mm and are cut in slabs, according with the requirements of the respective client / order. In this process the inputs are the stabilized blocks and electricity. In the regular maintenance of the saws are used metallic parts (saws). The outputs are the ICB slabs, waste of granulates from rectification or damaged slabs and metallic elements (from saws replacement). The ICB is ready for packaging and will be transported again. The source of information are specific, collected at SOFALCA.

The allocation between the ICB and granulates pieces that will continue in the productive system is a mass allocation.

Dedusting

In this stage, the air from the rectification zone and sawing is filtered causing particles. This process was modelled according to the periodic monitoring made in 2011, once in 2010 the measures weren't performed (the frequency of monitoring is wider than the other points).

Packaging ICB

In this stage the ICB is packaged. The most of the ICB produced is packaged in PEBD with heat. According to the requirements of some clients, part of the ICB is packaged in corrugated boxes. To the expedition, the ICB is placed on wooden pallets (Euro-pallets) and secured with plastic straps (PP). The source of information are specific, collected at SOFALCA.

The inputs of this process are the materials of packaging, the product and electricity. The output is the packaged product.

Internal transport – 5 (expedition ICB)

The final step is the last transportation of packaged ICB to his expedition. This transportation is carried out with a tractor, similar to the above.

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**	21,59	1,4E-06	1,9E-01	3,3E-02	3,95E-05	6,86E-08	338,6
Transport	**A2**	1,39	2,04E-07	6,8E-03	1,58E-03	1,04E-04	1,77E-09	18,18
Manufacturing	**A3**	9,64	3,11E-06	2,6E-01	8,75E-01	1,13E-02	2,66E-05	431,7
Total	**Total**	32,62	4,73E-06	4,6E-01	1,22E-01	1,15E-02	2,67E-05	788,5
Re-use, recovery, recycling potential	**D**	0,68	Not relevant	0,05	0,01	1,64E-04	Not relevant	Not relevant

LEGEND:

Product stage

Benefits and loads beyond the system boundary

In the end of the reference service life of the building or equipment in which they are applied, the product can be reused, depending on the decommissioning conditions. Besides, the product can be recycled through the reintegration in their own production process.

For this EPD, given that the products are exported all over the world and its production is very localized, it was assumed that in the end-of-life the product is send to process of energy recovered, functioning as secondary fuels from renewable sources. Thus, beyond of system border, was simulated a simple burner, based on emission factors and lower calorific value from IPCC (for wood and wood waste / biomass).

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**	55,14	452,8	507,9	*	*	317,32	**	**	**	0,65
Transport	**A2**	0,027	0,0025	0,029	*	*	16,87	**	**	**	0,0012
Manufacturing	**A3**	130,86	78,82	209,68	*	*	426,11	**	**	**	0,058
Total	**Total**	182,12	531,6	713,7	*	*	760,31	**	**	**	0,71
Re-use, recovery, recycling potential	**D**								- 970,2		

Values expressed by declared unit

* It was not possible to disaggregate the non-renewable primary energy resources extracted from the use of energy or used as raw material.

** Not apply to process in SOFALCA plant and the information was not available for upstream processes from the database used.

LEGEND:

Product stage

Benefits and loads beyond the system boundary

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.

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**	**	**	**
Transport	**A2**	**	**	**
Manufacturing	**A3**	**	0,88	**
Total	**Total**	**	0,88	**
Re-use, recovery, recycling potential	**D**	Not relevant	0,88	Not relevant

Values expressed by declared unit

* Not applied to process in SOFALCA plant and the information was not available for upstream processes from the database used.

LEGEND:

Product stage

Benefits and loads beyond the system boundaries

2.5. Other environmental information describing output flows

Parameters	Units*	Results
Components for re-use	kg/m^3 Prod	**
Materials for recycling	kg/m^3 Prod	0,27
Radioactive waste disposed	kg/m^3 Prod	**
Materials for energy recovery	kg/m^3 Prod	44,62
Exported energy	MJ by energy carrier	**

* expressed by functional unit or declared unit

** Not applied to process in SOFALCA plant and the information were not available for upstream processes from the database used.

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

According with the literature, the use of cork as raw cork allows the capture of CO_2 storage in the product (biogenic carbon).

3.1. Additional environmental information about the release of dangerous substances - ICB

Taking into account the full acceptance of the products in an international level, SOFALCA promotes the analysis of the ICB product emissions during the use stage, and the results are presented in the table below.

Title of the scenario	Parameters	Units*	Results
Scenario emissions for indoor air, by ICB **(by LQAI – Laboratório de qualidade do ar interior, Porto, Portugal)** Chamber tests with time of exposure to the air of 28 days, according to ISO 16000-9. VOC analysis according to 16000-6 standard. Formaldehyde and acetaldehyde determined according to ISO 16000-3. The product was placed in a ventilated cabinet. The product was placed in a ventilated cabinet. It was introduced into the test chamber (with a volume of 0,255m^3) 25 days later and the air sampling were performed at 28 days. The experimental conditions of the chamber during sampling were: • Temperature – 22◦C • Relative humidity – 51% • Air speed of material surface – 0,16 m/s • Number of hourly air renovations in the chamber – 0,53 h^{-1} Relation area of the sample / volume of the chamber – 1,09 m^2/m^3	**Tests results**		
	Formaldehyde	Concentration in µg/m^3	n.d.
	Acetaldehyde		46,5
	Toluene		3,84
	Tetrachloroethylene		n.d.
	Xylene		2,73
	1,2,4-trimethylbenzene		n.d.
	1,4-dichlorobenzene		n.d.
	Ethylbenzene		n.d.
	2- butoxyethanol		n.d.
	Styrene		n.d.
	Total VOCs		31,9
	n.d. – not detected		

3.2. SOFALCA certification

Given that the raw material used comes from both byproducts of other industrial processes or forestry activity, as cork waste, SOFALCA is licensed as cork waste operator – with the authorization for management operation of waste by the Ministry of Environment – CCDRLVT and is valid until February 25th, 2015.

In addition, the company has FSC certification (Forest Stewardship Council).

REFERENCES

- ✓ General Instructions of the DAPHabitat System, Version 1.0, Edition March 2013 (in www.daphabitat.pt);
- ✓ **DAPhabitat,** "*RCP – modelo base para produtos e serviços de construção. Sistema DAPHabitat*"**,** Versão 1.0, 2012 (em www.daphabitat.pt), consultado entre Agosto de 2012 e Março de 2013
- ✓ **Ecoinvent Centre 2007**, **ECOINVENT data v2.0**, Swiss Centre for Life Cycle Inventories, Dubendorf, 2007
- ✓ **EN 15942:2011** Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ✓ **ENVIRONDEC,** "*Módulo Básico de RCP para os Produtos de Madeira, Cortiça, Palha e Cestaria*", para a divisão 31 da *Central ProductClassification* – Divisão de Estatística das Nações Unidas, Suécia, 2010
- ✓ **EN 15804:2012+A1:2013** Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products
- ✓ **Gil L.,** "*A Cortiça como Material de Construção - Manual Técnico*, APCOR" Associação Portuguesa de Cortiça, 2006, disponível em http://apcor.pt/userfiles/File/Caderno%20Tecnico%20F%20PT.pdf e consultado entre Agosto de 2012 e Março de 2013
- ✓ **IPCC** – http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_main.php, site consultado entre Agosto de 2012 e Março de 2013
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