DAPHABITAT SYSTEM ENVIRONMENTAL PRODUCT DECLARATION

WWW.DAPHABITAT.PT

[ACCORDING TO ISO 14025, EN 15804:2012+A2:2019 AND EN 15942]

Declaration number: DAP 002:2024

COLLECTION MURATTO ORGANIC BLOCKS

ISSUE DATE: 27/03/2024 VALID UNTIL: 26/03/2029

MURATTO - VASCO EMANUEL, LDA.

VERSION 1.4.1 ED. March 2024

INDEX

1. GENERAL INFORMATION

1.1. The DAPHAbitat System

Program operator:	Sustainable Construction Platform www.clusterhabitat.pt geral@clusterhabitat.pt	Cluster Habitat Sustentável
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro	
Email address:	deptecnico@clusterhabitat.pt	
Telephone number:	(+351) 234 401 576	
Website:	www.daphabitat.pt	
Logo	dap habitat	

1.2. EPD owner

Name of the owner:	MURATTO - VASCO EMANUEL, Lda.
Production site:	Ecoprodev, Lda. Zona Industrial da Palhaça, Rua C - Lote 11 | 3770 - 355 Palhaça | Oliveira do Bairro - Portugal
Address (head office):	Rua 28 de Janeiro, nº 350, Fração HI-08, 4400-335 Vila Nova de Gaia
Telephone:	+(351) 913 917 352
E-mail:	Muratto: marketing@muratto.com Ecoprodev: geral@ecoprodev.pt
Website:	https://www.muratto.com/
Logo:	muratto cork wall design
Information concerning the applicable management Systems:	The existing quality management system is not yet completely formalised. However, the products are subject to quality control under the product's technical standards.
Specific aspects regarding the production:	Main CAE: 46732.
Organisation's environmental policy:	MURATTO's process is based on the need for sustainable development, using natural raw materials whenever possible, trying to contribute to a natural lifestyle, and maintaining a positive attitude towards oneself and others.

1.3. Information concerning the EPD

Authors:	1. Centro Tecnológico da Cerâmica e do Vidro 2. MURATTO - VASCO EMANUEL, LDA. 3. ECOPRODEV, LDA
Contact of the authors:	1. CTCV materials: habitat | iParque – Parque Tecnológico de Coimbra - Lote 6 | 3040-540 Antanhol – Portugal (T) +351 239 499 200 Marisa Almeida: marisa@ctcv.pt 2. MURATTO - VASCO EMANUEL, LDA. Rua 28 de Janeiro, nº 350, Fração HI-08, 4400-335 Vila Nova de Gaia, Portugal (T) +(351) 913 917 352 3. ECOPRODEV, Lda. Zona Industrial da Palhaça, Rua C - Lote 11 | 3770 - 355 Palhaça | Oliveira do Bairro - Portugal
Issue date:	27/03/2024
Registration date:	09/04/2024
Registration number:	DAP 002:2024
Valid until:	26/03/2029
Representativity of the EPD (location, manufacturer, group of manufacturers):	This EPD is an average statement that describes the life cycle of products from the MURATTO ORGANIC BLOCKS collection, manufactured in a single production site (ECOPRODEV, LDA.) and marketed by MURATTO – VASCO EMANUEL, LDA. The MURATTO ORGANIC BLOCKS collection is divided into the following categories: • Design Blocks – BEEHIVE, CHOCK, MINICHOK, PEAK, SENSES, HEXAGON, DROP, KUBUS • Cork Strips – INFINITY, ZIG ZAG, STEP, GEOMETRIC, WAVE • Acoustic Panels – UNDERTONE, BUZZER
Where to consult explanatory material:	https://www.muratto.com/
Type of EPD:	This is an EPD from cradle to gate (A1-A3), with options (A4), with the end-of-life stage (modules C1-C4) and with module D

1.4. Demonstration of the verification

External independent verification, according to the standard ISO 14025:2010 and EN 15804:2012+A2:2019

Certification Body	Verifier
(**CERTIF – ASSOCIAÇÃO PARA A CERTIFICAÇÃO**)	(Ricardo Mateus)

1.5. EPD Registration

Programme operator

(PLATAFORMA PARA A CONSTRUÇÃO SUSTENTÁVEL)

1.6. PCR (product category rules) basic model

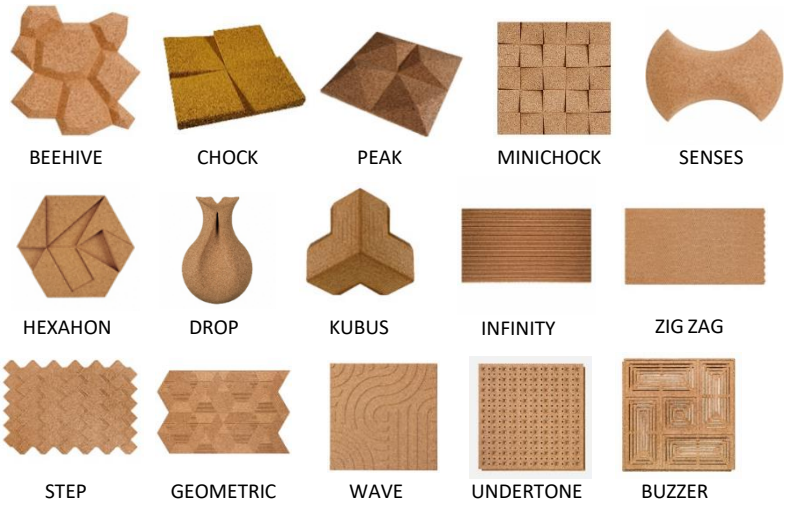
Name:	PCR: Basic module for construction products and services
Issue date:	Edition Agosto 2023
Number of registration on the data base:	PCR-mb001
Version:	Version 2.3
Identification and contact of the coordinator (s):	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt José Dinis Silvestre | jose.silvestre@ist.utl.pt
Identification and contact of the authors:	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt José Silvestre | jds@civil.ist.utl.pt Fausto Freire Cristina Rocha Ana Paula Duarte Ana Cláudia Dias Helena Gervásio Victor Ferreira Ricardo Mateus António Baio Dias
Composition of the Sectorial Panel:	-
Consultation period:	18/11/2015 - 18/01/2016 12/08/2023 – 30/11/2023
Valid until:	01/06/2027

CEN standard EN 15804 serves as the core Product Category Rules (PCR)

1.7. Relevant c-PCR (Complementary product category rules)

Name:	PCR: Wall Covering
Issue date:	Edition June 2023
Number of registration on the data base:	PCR 002:2014
Version:	Version 1.2
Identification and contact of the coordinator (s):	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt
Identification and contact of the authors:	Ana Cláudia Dias Luís Arroja | arroja@ua.pt Marisa Almeida | marisa@ctcv.pt
Composition of the Sectorial Panel:	RMC - Revestimentos de Mármore Compactos, S.A. Dominó – Indústrias Cerâmicas, S.A. Sonae Indústria, SGPS, S.A. APICER – Associação Portuguesa da Indústria de Cerâmica
Consultation period:	12/08/2013 to 30/11/2023
Valid until:	01/06/2027

1.8. Information concerning the product/product class

<table>
<tr><td>Identification of the product:</td><td>Products of the Collection MURATTO ORGANIC BLOCKS</td></tr>
<tr><td>Illustration of the product:</td><td>


</td></tr>
<tr><td>Brief description of the product:</td><td>Each product has a different volume and shape, giving each wall project a different aesthetic result.
The MURATTO ORGANIC BLOCKS collection is divided into the following categories:
• Design Blocks – BEEHIVE, CHOCK, MINICHOK, PEAK, SENSES, HEXAGON, DROP, KUBUS
• Cork Strips – INFINITY, ZIG ZAG, STEP, GEOMETRIC, WAVE
• Acoustic Panels – UNDERTONE, BUZZER

The product is made up of the raw materials that constitute it, the main ones being cork, binder and pigment, and the packaging through which it is shipped, which is made up of wooden pallets, plastics, paper and cardboard.</td></tr>
<tr><td>Main technical characteristics of the product:</td><td>Table 1: Technical characteristics of the products
<table>
<tr><th></th><th>PRODUCT</th><th>MATERIAL</th><th>SIZE</th><th>INSTALLATION</th><th>FIRE RESISTANT</th><th>ACOUSTIC (NRC)</th><th>THERMAL CONDUCTIBILITY (W/m.C)</th><th>THERMAL RESISTANCE (m^2C/W)</th><th>VOC</th></tr>
<tr><td rowspan="7">DESIGN BLOCK</td><td>BEEHIVE</td><td rowspan="14">Massive cork pieces agglomerated with special resins and additives, molded in shape with mass color pigmentation.</td><td>248 x 180 x 20 mm</td><td rowspan="7">Glue or stickers</td><td rowspan="14">B-51,d0 (En13823)</td><td rowspan="12">0.3 (EN ISO 11654)</td><td rowspan="14">0.0468 (EN 12667-2001)</td><td rowspan="14">0.47 (EN 12667-2001)</td><td rowspan="14">class A (French Norm EN ISO/IEC 17025)</td></tr>
<tr><td>CHOCK</td><td>248 x 248 x 24 mm</td></tr>
<tr><td>DROP</td><td>230 x 150 x 42 mm</td></tr>
<tr><td>HEXAGON</td><td>217 x 188 x 25 mm</td></tr>
<tr><td>MINICHOCK</td><td>248 x 248 x 24 mm</td></tr>
<tr><td>PEAKS</td><td>248 x 248 x 24 mm</td></tr>
<tr><td>SENSES</td><td>248 x 160 x 43 mm</td></tr>
<tr><td rowspan="7">CORK STRIPS</td><td>GEOMETRIC</td><td>630 x 396 x 7 mm</td><td rowspan="7">Glue</td></tr>
<tr><td>INFINITY</td><td>693 x 393 x 7 mm</td></tr>
<tr><td>STEP</td><td>703 x 483 x 12 mm</td></tr>
<tr><td>WAVE</td><td>503 x 502 x 7 mm</td></tr>
<tr><td>ZIG ZAG</td><td>698 x 395 x 7 mm</td></tr>
<tr><td rowspan="2">ACOUSTIC PANEL</td><td>BUZZER</td><td>502 x 502 x 30 mm</td><td rowspan="2">Glue and clips</td><td>0.8</td></tr>
<tr><td>UNDERTONE</td><td>491 x 491 x 30 mm</td><td>0.7</td></tr>
</table>
</td></tr>
<tr><td>Description of the product's application/use:</td><td>The cork panels from the MURATTO ORGANIC BLOCKS collection are used in interior cladding applications.</td></tr>
<tr><td>Placing on the market / Rules of application in the market / Technical rules of the product:</td><td>Technical rules of the product;
EN 13823:2020 - Reaction to fire tests for building products
EN ISO 11654 - Acoustics (Sound absorbers for use in buildings)
EN 12667-2001 - Thermal performance of building materials and products
EN ISO/IEC 17025 - Testing and calibration laboratories</td></tr>
<tr><td>Quality control:</td><td>The existing quality management system is not formalised. However, the products are subject to quality control following the product's technical standards.</td></tr>
<tr><td>Special delivery conditions:</td><td>Not applicable</td></tr>
<tr><td>Components and substances to declare:</td><td>The product does not contain any REACH candidate substance of very high concern, in a quantity greater than 0.1% by mass.</td></tr>
</table>

	Table 2. Main components of the product. *Raw Materials* / *Percentage* Cork: 64 – 68 Binder: 28 – 30 Pigment: 0 – 11 *Packaging* / *Percentage* Wooden pallet: 30.5 Cardboard box: 63.9 Plastic and tape: 5.6
Where explanatory material may be obtained:	Each product has a different volume and shape, giving each wall project a distinct aesthetic result. Products are produced at ECOPRODEV facilities by moulding technology. The information can be consulted at the following link: https://www.muratto.com/en/organic-blocks
History of the LCA studies:	Not applicable

1.9. Calculation rules of the LCA

Functional unit:	1 m^2 of cork panels, agglomerated with resins and special additives[1], with a specific weight of 2.06 kg/m^2 Table 1 - Conversion factors to be applied to the DAP results for the different MURATTO ORGANIC BLOCKS collection products.

	PRODUCT	PESO ESPECÍFICO (kg/m^2)	FATOR DE CONVERSÃO
DESIGN BLOCK	BEEHIVE	4,93	2,40
	CHOCK	4,20	2,04
	DROP	7,12	3,46
	HEXAGON	5,44	2,64
	MINICHOCK	4,20	2,04
	PEAKS	3,88	1,88
	SENSES	6,21	3,01
CORK STRIPS	GEOMETRIC	2,61	1,27
	INFINITY	2,06	1,00
	STEP	2,56	1,24
	WAVE	2,13	1,04
	ZIG ZAG	2,17	1,06
ACOUSTIC PANEL	BUZZER	4,80	2,33
	UNDERTONE	6,25	3,04

Declared unit:	-
System boundaries:	EPD from cradle to gate (A1 to A3), with option A4 (product transport), with the end-of-life stage (module C) and module D. Covering: A1-A3, A4, C and D.
Criteria for the exclusion:	The following processes were not considered in this study: • The environmental loads associated with the construction of industrial infrastructures and the manufacture of machinery and equipment; • The environmental loads related to the infrastructures (production of vehicles, road maintenance) of the transport of pre-products; • • Long-term emissions.
Assumption and limitations	The presented EPD for the cork panel refers to all types of "Organic blocks" cork panels manufactured in a single industrial unit (Ecoprodev).
Quality and other characteristics of the information used in the LCA:	The generic data used belong to the Ecoinvent v3.7 databases and comply with the quality criteria (age, geographical and technological coverage, plausibility, etc.) of generic data. The information based on LCA and additional information stated in this report complies with the requirements of applicable European and Portuguese Standards. According to the criteria defined in Table E.1 of Annex E of the EN 15804+A2+AC standard, defined by the "UN Environment Global Guidance on LCA database development", the quality of all relevant data is considered to be "good" to "very good", on a qualitative scale

[1] Corresponding to the product: cork strips infinity

	of 5 levels, from very poor to very good. The quality of data from module D is also good (dominant) to very good, except for the geographic representation of some processes, which was considered good and reasonable.
Allocation rules:	Priority was given to establishing a physical relationship between the inputs and outputs of the system and its various products and processes. When this was not possible, criteria such as mass and volume were used for load allocation (distribution of burdens) depending on the type of parameters and the nature of the process.
Software used for the assessment:	SimaPro, version 9.2
Background database used for the LCA:	Ecoinvent database version 3.7 published in December 2020; approach "cut-off"
Comparability of EPD for construction products	The EPD of construction products and services cannot be comparable if they are not developed according to EN 15804 and EN 15948 and according to the comparability conditions determined by ISO 14025.

1.10. Use of average environmental performance

This EPD presents the average environmental performance of the entire range of products from the MURATTO ORGANIC BLOCKS collection produced by MURATTO - VASCO EMANUEL, LDA, with the same raw material recipe. The variability in environmental performance among specific products is not considered relevant.

1.11. Technical information for Reference Service Life (RSL)

Not applicable, as this EPD does not include the use stage (module B).

1.12. Flow diagram of input and output of the processes

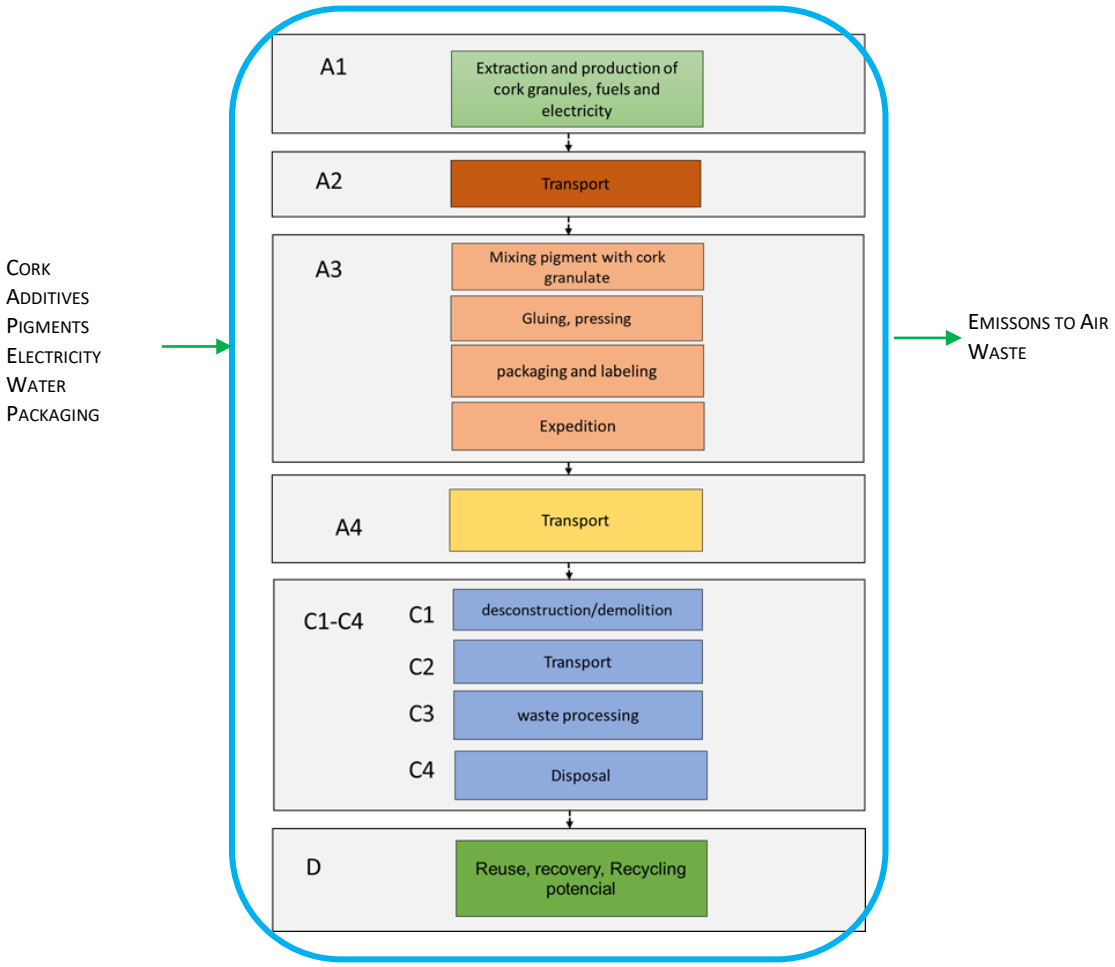


Figure 1: Activities related to each life cycle stage of the cork panel.

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2. CORE ENVIRONMENTAL IMPACT INDICATORS

2.1. Description of the system boundaries

(✓= included; ND = 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
✓	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓

Production stage; A1 – A3

This step includes modules A1 (Extraction and processing of raw materials), A2 (Transport) and A3 (Manufacturing).

Regarding transport (module A2), the raw materials and auxiliary materials arrive at the installation by road in trucks.

Concerning stage A3 (Manufacturing), the manufacturing process of the cork products in the MURATTO ORGANIC BLOCKS collection comprises the following stages:

- Mixture of pigment with cork granules;
- Gluing, pressing;
- Packaging and labelling;
- Expedition.

In the initial stage of the manufacturing process, a mixture of the pigment with the cork granulate and with the agglomerating element, the resin, is carried out.

This mixture is then weighed and placed in moulds to be hot pressed.

When it comes out of the mould, it is cooled down to stabilise. It is then packed in a cardboard box.

Construction; A4 – A5

Module A4 includes transport from the place of production to the consumer or to the place where Muratto cork products are installed. Three scenarios were considered:

- A4(1) – 150 km via road, by truck

- A4(2) – 2000 km via road, by truck
- A4(3) – 6500 km via ocean, by ship

Module A5 was not considered, being excluded from the system boundaries.

Use stage; B1 – B7

This module was not considered, being excluded from the system boundaries.

End of life stage; C1 – C4

The end-of-life stage comprises the following modules:

De-construction/demolition (C1); transportation of waste to the processing and end-of-life site (C2); waste treatment for reuse, recovery and/or recycling (C3) and disposal (C4).

The end-of-life stage is the last stage of the life cycle of a material, but it can become the first if, after demolition, waste is recycled and reused. Therefore, the recovery of the material is considered at the end of life.

C1. An energy consumption in the demolition process of 0.0437 MJ/kg demolished product is assumed (source: Ecoinvent 3.7.1).

C2. It is assumed that waste is collected and transported to the manufacturing facilities over an average distance of 50 km.

C3. 70% recycling (grinding cork to produce cork granules), according to statistical data on CDW (construction and demolition waste) from the APA (Portuguese Environmental Agency).

C4. The remaining 30% is deposited in landfills.

Recycling / reuse / recovery potential; Module D

The impacts and benefits of this step were included within the system boundary and are therefore evaluated.

It was considered that 70% of the waste is used at the end of its life (conservative value), according to statistical data on CDW (construction and demolition waste) from APA (Portuguese Environmental Agency), to make cork granules (after griding) that can be used in a new life cycle to replace virgin cork.

2.1.1. JUSTIFICATION FOR THE EXEMPTION TO DECLARE MODULES C1, C2, C3, C4 AND D

Not applicable.

2.2. Core environmental impact indicators

		Global warming potential total; GWP-total	Global warming potential fossil; GWP-fossil	Global warming potential biogenic; GWP-biogenic	Global warming potential land use and land use change; GWP-luluc	Depletion potential of the stratospheric ozone layer; ODP	Acidification potential; AP
Unit		kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CFC 11 eq.	mol H^+ eq.
Modules A1-A3		-8,89E+00	6,40E+00	-1,53E+01	1,82E-02	5,85E-05	2,08E-02
Module A4	Scenario A4.1	4,17E-02	4,17E-02	3,33E-05	3,16E-07	9,68E-09	8,22E-05
	Scenario A4.2	5,56E-01	5,55E-01	4,44E-04	4,21E-06	1,29E-07	1,10E-03
	Scenario A4.3	1,18E-01	1,18E-01	7,60E-05	1,22E-06	2,48E-08	4,05E-03
Module C1		7,74E-03	7,74E-03	5,70E-06	1,13E-07	1,74E-09	8,35E-05
Module C2		1,39E-02	1,39E-02	1,11E-05	1,05E-07	3,23E-09	2,74E-05
Module C3		3,89E-03	3,36E-03	1,07E+01	7,55E-06	1,87E-10	1,74E-05
Module C4		6,49E-02	2,70E-03	6,22E-02	2,99E-07	5,74E-10	2,79E-05
Module D		1,08E+01	-4,31E-02	1,08E+01	-1,70E-03	-9,84E-09	-2,34E-04

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End-of-life stage
- Benefits and loads beyond the system boundary

NOTES: P.C.I. – Net calorific value.
Units expressed by functional unit (1m²)

		Eutrophication potential aquatic freshwater; EP-freshwater	Eutrophication potential aquatic marine; EP-marine	Eutrophication potential terrestrial; EP-terrestrial	Formation potential of tropospheric ozone; POCP	Abiotic depletion potential for non-fossil resources ADP-minerals&metals	Abiotic depletion potential for fossil resources potential ADP-fossil	Water (user) deprivation potential; WDP
Units		kg P eq.	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m^3 World eq. deprived
Modules A1-A3		1,38E-04	3,27E-03	4,54E-02	1,41E-02	2,81E-06	7,99E+01	4,09E+00
Module A4	Scenario A4.1	2,28E-08	1,37E-05	1,53E-04	5,40E-05	1,77E-09	5,91E-01	-1,25E-04
	Scenario A4.2	3,03E-07	1,83E-04	2,03E-03	7,19E-04	2,36E-08	7,88E+00	-1,67E-03
	Scenario A4.3	7,01E-08	9,97E-04	1,11E-02	2,82E-03	9,81E-10	1,52E+00	-3,56E-04
Module C1		5,79E-09	3,74E-05	4,11E-04	1,12E-04	3,85E-10	1,07E-01	2,21E-05
Module C2		7,58E-09	4,57E-06	5,09E-05	1,80E-05	5,90E-10	1,97E-01	-4,18E-05
Module C3		3,50E-07	2,57E-06	3,12E-05	7,89E-06	2,70E-10	1,66E-01	1,21E-03
Module C4		3,24E-08	3,00E-05	1,34E-04	5,11E-05	1,32E-10	3,97E-02	4,26E-05
Module D		-1,03E-05	-9,87E-05	-9,96E-04	-6,56E-04	-3,42E-09	-6,02E-01	-5,18E-03

LEGENDA:

- Product stage
- Construction process stage
- Use stage
- End-of-life stage
- Benefits and loads beyond the system boundary

P.C.I. – Net calorific value.
Units expressed by functional unit (1m^2)

2.3. Additional environmental impact indicators

		Potential incidence of disease due to PM emissions PM	Potential Human exposure efficiency relative to U235 IRP	Potential Comparative Toxic Unit for ecosystems ETP-fw	Potential Comparative Toxic Unit for humans, cancer effects HTP-c	Potential Comparative Toxic Unit for humans, not cancer effects HTP-nc	Potential soil quality index SQP
Unit		Disease incidence	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Modules A1-A3		1,72E-07	1,13E-01	6,82E+01	2,35E-08	3,23E-08	4,44E+02
Module A4	Scenario A4.1	5,39E-09	9,26E-03	7,23E-01	2,22E-11	7,72E-10	1,88E-03
	Scenario A4.2	3,21E-08	3,47E-02	3,15E+00	4,15E-11	4,93E-09	2,51E-02
	Scenario A4.3	2,99E-09	6,65E-03	4,87E-01	1,91E-11	4,02E-10	4,76E-03
Module C1		2,25E-09	4,68E-04	3,59E-02	4,71E-13	3,73E-11	3,93E-04
Module C2		8,01E-10	8,68E-04	7,87E-02	1,04E-12	1,23E-10	6,27E-04
Module C3		5,65E-11	3,37E-03	5,50E-02	8,71E-13	3,21E-11	2,59E-02
Module C4		7,36E-10	2,50E-04	4,50E-02	3,21E-13	9,47E-11	1,09E-01
Module D		-3,95E-09	-2,64E-03	-3,62E-01	-4,82E-11	-1,42E-09	-2,87E+02

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End-of-life stage
- Benefits and loads beyond the system boundary

P.C.I. – Net calorific value.
Units expressed by functional unit (1m²)

2.4. Indicators describing resource use

		Primary energy					
		EPR	RR	TRR	EPNR	RNR	TRNR
Unit		MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.
Modules A1-A3		1,75E+02	3,89E+00	1,79E+02	8,30E+01	3,58E+00	8,66E+01
Module A4	Scenario A4.1	8,70E-04	0,00E+00	8,70E-04	6,28E-01	0,00E+00	6,28E-01
	Scenario A4.2	1,16E-02	0,00E+00	1,16E-02	8,37E+00	0,00E+00	8,37E+00
	Scenario A4.3	1,99E-03	0,00E+00	1,99E-03	1,61E+00	0,00E+00	1,61E+00
Module C1		1,70E-04	0,00E+00	1,70E-04	1,14E-01	0,00E+00	1,14E-01
Module C2		2,90E-04	0,00E+00	2,90E-04	2,09E-01	0,00E+00	2,09E-01
Module C3		1,05E-01	0,00E+00	1,05E-01	1,69E-01	0,00E+00	1,69E-01
Module C4		3,66E-03	0,00E+00	3,66E-03	4,20E-02	0,00E+00	4,20E-02
Module D		-1,17E+02	0,00E+00	-1,17E+02	-6,42E-01	0,00E+00	-6,42E-01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End-of-life 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);

Units expressed by functional unit (1m²)

		Secondary materials and fuels, and use of water			
		MS	CSR	CSNR	Net use of fresh water
Unit		kg	MJ, P.C.I.	MJ, P.C.I.	m^3
Modules A1-A3		0,00E+00	0,00E+00	0,00E+00	9,68E-02
Module A4	Scenario A4.1	0,00E+00	0,00E+00	0,00E+00	8,88E-07
	Scenario A4.2	0,00E+00	0,00E+00	0,00E+00	1,18E-05
	Scenario A4.3	0,00E+00	0,00E+00	0,00E+00	3,66E-06
Module C1		0,00E+00	0,00E+00	0,00E+00	2,69E-06
Module C2		0,00E+00	0,00E+00	0,00E+00	2,96E-07
Module C3		0,00E+00	0,00E+00	0,00E+00	3,53E-04
Module C4		0,00E+00	0,00E+00	0,00E+00	1,12E-05
Module D		0,00E+00	0,00E+00	0,00E+00	-1,99E-04

LEGEND:

Product stage

Construction process stage

Use stage

End-of-life stage

Benefits and loads beyond the system boundary

MS = use of secondary material; CSR = use of renewable secondary fuels; CSNR = use of non-renewable secondary fuels.

Units expressed by functional unit ($1m^2$)

2.5. Other environmental information describing different waste categories

		Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed
Unit		kg	kg	kg
Modules A1-A3		1,77E-04	8,89E-02	1,18E-04
Module A4	Scenario A4.1	1,57E-06	2,47E-05	4,29E-06
	Scenario A4.2	2,09E-05	3,30E-04	5,72E-05
	Scenario A4.3	8,94E-07	7,26E-05	1,10E-05
Module C1		2,80E-07	6,69E-06	7,70E-07
Module C2		5,22E-07	8,24E-06	1,43E-06
Module C3		2,92E-08	1,16E-04	1,95E-06
Module C4		9,50E-08	6,18E-01	3,08E-07
Module D		-3,21E-06	-2,26E-04	-4,33E-06

LEGENDA:

- Product stage
- Construction process stage
- Use stage
- End-of-life stage
- Benefits and loads beyond the system boundary

Units expressed by functional unit (1m²)

2.6. Environmental information describing output flows

		Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
Unit		kg	kg	kg	MJ
Modules A1-A3		0,00E+00	5,79E-02	4,61E-02	0,00E+00
Module A4	Scenario A4.1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Scenario A4.2	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Scenario A4.3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C1		0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C2		0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C3		0,00E+00	1,44E+00	0,00E+00	0,00E+00
Module C4		0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module D		0,00E+00	0,00E+00	0,00E+00	0,00E+00

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End-of-life stage
- Benefits and loads beyond the system boundary

NOTE: Units expressed by functional unit (1m²)

2.7. Information describing the biogenic carbon content at the factory gate

Biogenic carbon content*	Units**	Modules A1-A3 (results)
Biogenic carbon content in product	Kg C	7,18E-01
Biogenic carbon content in accompanying packaging	Kg C	1,01E-01

* 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2.

** This information can be omitted whenever the content of biogenic carbon in the product, or in the respective packaging, is less than 5% of the mass of the product, or the respective packaging.

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION[2]

3.1. A4 TRANSPORT TO THE BUILDING SITE – CONSTRUCTION PROCESS STAGE

Parameter	Units*/comments	Results expressed per functional or declared unit		
		Scenario A4.1	Scenario A4.1	Scenario A4.1
Scenario	Name and description of the scenario	Portugal	Europe	Internacional
Related scenario	Name of the scenarios linked to this scenario	-	-	-
Fuel type and consumption of vehicle or vehicle type used for transport, e.g. long-distance truck, boat, etc.	Litre of fuel type per distance, or vehicle type**	Road transport by truck (16-32 ton class EURO 6)	Road transport by truck (16-32 ton class EURO 6)	Boat
Distance	km	150	2000	6500
Capacity utilisation (including empty returns)	%(useful load)	Full load (100%) is assumed, and that the return is not empty	Full load (100%) is assumed, and that the return is not empty	Full load (100%) is assumed, and that the return is not empty
Bulk density of transported products	kg/m^3	189,9	189,9	189,9
Volume capacity utilization factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	< 1	< 1	< 1

* expressed per functional unit or per declared unit

** Directive 2007/37/EC (European Emission Standard)

[2] if there is no additional technical information and no scenarios have been carried out, entries should be filled in with "not applicable".

3.2. C1 DEMOLITION – END OF LIFE OF THE PRODUCT

Parameter	Units/comments	Results expressed per functional or declared unit (1m²)
		Scenario C1
Scenario	Name and description of the scenario	Demolition process
Related scenario	Name of the scenarios linked to this scenario	--
Material collected separately	kg	1,44
Material collected with mixed construction waste	kg	0
Additional assumptions	units as appropriate	Electricity required in the demolition process

3.3. C2 TRANSPORT – END OF LIFE OF THE PRODUCT

Parameter	Units/comments	Results expressed per functional or declared unit
		Scenario C2
Scenario	Name and description of the scenario	Transport by truck
Related scenario	Name of the scenarios linked to this scenario	--
Fuel type and consumption of vehicle or vehicle type used for transport, e.g. long-distance truck, boat, etc.	Litre of fuel type per distance, or vehicle type*	Transport by truck (16-32 ton, class EURO 6)
Distance	km	50
Capacity utilisation (including empty returns)	% (useful load)	< 100
Bulk density of transported products	kg/m^3	189.8
Volume capacity utilization factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	< 1
Additional assumptions	units as appropriate	--
*Commission Directive 2007/37/EC (European Emission Standard)		

3.4. C3 WASTE PROCESSING FOR REUSE, RECOVERY AND/OR RECYCLING – END OF LIFE OF THE PRODUCT

Parameter	Units/comments	Results expressed per functional or declared unit
		Scenario C3
Scenario	Name and description of the scenario	70% recycling (cork granules for later recovery in a subsequent life cycle)
Related scenario	Name of the scenarios linked to this scenario	--
Material for re-use	kg	0
Material for recycling	kg	1.44
Material for energy recovery	kg	0
Additional assumptions	units as appropriate	30% to landfill

3.5. C4 DISPOSAL – END OF LIFE OF THE PRODUCT

Parameter	Units/comments	Results expressed per functional or declared unit
		Scenario C4
Scenario	Name and description of the scenario	30% to landfill
Related scenario	Name of the scenarios linked to this scenario	--
Material for final deposition	kg	0,618
Additional assumptions	units as appropriate	--

3.6. SCENARIO AND TECHNICAL INFORMATION FOR MODULE D

Parameter	Units/comments	Results expressed per functional or declared unit
		Scenario D
Scenario	Name and description of the scenario	It was considered that 70% of Muratto product waste is used for recovery at the end of life (conservative value) after crushing and replacing virgin cork, according to statistical data on CDW (Construction and demolition waste) from APA (Portuguese Environment Agency).
Related scenario	Name of the scenarios linked to this scenario	--
Net output flow specified per material	units as appropriate	1,44
Avoid production	units as appropriate	1,44
Location of end-of-waste point	Not applicable	Yes
Point of functional equivalence	Not applicable	Not applicable
Assumptions	units as appropriate	--

3.7. ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES TO INDOOR AIR, SOIL, AND WATER DURING THE USE STAGE

Limit values established by French legislation and concentrations observed for the material after 28 days of exposure for a specific ventilation rate of 0.50 m3h-1m-2

Compound	CAS	Concentration (µg/m³)				
		Classes				MC69/17 28 days
		C	B	A	A+	
Formaldehyde +	50-00-0	>120	<120	<60	<10	<1.3*
Acetaldehyde +	75-07-0	>400	<400	<300	<200	<2.45*
Toluene	108-88-3	>600	<600	<450	<300	<0.4*
Tetrachloroethylene +	127-18-4	>500	<500	<350	<250	<1.8*
Xylene +	1330-20-7	>400	<400	<300	<200	<0.5*
1,2,4 - trimethylbenzene	95-63-6	>2000	<2000	<1500	<1000	<0.6*
1,4-dichlorobenzene+	106-46-7	>120	<120	<90	<60	<0.4*T
Ethylbenzene+	100-41-4	>1500	<1500	<1000	<750	<0.4*
2-butoxyethanol+	111-76-2	>2000	<2000	<1500	<1000	<1.0*
Styrene+	100-42-5	>500	<500	<350	<250	<0.3*
TVOC+	--	>2000	<2000	<1500	<1000	1203

Method IT.403.04 (based on ISO 16009) (IT - indicates internal laboratory procedure); ISO 16006; ISO 16003
(*) LOD – Limit of detection; (**) LOQ Limit of Quantification; (*T) Limit of detection calculated for toluene; (+) Out of the scope accreditation

Compound	CAS	Concentration (µg/m3)	
		Limit	MC69/17 28 days
Trichloroethylen+e	79-01-6	<1µg/m3	n.d.
Benzene	71-43-2	<1µg/m3	n.d*
Bis(2-ethylhexyl) phthalate+	117-81-7	<1µg/m3	n.d.**
Dibutyl phthalate (DBP)+	84-74-2	<1µg/m3	n.d.

Method IT.403.04 (based on ISO 16009) (IT - indicates internal laboratory procedure); ISO 16006; ISO 16003
n.d. not detected, which means lower than the limit of detection; *Limit of Detection for benzene= 0.39 µg/m³; **Although it has not been evaluated analytically, it is considered that this compound is not present in the emissions of the material under study, as stated by the manufacturer in the attached declaration; + Out of the scope accreditation

4. REFERENCES

- ✓ General Instructions of the DAPHabitat System, Version 2.1, Edition August 2023 (in www.daphabitat.pt);
- ✓ PCR – basic module for construction products and services. DAPHabitat System. Version 2.3, August 2023 (in www.daphabitat.pt);
- ✓ ISO 14025:2009 Environmental declarations and labels – Type III environmental declarations – Principles and procedures;
- ✓ EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products;
- ✓ EN 15942:2021 Sustainability of construction works – Environmental product declarations – Communication format business-to-business.