DAPHabitat System

www.daphabitat.pt

ENVIRONMENTAL PRODUCT DECLARATION

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

dap habitat

ECO PLATFORM **EPD** EN 15804 VERIFIED

DECLARATION NUMBER: DAP 002:2016

ECOPLATFORM DECLARATION NUMBER: 000464

EXPANDED INSULATION CORKBOARD (ICB)

ISSUE DATE: 2016-10-06

VALID UNTIL: 2021-10-05

AMORIM ISOLAMENTOS, S.A.

AMORIM ISOLAMENTOS

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
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@centrohabitat.net
Telephone number:	(+351) 234 401 576
Website:	www.daphabitat.pt
Logo:	

1.2. EPD OWNER

Name of the owner:	Amorim Isolamentos, S.A.
Production site:	Industrial Unit of Vendas Novas: Estrada de Lavre, km 6 – Apartado 7, 7080-026 Vendas Novas, Portugal Industrial Unit of Silves: Vale de Lama – Apartado 27, 8300-999 Silves, Portugal
Address (head office):	Industrial Unit of Vendas Novas: Estrada de Lavre, km 6 – Apartado 7, 7080-026 Vendas Novas, Portugal
Telephone:	Industrial Unit of Vendas Novas: +351 265 809 220 Industrial Unit of Silves: +351 282 440 720
E-mail:	geral.aisol@amorim.com
Website:	www.amorimisolamentos.com
Logo:	
Information concerning the applicable management Systems:	ISO 9001: Quality Management Systems (Silves industrial plant)
Specific aspects regarding the production:	CAE 16295 – Manufacture of other cork products

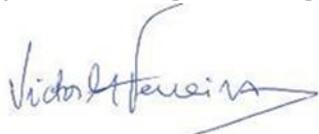| Organization's environmental policy:	In view of promoting the sustained growth and progress of its activities, Amorim Isolamentos commits to comply with the following principles:
	• Laboring in compliance with all significant regulations regarding the environment, as well as the application of best practices in environmental management, with a view to continuous improvement of its environmental performance.
	• Analyze the environmental implications of their activities to minimize gaseous emissions.
	• Manage effectively the waste from their activity.
	• Commitment to a better management of their activities on the environment, thus contributing to sustainable development.
	• Awareness of its employees regarding their individual and collective responsibilities in protecting the environment and improving the quality of life.
	• To promote the rational and efficient use of energy, water and other natural resources, through continuous improvement programs or using more economic technologies, if feasible.
	• Comply with legal, regulatory and others that the company subscribes, keeping in mind the company's business sense.
	• Provide and maintain a harmonious atmosphere with the neighborhood and the local community and collaborate with public or private entities in activities aimed at improving the environmental performance of the company.
	• Ensure the dissemination of this environmental policy to all employees and stakeholders.
	Through incorporating environmental legislation, Amorim Isolamentos shall periodically review its objectives and strategic principles.

1.3. Information concerning the EPD

Authors:	Amorim Isolamentos, S.A. S+A Green Lab
Contact of the authors:	1. Amorim Isolamentos, S.A. Industrial Unit of Vendas Novas: +351 265 809 220 Industrial Unit of Silves: +351 282 440 720 Carlos Manuel Silva: E. cmanuel.aisol@amorim.com 2. S+A Green Lab T. +351 213 939 340/9 Marta Matos: E. mmatos@greenlab.com.pt
Emission date:	2016-10-06
Registration date:	2016-11-30
Registration number:	DAP 002:2016
Valid until:	2021-10-05
Representativity of the EPD (location, manufacturer, group of manufacturers):	EPD of one (1) product produced in two (2) industrial units belonging to a single producer (Amorim Isolamentos).
Where to consult explanatory material:	www.amorimisolamentos.com
Type of EPD:	EPD from cradle-to-gate (A1-A3)

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

Operador de Programa de registo

(Plataforma para a Construção Sustentável)

1.6. PCR of reference

Name:	PCR: Basic module for construction products and services PCR: Thermal Insulation
Emission date:	Edition of September 2015 Edition of December 2014
Number of registration on the data base:	RCP-mb001 RCP004:2014
Version:	Version 2.0. Version 1.1.

Identification and contact of the coordinator (s):	PCR: basic module for construction products and services
	    Luis Arroja |arroja@ua.pt
	    Marisa Almeida | marisa@ctcv.pt
	    José Silvestre | jds@civil.ist.utl.pt
	
	PCR: Thermal Insulation
	    José Dinis Silvestre
	    Manuel Duarte Pinheiro

Identification and contact of the authors:	PCR: basic module for construction products and services
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	    Ana Cláudia Dias
	    Helena Gervásio
	    Victor Ferreira
	    Ricardo Mateus
	    António Baio Dias
	
	PCR: Thermal Insulation
	    José Dinis Silvestre
	    Manuel Duarte Pinheiro

Composition of the Sector Panel:	PCR: Thermal Insulation: • Amorim Isolamentos • Sofalca-Aglomerados de Cortiça, ACE • Argex-Argila Expandida, S.A. • IberFibran-Poliestireno Extrudido, S.A. • Termolan-Isolamentos termo-acústicos, S.A. • Eurofoam-Indústria de poliestireno extrudido, Lda • Knauf Insulation
Consultation period:	18/11/2015 - 18/01/2016 01/08/2013 - 30/11/2013
Valid until:	January of 2021 February of 2019

1.7. Information concerning the product/product class

Identification of the product:	Expanded Insulation Corkboard (ICB), with an average density of 115 kg/m³.
Illustration of the product:	
Brief description of the product:	The Insulation Cork Board (ICB) is a natural solution, consisting only of cork, with a high thermal, acoustic and anti-vibration performance, especially suitable for use in exterior walls, interior and double; slabs; flat and pitched roofs and underfloor heating.

Table 1: Composition of the product ICB:

Component	Percentage (mass)
Cork (suberin, lignin and cellulose)	100%

This EPD indicates the average of the values of two plants, Vendas Novas and Silves. The environmental impacts indicated in the EPD are proportional to the density of the material.

Main technical characteristics of the product

Table 2: Technical characteristics declared in DoP – generic ICB

Essential features (EN 13170:2012)	Performance	
Reaction to fire, Euroclass characteristics	Fire reaction	Euroclasse E
Thermal resistance	Thermal conductivity	0,040 W/m.K
	Thickness, dL	T1-T2 (dL > 50 mm)
Water Permeability	Water Absorption	WS
Permeability to water vapor	Water vapor transmission	MU20
Compressive strength	Compressive strength at 10% deformation	CS(10)100
Durability of the reaction to fire with heat, weather agents, aging / degradation	Durability characteristics	satisfy
Durability of thermal resistance to heat, weather agents, aging / degradation	Thermal resistance and thermal conductivity	satisfy
	Durability Characteristics	satisfy
Tensile strength / bending	Tensile strength Perpendicular to surface	TR50
Compressive strength durability with aging / degradation	Fluency by compression	CC(0,8/0,4/10)5

Table 3: Thermal conductivity for ICB with different densities

Density (kg/m³)	Thermal conductivity λ (W/m.ºC)
Up to 130	0,040
140-160	0,043
170-190	0,044
190 - 210	0,045

Description of the products application:	Thermal insulation and/or sound in the following applications: • Pitched roof with rigid insulation over slab • Flat tapered and Traditional flat roof • Green roof • Pitched roof with roof membrane or with corrugated roofing system • Masonry wall and Slab discontinuity • Metal-stud wall and slab discontinuity • Metal stud partition wall with insulation • Metal stud over masonry wall with insulation • Double wall with insulation fully filling the cavity • Internal partitions with insulation lined on both sides • Decoupling layer for window frames and core • Door core insulation • Heavy Machinery Vibration Control • HVAC Vibration Control • Pipe section • Expansion joists • Formwork insulation • Electric/Traditional underfloor heating • Flooring joists cavity filling • Unlinking screed filler to the wall • Floating slab with mosaic flooring • Floating slab with wood flooring • Ventilated façade • Double wall with insulation partially filling the cavity • Exterior cladding - cork at sight • ETICS/ EIFS
Reference service life:	Not specified
Placing on the market / Rules of application in the market / Technical rules of the product:	Standards EN13170 and EN13172
Quality control:	According with Technical Product Standards
Special delivery conditions:	Not applicable
Components and substances to declare:	Not applicable
History of the LCA studies:	--

2. ENVIRONMENTAL PERFORMANCE OF THE PRODUCT

2.1. Calculation rules of the LCA

Declared unit:	1 m³ of insulation cork board (ICB) with a density of 115 kg/m³ (including packaging).
Functional unit:	-
System boundaries:	EPD from cradle-to-gate
Criteria for the exclusion:	The following processes were not considered in this study, since they fall under the cut-off criteria: • Construction of industrial infrastructures and manufacture of equipment and machinery; • The burdens of infrastructures (vehicle manufacturing, road maintenance) associated to transportation of pre-products and raw materials; • Water consumption and wastewater in administrative areas and laboratories was also not considered, since these burdens are not directly associated to the production process (all products); • Raw material packaging was considered negligible and falling in the cut-off criteria, since the raw materials with a higher percentage (in weight) in the products analysed are bought in bulk. • Packaging of products used to treat the water in the boiler of Amorim Isolamentos was also not considered in the model, since the quantities of these products are negligible, making their packaging also insignificant in the overall impacts; • The dataset used to model the cork extraction includes consumption of electricity and diesel in equipment, however, there is no information showing that these consumptions include the energy used in the separation process of cork from wood, a process which the manufacturer does not have information; • The grinding stage results in cork powder, soil, stones and sand. The waste of soil, stones and sand produced are not accounted and do not result in additional impacts, since they go back to their origin and are inert materials; • Wastewater basic treatment and release to a water stream (Silves) was not considered, since it represented less than 0,3% of the total impacts; • Sanders used in the process is also negligible; • Also paper and cardboard in packaging stage were not considered, since the amount of paper used in labeling is irrelevant and the cardboard is only used to pack a small amount of products.
Assumption and limitations:	For the cases on which producers have no influence or specific information such as the extraction of raw materials and the production of electricity, generic data were used databases Ecoinvent v2.2 and v3. Environmental impacts indicated in this DAP are a simple average of the impacts of production of the ICB in the industrial units of Vendas Novas and Silves.
Quality and other characteristics about the information used in the LCA:	The collected production data are for 2014 and are in line with reality. The generic data used belong to Ecoinvent v3 databases and meet the quality criteria (age, geographical and technology coverage, plausibility, etc.) generic data.
Allocation rules:	In 2014, at the plant in Vendas Novas produced ICB (74.6% mass production), cork granules (24.2%) and coconut fibers (1.3%). In Silves unit it was produced only ICB (79.2%) and cork granules (20.8%). The production of ICB results in the production of two co-products, cork powder and granulated cork. The cork powder has a negligible market value in relation to the ICB and the cork granules, so that environmental burdens are allocated entirely to them. For inputs and outputs common to the ICB and granules, it was made an allocation of impacts, considering a percentage of annual output associated only with cork products. For the inputs and outputs common to all products, it was also carried out a weight allocation of impacts considering all manufactured products including coconut fibers, in Vendas Novas.
Comparability of EPD for construction products:	The EPD of construction products and services cannot be comparable in case they are not produced according to EN 15804 and EN 15942 and according to the comparability conditions determined by ISO 14025.

2.1.1. Flow diagram of input and output of the processes
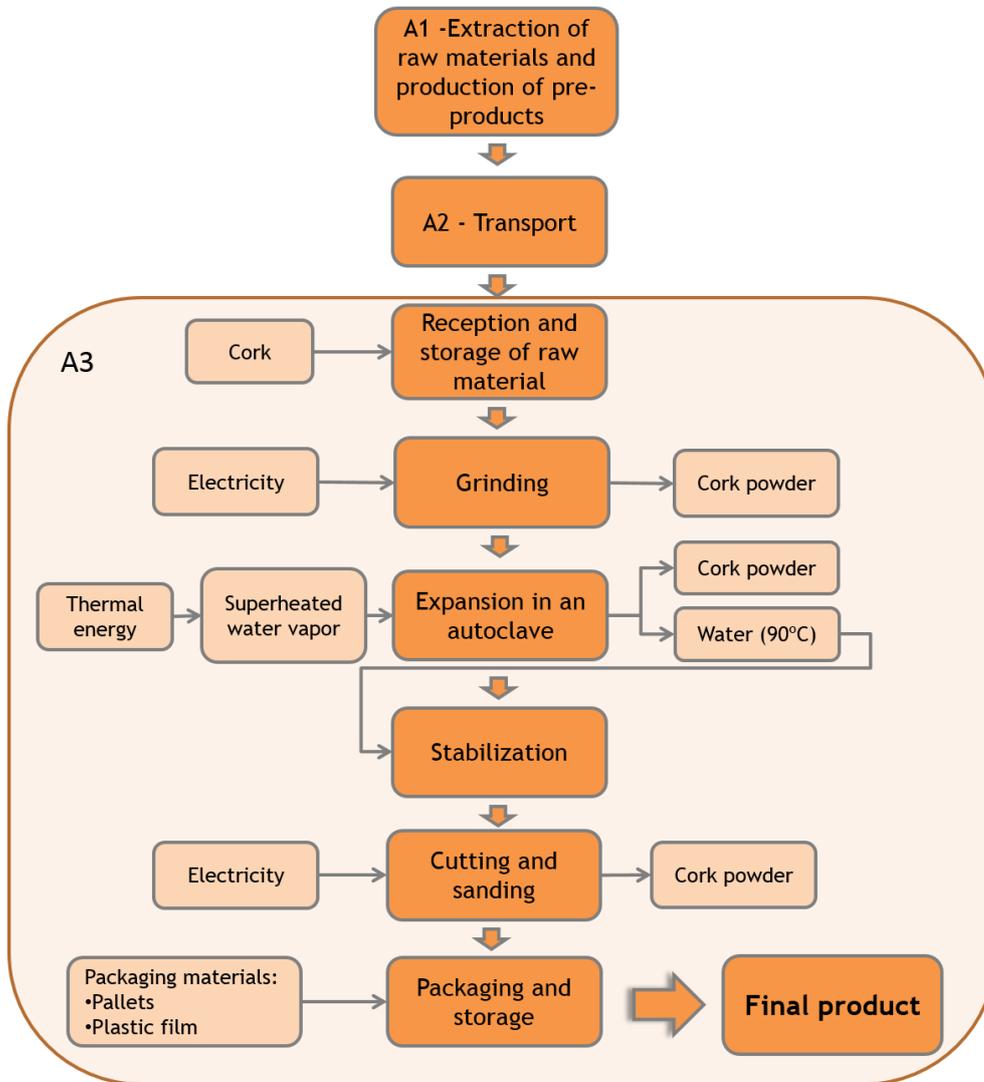
Figure 1: Product stage of the product ICB (A1-A3)

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
✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

Expanded insulation cork board (ICB) is a natural product since the cork granules are aggregated solely by the action of the natural resins contained in cork.

The first stage of the production process consists in extraction of cork from the cork oak. This operation can be performed manually or with electric equipment. After this procedure, cork is transported to the industrial unit by truck and is stored. In the factory the cork is ground into granules with the appropriate size and placed in an autoclave. Under the effect of pressure and superheated steam the granules expand and are agglomerated, originating blocks. This process occurs only with the natural resin (suberin) of the raw material, meaning that it does not require any extra use of any adhesives. Once formed, the blocks are forwarded to cooling stage, where recycled water is injected at a temperature of approximately 90°C. The stabilization phase, requiring any use of energy, occurs by placing the blocks in the tunnel and then in a ventilated space. After the stabilization period, the blocks are cut according to the desired thickness and then packed.

2.2. Parameters describing environmental impacts

	Product	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 Transport Manufacturing	A1-A3	1 m³ of ICB	-1,98E+02	6,81E-06	1,15E+00	3,67E-01	6,31E-02	7,24E-05	8,68E+02

LEGEND:

☐ Product stage

NOTES: P.C.I. – Low Heating Value (LHV).
Units expressed per declared unit (1m³).

2.3. Parameters describing resource use

	Product	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 m³
Raw material supply Transport Manufacturing	A1-A3	1 m³ of ICB	9,68E+02	5,82E+03	6,79E+03	9,31E+02	4,91E+01	9,80E+02	0,00E+00	0,00E+00	0,00E+00	1,72E+00

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.

NOTE: Units expressed per declared unit (1m³).

2.4. Other environmental information describing different waste categories

		Product	Hazardous waste disposed kg	Non hazardous waste disposed kg	Radioactive waste disposed kg
Raw material supply Transport Manufacturing	A1- A3	1 m³ of ICB	1,02E-03	1,04E+01	4,21E-03

LEGEND:

☐ Product stage

NOTE: Units expressed per declared unit (1m³).

2.5. Other environmental information describing output flows

Parameters	Units*	Results
Components for reuse	kg	**
Materials for recycling	kg	1,38E-01
Radioactive waste disposed	kg	4,21E-03
Materials for energy recovery	kg	**
Exported energy	MJ per energy carrier	**

* expressed by declared unit (1m³).

** Not applicable to processes in this factories

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

3.1. A4 Transport to the building site – Construction process stage

Parameters	Units*	Results
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Liter of fuel type per distance, or vehicle type, Commission Directive 2007/37/EC (European Emission Standard)	N/A
Distance	km	N/A
Capacity utilization (including empty returns)	%	N/A
Bulk density of transported products	kg/m³	N/A
Volume capacity utilization factor (factor=1 or < 1 or > 1 for compressed or nested packaged products)	Not applicable	N/A
* expressed per declared unit		

3.2. A5 Installation of the product in the building – Construction process stage

Parameters	Units*	Results
Ancillary materials for installation (specified by material)	kg or other units as appropriate	N/A
Water use	m³	N/A
Other resource use	kg	N/A
Quantitative description of energy type (regional mix) and consumption during the installation process	kWh ou MJ	N/A
Waste of materials on the building site before waste processing, generated by the product's installation (specified by type)	kg	N/A
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	kg	N/A
Direct emissions to ambient air, soil and water	kg	N/A
* expressed per declared unit		

3.3. B1 Use stage

(Relevant information about the use of the product) if applicable

3.4. B2 Maintenance

Maintenance process   (Description or source where description can be found)

Process	Units*	Results
Maintenance cycle	Number per RSL or year	N/A
Ancillary materials for maintenance e.g. cleaning agent, specify materials	kg/cycle	N/A
Waste material resulting from maintenance (specify materials)	kg	N/A
Net fresh water consumption during maintenance	m^3	N/A
Energy input during maintenance e.g. vacuum cleaning, energy carrier type, e.g. electricity, and amount, if applicable and relevant	kWh	N/A
[1]Description of other scenarios	Units as appropriate	N/A
* expressed per declared unit		

3.5. B3 Repair

Repair process   (Description or source where description can be found)

Inspection process   (Description or source where description can be found))

Process	Units*	Results
Repair cycle	Number per RSL or year	N/A
Ancillary materials, e.g. lubricant, specific materials	Kg or kg/ cycle	N/A
Waste material resulting from repair (specify materials)	kg	N/A
Net fresh water consumption during repair	m^3	N/A
Energy input during repair, e.g. crane activity, energy carrier type, e.g. electricity, and amount	kWh /RSL, kWh / cycle	N/A
[2]Description of other scenarios	units as appropriate	N/A
* expressed per declared unit		

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[1] In case there are no more described scenarios, this line should be eliminated in the final document.
[2] In case there is no more described scenarios, this line should be eliminated in the final document

3.6. B4 Replacement

Process	Units*	Results
Replacement cycle	Number per RSL or year	N/A
Energy input during replacement, e.g. crane activity, energy carrier type, e.g. electricity and amount if applicable and relevant	kWh	N/A
Exchange of worn parts during the product's life cycle, e.g. zinc galvanized steel sheet, specify materials	kg	N/A
[5] Description of other scenarios	units as appropriate	N/A
* expressed per declared unit		

3.7. B5 Refurbishment

Refurbishment process   (Description or source where description can be found)

Process	Units*	Results
Refurbishment cycle	Number per RSL or year	N/A
Energy input during refurbishment, energy carrier type e.g. electricity, and amount if applicable and relevant	kWh	N/A
Material input for refurbishment e.g. bricks, including ancillary materials for the refurbishment process e.g. lubricant	kg or kg/cycle	N/A
Waste material during from refurbishment	kg	N/A
[3] Further assumptions for scenario development e.g. frequency and time period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

3.8. B6 Use of energy

Parameters	Units*	Results
Ancillary materials specified by material	kg or units as appropriate	N/A
Net fresh water consumption	m^3	N/A
Type of energy carrier e.g. electricity, natural gas, district heating	kWh	N/A
Power output of equipment	kW	N/A
Characteristic performance e.g. energy efficiency, emissions, variation of performance with capacity utilization, etc	units as appropriate	N/A
[6] Further assumptions for scenario development e.g. frequency and period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

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[3] In case there are no more described scenarios, this line should be eliminated in the final document.

3.9. Use of water

Parameters	Units*	Results
Ancillary materials specified by material	kg or units as appropriate	N/A
Net fresh water consumption	m^3	N/A
Type of energy carrier e.g. electricity, natural gas, district	kWh	N/A
Power output of equipment	kW	N/A
Characteristic performance e.g. energy efficiency, emissions, variation of performance with capacity utilization, etc.	units as appropriate	N/A
[6] Further assumptions for scenario development e.g. frequency and period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

3.10. [C1 – C4] End of life of the product

Processes	Units*	Results
Collection process specified by type	kg collected separately	N/A
	kg collected with mixed construction waste	N/A
Recovery system specified by type	kg for reuse	N/A
	kg for recycling	N/A
	kg for energy recovery	N/A
Disposal specified by type	kg product or material for final deposition	N/A
[4] Assumptions for scenario development e.g. transportation	units as appropriate	N/A
Definition of scenario[7]	units as appropriate	N/A
* expressed per declared unit		

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[4] In case there is no more described scenarios, this line should be eliminated in the final document

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

Scenario title	Parameters	Units*	Results
Release scenario **Indoor air**	**Test results according to CEN/TC 351**		N/A
	Description scenario 1[7]	units as appropriate	N/A
	Description scenario n[7]	units as appropriate	N/A
Release scenario **Soil**	**Test results according to CEN/TC 351**		N/A
	Description scenario 1[7]	units as appropriate	N/A
	Description scenario n[7]	units as appropriate	N/A
Release scenario **Water**	**Test results according to CEN/TC 351**	(...)	N/A
	Description scenario 1[7]	units as appropriate	N/A
	Description scenario n[7]	units as appropriate	N/A
* expressed per declared unit			
Note: Emissions to indoor air and releases to soil and water according to the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised testing methods according to the provisions of the respective Technical Committees for European product standards, when available.			

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 2.0, September 2015 (in www.daphabitat.pt);

✓ **PCR – thermal insulation.** DAPHabitat System. Version 1.0., March 2013 (in Portuguese);

✓ **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.