DAPHabitat System

www.daphabitat.pt

ENVIRONMENTAL PRODUCT DECLARATION

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

Registration Number: DAP 006:2022

Mineral Wool Coated with White Reinforced Veil

ISSUE DATE: 30/09/2022 **VALID UNTIL: 29/09/2027**

VOLCALIS – ISOLAMENTOS MINERAIS, S.A.

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:	VOLCALIS – Isolamentos Minerais, S.A.
Production site:	Industrial Area of Bustos, Azurveira, 3770-011 Bustos - Portugal
Address (head office):	Industrial Area of Bustos, Azurveira, 3770-011 Bustos - Portugal
Telephone:	Industrial Area of Bustos: +351 234 751 533 Eng.º José Ávila e Sousa +351 236 210 160
E-mail:	geral@volcalis.pt
Website:	www.volcalis.pt
Logo:	
Information concerning the applicable management Systems:	Environmental Management System (EN ISO 14001:2015) – Certificate Nr.: A - 0944 valid until 18/07/2025, issued by EIC (Empresa internacional de Certificação, SA) Quality Management System (EN ISO 9001:2015) - Certificate Nr.: E - 6172 valid until 18/07/2025, by EIC
Specific aspects regarding the production:	SIC Code 23140: MANUFACTURE OF GLASS FIBRES
Organization's environmental policy:	Volcalis - Isolamentos Minerais S.A. intends to reconcile economic growth, the satisfaction of all interested parties and environmental concerns, committing itself to adopt a socially and ethically responsible management model. To ensure compliance with this objective, the organization has developed the following guidelines: 1. Satisfy customers' requirements in order to promote their satisfaction and exceed their expectations, respecting and promoting environmental protection and social responsibility; 2. Comply with professionalism and rigor the applicable legislation and regulations on Quality and Environment, as well as other signed compliance obligations; 3. Promote the continuous improvement of the Integrated Management System, reviewing the established objectives, the adequacy to the context of the organization, addressing the risks and opportunities inherent to its activity, optimizing the production process and periodically evaluating its significant environmental aspects and impacts;

4. Provide all workers with a work environment that promotes equal opportunities, under principles of mutual respect, and that promotes excellence in performance and recognition of the commitment that employees place in a daily basis;

5. Apply good environmental management practices, with special attention to waste management, focusing on reduction, reuse and recycling, and the preservation of natural resources;

6. Establish itself in the market, through the high quality and innovation of its products, technical support and compliance with established deadlines;

7. Promote and communicate this Policy with interested parties, in order to comply with the Quality and Environment requirements of Volcalis - Isolamentos Minerais, S.A.

The Administration of Volcalis - Isolamentos Minerais, S.A., undertakes the commitment to periodically review this Integrated Management System Policy, to ensure its effectiveness, being this documented, implemented, maintained and communicated as appropriate.

1.3. Information concerning the EPD

Authors:	CERIS - Civil Engineering Research and Innovation for Sustainability, Vera Durão and José Dinis Silvestre
Contact of the authors:	Av. Rovisco Pais | 1049-001 Lisboa Phone contact: +351 218 419 709; E-mail: jose.silvestre @tecnico.ulisboa.pt
Emission date:	30/09/2022
Registration date:	14/10/2022
Registration number:	DAP 006:2022
Valid until:	29/09/2027
Representativity of the EPD (location, manufacturer, group of manufacturers):	This is the cradle-to-gate EPD of one (1) product produced in one (1) industrial unit belonging to a single producer (Volcalis - Isolamentos Minerais, S.A).
Where to consult explanatory material:	www.volcalis.pt
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)	(Ricardo Mateus)

1.5. EPD Registration

Program Operator

(Plataforma para a Construção Sustentável)

1.6. PCR of reference

Name:	1. PCR: Basic module for construction products and services 2. PCR: Thermal Insulation
Emission date:	1. September 2015 2. December 2014
Number of registration on the data base:	1. RCP-mb001 2. RCP004:2014
Version:	1. Version 2.1 2. Version 1.2
Identification and contact of the coordinator (s):	1. PCR: basic module for construction products and services • Marisa Almeida | marisa@ctcv.pt • Luís Arroja | arroja@ua.pt • José Silvestre | jds@civil.ist.utl.pt 2. PCR: Thermal Insulation • José Dinis Silvestre |jose.silvestre@ist.utl.pt • Manuel Duarte Pinheiro |manuel.pinheiro@ ist.utl.pt
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Composition of the Sector Panel:	2. PCR: Thermal Insulation • 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:	1. 18/11/2015 - 18/01/2016 2. 01/08/2013 - 30/11/2013
Valid until:	1. December of 2022 2. December of 2022

1.7. Information concerning the product/product class

Identification of the product:	Mineral wool (MW), coated with white reinforced veil, density 14.5 kg/m^3(Volcalis Easy), thickness 60 mm
Illustration of the product:	
Brief description of the product:	Volcalis MW is a last generation sand and binder insulation product, coated with White reinforced veil, available in rolls. Its good thermal performance contributes to the comfort and thermal and acoustic efficiency of buildings and reduces energy consumption. This MW is a natural, ecological, long-lasting, and inert product that does not degrade or rot; and is lightweight. Its main benefits are: • Due to its internal structure, it is an excellent acoustic insulation; • Fire resistant, not combustible or conductive to heat; • Results from a sustainable process that uses raw materials and advanced technologies of high efficiency; • It's a 100% recyclable product. For the purpose of this EPD, the results indicated refer to 1 m^2 of product from the range with the lower density, (Volcalis Easy) with 60 mm thickness. Because the production process is the same for all products, it is possible to have the LCA results for the products from different product ranges (and densities) and with distinct thicknesses using a conversion factor, as indicated in the table below.

Table 1: Factor to apply to LCA results for different product ranges and thicknesses (in relation to the values presented for MW coated with reinforced white veil in this EPD)

Range of product	Thickness (mm)	Conversion factor for m^2
Easy	**60**	**1.00**
	80	1.14
	100	1.40
	180	2.44

Main technical characteristics of the product:

The main technical characteristics of the product are presented in Table 2.

Table 2: Summary of the product's technical characteristics (Easy range of products)
(Source: https://www.volcalis.pt/categoria_file/dop_71_40rfws_rev03-726.pdf)

Essential characteristics (EN 13162:2012)		Test Procedures	Declared value	Units
Thermal resistance	Thickness – Thermal resistance	EN 12667 or EN 12939	60 mm - 1.50 80 mm - 2.00 100 mm - 2.50 180 mm - 4.00	m^2.K/ W
	Thermal conductivity	-	0.040	W/m.K
	Thickness	EN 823	T1	mm
Reaction to fire	Reaction to fire	EN 13501-1 and EN 15715	A1	Euroclass
Durability of reaction to fire against heat, weathering, ageing/degradation	Durability characteristics	-	NPD	
Durability of thermal resistance against heat, weathering, ageing/degradation	Thermal conductivity and resistance	-	NPD	-
	Durability characteristics (for dimensional stability, thickness only)	-		
Compressive strength	Compressive stress/ Compressive strength	EN 826	NPD	kPa
	Point load	EN 12430	NPD	kPa
Tensile/flexural strength	Tensile strength perpendicular to faces (also in handling and installation)	EN 1607	NPD	kPa
Durability of compressive strength against ageing/degradation	Compressive creep	EN 1606	NPD	kPa
Water permeability	Short-term water absorption	EN 1609	WS	kg/m^2
	Long-term water absorption	EN 12087	NPD	kg/m^2
Water vapour permeability	Water vapour transmissions	EN 12086	NDP	(factor)
Impact noise transmissions index (for flours)	Dynamic stiffness	EN 29052-1	NPD	MN/m^3
	Thickness, Dl	EN 12431	NPD	mm
	Compressibility	-	NPD	mm
	Air flow resistivity	EN 29053	NPD	$kPa.S/m^2$
Acoustic absorption index	Sound absorption	EN ISO 354; EN ISO 11654	NPD	
Direct airborne sound insulation index	Air flow resistivity	-	NDP	-
Release of dangerous substances to the indoor environment	Release of dangerous substances	-	NPD	

NPD – Performance not determined

Description of the products' application:

Volcalis' MW coated with white reinforced veil can be used in metal facades.

Reference service life:

Not specified

Placing on the market /

- Decision No. 768/2008 / EC of the European Parliament and of the Council of 9 July 2008
- Regulation (EC) No 764/2008 of the European Parliament and of the Council of 9 July 2008

Rules of application in the market / Technical rules of the product:	• Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 • Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 and its amendments. • Technical Product Standards: – EN 13162: 2012 + A1 2015 - Thermal insulation products for buildings - factory made mineral wool products – specification.
Quality control:	Quality control is assured according with the technical standards of the product.
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:	One square meter (1 m^2) of MW coated with white reinforced veil, with the thickness 60 mm and bulk density of 14.5 kg/m^3, packed, at the out gate of the production site
Functional unit:	-
System boundaries:	EPD from cradle-to-gate
Criteria for the exclusion:	The following processes were not considered in this study, since they meet the cut-off criteria of 1% use of renewable and non-renewable primary energy and 1% of the total input mass of the unit process where they occur, with a maximum of 5% energy and mass use in the considered stages (A1-A3): • Construction of industrial infrastructures, manufacture and exchange of equipment and machinery; • Impacts of infrastructure (vehicle manufacturing, road maintenance) associated with the transport of pre-products and raw materials; • The consumption of energy, water or waste and effluents produced in administrative areas and laboratories was also not considered, since they are not directly associated with the production process; • Transport of small consumables to the industrial unit; • Other negligible flows, considering their contribution below the cut-off criteria.
Assumption and limitations:	This EPD represents one (1) product that is produced in one (1) manufacturing unit and may have different densities (product ranges) and thicknesses.
Quality and other characteristics about the information used in the LCA:	Production data was collected for the year of 2020, from internal and official records and is according to with the reality. Generic data used belongs to Ecoinvent v3.5, ELCD, USLCI and Simapro industrial database (Industry data 2.0), and meets the quality criteria (age, geographical and technology coverage, plausibility, etc.) for generic data.
Allocation rules:	The manufacturing plant where the mineral wool coated with white reinforced veil is produced, also produces uncoated mineral wool and mineral wool with three other alternative coatings. Concerning the allocation between these co-products, for all materials and energy that are used in all of them, the principle of mass allocation was applied. For materials that are only used in one of the coating alternatives (or two, in the case of White reinforced veil), the material was allocated only to that product.
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

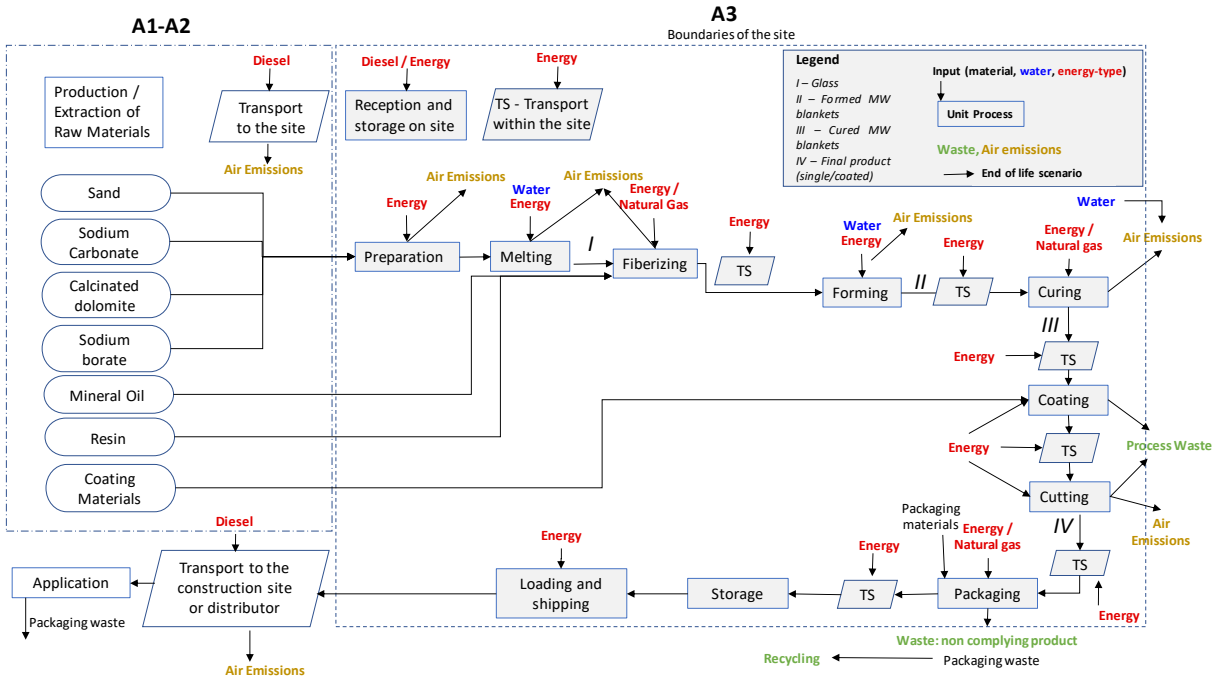

Figure 1. Life cycle stages Volcalis' mineral wool production process

The following paragraphs describe the life cycle stages studied for the development of this EPD.

After raw and ancillary materials arrive at the industrial site, they are stored on site in bulk (sand) and in silos. Raw o the materials are weighed and mixed in the mixer. This mixture is fed to the melting furnace. The molten glass is drained and goes through a feeding channel that ensures temperature control before fiberizing. The glass flows through the exit holes in the feed channel, through heated platinum rings. After leaving the platinum ring, the glass goes through the fiberizer, which, due to centrifugal force, allows the extraction of the fibres, through its holes.

The fibres are sprayed with organic additives, which promote their aggregation. Subsequently, they are confined and sent to perforated drums forming a fibre blanket (forming process). After the blanket is formed, it is sent to the curing oven. In the curing oven, the polymerization (curing) of organic additives takes place and the thickness of the product is calibrated.

Leaving the curing oven, the cured glass wool blanket goes to a cooling zone. Following this, the blanket is trimmed on its sideboards to give it an even width. Downstream, the product is cut by saws and by a guillotine cutter, to the desired width and length, according to the requests for panels or roll.

The final stage of the MW production corresponds to the packaging stage. The product to be sold in rolls goes to a winder, is compressed and then wrapped in polyethylene film. The product to be sold in panel is stacked through the stacker, which after compression is wrapped in polyethylene film.

After this primary packaging, the packages go to a multipack system where sets of roll packages and sets of panel packages are created. They are compressed by a compactor, palletized and finally plasticized in the encapsulator. The pallets are stored in the finished product warehouse and are subsequently dispatched.

Transport to the construction site or the distributor is outside of the boundaries of this EPD.

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
✓	✓	✓	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖

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**	5.03E-01	8.52E-06	2.94E-03	1.15E-03	1.17E-04	2.92E-06	6.09E+00
Transport	**A2**	2.03E-02	4.10E-11	9.10E-05	2.08E-05	6.46E-06	8.07E-10	2.84E-01
Manufacturing	**A3**	9.10E-01	5.83E-08	4.53E-03	3.02E-04	2.20E-04	3.01E-07	1.33E+01
Total	**Total**	1.43E+00	8.57E-06	7.56E-03	1.47E-03	3.43E-04	3.22E-06	1.97E+01

LEGEND:

Product stage

NOTES: P.C.I. – Low Heating Value (LHV).

Units expressed per declared unit (1 m^2).

2.3. Parameters describing resource use

		Primary energy						Secondary materials and fuels, and use of water			
		EPR MJ, L.H.V.	RR MJ, L.H.V.	TRR MJ, L.H.V.	EPNR MJ, L.H.V.	RNR MJ, L.H.V.	TRNR MJ, L.H.V.	MS kg	CSR MJ, P.C.I.	CSNR MJ, P.C.I.	Net use of fresh water m^3
Raw material supply	**A1**	2.61E+00	0.00E+00	2.61E+00	7.00E+00	0.00E+00	7.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E-05
Transport	**A2**	3.24E-04	0.00E+00	3.24E-04	2.86E-01	0.00E+00	2.86E-01	0.00E+00	0.00E+00	0.00E+00	-2.91E-06
Manufacturing	**A3**	4.78E+00	8.02E-01	5.59E+00	1.28E+01	9.14E-01	1.37E+01	0.00E+00	0.00E+00	0.00E+00	6.88E-05
Total	**Total**	7.39E+00	8.02E-01	8.19E+00	2.01E+01	9.14E-01	2.10E+01	0.00E+00	0.00E+00	0.00E+00	1.30E-04

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;

Net use of fresh water = use of freshwater resources

* Not applicable to processes in this factory

NOTE: Units expressed per declared unit (1 m^2).

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**	**9.18E-06**	**1.00E-01**	**2.25E-05**
Transport	**A2**	**0.00E+00**	**2.51E-08**	**0.00E+00**
Manufacturing	**A3**	**8.38E-04**	**3.14E-02**	**1.97E-05**
Total	**Total**	**8.47E-04**	**1.32E-01**	**4.22E-05**

LEGEND:

Product stage

NOTE: Units expressed per declared unit (1 m^2).

2.5. Other environmental information describing output flows

Parameters	Units*	Results
Components for re-use	kg/m^3 Prod	0.00E+00
Materials for recycling	kg/m^3 Prod	5.66E-03
Radioactive waste disposed	kg/m^3 Prod	0.00E+00
Materials for energy recovery	kg/m^3 Prod	0.00E+00
Exported energy	MJ by energy carrier	0.00E+00

* expressed by declared unit (1 m^2)

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

This EPD evaluates only the production stage of the product, integrating stages A1 to A3. Thus, the following scenarios of the construction stage (modules A4 and A5), stage of use (B1 to B7) and end of life stage (C1 to C4), are not applicable.

3.1. Additional environmental information about the release of dangerous substances

There are no known toxic effects of this product. Due to its properties, no danger to the environment is expected.

3.2. Certifications

VOLCALIS, S.A. has implemented their Environmental Management System (EN ISO 14001:2015), certified by EIC (Empresa internacional de Certificação, SA), with the Certificate Nr.: A - 0698 valid until 18/07/2022. They have also implemented and certified their Quality Management System (EN ISO 9001:2015) with the Certificate Nr.: E - 5088 valid until 18/07/2022, by EIC.

The product was awarded the Sustainability Label by the Sustainable Construction Portal, for complying with 9 of its 10 sustainability principles.

3.3. End-of-life management

The product shall be treated as a construction waste in accordance with national regulations. It shall be referred to using the European Waste Code (EWC): 17 06 04 - insulation materials other than those mentioned in 17 06 01 and 17 06 03 (meaning, containing no asbestos or hazardous substances). Packaging not contaminated with other materials shall be recycled.

REFERENCES

- ✓ CEN/TR 15941:2014 - Sustainability of construction works. Environmental product declarations. Methodology for selection and use of generic data.
- ✓ DAPHabitat. General Program Instructions of DAPHabitat, V. 1.0, 2013.
- ✓ DAP Habitat. PCR - Basic model products and construction services according to EN 15804: 2012 + A1: 2013, V. 2.1, 2015.
- ✓ DAP Habitat. PCR - Thermal insulation - V. 1.2; 2014.
- ✓ EN 15804:2012+A1:2013 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- ✓ EN ISO 14020:2005 - Environmental labels and declarations - General principles (EN ISO 14020:2005).
- ✓ EN ISO 14021:2016 - Environmental labels and declarations - Self declarations (Type II environmental declarations).
- ✓ EN ISO 14024:2018 - Environmental labels and declarations - Type I environmental declarations - Principles and procedures.
- ✓ EN ISO 14050:2010 - Environmental management – Vocabulary.
- ✓ ISO 14025:2009 - Environmental labels and declarations - Type III environmental declarations – Principles and procedures.
- ✓ ISO 14040:2008 - Environmental management - Life cycle assessment - Principles and framework.
- ✓ EN ISO 14044:2006/A1:2018 - Environmental management - Life cycle assessment - Requirements and guidelines.
- ✓ ISO 21930:2017 - Sustainability in building construction - Environmental declaration of building products.
- ✓ Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The Ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230.