DAPHabitat System

Environmental Product Declaration

www.daphabitat.pt

[according to ISO 14025, EN 15804:2012+A2:2019 e EN 15942]

Declaration number: DAP 011:2025

STONE WOOL

Issue date: 03/09/2025

Valid until: 02/09/2025

TERMOLAN – ISOLAMENTOS TERMO-ACÚSTICOS, S.A.

Version 1.5 Edition June 2024

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1. GENERAL INFORMATION

1.1. The DAPHabitat System

Programme operator:	Associação Plataforma para a Construção Sustentável www.clusterhabitat.pt geral@clusterhabitat.pt
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:	

1.2. EPD owner

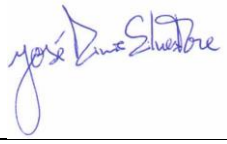
Name of the owner:	TERMOLAN - Isolamentos Termo-Acústicos, S.A.
Production site:	Unit 1: Rua Padre Joaquim Carlos Lemos (Lugar da Barca) | 4795-094 Vila das Aves – Portugal Unit 2: Rua dos 5 Caminhos (Zona Industrial de Argemil) | 4780-382 Santo Tirso - Portugal
Address (head office):	Avenida de Poldrães, nº 10 | 4795-006 Vila das Aves – Portugal
Telephone number:	Headquarters: +351 252 820 080
Email address:	termolan@termolan.pt
Website:	www.termolan.pt
Logo:	
Information concerning the applicable management Systems:	ISO 9001 – Quality Management Systems, granted by AENOR, No. ER-0304/2021 and valid until 13/05/2026. ISO 14001 – Environmental Management Systems, granted by AENOR, No. GA-2021/0134 and valid until 25/03/2027.
Specific aspects regarding production:	CAERev.3 n. º 23992 – Production of various other non-metallic mineral products, n.e.

Organization's environmental policy:	Aware that the market for the thermal and acoustic insulation industry is increasingly competitive regarding customer requirements and expectations, as well as environmental requirements, we have decided to guide our performance based on a set of principles and guidelines: We believe that Quality is achieved when we have satisfied customers and faithful to the products manufactured by TERMOLAN. We consider that we have achieved the excellence of Environmental Performance and Pollution Prevention, in the scope of the adoption of the Best Available Techniques for the Sector (BAT), aligned with the Environmental Licensing, and compliance with all applicable legal and regulatory requirements and subscribed by TERMOLAN. We assume that Quality is only perceived by all, when we strictly comply with the requirements of our customers, statutory and regulatory. We disseminate Quality and Environment, committing all employees, suppliers and other stakeholders to our organization. We recognize that Quality and Environment can be continually improved when we effectively seek the causes of problems/potential problems and act accordingly on them. We obtain the valorisation of Quality and Environment, when we reduce costs due to waste. Assuming the Quality and Environment as a management tool, the General Board is committed to the challenge of maintaining, and continuously improve, a system of Quality and Environment in accordance with the requirements under the NP EN ISO 9001 and NP EN ISO 14001.

1.3. Information concerning the EPD

Authors:	1. Centro Tecnológico da Cerâmica e do Vidro 2. TERMOLAN – Isolamentos Termo-Acústicos, S.A.
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. TERMOLAN – Isolamentos Termo-Acústicos, S.A. | Avenida de Poldrães, nº10 | 4795-006 Vila das Aves – Portugal (T) +351 252 820 080 António Gonçalves: antoniogoncalves@termolan.pt
Issue date:	03/09/2025
Registration date:	18/09/2025
Registration number:	DAP 011:2025
Valid until:	02/09/2030
Representativity of the EPD (location, manufacturer, group of manufacturers):	DAP of one (1) product class, produced in two (2) industrial units belonging to one (1) sole producer (TERMOLAN - Isolamentos Termo-Acústicos, S.A.).
Type of EPD	EPD from cradle to grave and module D

1.4. Verification demonstration

External independent verification, accordingly, with the standard ISO 14025:2010 and EN 15804:2012+A2:2019	
Certification Body	Verifier
	
(CERTIF – Associação para a Certificação)	José Dinis Silvestre

1.5. EPD registration

Programme operator

(Plataforma para a Construção Sustentável)

1.6. PCR (Product Category Rules) basic model

Name:	RCP de modelo base para produtos e serviços de construção
Issue date:	Edição Junho 2024
Number of registrations on the database:	RCP-mb001
Version:	Versão 3.0
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. C-PCR (Complementary Product Category Rules)

Name:	1. PCR - Thermal Insulation 2. EN 16783:2024 - Thermal insulation products - Environmental Product Declarations (EPD) - Product Category Rules (PCR) complementary to EN 15804 for factory made and in-situ formed products
Issue date:	1. 10/02/2014 2. 03/04/2024
Number of registrations on the database:	1. RCP004:2014 2. --
Version:	1. Version 1.3 2. Version 2.00
Identification and contact of the coordinator(s):	1. José Silvestre | jose.silvestre@tecnico.ulisboa.pt Manuel Duarte Pinheiro | manuel.pinheiro@civil.ist.utl.pt 2. --
Identification and contact of the authors:	1. José Silvestre | jose.silvestre@tecnico.ulisboa.pt Manuel Duarte Pinheiro | manuel.pinheiro@civil.ist.utl.pt 2. --
Composition of the Sectorial Panel:	1. 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 2. --
Consultation period:	1. 01/08/2013 to 30/11/2013 2. 03/04/2024 to 11/09/2024
Valid until:	1. 01/06/2027 2. --

1.8. Information concerning the product/product class

Identification of the product:	Stone wool panels or blankets for thermal insulation, acoustic and fire protection (density of 30 kg/m^3 and thermal conductivity of 0.037 W/m.K)

Illustration of the product:

Brief description of the product:

Stone wool is produced from a volcanic rock (in this case basalt), being a product of construction, used for thermal and acoustic insulation, that can be available with different densities and thermal conductivities, and it can be used in various constructive solutions (residential buildings, air conditioning and heating), industry, shipbuilding and metalworking.

Tabela 1: Stone wool product composition.

Component	Percentage (mass)
Basalt	50-60
Briquette	40-50

Main technical characteristics of the product:

Table 2: Technical characteristics declared – generic Stone wool (30 kg/m^2)

Essential characteristics	Value	Standard
Reaction to fire, Euroclass	A1	EN 13501-1 ISO 1182
Thermal resistance, RD (m^2.K/ W)	Thickness (mm) / RD (m^2.K/W): 30 / 0.75 37 / 1.00 40 / 1.05 50 / 1.30 60 / 1.55 80 / 2.10 100 / 2.60	EN 12667 EN 12939
Thermal conductivity - λD (W/m.K)	0.037	EN 12667 EN 12939
Short-term water absorption	WS ≤ 1.00 kg/m^2	NP EN 1609
Water vapor diffusion factor	μ=1	EN 12086
Sound absorption coefficient - αw	αw = 0.85	EN ISO 11654

(see link of the technical datasheets with all data http://termolan.pt/en/products/technical-files/)

Description of the product's application/use:

Thermal and/or acoustic insulation in the following applications:

- Pitched roof with insulation on the roof slab
- Flat roof with sloped insulation
- Traditional flat roof
- Green flat roof
- Pitched roof with interior insulation between rafters
- Traditional pitched roof with steam barrier
- Pitched roof with subtile

	• Disconnection of interior walls • Disconnection of single partitions • Simple partition with insulation • Partition composed with insulation • Double wall with insulation completely filling the cavity • Partition wall with bifacial insulation • Decoupling and filling of the windows core • Filling the core of doors • Elimination of vibrations of heavy machinery • Elimination of HVAC vibrations • Pipes covers • Expansion joints • Stay-in-place formwork system • Electric radiant floor • Traditional radiant floor • Floor box fill • Disconnection of screed mortar to the wall • Floating plate with ceramic cladding • Floating plate with wood cladding • Interior insulation of exterior walls • Ventilated rainscreen facade • Double wall with insulation partially filling the cavity • Exterior uncoated cladding • ETICS – External Thermal Insulation Composite Systems
Placing on the market / Rules of application in the market / Technical rules of the product:	EN 13162:2012+A1:2015 - Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification EN 14303:2015 - Thermal insulation products for building equipment and industrial installations - Factory made mineral wool (MW) products - Specification
Quality control	Certified under the Quality Management System standard NP EN ISO 9001:2015, ensuring compliance with quality control in production across its industrial units. Tests carried out in accordance with the product's technical standards.
Special delivery conditions:	Panels packed in plastic-wrapped bundles, available in various dimensions. Bundles wrapped in shrink plastic.
Components and substances to declare:	The product does not contain substances included in the 'Candidate List of Substances of Very High Concern (SVHCs) for authorisation' in concentrations exceeding the registration thresholds set by the European Chemicals Agency (ECHA), i.e., greater than 0.1% by weight (w/w).
Where explanatory material may be obtained:	The information is available at the following link: https://termolan.pt/produtos/
History of the LCA studies:	Registration number: DAP 001:2019 ECO EPD registration number: 00000909

1.9. Calculation rules of the LCA

Functional unit:	1 m^2 of stone wool panels or blankets (with a thickness of 0.037 m) (including packaging), with a thermal resistance of 1 (m^2.◦C)/W for a reference lifespan of 50 years.
System boundaries:	EPD from cradle to grave and module D.
Criteria for the exclusion:	According to paragraph 6.3.5 of EN 15804, the exclusion criterion for unitary processes is 1% of the total energy consumed and 1% of the total mass of the inputs, paying particular attention not to exceed a total of 5% of energy and mass flows excluded in the product step. The following cases were not considered in this study: • Environmental loads associated with the construction of industrial infrastructures and the manufacture of machinery and equipment; • Environmental loads relating to infrastructure (vehicle and road production and maintenance) for the transport of pre-products; • Long-term emissions; • Adhesive for packaging plastic used at the Vila das Aves Unit.
Assumption and limitations:	For processes over which producers have no influence or specific information, such as the extraction of raw materials, generic data from the Ecoinvent v3.9.1 databases were used. The dataset used to model the production of electricity and natural gas was adapted to the national reality. The electric mix was updated for the year 2023 through information from the National Energy Networks (REN), the Energy Services Regulatory Authority (ERSE) and the General Board of Energy and Geology (DGEG) in order to obtain more current results regarding the environmental impacts generated by the electricity grid in Portugal. The natural gas process was modelled according to the information provided by the DGEG Energy Report in Portugal, regarding the countries where the importation comes from. The environmental impacts indicated in this EPD are a weighted average between the impacts of the production of stone wool in the industrial units of Vila das Aves and Santo Tirso, using the production values of each of the installations for the year 2023.
Quality and other characteristics about the information used in the LCA:	The production data collected correspond to the year 2023 and are in line with reality. The generic data used belong to the Ecoinvent v3.9.1 databases and meet the quality criteria (age, geographical and technological coverage, plausibility, etc.) of generic data. According to the criteria defined in Table E.1 of Annex E of the EN 15804+A2+AC standard, established by the "UN Environment Global Guidance on LCA Database Development," the quality of all relevant data is considered mostly "good," on a qualitative scale of five levels, ranging from very poor to very good. The quality of the data in module D is also good (dominant) to very good. The information based on the LCA, as well as the additional information declared in this report, is in accordance with the requirements of the applicable European and Portuguese Standards.
Allocation rules:	The production of stone wool occurs in a similar way, so the results obtained are valid for all the final forms (panel, blanket and wool in bulk), considering a mass allocation.
Software used for the assessment:	SimaPro, version 9.5
Background database used for the LCA:	Ecoinvent database version 3.9.1, published in March 2023; "cut-off" approach.
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 15948 and according to the comparability conditions determined by ISO 14025.

For other TERMOLAN stone wool products, environmental impacts can be determined by multiplying the results of this study with scale factors. These scale factors allow to estimate the proportion of environmental impacts generated by the manufacture of products with different thicknesses, densities and thermal conductibility.

Table 3: Scaling factors for other stone wool products of TERMOLAN.

Internal Reference	Density [kg/m^2]	Thickness [m]	Thermal conductibility [*W/m. ˚C*]	Scaling Factor
(PN-PK-PA)/30-(MA-MK-MN-VF-Venticlad)/230	1.1	0.037	0.037	1
(PN-PK-PA)/40-(MA-MK-MN)/40, T40VF, WA40 , Isole+ , PI40 e AC40/60	1.4	0.035	0.035	1.3
(PN)/55-(MA-MK-MN)/50, T55VFe PI55	1.7	0.034	0.034	1.6
PN 70,PN70F, T70VF,WA70,R70,(MK-MA-MN/70),GC,PI70 e Chaminé	2.3	0.033	0.033	2.1
LF90-GC90-PI90	3.0	0.033	0.033	2.7
PN 100,PI100 e r100	3.3	0.033	0.033	3
LF 110	3.6	0.033	0.033	3.3
recoat+, LF110+, Cob Power +	3.89	0.035	0.035	3.6
PI120 e r120	4.6	0.038	0.038	4.2
recoat, PI145	5.5	0.038	0.038	5
Cob Power	4.67	0.036	0.036	4.3
CobN50-,B50, PI 150	5.7	0.038	0.038	5.2
CobN50F- B50F-C-CS	5.56	0.038	0.038	5.1
cobn75, PI 180	6.7	0.038	0.038	6.1

1.10. Use of the average environmental performance

This EPD presents the average environmental performance of the entire range of products manufactured by Termolan, using the same raw material recipe. The variability in environmental performance between specific products is related to thickness, and the scaling factor to be applied is the one provided in the table of the previous item.

1.11. Technical information for Reference Service Life (RSL)

It depends on the service life of a building and its components, therefore, the default value of 50 years will be considered.

1.12. Flow diagram of input and output of the process

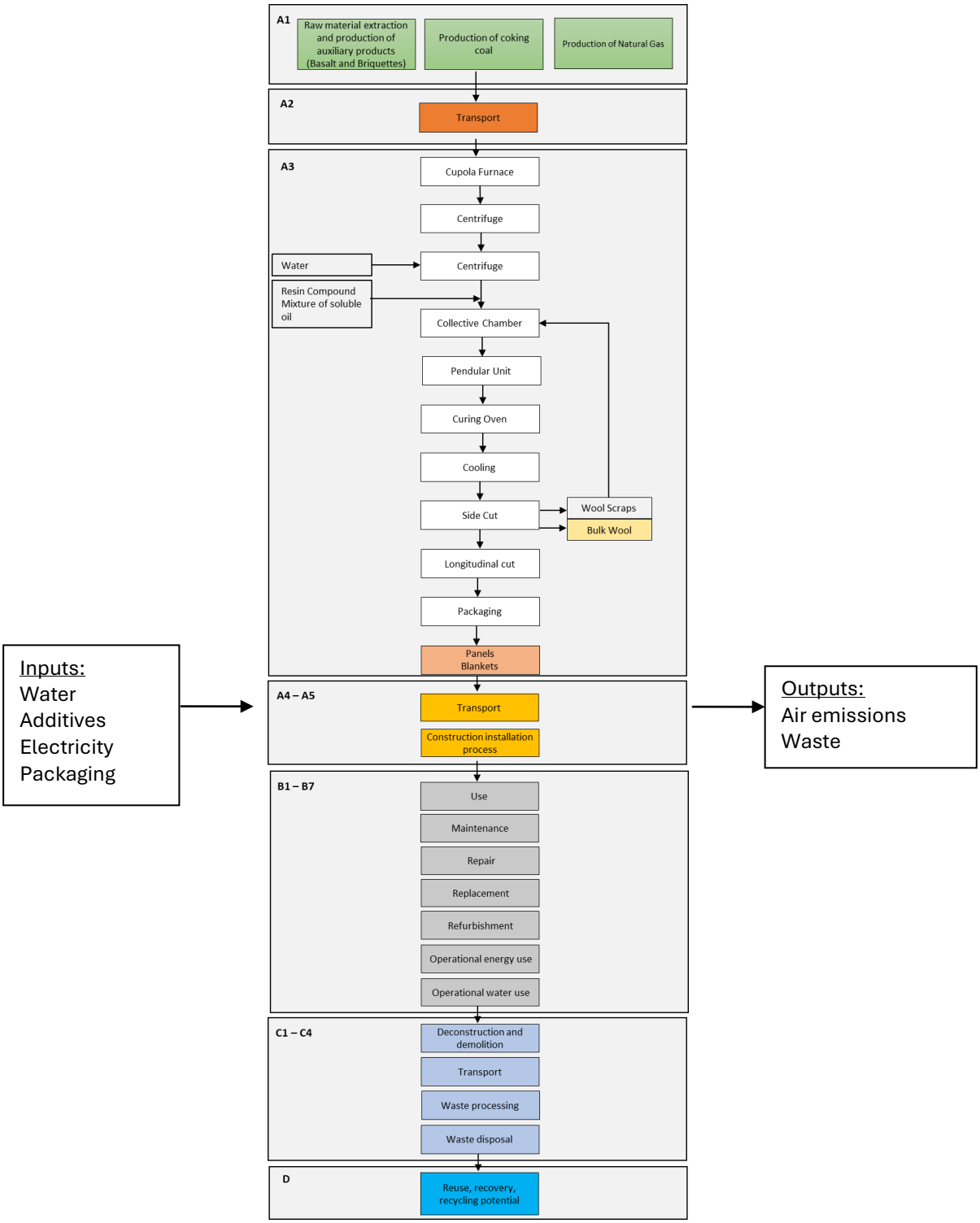


Figure 1: Example of the life cycle stages and unit processes of the product.

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	Rehabilitation	Operational energy use	Operational water use	Deconstruction and demolition	Transport	Waste process	Disposal	Reuse, recovery, potential recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Production stage, A1-A3

This stage includes modules A1 (Raw material extraction and processing), A2 (Transport), and A3 (Manufacturing).

Regarding transport (module A2), the raw materials and auxiliary materials arrive at the facility by road (truck) and/or train.

Regarding stage A3 (Manufacturing), the production process of the stone wool products is described as follows:

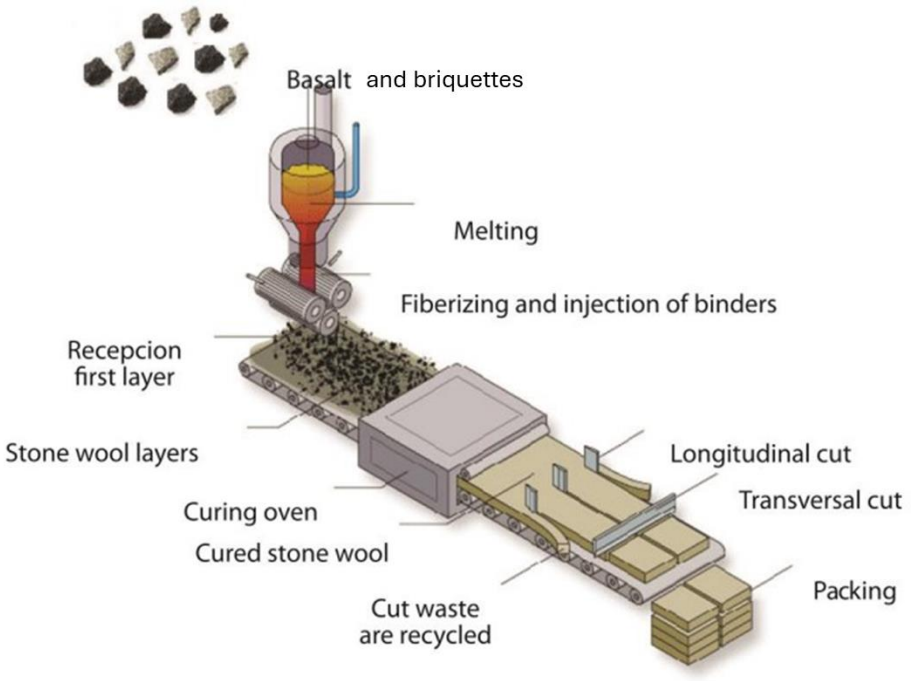


Figure 2: It schematically represents the stone wool production process.

The main material used in the production of stone wool is basalt and mineral wool-based briquettes. The basalt is transported from the warehouse to the silo located at the beginning of the production line.

The mixture is transported from the storage silo to a dispenser by a conveyor belt. Then the material is weighed and thrown into the cupola furnace, where the stone is melted.

The cupola furnace is one of the main elements of the whole process, of last generation and, therefore, of high yield and efficiency. It consists of three parts, one at the top, where the furnace is loaded, an intermediate part consisting of an inner shell enclosed in water for cooling and a lower part, also refrigerated, where the melting takes place. The fuel used in the furnace is coal coke, natural gas also being used only for indoor air heating. Oxygen is also introduced into the furnace for the combustion process.

After melting, molten basalt upon falling on a spinning disk, such as a centrifuge, with the adding of additive binders (resin and oil mix), causes the formation of fibres. The fibres are drawn from the spinning wheels through a jet of air and are thrown into a collection chamber. In the collection chamber, the fibres are cooled by means of an air exhaust system and form a primary layer of mineral wool as it passes through a roller.

This primary layer of stone wool is transferred to a pendulum unit and layered by a pendulum onto a conveyor belt, until the desired density is achieved.

Next, the layer of stone wool then enters the curing oven. In this oven, the wool is exposed to hot air and compressed by a cylinder to the exact thickness. The air used in this step is heated through natural gas burners. Subsequently, the stone wool rug moves to an air cooling zone.

In this process, for the width of the blanket or panel to be uniform, it is trimmed, then the chips are forwarded to the collection chamber through a suction system.

After going through the cooling zone and already at the end of the conveyor belt, the material is cut.

If webs are being produced, a retractor picks up the web, which is cut automatically when it reaches a predetermined length.

Finally, the product is packed with plastic, cardboard boxes and wood pallets and placed in the finished products warehouse.

Construction Stage; A4 – A5

Module A4 includes transport from the production site to the consumer or to the installation site of Termolan's stone wool products. The following scenario was considered:

• 1390 km by road, by truck.

Phase A5 corresponds to the construction and installation in the building. In this scenario, there is no energy consumption during installation, with only labor required. Module A5 also considers the processing of packaging waste (recycling, incineration, disposal). A 2% waste loss at the product installation site is assumed, in accordance with EN 16783:2024, for thermal insulation products.

Use Stage; B1 – B7

Modules B1, B2, B3, B4, B5, B6, and B7 are not relevant, according to EN 16783:2024 and the standard EN 15804:2012+A2:2019/AC:2021.

B1 – The environmental impacts generated during the use phase are very low and can therefore be neglected.

B2 – Thermal insulation products do not require maintenance during use if properly applied. In this case, the environmental impacts are assumed to be zero.

B3 – Thermal insulation products do not require repair during the use phase if properly applied. In this case, the environmental impacts are assumed to be zero.

B4 – Thermal insulation products do not require replacement during the use phase, and therefore no impacts should be declared in this replacement phase.

B5 – Thermal insulation products do not require refurbishment during the use phase, and therefore no impacts should be declared at this stage.

B6 – Thermal insulation products do not consume energy during the use of the building. In this case, the environmental impacts are assumed to be zero.

B7 – Thermal insulation products do not use water during the use of the building. In this case, the environmental impacts are assumed to be zero.

End-of-Life Stage; C1 – C4

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

Deconstruction/demolition (C1); transport 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 final phase of a material's life cycle but can become the first if, after demolition, the waste is recycled and reused, that is, if the material considered at end-of-life is valorized.

C1. The contribution of the insulation to the environmental burdens resulting from deconstruction and/or dismantling is very low and can therefore be neglected.

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

C3. A 5% recycling rate is assumed.

C4. The remaining 95% is disposed of in landfills.

Recycling/Reuse/Recovery Potential; Module D

The impacts and benefits of this stage were included within the system boundary and are therefore assessed.

It was assumed that 5% of the stone wool product waste is recovered at end-of-life (conservative value).

2.1.1. Justification for the exemption to declare modules C and D

Not applicable.

2.2. Core environmental impact indicators

	Global warming potential - total;	Global warming potential fossil;	Global warming potential - biogenic;	Global warming potential land use and land use change;	Depletion potential of the stratospheric ozone layer;	Acidification potential;
	GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	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	1.36E+00	1.39E+00	-3.24E-02	1.19E-03	3.60E-08	3.05E-03
Module A4	2.30E-01	2.30E-01	6.96E-05	4.51E-06	4.98E-09	2.90E-04
Module A5	8.81E-02	5.27E-02	3.54E-02	3.57E-05	1.11E-09	7.09E-05
Module B1-B7	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
Module C2	8.29E-03	8.29E-03	2.50E-06	1.62E-07	1.79E-10	1.04E-05
Module C3	7.97E-04	7.94E-04	3.01E-06	2.75E-08	1.61E-11	7.40E-06
Module C4	2.85E-03	2.85E-03	1.12E-06	1.43E-07	4.24E-11	2.65E-05
Module D	-6.86E-02	-6.84E-02	-1.05E-04	-3.45E-05	-1.39E-09	-5.98E-04

LEGEND:

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

NOTES:

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

	Eutrophication potential aquatic freshwater;	Eutrophication potential aquatic marine;	Eutrophication potential terrestrial;	Formation potential of tropospheric ozone;	Abiotic depletion potential for non-fossil resources;	Abiotic depletion potential for fossil resources potential;	Water (user) deprivation potential;
	EP-freshwater	EP-marine	EP-terrestrial	POCP	ADP-minerals&metals	ADP-fossil	WDP
Unit	Unit	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m3 World eq. deprived
Modules A1-A3	3.79E-05	7.04E-04	8.48E-03	5.42E-03	1.58E-07	1.56E+01	2.45E-01
Module A4	1.81E-07	7.18E-05	7.00E-04	5.39E-04	7.92E-09	3.06E+00	2.81E-03
Module A5	1.15E-06	2.77E-05	3.04E-04	1.78E-04	4.99E-09	4.79E-01	7.58E-03
Module B1-B7	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00
Module C2	6.51E-09	2.58E-06	2.52E-05	1.94E-05	2.85E-10	1.10E-01	1.01E-04
Module C3	8.89E-10	3.50E-06	3.81E-05	1.13E-05	3.30E-11	1.08E-02	1.32E-05
Module C4	1.01E-08	1.20E-05	1.31E-04	3.92E-05	1.13E-10	3.66E-02	5.04E-05
Module D	-2.48E-06	-5.67E-05	-1.02E-03	-3.24E-04	-3.54E-08	-7.89E-01	-1.51E-02

LEGEND:

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

NOTE: P.C.I. – Net calorific value

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

"The results obtained for the indicators "Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)", "Abiotic depletion potential for fossil resources potential (ADP-fossil)" and "Water (user) deprivation potential (WDP)" should be used with caution since the uncertainties associated with them are high or there is little experience with the indicator."

2.3. Additional environmental impact indicators

	Potential incidence of disease due to PM emissions	Potential Human exposure efficiency relative to U235	Potential Comparative Toxic Unit for ecosystems	Potential Comparative Toxic Unit for humans, cancer effects	Potential Comparative Toxic Unit for humans, not cancer effects	Potential soil quality index
	PM	IRP	ETP-fw	HTP-c	HTP-nc	SQP
Unit	Disease incidence	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Modules A1-A3	3.98E-08	1.50E-02	7.60E+00	5.94E-09	2.63E-09	8.69E+00
Module A4	1.39E-08	4.88E-04	1.36E+00	1.43E-11	1.58E-09	5.82E-03
Module A5	1.62E-09	4.53E-04	2.65E-01	1.91E-10	1.88E-10	2.66E-01
Module B1-B7	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
Module C2	4.99E-10	1.75E-05	4.89E-02	5.14E-13	5.70E-11	2.09E-04
Module C3	6.25E-10	1.18E-05	4.54E-03	4.45E-14	1.15E-12	2.39E-03
Module C4	7.33E-10	4.89E-06	1.72E-02	2.23E-13	5.15E-12	4.35E-02
Module D	-2.80E-09	-7.78E-04	-1.71E-01	-2.58E-10	-2.34E-10	-2.21E-01

LEGEND:

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

NOTES:

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

The impact indicator "POTENTIAL HUMAN EXPOSURE EFFICIENCY RELATIVE TO U235" focuses mainly on the possible impact of a low dose of ionising radiation on human health resulting from the nuclear fuel cycle. It does not consider effects arising from possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

The results of the indicators "POTENTIAL COMPARATIVE TOXIC UNIT FOR ECOSYSTEMS (ETP-FW)", "POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, CANCER EFFECTS", "POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, NOT CANCER EFFECTS" and "POTENTIAL SOIL QUALITY INDEX" should be used with caution as the uncertainties associated with them are high or there is little experience with the indicator.

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	1.48E+00	1.53E-02	1.49E+00	1.68E+01	9.71E-04	1.68E+01
Module A4	4.34E-03	0.00E+00	4.34E-03	3.13E+00	0.00E+00	3.13E+00
Module A5	-1.74E-01	2.19E-01	4.49E-02	5.15E-01	0.00E+00	5.15E-01
Module B1-B7	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
Module C2	1.56E-04	0.00E+00	1.56E-04	1.13E-01	0.00E+00	1.13E-01
Module C3	4.68E-04	0.00E+00	4.68E-04	1.14E-02	0.00E+00	1.14E-02
Module C4	1.63E-04	0.00E+00	1.63E-04	3.89E-02	0.00E+00	3.89E-02
Module D	-3.31E-02	0.00E+00	-3.31E-02	-8.56E-01	0.00E+00	-8.56E-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);

NOTE: Units expressed by functional unit (1 m^2).

	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	1.74E-01	0.00E+00	0.00E+00	6.90E-03
Module A4	0.00E+00	0.00E+00	0.00E+00	4.43E-06
Module A5	0.00E+00	0.00E+00	0.00E+00	2.17E-04
Module B1-B7	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	1.59E-07
Module C3	0.00E+00	0.00E+00	0.00E+00	1.51E-06
Module C4	0.00E+00	0.00E+00	0.00E+00	8.87E-07
Module D	0.00E+00	0.00E+00	0.00E+00	-4.04E-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.

NOTE: Units expressed by functional unit (1 m^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	3.63E-05	6.12E-02	1.15E-05
Module A4	7.82E-06	1.23E-04	2.14E-05
Module A5	1.14E-06	1.60E-02	3.58E-07
Module B1-B7	0.00E+00	0.00E+00	0.00E+00
Module C1	0.00E+00	0.00E+00	0.00E+00
Module C2	2.81E-07	4.44E-06	7.70E-07
Module C3	6.80E-08	5.54E-02	6.36E-09
Module C4	2.36E-07	1.05E+00	2.17E-09
Module D	-1.60E-06	-1.07E-03	-5.04E-07

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 (1 m^2).

The characteristics that render waste hazardous are described in the applicable legislation in force, for example, in the European Waste Framework Directive.

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	2.53E-02	1.70E-03	0.00E+00
Module A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Module A5	0.00E+00	1.91E-02	1.36E-02	0.00E+00
Module B1-B7	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	5.55E-02	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 (1 m^2).

The characteristics that render waste hazardous are described in the applicable legislation in force, for example, in the European Waste Framework Directive.

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	0
Biogenic carbon content in accompanying packaging	Kg C	1.38E-02
* 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2		

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

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

Destination	Type of transport	Average distance (km)
Europe	Truck with a capacity of 27 tons	1390

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

Parameter	Units/comments	Results expressed per functional Scenario A5
Scenario	Name and description of the scenario	N/A
Related scenario	Name of the scenarios linked to this scenario	N/A
Ancillary materials for installation (specified by material)	kg or other units as appropriate	N/A
Water use	m^3	N/A
Other resource use	kg	N/A
Quantitative description of energy type (regional mix) and consumption during the installation process	kWh or MJ	N/A
Waste of materials on the building site before waste processing, generated by the product's installation (specified by type)	kg	2% packaging material
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	Waste management process for packaging materials
Direct emissions to ambient air, soil and water	kg	N/A

3.3. Module B1 - Use stage

The use, maintenance, repair, replacement, and refurbishment stages are not required for stone wool.

3.4. Module B2 - Maintenance

The use, maintenance, repair, replacement, and refurbishment stages are not required for stone wool.

3.5. Module B3 - Repair

The use, maintenance, repair, replacement, and refurbishment stages are not required for stone wool.

3.6. Module B4 – Replacement

The use, maintenance, repair, replacement, and refurbishment stages are not required for stone wool.

3.7. Module B5 - Refurbishment

The use, maintenance, repair, replacement, and refurbishment stages are not required for stone wool.

3.8. Module B6 - Energy usage (operational)

This module is not relevant for stone wool.

3.9. Module B7 - Water usage (operational)

This module is not relevant for stone wool.

3.10. Module C1 Demolition – End-of-Life Stage

This module is not relevant for stone wool.

3.11. Module C2 Transportation – End-of-Life Stage

The thermal insulation demolition waste is transported from the construction site to a container or treatment station by truck (27 tons), with an average distance of 50 km considered.

3.12. C3 Waste processing for reuse, recovery, and recycling – End-of-Life Stage

Destination	Result	Unit of measurement
Recycling (C3)	5	%

3.13. C4 Waste disposal – End-of-Life Stage

Destination	Result	Unit of measurement
Landfill disposal (C4)	95	%

3.14. Scenarios and technical information for module D

It was considered that 5% of the stone wool product waste is recovered at end-of-life (conservative value).

3.15. Additional environmental information regarding the release of hazardous substances into air, soil, and water during the use stage

The product is classified as A+ according to French regulations. Source: Self-declaration by TERMOLAN.

4. REFERENCES

✓ Instruções Gerais do Sistema DAPHabitat, Versão 3.0, june 2024 (em www.daphabitat.pt);

✓ RCP – modelo base para produtos e serviços de construção. Sistema DAPHabitat. Versão 3.0, june 2024 (em www.daphabitat.pt);

✓ NP ISO 14025:2009 Rótulos e declarações ambientais – Declarações ambientais Tipo III – Princípios e procedimentos;

✓ 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.

✓ EN 16783:2024 Thermal insulation products - Environmental Product Declarations (EPD) - Product Category Rules (PCR) complementary to EN 15804 for factory made and in-situ formed products.