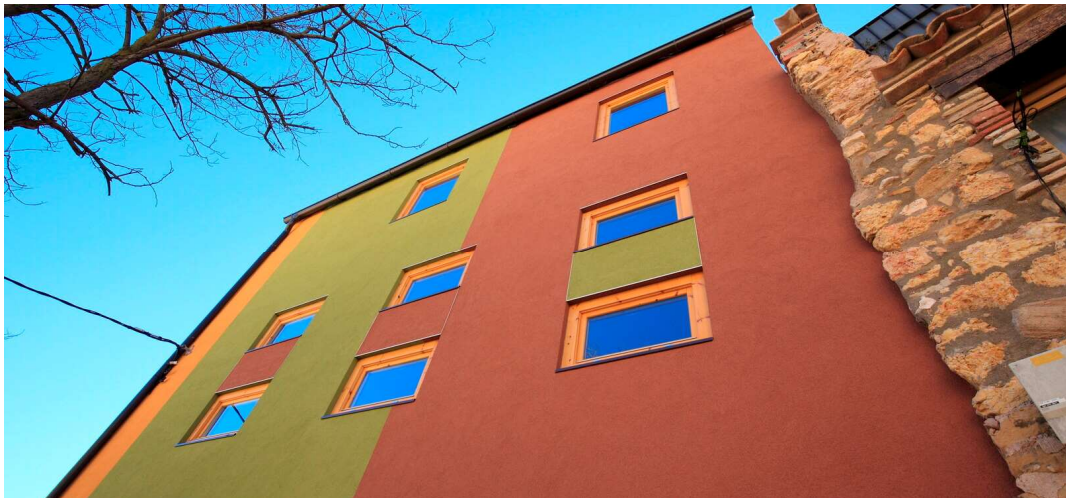


ROCKWOOL REDArt®

Soporte Madera – Acabado Silicona

ETICS system

Environmental Product Declaration according to EN 15804 and ISO 14025 and 3rd party verified



Manufacturer: ROCKWOOL Peninsular, S.A.U.

Owner of the declaration:
ROCKWOOL Peninsular S.A.U.
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Life Cycle Assessment study:

This environmental product declaration is based on a Life Cycle Assessment (LCA) background study according to EN 15804:2012+A1:2013 carried out by:

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Verification:

CEN standard EN 15804+1: 2013 serves as the core PCR (product category rule)

Independent third-party verification and data, according to EN ISO 14025:2010:

- external EPD verification
 internal EPD verification

Third party Verifier
Yannick LEGUERN (EYS CONSEIL)
Approved by: INIES Program (France)

WARNING

Environmental Product Declarations (EPDs) may not be comparable if they do not comply with the EN15804:2012+A1: 2013 Clause 5.3

A comparison of the environmental performance of construction products using the EPD information must be based on the use of the products and their impact on the building and must consider the entire life cycle (all information modules).

A statement that the EPD owner has the sole ownership, liability, and responsibility of the EPD.

1 Product (REDArt System)

1.1 Product Identification

The REDArt System is an external thermal insulation system for wooden façades consisting of an insulation panel, adhered to a wall, usually with adhesive mortar and mechanical fixings. The insulation panel is protected with a coating applied directly to it and consisting of a mortar layer, a reinforcement mesh, a primer, and a silicone finishing.

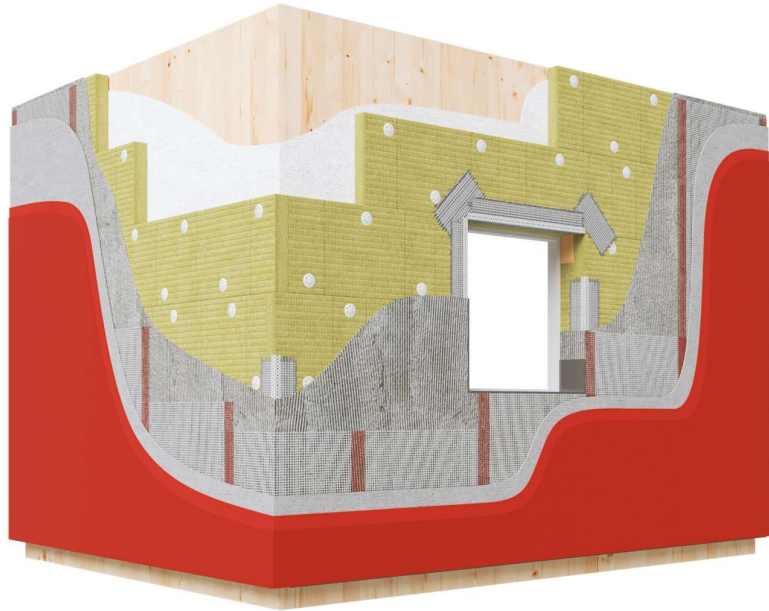
The REDArt System is conceived as a comprehensive system for the insulation of facades. This means that each component is part of the set, thereby ensures system compatibility and better result.

The REDArt System is supplied as a set (kit) comprising the different components, being the ROCKWOOL company in charge of the whole, and is supported by the European Technical Assessments ETA 18/1042 (for Timber Frame wood support) and ETA 18/0802 (for CLT wood support).

1.2 Composition of the REDART system

The components of REDArt system are:

- Rocksate Duo Plus double density stone wool panel (120 kg/m³ in the upper layer and 70 kg/m³ in the lower layer), uncoated
- water-based dispersion adhesive REDArt Adhesivo DS, used to adhere the insulation panel to the support
- Mechanical screw fixings Ejothem STR H
- Base coat mortar REDArt Capa Base Plus, with polymer cement mortar base and white color
- Anti-alkali fiberglass mesh, REDArt Standard Mesh, 3.5x3.8 mm mesh size, 160 g/m² surface mass
- REDArt Silicone Primer
- Finishing layer of coating REDArt Silicone Finish



The following table shows the components and its composition.

Material	Name of product	Amount in kg/m ² of system	% of total weight
Adhesive mortar	REDArt Adhesivo DS	2	11,48
Insulation panel	Rocksate Duo Plus 60mm	5,20	29,86
Anchor	Ejothem STR U 2G	0.201	1,15
Base coat	REDArt Capa Base Plus	7	40,20
Mesh	REDArt Malla Estándar	0.16	0,92
Primer	REDArt Imprimación Silicona	0.35	2,010
Topcoat	REDArt Acabado Silicona	2.50	14,36
Total		17.411	100

2 Information on LCA

Description of functional unit	1 m external thermal insulation system with stone wool insulation installed for 25 years in a building with a thermal resistance of 1.70 m ² K/W and insulation thickness of 60 mm
Reference service life	25 years
Cut of rules	All products of REDArt system are included
Allocation rules	No allocation process has been carried out
Data quality	Primary data: Insulation panel and ETICS product (adhesive mortar, base coat, topcoat, primer): data provided by our production site (ROCKWOOL Group) Anchor: data provide by IBU EPD (EPD-EJO-20210060-IBD1-DE) Mesh: data provided by the supplier (Saint Gobain Adfors) Secondary data: Ecoinvent Database V3.6 (except for energy V3.4)
Representativeness	Geographical coverage: Spanish market Technical coverage: Europe Time related coverage: 2019 for ancillary products and insulation product

This Reference Service Life of 25 years has been established according the ETAG 004 -that's it, the guidelines for European Technical Approval of ETICS systems. However, ROCKWOOL stone wool insulation products have proved a durability of more than 55 years. The thermal, fire-resistance, and acoustic performance of ROCKWOOL stone wool products, when correctly installed, remains the same during the lifetime of the building.¹

3 System Boundaries, scenarios, and additional technical information

3.1 Upstream (information of raw materials)

Stone wool is manufactured in France (Saint Eloy les Mines) by ROCKWOOL. Adhesive mortar, base coat, primer and top coat are manufactured in Poland by FAST-ROCKWOOL. Anchors are manufactured by Ejot. Mesh is manufactured by Saint-Gobain Adfors. The transport distance between supplier and Spain is included.

3.2 Transportation and construction process

REDArt components are transported from Caparrosa ROCKWOOL plant to the building site by truck.

The average considered distance is 350 km.

In addition to the system components, it is necessary to consume energy and water for the installation of REDArt System. The consumption of electricity is 0.04 kWh/kg (adhesive, mortar, primer, and topcoat) and the consumption of water is 2.6 l/m². The material losses of each component are 5%. The packaging waste is transported by truck and landfilled (50km).

3.3 Use stage

B1-B5, use stage, information modules relating to building site

All components of REDArt system have a service life equal to that of the ETICS system, 25 years.

No impacts for these stages.

B6-B7, use stage, information modules relating to operation of the building

No impacts for these stages.

¹ FIW-München, Durability Project Mineral Wool (2016)

3.4 End of life stage (C1-C4, end of life stage, information modules)

Parameter	Unit
Collection process specified by type	17.41 kg collected separately
Recovery system by type	0 kg for re-use
	0 kg for recycling
	0 kg for energy recovery
Disposal specified by type	17.41 kg product or material for final deposition
Assumptions for scenario development	Transport to landfill: 50 km

1.1. Benefits and loads beyond the product system boundaries

Due to no recycling of waste (ETICS system and packaging waste), no impacts in D module.



4 Life cycle Impact Assessment

Description of the system boundaries (x=included, MNA = Module not assessed)

Production stage			Construction stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction/ demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling - potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	x	MNA	x	MNA



4.1 Environmental impacts

Parameter	Production stage	Construction stage	Use stage								End-of-life stage			D Benefits and loads beyond the boundaries of the system	
	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-construction/ demolition	C2 Transport	C3 Waste treatment		C4 Disposal
Global warming potential (GWP) kg CO ₂ eqv	12,26	0,59	0,87	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,55	8,46E-02	0,00E+00	0,41	MNA
The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.															
Ozone depletion potential (ODP) kg CFC11 eqv	2,24E-06	2,40E-07	7,63E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,41E-07	3,42E-08	0,00E+00	1,54E-08	MNA
Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
Acidification potential (AP) kg SO ₂ eqv	6,30E-02	1,52E-03	3,34E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,92E-02	2,18E-04	0,00E+00	4,88E-04	MNA
Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
Eutrophication potential (EP) kg PO ₄ ³⁻ eqv	1,62E-02	3,35E-04	3,07E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,48E-03	5,08E-02	0,00E+00	1,10E-03	MNA
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.															
Photochemical ozone creation (POCP) kg Ethene eqv	1,47E-02	2,35E-04	7,77E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,90E-03	3,36E-05	0,00E+00	1,48E-04	MNA
Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction															
Abiotic depletion potential for non-fossil resources (ADP-elements) kg Sb eqv	4,06E-05	3,10E-10	2,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,36E-06	4,44E-11	0,00E+00	2,85E-07	MNA
Abiotic depletion potential for fossil resources (ADP-fossils) MJ	175,14	4,23	13,56	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	35,20	6,07E-01	0,00E+00	1,32	MNA
Consumption of non-renewable resources, thereby lowering their availability for future generations.															

4.2 Resource use

Parameter	Production stage	Construction stage	Use stage								End-of-life stage				D Benefits and loads beyond the boundaries of the system
	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-construction/ demolition	C2 Transport	C3 Waste treatment	C4 Disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - MJ/FU	23,52	1,83E-02	1,25	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,88E-01	2,61E-03	0,00E+00	1,14E-02	MNA
Use of renewable primary energy resources used as raw materials - MJ/FU	5,50	0,00E+00	2,76E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Total use of renewable primary energy resources - MJ/FU	29,02	1,83E-02	1,87	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,88E-01	2,61E-03	0,00E+00	1,14E-02	
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - MJ/FU	195,76	6,92	19,06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	25,00	0,54	0,00E+00	0,30	MNA
Use of non-renewable primary energy resources used as raw materials - MJ/FU	11,90	1,00	0,77	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,95	5,89E-01	0,00E+00	1,00E+00	MNA
Total use of non-renewable primary energy resources - MJ/FU	208,10	7,92	19,85	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	34,95	1,13	0,00E+00	1,30	MNA
Use of secondary materials - kg/FU	0,44	0,00E+00	2,21E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Use of renewable secondary fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Use of non-renewable secondary fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Net use of fresh water - m ³ /FU	0,58	4,08E-04	3,18E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,75E-03	1,85E-05	0,00E+00	1,10E-03	MNA

4.3 Waste categories

Parameter	Production stage	Construction stage	Use stage							End-of-life stage				D Benefits and loads beyond the boundaries of the system	
	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-construction/ demolition	C2 Transport	C3 Waste treatment		C4 Disposal
Hazardous waste disposed - kg	3,72E-01	1,29E-04	1,90E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,24E-02	5,01E-05	0,00E+00	4,59E-04	MNA
Non-hazardous waste disposed - kg	4,17	3,51E-04	1,08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,38E-01	9,74E-06	0,00E+00	17,94	MNA
Radioactive waste disposed - kg	3,77E-02	6,82E-05	1,89E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,46E-04	0,00E+00	0,00E+00	5,03E-06	MNA

* There is never radioactive waste from a ROCKWOOL plant (A3), but potentially in its upstream chain (A1 & A2).

4.4 Output flows

Parameter	Production stage	Construction stage	Use stage							End-of-life stage				D Benefits and loads beyond the boundaries of the system	
	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-construction/ demolition	C2 Transport	C3 Waste treatment		C4 Disposal
Component for re-use - kg	8,60E-02	0,00E+00	4,30E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Materials for recycling - kg	5,00E-03	0,00E+00	2,50E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Materials for energy recovery - kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Exported electrical energy - MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA
Exported thermal energy - MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNA

5 Interpretation of LCA results

Environmental Impacts / Stage	Production stage (A1-A3)	Construction stage (A4-A5)	Use stage (B1-B7)	End of life stage (C1-C4)	Total Life Cycle (A1-C4)	Benefits and loads (D)
Global warming potential <i>kg CO₂ equiv /FU</i>	12,26	1,47	0,00	3,04	16,77 kg CO ₂ equiv /FU	0,00
Abiotic depletion potential for fossil resources <i>MJ/FU</i>	175,14	17,79	0,00	37,13	230,06 MJ/UF	0,00
Total use of primary energy ^[1] <i>MJ/FU</i>	237,12	29,66	0,00	37,59	304,35 MJ/UF	0,00
Net use of fresh water <i>m³/FU</i>	0,58	0,03	0,00	0,01	0,61 m ³ /UF	0,00
Total waste ^[2] <i>kg/FU</i>	4,58	1,11	0,00	18,10	23,79 kg/UF	0,00

^[1] Sum de : "Total use of renewable primary energy resources" + "Total use of non renewable primary energy resources".
^[2] Sum : "Hazardous waste disposed" + "Non hazardous waste disposed" + "Radioactive waste disposed".

Except for waste production, the main environmental impacts occur in production stage (73% of GWP, 75-80% consumption of energy).

6 Additional Information

Dangerous substances

ROCKWOOL stone wool does not contain substances from the Candidate List of Substances of Very High Concern.

Mineral wool fibres produced by ROCKWOOL are classified as non-hazardous under REACH (Regulation (EC) No 1272/2008 of the European parliament and of the council of 16 December 2008 on classification, labelling and packaging of substances and mixtures).

The ROCKWOOL fibres are registered with REACH under the following definition: "Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($\text{Na}_2\text{O}+\text{K}_2\text{O}+\text{CaO}+\text{MgO}+\text{BaO}$) content greater than 18% by weight and fulfilling one of the Note Q conditions".

ROCKWOOL products produced in Europe fulfil the Note Q requirements [ref. Note Q]. This is certified by the independent certification body EUCEB. More information on EUCEB can be found at www.euceb.org

The International Agency for Research on Cancer (IARC), part of the World Health Organization, revised its classification of mineral wool fibres in October 2001, including them in Group 3 as an agent "not classifiable as to its carcinogenicity to humans".



Cover exposed skin.
When working in unventilated area wear disposable face mask.



Clean area using vacuum equipment.



Waste should be disposed of according to local regulations.



Rinse in cold water before washing.



Ventilate working area if possible.



Wear goggles when working overhead.

Instruction for safe installation

Due to the well-known mechanical effect of coarse fibres, mineral wool products may cause temporary skin itching. Mineral wool fibres cannot cause a chemical or allergic reaction.

To diminish the mechanical effect of coarse fibres and avoid unnecessary exposure to mineral wool dust, information on good practice is available on the packaging of all mineral wool products with pictograms and/or written information (see pictograms on this page).

Safe use instruction sheets are also available from www.rockwool.es.



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June 22