ENVIRONMENTAL PRODUCT DECLARATION

According to 15804:2012+A1:2014 and ISO 14025:2010

CLIMAVER A2 APTA

Date of publication: 17/07/2018
Audit date: 09/04/2020
Valid until: 09/04/25
Scope of the EPD®: Spain and Portugal
Version: 2
EPD® registration number: S-P-01250

Original translation of the document issued by ENVIRONDEC with reference EPD S-P-01248. In case of discrepancy, the original version will prevail.

General Information

Manufacturer: Saint-Gobain Isover Ibérica S.L. Avenida del Vidrio S/N. 19200 Azuqueca de Henares.
Programme used: The International EPD® System. Further information at www.environdec.com
EPD® registration number: S-P-01250
PCR Identification: PCR 2012:01 Construction products and construction services v2.3 and Sub-PCR-I Thermal insulation products
UN CPC code: 37990
Product name and represented manufacturer: CLIMAVER A2 APTA; Saint-Gobain Isover Ibérica SL
Declaration owner: Saint-Gobain Isover Ibérica SL
EPD® designed by: Nicolás Bermejo and Alfonso Díez
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Email: nicolas.bermejo@saint-gobain.com, alfonso.diez@saint-gobain.com
Date of publication: 17/07/2018**, valid until:** 09/04/25
Demonstration of audit: independent audit of the declaration has been carried out, in accordance with ISO 14025:2010. The audit has been external and carried out by a third party, based on the PCR mentioned above (see information below):

The EN 15804 standard serves as the basis of the Product Category Rules	
EPD programme operator	The International EPD® System. Operated by EPD® International AB. www.environdec.com.
PCR review performed by	The technical committee of The International EPD® System
LCA and EPD® developed by Saint-Gobain Isover Ibérica SL	
Independent audit of environmental declaration and data in accordance with EN ISO 14025:2010 Internal ☐ External ☒	
Auditor Marcel Gómez Ferrer Marcel Gómez Consultoría Ambiental (www.marcelgomez.com) Tlf. 0034 630 64 35 93 Email: info@marcelgomez.com	
Accredited or approved by	The International EPD® System
www.isover.es	

Product Description

Product description and use:

This Environmental Product Declaration (EPD®) details the environmental impact of 1 m² of mineral wool with a thermal resistance equal to 1.25 K·m²·W-1.

The CLIMAVER A2 APTA product is defined as an ISOVER mineral wool panel, designed for the formation of ventilation and air conditioning ducts covered on the inside by a glass fabric that gives it acoustic properties.

The production plant of Saint-Gobain Cristalería S.L. located in Azuqueca de Henares (Spain), uses raw materials of natural origin that stand out for their abundance in the Earth's crust (such as volcanic rock or silica sand, depending on the desired product) in order to obtain mineral wool products through fusion and fiberising techniques. The products obtained in the form of mineral wool are characterised by their lightness, given that their structure contains a high air content that remains immobile between the intertwined filaments.

On Earth, the best insulator is dry, still air. At 10 °C its thermal conductivity factor, λ, is 0.025 W/(m·K) (watts per meter and Kelvin degree). The thermal conductivity of mineral wool is very similar to the conductivity of still air, and lambda values are associated with it that vary from 0.030 W/(m·K) for the most efficient wools to values of 0.040 W/(m·K). K) for the least efficient products.

Given its intertwined structure, mineral wool is a porous material that traps air, making it one of the best materials for insulation. The porous and elastic structure of the wool also absorbs noise and shock, offering good acoustic correction inside buildings. Mineral wools mainly contain inorganic materials, which is why they are considered non-combustible and non-flammable.

Isover mineral wool insulators (Glass Wool, Stone Wool, etc.) are used in both buildings and industrial facilities. This guarantees a high level of comfort, a reduction in energy costs derived from home use, carbon dioxide (CO_2) emissions into the atmosphere are minimised, heat losses through roofs, ceilings, walls, floors, pipes and boilers are avoided, noise pollution is reduced, and homes and industrial facilities are protected from fire hazards.

The life of mineral wool products reaches the same average life time associated with the building in which it is installed (whose value is usually established at 50 years), or the time that the aforementioned insulating component is part of the building.

Technical data/physical characteristics:

The Thermal Resistance of the product, R, is equal to: **1.25 K·m²·W^{-1} (UNE-EN 12667)**
The Thermal Conductivity of mineral wool is: **0.032 W/(m·K) (UNE-EN 12667)**
Reaction to Fire: Euroclass **A2-s1;d0 (UNE-EN 13501-1)**
Acoustic Properties: up to **Aw 0.85 (UNE-EN ISO 354)**
Water vapour transmission: **Z=130 (UNE-EN 12086)**

Description of the main components and/or constituent materials of the mineral wool product:

PARAMETER	VALUE
Weight per 1 m^2 of product	**2.87 kg**
Wool thickness	**40 mm**
Covering	- Aluminium - Glass mesh/Glass veil - Fibreglass Fabric - Paper - Polyethylene
Packaging for distribution and transportation	**Polyethylene:** 5 g **Label paper:** negligible **Cardboard:** 220 g **Staples:** negligible **Pallet wood:** reused 25 times
Product used for installation:	**None**

The product contains 65% post-consumer recycled raw materials in its mineral wool.

During the life cycle of the product, hazardous substances listed in the 'Candidate List of Substances of Very High Concern (SVHC) for authorisation1' are not used in a percentage greater than 0.1% of the weight of the product.

Neither the auditor nor the programme operator makes any representation or responsibility regarding the legality of the product.

Information for Calculating LCA

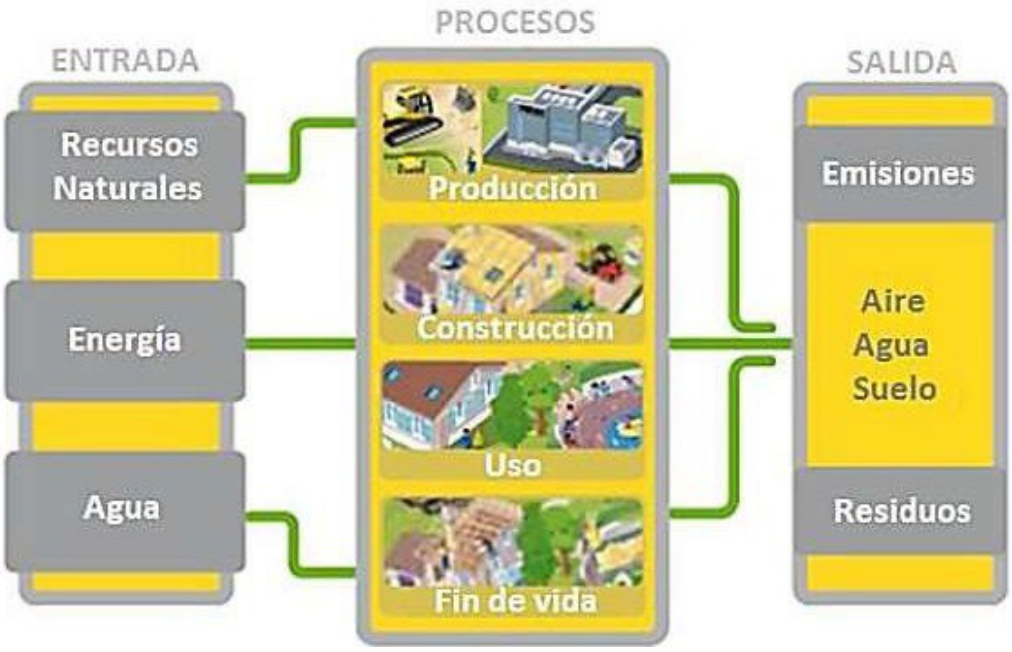
FUNCTIONAL UNIT (OF REFERENCE)	Provides thermal insulation of 1 m² of product with a thermal resistance of 1.25 K.m².W-1
SYSTEM LIMITS	'Cradle to Grave': Mandatory stages = A1-3, A4-5, B1-7, C1-4. Module D has not been included within the system limits.
REFERENCE SERVICE LIFE (RSL)	50 years.
CUT-OFF CRITERIA	If there isn't enough information available, those process mass and energy inputs and outputs that represent less than 1% of the total energy and mass used in the process may be excluded, as long as they do not have a relevant environmental impact. The total sum of inputs and outputs not included in a process will be less than 5% of the total energy and mass used per module (A1-A3, A4-A5, etc.). Flows related to human activities, such as transporting employees, are excluded. Likewise, flows related to the construction of production plants, production machines and transportation systems are exempt. The aforementioned flows are considered negligible compared to the construction product manufacturing (if we compare it taking into account the useful life of the systems).
ASSIGNMENTS	The allocation criteria are based on product mass. 'Polluter pays' and modularity principles principle have been followed.
GEOGRAPHIC COVERAGE PERIOD	Spain and Portugal 2018

- 'EPDs of construction products may not be comparable if they do not meet the compatibility requirements established in the EN 15804 standard.'
- 'EPDs within the same product category from different programs may not be comparable.'

[1] 1 http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

Life Cycle Stages

Life cycle flowchart



Product Stages, A1-A3

Stage description: The 'product stage' of mineral wool products is subdivided into 3 modules, A1, A2 and A3, representing 'raw material supply', 'transportation' and 'manufacturing', respectively.

The unification of modules A1, A2 and A3 is a possibility contemplated by the EN 15804 standard. This rule applies in this EDP.

Description of the scenarios and other additional technical information:

A1, Raw Material Supply
This module takes into account the extraction and processing of raw materials, and the energy that is produced before and during the manufacturing process under study.

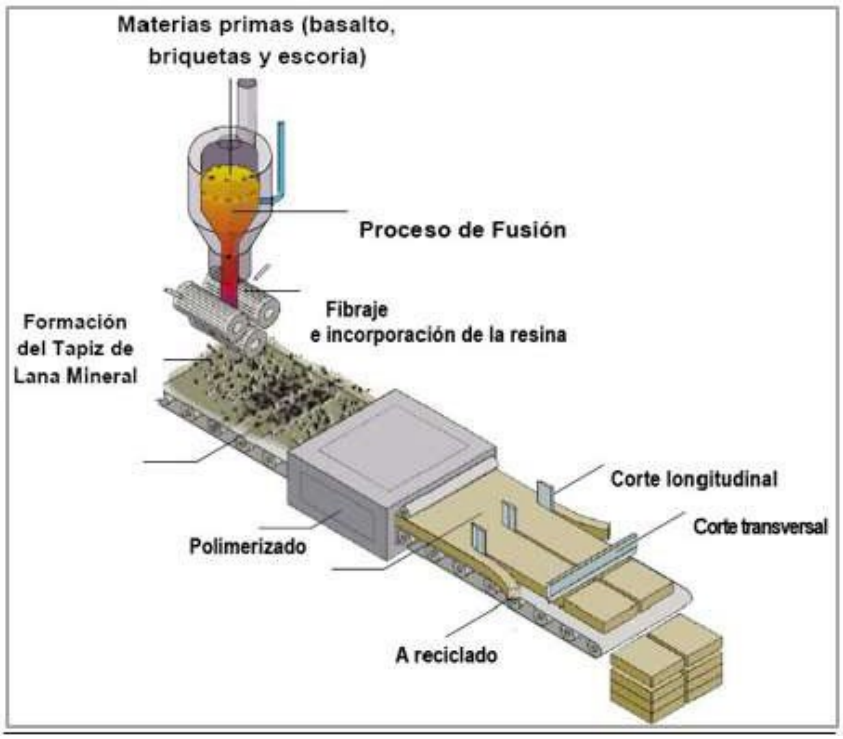
Specifically, the supply of raw materials ranges from the production of the binding components (resin) to the sources of origin (quarry) of the raw materials (e.g. Basalt, slag, sand...) for the production of the wool. In addition to these raw materials, other recycled materials (agglomerates) are also used as input streams. It should be added that all of the electricity used in this stage comes from 100% renewable sources and is certified.

A2, Transportation to the Factory
Raw materials are transported to the manufacturing plant. In our case, the model includes road transportation (average values) of each of the raw materials.

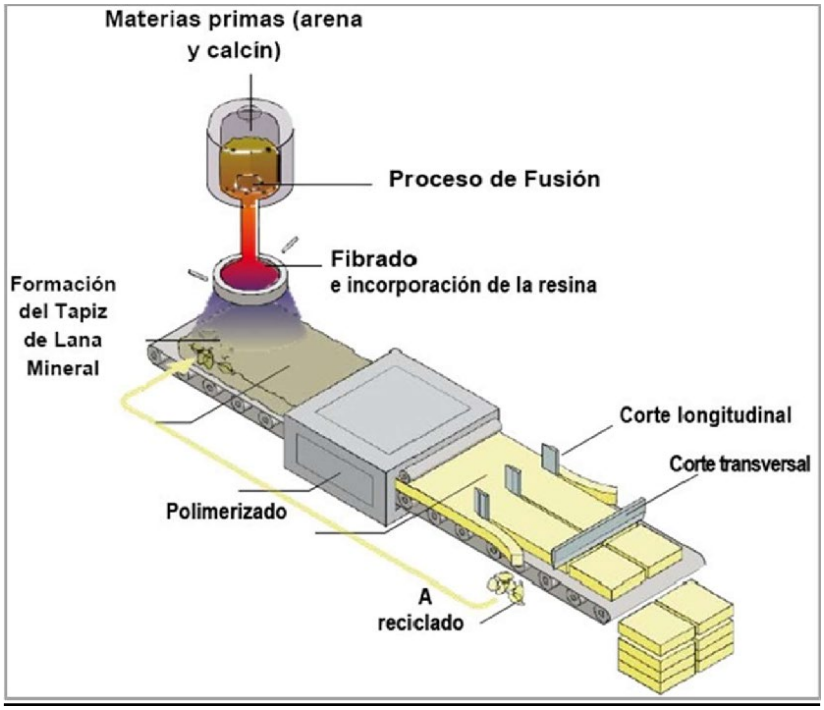
A3, Manufacturing
This module includes the manufacturing of products and containers/packaging and the management of the waste generated. Specifically, it covers vitrifiable glass production, resin production, mineral wool manufacturing (including the melting and fiberising processes shown in the flow chart) and packaging. The production of packaging material is taken into account at this stage.

Manufacturing Process Flowchart

Producción de Lana de Roca



Glass Wool Production



Construction process stage, A4-A5

Stage description: The construction process is divided into 2 modules: 'transport to the site', A4, and 'installation', A5.

A4, Transportation to the Site: This module includes transportation from the factory door to the construction site where the product will be installed.
Transportation is calculated based on a scenario whose characteristic parameters are described in the following table.

PARAMETER	VALUE/DESCRIPTION
Type of fuel and consumption of the vehicle or type of means of transport used, for example if it is a long-distance truck, a ship, etc.	**Truck with trailer with an average load of 24t and diesel consumption of 38 litres per 100 km.**
Distance	**450 km**
Usage capacity (including return of the transport without load)	**100% capacity, by volume 30% empty returns**
Apparent density of the transported product*	**20-200 kg/m3**
Usage capacity factor, by volume	**1 (default)**

*Isover products have a compression factor of 1-4. For an average truck volume of 65 m3 and the m2 of product specified in the tariff.

A5, Installation in the building: this module includes:

- Residue or waste derived from the products (see the percentage value in the table below). These losses are sent to landfill (see the landfill model for mineral wool in the End of Life chapter).
- Additional production processes to compensate for losses.
- Processing of waste derived from containers and packaging, which is 100% collected and 100% transformed and reduced to its elemental components (recovered material).

PARAMETER	VALUE/DESCRIPTION
Auxiliary materials for installation	0 kg
Water use	0 m3
Use of other resources	0 kg
Quantitative description of the type of energy and consumption during the installation process	0 kWh
Waste of materials at the construction site, before processing waste, generated during the installation of the product (specified by type)	5%
Outflow of materials (specified by type) resulting from waste processing at the construction site, for example during collection for recycling, energy recovery or landfill (specifying the route)	Product packaging waste is 100% collected and transformed into recovered material. Losses or waste of mineral wool are taken to landfill. In relation to the transport of the waste generated, a distance of 50 km has been considered both towards the operator (recoverable material) and towards the landfill (in case of final disposal).
Direct emissions to ambient air, soil and water	0 kg

Use Phase (excluding possible savings), B1-B7

Stage description: The product use stage is subdivided into the following modules:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

Description of Scenarios and Additional Technical Information:
Once the installation is complete, the product does not require any technical action or operation until the end-of-life stage. Therefore, mineral wool insulation products have no impact (excluding possible energy savings) at this stage.

End of Life Stage, C1-C4

Stage description: this phase includes the different modules detailed below:

C1, Deconstruction, dismantling, demolition
The deconstruction and/or dismantling of insulating products is part of the entire demolition process of a building. In our case, it is assumed that the associated environmental impact is very small, so much so that it can be neglected.

C2, Transport of the discarded product to the processing location
The model used for transportation applies.

C3, Processing of waste for reuse, recovery and/or recycling
Considered as waste that goes directly to landfill without reusing, recovering or recycling.

C4, Disposal (elimination), physical pre-treatment and management
100% of mineral wool waste is taken to landfill.

Description of the scenarios and other additional technical information: (See table below)

End of Life:

PARAMETER	VALUE/DESCRIPTION
Waste collection process specified by type	**2.87** kg (mixed with the rest of the construction waste)
Recovery system specified by type	There is no reuse, recycling or energy recovery
Disposal, specified by type	**2.87** kg sent to landfill
Assumptions for the development of the scenario (e.g. transportation)	Truck with trailer with an average load of 24t and diesel consumption of 38 litres per 100 km. 25 km average distance to the landfill

Potential reuse/recovery/recycling, D

Stage description: module D has not been included in the scope of the study.

LCA Results

The LCA model, data recording and environmental impact have been calculated using TEAM™ 5.1 software. The CML IA 4.1 impact method has been used, together with the LCA DEAM (2006) and Ecoinvent 2.3 databases to obtain inventory data for generic processes.

Data on the amount of raw materials used as well as energy consumption and transport distances have been taken directly from the Saint-Gobain Isover Spain manufacturing plant in 2018. Factory use of 100% certified renewable electricity.

Below are the tables that summarise the LCA results in detail.

PRODUCT STAGE			CONSTRUCTION STAGE		USAGE STAGE							END OF LIFE STAGE				BURDENS AND BENEFITS BEYOND SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

ENVIRONMENTAL IMPACTS

Parameters	Product Stage	Construction Process Stage		Usage Stage							End of Life Stage				D Potential for Reuse, Recovery and Recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste processing	C4 Waste disposal	
Global Warming Potential (GWP) *kg CO2 equiv/UF*	3.42E+00	2.96E-01	1.88E-01	0	0	0	0	0	0	0	0	1.61E-02	0	3.22E-02	MND
Total contribution to global warming resulting from the emission of a unit of gas into the atmosphere with respect to a unit of reference gas, which is carbon dioxide, which is assigned a value of 1.															
Ozone Depletion Potential (ODP) of the ozone layer *kg CFC 11 equiv/UF*	1.62E-07	5.40E-08	1.14E-08	0	0	0	0	0	0	0	0	2.94E-09	0	7.93E-09	MND
Destruction of the stratospheric ozone layer that protects the earth from ultraviolet rays (harmful to life). This ozone destruction process is due to the breakdown of certain compounds containing chlorine and bromine (chlorofluorocarbons or halons) when they reach the stratosphere, causing the catalytic breakdown of ozone molecules.															
Acidification Potential of soil and Water Resources (AP) *kg SO2 equiv/UF*	2.79E-02	9.89E-04	1.46E-03	0	0	0	0	0	0	0	0	5.39E-05	0	2.04E-04	MND
Acid rain has negative impacts on natural ecosystems and the environment. The main sources of emissions of acidifying substances are agriculture and combustion of fossil fuels used for electricity production, heating and transportation.															
Eutrophication Potential (EP) *kg $(PO_4)^{3-}$ equiv/UF*	5.21E-03	1.70E-04	2.72E-04	0	0	0	0	0	0	0	0	9.24E-06	0	5.03E-05	MND
Adverse biological effects derived from excessive nutrient enrichment of waters and continental surfaces															
Formation Potential of Tropospheric Ozone Photochemical Oxidants (POPC)) *kg ethane equiv/UF*	3.51E-03	2.83E-04	1.92E-04	0	0	0	0	0	0	0	0	1.54E-05	0	3.68E-05	MND
Chemical reactions caused by sunlight energy. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic Resource Depletion Potential for Non-Fossil Resources (ADP- elements)	5.90E-06	5.60E-07	3.25E-07	0	0	0	0	0	0	0	0	3.05E-08	0	1.21E-08	MND
Abiotic Resource Depletion Potential for Fossil Resources (ADP-fossil fuels) *MJ/UF*	6.58E+01	4.47E+00	3.55E+00	0	0	0	0	0	0	0	0	2.43E-01	0	4.50E-01	MND
Consumption of non-renewable resources with the consequent reduction in availability for future generations.															

USE OF RESOURCES

Parameters	Product stage	Construction Process Stage		Usage Stage							End of Life Stage				D Potential for Reuse, Recovery and Recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste processing	C4 Waste disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/UF*	3.24E+01	5.52E-02	1.62E+00	0	0	0	0	0	0	0	0	3.00E-03	0	1.13E-02	MND
Use of renewable primary energy used as raw material - *MJ/UF*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Total use of renewable primary energy (primary energy and renewable primary energy resources used as raw material)- *MJ/UF*	3.24E+01	5.52E-02	1.62E+00	0	0	0	0	0	0	0	0	3.00E-03	0	1.13E-02	MND
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw material - *MJ/UF*	6.14E+01	4.44E+00	3.33E+00	0	0	0	0	0	0	0	0	2.42E-01	0	4.48E-01	MND
Use of non-renewable primary energy used as raw material - *MJ/UF*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Total use of non-renewable primary energy (primary energy and non-renewable primary energy resources used as raw material).- *MJ/UF*	6.14E+01	4.44E+00	3.33E+00	0	0	0	0	0	0	0	0	2.42E-01	0	4.48E-01	MND
Use of secondary materials. - *kg/UF*	1.87E+00	0	2.12E-02	0	0	0	0	0	0	0	0	0	0	0	MND
Use of renewable secondary fuels - *MJ/UF*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Jse of non-renewable secondary fuels - *MJ/UF*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Net use of running water resources - m^3/*UF*	3.08E-02	8.58E-04	1.61E-03	0	0	0	0	0	0	0	0	4.67E-05	0	4.33E-04	MND

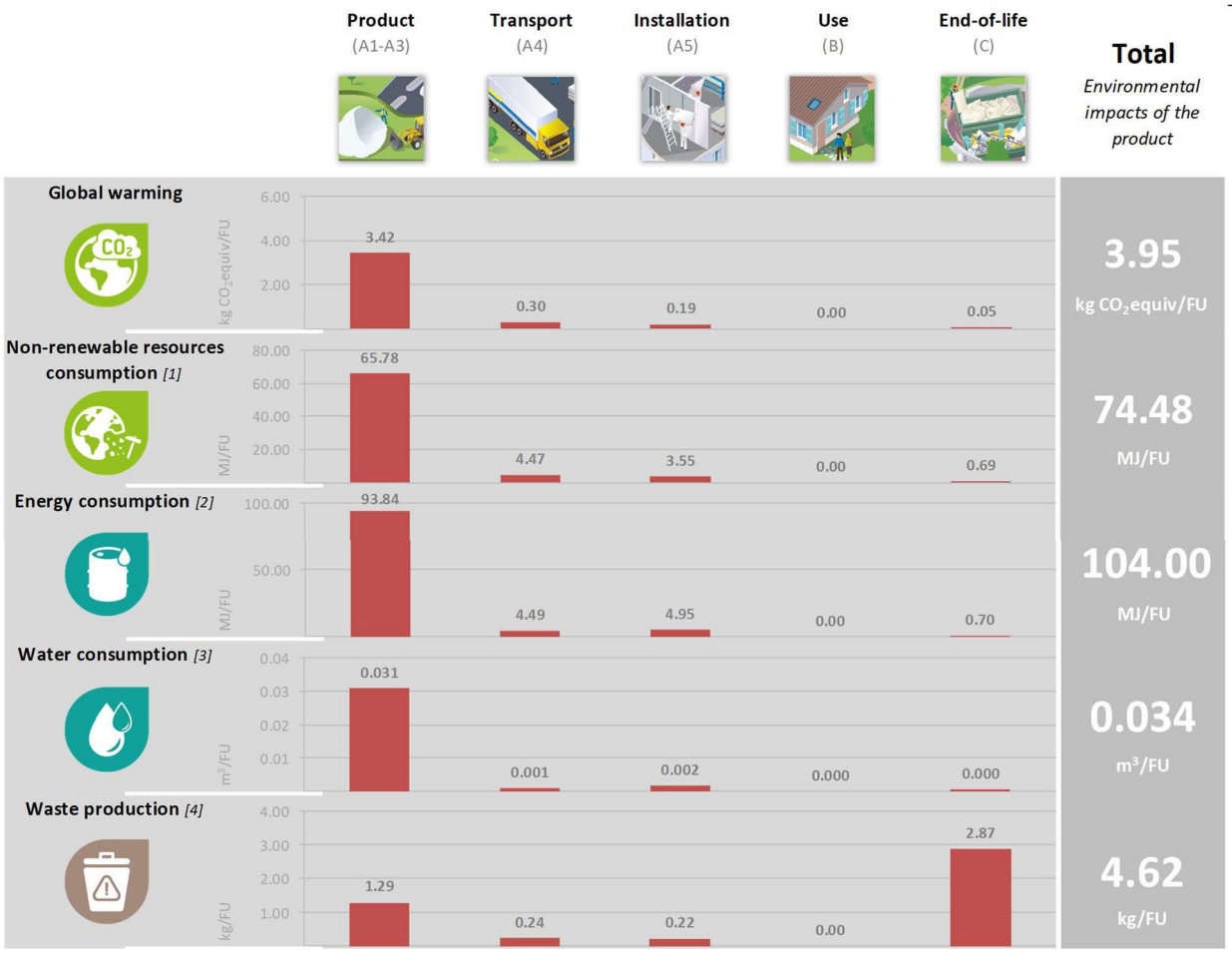
WASTE CATEGORIES															
Parameters	Product stage	Construction Process Stage		Usage Stage							End of Life Stage				D Potential for Reuse, Recovery and R ecycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction/D emolition	C2 Transport	C3 Waste processing	C4 Waste disposal	
Hazardous waste disposal *kg/FU*	1.74E-01	2.91E-03	8.88E-03	0	0	0	0	0	0	0	0	1.58E-04	0	2.03E-04	MND
Non-hazardous waste disposal *kg/FU*	1.12E+00	2.33E-01	2.11E-01	0	0	0	0	0	0	0	0	1.27E-02	0	2.86E+00	MND
Radioactive waste disposal *kg/FU*	8.22E-05	3.03E-05	5.84E-06	0	0	0	0	0	0	0	0	1.65E-06	0	2.63E-06	MND

OTHER OUTPUT FLOWS

Parameters	Product Stage	Construction Process Stage		Usage Stage							End of Life Stage				D Potential for Reuse, Recovery and Recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction/Demolition	C2 Transport	C3 Waste processing	C4 Waste disposal	
Components for reuse *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Materials for recycling *kg/FU*	2.22E-02	0	5.26E-01	0	0	0	0	0	0	0	0	0	0	0	MND
Materials for energy recovery *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Exported Energy (electrical, thermal,…) *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND

Interpretation of LCA Panels

The Product stage (A1-A3) is the one that has the greatest impact throughout its life cycle for the following impact indicators: Global warming, Consumption of non-renewable resources, energy and water consumption. The production of waste is mainly attributed to the End of Life stage.
This is because 100% of the product is deposited in (controlled) landfill at the end of its useful life.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

Bibliography

- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14020:2000 Environmental labels and declarations-General principles
- ISO 14025:2010: Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures.
- PCR 2012:01 Construction products and construction services v 2.3 (EN 15804:A1) and its sub-PCR I Thermal insulation products (EN 16783)
- UNE-EN 15804:2012+A1:2014 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- General Programme Instructions for the International EPD® System, version 2.5.
- Life Cycle Analysis of Isover Saint-Gobain (2018) insulating materials.
- Saint-Gobain Methodological guide for construction products (*Environmental Product Declaration Methodological Guide for Construction Products*).
- EN 15978 Sustainability of construction works-Assessment of environmental performance of buildings-Calculation method

Differences with Respect to Previous

Compared to the previous version of the document, 100% renewable electricity consumption in the factory has been introduced. At the same time, the factory data has been updated to 2018.

ENGLISH SUMMARY

Saint-Gobain Isover

Saint-Gobain Isover Ibérica, S.L. is part of the Saint-Gobain Group, the world leader in Habitat with innovative, energy-efficient solutions that contribute to environmental protection, and is the world leader in the manufacture of insulating materials. It offers, in mineral wool, the most complete range of thermal and acoustic insulation and fire protection solutions.

Product

This environmental declaration refers to CLIMAVER A2 APTA
The CLIMAVER APTA product is defined as a rigid panel of mineral wool by ISOVER designed for application in constructions acoustics ducts for HVAC.

Functional Unit

The functional unit is to provide the thermal insulation of 1 m² of product with a thermal resistance of 1,25 K·m²·W-1.

System boundaries

This present study is called “cradle to grave” because it includes all the life cycle stages of the product (manufacturing, transport to construction site, installation, use and end of life). The Module D has not been calculated.

Additional information

For further information, please contact Mr Alfonso Díez (alfonso.diez@saint-gobain.com) or Mr. Nicolás Bermejo (nicolas.bermejo@saint-gobain.com)

Results

ENVIRONMENTAL IMPACT OF 1 M2 OF CLIMAVER A2 APTA (25 mm thickness)		
Impact category	**Unit**	**Result**
Global warming potential	kg CO2-eq	3.95E+00
Photochemical ozone creation	kg Ethene-eq	4.04E-03
Acidification potential	kg SO2-eq	2.79E-02
Eutrophication potential	kg PO4--eq	5.71E-03
Abiotic depletion (fossil fuels)	MJ	6.83E-06