



FICHE DE DECLARATION ENVIRONNEMENTALE ET SANITAIRE DU PRODUIT

GEOPANNEL® PLUS FR2, PLUS FR2 AL AND PLUS FR2 NW 40 mm

Compliant with ISO 14025, NF EN 15804+A1 and its national complement NF EN 15804/CN



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Contents

1. GENERAL INFORMATION	4
1.1 Warning	5
1.2 Reading guide	5
1.3 Warning when using EPDs for product comparison	5
2. COMPANY INFORMATION	6
3. PRODUCT DESCRIPTION	6
3.1 Functional unit	6
3.2 Limits of the system	6
3.3 Product Description	7
3.4 Technical data and physical characteristics	8
3.5 Description of the main compounds and / or materials	8
3.6 Description of the Reference Service Life	9
4. LIFE CYCLE STAGES	9
4.1 System boundaries	9
5. INFORMATION FOR THE CALCULATION OF THE LIFE CYCLE ANALYSIS	14
5.1. PCR used	14
5.2. System boundaries	14
5.3. Geographical and temporal representativeness of the data	14
5.4. Secondary data	14
5.5. Allocation	14
5.6. Cut-off rules	14
5.7. Impact assessment methods	15
5.8. Variability of results	15
6. LIFE CYCLE ASSESSMENT RESULTS FOR THE 40 mm THICKNESS	15
7. INTERPRETATION OF RESULTS	20
8. ADDITIONAL INFORMATION ON THE RELEASE OF HAZARDOUS SUBSTANCES TO INDOOR AIR, SOIL AND WATER DURING THE USE STAGE	21
8.1 Emissions to air	21
8.2 Emissions to soil and water	21
9. CONTRIBUTION OF THE PRODUCT TO THE INDOOR AIR QUALITY	21
10. REFERENCES	22
ANNEX 1: RESULTS FOR THE PRODUCT WITH DESTINATION SPAIN FOR THE 40 mm THICKNESS	22

ANNEX 2: INFLUENCE OF THICKNESS.....	27
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1.GENERAL INFORMATION

Table 1 General information

MANUFACTURER'S NAME AND ADDRESS	GEOPANNEL C / LAS CAÑAS 101 P.I. CANTABRIA II 26009 LOGROÑO (LA RIOJA) SPAIN Tel: +34 941 255 321, Email: info@geopannel.com	
PRODUCTION SITE	C / LAS CAÑAS 101 P.I. CANTABRIA II 26009 LOGROÑO (LA RIOJA), SPAIN	
TYPE OF FDES	From the cradle to the grave. Individual.	
DISTRIBUTION CHANNEL	B to B & B to C	
VERIFICATION PROGRAM	Programme FDES-INIES Address: Association HQE. 4 Avenue du Recteur Poincaré 750116 Paris Web: http://www.inies.fr/acceuil/	
PRODUCT CATEGORY RULES (PCR)	NF EN 15804+A1 and its national complement NF EN 15804/CN	
TYPE OF VERIFICATION	EN 15804 standard serves as a core PCR. Independent third-party verification in accordance with ISO 14025 and EN 15804 as well as the specific PCRs mentioned above. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	
THIRD-PARTY VERIFIER	Sylvain Cléder, Evea Conseil Email : s.cleder@evea-conseil.com Web: www.evea-conseil.com	
TECHNICAL SUPPORT	Marcel Gómez Consultoría Ambiental www.marcelgomez.com Email: info@marcelgomez.com	
PREVIOUS VERSIONS	1ST VERSION OF THE FDES	
INCLUDED COMMERCIAL REFERENCES	GEOPANNEL PLUS FR2, PLUS FR2 AL, PLUS FR2 NW	
THICKNESS INCLUDED IN THIS FDES	40 mm	

1.1 Warning

The information contained in this declaration is provided under the responsibility of GEOPANNEL (producer of the FDES) according to standard NF EN 15804 + A1 and its national supplement NF EN 15804 / CN.

Any exploitation, total or partial, of the information provided in this document must at least be accompanied by the complete reference of the original FDES as well as its producer.

CEN standard EN 15804 + A1 and the national supplement NF EN 15804 / CN serve as rules for defining product categories (SPC).

NOTE: The literal translation in French of "EPD (Environmental Product Declaration)" is "DEP" (Environmental Product Declaration). However, in France, the term FDES (Environmental and Health Declaration Sheet) is commonly used, which combines both the Environmental Declaration and Health information for the product covered by this FDES. The FDES is therefore a "DEP" supplemented by health information.

1.2 Reading guide

The results of the indicators are presented in scientific format with 3 significant digits including 2 digits after the decimal point.

1.3 Warning when using EPDs for product comparison

EPDs of construction products may not be comparable if they do not comply with standard NF EN 15804 + A1.

Standard NF EN 15804 + A1 defined in § 5.3 Comparability of EPDs for construction products, the conditions under which construction products can be compared, based on the information provided by EPD.

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

2.COMPANY INFORMATION

In constant evolution, we recycle textiles and manufacture non-woven products for more than 70 years. Today, under the GEOPANNEL® brand, we manufacture the latest generation of thermo-acoustic, leading our sector in terms of quality and technology.

We are currently present in the automotive, construction, aeronautics, industrial ventilation, refrigeration, felts for upholstery, packaging, medical, decoration and footwear sectors. In GEOPANNEL® we dedicate an important part of our resources to Research and Development searching more effective and ecological solutions for all the sectors in which we are present.

With 15 Research and Development projects already carried out and two in progress, both at European and national level, we build our future and guarantee our customers the ability to adapt and immediate response to the needs of a changing world in constant evolution.

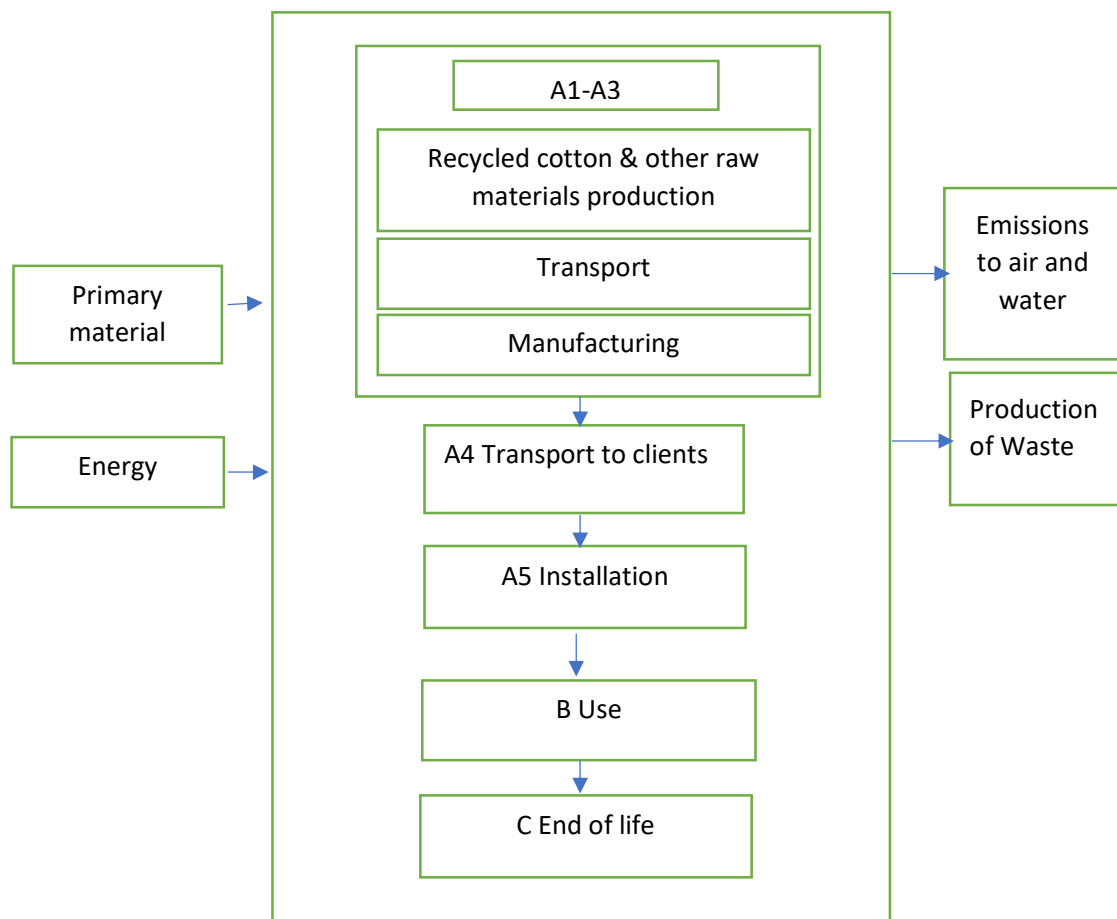
3 PRODUCT DESCRIPTION

3.1 Functional unit

To perform a thermal insulation function on 1 m² of wall for a thermal resistance value R of 1.25 K.m² / W (for 40 mm thickness) over a Reference Service Life of 50 years while ensuring the prescribed performance of the product. As a secondary function the product presents noise insulation properties.

3.2 Limits of the system

The limits of the system under study are shown below:



3.3 Product Description

GEOPANNEL® does not require special protection for its handling. As it does not contain mineral fibres, it is recommended for building roofs with air recirculation, ventilation ducts and busy premises, especially suitable for use in foodstuffs, large spaces such as auditoriums, classrooms, cinemas, etc.

This Fiche de Déclaration Environnementale et Sanitaire (FDES) describes the environmental impacts of the life cycle of 1 m² of Geopannel® PLUS FR2, PLUS FR2 AL (with aluminium facing by one face) and PLUS FR2 NW (with non-woven facing by one face) insulation panel of 40 mm thickness. As additional information (out of the scope of this FDES) in annex 2 it is explained how to obtain the results for the other thicknesses sold.

The product is manufactured with bonded regenerated cotton with thermosetting resin.

3.4 Technical data and physical characteristics

Table 2 Thermal resistance of the product

PRODUCT	THERMAL RESISTANCE (M2K/W)
GEOPANNEL PLUS FR2 40 mm	1.2500

Table 3 Technical specifications of the product

TECHNICAL SPECIFICATIONS	PERFORMANCE	STANDARD
Conductivity	0.032 W/m·K	EN 12667
Reaction to fire	Cs1d0	EN 13501-1
Parallel tensile strength	95 kPa	EN 1608
Dimensional stability	DS (70,-) 1 DS (70,90) 2	EN 1604
Water absorption	1 kg/m ²	EN 1609, method A
Density	45 ± 15%	EN 1602
Water vapour permeability	1 - 4	EN 12086
Water vapour permeability aluminium	< 0.03 g/m ² /d	EN 1921

3.5 Description of the main compounds and / or materials

Table 4 Composition of the product

Parameter	Value
Quantity of recycled cotton	70%-90%
Quantity of phenolic resin	10%-30%
Thickness	40 mm
Packaging	<ul style="list-style-type: none"> • PALLET-0.0783 kg • PE- 0,0132 kg
Biogenic Carbon stored	0,7999 Kg/m ²

The product does not contain any substance from the candidate list according to the REACH regulation (in a percentage bigger than 0.1% by mass).

3.6 Description of the Reference Service Life

Table 5 Description of the Reference Service Life

Parameter	Value
Reference service life (RSL)	50 years
Declared properties of the product when leaving the factory, finishing, etc.	Refer to the Declaration of Performance (DoP) according to the Règlement Produits de Construction (RPC)
Theoretical application parameters	-
Declared properties of the product when leaving the factory when the installation complies with the manufacturer's instructions	Compliant with EN 13172 standard
Exterior environment	The product is not intended to be used in the exterior.
Interior environment	Refer to the Declaration of Performance (DoP) according to the Règlement Produits de Construction (RPC)
Use conditions	See technical sheet of the product
Maintenance	The product does not need any maintenance

4. LIFE CYCLE STAGES

4.1 System boundaries

In accordance with standards NF EN 15804 + A1 and its national complement NF EN 15804 / CN, the modules included are the next (from cradle to grave):

Table 6. Life cycle modules included in the system boundaries.

Production stage			Construction process stage		Use stage							End of life stage				Module D
Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	
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

A1-A3 PRODUCTION STAGE

Description of the stage:

The stage of production of insulation panel is subdivided into three modules: A1) Raw material supply; A2) transport and A3) manufacturing.

A1 Raw material supply

This module takes into account the supply and processing of all raw materials and the energies that occur upstream of the manufacturing process. In particular, it covers the supply of raw materials (mainly recycled cotton and phenolic resin). These recycled materials actually make up the majority of the mix, up to 80% of the total.

A2 Transport

Raw materials transportation to the manufacturing site.

A3 Manufacturing



Products are made of recycled cotton fibers, mixed with phenolic resin. In the beginning of the process the fibers are crushed and opened. Then these fibers are mixed with two types of phenolic resin, according to the product. After the fiber orientation the raw materials are placed in an oven and finally stabilized and cooled. The process ends with the cut and packaging. During this process all the scrap is reintroduced in the beginning of the process again.

A4-A5 Construction process stage

The construction stage is divided into two modules: A4) Transport and A5) Construction-Installation.

A4 Transport

This module includes the transportation of the product from the manufacturing plant to the customer in France or Spain (results expressed in Annex 1).

Table 7. Specifications of the different types of transport used

PARAMETER	VALUE
Average distance to the construction site	983 km (France), 388 km (Spain)
Fuel type and vehicle consumption or type of vehicle used for transportation.	Average truck trailer with a 24t payload, diesel consumption 38 liters for 100 km
Use of truck capacity (including empty returns)	% assumed in Ecoinvent database
Coefficient of use of the volume capacity	1
Density of the product transported	45 kg/m ³

A5) Construction-Installation

This module includes the waste produced during the installation of the product in the building, the additional production generated to compensate for these losses (2% in our case) and the treatment of the produced waste (product losses+packaging).

Table 8. Main parameters / hypothesis applied in the Construction / Installation stage

PARAMETER	VALUE
Auxiliary materials for installation	No auxiliary input is used
Water use	-
Use of other resources	-
Quantitative description of the type of energy consumption during the installation process	No energy is used
Materials produced by waste treatment at the construction site, for example collection for recycling, energy recovery, disposal (specified by route)	Pallet: 0.0783 kg PE: 0,0132 kg Product losses: 2%
Materials produced by waste treatment at the construction site, for example collection for recycling, energy recovery, disposal (specified by route)	Packaging is 100% recycled. Product losses are 100% landfilled.
Direct emissions to air, water and soil	No direct emissions

B Use stage

The use stage is divided into the next modules:

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

No technical operation is necessary during the use phase until the end of life. Thus, there is no impact during this stage (except the energy savings during the use phase of the building in heating and cooling, which are not introduced in the LCA results).

C End of life stage

This stage includes the following modules: C1) Deconstruction, demolition; C2) Transport; C3) Waste processing; C4) Disposal.

C1) Deconstruction, demolition:

The deconstruction and / or dismantling of insulation products is part of the demolition of an entire building. In our case, the environmental impact is assumed to be very low and can be neglected.

C2) Transport

This module includes the transportation of waste to the waste manager.

C3) Waste processing

The product is currently considered to be landfilled without reuse, recovery and / or recycling.

C4) Disposal

The product is assumed to be 100% landfilled

Table 9. End of life scenario specifications

PARAMETER	VALUE
Collection process specified by type	100% of the product (1,8 Kg) is collected mixed with other construction waste.
Recovery system specified by type	-
Disposal specified by type	100% landfilled
Assumptions for scenario development (i.e. transportation)	Average truck trailer with a 24t payload, diesel consumption 38 liters for 100 km Distance: 50 km

D Benefits and loads beyond the system boundary

As the product is assumed to be 100% landfilled, no potential environmental savings due to recycling – reuse have been calculated.

5. INFORMATION FOR THE CALCULATION OF THE LIFE CYCLE ANALYSIS

5.1. PCR used

This declaration is based on standard NF EN 15804 + A1 and its national complement NF EN 15804 / CN.

5.2. System boundaries

From cradle to grave (A+B+C).

5.3. Geographical and temporal representativeness of the data

Primary data (i. e. consumption of raw materials and energy, transport distance to the customer) has been supplied by the manufacturer and corresponds to 2019.

5.4. Secondary data

Ecoinvent 3.5 database has been used together with Simapro 9.0. The electricity generation mix corresponds to that of Spain in 2018¹. The potential of global warming for the electric mix is 0.253 kg-eq. CO₂ / kWh.

5.5. Allocation

An allocation based in physical criteria has been made where necessary. The modularity principle has been followed. The polluter payer principle has been followed.

5.6. Cut-off rules

It has been included more than 99% of the total life cycle materials and energy use, and more than 95% of the materials and energy use per module.

¹ Source: Red Eléctrica Española. El sistema eléctrico español 2018.

5.7. Impact assessment methods

CML-IA v3.05 impact method has been used, together with EDIP v1.07 for waste production indicators and Cumulative Energy Demand v 1.11 for resource consumption indicators.

5.8. Variability of results

This FDES includes only GEOPANNEL® PLUS FR2, PLUS FR2 AL, PLUS FR2 NW in 40 mm thickness. As additional information in annex 2 it is shown how to obtain the results for other thicknesses. Since the results between the maximum value and the average value differs less than 40%, the average value has been indicated.

6.LIFE CYCLE ASSESSMENT RESULTS FOR THE 40 mm THICKNESS

Table 10. Environmental impacts

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Global warming (Kg CO ₂ -eq)	2,42E+00	1,65E-01	5,34E-02	0	0	0	0	0	0	0	0	8,33E-03	0	8,92E-03	2,66E+00	MND
Ozone depletion (kg CFC-11 eq)	1,63E-07	3,31E-08	4,26E-09	0	0	0	0	0	0	0	0	2,18E-09	0	2,80E-09	2,05E-07	MND
Acidification of soil and water (Kg SO ₂)	1,06E-02	4,36E-04	2,26E-04	0	0	0	0	0	0	0	0	3,76E-05	0	5,46E-05	1,14E-02	MND
Eutrophication (Kg PO ₄ eq)	1,54E-03	5,96E-05	3,26E-05	0	0	0	0	0	0	0	0	5,97E-06	0	9,14E-06	1,64E-03	MND
Photochemical ozone creation (Kg ethylene-eq)	1,22E-03	2,59E-05	2,53E-05	0	0	0	0	0	0	0	0	1,99E-06	0	2,76E-06	1,28E-03	MND
Abiotic depletion potential for non fossil resources-elements (Kg Sb-eq)	1,89E-05	3,22E-07	3,89E-07	0	0	0	0	0	0	0	0	1,37E-08	0	1,22E-08	1,96E-05	MND
Abiotic depletion potential for non fossil resources-fossil fuels (MJ)	4,61E+01	2,71E+00	1,00E+00	0	0	0	0	0	0	0	0	1,81E-01	0	2,35E-01	5,02E+01	MND
Water pollution (m3)	1,10E+02	1,56E+01	2,68E+00	0	0	0	0	0	0	0	0	1,02E+00	0	1,31E+00	1,31E+02	MND
Air pollution (m3)	1,18E+02	6,27E+00	2,54E+00	0	0	0	0	0	0	0	0	3,55E-01	0	4,15E-01	1,28E+02	MND

Table 11. Use of resources

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/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 processing	C4 Disposal		
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - MJ	6,48E+00	2,91E-02	1,31E-01	0	0	0	0	0	0	0	0	1,71E-03	0	2,05E-03	6,65E+00	MND
Use of renewable primary energy resources as raw materials - MJ	2,84E+01	0	5,68E-01	0	0	0	0	0	0	0	0	0	0	0	2,90E+01	MND
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	3,49E+01	2,91E-02	6,99E-01	0	0	0	0	0	0	0	0	1,71E-03	0	2,05E-03	3,56E+01	MND
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ	5,45E+01	2,92E+00	1,18E+00	0	0	0	0	0	0	0	0	1,95E-01	0	2,53E-01	5,91E+01	MND
Use of non-renewable primary energy resources as raw materials - MJ	9,04E+00	0	1,81E-01	0	0	0	0	0	0	0	0	0	0	0	9,22E+00	MND
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	6,36E+01	2,92E+00	1,36E+00	0	0	0	0	0	0	0	0	1,95E-01	0	2,53E-01	6,83E+01	MND
Use of secondary material - kg	1,52E+00	0	3,04E-02	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	1,55E+00	MND

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Use of renewable secondary fuels - MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Use of non-renewable secondary fuels - MJ/FU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Net fresh water use - m3 / FU	1,19E-02	6,40E-04	2,60E-04	0	0	0	0	0	0	0	0	3,01E-05	0	2,95E-04	1,31E-02	MND

Table 12. Other output flows

Waste category	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Hazardous waste eliminated - kg	3,96E-04	1,59E-06	7,98E-06	0	0	0	0	0	0	0	0	1,15E-07	0	1,55E-07	4,06E-04	MND
Non-hazardous waste eliminated - kg	2,99E-01	2,34E-01	4,78E-02	0	0	0	0	0	0	0	0	1,10E-02	0	1,80E+00	2,39E+00	MND
Radioactive waste eliminated - kg	8,47E-05	1,87E-05	2,26E-06	0	0	0	0	0	0	0	0	1,23E-06	0	1,58E-06	1,09E-04	MND
Components for reuse - kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Materials for recycling - kg	0	0	1,41E-01	0	0	0	0	0	0	0	0	0	0	0	1,41E-01	MND
Materials for energy recovery Kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Exported energy - MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND

7. INTERPRETATION OF RESULTS

As we can see in Figure 1, the impact on the life cycle of the product is dominated by A1-A3 Product stage. Thus, this stage represents between 96% (Abiotic depletion potential resources-elements) and 79% (Ozone layer depletion) of the total impact of the life cycle. The next stage with the biggest impact is A4 Transport, which represents between 16% (Ozone layer depletion) and 2% (Abiotic depletion potential resources-elements) of the total impact of the life cycle. A5 Installation stage represents 2% of the total impact for all impact categories. The transport of waste to the landfill (C2) represents less than 1% of the total impact. C4 Disposal stage represents between 2% (Ozone layer depletion) and less than 1% of the total impact of the product.

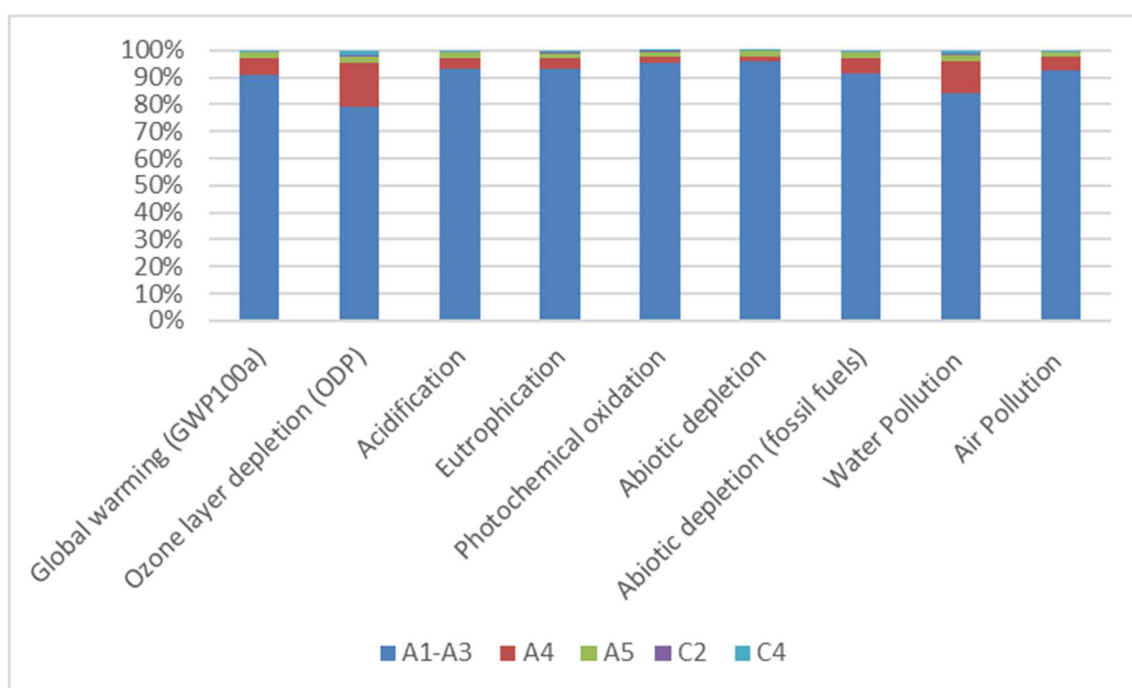


Figure 1. Potential impact on the environment of the life cycle one m² of product, in percentage.

8. ADDITIONAL INFORMATION ON THE RELEASE OF HAZARDOUS SUBSTANCES TO INDOOR AIR, SOIL AND WATER DURING THE USE STAGE

8.1 Emissions to air

PARAMETER	VALUE
COV AND FORMALDEHYDE	No test has been performed. The company presents its commitment to perform it during 2021 in compliance with the French Arrêté of April 19, 2011 relating to the labeling of construction products or wall or floor coverings and paints and varnishes on their emissions of volatile pollutants.
RADIOACTIVE EMISSIONS	Not relevant, no test has been performed.
BEHAVIOUR TOWARDS MICROORGANISMS	No test has been performed
EMISSION OF FIBERS AND PARTICLES	No test has been performed

8.2 Emissions to soil and water

Non pertinent for this product.

9. CONTRIBUTION OF THE PRODUCT TO THE INDOOR AIR QUALITY

PARAMETER	VALUE
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF HYGROTHERMAL COMFORT CONDITIONS IN THE BUILDING	The installation of GEOPANNEL® allows energy savings during the use phase of a building. Thermal conductivity = 0,032 W / mK.
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF ACOUSTIC COMFORT CONDITIONS IN THE BUILDING	Coefficient of absorption (Aw) Without Plenum=0.8 With Plenum=0.85 Standard (UNE-EN ISO 354)
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF VISUAL COMFORT CONDITIONS IN THE BUILDING	Materials can be seen in acoustic conditioning solutions or decorative acoustics. Slightly rough surface in bluish gray, green or yellow colors, with the possibility of coating in other colors, conveying a feeling of warmth and softness
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF OLFACTIVE COMFORT CONDITIONS IN THE BUILDING	No test has been performed

10. REFERENCES

- Life Cycle Assessment of Geopannel® insulation products (2020).
- ISO 14040:2006. Environmental management -- Life cycle assessment -- Principles and framework
- ISO 14044:2006. Environmental management -- Life cycle assessment -- Requirements and guidelines
- ISO 14025:2006. Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- EN 15804:2012+A1:2013 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- Arrêté du 23 décembre 2013 relatif à la déclaration environnementale des produits de construction et de décoration destinés à un usage dans les ouvrages de bâtiment (2013)
- Complément national à la NF EN 15804+A1: Contribution des ouvrages de construction au développement durable - Déclarations environnementales sur les produits – Règles régissant les catégories de produits de construction (2016)
- Règlement du programme de vérification INIES (2020)

ANNEX 1: RESULTS FOR THE PRODUCT WITH DESTINATION SPAIN FOR THE 40 mm THICKNESS

Table 14. Environmental impacts

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Global warming (Kg CO ₂ -eq)	2,42E+00	6,52E-02	5,14E-02	0	0	0	0	0	0	0	0	7,74E-03	0	9,51E-03	2,55E+00	MND
Ozone depletion (kg CFC-11 eq)	1,63E-07	1,31E-08	3,86E-09	0	0	0	0	0	0	0	0	1,55E-09	0	3,43E-09	1,85E-07	MND
Acidification of soil and water (Kg SO ₂)	1,06E-02	1,73E-04	2,21E-04	0	0	0	0	0	0	0	0	2,05E-05	0	7,17E-05	1,11E-02	MND
Eutrophication (Kg PO ₄ eq)	1,54E-03	2,36E-05	3,19E-05	0	0	0	0	0	0	0	0	2,80E-06	0	1,23E-05	1,61E-03	MND
Photochemical ozone creation (Kg ethylene-eq)	1,22E-03	1,02E-05	2,50E-05	0	0	0	0	0	0	0	0	1,22E-06	0	3,53E-06	1,26E-03	MND
Abiotic depletion potential for non fossil resources-elements (Kg Sb-eq)	1,89E-05	1,28E-07	3,85E-07	0	0	0	0	0	0	0	0	1,52E-08	0	1,07E-08	1,94E-05	MND
Abiotic depletion potential for non fossil resources-fossil fuels (MJ)	4,61E+01	1,07E+00	9,71E-01	0	0	0	0	0	0	0	0	1,27E-01	0	2,88E-01	4,85E+01	MND
Water pollution (m3)	1,10E+02	6,17E+00	2,49E+00	0	0	0	0	0	0	0	0	7,32E-01	0	1,60E+00	1,21E+02	MND
Air pollution (m3)	1,18E+02	2,48E+00	2,47E+00	0	0	0	0	0	0	0	0	2,95E-01	0	4,75E-01	1,24E+02	MND

Table 15. Use of resources

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - MJ	6,48E+00	1,15E-02	1,30E-01	0	0	0	0	0	0	0	0	1,37E-03	0	2,39E-03	6,63E+00	MND
Use of renewable primary energy resources as raw materials - MJ	2,84E+01	0	5,68E-01	0	0	0	0	0	0	0	0	0	0	0	2,90E+01	MND
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	3,49E+01	1,15E-02	6,98E-01	0	0	0	0	0	0	0	0	1,37E-03	0	2,39E-03	3,56E+01	MND
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ	5,45E+01	1,16E+00	1,14E+00	0	0	0	0	0	0	0	0	1,37E-01	0	3,10E-01	5,73E+01	MND
Use of non-renewable primary energy resources as raw materials - MJ	9,04E+00	0	1,81E-01	0	0	0	0	0	0	0	0	0	0	0	9,22E+00	MND
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	6,36E+01	1,16E+00	1,33E+00	0	0	0	0	0	0	0	0	1,37E-01	0	3,10E-01	6,65E+01	MND
Use of secondary material - kg	1,52E+00	0	3,04E-02	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	1,55E+00	MND

Indicator	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Use of renewable secondary fuels - MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Use of non-renewable secondary fuels - MJ/FU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Net fresh water use - m3 / FU	1,19E-02	2,54E-04	2,53E-04	0	0	0	0	0	0	0	0	3,01E-05	0	2,95E-04	1,27E-02	MND

Table 16. Other output flows

Waste category	Production stage	Construction process stage		Use stage							End of life stage				Total	Module D
	A1/A2/A3	A4 Transport	A5 Construction/ 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 processing	C4 Disposal		
Hazardous waste eliminated - kg	5,56E-04	6,30E-07	1,11E-05	0	0	0	0	0	0	0	0	7,49E-08	0	1,95E-07	5,68E-04	MND
Non-hazardous waste eliminated - kg	2,99E-01	9,26E-02	4,50E-02	0	0	0	0	0	0	0	0	1,10E-02	0	1,80E+00	2,25E+00	MND
Radioactive waste eliminated - kg	8,31E-05	7,40E-06	2,00E-06	0	0	0	0	0	0	0	0	8,79E-07	0	1,93E-06	9,53E-05	MND
Components for reuse - kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Materials for recycling - kg	0	0	1,41E-01	0	0	0	0	0	0	0	0	0	0	0	1,41E-01	MND
Materials for energy recovery Kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND
Exported energy - MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00E+00	MND

ANNEX 2: INFLUENCE OF THICKNESS

This FDES describes a thickness range of between 10 mm and 60 mm but the results are only for 40 mm thickness. The other thicknesses are out of scope in this FDES. The following table shows the multiplication factors for each individual thickness in the product family. In order to determine the environmental impacts associated with a given product, the results for 40 mm thickness must be multiplied by the corresponding multiplication factor. To obtain this factor, a conservative principle has been followed, with the real impact being slightly lower than that indicated in the table.

PRODUCT THICKNESS (mm)	MULTIPLICATION FACTOR
10	0.25
20	0.50
30	0.75
40	1.00
50	1.25
60	1.50