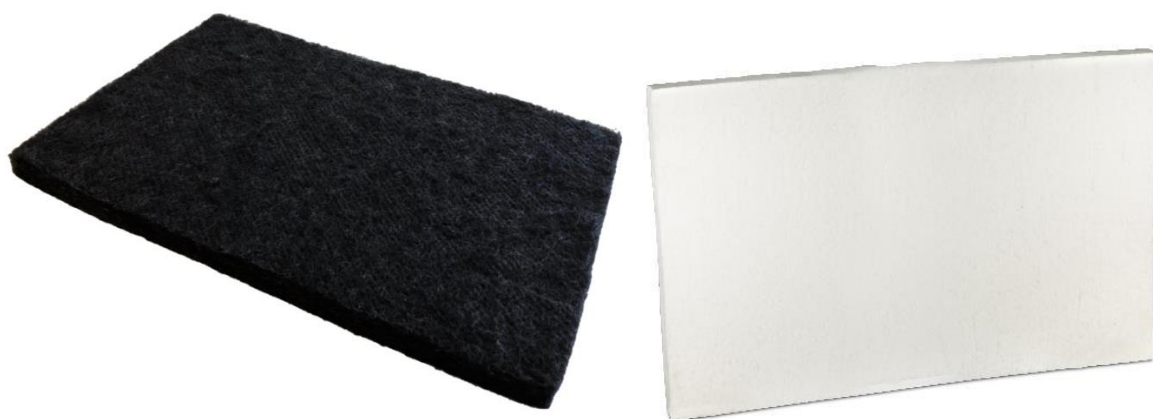




## FICHE DE DECLARATION ENVIRONNEMENTALE ET SANITAIRE DU PRODUIT

### GEOPANNEL® GEOPET

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



**Declaration holder: GEOPANNEL®**  
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## Warning

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

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

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

## Reading guide

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

## Warning when using FDES 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 the FDES:

**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).**

NOTE: The literal translation in French of "EPD (Environmental Product Declaration)" is "DEP" (Déclaration Environnementale de Produit). However, in France, the term FDES (Fiche de Déclaration Environnementale et Sanitaire du Produit) 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. GENERAL INFORMATION

Table 1. General information

<b>MANUFACTURER'S NAME AND ADDRESS</b>	GEOPANNEL C/ LAS CAÑAS 101 P.I. CANTABRIA II 26009 LOGROÑO (LA RIOJA)SPAIN Tel: +34 941 255 321 Email: info@geopannel.com	
<b>PRODUCTION SITE</b>	C/ LAS CAÑAS 101 P.I. CANTABRIA II 26009 LOGROÑO (LA RIOJA), SPAIN	
<b>TYPE OF DEP</b>	From cradle to grave with module D. Individual.	
<b>DISTRIBUTION CHANNEL</b>	B2B & B2C	
<b>VERIFICATION PROGRAM</b>	Programme FDES-INIES Address: Association HQE. 4 Avenue du Recteur Poincaré 750116 Paris Web: <a href="http://www.inies.fr/acceuil/">http://www.inies.fr/acceuil/</a>	
<b>PRODUCT CATEGORY RULES (PCR)</b>	NF EN 15804+A1 and its national complement NF EN 15804/CN	
<b>TYPE OF VERIFICATION</b>	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	
<b>THIRD-PARTY VERIFIER</b>	Etienne Lees-Perasso TIDE - Transmettre et Inspirer la Décroissance Environnementale Email: elp@tide-env.fr	
<b>TECHNICAL SUPPORT</b>	Marcel Gómez Consultoría Ambiental Email: info@marcelgomez.com Web: www.marcelgomez.com	
<b>PREVIOUS VERSIONS</b>	1ST VERSION OF THE FDES	
<b>INCLUDED COMMERCIAL REFERENCES</b>	GEOPANNEL® GEOPET NOISEFREE, NOISEFREE Wh and R-PET Seaqual	
<b>THE THICKNESS COVERED IN THE FDES</b>	80 mm	

## 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. DESCRIPTION OF THE FUNCTIONAL UNIT OF THE PRODUCT

### 3.1 Functional unit

To perform thermal insulation function on 1 m<sup>2</sup> of wall over a Reference Service Life of 50 years while ensuring the prescribed performance of the product. The thermal resistance values corresponding to 80 mm nominal thickness vary slightly among the three studied products:

- R value of NOISFREE: 2,162 K.m<sup>2</sup>/W
- R value of NOISFREE Wh and R-PET SEAQUAL: 2,286 K.m<sup>2</sup>/W

It should be noted that this difference in thermal resistance value owes to the color of the recycled material in each type of product, and not the variation in composition. In section [3.2](#) and [3.4](#), below this information will be further explained.

As a secondary function the product presents noise insulation properties.

### 3.2 Description and use of the product

GEOPANNEL® GEOPET is a family of ecological insulation panel with high thermal and acoustic performance. Designed to maintain its performance throughout the life of the building. All made with 80% recycled PET fibers and 20% polyester fibre and thus, 100% recyclable with a low carbon footprint. Hydrophobic, does not contain mineral fibers, irritation-free. Reaction to fire Bs1d0. This family include three products: NOISEFREE, NOISEFREE Wh and R-PET SEAQUAL, which have the same composition, only vary in colours. Due to this fact, the variation in terms of environmental impacts of these three products is considered to be 0%.

These products are visible solutions for acoustic conditioning, ventilated facades in light, metal or stone cladding, double ceramic sheet ventilated facades with a maximum height of 28 m. They can be applied on horizontal enclosures on continuous false ceilings, accessible false ceilings and perforated false ceilings, perforated panels, whether metallic, plaster or wood, non-load-bearing floor insulation. They can be as

well used as acoustic absorbers.

Regarding NOISEFREE Wh and R-PET SEAQUAL, on facades of great height the material can be used by installing a fire barrier following the DB-SI indicators of CTE.

NOISFREE is available in black and anthracite grey; NOISEFREE Wh and R-PET SEAQUAL are available in white.

This Fiche de Déclaration Environnementale et Sanitaire (FDES) describes the environmental impacts of the life cycle of 1 m<sup>2</sup> of GEOPANNEL® GEOPET range, including NOISFREE, NOISEFREE Wh and R-PET SEAQUAL insulation panels of 80 mm thickness. As additional information (out of the scope of this FDES) in the Annex it is explained how to obtain the results for the other marketed thicknesses.

### 3.3 Technical data and physical characteristics

In Table 2 the physical and technical characteristics of three GEOPET products are presented:

Table 2. Technical specifications of the product

TECHNICAL SPECIFICATIONS	APPLIED TEST STANDARD	NOISEFREE	NOISEFREE Wh	R-PET SEAQUAL
Nominal thickness (mm)	EN 823	80		
Density (kg/m <sup>3</sup> )	EN 1602	30 ± 15		
Thermal resistance (m <sup>2</sup> K/W)	EN 12667	2,162	2,286	
Reaction to fire (class)	EN 13501-1	Bs1d0		
Thermal conductivity λD (W/m·K)	EN 12667 (Category I)	0,037	0,035	
Parallel tensile strength (kPa)	EN 1608	54		
Dimensional stability	EN 1604	0,03		
Water absorption (kg/m <sup>2</sup> )	EN 1609, method A	0,3		
Combustion resistance of materials used for upholstered furniture	CAL TB 117:2013 Section 3	PASSES. No sample shows signs of latent combustion after the test.		
Flammability of upholstered furniture	BS 5852:2006 Burning cigarette	PASS. Does not present latent combustion, nor with flame, nor danger due to accelerated combustion		

### 3.4 Description of the main compounds and / or materials

The following data is representative for all three studied products and the production process:

Table 3. Composition of the product

PARAMETER	VALUE per FUNCIONAL UNIT
Recycled PET fibre	80%
Polyester fibre	20%

Packaging	<ul style="list-style-type: none"> <li>• Wooden pallet: 9,96E-03 kg</li> <li>• PE film: 4,25E-02 kg</li> </ul>
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As mentioned earlier, the composition is the same for all three products. Different colors of recycled PET fibre are used for each line of product, which give distinctive visual effect and yield different R-value. Due to this fact, the variation in terms of environmental impacts of the three products are neglectable.

### 3.5 Specification of Substances of Very High Concern

The products do 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 4. 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	DTU 45
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 of buildings.
Interior environment	Refer to the Declaration of Performance (DoP) according to the Règlement Produits de Construction (RPC)
Use conditions	Insulation panel made with recycled PET fibre
Maintenance	The product does not require any maintenance

### 3.7 Biogenic carbon content

The biogenic carbon content in the products and their packaging materials are presented in the following table:

Table 5. Description of biogenic carbon content of the functional unit

Results per Functional Unit		
BIOGENIC CARBON CONTENT	Unit	Quantity
Biogenic carbon content in the product	kg C	0
Biogenic carbon content in the packaging	kg C	4,98E-03

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO<sub>2</sub>



## 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 following (from cradle to grave with module D):

Table 6. Life cycle modules included in the system boundaries

	Production stage			Construction process stage		End of life stage							End of life stage			Materials recovery stage		
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Construction installation	Use	Maintenance	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Potential for reuse, recovery and recycling	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Declared module	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	x
Geography	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	
Specific data	> 95% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-	
Product variation	NR			-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Site variation	Manufactured in one production site			-	-	-	-	-	-	-	-	-	-	-	-	-	-	

NR = Not relevant

### 4.2 LCA information

#### A1-A3 Production stage

The product stage comprised of 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 to the manufacturing process. The product is made of PET fibre and polyester fibre. The PET fibre is 100% post-consumer recycled from plastic bottles.

## A2 Transport

This module includes the transport of the different materials from the suppliers to the factory where the final products are made. The distance and type of truck for each raw material have been introduced.

## A3 Manufacturing

At the production plant, first, the recycled PET fibre is crushed, opened and mixed with polyester resin. After the fibre orientation phase is the polymerization phase. Next, the mixture is placed in an oven to stabilize and cool. The panels are then cut into commercialized dimensions. The process ends with the panels packed into plastic bags and loaded onto wooden pallets. The plastic bags are made with 25% recycled PE. The pallets have an average reutilization rate of 25 times.

During the manufacturing process, all the scraps of material are reintroduced and processed together with the following batch, hence 0% loss is considered.

The demonstration of the production process is presented below:



## A4-A5 Construction process stage

The construction stage comprises of 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 Spain. The main parameters that affect the result of this stage are:

Table 7. Specifications of the different types of transport used

PARAMETER	VALUE per FUNCTIONAL UNIT
Average distance	<ul style="list-style-type: none"> <li>• 406,5 km by small truck</li> <li>• 91,7 km by van</li> </ul>

Fuel type and vehicle consumption or type of vehicle used for transportation.	<ul style="list-style-type: none"> <li>• Transport van 3,5-7 tn EURO5. Diesel consumption: 0,109 kg/tkm</li> <li>• Small truck 7,5-16 tn EURO5. Diesel consumption: 0,047 kg/tkm</li> </ul>
Use of truck capacity (including empty returns)	% assumption from in Ecoinvent database
Coefficient of use of the volume capacity	<1
Density of the product transported	< 30 kg/m <sup>3</sup> Including packaging

## A5 Construction-Installation

This module includes all materials and energy used for the installation of the product. At the same time, the transport and management of the waste produced are taken into account.

As per GEOPANNEL's initiatives to lower its products environmental impacts, the company offers to its clients "made to measure" service, by which the panels' dimensions are customized to clients' particular project, hence losses in installation are considered to be as low as 2%.

The high cohesion of GEOPANNEL® products make its installation possible without ancillary elements in dry building solutions. The installation is carried out manually and the panels can be easily cut by regular scissors or utility knife, therefore it is not necessary the use of water nor any type of energy. All packaging waste including wooden pallet and PE bags are sent to the closest recycling facility. The pallets have a reutilization average of 25 times.

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

PARAMETER	VALUE per FUNCTIONAL UNIT
Auxiliary inputs 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)	<ul style="list-style-type: none"> <li>• Wooden pallet: 9,96E-03 kg</li> <li>• PE bag: 4,25E-02 kg</li> <li>• Product loss: 2%</li> </ul>
Materials produced by waste treatment at the construction site, for example collection for recycling, energy recovery, disposal (specified by route)	<ul style="list-style-type: none"> <li>• Packaging materials and scraps are 100% recycled.</li> <li>• Wooden pallets are reused 25 times on average</li> </ul>
Direct emissions to air, water and soil	No direct emissions

## B Use stage

This stage is made up of B1 Use, B2 Maintenance, B3 Repair, B4 Substitution, B5 Rehabilitation, B6 Use of

energy in service and B7 Use of water in service.

Once the installation is completed, no technical actions nor operations are required during the use stages until end of life. Therefore, the insulation panels have no impact (excluding potential energy savings) at this stage.

### C End of life stage

This stage includes the following modules: C1 Deconstruction/ demolition; C2 Transport; C3 Waste processing and C4 Final disposal.

The company is currently implementing a RECYCLING service for their insulation panels once they complete their useful life. The dismantling of these products is advised to be manual and mechanical to facilitate the recovery process.

The types and ratios of waste treatment operations are considered to be the most updated statistic by Eurostat<sup>1</sup> database. In concrete, 47% is destined to recycling, 45% to landfill and 7% to incineration without energy recovery.

All the information regarding the end-of-life stage of the products is resumed in the table below:

Table 9. End of life scenario specifications

MODULE	PARAMETER	UNIT	VALUE per FUNCTIONAL UNIT
<b>C1 Dismantling</b>	Process of collection specified by type	Kg collected manually and separately	2,4 kg
		Kg collected mixed with construction waste	0
<b>C2 Transportation</b>	Fuel type and consumption, type of vehicles used for the transport	Truck 16 t EURO5	Diesel consumption: 0,037 kg/tkm
	Distance	km	50 km
	Capacity use	% assumption by Ecoinvent	100% volume outbound trip
	Useful capacity factor		1
<b>C3 Waste treatment</b>	Recovery system specified by type	Kg for reuse	0
		Kg for recycling	1,128 kg
		Kg for energy recovery	0
		Kg to incineration	0,168 kg
<b>C4 Final disposal</b>	Type of disposal	Kg to landfill	1,080 kg

<sup>1</sup> Management of waste excluding major mineral waste, by waste management operations. Eurostat 2018.

## D Benefits and loads beyond the system boundary

In the central facilities of GEOPANNEL, the end-of-life products are received, classified, and revalued. They are then given new shapes into new insulation products that can be installed again in other projects.

The recycling rate of the products is considered to be the most current Recycling rate documented by Eurostat for Spain (2018) and the recycling efficiency is recovered from Product Environmental Footprint Category Rules (PEFCRs) for Thermal insulation products.

This study claims the environmental benefits of recovered materials.

## 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 with module D (A+B+C+D).

### 5.3 Geographical and temporal representativeness of primary 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 2021 basing on direct monitoring, purchase records and utility bills, being representative for the products studied and the production process.

### 5.4 Secondary data

Ecoinvent 3.8 database has been used together with Simapro 9.3. The electricity generation mix corresponds to the supplier's information.

### 5.5 Allocation

An allocation based in physical criteria has been made where necessary. The modularity principle, as well as the polluter payer principle have been followed.

An allocation by m<sup>2</sup> has been made for energy consumption and waste generated during manufacturing. This is due to the fact that (1) the manufacturing processes are the same for all products and (2) the output flow is m<sup>2</sup> of products with the same delivered function, as the production uses m<sup>2</sup> as indicator.

## 5.6 Cut-off rules

95% of all the materials and energy inputs and outputs of each module have been included, identified in the life cycle inventory and at least 99% of the total life cycle.

## 5.7 Impact assessment methods

CML-IA v3.07 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

At the composition level, the three studied GEOPET products share the same Production Stage, that is the types of raw materials, acquisition of these materials, production processes and packaging materials. At this stage, the only difference of these products is their colors (coming from raw materials), which yield slightly distinct thermal resistance values. For this reason, they are separated into 3 different products.

At the time of development of this report, R-PET Seaqual has not been yet marketed. Data regarding the Distribution and Construction stage is hence assumed to be the same as NOISFREE products.

Taking these two points into account, no action was necessary for the calculation of average product.

This FDES includes three GEOPANNEL® GEOPET products: NOISEFREE, NOISFREE Wh and R-PET SEAQUAL in 80 mm thickness.

As additional information, the enclosed Annex demonstrates how to obtain the results for other thicknesses using conversion factors.

## 6. LCA RESULTS FOR NOMINAL THICKNESS

The following results are valid for the functional unit of all three Geopanel GEOPET products:

Table 10. Environmental impacts

Environmental impacts	Production stage				Construction process stage			Use stage							End of life stage					Module D	Total	
	A1 Acquisition of raw materials	A2 Transport	A3 Manufacturing	Total A1-A3	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	Total B1-B7	C1 Deconstruction	C2 Transport	C3 Waste processing	C4 Disposal			Total C1-C4
Global warming (Kg CO2-eq)	5,43E+00	6,55E-02	4,84E-01	5,98E+00	4,42E-01	1,29E-01	5,72E-01	0	0	0	0	0	0	0	0	0	3,29E-02	3,40E-01	8,64E-02	4,59E-01	-2,55E+00	7,01E+00
Ozone depletion (kg CFC-11 eq)	5,09E-07	1,24E-08	4,80E-08	5,69E-07	8,27E-08	1,32E-08	9,58E-08	0	0	0	0	0	0	0	0	0	6,22E-09	2,05E-10	8,18E-10	7,24E-09	-2,39E-07	6,72E-07
Acidification of soil and water (Kg SO2)	1,69E-02	1,76E-04	1,16E-03	1,82E-02	1,11E-03	3,88E-04	1,50E-03	0	0	0	0	0	0	0	0	0	8,84E-05	4,98E-05	4,27E-05	1,81E-04	-7,94E-03	1,99E-02
Eutrophication (Kg PO4 eq)	4,27E-03	3,03E-05	1,18E-04	4,41E-03	1,84E-04	9,23E-05	2,76E-04	0	0	0	0	0	0	0	0	0	1,52E-05	1,52E-05	6,98E-05	1,00E-04	-2,00E-03	4,79E-03
Photochemical ozone creation (Kg ethylene-eq)	1,21E-03	6,45E-06	9,06E-05	1,31E-03	4,13E-05	2,71E-05	6,84E-05	0	0	0	0	0	0	0	0	0	3,24E-06	1,27E-06	1,53E-05	1,98E-05	-5,70E-04	1,40E-03
Abiotic depletion potential for non-fossil resources-elements (Kg Sb-eq)	1,47E-06	2,87E-09	3,80E-08	1,51E-06	1,92E-08	3,07E-08	4,99E-08	0	0	0	0	0	0	0	0	0	1,44E-09	2,88E-10	2,90E-10	2,02E-09	-6,93E-07	1,57E-06
Abiotic depletion potential for non-fossil resources-fossil fuels (MJ)	7,49E+01	9,33E-01	8,71E+00	8,46E+01	6,24E+00	1,83E+00	8,06E+00	0	0	0	0	0	0	0	0	0	4,69E-01	1,36E-02	8,06E-02	5,63E-01	-3,52E+01	9,32E+01
Water pollution (m3)	1,71E+03	5,46E+00	7,27E+00	1,73E+03	3,65E+01	3,53E+01	7,18E+01	0	0	0	0	0	0	0	0	0	2,74E+00	1,36E+00	6,94E-01	4,80E+00	-8,06E+02	1,80E+03
Air pollution (m3)	1,22E+02	1,48E+00	7,75E+00	1,31E+02	7,78E+00	2,80E+00	1,06E+01	0	0	0	0	0	0	0	0	0	7,45E-01	2,91E-01	2,21E-01	1,26E+00	-5,74E+01	1,43E+02

Table 11. Use of resources

Use of resources	Production stage				Construction process stage			Use stage							End of life stage				Module D	Total				
	A1 Acquisition of raw materials	A2 Transport	A3 Manufacturing	Total A1-A3	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	Total B1-B7	C1 Deconstruction	C2 Transport	C3 Waste processing			C4 Disposal	Total C1-C4		
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - MJ	7,82E+00	1,43E-03	7,21E-01	8,54E+00	9,58E-03	1,71E-01	1,81E-01	0	0	0	0	0	0	0	0	0	7,20E-04	4,85E-04	2,86E-03	4,06E-03	-	3,67E+00	8,72E+00	
Use of renewable primary energy resources as raw materials - MJ	0	0	0	0	0	1,39E-01	1,39E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,39E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	7,82E+00	1,43E-03	7,21E-01	8,54E+00	9,58E-03	3,10E-01	3,20E-01	0	0	0	0	0	0	0	0	0	7,20E-04	4,85E-04	2,86E-03	4,06E-03	-	3,67E+00	8,86E+00	
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ	1,00E+02	9,93E-01	1,34E+01	1,15E+02	6,63E+00	2,44E+00	9,07E+00	0	0	0	0	0	0	0	0	0	4,99E-01	1,56E-02	9,00E-02	6,04E-01	-	4,72E+01	1,24E+02	
Use of non-renewable primary energy resources as raw materials - MJ	0	0	0	0	0	1,80E+00	1,80E+00	0	0	0	0	0	0	0	0	0	0	5,17E+00	0	5,17E+00	0	0	0	6,98E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ	1,00E+02	9,93E-01	1,34E+01	1,15E+02	6,63E+00	4,24E+00	1,09E+01	0	0	0	0	0	0	0	0	0	4,99E-01	5,19E+00	9,00E-02	5,78E+00	-	4,72E+01	1,31E+02	
Use of renewable secondary fuels - MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,93E+00



Use of non-renewable secondary fuels – MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net freshwater use - m3	8,97E-02	2,57E-06	3,50E-03	9,32E-02	1,71E-05	1,86E-03	1,88E-03	0	0	0	0	0	0	0	0	1,29E-06	8,03E-05	1,40E-05	9,56E-05	-4,21E-02	0

Table 12. Waste categories

Waste categories	Production stage				Construction process stage			Use stage							End of life stage					Module D	Total	
	A1 Acquisition of raw materials	A2 Transport	A3 Manufacturing	Total A1-A3	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	Total B1-B7	C1 Deconstruction	C2 Transport	C3 Waste processing	C4 Disposal			Total C1-C4
Hazardous waste eliminated - kg	9,66E-03	2,46E-06	7,42E-06	9,67E-03	1,64E-05	1,94E-04	2,10E-04	0	0	0	0	0	0	0	0	0	1,29E-06	8,03E-05	1,40E-05	9,56E-05	-4,21E-02	9,97E-03
Non-hazardous waste eliminated - kg	3,60E-01	3,85E-05	9,67E-03	3,70E-01	2,58E-04	7,41E-03	7,66E-03	0	0	0	0	0	0	0	0	0	1,79E-04	6,22E-05	3,77E-04	6,18E-04	-6,50E-01	3,78E-01
Radioactive waste eliminated - kg	3,37E-04	6,69E-06	5,65E-05	4,00E-04	4,47E-05	8,96E-06	5,36E-05	0	0	0	0	0	0	0	0	0	1,10E-04	7,59E-05	6,57E-04	8,43E-04	-1,30E+00	1,30E-03

Table 13. Other output flows

Output flow	Production stage				Construction process stage			Use stage							End of life stage					Module D	Total		
	A1 Acquisition of raw materials	A2 Transport	A3 Manufacturing	Total A1-A3	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	Total B1-B7	C1 Deconstruction	C2 Transport	C3 Waste processing	C4 Disposal			Total C1-C4	
Components for reuse - kg	0	0	0	0	0	6,64E-04	6,64E-04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,64E-04
Materials for recycling - kg	0	0	0	0	0	4,25E-02	4,25E-02	0	0	0	0	0	0	0	0	0	0	1,13E+00	0	1,13E+00	0	0	1,17E+00
Materials for energy recovery Kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy - MJ	Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vapor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gas and processes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## 7. INTERPRETATION OF RESULTS

As can be seen in Figure 1 and Table 10, the impact on the life cycle of the GEOPANNEL® GEOPET panels is dominated by A1-A3 Product stage. In concrete, this stage represents between 131% (Ozone depletion potential) and 173% (Water pollution and Abiotic depletion of mineral and metal resources) of the total impact of the life cycle. On the other hand, the benefits beyond the system boundary, module D shows that the environmental impacts regarding the 9 main studied categories are mayorly cancelled out by the recycling efforts. The impact-cancelling effects of module D are between 55% (Ozone depletion potential), up to 81% in Water pollution potential.

A4 Transport is the second most impactful stage, presenting its maximum of 19% in ozone depletion potential. A5 Installation stage follows with an average of 3% in all impact categories. The remaining stages C2, C3, C4 have relatively low impact potentials (less than 1% of the total impact of the products).

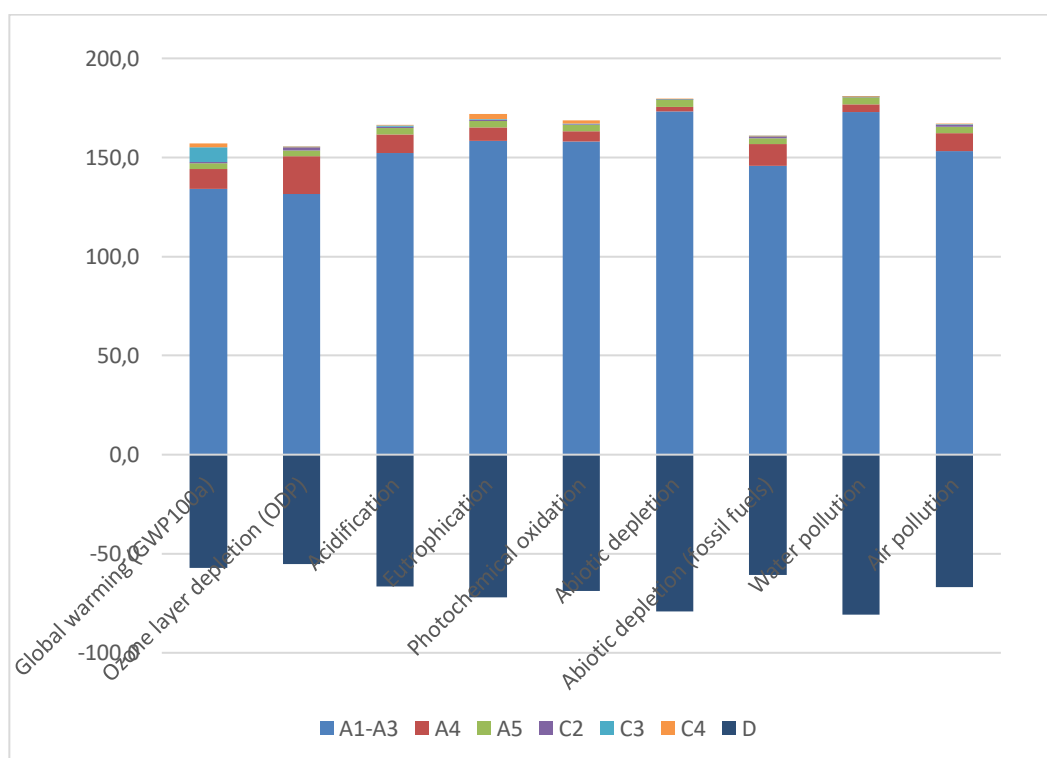


Figure 1. Potential impact on the environment of the life cycle one m2 of GEOPANNEL® GEOPET panels, in percentage.

## 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
VOCs AND FORMALDEHYDE	No test has been performed
RADIOACTIVE EMISSIONS	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 water

Not applicable for this product.

## 9. CONTRIBUTION OF THE PRODUCT TO THE QUALITY OF LIFE INSIDE OF BUILDINGS

PARAMETER	VALUE
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF HYGROTHERMAL COMFORT CONDITIONS IN THE BUILDING	The installation of GEOPANNEL® provides energy savings during the use phase of a building. Thermal conductivity between 0,035 and 0,037 W /mK depending on the color of the product.
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	Applicable in acoustic conditioning solutions or decorative acoustics. Available in black and anthracite gray
CHARACTERISTICS OF THE PRODUCT PARTICIPATING IN THE CREATION OF OLFACTIVE COMFORT CONDITIONS IN THE BUILDING	No test has been performed

## 10. REFERENCES

- Geopanel® Insulation Products Life Cycle Assessment Report (2022).
- 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)
- Product Environmental Footprint Category Rules (PEFCRs) for Thermal Insulation v5 (Oct 2019)

## ANNEX: INFLUENCE OF THICKNESS

This FDES describes a thickness range of between 10 mm and 190 mm but the presented results in Section 6 of this document are solely valid for the reference thickness of 80 mm. The other thicknesses are out of scope in this FDES.

It is however possible to obtain the environmental impact characterization values of the other available thicknesses by multiply the results shown in Section 6 with the corresponding multiplication factor in Table 14.

Table 14. Multiplication factor

THICKNESS OF THE PRODUCT (mm)	MULTIPLICATION FACTOR
10	0,13
20	0,25
30	0,38
40	0,50
50	0,63
60	0,75
70	0,88
80	1,00
90	1,13
100	1,25
110	1,38
120	1,50
130	1,63
140	1,75
150	1,88
160	2,00
170	2,13
180	2,25
190	2,38