Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

REFLECTIVE THERMAL INSULATION PANELS WÜRTH

by **WÜRTH ESPAÑA S.A.**

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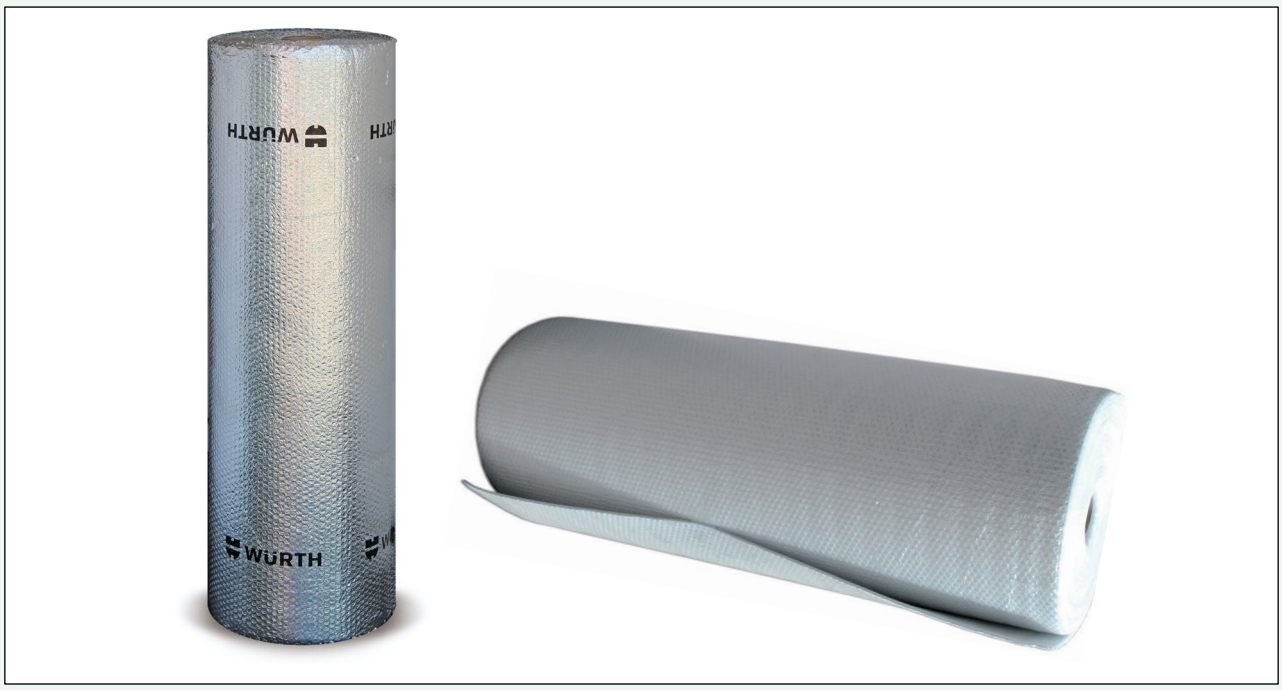
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
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The CEN EN 15804 standard serves as the basis for the Product Category Rule (PCR)
Product Category Rules (PCR): *PCR 2019:14 Construction Products (EN 15804+A2), version 1.11* *PCR 2019:14 c-PCR-005 Thermal Insulation products (EN 16783)*
PCR review was conducted by: *El Technical Committee of the International EPD® System* President: *Claudia A. Peña.* Contact via *info@environdec.com*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: *TECNALIA R&I SL* Verifier: *Cristina Gazulla Santos* Accredited by: ENAC. Acreditation nº 125/C-PR283
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The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Würth España S.A. - C/ Joiers 21, 08184 Palau-solità i Plegamans, Barcelona, Spain

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Description of the organisation: Founded in 1977, currently, Würth España S.A., is present throughout the Spanish territory, marketing everything that serves to fix, join, glue and assemble.

The headquarters of Würth España S.A. is located in the town of Palau-Solità i Plegamans (Barcelona) and is dedicated to the direct distribution of the brand's products to professionals in sectors such as Auto, Cargo (Industrial Vehicle), Metal, Installers, Construction, Maintenance and Wood and has been in the group of the company's main international companies for years.

In Spain, more than 300,000 professional clients trust the service and quality of the references of the articles in the exclusive catalogue of the Würth brand. Thanks to the logistics system, it is ensured that, at any point in the Spanish geography, 98% of orders are served between 24 and 48 hours.

In addition to the main headquarters located on the outskirts of Barcelona, Würth subsidiary also has another logistics centre in the Rioja town of Agoncillo, where Würth La Rioja Museum was also built in 2007.

The proximity to the customer, guaranteed by the visits of the Würth vendors, is complemented by a network of Self-Services with establishments spread throughout the Spanish geography, which provide the possibility to immediately obtain the products in need.

In the Self-services there are some 4,000 references of articles from the Würth catalogue within a selection that includes those of frequent use. Users have within sight a wide range of tools, chemicals, screws, plugs and anchors, work clothing as well as a long list of references, all classified and ordered in the corresponding exhibitors. The customer service offer also includes the electronic store or eShop.

Product-related certifications: Würth thermal reflective insulation panels have been evaluated with:

- Radon gas test (report 21243) issued by LaRUC, Radioactivity Laboratory of the University of Cantabria, in accordance with ISO 11665-13.

In addition, Würth products comply with the following standards:

- ASTM global standards
- EOTA technical assessment
- Technical Building Code CTE

Production site: Barcelona, España.

Products information

Products' names: **TermicPlus, Termoplane y TermoPlane 13**

Products' identification: This EPD represents Würth's reflective thermal insulation for floors and buildings. They are durable, low-thickness sheets that are easy to install and clean, impervious to water, which provide comprehensive thermal insulation solutions.

UN CPC Code: 369 Other plastic products.

Product description: The description and technical characteristics of the mentioned products are detailed below:

TermicPlus: It is a 4 mm thick thermal-reflective insulating sheet for buildings:

- Sheet made of a double layer of pure aluminium protected by NC varnish with a bubble of dry air inside.
- Indicated as thermal insulation for walls and roofs, taking into account that in its placement it is necessary to leave an air chamber to increase the thermal resistance of the whole.
- Impervious to water and water vapour.
- Contains no hazardous substances.
- Thermal insulation that reduces heat input in summer and preserves the interior heat in winter.
- Durable product: it is unalterable under the conditions of use, it does not rot, it is not altered by contact with insects or rodents.
- Low thickness.
- Light, clean, easy to apply.
- It adapts to most of the surfaces present in the building.

TermoPlane and TermoPlane 13: are reflective thermal insulation panels for floors, of 8 mm and 13 mm in thickness, respectively.

- Composed of a plastic sheet, a dry air bubble sheet, a 9 µm aluminium sheet and a polyethylene foam.
- High thermal and acoustic insulation of the floor of the house, avoiding energy loss.
- Light, clean, thin and easy to apply.
- Conforms to most surfaces.
- Does not rot, unaltered by insects, rodents, or chemicals. Antiallergic.
- Impervious to moisture, creating an excellent barrier to condensation.

During installation, it is necessary to use 50mm wide aluminium foil tape (ALUMINUM TAPE) to bond the reflective insulation panels.

The properties and technical characteristics of these products are presented below:

Table 1. Properties and technical characteristics of the low-thickness reflective thermal insulation systems TermicPlus, TermoPlane and TermoPlane 13

		Applied test standard	TermoPlane	TermoPlane 13	TermicPlus
Physical properties (+/- 5%)	**Weight (gr/m2)**	EN 1602	350	517	230
	Thickness (mm)	EN 823	8	13	4
Thermal properties	**Emissivity (ε90/90)**	EN 16012	0,05		
	Reflectivity (%)	EN 16012	97,00		
	Thermal conductivity (λ) W/mK	EN ISO 16012:2012	0,025		
Thermal resistance (Rt)	**Vertical Facing (m2 K/W)**	EN ISO 16012:2012	1,35	1,51	1,46
	Horizontal Facing (m2 K/W)	EN ISO 16012:2012			2,40
Acoustic properties	**Impact noise insulation Δ LW (dB)**	ISO 717-2	22,00		-
	Impact noise insulation LW "in situ" (dB (A))	UNE EN-ISO 140-8	69,00		-
	Airborne noise insulation R,w (C;Ctr) (dB)	UNE EN-ISO 717-1	53 (0; -3)	-	51 (-1; -4)
Other properties	**Compressive strength (KPa)**	EN 826:1999	10,20		-
	Fire classification	EN 13501-1	-		B S1 d0 – M1
	Stabilisation temperature	Not Applicable	-20 °C + 80 °C		-40°C/+80°C
	Anticondensation	ISO 12572	Yes		
	Tensile Strength (N/5cm)	EN 11339	-	-	76,00
	Resistance to elongation (%)	EN ISO 12310-1	-	-	3,5
	Tear Strength (N)	EN ISO 12310-1	-	-	28,00
	Hazardous substances	Not Applicable	Do not contain		
	Radon Gas Diffusion Coefficient	ISO 11665-13	< 10^{-13} m2/s comply with DB HE6		

LCA information

Functional unit: The functional unit defines the way in which the functions identified by the performance characteristics (capability) of the product are quantified. This is a reference by which material flows, Life Cycle Analysis (LCA) results and any other information are normalized. This allows for the comparison with any other product system that has been evaluated with the same functional unit.

According to UNE-EN 15804:2012+A2:2019, in the case of a construction product, the following must be specified: the application of the product, the magnitude (quantity) of reference, the key properties quantified under the defined conditions, and a specified period of time.

In this case, the manufacturing, distribution, installation, use and end of life of one square meter (1 m2) of Würth reflective thermal insulations products with the main function as an in-situ thermal insulation system in buildings has been chosen as the functional unit, for a useful life of 20 years.

The R values, thickness and weight of each product reference corresponding to this unit are collected in the following two tables:

Table 2. Thermal resistance values, thickness, weight and applications corresponding to one square meter of TermicPlus, TermoPlane and TermoPlane 13

CONCEPTO	Propiedad	Norma de ensayo aplicada	TermoPlane	TermoPlane 13	TermicPlus
Physical properties	**Weight (gr/m2)**	EN 1602	350	517	230
	Thickness (mm)	EN 823	8	13	4
Thermal resistence (Rt)	**Vertical (m2 K/W)**	EN ISO 16012:2012	1,35	1,51	1,46
	Horizontal (m2 K/W)	EN ISO 16012:2012			2,40
Application area: in buildings		UNE-EN 16783	Ceiling, roof, floor		Ceiling, roof, floor, wall

Reference service life (RSL): the RSL of the products is considered to be 20 years, according to the company's experience and the guarantee offered to the client.

Temporal and geographical representativeness: The primary data used has been provided for the year 2021 by the manufacturer, being representative of the products and the production process.

Regarding the market area, the products are mainly marketed within Europe.

This document will be used for B2B communication, with a global scope.

Data quality:
Specific data has been taken on the amounts of materials and energy used during the life cycle of the product. These data refer to the year 2021 and are representative for the products and the production processes.

Generic data have been taken on the impact per unit of matter or energy. These data have been obtained from the Ecoinvent database, of recognized international prestige, in its version 3.8. Said database has been selected as the reference database because it coincides with the input flows of matter and energy on the following aspects:

- Technological equivalence: the data derives from the same physical and chemical processes, or at least the same technological coverage.
- Limits towards nature: the data contains all the quantitative information necessary for the EPD®.
- Limits towards technical systems: the considered stages of the life cycle are equivalent.

The treatment and processing of the data has been carried out in accordance with the international standards ISO 14025, ISO 14040, ISO 14044 and UNE-EN 15804: 2012 + A2: 2019.

Database and LCA software used: The Simapro 9.3 calculation software and the Ecoinvent 3.8 database were used for the development of this study.

Description of system limits: The presented EPD® is structured by the stages of the life cycle established according to the reference standard PCR: Construction products and construction services, based on UNE-EN 15804 regulations. This EPD® is from cradle to grave with module D ((A+B+C)+D).

The life cycle stages analysed are described below:

A1-A3 Product stage

The product stage is made up of the stages of supply of raw materials (A1), transport of raw materials (A2) and manufacturing (A3). As permitted by UNE-EN 15804 regulations, the results of stages A1-A3 have been grouped into a single product stage (A).

A1- Supply of materials

This module takes into account the acquisition of both raw and prefabricated materials that make up the products.

A2- Transportation of raw materials

This module includes the transport of the different materials from the supplier to the company. The distance and type of truck for each raw material have been introduced.

A3- Manufacturing

This module includes the consumption of energy and packaging materials used to make the study products.

The electrical energy consumed in production is from sources without CO2 emissions, according to the supplier's information. Regarding reflective thermal insulation systems, the company performs the role of redistributor. The electrical consumption of each product reference is, therefore, the general electrical consumption of the factory (lighting, air conditioning, etc.). To calculate it, the difference between the invoiced electricity and the electricity demand for the sum of machinery has been used, dividing this difference by the total number of products (in m2), both manufactured and stored in the plant. In this way, the general electrical consumption is the same for all the references studied.

A4-A5 Construction stage

The Construction Process stage is made up of modules A4 Distribution and A5 Construction-Installation Process.

The **A4 Distribution** module includes the transport of the finished and packaged products from the factory gate to the construction site for subsequent installation.

The mileage associated with each product has been considered based on its sales during the year 2021.

PARAMETER	VALUE EXPRESSED PER FUNCTIONAL UNIT
Fuel's type and consumption, type of vehicles used for transportation. For example: long-distance truck, ship, etc.	• Transport van 3,5 – 7 tn EURO5. Diesel consumption: 0,109 kg/tkm • Small truck 7,5-16 tn EURO5. Diesel consumption: 0,047 kg/tkm • Medium truck 16-32 tn EURO5. Diesel consumption: 0,037 kg/tkm • Big truck > 32 tn EURO5. Diesel consumption: 0,019 kg/tkm
Distance	• Van: 75 km • Small truck: 493 km • Medium truck: 560 km • Big truck: 641 km
Capacity utilization	% assumption from Ecoinvent
Apparent density of transported product	Varying between 27,18 and 42,31 kg/m3
Useful Capacity Factor	1

Module **A5 Installation Process** includes all materials and energy used to prepare the products for use. At the same time, the transport and management of packaging wastes and their transport to a local waste manager is taken into account.

At this stage, 0% losses are considered. Installation is done manually, so the energy consumption value is 0. The consumption of aluminized polyester adhesive tape to seal the joint between sheets is taken into account.

In the management of packaging waste, the most up-to-date treatment scenario of Eurostats (2019) is considered. Between treatments, the final disposal takes place in a controlled landfill within a radius of 50 km.

PARAMETER	DESCRIPTION	VALUE PER FUNCTIONAL UNIT
Auxiliary materials for installation	Aluminized polyester adhesive tape (m)	0,5 m
Use of water	m3	0
Use of other resources	Not applicable	0
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Not applicable	0
Direct emissions to air, water and land	kg	0

Waste materials on site, before waste processing, generated by the installation of the product; specified by type	Installation losses	0%
	Packaging (kg)	0,072 kg (average value)
Outflow of materials (specified by type) resulting from the processing of waste on the construction site, for example, during collection for recycling, energy recovery (valorisation) or dumping (specifying the route)	Recycled	0
	Landfilled	0,072 kg (average value)

B1-B7 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 complete, no technical actions or operations are required during the use stages until end of life. Therefore, Würth's thermal insulators have no impact (excluding potential energy savings) at this stage.

C1-C4 End-of-life stage

This stage includes the following end-of-life activities of the products: **C1 Dismantling/Deconstruction, C2 Transport to the waste manager, C3 Waste treatment** and **C4 Final disposal.**

Included are the provision of all transportation, materials, products, and the related use of energy and water. The impact of the manual dismantling of the insulation is considered very small compared to the impact of the deconstruction of the building as a whole and can be neglected in C1.

Although Würth products are recyclable indefinitely and are partially recycled at the end of their useful life, there is not yet an established collection system in all member countries. Therefore, the assumption chosen in this study is 100% landfill (C4), being the most conservative approach.

The following table summarizes the information necessary for the end-of-life stage:

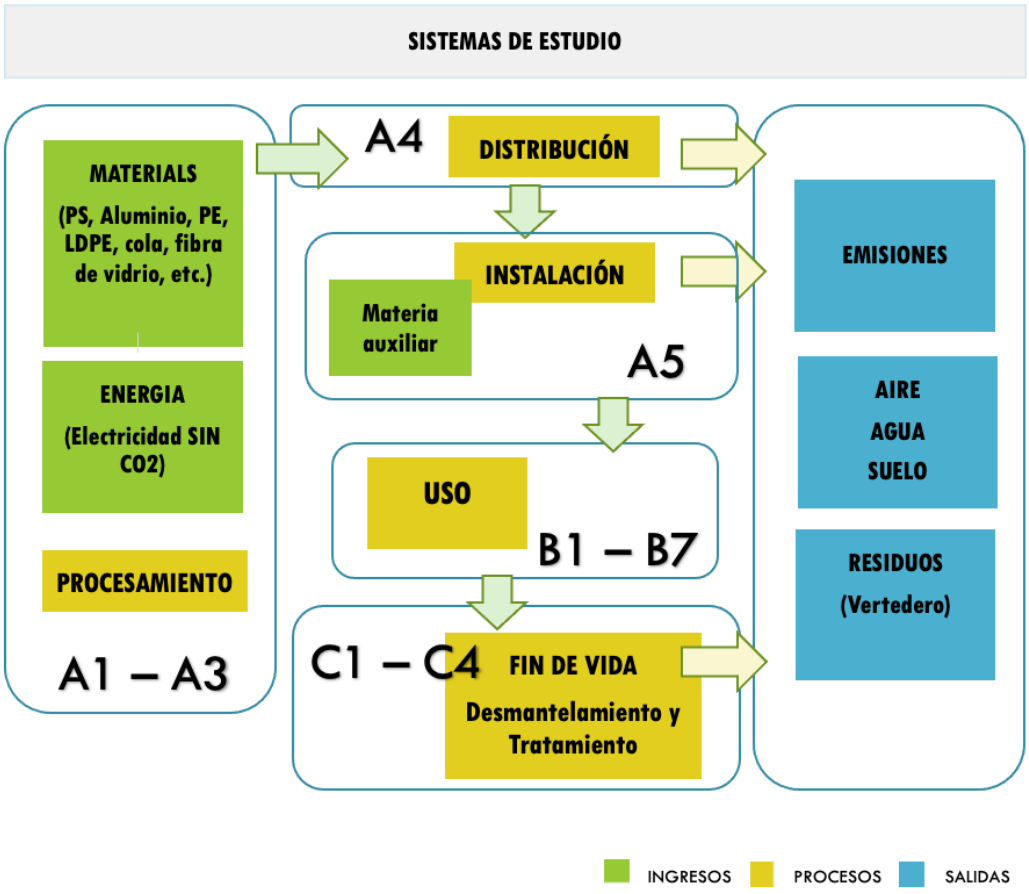
Module	Parameter	Unit (expressed per functional unit)	Average value
C1 Dismantling	Process of collection s pecified by type	Kg collected manually and separately	0
		Kg collected mixed with construction waste	0,298 kg
C2 Transportation	Fuel type and consumption, type of v ehicles used for the tra nsport	Truck 16 t EURO5	Diesel consumption: 0,0165 kg/tkm
	Distance	km	100
	Capacity use	% assumption by Ecoinvent	100% volume outbound trip
	Useful capacity factor		1
C3 Waste treatment		Kg for reuse	0

	System recovery specified by type	Kg for recycle	0
		Kg for energy recovery	0
C4 Final disposal	Disposal specified by type	Kg for elimination	Total 0,298 kg (average value)

D Reuse, Recovery and Recycling Potential

These products do not claim environmental benefits due to recycling and/or reuse.

System diagram:



More information: https://www.wurth.es/

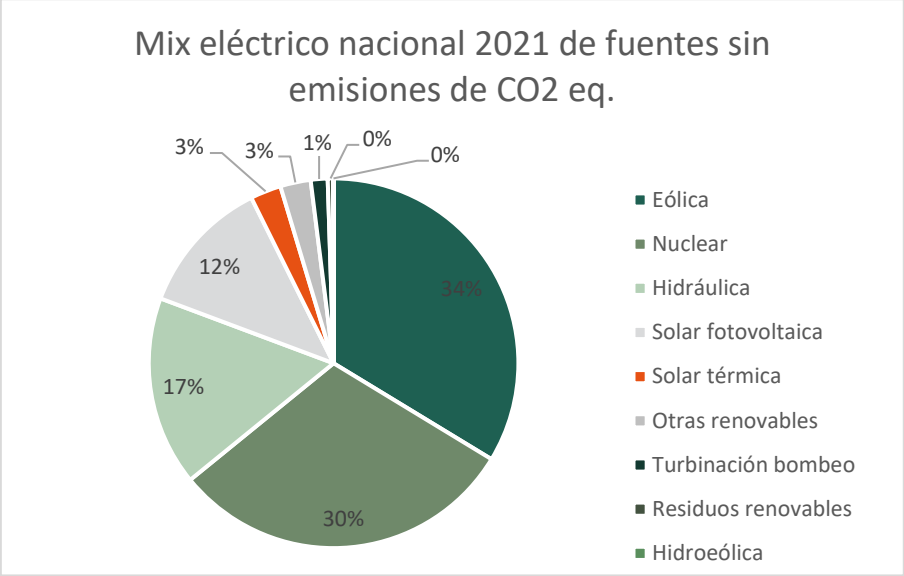
Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product Stage			Construction stage		Use stage							End-of-life stage				Benefits
	Raw materials	Transportation	Fabrication	Distribution	Installation/construction	Use	Maintenance	Reparation	Replacement	Rehabilitation	Energy use	Water use	Deconstruction-demolition	Transport	Waste treatment	Waste elimination	Reutilization, recuperation and recycle potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Declared modules	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	ES	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data	> 95% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-
Product variation	Less than 10% for each product group					-	-	-	-	-	-	-	-	-	-	-	-
Site variation	NR			-	-	-	-	-	-	-	-	-	-	-	-	-	-

NR = Not relevant

Additional information

- Technical support for the implementation of the EPD: Marcel Gómez Consultoría Ambiental.
- The mix of electricity used in the manufacturing plant is an adaptation of the 2021 national mix of sources WITHOUT CO2 eq emissions, according to the supplier's information. The energy sources in this mix are the following: Wind 33,7%, Nuclear 30,4%, Hydro 16,6%, Solar photovoltaic 12%, Solar thermal 2,7%, Other renewables 2,7%, Pumped turbine 1,5%, Renewable waste 0,5% and Hydro-wind 0,01%[1]



- Cut-off rules and considerations:
  - 95% of all the mass and energy inputs and outputs of the central system have been included, identified in the life cycle inventory included in this report and at least 99% for the total life cycle.
  - The principle of modularity has been followed, as well as the polluter-payer principle.
- Allocation procedure: whenever possible, allocation has been avoided, but for general electricity consumption and waste production an allocation has had to be made based on physical mass considerations.
- Based on the system boundaries indicated in the reference regulation PCR Construction products and construction services, the following processes have not been taken into account:
  - The manufacture of capital goods with an expected life of more than three years, buildings and other capital assets.
  - Maintenance activities of the production plant.
  - Research and development activities.
  - Transportation of personnel on the home-factory-home route.
  - Long-term emissions.
- The scenarios included are currently in use and are representative of one of the most likely alternatives for the product under review.

[1] STRUCTURE OF THE GENERATION WITH/WITHOUT EMISSIONS CO2 EQ. (%) | ELECTRICAL SYSTEM: National. Source: Red Eléctrica España – Consulted for the period January-December 2021

Content information

The presented Würth thermal insulations have variable composition. Due to confidentiality issues, this table presents the information on the variation range of the content of the product references studied:

Raw material	Percentage, %	Post-consumer material, weight-%	Renewable material, weight-%
Laminated aluminium	24-59%	0	0
LDPE	30-41%	0	0
Polyester foam	0-46%	0	0
TOTAL	0,17-0,37 kg		
Packaging Materials	**Weight, kg**	**Weight-% (versus product)**	**Post-consumer material, weight-%**
Polyethylene film and bag	0,003-0,006	1,3-1,7%	0
Cardboard tube	0,006-0,013	2,9-3,5%	0
Wooden pallet	0,031-0,092	14-25%	0
TOTAL	0,04-0,11	18,5-30,1%	

The products studied do not include during their life cycle any dangerous substance included in the list of “Substances of Very High Concern” for Authorization (SVHC) in a percentage greater than 0,1% of the weight of the product.

Environmental information

Information on environmental impacts is expressed with Life Cycle Impact Assessment (LCIA) impact category indicators using characterization factors in an LCIA according to ISO 14044. Information on impact categories, indicators, characterization methods, units and characterization factors to be applied is in accordance with what is indicated in Annex C of EN 15804+A2.

The additional impact categories of table 4 of EN 15804+A2 are presented within the LCA report and are not declared in this EPD.

Below are the results of the potential environmental impact of the products studied:

Group 1

These results are valid for the following product: TermicPlus

Potential environmental impact: mandatory indicators according to EN 15804

Estimated impact results are only relative statements that do not indicate impact category endpoints, exceeding threshold values, safety margins, or risks.

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	2,49E+00	1,56E-02	1,26E-01	0	0	0	0	0	0	0	0	0	0	1,98E-02	0
GWP-biogenic	kg CO_2 eq.	5,07E-03	6,21E-06	2,41E-04	0	0	0	0	0	0	0	0	0	0	1,78E-06	0
GWP-luluc	kg CO_2 eq.	5,79E-03	7,29E-06	2,05E-04	0	0	0	0	0	0	0	0	0	0	2,03E-06	0
GWP-total	kg CO_2 eq.	2,50E+00	1,56E-02	1,26E-01	0	0	0	0	0	0	0	0	0	0	1,98E-02	0
ODP	kg CFC 11 eq.	8,28E-08	3,52E-09	8,52E-09	0	0	0	0	0	0	0	0	0	0	5,45E-10	0
AP	mol H^+ eq.	1,43E-02	6,22E-05	7,84E-04	0	0	0	0	0	0	0	0	0	0	1,63E-05	0
EP-fresh water	kg P eq	7,74E-04	1,17E-06	4,26E-05	0	0	0	0	0	0	0	0	0	0	2,98E-07	0
EP-marine	kg N eq.	2,48E-03	1,81E-05	1,25E-04	0	0	0	0	0	0	0	0	0	0	3,62E-04	0
EP-terrestrial	mol N eq.	2,55E-02	1,98E-04	1,36E-03	0	0	0	0	0	0	0	0	0	0	5,88E-05	0
POCP	kg NMVOC eq.	8,91E-03	6,10E-05	4,35E-04	0	0	0	0	0	0	0	0	0	0	2,10E-05	0
ADP-minerals&metals*	kg Sb eq.	1,30E-05	7,01E-08	3,18E-06	0	0	0	0	0	0	0	0	0	0	6,30E-09	0
ADP-fossil*	MJ	4,29E+01	2,34E-01	1,89E+00	0	0	0	0	0	0	0	0	0	0	4,33E-02	0
WDP*	m^3	1,03E+00	7,47E-04	5,34E-02	0	0	0	0	0	0	0	0	0	0	1,84E-03	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact: additional mandatory and voluntary indicators

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2]	kg CO_2 eq.	2,42E+00	1,55E-02	1,23E-01	0	0	0	0	0	0	0	0	0	0	1,72E-02	0

Use of resources

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3,86E+00	3,91E-03	1,31E-01	0	0	0	0	0	0	0	0	0	0	8,87E-04	0
PERM	MJ	1,11E-01	0	0	0	0	0	0	0	0	0	0	0	0		0
PERT	MJ	1,73E+01	3,91E-03	1,31E-01	0	0	0	0	0	0	0	0	0	0	8,87E-04	0
PENRE	MJ	4,58E+01	2,48E-01	2,02E+00	0	0	0	0	0	0	0	0	0	0	4,60E-02	0
PENRM	MJ.	1,34E+01	0	0	0	0	0	0	0	0	0	0	0	0		0
PENRT	MJ	5,92E+01	2,48E-01	2,02E+00	0	0	0	0	0	0	0	0	0	0	4,60E-02	0
SM	kg	6,90E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	2,49E-02	4,63E-07	1,25E-03	0	0	0	0	0	0	0	0	0	0	4,42E-05	0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

[2] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Non-hazardous waste disposed	kg	3,70E-01	1,02E-02	7,28E-02	0	0	0	0	0	0	0	0	0	0	1,70E-01	0
Hazardous waste disposed	kg	6,28E-04	6,24E-07	1,89E-05	0	0	0	0	0	0	0	0	0	0	6,55E-08	0
Radioactive waste disposed	kg	6,49E-05	1,57E-06	4,05E-06	0	0	0	0	0	0	0	0	0	0	2,54E-07	0

Output flows

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content.

Results per Functional Unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in the product	kg C	0,00E+00
Biogenic carbon content in the packaging	kg C	4,11E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2

Group 2

These results are valid for the following products: TermoPlane 13

Potential environmental impact: mandatory indicators according to EN 15804

Estimated impact results are only relative statements that do not indicate impact category endpoints, exceeding threshold values, safety margins, or risks.

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	2,99E+00	3,60E-02	1,26E-01	0	0	0	0	0	0	0	0	0	0	4,14E-02	0
GWP-biogenic	kg CO_2 eq.	6,41E-03	1,43E-05	2,41E-04	0	0	0	0	0	0	0	0	0	0	3,73E-06	0
GWP-luluc	kg CO_2 eq.	6,11E-03	1,68E-05	2,06E-04	0	0	0	0	0	0	0	0	0	0	4,24E-06	0
GWP-total	kg CO_2 eq.	3,00E+00	3,60E-02	1,26E-01	0	0	0	0	0	0	0	0	0	0	4,14E-02	0
ODP	kg CFC 11 eq.	9,78E-08	8,12E-09	8,69E-09	0	0	0	0	0	0	0	0	0	0	1,14E-09	0
AP	mol H^+ eq.	1,61E-02	1,44E-04	7,88E-04	0	0	0	0	0	0	0	0	0	0	3,39E-05	0
EP-fresh water	kg P eq	9,02E-04	2,69E-06	4,26E-05	0	0	0	0	0	0	0	0	0	0	6,23E-07	0
EP-marine	kg N eq.	2,85E-03	4,19E-05	1,26E-04	0	0	0	0	0	0	0	0	0	0	7,56E-04	0
EP-terrestrial	mol N eq.	2,91E-02	4,57E-04	1,37E-03	0	0	0	0	0	0	0	0	0	0	1,23E-04	0
POCP	kg NMVOC eq.	1,25E-02	1,41E-04	4,40E-04	0	0	0	0	0	0	0	0	0	0	4,39E-05	0
ADP-minerals&metals*	kg Sb eq.	1,60E-05	1,62E-07	3,18E-06	0	0	0	0	0	0	0	0	0	0	1,32E-08	0
ADP-fossil*	MJ	6,13E+01	5,39E-01	1,90E+00	0	0	0	0	0	0	0	0	0	0	9,03E-02	0
WDP*	m^3	1,48E+00	1,72E-03	5,39E-02	0	0	0	0	0	0	0	0	0	0	3,83E-03	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact: additional mandatory and voluntary indicators

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[3]	kg CO_2 eq.	2,91E+00	3,57E-02	1,23E-01	0	0	0	0	0	0	0	0	0	0	3,59E-02	0

Use of resources

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	6,01E+00	9,02E-03	1,31E-01	0	0	0	0	0	0	0	0	0	0	1,85E-03	0
PERM	MJ	2,46E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	6,25E+00	9,02E-03	1,31E-01	0	0	0	0	0	0	0	0	0	0	1,85E-03	0
PENRE	MJ	6,54E+01	5,72E-01	2,03E+00	0	0	0	0	0	0	0	0	0	0	9,60E-02	0
PENRM	MJ.	2,40E+01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	8,95E+01	5,72E-01	2,03E+00	0	0	0	0	0	0	0	0	0	0	9,60E-02	0
SM	kg	1,01E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	3,52E-02	6,37E-05	1,41E-03	0	0	0	0	0	0	0	0	0	0	9,23E-05	0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

[3] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Non-hazardous waste disposed	kg	3,88E-01	2,35E-02	1,52E-01	0	0	0	0	0	0	0	0	0	0	3,54E-01	0
Hazardous waste disposed	kg	5,69E-04	1,44E-06	1,89E-05	0	0	0	0	0	0	0	0	0	0	1,37E-07	0
Radioactive waste disposed	kg	8,83E-05	3,61E-06	4,13E-06	0	0	0	0	0	0	0	0	0	0	5,30E-07	0

Output flows

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content.

Results per Functional Unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in the product	kg C	0,00E+00
Biogenic carbon content in the packaging	kg C	9,95E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2

Group 3

These results are valid for the following products: TermoPlane

Potential environmental impact: mandatory indicators according to EN 15804

Estimated impact results are only relative statements that do not indicate impact category endpoints, exceeding threshold values, safety margins, or risks.

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	5,25E+00	2,59E-02	1,11E-01	0	0	0	0	0	0	0	0	0	0	2,97E-02	0
GWP-biogenic	kg CO_2 eq.	1,07E-02	1,51E-06	1,61E-04	0	0	0	0	0	0	0	0	0	0	1,29E-06	0
GWP-luluc	kg CO_2 eq.	9,91E-03	2,08E-07	1,76E-04	0	0	0	0	0	0	0	0	0	0	8,56E-07	0
GWP-total	kg CO_2 eq.	5,27E+00	2,59E-02	1,11E-01	0	0	0	0	0	0	0	0	0	0	2,97E-02	0
ODP	kg CFC 11 eq.	1,55E-07	6,11E-09	7,28E-09	0	0	0	0	0	0	0	0	0	0	2,54E-10	0
AP	mol H^+ eq.	2,73E-02	8,74E-05	5,91E-04	0	0	0	0	0	0	0	0	0	0	1,49E-05	0
EP-fresh water	kg P eq	1,66E-04	1,32E-08	3,18E-06	0	0	0	0	0	0	0	0	0	0	2,52E-08	0
EP-marine	kg N eq.	4,50E-03	2,75E-05	9,58E-05	0	0	0	0	0	0	0	0	0	0	3,72E-05	0
EP-terrestrial	mol N eq.	4,94E-02	3,03E-04	1,06E-03	0	0	0	0	0	0	0	0	0	0	6,28E-05	0
POCP	kg NMVOC eq.	1,97E-02	8,28E-05	3,53E-04	0	0	0	0	0	0	0	0	0	0	2,38E-05	0
ADP-minerals&metals*	kg Sb eq.	9,97E-06	1,12E-09	2,52E-07	0	0	0	0	0	0	0	0	0	0	6,91E-11	0
ADP-fossil*	MJ	1,07E+02	3,65E-01	1,71E+00	0	0	0	0	0	0	0	0	0	0	2,08E-02	0
WDP*	m^3	2,66E+00	-6,14E-05	4,82E-02	0	0	0	0	0	0	0	0	0	0	7,18E-05	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact: additional mandatory and voluntary indicators

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[4]	kg CO_2 eq.	5,10E+00	2,58E-02	1,08E-01	0	0	0	0	0	0	0	0	0	0	2,57E-02	0

Use of resources

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	7,07E+00	5,59E-04	8,81E-02	0	0	0	0	0	0	0	0	0	0	6,96E-04	0
PERM	MJ	1,84E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	7,26E+00	5,59E-04	8,81E-02	0	0	0	0	0	0	0	0	0	0	6,96E-04	0
PENRE	MJ	1,15E+02	3,87E-01	1,83E+00	0	0	0	0	0	0	0	0	0	0	2,21E-02	0
PENRM	MJ.	4,25E+01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,57E+02	3,87E-01	1,83E+00	0	0	0	0	0	0	0	0	0	0	2,21E-02	0
SM	kg	1,10E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	6,49E-02	9,37E-07	1,25E-03	0	0	0	0	0	0	0	0	0	0	2,73E-06	0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

[4] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Non-hazardous waste disposed	kg	4,81E-01	1,50E-05	8,69E-02	0	0	0	0	0	0	0	0	0	0	2,66E-01	0
Hazardous waste disposed	kg	1,00E-03	9,59E-07	1,78E-05	0	0	0	0	0	0	0	0	0	0	4,06E-08	0
Radioactive waste disposed	kg	1,34E-04	2,61E-06	3,40E-06	0	0	0	0	0	0	0	0	0	0	1,23E-07	0

Output flows

Results per Functional Unit																
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content.

Results per Functional Unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in the product	kg C	0,00E+00
Biogenic carbon content in the packaging	kg C	7,37E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2

LCA interpretation

This section presents the interpretation of the results of potential environmental impact of groups 1 of least impact magnitude. The graph shown below indicates the impact contribution of each life cycle stage to the total impact by category.

Group 1

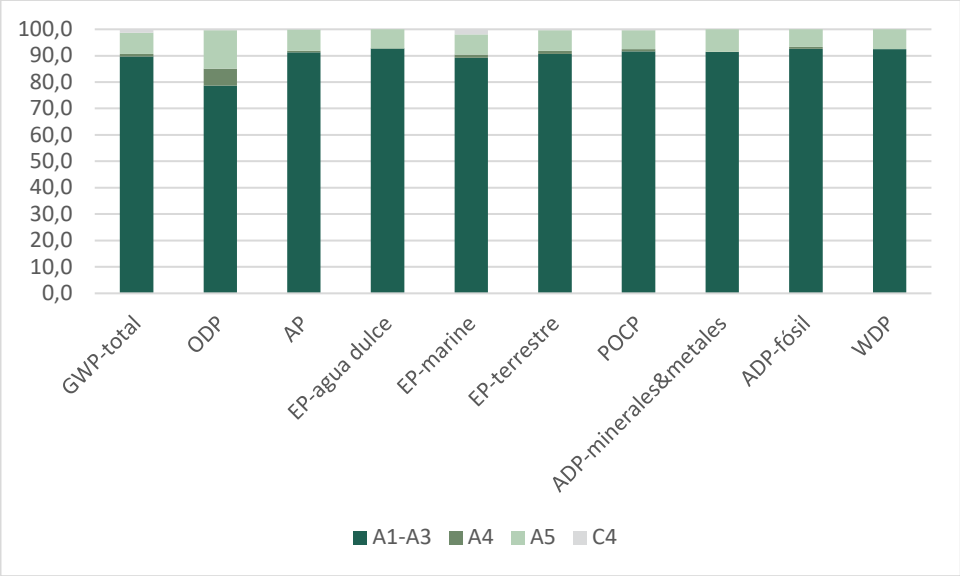


Figure 1. Environmental impact by life cycle stage of TermicPlus

As can be seen in Figure 1, the product stage (A1-A3) is the Life Cycle Stage that has the greatest impact for all the impact categories analysed, representing between 78,6% (Depletion of stratospheric ozone layer) and 92,6% (Depletion of fossil resources), resulting in an average of 90% of the total life cycle impact of this product.

The A5 stage of installation is the second contributor to the total impact, reaching its maximum of 14,6% in the depletion potential of the stratospheric ozone layer. Stage A4 of distribution to customer and stage C4 of final disposal represent a low impact potential, with an average of 1,2% and 0,4%, respectively.

Information related to Sector EPD

This EPD® is individual.

Difference comparing to previous versions

First version of EPD®.

References

- General Programme Instructions of the International EPD® System. Version 3.01.
- ISO 14020: 2000 Environmental labels and declarations — General principles
- ISO 14025: 2010 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 14040: 2006 Environmental management — Life cycle assessment — Principles and framework
- ISO 14044: 2006 Environmental management — Life cycle assessment — Requirements and guidelines
- UNE-EN 15804:2012 + A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PCR 2019:14 Construction products (EN 15804+A2) version 1.11.
- PCR 2019:14-c-PCR-005 Thermal Insulation products (EN 16783) (2019-12-20)
- EU Construction & Demolition Waste Management Protocol.
- European Commission (DG ENV) (2011). Report on the management of construction and demolition waste in the EU - SERVICE CONTRACT ON MANAGEMENT OF CONSTRUCTION AND DEMOLITION WASTE – SR1. Final Report Task 2. ENV.G.4/FRA/2008/0112. Paris.

VERIFICATION STATEMENT CERTIFICATE

CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD07402

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:
TECNALIA *R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:*

WÜRTH ESPAÑA S.A.
C/ Joiers 21
08184 PALAU-SOLITÀ I PLEGAMANS (Barcelona) SPAIN

for the following product(s):
para el siguiente(s) producto(s):

REFLECTIVE THERMAL INSULATION PANELS WÜRTH.
AISLANTES TÉRMICOS REFLECTIVOS WÜRTH.

with registration number **S-P-06532** in the International EPD® System *(www.environdec.com).*
*con número de registro **S-P-06532** en el Sistema International EPD® (www.environdec.com).*

it´s in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.3.01.**
- **PCR 2019:14 Construction products (EN 15804:A2) v.1.11.**
- **c-PCR-005 Thermal Insulation products (EN 16783) (2019-12-20).**
- **UN CPC 369 Other plastics products.**

Issued date / *Fecha de emisión:*	02/08/2022
Update date / *Fecha de actualización:*	02/08/2022
Valid until / *Válido hasta:*	28/07/2027
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Carlos Nazabal Alsua
Manager

CERTIFICACIÓN ISO 17065 Nº125 / C-PR283

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