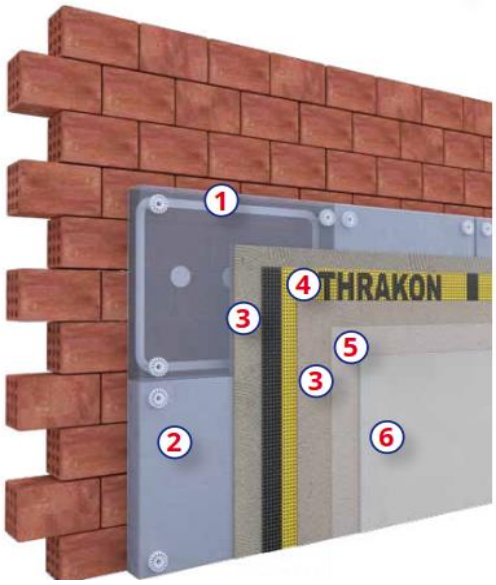
Environmental Product Declaration

of CLIMAPLUS, CLIMAPLUS XPS & CLIMAPLUS MW ETICS SYSTEMS by THRAKON S.A.

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

EPD of multiple products, based on the results of the representative product of the CLIMAPLUS series category. The products are:

- **CLIMAPLUS**
- **CLIMAPLUS XPS**
- **CLIMAPLUS MW**



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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

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Program: The International EPD® System
Address: EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website: www.environdec.com
E-mail: info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
CEN standard EN 15804:2012+A2:2019 (October 2019) serves as the Core Product Category Rules (PCR) EN 16783:2024 is the standard for the c-PCR 005 also used
Product category rules (PCR) PCR 2019:14 Construction products, version 1.3.4 (2024-04-30) c-PCR-005 Thermal Insulation products (EN 16783) (2024-05-03)
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

Life Cycle Assessment (LCA)

LCA accountability:	ENVIROMETRICS Climate | Environment | Energy	ENVIROMETRICS S.A Kodrou 3 str., 152 32, Chalandri, Greece info@envirometrics.gr www.envirometrics.gr

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ EPD verification by certification body

Third party verification:

BUSINESS QUALITY VERIFICATION BQV

Business Quality Verification P.C, Accredited by E.S.Y.D, Accreditation No. 1218
5 Konitsis street, Marousi, GR 15125, Greece
https://bqv.gr/

Business Quality Verification P.C. is an approved certification body accountable for the third-party verification

Procedure for follow-up of data during EPD validity involves third party verifier:
☐Yes ☒ No

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EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison.

Company Information

THRAKON is a leading manufacturer of dry mortars, coatings, and construction chemicals in the building industry. With over 25 years of experience, we are committed to delivering high-quality, cost-effective construction solutions with exceptional technical support, customer service, and after-sales assistance. Exceeding 1700 high-performance products, we offer the best construction solutions that add value to our customers. We bring innovation and expertise to the construction world for more than 25 years.

THRAKON offers complete building solutions across a myriad of applications. Our product categories, including External Thermal Insulation Systems (ETICS), Plasters & Renders, Tile Adhesives & Grouts, Waterproofing, Repairing, Microcement, Paints & Varnishes, Solvent Adhesives and Flooring Screeds, ensure that we cater to every construction need.

We offer complete building solutions for all areas of application, rather than individual products. Our certified systems guarantee solutions that meet every customer's needs, providing system-based approaches that increase confidence in selecting the safest and most reliable building solutions for any construction project. We invest substantial resources in research and development, with innovation being the cornerstone of our growth. Our strong R&D department identifies key construction needs and develops products that not only meet industry standards but exceed expectations.

Our six manufacturing plants in Greece are equipped with state-of-the-art technology and staffed with qualified personnel, ensuring top-quality products. THRAKON also operates its quarries, producing white marble and high-quality silica sand, enabling us to manufacture the best products. THRAKON's commitment to excellence is reflected in every step of our manufacturing process.

Name: THRAKON S.A.
Address: 130 SYNGROU AVENUE,11745, ATHENS
Website: www.thrakon.gr
E-mail: info@thrakon.gr

Product Information

In this EPD, there are three types of CLIMAPLUS series systems:

- CLIMAPLUS (ETA 12/0391)
- CLIMAPLUS XPS (ETA 17/0370)
- CLIMAPLUS MW (ETA 20/0595)

CLIMAPLUS series (CLIMPALUS, CLIMAPLUS XPS and CLIMAPLUS MW) are complete external thermal insulation systems for buildings, which can be applied on new or existing buildings. The result is an excellent insulation and very good quality of interior air.

- Thermal Insulation of Interior or Exterior Masonry: When the Regulation of Energy Performance of Buildings is applied, most buildings must reinforce their thermal insulation. CLIMAPLUS series have easy application in exterior or interior masonry.
- Thermal Insulation for ceilings in pilotis, basements and penthouse: CLIMAPLUS series are suitable for application in ceilings, basements, parking. The valuable heat escapes through doors and windows. Poor insulation of pilotis and basements is a common cause of energy loss. The ease of CLIMAPLUS systems application is a major advantage for these areas.

CLIMAPLUS series systems comply with European Standards EAD 040083-00-0404. The products are certified and can ensure the user for the:

- Suitability of system for provided use
- Protection of system during the use
- Strength of system during the lifetime of construction
- Fire protection
- Health and protection from the use of system
- Protection of noise
- Compatibility of the individual materials in the system together

Components of the CLIMAPLUS systems

Adhesive for insulation panels: Bonds the insulation panel to the substrate (wall). It ensures strong adhesion, compensates for minor surface irregularities, and contributes to system stability.

- CLIMABOND THC 403
- THC 405
- FIBERPLUS THC 405
- THC 405 PLUS
- THC 404 PRO
- THC 409
- CLIMAFLEX THC 410
- CLIMAFLEX THC 410C

Thermal insulation panels: Provides thermal insulation, reducing heat loss and improving energy efficiency. Typically made of materials like EPS (expanded polystyrene), XPS (extruded polystyrene), or mineral wool.

- THRAKON ULTRAPOR EPS or ISOPOR THP EPS (range of thicknesses from 3 to 20 cm). Applicable only for CLIMAPLUS ETICS system
- STYROPAN XPS (range of thicknesses from 3 to 10 cm). Applicable only for CLIMAPLUS XPS ETICS system
- MINERAL WOOL (thickness 10 cm). Applicable only for CLIMAPLUS MW ETICS system

Anchors: Mechanical fasteners that secure the insulation panels to the wall, preventing detachment due to wind loads or other forces. Used in combination with adhesive for added stability.

- LTX-8
- LTX-10
- LMX-8
- LMX-10

Base coat: A protective layer applied over the insulation panel, serving as a bonding agent for the reinforcement mesh and providing impact resistance.

- THC 405
- FIBERPLUS THC 405
- THC 405 PLUS
- THC 404 PRO
- THC 409
- CLIMAFLEX THC 410
- CLIMAFLEX THC 410C

Fiber glass mesh: Embedded in the base coat to enhance tensile strength and flexibility, preventing cracks and improving the durability of the system.

- THRAKON PRIMAFAS 160
- THRAKON CLIMAPLUS PROFESSIONAL

Key coat: A priming layer applied before the finishing coat to improve adhesion and ensure an even texture. It also enhances the durability of the final finish.

- CLIMASIL PRIMER GLX 494
- GLX 496
- CLIMASIL PRIMER GLX 498

Finishing coat: The outermost layer, responsible for aesthetics and weather protection. It comes in various textures and colors and shields the system from UV rays, moisture, and mechanical damage.

- DEC 427 DECORATIVA
- CLIMA PLASTER DEC 428
- DEC 431 FINE
- STATUS ACRYLIC GRANULE PLASTER
- PRIMO TECH SILICONE
- CLIMASIL PLASTER DEC 438

For the grouping of all these different combinations of ETICS systems, the chosen option was the representative product (CLIMAPLUS with EPS 80 and insulation thickness 70mm), based on the production volumes. The weight of the product is 13,76 kg/m^2. In the following table, the composition of the representative product selected is presented.

Components	Weight in kg (per 1 m² of system)	Biogenic carbon content*
CLIMABOND THC 403 adhesive	3,50	-
ISOPOR EPS 80 board, 70mm thickness	1,085	-
THC 405 base coat	6,00	-
THRAKON PRIMAFAS 160 Fiberglass mesh	0,16	-
CLIMASIL PRIMER GLX 494 key coat	0,20	-
CLIMA PLASTER DEC 428 finishing coat	2,80	-
Anchors (8 pc/m²)	0,015	-
Total mass of the system	**13,76**	-
Plastic bucket	1,20E-01	-
Paper bag	6,08E-02	3,04E-02
Pallets	5,83E-02	2,92E-02
Total mass of packaging	**2,39E-01**	

*Biogenic carbon content of wood and wood-based materials is assumed as 50% of the mass of the material, adopted from EN 16449.

Content declaration for the representative product

Description and Characteristics	Regulation	Declared Characteristics of insulation	Value
Reaction to Fire	EN 13501	E	---
Thermal Resistance	EN 12667	Defined in CE mark per EN 13163	---
Thickness	EN 823	T(t) ± tolerance	±1 mm
Length	EN 822	L(2) ± tolerance	±2 mm
Width	EN 822	W(2) ± tolerance	±2 mm
Squareness	EN 824	S(2) ± tolerance	±2 mm
Flatness	EN 825	P(5) max deviation	5 mm
Surface	EAD 040083-00-0404	Cut surface (homogeneous, without coating)	---
Dimensional Stability (Temp. & Humidity)	EN 1604	DS(70,-)1	1%
Dimensional Stability (Lab conditions)	EN 1603	DS(N)2	0.2%
Short-Term Water Absorption	EN 1609	---	< 1 kg/m²
Diffusion Factor (μ)	EN 13163	MU 30 - 70	20 - 40
Tensile Strength (Perpendicular to face)	EN 1607	TR150	≥ 150 kPa
Shear Strength	EN 12090	SS20	≥ 20 kPa
Shear Modulus of Elasticity	EN 12090	GM1000	≥ 1000 kPa

Properties of ETICS system

According to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, the product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0.1% weight by weight (w/w).

System Boundaries

X= Included, ND= Module Not Declared																	
	Product stage			Construction stage		Use stage							End-of-life stage				Resource recovery stage
	Raw Materials Supply	**Transport**	**Manufacturing**	Transport	**Construction installation**	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	**De-construction and demolition**	**Transport**	**Waste processing for reuse, recovery and/or recycling**	**Disposal**	**Reuse-Recovery-Recycling-potential**
Module	**A1**	**A2**	**A3**	A4	**A5**	B1	B2	B3	B4	B5	B6	B7	**C1**	**C2**	**C3**	**C4**	**D**
Module Declared	**X**	**X**	**X**	ND	**X**	ND	ND	ND	ND	ND	ND	ND	**X**	**X**	**X**	**X**	**X**
Geography	**GLO**	**GLO**	**GR**	-	**GR**								**EU**	**EU**	**EU**	**EU**	**EU**
GWP-GHG share of Specific data used	**13,75%**			-									-	-	-	-	**-**
Variation-products (GWP-GHG)	**Deviation of representative from max/min -208,75%/40,34%**			-									-	-	-	-	**-**
Variation-sites	**0%**			-									-	-	-	-	**-**

Product stage (A1-A3)

Product stage (modules A1-A3) includes raw material supply, transportation, and manufacturing.

A1: Raw Material Supply

Production starts with the material supply. This module includes the mining and pretreatment processes before production (processing of raw materials, generation of electricity and fuels required for the manufacturing process). The raw materials consumed are:

- Cement, calcium carbonate and other additives such as calcium formate, fibers for adhesives, plasters and renders production.
- Calcium carbonate, titanium dioxide and other acrylic dispersions and chemicals for primers production
- Fiberglass mesh
- Polystyrene (EPS) boards or mineral wool boards (depending on the system)
- Anchors

A2: Transportation of raw materials to manufacturer

Module A2 includes the delivery of raw materials used for components manufacturing, the transportation of components that not manufactured in THRAKON premises and packaging materials from suppliers to the gate of manufacturing plant in Oinofyta. All raw materials (calcium carbonate, cement, lime, additives), and packaging materials are imported from suppliers located in Europe, except for cement that derives from north Africa.

A3: Manufacturing

This module includes all emissions that may occur during the manufacturing process (direct emissions in water/air from fuels combustion and water treatment, manufacturing waste treatment). Personnel-related activities, such as transportation of employees to and from work, and production of infrastructure and capital goods are not included in the scope of this study.

The manufacturing process starts with proportioning of raw materials, where they are proportioned according to specific formulations designed to meet the desired properties of the mortar. Then, the mixing process takes place. The mixing process involves dry mixing, where dry ingredients (cement, calcium carbonate etc.) are thoroughly mixed to ensure a uniform distribution of materials, and wet mixing, where water and any liquid admixtures are added to the dry mix. This is typically done in a high-shear mixer to ensure thorough blending and consistency. The assembly of the components of the system takes place in customer's site.

A5: Installation stage

This module includes impacts related to the installation of ETICS into customer's place. Installation is conducted manually, so electricity required during the installation process is zero. Furthermore, in this module, impacts from the treatment of waste packaging materials and the compensation of biogenic emissions from wooden pallets and paper sacks are taken into account.

Finally, in this module, impacts from water required during the installation process (for adhesives) and Volatile Organic Compounds (VOC) are taken into account.

For adhesives installation into the system, THC 403 & THC 405 require approximately 0,24 kg per kg of mortar, so based on the consumption of adhesives into the system, 2,28 kg of water per m^2 are totally required.

Regarding VOC emissions, according to lab tests, THC 403 & THC 405 emit up to 10 g VOC per kg, while GLX 494 and DEC 428 emit up to 40 g VOC per kg. So based on the consumption of components into the system, 0,215 kg VOC per m^2 are totally emitted.

For all packaging materials, data from European Statistical Authority for Greece have been acquired. Based on the most recent data of 2022 (Packaging materials waste end-of-life), 43,4% of packaging materials are recycled, and 56,6% are landfilled.

Scenario Information (module A5)	Unit
Ancillary materials for installation (specified by material)	Water required for adhesives: 2,28 kg of water per m^2
Quantitative description of energy type kWh or MJ (regional mix) and consumption during the installation process	Considered negligible (manual installation)
Other emissions	VOC emissions: 0,215 kg VOC per m^2
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Packaging waste: **Wooden pallets:** 5,83E-02 kg per m^2 of CLIMAPLUS (43,4% recycling, 56,6% disposal) **Paper sacks:** 6,08E-02 kg per m^2 of CLIMAPLUS (43,4% recycling, 56,6% disposal) **Plastic buckets:** 1,20E-01 kg per m^2 of CLIMAPLUS (43,4% recycling, 56,6% disposal)

End of life stage (C1-C4)

The end-of-life stages begin with the deconstruction and demolition from the installation site and then the waste is transferred for recycling and disposal of the product.

C1: De-construction and demolition

This module refers to the impact arising from the diesel consumption of the heavy vehicles during demolition process. The end-of-life stages begin with the deconstruction and demolition from the installation site and then they transferred for recycling and disposal. Usually, this phase results in little impact because the product is generally part of a larger system (e.g., building) and for that reason, impacts from dismantling should be allocated to all components of that system. For this reason, the impact of the dismantling phase was considered negligible.

C2: Transportation to waste processing

This module includes the transportation of the discarded product either to the recycling site or to landfills for final disposal. A distance of 50 km by lorry 16-32 tonnes from construction/demolition sites to disposal sites has been chosen as a conservative assumption.

C3: Waste processing for reuse, recovery and/or recycling

This module includes impacts related to the reuse/recycling of products after their life cycle. As a conservative assumption, all components of the system after the demolition process will be landfilled. So, there are no environmental impacts assigned to this module.

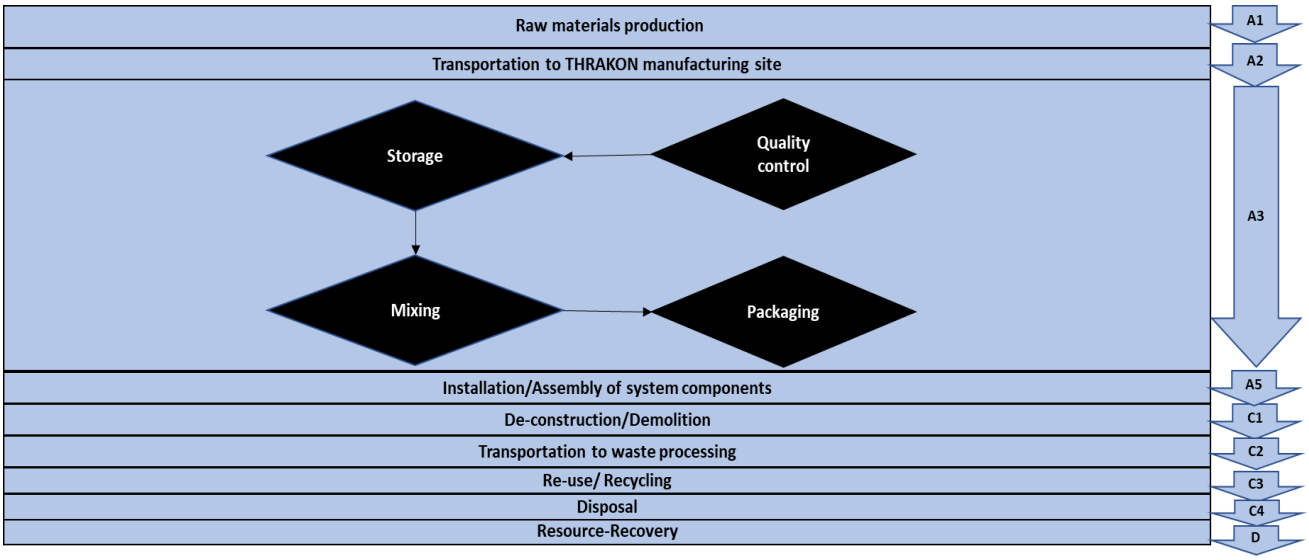
C4: Disposal

This module includes impacts related to the reuse/recycling of components after their life cycle. As said above, 100% of them will be landfilled.

Resource and recovery stage (D)

D: Reuse-Recovery-Recycling-potential

Module D encompasses all avoided burdens related to the potential reuse and/or recycling of the product after its end-of-life stage. In particular, all benefits from the recycling of packaging materials, that can substitute the production of primary wood, paper or energy.



LCA Information

Declared unit

The declared unit of the study is 1 m^2 of ETICS systems manufactured in THRAKON Plant located at Oinofyta, Greece. The chosen option was the representative product (CLIMAPLUS with EPS 80 and insulation thickness 70mm), based on the production volumes. The weight of the product is 13,76 kg/m^2.

Goal and Scope

This EPD evaluates the environmental impacts of the production of 1 m^2 of ETICS, from cradle to gate (modules A1-A3), along with construction/installation stage (module A5) end-of-life modules (C1-C4) end module D.

Cut-off rules

The cut-off criteria adopted is as stated in *''EN 15804:2012+A2:2019''* and *''PCR 2019:14, v.1.3.4''.* Where there are insufficient data or data gaps for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass. In this case, cut-off was applied only in generated wastes from the manufacturing waste (categorized as municipal solid waste) and in lubricants for equipment operation. The quantity of cut-off was 1%.

Allocations

Allocation rules have been performed in accordance with the requirements of ISO 14044:2006. Wherever possible, allocation was avoided by dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes. Where allocation cannot be avoided, the inputs and outputs of the system were partitioned between its different products or functions in a way that reflects the underlying physical relationships between them. In this case, allocation based on the mass of produced quantities was applied to the following streams used for the manufacturing of in-house components (plasters, adhesives, renders etc.):

- Fuels used for the manufacturing process (diesel and LPG)
- Electricity consumed throughout the manufacturing process

The allocation of waste shall follow the polluter-pays principle that is made operational according to the following rules. Processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached. The system boundary to the subsequent product system is set where the waste (e.g., the discarded product) reaches the end-of-waste state, i.e., when the material has become a usable flow (e.g., for reuse, energy recovery and/or recycling). The end-of-waste state is reached when all the following criteria are fulfilled:

- the recovered material or product (including, e.g., energyware such as fuel, electricity and heat) is commonly used for specific purposes

- a market or demand, identified for example by a positive economic value, exists for such a recovered material or product

- the recovered material or product fulfils the technical requirements for the specific purposes for which it is used and meets the existing legislation and standards applicable to its use

- the use of the recovered material or product will not lead to overall adverse environmental or human health impacts, which shall be understood as content of hazardous substances below limit values in applicable legislation

The following rules indicate that for all waste that require disposal in modules A5, C4, impacts from the whole disposal activity will be assigned in this product system. For waste (or parts thereof) that require recycling in module A5, only the sorting and transportation of waste will be assigned to this product system.

Data quality

ISO 14044 was applied in terms of data collection and quality requirements. The impact of the production of raw materials recovered from *Ecoinvent database v.3.10.1+EN 15804 add-on*. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by THRAKON and concerns the full year 2023. These data were the quantities of all input and output materials extracted from the company's SAP system and predetermined recipes, the consumed utilities (energy, LPG and diesel) from bills and invoices. Regarding electricity mix, the latest (2023) national residual electricity mix as published in DAPEEP S.A. was utilized. The climate impact (GWP-GHG) of this electricity, as calculated from a manually created dataset in openLCA is 0,7068 kg CO_2 eq./kWh. The CO_2 emissions from diesel and LPG combustion data were calculated from the National Inventory Report (NIR) of Greece (NIR Greece) The end-of-life are based on the most representative scenarios for this product. Background data for this stage are retrieved from *Ecoinvent v.3.10.1+EN 15804 add-on.*

Time representativeness

Data obtained refer to the year 2023

Software used

OpenLCA v.2.4

Characterization factors (JRC)

Based on Reference package EF 3.1

Environmental Performance

In ***the tables below,*** the results of life cycle assessment for the representative product (CLIMAPLUS with EPS 80, 70 mm thickness), are presented.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The use of the results of modules A1-A3 is discouraged without considering the results of module C. For Primary Energy Use indicators, option A of PCR 2019:14 v.1.3.4 has been followed.

IMPACTS	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1.15E+01	2.07E-01	0.00E+00	1.33E-01	0.00E+00	2.62E-01	-1.33E-01
GWP-fossil	kg CO2 eq	1.16E+01	3.27E-02	0.00E+00	1.33E-01	0.00E+00	2.61E-01	-1.32E-01
GWP-biogenic	kg CO2 eq	-1.09E-01	1.74E-01	0.00E+00	9.13E-05	0.00E+00	8.34E-04	0.00E+00
GWP-luluc	kg CO2 eq	5.18E-03	1.80E-05	0.00E+00	4.35E-05	0.00E+00	3.84E-05	-4.21E-04
GWP-GHG[1]	kg CO2 eq	1.16E+01	8.41E-02	0.00E+00	1.33E-01	0.00E+00	2.61E-01	-1.33E-01
ODP	kg CFC-11 eq	1.80E-07	3.23E-10	0.00E+00	2.65E-09	0.00E+00	4.28E-09	-6.64E-09
AP	mol H+ eq	5.59E-02	8.75E-05	0.00E+00	4.17E-04	0.00E+00	1.48E-03	-5.03E-04
EP-freshwater	kg P eq	2.08E-03	3.99E-06	0.00E+00	8.89E-06	0.00E+00	2.12E-04	-5.59E-05
EP-marine	kg N eq	9.27E-03	1.02E-04	0.00E+00	1.40E-04	0.00E+00	1.10E-03	-1.12E-04
EP-terrestrial	mol N eq	9.77E-02	2.83E-04	0.00E+00	1.53E-03	0.00E+00	4.10E-03	-1.14E-03
POCP	kg NMVOC eq	4.29E-02	5.06E-02	0.00E+00	6.53E-04	0.00E+00	1.53E-03	-7.90E-04
ADPe[2]	kg Sb eq	8.42E-05	1.03E-07	0.00E+00	4.36E-07	0.00E+00	2.79E-07	-1.19E-06
ADPf[2]	MJ	1.97E+02	2.89E-01	0.00E+00	1.87E+00	0.00E+00	3.22E+00	-4.28E+00
WDP[2]	m^3 eq	5.44E+00	5.01E-03	0.00E+00	9.04E-03	0.00E+00	1.89E-02	-4.84E-02

[1] GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).

[2] The results of this environmental impact indicators of ADPf, ADPe and WDP shall be used with care as the uncertainties of these results are high or as there is limited experienced with the indicator.

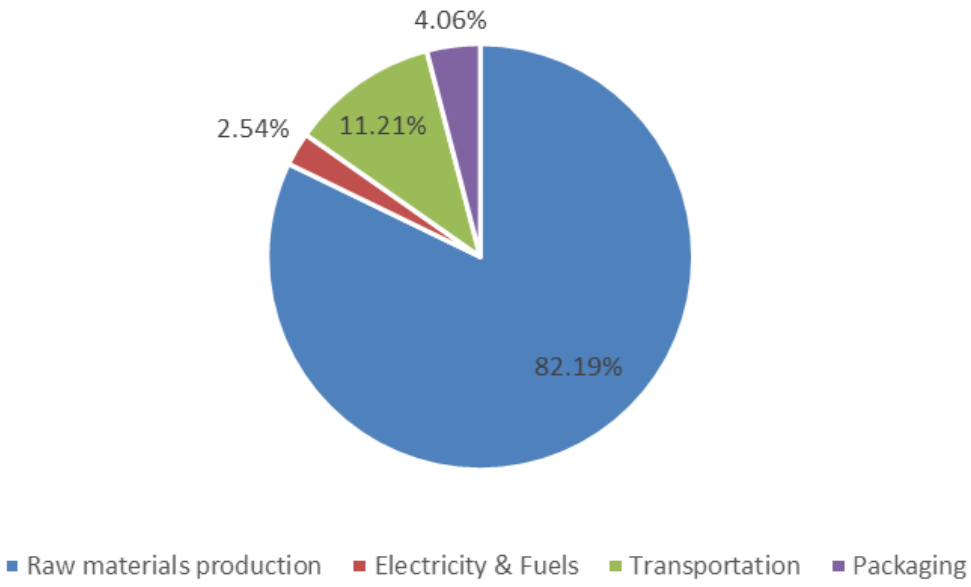
RESOURCE USE	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	6.33E+00	1.31E-02	0.00E+00	2.79E-02	0.00E+00	5.92E-02	-1.68E-01
PERM	MJ	5.17E+00	-5.17E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.15E+01	-5.16E+00	0.00E+00	2.79E-02	0.00E+00	5.92E-02	-1.68E-01
PENRE	MJ	1.90E+02	2.67E-01	0.00E+00	1.70E+00	0.00E+00	2.92E+00	-3.94E+00
PENRM	MJ	6.50E+00	-6.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.97E+02	-6.23E+00	0.00E+00	1.70E+00	0.00E+00	2.92E+00	-3.94E+00
SM	kg	3.35E-01	1.11E-01	0.00E+00	2.11E-03	0.00E+00	3.56E-03	9.76E-02
RSF	MJ	1.46E-01	3.16E-04	0.00E+00	5.91E-04	0.00E+00	1.21E-03	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.37E-01	1.88E-03	0.00E+00	2.48E-04	0.00E+00	-3.98E-02	-1.24E-03

WASTE CATEGORIES	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	4.31E-01	1.25E-03	0.00E+00	1.83E-03	0.00E+00	3.94E-03	-4.95E-03
NHWD	kg	1.22E+01	1.35E-01	0.00E+00	2.03E-02	0.00E+00	1.38E+01	-9.15E-01
RWD	kg	1.38E-04	3.04E-07	0.00E+00	5.96E-07	0.00E+00	1.03E-06	-3.48E-06
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	2.71E-01	1.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	6.57E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE,e	MJ	7.89E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE,t	MJ	4.99E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ADDITIONAL	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	5.37E-07	1.53E-09	0.00E+00	1.05E-08	0.00E+00	2.32E-08	-3.76E-09
IR[3]	kBq U235 eq	5.46E-01	1.20E-03	0.00E+00	2.40E-03	0.00E+00	4.22E-03	-1.36E-02
EF	CTUe	3.85E+01	2.06E+00	0.00E+00	5.02E-01	0.00E+00	2.57E+00	-6.15E-01
HT-c	CTUh	2.64E-08	2.50E-10	0.00E+00	9.31E-10	0.00E+00	7.92E-10	-5.08E-10
HT-nc	CTUh	1.18E-07	1.15E-08	0.00E+00	1.20E-09	0.00E+00	4.60E-09	-1.25E-09
LU	Dimensionless	5.68E+01	2.49E-01	0.00E+00	1.11E+00	0.00E+00	7.87E+00	-8.30E+00

[3]Ionizing radiation potential (IRP) impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Interpretation-GWP-GHG Contribution per stream category



The figure illustrates the Global Warming Potential (GWP-GHG) contribution for CLIMAPLUS, highlighting the relative impact of different production and supply chain processes. Raw materials production (cement, calcium carbonates, other minerals and dispersions, as well as externally sources system components) emerge as the largest contributor, accounting for 82,19% of the total GWP-GHG.

Transportation of raw materials or components to THRAKON manufacturing site accounts for 11,21% of the GWP. Packaging of the system components (plastic buckets for liquids, paper sacks for mortars, pallets) adds up 4,06%, while the least significant stream appears to be the production of electricity and fuels, with 2,54%.

Additional information

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.

Version History

2025-06-17 Recalculation and verification in order to expand the ranges of EPS board, from 3 cm-10 cm to 3 cm-20 mm

Abbreviations

LCA	Life Cycle assessment
EPD	Environmental Product Declaration
PCR	Product category rules
GWP-total	Global Warming Potential total
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Ozone Depletion Potential
AP	Acidification Potential
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 photochemical oxidants
ADPe	Abiotic depletion potential for non-fossil resources
ADPf	Abiotic depletion potential for fossil resources
WDP	Water use
PERE	Use of renewable primary energy excluding 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 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 resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for re-use
MFR	Materials for recycling
MER	Materials for energy recovery
EE	Exported Energy
PM	Particulate matter emissions
IR	Ionizing radiation, human health
ETP-FW	Ecotoxicity, freshwater
HTP-c	Human toxicity, cancer
HTP-nc	Human toxicity, non-cancer
SQP	Land use related impacts/Soil quality

References

- ***General Programme Instructions*** *for the International EPD® System. Version 4.0*
- ***PCR 2019:14*** *v.1.3.4 Construction products. EPD System.*
- ***c-PCR-005 Thermal Insulation products (2024-05-03).*** *EPD System.*
- ***EN 16783:2024*** *Thermal insulation products - Environmental Product Declarations (EPD) - Product Category Rules (PCR) complementary to EN 15804 for factory made and in-situ formed products*
- ***EN 15804:2012+A2:2019/AC,*** *Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products*
- ***ISO 14020:2000*** *Environmental labels and declarations — General principles*
- ***ISO 14025:2006*** *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*
- ***Ecoinvent / Ecoinvent Centre***
- ***TACKLING RECYCLING ASPECTS IN EN15804*** *- Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, Ladji Tikana*
- ***National Inventory Report for Greece***
- ***Residual Energy Mix 2023, DAPEEP***

Appendix

Deviations of representative product from Min & Max case

IMPACTS	Unit	MIN	MAX
GWP-total	kg CO2 eq	41.00%	-212.36%
GWP-fossil	kg CO2 eq	40.33%	-208.40%
GWP-biogenic	kg CO2 eq	0.00%	0.00%
GWP-luluc	kg CO2 eq	41.04%	-103.99%
GWP-GHG	kg CO2 eq	40.34%	-208.75%
ODP	kg CFC-11 eq	41.89%	-144.89%
AP	mol H+ eq	56.80%	-171.47%
EP-freshwater	kg P eq	45.98%	-142.99%
EP-marine	kg N eq	39.93%	-171.28%
EP-terrestrial	mol N eq	38.52%	-173.76%
POCP	kg NMVOC eq	43.62%	-189.91%
ADPe	kg Sb eq	23.06%	-31.70%
ADPf	MJ	50.54%	-251.83%
WDP	m^{3} eq	64.18%	-272.04%

RESOURCE USE	Unit	MIN	MIN
PERE	MJ	48.68%	-110.60%
PERM	MJ	24.54%	-32.99%
PERT	MJ	34.26%	-75.71%
PENRE	MJ	51.20%	-258.32%
PENRM	MJ	38.24%	-61.72%
PENRT	MJ	50.54%	-251.83%
SM	kg	50.33%	-43.96%
RSF	MJ	53.31%	-38.97%
NRSF	MJ	0.00%	0.00%
FW	m^{3}	63.68%	-253.66%

WASTE CATEGORIES	Unit	MIN	MIN
HWD	kg	80.75%	-94.86%
NHWD	kg	82.90%	-26.87%
RWD	kg	47.65%	-67.66%
CRU	kg	0.00%	0.00%
MFR	kg	51.79%	-45.05%
MER	kg	53.31%	-38.97%
EE,e	MJ	54.97%	-48.50%
EE,t	MJ	83.95%	-28.12%

ADDITIONAL	Unit	MIN	MIN
PM	Disease incidence	50.38%	-216.89%
IR	kBq U235 eq	47.66%	-69.75%
EF	CTUe	62.19%	-81.84%

HT-c	**CTUh**	38.40%	-146.75%
HT-nc	**CTUh**	49.94%	-58.69%
LU	**Dimensionless**	27.14%	-79.45%