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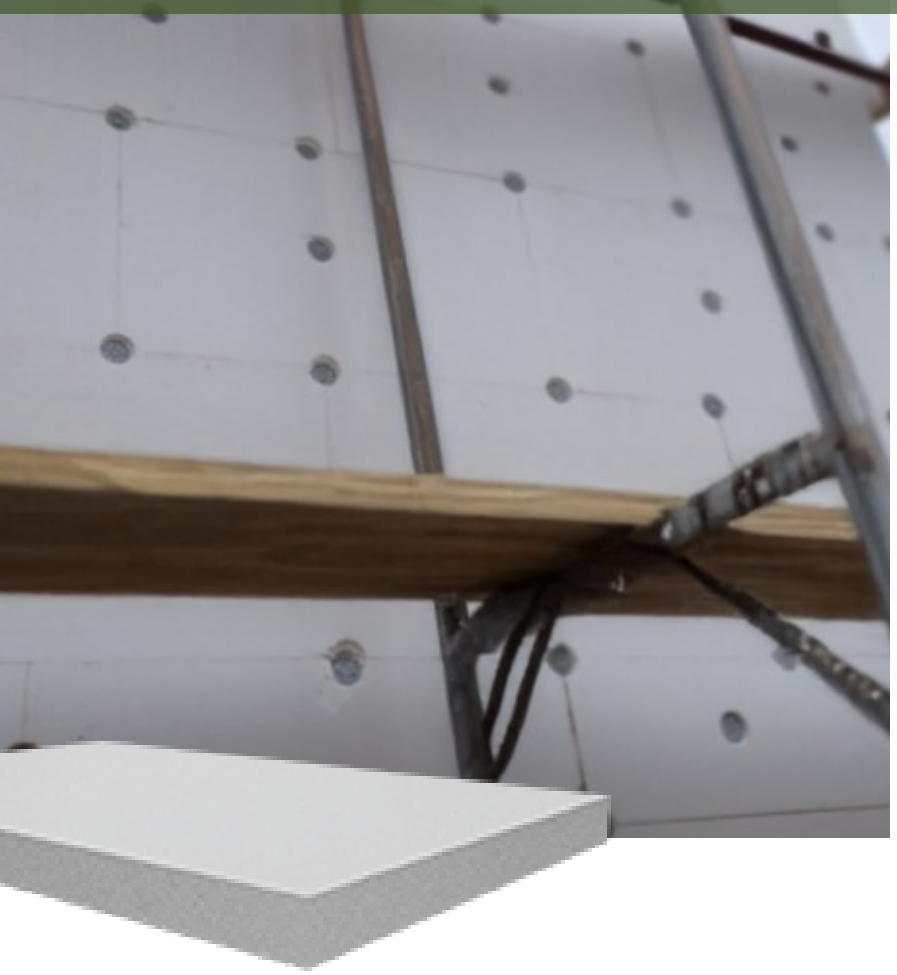
EPD
INTERNATIONAL EPD SYSTEM

ECO PLATFORM
EPD
VERIFIED

Environmental Product Declaration

for ISOMAT THERMOSYSTEM EPS WHITE thermal insulation boards by ISOMAT

Programme	Programme operator	EPD registration Number	Publication date	Valid until	Geographical scope
The International EPD® System, www.environdec.com	EPD International AB	EPD-IES-0021385	2025-08-25	2030-08-24	Global



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

ISOMAT THERMOSYSTEM EPS WHITE

EPD of multiple products, based on representative product. The products included are EPS WHITE 80, EPS WHITE 100, EPS WHITE 120, EPS WHITE 150, EPS WHITE 200

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com.

General Information

Program: The International EPD® System
Address: EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website: www.environdec.com
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Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 "Construction products", version 2.0.1 c-PCR-005 (TO PCR 2019:14) "Thermal Insulation Products" (EN 16783:2024 "Thermal insulation products - Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations".), version 1.0.0
PCR review was conducted by: The Technical Committee of the International EPD System. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat c-PCR review was conducted by: Technical Committee CEN/TC 88 "Thermal insulating materials and products"
Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006: □ Individual EPD verification, without a pre-verified LCA/EPD tool Third party verifier: **Dr. Nikolay Minkov, greentability Ltd.**
Procedure for follow-up of data during EPD validity involves third party verifier: ☐Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility of the EPD.

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.

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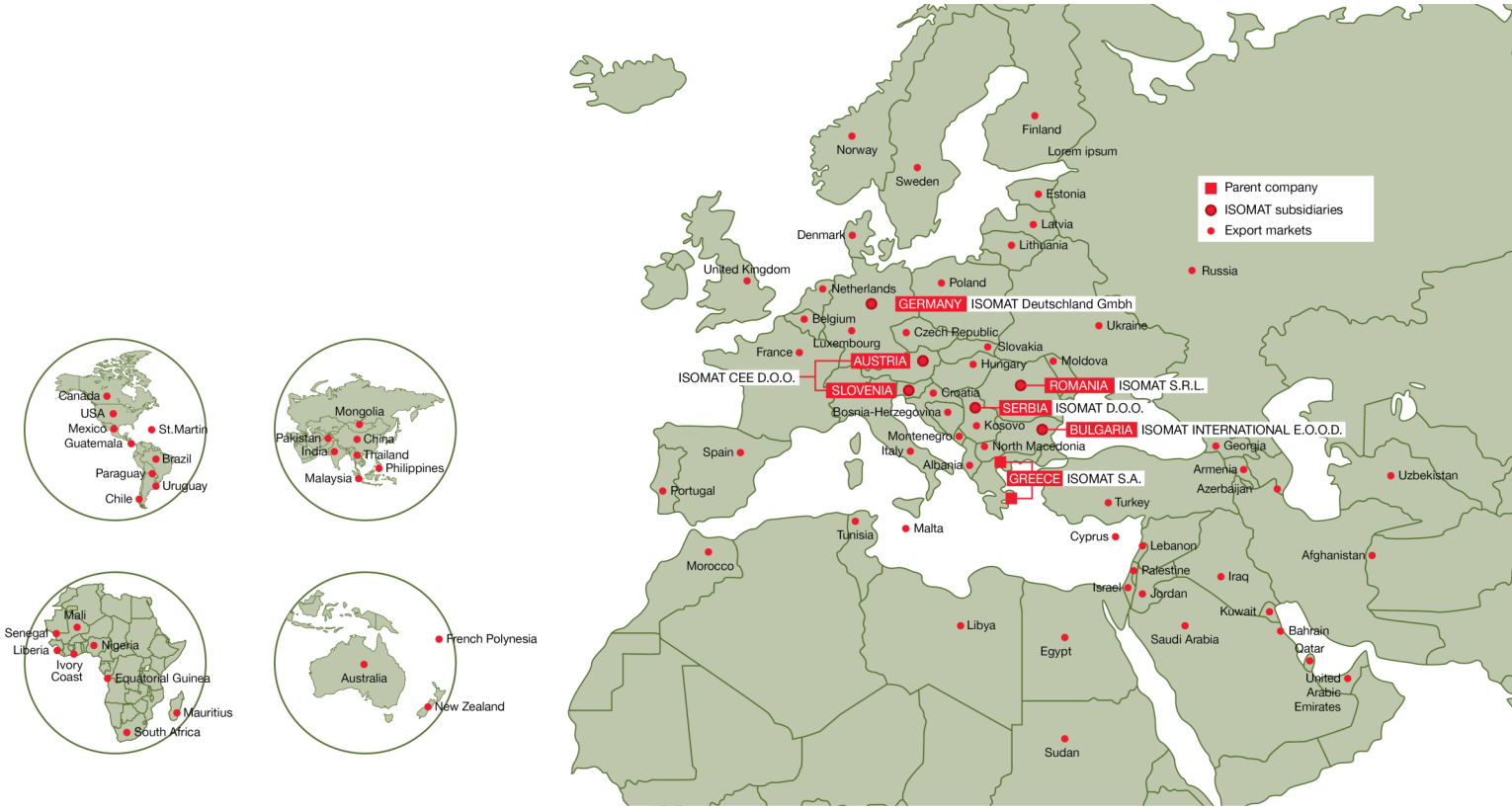
Information about EPD owner

ISOMAT is a multinational Group specializing in the development and manufacture of building chemicals, mortars and paints. For 45 years, **ISOMAT** has been making a history of quality, reliability, deep expertise and continuous business growth. It has 3 production plants; one in the parent company in Greece and two in its subsidiaries in Romania and Serbia. In addition, it has 3 commercial subsidiaries in Germany, Bulgaria, and Slovenia and exports to over 80 countries worldwide.



The **ISOMAT** Group produces and distributes an extensive range of high-quality products falling into the following 8 categories:

- Waterproofing
- External Thermal Insulation
- Paints & Surface Protection
- Tile & Natural Stone Installation
- Concrete Admixtures & Repair Products
- Masonry Construction & Repair
- Industrial Floorings
- Microcement Coatings & Decorative Floorings

Staying true to its vision of being a leading partner to the global construction industry by providing reliable and innovative integrated solutions, ISOMAT invests in Research and Development with sustainability at the core of new product development and existing product improvement. Drawing on scientific knowledge, its dedicated team of experts at 7 R&D centers and 3 Quality Control labs (in Greece and its subsidiaries in Serbia and Romania) develops numerous pioneering products each year, while optimizing existing ones to align with the ever-evolving market demands and the latest technological advancements in the construction industry.

Energy and Social Responsibility Policy

For **ISOMAT**, its people are the most valuable asset, and investing in them is a key factor in its continuous evolution. The primary focus areas include ensuring safe and healthy working conditions, maintaining a highly trained workforce, and offering ongoing training through technical and educational seminars. Furthermore, ISOMAT actively engages in corporate social responsibility, supporting socially vulnerable groups, public benefit foundations, hospitals, educational institutions, and public services. Moreover, with a strong customer-centric approach, **ISOMAT** adeptly addresses its customers' ever-changing needs while delivering an exceptional service experience.

ISOMAT adheres to legislative requirements, the ISO 9001 standard, and other international standards, which underpin its product certifications. The effectiveness of the Quality Management System is consistently improved, with measurable quality targets set and reviewed on an annual basis. These objectives are outlined in the annual quality review.

Sustainability is a strategic priority for the ISOMAT Group. ISOMAT implements Energy and Environmental Management systems, certified according to ISO 50001 and ISO 14001, to reduce the consumption of available natural resources, including water, and save energy and associated emissions during the production process.

ISOMAT has incorporated the processes of both the Energy and the Environmental Management systems into its standard operating procedures by investing in high energy efficiency equipment which enable producing its products with minimal impact on the environment and ensure compliance with the National and European environmental legislation.

Staying true to its commitment to reducing its carbon footprint, ISOMAT installed a 1MW rooftop solar PV power system at its headquarters in Thessaloniki, Greece. In addition, ISOMAT's new EPS (expanded polystyrene) production unit, is the first in Greece and currently the only one of its kind operating with zero direct carbon dioxide emissions. The unit also features a zero waste EPS recycling system. Moving towards a circular economy, ISOMAT joined the “In the Loop” environment-driven platform in May 2022, systematically separating and collecting its plastic waste so that new, sustainable products can be produced. Last but not least, aiming towards a more sustainable future, **ISOMAT** is continuously developing and producing premium-quality products that contribute to a healthy living and working environment. These products have received internationally recognized certifications for both their technical characteristics and their friendliness towards applicators, end-users, and the environment.

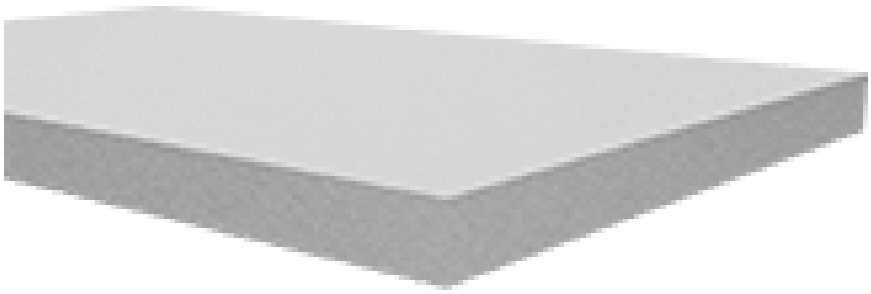
PREMISES

Product Information

ISOMAT THERMOSYSTEM EPS WHITE is produced by expanding polystyrene beads in the manufacturing plant located in Thessaloniki – Ag. Athanasios, Greece. The manufacturing process includes the following steps:

- **Pre-Expansion**: The polystyrene beads are heated with steam, causing the pentane gas within them to expand. This process increases the volume of the beads by 40-60 times, forming a lightweight, cellular structure.
- **Curing**: The expanded beads are stored in a curing chamber to stabilize their structure. This step allows air to replace the pentane gas inside the beads, ensuring uniformity and improving their bonding properties.
- **Molding**: The cured beads are placed into molds and subjected to steam again. The heat causes the beads to soften and fuse together, forming a solid block or sheet of EPS.
- **Aging**: After molding, the EPS blocks are left to age. This step helps release any residual moisture or gases, enhancing the dimensional stability and mechanical properties of the boards.
- **Cutting**: The aged blocks are cut into the desired dimensions using specialized cutting equipment, such as hot-wire cutters. This step determines the final size and thickness of the EPS boards.
- **Packaging**: The finished boards are packaged for transportation and storage, using LDPE film wrap.

It is the ideal insulation material for use in external thermal insulation systems. It is also used in the certified external thermal insulation composite systems ISOMAT THERMOSYSTEM CLASSIC, ISOMAT THERMOSYSTEM PREMIUM and ISOMAT THERMOSYSTEM FLEX. It is also suitable for indoor applications.



Product category	Qualities covered
ISOMAT THERMOSYSTEM EPS WHITE	EPS 80 EPS 100 EPS 120 EPS 150 EPS 200

Qualities covered

The product is classified under UN CPC 369: Other plastic products.

This EPD covers multiple WHITE EPD boards, some of which are already on the market, while others are not. It is important to note that all products are manufactured using the same production methods and processes. The difference between products under the same category lies in the density: higher-density products require more polystyrene per cubic meter. For the products not yet on the market, modeling was based on pilot production data. All parameters remained consistent with market products, except for the formulation (recipe), which is known from pilot runs.

Essential characteristics	Performance					Test method	Harmonized Technical Specification
	EPS 80	EPS 100	EPS 120	EPS 150	EPS 200		
Thermal conductivity	0.036 W/mK	0.034 W/mK	0.034 W/mK	0.034 W/mK	0.033 W/mK	EN 12667	EN 13163:2012 +A1:2015
Durability of thermal resistance against heat, weathering, ageing/degradation	Invariant	Invariant	Invariant	Invariant	Invariant	-	
Reaction to fire	E	E	E	E	E	EN 13501-1	
Compressive stress at 10% deformation CS(10)	≥ 80 KPa	≥ 100 KPa	≥ 120 KPa	≥ 150 KPa	≥ 200 KPa	EN ISO 29469	
Tensile strength perpendicular to faces TR	≥ 150 KPa	≥ 150 KPa	≥ 150 KPa	≥ 200 KPa	≥ 200 KPa	EN 1607	
Bending strength BS	≥ 125 KPa	≥ 150 KPa	≥ 170 KPa	≥ 200 KPa	≥ 250 KPa	EN 12089	
Dimensional tolerances	Thickness T: ± 1 mm	Thickness T: ± 1 mm	Thickness T: ± 1 mm	Thickness T: ± 1 mm	Thickness T: ± 1 mm	EN ISO 29466	
	Length L ± 2 mm	Length L ± 2 mm	Length L ± 2 mm	Length L ± 2 mm	Length L ± 2 mm	EN ISO 29465	
	Width W ± 2 mm	Width W ± 2 mm	Width W ± 2 mm	Width W ± 2 mm	Width W ± 2 mm	EN ISO 29465	
Water absorption by partial immersion WL(P)	0.1 kg/m^2	0.2 kg/m^2	0.2 kg/m^2	0.2 kg/m^2	0.2 kg/m^2	EN ISO 16535	

Properties of ISOMAT THERMOSYSTEM EPS WHITE

Quality	EPS 80	EPS 100	EPS 120	EPS 150	EPS 200
Thickness (mm)	70	66.11	66.11	66.11	64.17
Density (kg/m^3)	18	20	22	25	30
Weight (kg/m^2)	1.260	1.322	1.454	1.653	1.925
R-value (m^2/WK)	1.944				

Characteristics for each ISOMAT THERMOSYSTEM EPS WHITE quality included in the EPD

Content Declaration

In this EPD, the studied products are grouped into one category, and the results of the representative product of the category are presented. The reference product is ISOMAT THERMOSYSTEM EPS WHITE 80, with thickness 70 mm.

The mass of m^2 is 1.26 kg.

Components	Weight (kg/m^2)	Post-consumer recycled content	Biogenic content (kg C)
Expandable polystyrene beams (white)	1.26	0%	0
Packaging materials		0%	0
LDPE film	0.03	0%	0

Content declaration for the representative ISOMAT THERMOSYSTEM EPS WHITE product

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).

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LCA Information

Functional unit:

The functional unit is 1 m^2 of ISOMAT THERMOSYSTEM EPS WHITE 80 with R-value of 1.94 m^2K/W, for use in external thermal insulation systems and with a lifetime of 50 years. The mass of the representative product is 1.26 kg per m^2.

Goal and Scope:

This EPD evaluates the environmental impacts of the production of 1 m^2 of ISOMAT THERMOSYSTEM EPS WHITE with R-value of 1.94 m^2K/W from cradle to grave (modules A, B, C & D) with options -Type c EPD.

System Boundaries:

	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 re-use, recovery and/or recycling	Disposal	Re-use-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules Declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU	EU	GR	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
GWP-GHG share of Specific data used	44.94%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products *	27.92%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

**This variation represents the difference between the declared representative GWP-GHG result for Modules A1-A3 and the product with GWP-GHG results furthest from the declared results (ISOMAT THERMOSYSTEM EPS WHITE 200)*

Product stage (modules 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 required for the manufacturing). Polystyrene beads are the raw materials. Furthermore, electricity (79.74% grid mix and 20.26% solar) production and transmission are included in this module.

A2: Transportation of raw materials to manufacturer

Transportation is relevant to the delivery of raw materials from the supplier to the gate of the manufacturing plant. Polystyrene beads are transported to the manufacturing site of ISOMAT in Agios Athanasios, Greece from suppliers located mainly in Central Europe, while LDPE film for packaging is supplied by Greek and Italian manufacturers.

A3: Manufacturing

This module incorporates all impacts related to the manufacturing stage of EPS boards. No direct GHG emissions are generated during manufacturing of EPS boards, since the production process does not involve the use of fuels and relies on electricity supplied by both the national grid and on-site photovoltaic systems. Only the impact of waste management is included here.

Construction/Installation stage (A4-A5)

Module A4 incorporates all impacts related to the transportation of final products to the construction/installation stage. Since ISOMAT takes on projects all over Greece, it is assumed that the final products cover an average distance of 500 km from the manufacturing site of Agios Athanasios to the construction site.

Scenario information	Unit (expressed per functional unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc.	EURO 5 truck, diesel
Distance	500 km
Capacity utilisation (including empty returns)	100%
Bulk density of transported products	Not applicable
***Volume* capacity utilisation factor (factor: =1 or <1 or ~1 for compressed or nestedpackaged products)**	Not applicable

Module A5 in general includes the impacts during the installation of EPS boards into the building (from electricity required), as well as the treatment of packaging materials (LDPE films) after the installation.

Since installation of EPS boards into the building is conducted manually, the electricity required for the installation is considered negligible.

For waste packaging treatment, data from European Statistical Authority are used (Packaging Waste Statistics-EUROSTAT). For Greece, 43.4% of packaging materials are recycled, while the rest 56.6% is landfilled.

Scenario information	Unit (expressed per functional unit)
Ancillary materials for installation (specified by material);	Not applicable
Water use	Not applicable
Quantitative description of energy type and consumption during the installation process	Considered negligible
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Not applicable
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	Waste packaging materials (LDPE films): 0.03 kg per m^2. Recycling rate 43.4%, disposal rate 56.6%.
Direct emissions to ambient air, soil and water	Not applicable

Use stage (B)

Modules B (B1-B7) are also included in the study for completeness reasons. Nevertheless, there are no environmental impacts or benefits occurring during the use phase of the product's life cycle, either due to the product's nature. This means that it lacks required maintenance, refurbishment, water or electricity during its use phase.

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 impacts arising during the de-construction of EPS board from the building. It is assumed that this demolition is conducted manually with hand tools, so the energy (electricity or thermal) required is zero. Thus, the environmental impacts in C1 module are zero.

C2: Transportation to waste processing

This module includes the transportation of the discarded product from the demolition site to relevant waste treatment facilities. As a conservative assumption, a distance of 50 km with EURO5 trucks is considered.

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

This module generally includes the impacts arising from potential recycling/reuse of final products after their life cycle. As a conservative assumption, the whole amount of polystyrene waste after demolition is going to be landfilled. So, there are no environmental impacts assigned to this module.

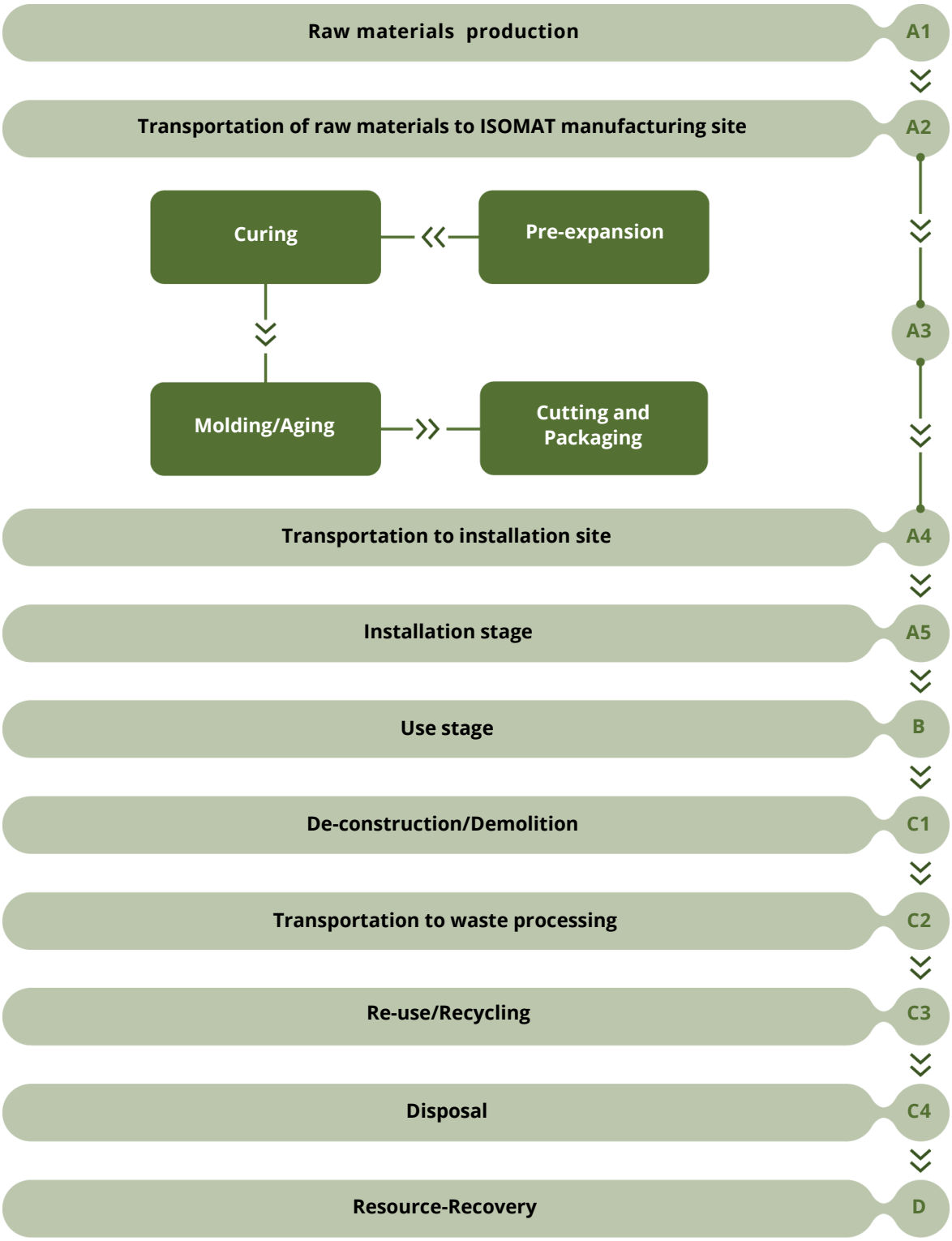
C4: Disposal

This module generally includes the impacts arising from potential landfill of final products after their life cycle. As mentioned above, the whole quantity of polystyrene will be landfilled.

Resource and recovery stage (D)

D: Reuse-Recovery-Recycling-potential

Module D generally includes potential avoided burdens related to the potential reuse and/or recycling of the product and its packaging after its end-of-life stage. In this case, since all polystyrene is assumed to be landfilled, the environmental benefits from the recycling of this 43.4% of LDPE packaging film is considered.



Flow diagram regarding system boundaries

LCA Information

Cut-off rules:

The cut-off criteria adopted is as stated in PCR 2019:14, v.2.0.1 and EN 15804:2012+A2:2019. Where there is 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, no cut-off was applied to any stream.

Other exclusions:

Personnel-related processes, such as transportation of employees to and from work, are excluded from the study according to PCR 2019:14 v.2.0.1. Furthermore, production of infrastructure and capital goods are excluded from the study.

Allocations:

Co product 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 or economic relationships between them. Mass allocation is applied to electricity consumed during the manufacturing process, based on the production volumes of each EPS type and quality and the total electricity consumed in EPS production line. In this way, the specific consumptions per m^3 of board, are calculated.

End-of-Life allocation generally follows the requirements of ISO 14044 & EN 15804. 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).

Consequently, regarding the treatment of wastes from the manufacturing process (A3 module), such as chemicals and other hazardous waste, all impacts from their disposal shall be assigned to this product system. Furthermore, in module A5, disposal of part of LDPE films (56.6%) shall be fully assigned to this product system, while regarding the part of LDPE films that will be recycled (43.4%), the sorting of polyethylene will be assigned to this product system.

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LCA Information

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+EN 15804 add-on. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by ISOMAT and concerns the full year 2024. These data were the quantities of all input and output materials extracted from the company's SAP system and products recipes, the consumed utilities (energy) from bills and invoices and the distances and means of transport for each input stream from purchase invoices. Regarding electricity, in 2024, ISOMAT consumed both electricity derived from grid and electricity from solar panels. The GWP-GHG climate impact of electricity from grid is 0.811 kg CO_2 eq./kWh according to representative dataset from Ecoinvent, that uses the data from the 2023 Mix Report of Greece published by AIB, while GWP-GHG impact for the production of solar energy is 0.08332 kg CO_2 eq./kWh, according to a representative dataset from Ecoinvent. Background data for all stages are retrieved from Ecoinvent v.3.10+EN 15804 add-on.

Process	Type of source	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Generation of electricity used in manufacturing of product	Database	Ecoinvent v3.10	2024	Primary data	39.27%
Manufacturing of raw materials	Database	Ecoinvent v3.10	2024	Secondary data	0%
Transportation of materials	Database	Ecoinvent v3.10	2024	Primary data	5.68%

Geographical Scope:
Worldwide

Time representativeness:
Data obtained refer to the year 2024

Software used:
OpenLCA v.2.4

Reference package (JRC):
Based on characterization factors from EF 3.1.

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Environmental Performance

In the tables below, the results of life cycle assessment for 1 m^2 of the representative product with R = 1.94 $m^2 \cdot K/W$ **(ISOMAT THERMOSYSTEM EPS 80 WHITE, with insulation thickness 70 mm)** are presented. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). 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.

IMPACTS	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	8.31E+00	1.22E-01	6.87E-03	0.00E+00	0.00E+00	1.22E-02	0.00E+00	1.55E-01	-3.79E-02
GWP-fossil	kg CO_2 eq	8.26E+00	1.22E-01	5.91E-03	0.00E+00	0.00E+00	1.22E-02	0.00E+00	1.55E-01	-3.78E-02
GWP-biogenic	kg CO_2 eq	4.82E-02	8.36E-05	9.64E-04	0.00E+00	0.00E+00	8.36E-06	0.00E+00	1.16E-04	0.00E+00
GWP-luluc	kg CO_2 eq	5.93E-04	3.99E-05	3.02E-06	0.00E+00	0.00E+00	3.99E-06	0.00E+00	8.20E-06	-2.77E-05
GWP-GHG[1]	kg CO_2 eq	8.28E+00	1.22E-01	6.35E-03	0.00E+00	0.00E+00	1.22E-02	0.00E+00	1.55E-01	-3.69E-02
ODP	kg CFC-11 eq	1.64E-07	2.42E-09	6.69E-11	0.00E+00	0.00E+00	2.42E-10	0.00E+00	3.65E-10	-1.20E-09
AP	mol H+ eq	3.32E-02	3.82E-04	1.50E-05	0.00E+00	0.00E+00	3.82E-05	0.00E+00	1.02E-04	-1.30E-04
EP-freshwater	kg P eq	3.71E-03	8.14E-06	7.46E-07	0.00E+00	0.00E+00	8.14E-07	0.00E+00	1.54E-06	-9.61E-06
EP-marine	kg N eq	5.30E-03	1.29E-04	9.29E-06	0.00E+00	0.00E+00	1.29E-05	0.00E+00	8.68E-04	-2.26E-05
EP-terrestrial	mol N eq	4.96E-02	1.40E-03	4.93E-05	0.00E+00	0.00E+00	1.40E-04	0.00E+00	4.14E-04	-2.60E-04
POCP	kg NMVOC eq	2.47E-02	5.98E-04	2.02E-05	0.00E+00	0.00E+00	5.98E-05	0.00E+00	1.79E-04	-1.99E-04
ADPe[2]	kg Sb eq	7.70E-06	3.99E-07	2.17E-08	0.00E+00	0.00E+00	3.99E-08	0.00E+00	3.21E-08	-2.52E-07
ADPf[2]	MJ	1.62E+02	1.71E+00	5.73E-02	0.00E+00	0.00E+00	1.71E-01	0.00E+00	3.15E-01	-1.06E+00
WDP[2]	m^3 eq	4.29E+00	8.27E-03	9.66E-04	0.00E+00	0.00E+00	8.27E-04	0.00E+00	1.52E-03	-2.36E-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	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	6.73E+00	2.55E-02	2.28E-03	0.00E+00	0.00E+00	2.55E-03	0.00E+00	4.09E-03	-3.28E-02
PERM	MJ	1.17E-01	0.00E+00	-4.02E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.25E-02	0.00E+00
PERT	MJ	6.85E+00	2.55E-02	-3.79E-02	0.00E+00	0.00E+00	2.55E-03	0.00E+00	-5.84E-02	-3.28E-02
PENRE	MJ	1.59E+02	1.55E+00	5.29E-02	0.00E+00	0.00E+00	1.55E-01	0.00E+00	2.86E-01	-9.80E-01
PENRM	MJ	2.95E+00	0.00E+00	-1.94E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.72E+00	0.00E+00
PENRT	MJ	1.62E+02	1.55E+00	-1.41E-01	0.00E+00	0.00E+00	1.55E-01	0.00E+00	-2.43E+00	-9.80E-01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	8.47E-02	5.41E-04	4.69E-05	0.00E+00	0.00E+00	5.41E-05	0.00E+00	4.49E-05	-9.07E-04
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.02E-01	2.27E-04	-4.16E-05	0.00E+00	0.00E+00	2.27E-05	0.00E+00	-4.66E-03	-5.88E-04

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OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	8.96E-02	1.68E-03	2.67E-04	0.00E+00	0.00E+00	1.68E-04	0.00E+00	3.93E-04	-1.09E-03
NHWD	kg	1.02E+00	1.86E-02	1.68E-02	0.00E+00	0.00E+00	1.86E-03	0.00E+00	1.26E+00	-2.25E-01
RWD	kg	1.96E-05	5.46E-07	4.86E-08	0.00E+00	0.00E+00	5.46E-08	0.00E+00	7.98E-08	-9.34E-07
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.51E-01	1.75E-03	1.90E-04	0.00E+00	0.00E+00	1.75E-04	0.00E+00	1.74E-04	-1.57E-03
MER	kg	3.78E-05	2.43E-07	2.11E-08	0.00E+00	0.00E+00	2.43E-08	0.00E+00	2.02E-08	-4.08E-07
EE,e	MJ	5.46E-03	2.88E-04	2.61E-05	0.00E+00	0.00E+00	2.88E-05	0.00E+00	3.06E-05	-5.13E-04
EE,t	MJ	7.18E-03	4.08E-04	1.83E-05	0.00E+00	0.00E+00	4.08E-05	0.00E+00	3.59E-05	-4.85E-04

ADDITIONAL IMPACTS	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PM	Disease incidence	2.85E-07	9.58E-09	3.05E-10	0.00E+00	0.00E+00	9.58E-10	0.00E+00	2.28E-09	-7.49E-10
IRP[3]	kBq U235 eq	7.92E-02	2.20E-03	1.92E-04	0.00E+00	0.00E+00	2.20E-04	0.00E+00	3.26E-04	-3.72E-03
ETP-FW	CTUe	1.28E+01	4.60E-01	3.82E-02	0.00E+00	0.00E+00	4.60E-02	0.00E+00	4.88E-01	-2.46E-01
HTP-c	CTUh	9.32E-09	8.52E-10	5.08E-11	0.00E+00	0.00E+00	8.52E-11	0.00E+00	8.33E-11	-8.85E-11
HTP-nc	CTUh	3.62E-08	1.10E-09	6.49E-11	0.00E+00	0.00E+00	1.10E-10	0.00E+00	1.27E-09	-2.52E-10
SQP	dimensionless	1.87E+01	1.02E+00	5.00E-02	0.00E+00	0.00E+00	1.02E-01	0.00E+00	7.31E-01	-1.43E-01

[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.

Variations

In this section, the deviations between different product qualities with the same functional unit—1 m² of EPS board with a thermal resistance of R = 1.94 m²·K/W are presented. To calculate the deviations, a full life cycle assessment was performed for each product quality using primary data inputs. In the following tables, deviations for each quality of EPS boards from the representative product ISOMAT THERMOSYSTEM EPS WHITE 80 are presented as a percentage. A positive value indicates that the product has a higher environmental impact compared to the representative product.

IMPACTS	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
GWP-total	kg CO_2 eq	0.81%	7.18%	16.73%	28.75%
GWP-fossil	kg CO_2 eq	0.80%	7.16%	16.70%	28.70%
GWP-biogenic	kg CO_2 eq	2.27%	10.09%	21.82%	37.22%
GWP-luluc	kg CO_2 eq	-2.16%	1.33%	6.37%	11.53%
GWP-GHG	kg CO_2 eq	0.81%	7.17%	16.72%	28.74%
ODP	kg CFC-11 eq	-1.73%	2.09%	7.82%	13.93%
AP	mol H+ eq	0.08%	5.71%	14.16%	24.48%
EP-freshwater	kg P eq	-5.08%	-4.61%	-3.89%	-5.54%
EP-marine	kg N eq	0.98%	7.53%	17.35%	29.78%
EP-terrestrial	mol N eq	1.24%	8.03%	18.22%	31.23%
POCP	kg NMVOC eq	1.51%	8.58%	19.18%	32.83%
ADPe	kg Sb eq	-4.95%	3.72%	4.63%	10.85%
ADPf	MJ	1.79%	9.13%	20.15%	34.44%
WDP	m^3 eq	3.17%	11.89%	24.97%	42.46%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Core Environmental Impacts

RESOURCE USE	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
PERE	MJ	-4.52%	-3.49%	-1.93%	-2.29%
PERM	MJ	-3.93%	-2.30%	0.14%	1.15%
PERT	MJ	-4.51%	-3.47%	-1.90%	-2.23%
PENRE	MJ	1.88%	9.31%	20.47%	34.96%
PENRM	MJ	-2.81%	-0.06%	4.06%	7.67%
PENRT	MJ	1.79%	9.13%	20.15%	34.44%
SM	kg	0.00%	0.00%	0.00%	0.00%
RSF	MJ	-5.14%	-4.74%	-4.12%	-5.94%
NRSF	MJ	0.00%	0.00%	0.00%	0.00%
FW	m^3	2.86%	11.28%	23.90%	40.68%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Resource use indicators

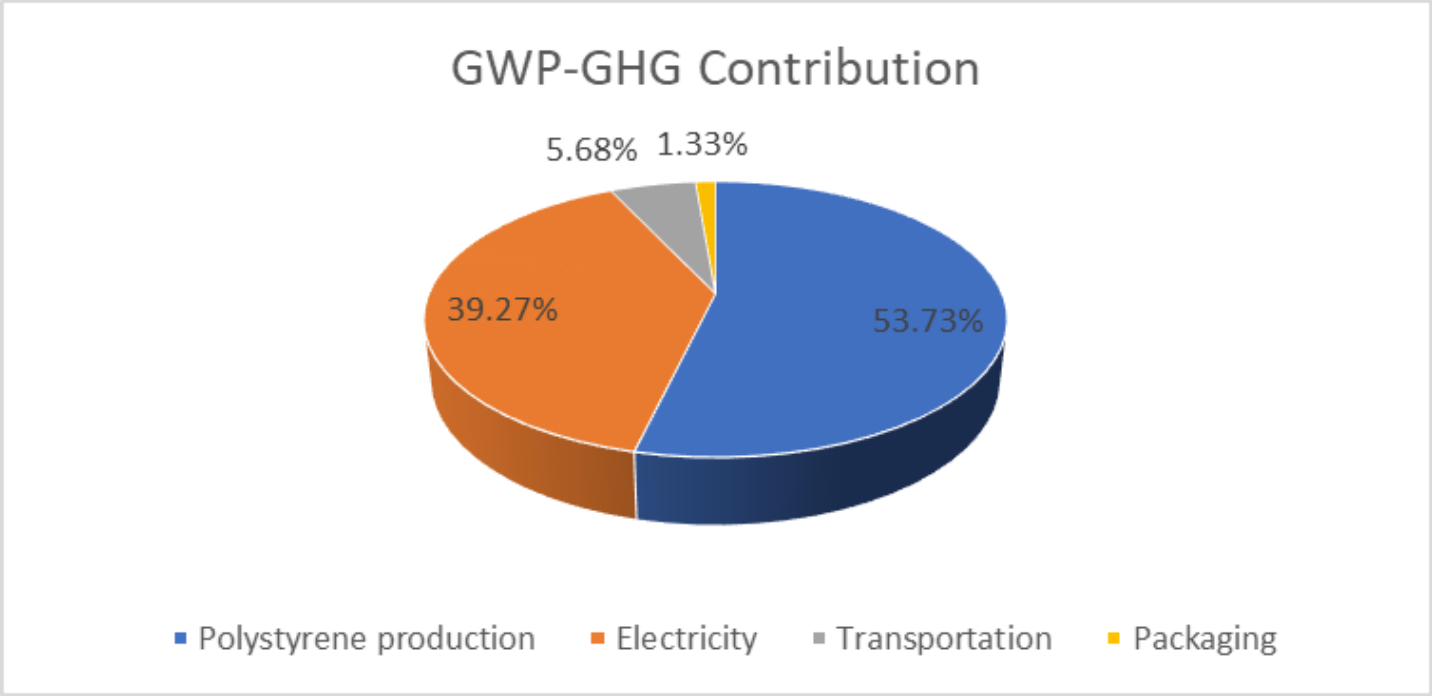
OUTPUT FLOWS AND WASTE CATEGORIES	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
HWD	kg	0.32%	6.20%	15.02%	25.91%
NHWD	kg	3.59%	12.74%	26.46%	44.94%
RWD	kg	-5.20%	-1.60%	-1.07%	0.02%
CRU	kg	0.00%	0.00%	0.00%	0.00%
MFR	kg	-4.86%	-4.17%	-3.13%	-4.30%
MER	kg	-3.74%	-3.66%	-3.54%	-4.50%
EE,e	MJ	-2.40%	0.75%	5.48%	10.03%
EE,t	MJ	-2.52%	0.51%	5.07%	9.34%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Output and waste categories indicators

ADDITIONAL IMPACTS	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
PM	Disease incidence	2.32%	10.19%	22.00%	37.52%
IRP	kBq U235 eq	-4.00%	-2.45%	-0.12%	0.71%
ETP-FW	CTUe	-2.33%	0.90%	5.74%	10.46%
HTP-c	CTUh	-0.93%	3.69%	10.62%	18.59%
HTP-nc	CTUh	-2.62%	0.31%	4.71%	8.76%
SQP	dimensionless	-2.60%	0.35%	4.79%	8.89%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Resource use indicators

Interpretation of the results



As it is presented above, polystyrene production (module A1) contributes the most for the production of ISOMAT THERMOSYSTEM EPS WHITE boards, accounting for 53.73%. Next most important stream is electricity production (module A1), accounting for 39.27%. Transportation of raw and packaging materials to ISOMAT manufacturing site (module A2) accounts for 5.68%. Finally, production of packaging (module A3) is less important, with a contribution of 1.33%.

Additional Environmental Information

Conversion from representative to other products of the category

As complementary information, in this study a way to calculate the impact for A1-A3 for each different thickness is included. The first step is to identify the deviations between different product qualities with the same functional unit—1 m² of EPS board with a thermal resistance of R = 1.94 m²·K/W, in a same way as carried for the full life cycle. In the following tables, deviations for each quality of EPS boards from the representative product ISOMAT THERMOSYSTEM EPS WHITE 80 are presented as a percentage. A positive value indicates that the product has a higher environmental impact compared to the representative product. These deviations concern the A1-A3 stages (cradle-to-gate).

IMPACTS	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
GWP-total	kg CO_2 eq	0.67%	6.90%	16.25%	27.94%
GWP-fossil	kg CO_2 eq	0.66%	6.88%	16.21%	27.89%
GWP-biogenic	kg CO_2 eq	2.41%	10.38%	22.33%	38.06%
GWP-luluc	kg CO_2 eq	-2.77%	0.13%	4.26%	8.01%
GWP-GHG	kg CO_2 eq	0.67%	6.89%	16.23%	27.92%
ODP	kg CFC-11 eq	-1.85%	1.84%	7.39%	13.22%
AP	mol H+ eq	0.01%	5.56%	13.91%	24.05%
EP-freshwater	kg P eq	-5.11%	-4.66%	-3.99%	-5.71%
EP-marine	kg N eq	0.24%	6.05%	14.76%	25.47%
EP-terrestrial	mol N eq	1.10%	7.75%	17.74%	30.43%
POCP	kg NMVOC eq	1.40%	8.36%	18.79%	32.18%
ADPe	kg Sb eq	-5.56%	3.03%	3.03%	8.33%
ADPf	MJ	1.75%	9.05%	20.01%	34.21%
WDP	m^3 eq	3.16%	11.88%	24.96%	42.45%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Core Environmental Impacts (A1-A3)

RESOURCE USE	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
PERE	MJ	-4.56%	-3.58%	-2.09%	-2.56%
PERM	MJ	-4.26%	-2.98%	-1.04%	-0.81%
PERT	MJ	-4.56%	-3.57%	-2.07%	-2.53%
PENRE	MJ	1.84%	9.24%	20.34%	34.75%
PENRM	MJ	-3.34%	-1.13%	2.20%	4.57%
PENRT	MJ	1.75%	9.05%	20.01%	34.21%
SM	kg	0.00%	0.00%	0.00%	0.00%
RSF	MJ	-5.22%	-4.89%	-4.38%	-6.38%
NRSF	MJ	0.00%	0.00%	0.00%	0.00%
FW	m^3	2.95%	11.45%	24.21%	41.19%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Resource use indicators (A1-A3)

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Additional Environmental Information

OUTPUT FLOWS AND WASTE CATEGORIES	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
HWD	kg	0.23%	6.01%	14.68%	25.34%
NHWD	kg	-3.88%	-2.20%	0.31%	1.43%
RWD	kg	-5.56%	-2.18%	-2.18%	-1.79%
CRU	kg	0.00%	0.00%	0.00%	0.00%
MFR	kg	-5.00%	-4.45%	-3.61%	-5.09%
MER	kg	-3.81%	-3.81%	-3.81%	-4.94%
EE,e	MJ	-2.86%	-0.16%	3.90%	7.40%
EE,t	MJ	-3.01%	-0.48%	3.34%	6.46%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Output and waste categories indicators (A1-A3)

ADDITIONAL IMPACTS	Unit	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
PM	Disease incidence	2.21%	9.97%	21.62%	36.88%
IRP	kBq U235 eq	-4.31%	-3.07%	-1.19%	-1.07%
ETP-FW	CTUe	-2.88%	-0.21%	3.80%	7.23%
HTP-c	CTUh	-1.55%	2.45%	8.46%	14.99%
HTP-nc	CTUh	-3.13%	-0.72%	2.92%	5.77%
SQP	dimensionless	-3.33%	-1.13%	2.20%	4.59%

Deviations from ISOMAT THERMOSYSTEM EPS WHITE 80 board – Resource use indicators (A1-A3)

Additional Environmental Information

The next step to calculate the different impacts for each indicator, the following formula should be used:

$$Result, X_i = Result, representative_i \bullet (1 - dev) \bullet CF \bullet Thickness$$

Where:

X= the product for which the impact needs to be calculated

i= the impact indicator

dev= the deviation of the relevant impact for each quality compared to the representative products (for A1-A3)

CF= Conversion factor for different qualities

The conversion factor for each quality is presented in the table below.

QUALITY	EPS 80 WHITE	EPS 100 WHITE	EPS 120 WHITE	EPS 150 WHITE	EPS 200 WHITE
Conversion Factor - WHITE	0.01429	0.01513	0.01513	0.01513	0.01558

Conversion factors for each quality

Information on the release of dangerous substances

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.

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Abbreviations

LCA	Life Cycle assessment
EPD	Environmental Product Declaration
PCR	Product category rules
GLO	Global
RER	Europe
RoW	Rest of the world
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
IRP	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 5.0.1, dated 2024-06-19
- **PCR 2019:14** Construction products. EPD International. Version 2.0.0, dated 2025-04-07
- **EN 15804:2012+A2:2019/AC**, Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products
- c-PCR-005 **"Thermal Insulation Products"**. EPD International System. Version 1.0.0, dated 2025-04-08
- EN 16783:2024 **"Thermal insulation products - Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations"**
- **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**, *www.Eco-invent.org*
- **Residual Energy Mix 2023, Association of Issuing Bodies, AIB**
- **TACKLING RECYCLING ASPECTS IN EN15804** - Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, Ladji Tikana

Version History

Original Version of the EPD, 2025-08-25