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ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

for One-component Polyurethane Liquid Waterproofing Membranes 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-0016960	2024-10-31	2029-10-30	Global

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

ISOFLEX-PU 500
ISOFLEX-PU 510
ISOFLEX-PU 500A

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.
The current is an EPD of multiple products, based on the average results of a product group.

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Accredited by	The International EPD® system	

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

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

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 1.3.4. Published on 2024.04.30, valid until: 2025.06.20.
CPC CODE: 351, Paints ,varnishes and other related products.

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* .

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

EPDs within the same product category but registered in different EPD programs 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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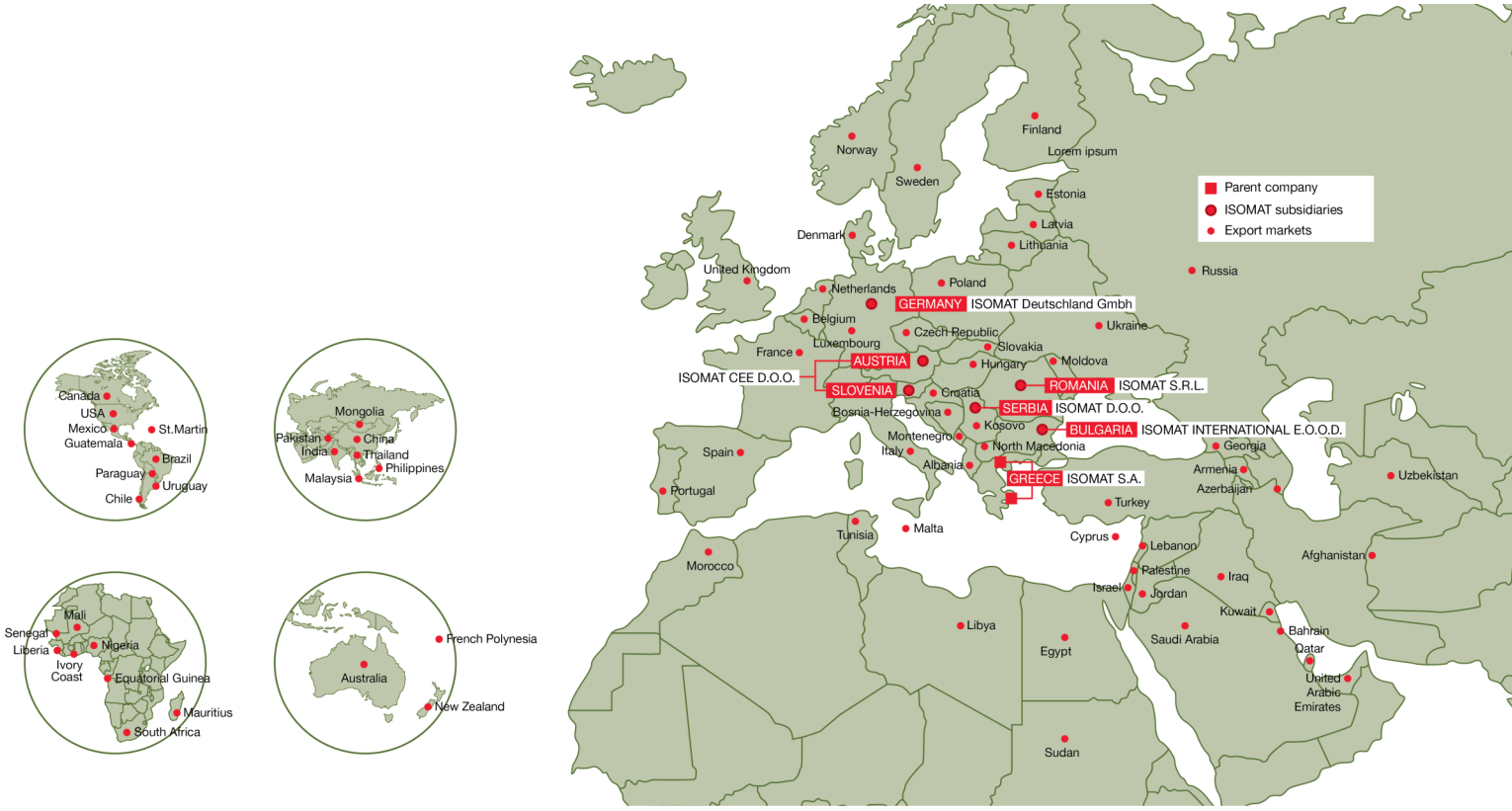
Company Info

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, Slovenia, and Bulgaria 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 for 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, Quality and Social Responsibility Policies

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 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 Info

In this EPD, weighted average results (based on the production masses of each product) of three one-component polyurethane liquid applied membranes (ISOFLEX-PU 500, ISOFLEX-PU 500 A and ISOFLEX-PU 510) will be presented.

One-component Polyurethane Liquid Waterproofing Membranes
ISOFLEX-PU 500
ISOFLEX-PU 500 A
ISOFLEX-PU 510

ISOFLEX-PU 500

ISOFLEX-PU 500 is a one-component, polyurethane, liquid waterproofing membrane for flat roofs.

- Offers excellent mechanical, chemical, thermal, UV and weather resistance properties, as it is based on pure, elastomeric, hydrophobic polyurethane resins.
- Forms a continuous, elastic, waterproof and vapor-permeable membrane, without seams or joints.
- Has strong adhesion to various substrates, including concrete, cement screed, wood and existing acrylic or hybrid liquid waterproofing membranes.
- It is applicable even to irregular substrates.

ISOFLEX-PU 500 can be applied in flat roofs and balconies as an exposed waterproofing membrane, green roofs and flower beds ,under tiles in kitchens, bathrooms, balconies and flat roofs, as long as quartz sand has been broadcast on its last layer, under thermal insulation boards on flat roofs, in construction works, such as highways, bridge decks, tunnels, etc., in open parking deck systems, foundations, gypsum and cement boards, old layers of bituminous membranes, polyurethane foam and metal surfaces.

The product has been successfully tested according to the requirements of EAD 030350-000402 and is classified as: W3, S, TL4-TH4, P4 special. Certified according to EN 1504-2 and classified as a coating for surface protection of concrete. CE marked.

ISOFLEX-PU 500 A

ISOFLEX-PU 500 A is a one-component, rapid curing, polyurethane, liquid waterproofing membrane for flat roofs. Based on elastomeric, hydrophobic polyurethane resins. ISOFLEX PU-500 A features excellent mechanical, chemical, thermal and weather resistance. Thanks to its unique formulation, it cures rapidly to form a thick, bubble-free membrane. It offers the following properties:

- It forms a continuous, elastic, waterproof, vapor-permeable membrane, without seams or joints.
- Shows excellent adhesion to various substrates, such as concrete, cement screed, wood and existing acrylic or hybrid liquid waterproofing membranes.
- Also, it is applicable even on irregular substrates and at low temperatures.
- Maximum consumption can be achieved in only one coat reducing labor costs.
- Lastly the membrane becomes quickly rainproof.

ISOFLEX-PU 500 A can be applied in roofs, flat roofs and balconies as an exposed waterproofing membrane, green roofs and flower beds, gypsum and cement boards, under tiles in kitchens, bathrooms, balconies and flat roofs as long as quartz sand has been broadcast on its last layer, under thermal insulation boards on flat roofs, in construction works, such as highways, bridge decks, tunnels, etc., foundations, old bituminous membranes, polyurethane foam and metal surfaces.

The product has been successfully tested according to the requirements of EAD 030350-000402 and is classified as: W3, S, TL4-TH4, P4 special. Certified according to EN 1504-2 and classified as a coating for surface protection of concrete. CE marked.

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Product Info

ISOFLEX-PU 510

ISOFLEX-PU 510 is a one-component, polyurethane, liquid waterproofing membrane.

- Offers excellent mechanical, chemical, thermal, UV and weather resistance properties, as it is based on pure, elastomeric, hydrophobic polyurethane resins.
- Forms a continuous, elastic, waterproof and vapor-permeable membrane, without seams or joints.
- It has strong adhesion to a variety of substrates, including concrete, screed, and existing acrylic or hybrid liquid waterproofing membranes. The application is possible even to irregular substrates.
- Lastly it constitutes an affordable and reliable waterproofing solution.

ISOFLEX-PU 510 can be applied in flat roofs and balconies as an exposed waterproofing membrane, green roofs and flower beds, under tiles in kitchens, bathrooms, balconies and flat roofs, as long as quartz sand has been broadcast on its last layer, under thermal insulation boards on flat roofs, in construction works, such as highways, bridge decks, tunnels, etc, foundations, gypsum and cement boards, old layers of bituminous membranes, polyurethane foam and metal surfaces.

The product has been successfully tested according to the requirements of EAD 030350-000402 and is classified as: W3, S, TL4-TH4,P4 special. Certified according to EN 1504-2 and classified as a coating for surface protection of concrete. CE marked.

All products intended for market distribution within the European Union (EU) and European Free Trade Association (EFTA) are accompanied by a Declaration of Performance (DoP) in accordance with the requirements of EN 1504-2:2004

Technical Specifications

Specification	ISOFLEX-PU 500	ISOFLEX-PU 500A	ISOFLEX-PU 510
Form	polyurethane prepolymer	polyurethane prepolymer	polyurethane prepolymer
Color	white, grey and other colors upon request	grey and other colors upon request	white and other colors upon request
Density	1.39 kg/l	1.43 kg/l	1.44 kg/l
Elongation (EN 527-3)	> 500%	350 ± 50%	> 450%
Tensile strength (EN 527-3)	> 8.0 N/mm^2	6 ± 1 N/mm^2	> 6.0 N/mm^2
Permeability to CO_2 (EN 1062-6)	Sd>50m	Sd>50m	Sd>50m
Permeability to water vapour (EN ISO 7783-2)	Class I (permeable)	Class I (permeable)	Class I (permeable)
Capillary absorption and permeability to water (EN 1062-3)	w<0.1kg/m^{2}h$^{0.5}$	w<0.1kg/m^{2}h$^{0.5}$	w<0.1kg/m^{2}h$^{0.5}$
Adhesion (EN 1542)	≥2 .0MPa	≥ 2.0MPa	≥ 2.0MPa
Solar reflectance Index (SRI) (ASTM E1980-01)	108 %	85 %	84 %
Reaction to Fire (EN 13501-5)	Broof-t1	Broof-t1	Broof-t1

Further details on the technical specifications of the products can be obtained from the corresponding Technical Data Sheets (TDSs), which are available upon request from ISOMAT personnel.

According to the UN CPC classification system, these products can be classified under the UN CPC code: 54530 Roofing and waterproofing services.

This is an EPD of multiple products, based on a weighted average product from the product group, which was identified based on the production volumes. The content declaration for the avergae product is presented in the following table, while the composition of the product is expressed in mass per declared unit (kg/kg).

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH Regulations that exceed 0.1% of the total weight are present in the examined systems.

Weighted average product content declaration (kg/kg)

Components	Weight (%)		Biogenic Material-Weight (kg C/kg)
	Min	max	
Polyurethane (PU) Prepolymer	25.0	50.0	-
Solvents	2.0	7.0	-
Plasticizers	4.0	9.0	-
Fatty Acids	< 2		-
Fillers	30.0	55.0	-
Pigments	3.0	8.0	-
Thickeners	2.0	7.0	-
Other Polymers	3.0	9.0	-
Packaging materials	Weight (%)		Biogenic Material Weight (kg C/kg)
Plastic	0.05 %		-
Wood	1.4 %		0.0003
Steel	4.68 %		-

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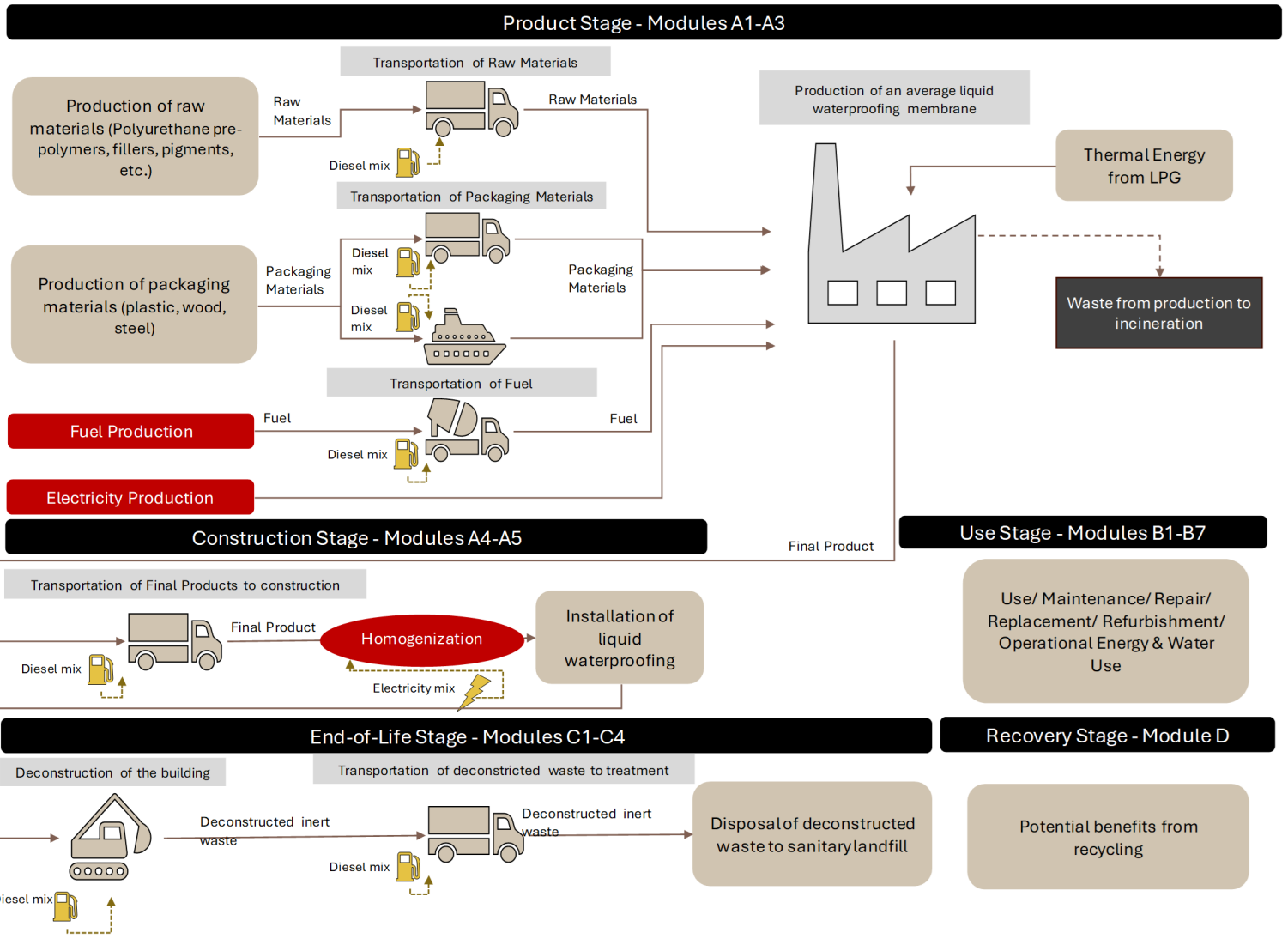
System Diagram



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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
Specific data used	<3 %			—	—	—	—	—	—	—	—	—	—	—	—	—	—
Variation-products	Up to –12.5 %			—	—	—	—	—	—	—	—	—	—	—	—	—	—
Variation-sites	0%			—	—	—	—	—	—	—	—	—	—	—	—	—	—

Product stage (A1-A3)

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

A1: Raw Material Supply

The Product Stage includes all activities related to the production of input commodities, such as the generation of raw materials utilized in the manufacturing of the products under assessment, as well as the provision of utilities, specifically fuel used for thermal energy generation and electricity. The electricity used in production is supplied by the Greek medium-voltage electricity grid" and hence for the purpose of electricity modeling, country's residual electricity mix , as outlined in the latest report from the Greek

Administrator of Renewable Energy and Guarantees of Origin (DAPEEP) for the year 2023, is considered.
The emission intensity of electricity production, as calculated using the LCA software LCA For Experts for the Greek residual electricity mix in 2023, is expressed as a GWP-GHG value of **0.517 kg CO_2/kWh.**

A2: Transportation of raw materials to manufacturer

In Module A2, the transportation of input commodities to the manufacturing facility is accounted for, including both raw materials and packaging. Assumptions regarding transportation routes and distances (in kilometers) are based on the actual locations of the suppliers. The transportation modes were modeled using selected LCI datasets from the Managed LCA Database (MLC database), with consideration given to technological and temporal relevance.

A3: Manufacturing

Module A3 covers the manufacturing of packaging materials as well as the production of the examined products. The release of VOCs during production process is also included. Additionally, Module A3 accounts for the treatment of production waste up to the point it reaches the end-of-waste stage. Incineration of these volumes of waste is carried out based on details from contractual agreements with waste management facilities.

Transport of Input Goods		
Transportation Route	**Type of Transferred Good**	**Transportation Mode**
Road	Raw & packaging materials	Truck, Euro 6, 12 - 14t gross weight / 9.3t payload capacity/ Fuel type: Diesel
Vessel	Packaging materials	Average ship of 3500t payload capacity/ Fuel type: Diesel
Road	Fuel	US: Truck-tanker (EPA SmartWay)/ Fuel type: Diesel

Construction/Installation stage (A4-A5)

Modules A4 & A5 are also included in the study. The scenarios included are currently in use and are representative for one of the most probable alternatives. Additional declaration of representative mixes for the relevant region is permissible.

A4 : Transport

In module A4 the transportation of the final products to the construction sites is considered. It is noteworthy that ISOMAT's clients are located in the mainland of the European region and transportation data is retrieved from the company's sales volumes during the reference period of the study. The table below, provides details on the scenario developed for the transportation of final goods to construction sites.

Scenario for delivery of one-component polyurethane liquid waterproofing membranes to construction sites	
Transportation mode	Road
Means of transportation	Truck Euro 6, 28-32t gross weight
Fuel type	Diesel
Payload capacity	22 tonnes
Utilization ratio	61%(empty returns included)
Km (weigthed average based on sales volumes)	500

A5: Construction installation

In Module A5, emissions related to the installation of one-component polyurethane-based products are examined. For the application of one-component polyurethane liquid waterproofing membranes, no ancillary materials are considered to be used, except energy consumed exclusively during homogenization of the products prior to application. The energy consumption for this purpose accounts for 0,050 kWh/kg, if a 1500 W mixing drill is used for 2 minutes. Additionally, Volatile Organic Compound (VOC) emissions associated with this stage of the life cycle account for a maximum of 500gr/litre of product. With respect to material losses, it is assumed that ISOFLEX-PU products are applied correctly, and therefore, no material losses are accounted for at this stage. Module A5 accounts also for the treatment of packaging materials until they reach the end-of-waste state. Based on a study provided by the EuRIC AISBL, 90% of the world's steel used in the construction industry, is retrieved through recycling, while the remaining 10% is disposed of. Lastly, nylon film is assumed to be directed for recycling based on prevailing treatment routes for such types of materials. Therefore, the system boundary is set to the point where sorted plastic is delivered to the recycling

Scenario for installation of one-component polyurethane liquid waterproofing membranes in the building	
Ancillary materials for installation (electricity)	0.180 Mj/kg
Packaging materials	1] 90% of steel tinplate container for recycling & 10% of steel tinplated container for disposal. System boundary is set to the point of delivery to the recycling and disposal facilities 2] 100% of nylon film for recycling. System boundary is set to the point of delivery to the recycling facility
Direct emissions to ambient air	500gr/Lt Volatile Organic Compounds (VOCs) during application

Use stage (B1-B7)

It is assumed that the application of the one-component polyurethane liquid waterproofing membranes is done properly and based on the recommendations of the manufacturer. Hence, It is considered that these products do not require any maintenance, repair, replacement, or refurbishment during their 50-year service life.

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 disposal of the product. The scenarios included are currently in use and are representative for one of the most probable alternatives. Additional declaration of representative mixes for the relevant region is permissible.

C1: De-construction and demolition

The deconstruction of one-component polyurethane liquid waterproofing membranes is anticipated to occur simultaneously with the demolition of the building structure. Specifically, the removal of one-component polyurethane liquid waterproofing membranes, along with the rest of the building, is expected to be performed using a 100 kW diesel-powered excavator.

C2: Transportation to waste processing

This module addresses the transportation of dismantled one-component polyurethane liquid waterproofing membranes to final waste handling facilities, assuming an average distance of 150 km between construction sites and landfill facilities. Road transport is considered the primary mode of transportation.

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

This module does not account for any emissions, as it is assumed that all dismantled one-component polyurethane liquid waterproofing membranes are directed to landfill as part of the end-of-life scenario.

C4: Disposal

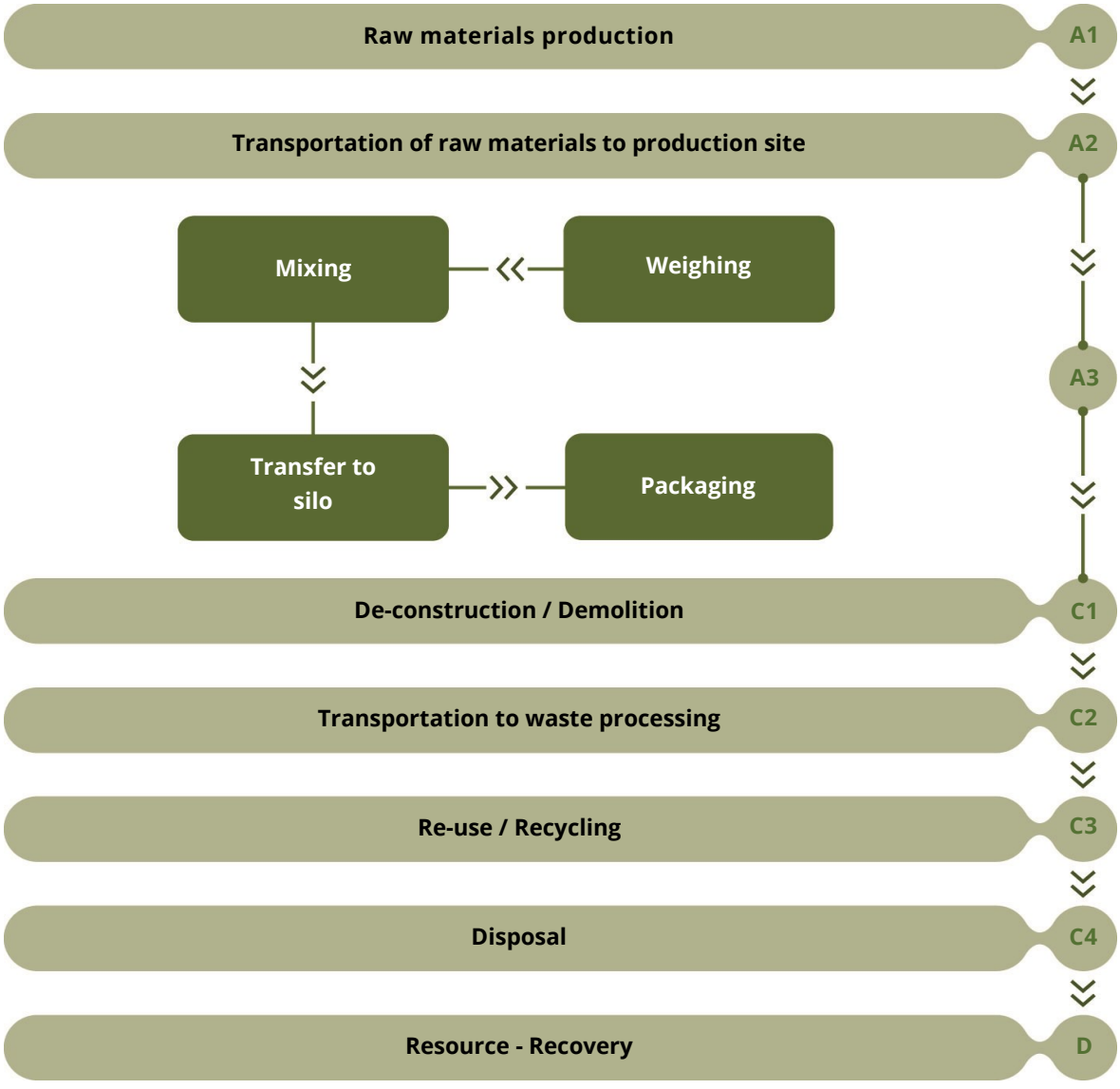
This module entails the emissions related to the landfilling of one-component polyurethane liquid waterproofing membranes designated for disposal.

End-of-life scenarios of one-component polyurethane liquid waterproofing membranes	
Collection process specified by type	0kg collected separately
	1kg collected with mixed construction waste
Recovery system specified by type	0kg for re-use
	0kg for recycling
	0kg for energy recovery
Disposal specified by type	1kg product of material for final deposition
Assumptions for scenario development (transportation)	Distance of waste disposal facilities: 150km

Resource and recovery stage (D)

D: Reuse-Recovery-Recycling-potential

This module accounts for the net benefits derived from recovery procedures. Hence, the recycling of nylon packaging waste and the recovery of the fraction of tinplate metal container (90% of steel tinplated waste) are considered. The recycling process is assumed to achieve 100% efficiency, while the quantity ratio between the recovered and substituted material is set to 1.



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LCA Information

Declared unit:
The declared unit is one (1) kilogram (kg) of One-Component Polyurethane liquid waterproofing membrane. The declared results refer to a weighted average product, based on the production volumes within the reference period.

System Boundary:
This EPD follows a cradle-to-gate with options approach, with Modules C1-C4 and Module D. Optional modules integrated comprise A4 and A5 from the construction process stage, along with B1-B7 from the use stage. The selected modules collectively cover the entire life cycle of the examined products.

Cut-off rules:
Life Cycle Inventory data covering at least 95% of the total mass and energy inputs per module are being incorporated. The study also includes data on elementary flows to and from the product system, accounting for a minimum of 99% of the reported environmental impacts. The sole processes that were omitted from this study include:

- Infrastructure and capital goods which are out of scope
- Wooden pallets management introduced as packaging of the raw materials, since they are designed for reuse, thereby minimizing the need for specific management practices.

Allocations:
The kWh consumption was allocated entirely to the production of one-component polyurethane products based on the machinery's power rating (kW) and the total hours of operation within the unit of interest.
LPG, employed for thermal energy generation, is dedicated solely to one-component polyurethane liquid waterproofing membranes production line. As a result, the entire LPG consumption, amounting to 100%, is mass allocated to whole production of one-component polyurethane liquid waterproofing membranes during the reference period.
A co-product allocation was implemented for the production waste streams, as they are considered to reach the end-of-waste status upon delivery to treatment facilities, within Module A3. Since there is no available information regarding their economic value, the waste streams are conservatively assumed to have zero economic worth, meaning no environmental burdens are assigned to them. Waste flows allocated as co-products are regarded as exiting the product system without any associated environmental impact.

Assumptions:

- Assumptions were made regarding the transportation modes to and from the manufacturing site. Specific details related to the transportation routes, the types of trucks or vessels used, including their technology, fuel type, payload capacity, and utilization ratio, were based on these assumptions.
- The employment of a diesel-driven excavator (100kW) is assumed for the demolition of the building.
- A distance of 150 kilometers (km) between construction sites and waste treatment facilities was considered in within the study's calculations. This assumption takes into account the hypothetical distance that materials would need to be transported to access the treatment facilities necessary for their processing or disposal.
- Assumptions were employed regarding treatment of waste generated in Modules A5, and C1-C4. Specifically, it is considered that all of the waste generated from the deconstruction process will be disposed of in sanitary landfills as part of its waste handling procedure. Regarding packaging waste and namely, tinplate metal and nylon waste, the former will be recovered through mechanical recycling at a 90% with the remaining 10% of steel waste to be disposed, while 100% of the nylon waste will be fully recycled.

Geographical Scope:
The geographical extent of each module alludes to a global scale. The sole exception refers to Module A3, which focuses on Greece.

Time representativeness:
Data obtained refer to the year 2023

Software used:
LCA For Experts (Formely known as GaBi)

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Environmental Performance

This EPD declares the selected impact categories and corresponding indicators as defined by the International EPD System, following the default indicator list version 2.0 and PCR 2019:14 'Construction products' v.1.3.4. Additionally, the results for a supplementary climate impact indicator are reported. The characterization factors (CFs) used are consistent with the EF-JRC package for EN 15804, based on the EF reference package 3.1.

Please note that 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 LCIA results are normalized to the selected declared unit, 1kg of an average one-component polyurethane liquid waterproofing membrane .

Please note that the inclusion of module C in the Environmental Product Declaration (EPD) mandates a comprehensive consideration of its results alongside modules A1-A3. It is strongly discouraged to utilize the outcomes of modules A1-A3 without duly integrating the results of module C.

IMPACTS	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.24E+00	4.24E-02	1.65E-02	0.00E+00	6.60E-04	1.40E-02	0.00E+00	5.17E-03	-6.84E-02
GWP-fossil	kg CO_2 eq	2.16E+00	4.20E-02	1.65E-02	0.00E+00	6.50E-04	1.38E-02	0.00E+00	5.17E-03	-6.84E-02
GWP-biogenic	kg CO_2 eq	-2.57E-04	0.00E+00	2.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq	8.09E-02	4.24E-04	2.03E-05	0.00E+00	1.05E-05	2.25E-04	0.00E+00	4.87E-06	-9.67E-06
ODP	kg CFC-11 eq	6.48E-08	3.71E-15	1.40E-10	0.00E+00	9.19E-17	1.97E-15	0.00E+00	2.13E-09	1.31E-11
AP	mol H+ eq	5.71E-03	5.33E-05	3.72E-05	0.00E+00	3.22E-06	2.10E-05	0.00E+00	4.95E-05	-1.61E-04
EP-freshwater	kg P eq	2.17E-04	1.08E-07	4.66E-07	0.00E+00	2.67E-09	5.72E-08	0.00E+00	4.82E-07	2.07E-07
EP-marine	kg N eq	1.61E-03	2.20E-05	1.01E-05	0.00E+00	1.52E-06	8.06E-06	0.00E+00	1.72E-05	-2.37E-05
EP-terrestrial	mol N eq	1.31E-02	2.55E-04	1.01E-04	0.00E+00	1.68E-05	9.46E-05	0.00E+00	1.89E-04	-2.16E-04
POCP	kg NMVOC eq	4.91E-03	5.25E-05	8.66E-02	0.00E+00	4.30E-06	2.09E-05	0.00E+00	5.49E-05	-1.03E-04
ADPe	kg Sb eq	1.48E-05	2.20E-09	3.49E-08	0.00E+00	5.44E-11	1.17E-09	0.00E+00	1.20E-08	-3.82E-07
ADPf	MJ	4.67E+01	3.32E-01	3.44E-01	0.00E+00	8.22E-03	1.77E-01	0.00E+00	1.48E-01	-6.67E-01
WDP	m3 eq	4.54E-01	3.91E-04	4.48E-03	0.00E+00	9.67E-06	2.08E-04	0.00E+00	6.77E-03	-3.46E-03

[1] Negative results of GWP-biogenic corresponding biogenic carbon dioxide which is stored in the wood packaging are already balanced out in Module A5.
[2] 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.

Environmental Results of 1 kg of an average polyurethane liquid waterproofing membrane

Climate Change		Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Potential – GHG[3]	**GWP-GHG**	**kg CO2 eq.**	2.24E+00	4.24E-02	1.65E-02	0.00E+00	6.60E-04	1.40E-02	0.00E+00	5.17E-03	-6.84E-02

[3] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such. the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

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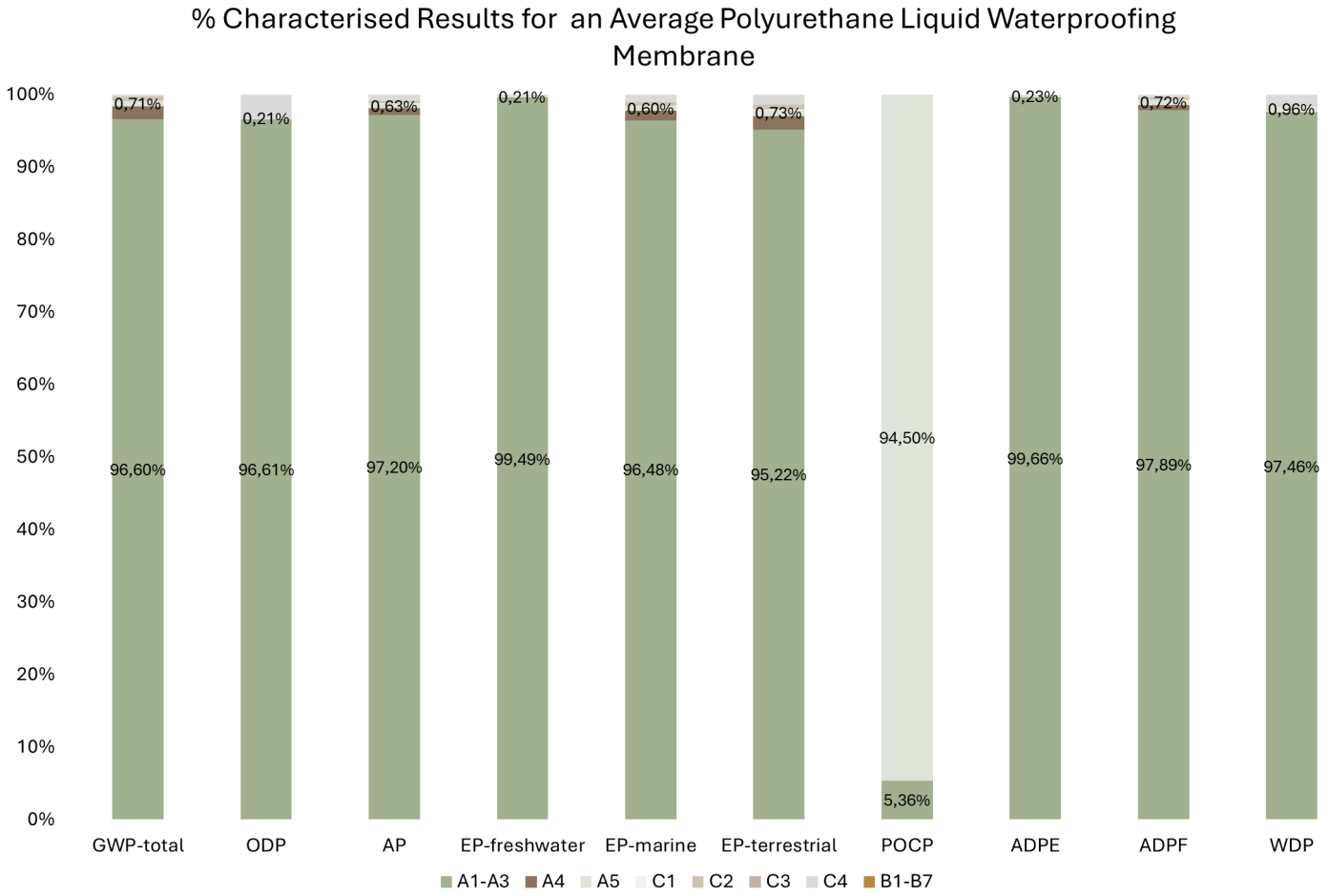
RESOURCE USE	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	3.29E+00	2.86E-02	2.29E-01	0.00E+00	7.08E-04	1.52E-02	0.00E+00	1.28E-03	2.92E-02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.29E+00	2.86E-02	2.29E-01	0.00E+00	7.08E-04	1.52E-02	0.00E+00	1.28E-03	2.92E-02
PENRE	MJ	4.67E+01	3.32E-01	3.44E-01	0.00E+00	8.22E-03	1.77E-01	0.00E+00	1.48E-01	-6.67E-01
PENRM	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
PENRT	MJ	4.68E+01	3.32E-01	3.44E-01	0.00E+00	8.22E-03	1.77E-01	0.00E+00	1.48E-01	-6.67E-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	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
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	1.37E-02	3.19E-05	1.82E-04	0.00E+00	7.89E-07	1.69E-05	0.00E+00	1.58E-04	-7.37E-03

OUTPUT FLOWS AND WASTE	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	6.44E-05	1.27E-11	4.54E-10	0.00E+00	3.15E-13	6.76E-12	0.00E+00	0.00E+00	-5.45E-09
NHWD	kg	1.29E-02	5.42E-05	4.95E-03	0.00E+00	1.34E-06	2.88E-05	0.00E+00	0.00E+00	8.81E-03
RWD	kg	2.70E-04	6.05E-07	5.02E-05	0.00E+00	1.50E-08	3.22E-07	0.00E+00	0.00E+00	7.97E-08
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	0.00E+00	0.00E+00	4.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	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
EEe	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
EEt	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

ADDITIONAL IMPACTS	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PM	Disease incidence	4.86E-08	5.34E-10	3.55E-10	0.00E+00	3.84E-11	2.22E-10	0.00E+00	9.70E-10	-1.51E-09
IRP[4]	kBq U235 eq	1.05E-01	8.78E-05	8.41E-03	0.00E+00	2.17E-06	4.66E-05	0.00E+00	6.53E-04	1.65E-03
ETP-FW [2]	CTUe	2.12E+01	2.47E-01	8.16E-01	0.00E+00	6.10E-03	1.31E-01	0.00E+00	3.89E-02	-3.46E-02
HTP-c [2]	CTUh	1.13E-09	4.98E-12	7.18E-12	0.00E+00	1.23E-13	2.65E-12	0.00E+00	2.36E-12	3.04E-11
HTP-nc [2]	CTUh	2.13E-08	2.24E-10	1.89E-08	0.00E+00	5.54E-12	1.19E-10	0.00E+00	2.60E-11	1.52E-10
SQP [2]	dimension less	1.17E+01	1.63E-01	1.81E-01	0.00E+00	4.04E-03	8.68E-02	0.00E+00	3.09E-01	-8.81E-03

[2] 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.
[4] This 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

Interpretation



As depicted in the diagram, it is clear that, in general, the production phase (Modules A1-A3) has the most significant impact on the results of each of the assessed impact indicators. More specifically, the following key points are noted:

- The total Global Warming Potential is allocated across Modules A1-A3, accounting for almost 97% of the overall potential environmental impacts.
- The contribution of product installation and implicated VOC emissions in Module A5 is significant of Photochemical Ozone Formation contributing for 94.59% of total environmental impacts.
- Contribution of End-of-life & Use stage Modules (C1-C4 & B1-B7) is rather negligible.

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.

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List of 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 of the International EPD® System. Version 5.0

PCR 2019:14 v.1.3.4 Construction products. EPD System.

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, www.Eco-invent.org

Residual Energy Mix 2023 from Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA)

World Steel Association International industry association for the iron and steel sector - www.worldsteel.org

Sphera – LCA for Experts Product Sustainability software – www.sphera.com

The International EPD® System - www.environdec.com

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Appendix

Deviations of each product from the declared average				
		ISOFLEX-PU 500	ISOFLEX-PU 500 A	ISOFLEX-PU 510
GWP-total	kg CO2 eq	3.9%	-12.5%	-5.0%
GWP-fossil	kg CO2 eq	4.1%	-12.9%	-5.1%
GWP-biogenic	kg CO2 eq	-	-	-
GWP-luluc	kg CO2 eq	0.1%	-0.4%	-0.1%
GWP-GHG	kg CO2 eq	3.9%	-12.5%	-5.0%
ODP	kg CFC-11 eq	-1.1%	-34.1%	1.9%
AP	mol H+ eq	2.0%	-14.1%	-2.4%
EP-freshwater	kg P eq	-0.7%	-37.5%	1.3%
EP-marine	kg N eq	2.4%	-13.0%	-2.9%
EP-terrestrial	mol N eq	2.6%	-13.7%	-3.2%
POCP	kg NMVOC eq	4.4%	-5.5%	-5.6%
ADPe	kg Sb eq	2.7%	-13.5%	-3.3%
ADPf	MJ	4.2%	-6.6%	-5.3%
WDP	m3 eq	0.9%	-13.8%	-1.0%

RESOURCE USE	Unit	ISOFLEX-PU 500	ISOFLEX-PU 500 A	ISOFLEX-PU 510
PERE	MJ	1.5%	-10.0%	-1.8%
PERT	MJ	1.5%	-10.0%	-1.8%
PENRE	MJ	4.2%	-6.6%	-5.3%
PENRT	MJ	4.2%	-6.6%	-5.3%
FW	M3	1.9%	-15.2%	-2.3%

WASTE CATEGORIES	Unit	ISOFLEX-PU 500	ISOFLEX-PU 500 A	ISOFLEX-PU 510
HWD	Kg	6.4%	36.8%	-8.8%
NHWD	kg	6.9%	-15.3%	-8.8%
RWD	kg	4.8%	-11.9%	-6.1%

ADDITIONAL IMPACTS	Unit	ISOFLEX-PU 500	ISOFLEX-PU 500 A	ISOFLEX-PU 510
PM	kBq U235 eq.	2.9%	-11.6%	-3.6%
IRP	CTUe	2.1%	-15.9%	-2.5%
ETP-FW	CTUh	3.6%	-16.5%	-4.4%
HTP-c	CTUh	1.2%	-28.5%	-1.2%
HTP-nc	CTUh	3.6%	-11.6%	-4.6%
SQP	dimensionless	0.5%	-20.3%	-0.4%