EPD®

THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

maris SAINT-GOBAIN

ENVIRONMENTAL PRODUCT DECLARATION

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

MARISEAL® 400

EPD VERIFIED

Date of issue: 2023-01-11
Validity: 5 years
Valid until: 2028-01-10
Version: 1
Scope of the EPD®: Global.

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

Registration number
The International EPD® System:
S-P-07977

General information

Manufacturer: MARIS POLYMERS S.M.S.A.

Programme used: International EPD System **http://www.environdec.com/**

EPD registration number: S-P-07977.

PCR identification: PCR 2019:14 Construction products version 1.11.

Site of manufacture: Thesi Roumani Inofyta Viotia, 32011, Greece**.**

Owner of the declaration: MARIS POLYMERS S.M.S.A.

Product / product family name and manufacturer represented: Mariseal® 400 manufactured by Maris Saint-Gobain.

UN CPC code: 35110 - Paints and varnishes and related products**.**

EPD Prepared by: LCA Central Team, Saint-Gobain.

Contact: Loukia Bousia (Loukia.Bousia@saint-gobain.com).

Declaration issued: 2023/01/11, valid until: 2028/01/10.

Declared Unit: 1 kg of product installed and with a service life of 25 years.

All inventory data, as well as all indicator results expressed in this report are declared for 1 kg of materials. Additionally, based on the standard product application, the equivalent results from the LCA study may be applicable to:

- 1 m^2 of covered surface with the product applied in one or two coats of 0.12 to 0.25 kg/m^2 and with an estimated lifetime of 25 years.

Table 1. Consumption scenarios

Average consumption	Minimum consumption	Maximum consumption
kg/m^2	kg/m^2	kg/m^2
1.85E-01	1.20E-01	2.50E-01

Declaration of Hazardous substances: during the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0.1% of the weight of the product.

Geographical scope of the EPD®: Global.

The intended use of this EPD is for B2B communication.

Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party based on the PCR mentioned above.

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)

EPD program operator	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
Product Category Rules (PCR)	PCR 2019:14 Construction products (version 1.11)
PCR review was conducted by	The Technical Committee of the International EPD® System. See www.environdec.com/TC 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.

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

☒ External ☐ Internal

☐ EPD process certification ☒ EPD verification

Third party verifier: Marcel Gómez
Marcel Gómez Consultoría Ambiental, Tlf: 0034 630 64 35 93 - email: info@marcelgomez.com
Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third part verifier:

☒ Yes ☐ No

Product description

Product name:

MARISEAL® 400.

Product description and use:

MARISEAL® 400 is a pigmented, color & UV stable, highly permanent elastic, polyurethane coating, used as a topcoat for protection over exposed, polyurethane waterproofing membranes.

It is one component, UV-stable, aliphatic polyurethane topcoat, prolonging the life span of the waterproofing membrane, with normal pedestrian traffic, glossy-stable colour and non-chalking finish.

Certified for up to 25 years expected life span (EOTA) under MARISEAL® 250 SYSTEM & EN 13813.

Consumption: 0.12 – 0.25 kg/m^2 applied in one or two layers.

Technical data/physical characteristics:

Property	Results	Test method
Elongation at break	180%	ASTM D412
Tensile strength	>20 Wmni	ASTM D412
Resistance to Water Pressure	No Leak	DIN EN 1928
Gloss retention after 2000h of accelerated aging (DIN EN ISO 4892-3. 400 Wen2)	Good	DIN 67530
Surface chalking after 2000h of accelerated aging (DIN EN ISO 4892-3.400 W/m2)	No chalking observed. Chalking grade 0	DIN EN ISO 4628-6
Adhesion to MARISEAL• 250	>2 N/rnm2	EN 1542
Adhesion to cement	4.5 N/rnm2	EN 13892-8
Hardness (Store A Scale)	85-90	ASTM D 2240 (15'')
Solar Reflectance Index (SRI) (white colour)	107	ASTM E1980-01
Infrared emittance (white colour)	0.89	ASTM C1371-04a
Solar Reflectance (white colour)	85	ASTM E903-12
IN accelerated ageing, in the presence of moisture	Passed - No significant changes	EOTA TR-010
Hydrolysis (5% KOH. 7days cycle)	No significant elastomeric	Inhouse Lab
Service Temperature	-40°C to +90°C	Inhouse Lab
Tack Free Time	1-3 hours	Conditions: 20°C. 50% RH
Light Pedestrian Traffic Time	12 hours	
Final Cuing time	7 days	
Chemical Properties	Good resistance against acidic and alkali solutions (5%), detergents, seawater and oils.	

Advantages:

- Simple application (roller or airless spray).
- Increases the abrasion and wear resistance of the waterproofing membrane underneath.
- Provides high solar reflectance (white color), contributing to thermal insulation.
- UV & Color stable.
- Gives a glossy and easy-to-clean surface.
- No chalking effects.
- Resistant to stagnating water, heat and frost.
- Maintains its mechanical properties over a temperature span of -40°C to +90°C.
- The waterproofed surface can be walked on (light pedestrian traffic).

Main Uses:

- Used over:
  MARISEAL® 250, 250 FLASH, 260, etc. on surfaces with light pedestrian traffic (e.g. Roofs, Terraces, Balconies, etc.) that require a glossy, colour-stable and non-chalking finish
- Waterproofing of Roofs
- Waterproofing of Balconies, Terraces and Verandas
- Protection of Polyurethane Foam Insulation

Description of the main product components and/or materials:

The composition range of the product is shown below. For its representation in the calculation model, an average product has been represented at the composition level, based on the contribution to the environmental impact of the different raw materials.

Product components	Weight (%)	Post-consumer material weight (%)	Renewable material weight (%)
PU prepolymer	35 - 45	0%	0%
Pigments	15 - 20	0%	0%
Solvents	35 - 40	0%	0%
Additives	5 - 10	0%	0%
TOTAL	**100**	0%	0%

Packaging materials	Weight (Kg)	Weight-% (versus the product)
Metal packaging	1.03E-01	10.28%
Plastic wrap	6.20E-04	0.06%
EURO Wood-pallet	1.62E-03	0.16%

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0.1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

LCA calculation information

EPD TYPE DECLARED	Cradle to grave and module D Product-specific (one product, one manufacturing site)
DECLARED UNIT	1 kg of product installed and with a service life of 25 years
SYSTEM BOUNDARIES	Cradle to grave + Module D = (A + B + C) + D
REFERENCE SERVICE LIFE (RSL)	The RSL is considered to be up to 25 years, due to its nature and composition, this material is of high quality and proven durability.
CUT-OFF RULES	In general, the cut-off criteria are 1% of the consumption of renewable and non-renewable primary energy and 1% of the total input mass of the manufacturing process (according to the EN 15804 standard). In the evaluation, all available data of the production process is considered, i.e., all raw materials used, auxiliary materials used and energy consumption using the best available data sets in the reference database. The following processes have been excluded: • Manufacture of equipment used in production, infrastructure, or any other capital goods. • Transportation of personnel to the plant or from the production site. • Research and development activities. • Long-term emissions.
ALLOCATIONS	In general, whenever possible, allocation was avoided. Materials production was divided into families, and input and output data related to each were collected, when the data could not be directly attributed to a specific product, they were generally assigned to the total production of materials without differentiation. The allocation of the consumption of common inputs such as water consumption, as well as common production outputs, such as solid waste generation, was made based on the total annual production of materials. The consumption reported for fuels and electricity was made at plant level, the allocation was assumed by total production (by mass). The modularity principle as well as the polluter-payer principle have been followed. The waste management data corresponds to all the waste generated in the facilities of the production plant, considering total generation of residues. Therefore, the reported data includes all the products made in the production plant.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Production site location: Greece. Use and end-of-life location: Global. Data is collected from one production site in Thesi Roumani Inofyta Viotia, 32011, Greece Data collected for the year 2021. Background data: Ecoinvent 3.8 and SimaPro 9.3.
PRODUCT UN CPC CODE	35110 - Paints and varnishes and related products.

According to EN 15804:2012+A2:2019, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programmes.

Life Cycle stages

Flow diagram of the Life Cycle

Product stage, A1-A3

Description of the stage: the product stage of plaster products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

A1. Raw materials extraction

For each product, a model was made and then an average of the models was calculated, per kilogram of product. The specific consumption per kg of product is calculated in kg/m^2.

For the quantification of impacts associated with raw materials, 100% of the components reported in the production of materials have been used, including main and secondary raw materials.

A2. Transportation of raw materials

To determine the transport of raw materials, the data recorded by the production plant regarding their raw materials and data referring to their supply have been used. Additionally, the production plant has

also reported the road transport distance for each of the secondary materials (consumables) used in the production activities of the year. Consumable materials include: fuels (diesel), oils and others. For each of them, the total quantity transported and the weighted average distance according to the quantity registered by each production center have been determined, to calculate the kg*kilometer ratio, which has been consolidated for each product family.

Greece production center of Maris has reported the average distance and means of transport used for the mobilization of raw materials from their production site.

A3. Production (Manufacturing)

Based on the internal records of the production plant, the quantity of materials produced per year, by nature of the product, has been reported.

These products come from the combination of different polymers; some products are the result of more than 5 combined polymers.

The general manufacturing processes within the operational limits of MARISEAL® 400 production are presented in following figure and listed below:

1) Reception of the raw material.
2) Quality control.
3) Storage.
4) Mix with resins and pigments.
5) Mass distribution.
6) Quality control.

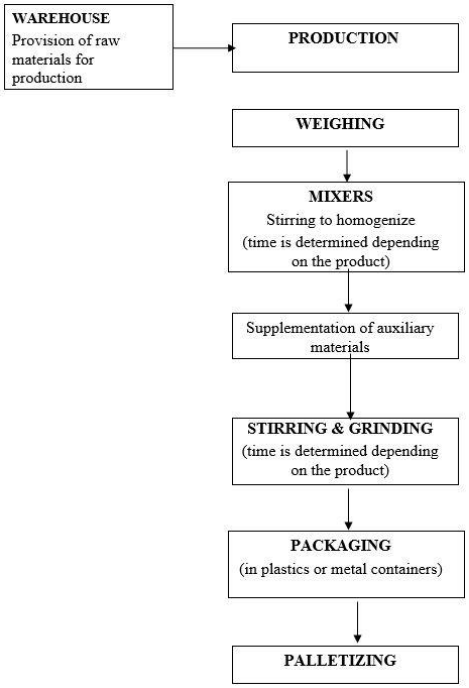


Figure 1. Manufacturing process for Maris products

The main inputs of the manufacturing system are:

- Energy: Electricity and Fuels.
- Water: Well intake or network consumption.
- Consumables: External raw materials, Waste to be processed and/or recovered.
- Transports: Packaging and waste.

The main outputs of the production system are:

- Waste generated: Hazardous, Non-hazardous.
- Emissions to air, water or soil (none).

Construction process stage, A4-A5

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building.

A4. Product transport

Considering the wide distribution of products at an international and regional level, based on the sales distribution report, the total production sold by family and by country of destination is considered. For each of the destinations, according to information for internal use, the export ports in the country of origin and import ports in the destination countries are determined. An average transportation distance to the construction site is determined in each destination country.

For each case, the transport distances are determined and associated with a mode of transport: land freight vehicle, and maritime container ship. The detail of the technical parameters for the transport model is obtained from the Ecoinvent 3.8 database and its reference technical studies. The assumptions of this modeling are summarized below.

PARAMETER	VALUE EXPRESSED PER DECLARED UNIT	
Type and fuel consumption of the vehicle, type of vehicles used f or the transport; for example, truc ks for long distances, boat, etc.	Transport, freight, lorry 16-32 metric ton, EURO6 {RER}| transport, freight, lorry 16-32 metric ton, EURO6 | Cut-off, U	Transport, freight, sea, container ship {GLO}| transport, freight, sea, container ship | Cut-off, U
Distance	Km by truck: 1658.74	Km by ship: 190.76
Capacity utilization (including empty return trip)	Percentage assumed by Ecoinvent database	Percentage assumed by Ecoinvent database
Apparent density	kg/m^3: 1.18	
Useful capacity factor	1	1

A5. Construction-Installation process

Considering the uses and installation, it can be reported that more than 99 % of the cases require a manual installation that does not imply the use of extra resources, neither energy, nor water nor application machines, only spreading on the surfaces where the product is applied, and it remains. It is considered that it does not generate extra waste not previously considered, apart from that referring to the packaging in which the product is stored and the packaging in which it is transported from the country of origin to the destination.

There is an estimation of 0.3 % of material loss during the installation process. Regarding waste management, plastic waste (container pots), pallets, metal waste and mixed packaging are considered, which are assumed to be 100 % recycled considering at an average distance scenario of 50 km.

Use stage, B1-B7

The use stage, related to the application of the product in the building includes:

B1: Use or application of the installed product;
B2: Maintenance;
B3: Repair;
B4: Replacement;
B5, Refurbishment;
B6: Operational energy use;
B7: Operational water use.

Description of scenarios and additional technical information:
Based on their design features and components, Maris products have a service life of 25 years. Regardless of the installation conditions and multiple applications for final finishing, the maintenance needs are none. Therefore, the impact of these stages is 0.

End-of-life stage C1-C4

This stage includes the next modules:

C1: Deconstruction, demolition;
C2: Transport to waste processing;
C3: Waste processing for reuse, recovery and/or recycling;
C4: Disposal.

Description of the scenarios and additional technical information for the end-of-life:

Module	Parameter	Unit (per declared unit)	Value
C1 Deconstruction	Process of collection specified by type	Kg collected in a separate way	0
		Kg collected mixed with waste from construction	1
C2 Transport	Type and fuel consumption of the vehicle, type of vehicles used for the transport	Transport, freight, lorry 16-32 metric ton, EURO6	Diesel consumption: 0.036 tkm
	Distance	km	50
	Use of the capacity (including empty return)	%	Percentage assumed by Ecoinvent database
	Apparent density of transported products	kg / m^3	1180
	Useful capacity factor		1
C3 Treatment of waste	System recovery specified by type	kg for reuse	0
		kg for recycle	0
		kg for energy recovery	0
C4 Disposal	Disposal specified by type	kg of product for final deposition	1

Reuse/recovery/recycling potential, D

100 % of wastes are landfilled. There is no reuse nor recovery nor recycling of this product. Hence, no recycling benefits are reported on Module D.

LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors from the ILCD. Specific data has been supplied by the plant, and generic data come from Ecoinvent v3.8 database. All emissions to air, water, and soil, and all materials and energy used have been included.

The estimated impact results are only relative statements which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins or risks.

The following results corresponds to a single product manufactured in a single plant:

System boundaries (X=included, MND=module not declared)

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery
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	GR	GR	GR	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>90% GWP- GHG																
Variation products	Only one product is reported in this EPD																
Variation sites	Only one site is reported for this product																

Environmental impacts

All data results are representative for 1 kg of MARISEAL® 400 surface coating, as declared unit. Estimated impact results are only relative statements that do not indicate impact category endpoints, exceeding threshold values, safety margins, or risks.

		Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
	Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change [kg CO_2 eq.]	5.87E+00	1.46E-01	1.85E-02	0	0	0	0	0	0	0	0	8.15E-03	0	5.35E-03	0
	Climate Change (fossil) [kg CO_2 eq.]	5.86E+00	1.46E-01	1.84E-02	0	0	0	0	0	0	0	0	8.14E-03	0	5.27E-03	0
	Climate Change (biogenic) [kg CO_2 eq.]	-4.78E-03	1.53E-04	-1.36E-05	0	0	0	0	0	0	0	0	7.42E-06	0	7.97E-05	0
	Climate Change (land use change) [kg CO_2 eq.]	1.33E-02	5.54E-05	4.03E-05	0	0	0	0	0	0	0	0	3.26E-06	0	1.91E-06	0
	Ozone depletion [kg CFC-11 eq.]	4.60E-07	3.63E-08	1.58E-09	0	0	0	0	0	0	0	0	1.89E-09	0	9.36E-10	0
	Acidification terrestrial and freshwater [Mole of H+ eq.]	8.40E-02	5.18E-04	2.54E-04	0	0	0	0	0	0	0	0	2.31E-05	0	4.91E-05	0
	Eutrophication freshwater [kg P eq.]	3.10E-04	1.04E-06	9.35E-07	0	0	0	0	0	0	0	0	5.81E-08	0	6.33E-08	0
	Eutrophication marine [kg N eq.]	9.97E-03	1.15E-04	3.04E-05	0	0	0	0	0	0	0	0	4.59E-06	0	2.03E-05	0
	Eutrophication terrestrial [Mole of N eq.]	1.21E-01	1.28E-03	3.70E-04	0	0	0	0	0	0	0	0	5.12E-05	0	2.23E-04	0
	Photochemical ozone formation - human health [kg NMVOC eq.]	3.24E-02	4.84E-04	9.94E-05	0	0	0	0	0	0	0	0	1.97E-05	0	6.16E-05	0
	Resource use, mineral and metals [kg Sb eq.]	1.99E-03	3.48E-07	5.98E-06	0	0	0	0	0	0	0	0	2.89E-08	0	2.40E-10	0
	Resource use, energy carriers [MJ]	1.04E+02	2.37E+00	3.25E-01	0	0	0	0	0	0	0	0	1.23E-01	0	7.01E-02	0
	Water deprivation potential [m^3 world equiv.]	4.30E+00	8.11E-03	1.29E-02	0	0	0	0	0	0	0	0	3.76E-04	0	1.75E-04	0

The results of this environmental impact indicator should be used with caution, as the uncertainties of the results are high and experience with this parameter is limited.

Potential environmental impact – additional mandatory and voluntary indicators

	Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
GWP-GHG[1] [kg CO_2 eq.]	5.65E+00	1.45E-01	1.78E-02	0	0	0	0	0	0	0	0	8.07E-03	0	5.20E-03	0

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

Resources Use

	Resources Use indicators	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Use of renewable primary energy (PERE) [MJ]	7.47E+00	3.00E-02	2.26E-02	0	0	0	0	0	0	0	0	1.76E-03	0	1.65E-03	0
	Primary energy resources used as raw materials (PERM) [MJ]	2.99E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of renewable primary energy resources (PERT) [MJ]	7.50E+00	3.00E-02	2.26E-02	0	0	0	0	0	0	0	0	1.76E-03	0	1.65E-03	0
	Use of non-renewable primary energy (PENRE) [MJ]	1.11E+02	2.52E+00	3.46E-01	0	0	0	0	0	0	0	0	1.31E-01	0	7.45E-02	0
	Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	2.53E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of non-renewable primary energy resources (PENRT) [MJ]	1.11E+02	2.52E+00	3.46E-01	0	0	0	0	0	0	0	0	1.31E-01	0	7.45E-02	0
	Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of net fresh water (FW) [m^3]	1.12E-01	2.81E-04	3.36E-04	0	0	0	0	0	0	0	0	1.40E-05	0	8.42E-06	0

*For this study, both the product and its packaging are reported in the indicators "Use of renewable primary energy resources used as raw materials" ("PERM") and "Use of non-renewable primary energy resources used as raw materials" ("PENRM"). PERM and PENRM are reported as negative values when materials are recycled or recovered, but not when landfilled.

Waste Category & Output flows

		Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
	Waste Category & Output Flows	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction /	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	**Hazardous waste disposed (HWD) [kg]**	7.49E-05	5.70E-06	2.59E-07	0	0	0	0	0	0	0	0	3.22E-07	0	1.50E-07	0
	**Non-hazardous waste disposed (NHWD) [kg]**	1.27E+00	2.20E-01	4.49E-03	0	0	0	0	0	0	0	0	6.46E-03	0	1.00E+00	0
	**Radioactive waste disposed (RWD) [kg]**	2.86E-04	1.61E-05	9.45E-07	0	0	0	0	0	0	0	0	8.34E-07	0	4.42E-07	0
	**Components for re-use (CRU) [kg]**	0	0	1.62E-03	0	0	0	0	0	0	0	0	0	0	0	0
	**Materials for Recycling (MFR) [kg]**		0	1.03E-01	0	0	0	0	0	0	0	0	0	0	0	0
	**Material for Energy Recovery (MER) [kg]**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	**Exported electrical energy (EEE) [MJ]**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	**Exported thermal energy (EET) [MJ]**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

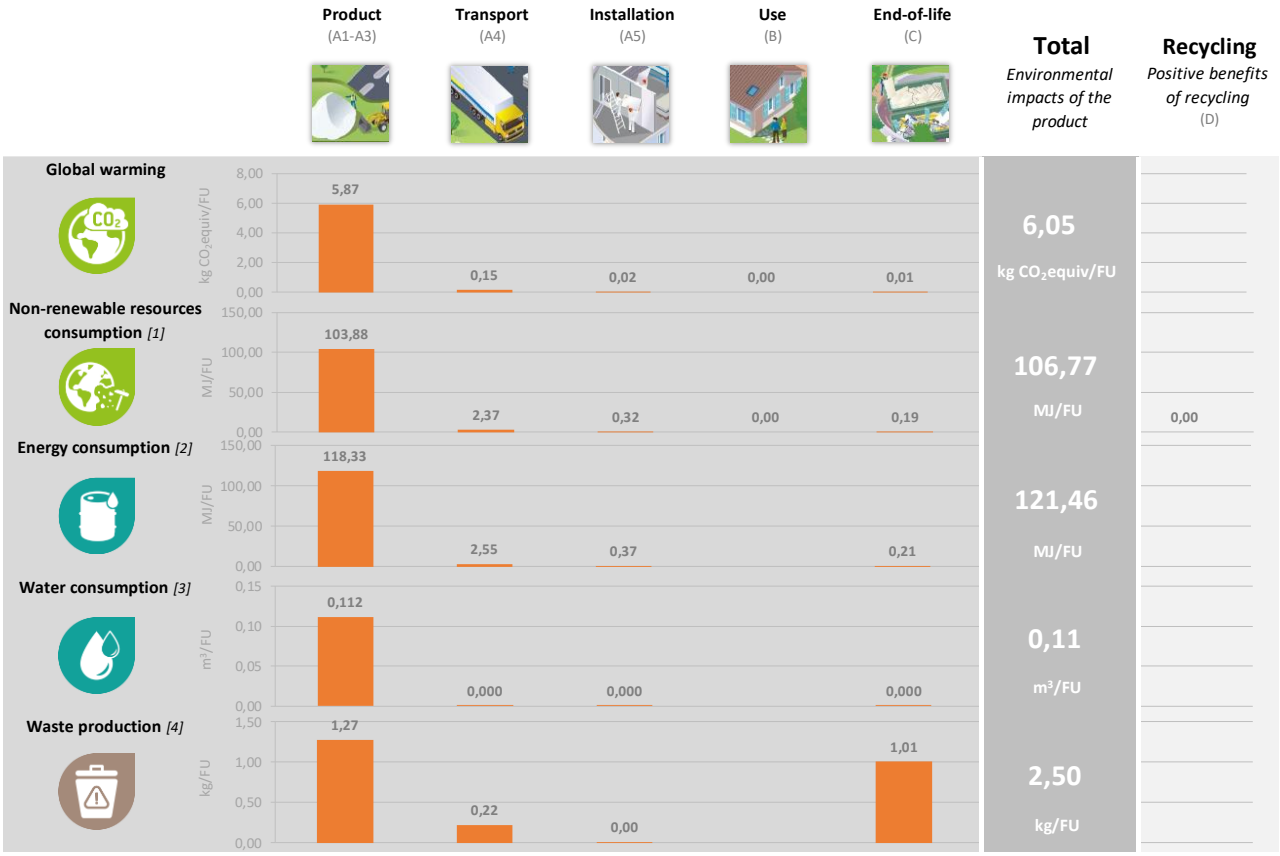
Information on biogenic carbon content

		Product stage
	Biogenic Carbon Content	A1 / A2 / A3
	Biogenic carbon content in product [kg]	0
	Biogenic carbon content in packaging [kg]	2,98E-03

Note: 1 kg biogenic carbon is equivalent to 44/12 (approx. 3.67) kg CO_2.

LCA results interpretation

The following figure refers to a functional unit of 1 kg of product expected to have average service life of 25 years.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

Global Warming Potential (Climate Change - GWP)

For GWP, the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. CO_2 is generated upstream from the production of raw materials and electricity and is also released on site by the combustion of coke, diesel and natural gas. We can see that other sections of the life cycle also contribute to the GWP. However, the production modules contribute to over 97 % to the impact. Impacts from A4 (transport to clients), waste disposal transportation in A5 (disposal after installation) and C (transport and disposal at the end of life) are much lower than A1-A3.

Non-renewable resources consumption

The consumption of non-renewable resources has the highest value in the production modules, due to the consumption of diesel within the factory, with a contribution to impact higher than 97 %.

The contribution to this impact of the other modules is very small and is mainly due to the non-renewable resources consumed during the transport of the product to the construction place.

Energy Consumption

Modules A1 – A3 have the highest contribution to total energy consumption, contribution higher than 97 %. Energy is consumed in the form of electricity, and diesel during the manufacturing of the Product.

Water Consumption

Water is used within the manufacturing facility and almost all the impact comes from the production phase.

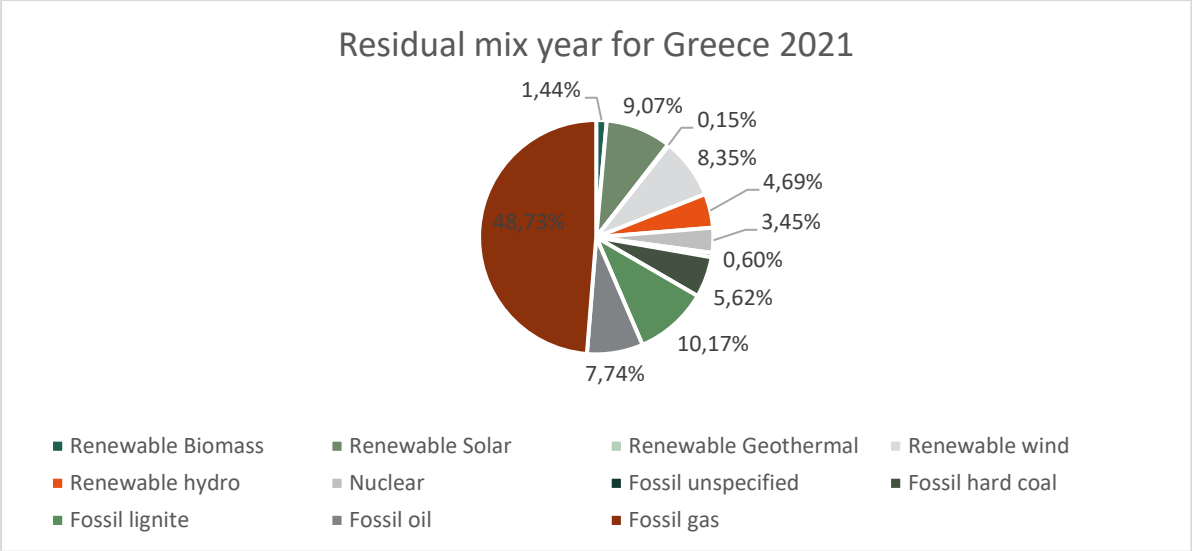
Waste Production

The largest contributor to the impact is the product phase (A1-A3) with a contribution to the impact of 51 % due to the production of Titanium dioxide. The end of life phase with a contribution to the impact around 40 % has also a remarkable contribution to the impact.

Additional information

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Greece
Production mix	Renewable Biomass- 1.44 % Renewable Solar-9.07 % Renewable Geothermal-0.15 % Renewable wind-8.35 % Renewable hydro-4.69 % Nuclear-3.45 % Fossil unspecified-0.60 % Fossil hard coal-5.62 % Fossil Oil-7.74 % Fossil lignite-10.17 % Fossil gas-48.73 %
Reference year	2021
Type of data set	Cradle to gate from Ecoinvent 3.8 database
Source	European Residual Mixes 2021
CO_2 emissions	444.63 (g /kWh)



Global warming potential for market application

Based on technical product properties all environmental impact indicators may be quantifyied for usual market product applications. The following results present the GWP indicator for a typical application of MARISEAL® 400 on surfaces.

Parameter	Unit	A1	A2	A3	A1+A2+A3	A4	A5	C2	C4	Total
Density	kg/m^3	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
Average weight application	kg/m^3	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
Minimum weight application	kg/m^2	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01
Maximum weight application	kg/m^2	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01
GWP – total	CO_2 eq. / m^2	4.09E+00	1.84E-01	1.60E+00	5.87E+00	1.46E-01	1.85E-02	8.15E-03	5.35E-03	6.05E+00
GWP – prom	kg CO_2 eq. / kg	7.56E-01	3.40E-02	2.96E-01	1.09E+00	2.71E-02	3.42E-03	1.51E-03	9.90E-04	1.12E+00
GWP – min	kg CO_2 eq. / m^2	4.90E-01	2.20E-02	1.92E-01	7.05E-01	1.75E-02	2.22E-03	9.78E-04	6.42E-04	7.26E-01
GWP – max	CO_2 eq. / m^2	1.02E+00	4.59E-02	4.00E-01	1.47E+00	3.66E-02	4.62E-03	2.04E-03	1.34E-03	1.51E+00

Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal reports and reporting documents from Saint-Gobain Maris. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality.

Information related to sector EPDs

Individual EPD.

Differences versus previous versions of the EPD

This is the first version of this EPD.

References

1. EPD International (2019) General Programme Instructions for the International EPD® System. Version 3.01, dated 2019-09-18.
2. The International EPD System PCR 2019:14 Construction products, Version 1.11.
3. EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
4. ISO 21930:2007 Sustainability in building construction – Environmental declaration of building products.
5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
6. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and framework
7. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
8. LCA report of Maris Saint-Gobain products (2022).

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