

Environmental Product Declaration

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

M.A.D. Danosa Acoustic Membrane

M.A.D.2 | M.A.D.4 | M.A.D.4 autoadhesive |

M.A.D.6 | M.A.D.6 autoadhesive | M.A.D. 3 |

M.A.D. PRO 50 | M.A.D. PRO 70 | M.A.D. PRO 70 autoadhesive |

M.A.D. PRO 100 | M.A.D. PRO 100 autoadhesive

from

DANOSA GROUP, S.A.



Building together

Programme:

The International EPD System, www.environdec.com

Programme operator:

EPD International AB

Type of EPD:

EPD of multiple products from a company / EPD of product not yet on the market

EPD registration number:

EPD-IES-0001923:003

Version date:

2025-12-11

Validity date:

2030-12-11

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

EPD of multiple products, based on a representative product.

M.A.D. PRO 50, M.A.D. PRO 70, M.A.D. PRO 70 autoadhesive and M.A.D. PRO 100 are not yet on the market – Results of this EPD shall be used with care as the LCI data for these products are not yet based on 1 year of production which may result in increased uncertainty.



GENERAL INFORMATION

Programme Information	
Programme:	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): Construction products, PCR 2019:14, version 2.0.1 UN CPC 3790
PCR review was conducted by: The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com . The review panel may be contacted via support@environdec.com . Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review. Rob Rouwette (chair), Noa Meron (co-chair).
c-PCR: Acoustical ceiling and wall solutions, c-PCR-014, version 1.0.0.

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> Individual EPD verification without a pre-verified LCA/EPD tool
Third-party verifier: <i>Elisabet Amat (Greenize)</i>
Approved by: International EPD System
*EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.environdec.com .
Procedure for follow-up of data during EPD validity involves third party verifier:
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD:

DANOSA GROUP, S.A.

Address:

Polígono Industrial sector 9, 19290 Fontanar (Guadalajara) – Spain.

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Description of the organisation:

DANOSA GROUP, S.A. has over four decades of experience, during which it has consistently pursued improvement and diversification of its business activities.

Its first line of business was the manufacture of waterproofing materials. Today, it meets the needs of the construction and civil engineering sectors in waterproofing, acoustic insulation, drainage systems, geotextiles, and skylights, positioning itself as a market leader in Spain (#7 according to Alimarket) and ranking sixth in Europe.

In the field of acoustics, the company has extensive research experience and has carried out more than 5,000 acoustic insulation projects in residential buildings, public facilities, classrooms, and audiovisual studios.

Its technology enables exports across all five continents, with production plants in Spain, Portugal, and India, and subsidiaries in France, Portugal, Morocco, Colombia, Mexico, and the United Kingdom.

Product-related or management system-related certifications:

Its products hold prestigious certifications that attest to compliance with the most demanding quality standards, such as CE marking, "Avis Techniques" from CSTB (France), "Documentos de Aplicação" from LNEC (Portugal), "Agréments Techniques Européens" from EOTA (FM systems in Europe), British Board Agreement Certificates, as well as DIT and D.I.T.E. issued by I.E.T.C.C.

The company also holds ISO 9001:2015 Quality Management Systems certification since 2012 (registration no. ES139363 - 1) and ISO 14001:2015 Environmental Management Systems certification since 2016 (registration no. ES144052 - 1).

DANOSA GROUP, S.A. is committed to the continuous improvement of the productivity of its facilities through the rational use of natural resources and energy, while reducing, whenever possible, the waste generated in all operations and facilitating its recycling.

It has a wide range of Environmental Product Declarations (EPDs) for a large part of its portfolio. Furthermore, it participates in the Green Building Council Spain's online materials platform (<http://materiales.gbce.es/>), making publicly available all necessary information to verify compliance of its products with the various criteria established in the main existing building environmental certifications (LEED, BREEAM, and VERDE), thereby contributing to sustainability in the construction sector.

PRODUCT INFORMATION

Product name:

M.A.D. Danosa Acoustic Membrane.

Product identification:

Bituminous membrane for low frequency acoustic insulation.

Visual representation of the product:



Figure 1. Acoustic membranes M.A.D. (left) and M.A.D. PRO (right)

UN CPC code: 3790

Product description:

This EPD is of multiple products, based on a representative product. The EPD covers the following ten products: M.A.D. 2 (3.5 kg/m²); M.A.D. 4 (7 kg/m²); M.A.D .4 autoadhesive (6 kg/m²); M.A.D. 6 (10 kg/m²); M.A.D. 6 autoadhesive (9 kg/m²); M.A.D. 3 (5 kg/m²); M.A.D. PRO 50 (5 kg/m²); M.A.D. PRO 70 (7 kg/m²); M.A.D. PRO 70 autoadhesive (6 kg/m²), M.A.D. PRO 100 (10 kg/m²) and M.A.D. PRO 100 autoadhesive (10 kg/m²).

According to PCR 2019:14 Construction products version 2.0.1, used for the preparation of this EPD, the representative product of multiple products has been considered. For the representative product, the selection has been done according to the product with the highest sales volume in the market. The declared results are based on the membrane M.A.D. 4 is 7 kg/m² weight and 4 mm thickness. The products covered in this EPD have a thickness ranging from 2 mm and 3.5 kg/m² (M.A.D. 2) to 5.4 mm and 10 kg/m² (M.A.D. 6).

These products are used for improvement of acoustic insulation on all types of surfaces. Each acoustic insulation membrane consists of a bituminous sheet with mineral fillers, coated on both sides by a high-density polyethylene film (M.A.D.) or an aluminized coating (M.A.D. PRO), as shown in the previous figure. There are autoadhesive versions of the acoustic membranes available for each of the two types mentioned above. Acoustically the sheet works as a plastic element between rigid layers and is an effective substitute for lead; in turn, when places between elastic elements it works as a membrane resonator (typical absorber at low frequencies).

These sheets are commercialized in rolls of 1 m wide by 12 m long for M.A.D. 2; 9 m long for M.A.D. 3 and M.A.D. PRO 50; 6 m long for M.A.D.4, M.A.D. 4 autoadhesive, M.A.D. PRO 70 and M.A.D. PRO 70 autoadhesive; and 4.5 m long for M.A.D. 6, M.A.D. 6 autoadhesive, M.A.D. PRO 100 and M.A.D. PRO 100 autoadhesive.

They can be installed according to the following cases:

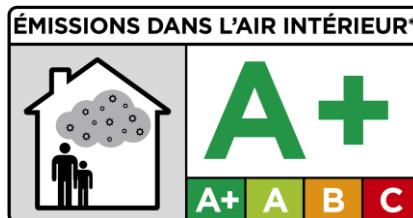
- Between rigid elements such as laminated plasterboard to improve insulation at low frequencies, both on vertical and horizontal walls.
- Between elastic elements (fibers, rock wool) to increase the overall isolation of the acoustical treatment, making a significant improvement at low frequencies through the membrane effect within the mass-elastic-mass systems.
- In industrial insulation as an anti-resonant material, providing acoustic mass to galvanized steel plates.

The technical lifespan of the products is 50 years.

M.A.D. PRO 50, M.A.D. PRO 70, M.A.D. PRO 70 autoadhesive, M.A.D. PRO 100 and M.A.D. PRO 100 autoadhesive are not yet on the market – Results of this EPD shall be used with care as the LCI data for these products are not yet based on 1 year of production which may result in increased uncertainty.

	Acoustic membranes			
	Standard	MIN	MAX	M.A.D. 4
				REPRESENTATIVE
Membrane thickness (mm)	---	2.0	5.4	4.0
Length (cm)	---	1200	450	600
Width (cm)	---	100	100	100
Surface area (m²)	---	12	4.5	6
Mass per unit area (nominal) (kg/m²)	EN 1849-1	3.5	10.0	7.0
Improvement to airborne noise on laminated gypsum board partition, ΔR (dBA)	EN 140-16	2	6	5
Improved insulation at 125 Hz (between elements resort) (dB)	EN 140-16	6.5	---	9.5
Insulation improvement at 125 Hz (between rigid elements) (dB)	EN 140-16	4	10	8
Tolerance (%)	EN 1849-1	<10	<10	<10
Poisson coefficient	---	0.46	0.48	0.48
Watertightness at 10 kPa (Type A)	UNE-EN 1928	Pasa	Pasa	Pasa
Young's module (kPa)	EN ISO 527-2	190	25	70
Reaction to fire	EN 13501-1	C s3 d0	C s3 d0	C s3 d0
Resistance to tearing (nail shank) (N)	EN 12310-1	125 ± 50	180 ± 50	180 ± 50

Regarding the emissions of VOC's (volatile organic compounds), tests have been carried out on the M.A.D. 4 sheet where it is concluded that they meet the requirements of Class A+ of Decree No. 2011-321 of March 23rd, 2011, of the French Ministry of Ecology, Development Sustainable, Transport and Housing. Therefore, based on the results obtained, the product is classified with the following distinctive corresponding to the A+ classification according to the mentioned legislation:



Name and location of production site(s):

DANOSA GROUP, S.A. Polígono Industrial sector 9, 19290 Fontanar (Guadalajara) – Spain.

More information about the products can be found at <https://www.danosa.com/>

CONTENT DECLARATION

Content declaration of representative product:

1 m² of M.A.D. 4 Danosa acoustic membrane of 7 kg weight and 4 mm thickness.

Content of the product in the form of a list of materials and substances, and their mass:

Product content	Mass, kg (representative product)/functional unit	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product
Reinforced glass veil	6.14E-02 - 6.45E-02	0%	0%
Polyethylene	2.05E-02 - 2.15E-02	0%	0%
Modified asphalt bitumen 160/220	1.66E+00 - 1.74E+00	0%	0%
Marpol bitumen	2.14E-01 - 2.26E-01	0%	0%
Fluxing agent for asphalt bitumen	2.63E-01 - 2.77E-01	0%	0%
Deodorizing additive for fluxing agent	2.73E-04 - 2.87E-04	0%	0%
Bulk filler	2.73E-04 - 2.87E-04	0%	0%
SBS rubber	4.39E+00 - 4.61E+00	0%	0%
TOTAL	6.82E+00 - 7.17E+00	0%	0%

The mass and the content of distribution and/or consumer packaging:

Packaging materials	Mass. kg (representative product)/functional unit*	Mass-% (versus the product)	Biogenic material. kg C/functional unit
Wooden pallet	1.60E-01	2.29%	6.06E-02
Polyethylene pallet cover	1.00E-02	0.14%	0.00E+00
100% Recycled cardboard core	2.00E-02	0.28%	1.57E-02
TOTAL	1.90E-01	2.71%	7.62E-02

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

*The packaging is only presented for the representative product.

Information on the environmental and hazardous/toxic properties of a substances contained in the product:

At the date of issue of this declaration, there is no “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight and neither do their packaging, following the European REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).

LCA INFORMATION

Functional unit:

1 m² of acoustic membrane installed for 50 years and with class E acoustic absorption.

Conversion factor to mass:

Weight of the representative product is 7 kg/m² (4 mm thickness).

The products covered in this EPD have a thickness ranging from 2 mm (3.5 kg/m²) to 5.4 mm (10 kg/m²).

Reference service life:

50 years. being considered the same as the useful life of the building.

Time representativeness:

Primary data refer to the year 2024 (1st January to 31st December).

Geographical scope:

Europe and China for raw materials (A1); Spain for production (A3); Global for distribution (A4), installation (A5), use (B1–B7), and end of life (C1–C4).

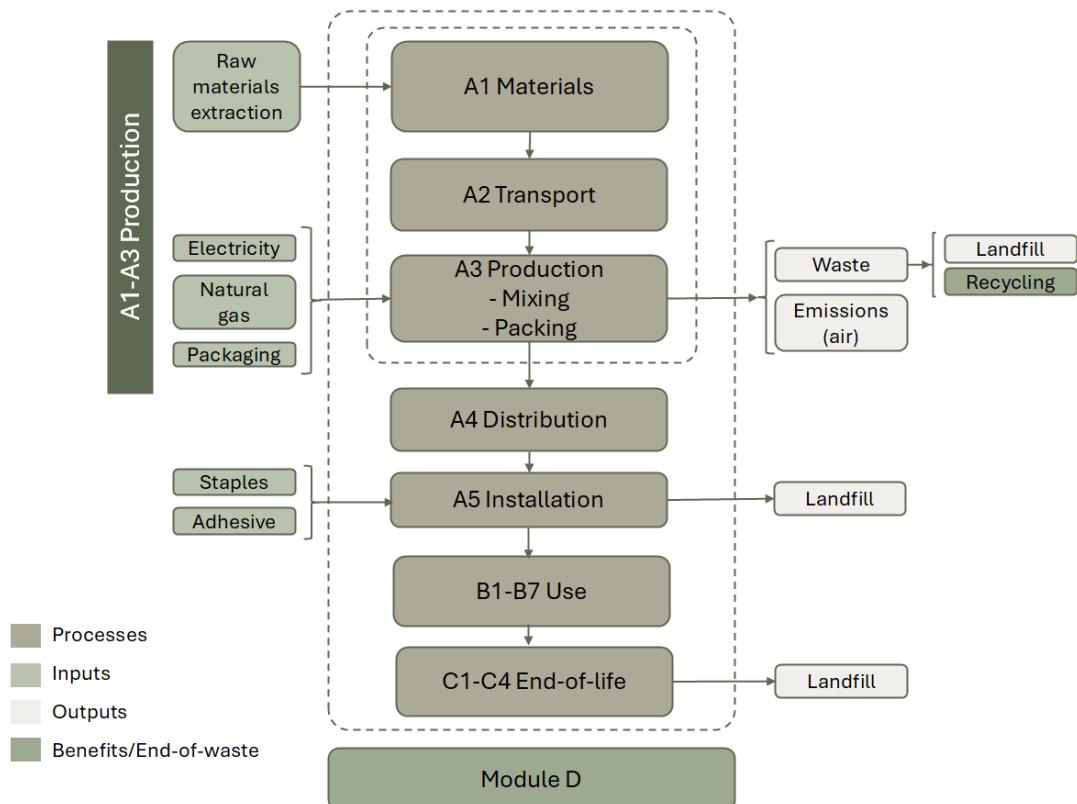
Database(s) and LCA software used:

Ecoinvent v3.11. and SimaPro v10.2.0.2. The characterization factors used for obtaining the results are based in EF 3.1 package.

Description of system boundaries:

Cradle-to-grave and module D (A+B+C+D).

Process flow diagram:



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

	Product stage			Distribution/ installation stage		Use stage						End-of-life stage				Beyond product life cycle	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-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	GLO	GLO	ES	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	
Share of primary data	16%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-49%; +42%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ES: Spain; GLO: Global

Source of data and share of primary data

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Share of primary data, of GWP-GHG results for A1					0%
A1- Raw materials (bitumen, polymers, solvents, fillers, glass fibre)	Database	Ecoinvent v3.11	2024	Secondary data	0%
Share of primary data, of GWP-GHG results for A2					0%
A2-Transport (lorry + ship)	Database	Company data. Ecoinvent v3.11	2024	Secondary data	0%
Share of primary data, of GWP-GHG results for A3					16.1%
A3- Electricity (GdO + PV + residual mix)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	1.3%
A3- Heat (natural gas)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	14.1%
A3- Factory emissions (COVs, NO _x , SO ₂ , PM, CO)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	0.4%
A3 – Factory waste (RSI landfill + incineration)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	0.1%
A3 – Extrusion / generic processes	Database	Ecoinvent v3.11	2024	Secondary data	0%
A3 – Packaging materials (pallet. PE bag. cardboard)	Database	Ecoinvent v3.11	2024	Secondary data	0%
Total share of primary data, of GWP-GHG results for A1-A3					16.1%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Product life cycle

Product stage (A1-A3)

A1- Raw material supply

Extraction and processing of all the raw materials that make up the different ranges of the product under study: reinforced glass veil, polyethylene, bitumen, fluxing agent, deodorizing additive, calcium carbonate as filler and SBS rubber.

A2- Transportation to the factory

Transport of all raw materials considered in module A1, from the place of extraction, production and treatment to the factory gate. It is considered only one way, as the return trip is allocated to another system. The model includes road (lorry) and sea transport (ship) of each of the raw materials.

A3- Manufacturing

This module includes the manufacture of the acoustic membranes and the production of the packaging necessary for their transport.

The manufacturing process of the membranes is as follows:

1. Coating: Transfer of the bituminous mastic through the filter from the mixer to the coating tank.
2. Reinforcement: The fiber felt passes through the bituminous mastic coating tank.
3. Lamination: The laminating or calender rollers apply the required amount of mastic to the sheet to achieve the target weight, a defining characteristic of the sheet, rather than its thickness.
4. Water tank and cooling rollers: The sheet is cooled by immersion in the water tank so that, upon reaching the compensator, its temperature is close to ambient.
5. Finishing: Application of polyethylene sheeting on both sides.
6. Sheet folding machine and palletizer: In the folding machine, the roll is formed, cut to the predetermined length, and sealed with the appropriate bands. Subsequently, the palletizer automatically stores the rolls on the pallet.

The following processes have been considered in the study:

- Packaging: production and transport to the plant of the packaging materials (protective film, pallets and cardboard).
- Production consumptions derived from the manufacturing of the membranes (electricity, natural gas, water and lubricating oils). For the electricity modelling, the specific electricity mix of the DANOSA GROUP, S.A. plant is considered, with part coming from self-consumption of the on-site photovoltaic plant and the other from its supplier, who certifies that a portion of the supplied energy carries Guarantees of Origin (solar thermoelectric). The remaining portion has been modelled using the residual mix for Spain.
- Production losses are considered at 2% of the product mass based on the information provided by the manufacturer.
- Production, transport and treatment of factory-generated waste (paper and cardboard waste, plastics and industrial solid waste).
- Air emissions: volatile organic compounds (VOCs) and particulate matter (PM).

Construction process stage (A4-A5)

A4- Transport to the building site

The modelling for transport has been carried out in accordance with the EN 15804 standard and the reference PCR. To obtain the calculation of the final transport distance, a weighting of this has been carried out according to the percentage of sales of the product for each of the destinations where it is distributed (Spain, Portugal and India) and by specific means of transport (transoceanic truck or cargo ship). Packaging material is included in the weight transported.

The above calculations are based on a scenario with the following parameters:

Scenario information	Unit/description
Type of means of transport used	Truck with an average load of 16t-32t and EURO6 Transoceanic cargo ship
Mass and distance transported (including packaging)	Truck: 14.02 tkm (2,003 km) Cargo ship: 129.64 tkm (18,520 km)
Usability (including return of unladen transport)	32% of capacity by volume % of empty returns assumed in Ecoinvent v3.11

A5- Installation in the building

This module includes the transport and consumption of auxiliary materials (in addition to the product itself) as well as the management of waste derived from the packaging materials and the product itself (installation losses).

- The M.A.D. and M.A.D. PRO acoustic membranes are installed by stapling and they can also be glued, without any energy or water consumption. The manufacturer recommends the use of its GLUEDAN ACUSTIC adhesive. For the installation of autoadhesive membranes, the release film is removed and the membrane is pressed onto the substrate, so no adhesive nor staples are required. To represent these options, it has been assumed that 70% of the M.A.D. and M.A.D. PRO membranes are stapled and 30% are glued.
- According to the manufacturer, a minimal installation loss (estimated at 1%) occurs and is sent to landfill.
- Waste derived from the product packaging (pallet, film and cardboard) is assumed to be disposed of in a landfill located 80 km away, transported by truck.
- The biogenic CO₂ sequestered by packaging during stages A1-A3 is balanced through its emission in this stage.

The considered scenario is defined by the following parameters:

Scenario information	Unit/description
Ancillary materials required in the installation	- Staples: 0.00008 kg/m ² of membrane. - Adhesive: 0.25 kg/m ² of membrane (0.125 kg per side). A transport distance of 50 km has been considered for these materials from the provider to the construction site.
Outflow of materials (specified by type) resulting from on-site waste processing	Product installation losses: 1%. Following a conservative approach, it has been assumed that the losses or waste derived from packaging and from the product itself are sent to landfill, although some of these materials are recyclable and/or reusable. Regarding the transport of the generated waste, a distance of 80 km to the landfill has been considered.
Quantitative description of the type of energy used and electricity consumption during the installation process	No energy is used during installation.

Use stage (B1-B7)

B1- Use of the installed product

The product does not produce any emissions into the environment during use. The emission of pollutants is considered irrelevant.

B2- Maintenance

B3- Repair

B4- Replacement

B5- Refurbishment

B6- Operational energy use

B7- Operational water use

For (B2-B7) modules it is assumed that the declared products will have a useful life equal to or greater than the useful life of the buildings. Once the installation is complete, no further operational actions are required during the use phase of the lifecycle. Therefore, products do not have an impact on this module (excluding potential energy savings due to product properties, which is outside the scope of the study).

According to laboratory tests, the membrane is classified as A+ in accordance with French Decree No. 2011-321 of March 23, 2011, which indicates very low emissions of volatile organic compounds (VOCs) into indoor air, evaluated after 28 days of testing according to ISO 16000. The assessment includes TVOC and ten regulated substances, all of which must comply with the thresholds established for Class A+. Therefore, no VOC emissions are considered during the use phase.

End of life stage (C1-C4)*

C1- Deconstruction, dismantling, demolition

The deconstruction and/or dismantling of the acoustic membranes is part of the entire demolition of a building. The installed product is considered to be dismantle manually. Therefore, this stage does not require energy or water consumption. In addition, the product is completely bonded to the building's demolition debris.

C2- Transport of the discarded product to the processing site

The membranes and the auxiliary installation materials are entirely sent to landfill, as they cannot be separated from the materials to which they are adhered once the building's service life ends. Transport is carried out by road, using a 16–32-ton truck with trailer. A transport distance of 80 km has been considered.

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

It is considered that no treatment takes place prior to disposal.

C4- Disposal

The product is encapsulated and bonded to other products as part of a system, which makes their effective separation impossible. Both the acoustic membranes and the auxiliary materials used during installation are disposed of in a landfill for final disposal.

Scenario information	Unit/description
C1- Deconstruction. dismantling. demolition	It is considered that there is no energy or water consumption, as the process is carried out manually. In addition, the product is completely bonded to the building's demolition debris
C2- Transport	For the transport of the generated waste, a distance of 80 km to the landfill has been considered in all cases, using a 16–32 t truck with trailer.
C3- Waste processing for reuse. recovery and/or recycling	The acoustic membranes do not undergo any treatment or processing before being sent to landfill.
C4- Disposal	All membranes and auxiliary materials are disposed of in landfill as inert waste.

**Disclaimer: The results from modules A1–A3 should not be interpreted or used in isolation without also considering the outcomes of module C. These partial results do not reflect the full life cycle impacts and may lead to incomplete or misleading conclusions. For an accurate and holistic assessment, it is essential to include module C in the analysis.*

Resource recovery stage D

Module D has not been considered in the present study, as no treatment has been carried out to recover or recycle the materials from the membranes.

Allocation rules:

The data obtained from the composition of panels are specific to the manufacturer, and, whenever possible, allocations based on economic and physical criteria have been avoided; however, in cases where this has not been possible (load assignments of processes with multiple outputs that obtain more than one product), the assignment has been made in accordance with the recommendations of ISO 14040:2006 and the corresponding PCR.

A load allocation has been made with physical criteria (allocation per m² produced) when necessary, i.e. in production consumption and in waste generation during the manufacture of the product, as well as in consumption of packaging material.

The principle of modularity and the principle referred to in the "international EPD System" as "Polluter-pay (PP) allocation method" have been followed.

Cut-off rules:

In accordance with the provisions of the PCR 2019:14 construction products, version 2.0.1 at least 99% of total inflows and outflows (mass and energy) per life-cycle stages and at least 95% of the environmental impact per such aggregated module have been included.

The following processes have been excluded:

- Manufacture of equipment used in production, buildings or any other capital goods.
- Transportation of personnel to the plant.
- Transportation of personnel within the plant.
- Research and development activities.
- Long-term emissions.

Data quality:

Data quality has been assessed using the semi-quantitative evaluation criteria from Product Environmental Footprint (PEF) method described in Table 3.2 of EN 15804 standard. The assessment

has covered the geographical (GeR), technical (TeR) and temporal (TiR) representativeness of the data (in line with requirements in Section 4.6. based on EN 15941).

The scale of values used is from 1 to 5, where 1 is the lowest score and 5 is the highest, resulting in an average score in GeR of 4; in TeR of 4 and in TiR of 5, with a total data quality rating of 4, which indicates that the data quality is good.

The secondary data considered for the bitumen used as a raw material have been verified to remain technically representative when compared with the most recent datasets, and they do not lead to any change exceeding 10% in aggregated results.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

The results shown below are those obtained in the study of the representative product: 1 m² of M.A.D. 4 Danosa acoustic membrane of 7 kg weight and 4 mm thickness, according to the Environmental Footprint 3.1 (EF) impact assessment method developed by the European Commission and based on the UNE-EN 15804:2014+A2:2019/AC:2021 standard.

Mandatory impact category indicators according to EN 15804

Indicator	Unit	Results per functional or declared unit														
		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2.10 E+01	3.34 E+00	2.13 E+00	0.00 E+00	8.48 E-02	0.00 E+00	1.84 E-02	0.00 E+00							
GWP-fossil	kg CO ₂ eq.	2.13 E+01	3.34 E+00	1.81 E+00	0.00 E+00	8.48 E-02	0.00 E+00	1.84 E-02	0.00 E+00							
GWP-biogenic	kg CO ₂ eq.	- 2.80 E-01	0.00 E+00	3.19 E-01	0.00 E+00											
GWP-lul	kg CO ₂ eq.	8.33 E-04	7.58 E-05	1.11 E-04	0.00 E+00	1.34 E-06	0.00 E+00	1.13 E-06	0.00 E+00							
ODP	kg CFC 11 eq.	3.09 E-06	6.56 E-08	2.23 E-07	0.00 E+00	1.93 E-09	0.00 E+00	2.82 E-10	0.00 E+00							
AP	mol H ⁺ eq.	1.07 E-01	4.12 E-02	1.12 E-02	0.00 E+00	1.05 E-04	0.00 E+00	1.67 E-04	0.00 E+00							
EP-freshwater	kg P eq.	3.87 E-05	2.30 E-06	5.71 E-06	0.00 E+00	5.24 E-08	0.00 E+00	1.77 E-08	0.00 E+00							
EP-marine	kg N eq.	1.49 E-02	1.02 E-02	1.83 E-03	0.00 E+00	2.37 E-05	0.00 E+00	7.83 E-05	0.00 E+00							
EP-terrestrial	mol N eq.	1.62 E-01	1.13 E-01	2.00 E-02	0.00 E+00	2.58 E-04	0.00 E+00	8.59 E-04	0.00 E+00							
POCP	kg NMVOC eq.	9.71 E-02	3.36 E-02	9.52 E-03	0.00 E+00	2.07 E-04	0.00 E+00	2.57 E-04	0.00 E+00							
ADP-minerals& metals*	kg Sb eq.	1.90 E-05	6.52 E-08	1.47 E-06	0.00 E+00	2.21 E-09	0.00 E+00	6.37 E-10	0.00 E+00							
ADP-fossil*	MJ	4.19 E+01	3.27 E-01	3.32 E+00	0.00 E+00	7.49 E-03	0.00 E+00	2.77 E-03	0.00 E+00							

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
WDP*	m ³	4.74 E+00	1.44 E-02	3.85 E-01	0.00 E+00	3.69 E-04	0.00 E+00	1.81 E-04	0.00 E+00							
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

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

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 results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2.10 E+01	3.34 E+00	2.13 E+00	0.00 E+00	8.48 E-02	0.00 E+00	1.84 E-02	0.00 E+00							
Particulate matter	diseases inc.	1.08 E-06	1.55 E-07	9.11 E-08	0.00 E+00	5.08 E-09	0.00 E+00	4.89 E-09	0.00 E+00							
Ionising radiation**	kBq U-235 eq	4.69 E-02	3.83 E-03	6.41 E-03	0.00 E+00	1.08 E-04	0.00 E+00	3.37 E-05	0.00 E+00							
Human toxicity, cancer*	CTUh	1.64 E-09	3.11 E-10	1.85 E-10	0.00 E+00	5.25 E-12	0.00 E+00	1.03 E-12	0.00 E+00							
Ecotoxicity, freshwater*	CTUe	2.00 E+01	3.21 E+00	1.69 E+01	0.00 E+00	1.02 E-01	0.00 E+00	1.22 E-02	0.00 E+00							
Human toxicity, non-cancer*	CTUh	3.33 E-08	1.65 E-08	5.41 E-09	0.00 E+00	5.66 E-10	0.00 E+00	2.01 E-11	0.00 E+00							
Land use*	Pt	2.21 E+01	5.52 E-02	1.90 E+00	0.00 E+00	1.43 E-03	0.00 E+00	2.96 E-01	0.00 E+00							

* Disclaimer: The results of this Environmental Impact Indicator should be used with caution, as the uncertainties of these results are high or because experience with the Indicator is limited

** Disclaimer: This impact category primarily refers to the eventual impact of low-dose ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured with this calculator.

¹ 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 CO₂ is set to zero.

Resource use indicators

Results per functional or declared unit																	
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
PERE	MJ	3.33 E+00	9.86 E-02	5.82 E-01	0.00 E+00	2.81 E-03	0.00 E+00	6.61 E-03	0.00 E+00								
PERM	MJ	3.44 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00		
PERT	MJ	6.77 E+00	9.86 E-02	5.82 E-01	0.00 E+00	2.81 E-03	0.00 E+00	6.61 E-03	0.00 E+00								
PENRE	MJ	-1.84 E+02	3.40 E-01	3.41 E+00	0.00 E+00	7.73 E-03	0.00 E+00	2.88 E-03	0.00 E+00								
PENRM	MJ	2.27 E+02	0.00 E+00	1.28 E-02	0.00 E+00												
PENRT	MJ	4.31 E+01	3.40 E-01	3.42 E+00	0.00 E+00	7.73 E-03	0.00 E+00	2.88 E-03	0.00 E+00								
SM	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00		
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00		
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00		
FW	m ³	1.11 E-01	8.24 E-04	8.49 E-03	0.00 E+00	2.18 E-05	0.00 E+00	0.00 E+00	0.00 E+00								
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy 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																

Waste indicators

Results per functional or declared unit																	
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Hazardous waste disposed	kg	7.43 E-04	2.60 E-04	8.73 E-05	0.00 E+00	7.50 E-06	0.00 E+00	1.64 E-06	0.00 E+00								
Non-hazardous waste disposed	kg	1.82 E-01	1.19 E-03	7.39 E-01	0.00 E+00	3.73 E-05	0.00 E+00	6.99 E+00	0.00 E+00								
Radioactive waste disposed	kg	3.14 E-05	2.31 E-06	4.57 E-06	0.00 E+00	6.81 E-08	0.00 E+00	1.84 E-08	0.00 E+00								

Output flow indicators

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00 E+00														
Material for recycling	kg	6.83 E-02	0.00 E+00													
Materials for energy recovery	kg	0.00 E+00														
Exported energy. electricity	MJ	0.00 E+00														
Exported energy. thermal	MJ	0.00 E+00														

Additional LCA results (other environmental performance results) of the product(s)

Information on biogenic carbon content

Results per functional or declared unit		
Indicator	Unit	A1-A3
Biogenic carbon content in the product	kg CO ₂	0.00E+00
Biogenic carbon content in packaging	kg CO ₂	2.80E-01

Information on product variability

The variation in the environmental performance results obtained in modules A-C for the different products analysed is shown. This reflects the range between the lowest and highest environmental impact compared to the chosen representative product.

Indicator	Unit	Variations per functional unit (A-C)		
		MIN M.A.D. 2	Representative M.A.D. 4	MAX M.A.D. 6
		%	%	%
Climate change - Total	kg CO ₂ eq	-51%	0%	46%
Climate change - Fossil	kg CO ₂ eq	-51%	0%	46%
Climate change - Biogenic	kg CO ₂ eq	-53%	0%	31%
Climate change - Land use and LU change	kg CO ₂ eq	-38%	0%	33%

Indicator	Unit	Variations per functional unit (A-C)		
		MIN M.A.D. 2	Representative M.A.D. 4	MAX M.A.D. 6
		%	%	%
Ozone depletion	kg CFC11 eq	-52%	0%	46%
Acidification	mol H+ eq	-51%	0%	47%
Eutrophication, freshwater	kg P eq	-40%	0%	36%
Eutrophication, marine	kg N eq	-51%	0%	46%
Eutrophication, terrestrial	mol N eq	-51%	0%	46%
Photochemical ozone formation	kg NMVOC eq	-51%	0%	47%
Resource use, minerals and metals	kg Sb eq	-6%	0%	16%
Resource use, fossils	MJ	-49%	0%	45%
Water use	m3 depriv.	-51%	0%	46%
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GWP-GHG	kg CO2 eq	-51%	0%	46%
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Particulate matter	disease inc.	-52%	0%	47%
Ionising radiation	kBq U-235 eq	-22%	0%	20%
Human toxicity, cancer	CTUh	-47%	0%	42%
Ecotoxicity, freshwater	CTUe	-30%	0%	27%
Human toxicity, non-cancer	CTUh	-42%	0%	40%
Land use	Pt	-53%	0%	37%
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Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	-46%	0%	45%
Use of renewable primary energy used as raw materials	MJ	-53%	0%	31%
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	-50%	0%	38%
Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	-51%	0%	43%
Use of non-renewable primary energy used as raw materials	MJ	-50%	0%	43%
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	-49%	0%	45%
Use of secondary materials	Kg	0%	0%	0%
Use of renewable secondary fuels	MJ	0%	0%	0%
Use of non-renewable secondary fuels	MJ	0%	0%	0%
Net use of fresh water	m ³	-51%	0%	46%
<hr/>				
Hazardous waste disposed	kg	-48%	0%	43%
Non-hazardous waste disposed	kg	-51%	0%	46%
Radioactive waste disposed	kg	-21%	0%	20%
<hr/>				
Components for re-use	kg	0%	0%	0%

Indicator	Unit	Variations per functional unit (A-C)		
		MIN M.A.D. 2	Representative M.A.D. 4	MAX M.A.D. 6
		%	%	%
Materials for recycling	kg	-50%	0%	43%
Materials for energy recovery	kg	0%	0%	0%
Exported Energy, electricity	MJ per vector	0%	0%	0%
Exported Energy, thermal	MJ per vector	0%	0%	0%
Biogenic carbon content in the product	kg	0%	0%	0%
Biogenic carbon content in packaging	kg	-7%	0%	-8%

ADDITIONAL ENVIRONMENTAL INFORMATION

Electric mix used:

To model the specific electricity mix of DANOSA GROUP, S.A.'s Fontanar (Guadalajara) plant for the year 2024, it was considered that low-voltage electricity consumption originates from three different sources:

- 32.27% (6,950,000 kWh) from Guarantees of Origin (GdO) certified 100% solar thermal electricity, with an emission factor of 0.088 kg CO₂-eq/kWh.
- 55.98% (12,056,744 kWh) from the Spanish residual mix, with an emission factor of 0.279 kg CO₂-eq/kWh.
- 11.74% (2,529,078 kWh) from self-consumption generated by the rooftop photovoltaic plant with monocrystalline silicon modules.

Low-voltage electricity processes for Spain from the Ecoinvent v3.11 database were used and adjusted to reflect this mix. The remaining electricity not covered by self-consumption or GdO supply was modelled using the 2024 Spanish residual mix, based on data published by the CNMC.

The residual mix of the supplier consists of 39.1% nuclear, 31.5% combined-cycle natural gas, 9.9% other non-renewable sources, 9.4% coal, 6.0% renewables, 2.3% fuel/gas, and 1.8% high-efficiency cogeneration.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization

Abbreviation	Definition
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO ₂ eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO ₂ eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO ₂ eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO ₂ eq.)
GWP-total	Total Global Warming Potential (kg CO ₂ eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO ₂ eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H ⁺ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m ³)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m ³)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy. Electricity (MJ)
EET	Exported Energy. Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use

Abbreviation	Definition
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
MJ	Megajoule
kg	Kilogram
m ³	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO ₂ eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO ₂ eq.	Kilograms of Carbon Dioxide Equivalent

REFERENCES

- a) General Programme Instruction of the International EPD® System. Version 5.0.1
- b) ISO 14025:2010 Environmental labels and declarations - Type III Environmental Declarations - Principles and procedures.
- c) ISO 14040:2006 Environmental management - Life Cycle Assessment-Principles and framework
- d) ISO 14044:2006 Environmental management - Life Cycle Assessment-Requirements and guidelines.
- e) PCR 2019:14 Construction products (EN 15804:A2) version 2.0.1.
- f) c-PCR-014. version 1.0.0 - Acoustical ceiling and wall solutions.
- g) EN 15804:2014+A2:2019/AC:2021. Sustainability of construction works-Environmental Product Declarations-Core rules for the product category of construction products.
- h) [EPD-IES-0001923:002 \(S-P-01923\) - Acoustic membranes M.A.D.](#)
- i) [Low Frequency – M.A.D. Danosa Acoustic Membrane](#)
- j) LCA Report 2025 DANOSA M.A.D. v4.

VERSION HISTORY

Original Version of the EPD, 2020-04-01

Revision 1, 2021-11-24

Differences versus the previously published version:

- The scope of the EPD has been expanded to include two more products from the same range: M.A.D. 6 and M.A.D. 6 autoadhesive.
- Recycled bitumen has been modelled in Simapro v10.2.0.2 software. including 21% of recycled raw material.
- The Ecoinvent database version v3.3 has been updated to v3.5.

Revision 2, 2025-12-11

Differences versus the previously published version:

- A new version of the PCR for construction products, the c-PCR for acoustic solutions and the EN 15804 standard have been used.
- The version of the software used has been updated from SimaPro 9.2 to SimaPro 10.2.0.2.
- The Ecoinvent database version v3.5 has been updated to v3.11.
- The impact assessment method has been changed from CML-IA (baseline) v4.2 to EF 3.1.
- The scope of the EPD has been expanded to include six additional products from the same range: M.A.D. 3, M.A.D. PRO 50, M.A.D. PRO 70, M.A.D. PRO 70 autoadhesive, M.A.D. PRO 100 and M.A.D. PRO 100 autoadhesive.
- The bitumen used as a raw material is not recycled; it has been modelled as a primary product.
- The electricity used for the product's manufacturing comes from three different sources: guarantee of origin, residual mix and renewable photovoltaic self-consumption.
- The EURO6 standard has been considered instead of EURO5 for all road transports.
- Recycled cardboard has been included as a packaging material, in addition to plastic and pallets.
- In the installation phase, the same product loss (1%) is considered in all cases.
- The distance to the landfill has been changed from 50 to 80 km, in accordance with the new PCR in force.
- The end-of-life scenario for the product assumes that 100% is sent to landfill, instead of considering a portion for treatment and recovery.

