Environmental Product Declaration

In accordance with UNE-EN 15804 and ISO 14025:

Danosa Acoustic Membranes:

MAD2 | MAD4 | MAD4 auto-adhesive | MAD6 | MAD6 auto-adhesive

From:

DANOSA – Derivados Asfálticos Normalizados, S.A.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01923
Issue date:	2020-04-01
Revision date:	2021-11-18
Valid until:	2026-11-17
PCR:	*2012:01 version 2.33. Construction Products and Construction Services.*
SUB PCR:	*SUB_PCR_C_Acoustical System Solutions (Construction product). Date 2020-09-18.*
Geographical scope:	*Global.*

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

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
E-mail:	info@environdec.com

CEN standard UNE-EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR 2012:01* Construction Products *(UNE-EN 15804), version 2.33*
PCR 2012:01-Sub-PCR-C: *Sub-PCR-C* Acoustical systems solutions (construction product) (*2020-09-18)*
PCR review was conducted by: *the Technical Committee of the International EPD System. President: Massimo Marino*. Contact via info@environdec.com
EPD developed by: *ISOLANA Ahorro Energético SL*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: *Cristina Gazulla* from *Tecnalia R&I Certificación, SL* - www.tecnaliacertificacion.com *In case of accredited certification bodies:* Accredited by: *ENAC. Accreditation No. 125 / C-PR283* *In case of recognised individual verifiers:* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

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

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with UNE-EN 15804. For further information about comparability, see UNE-EN 15804 and ISO 14025.

Company information

Owner of the EPD: DANOSA, Derivados Asfálticos Normalizados, SA

Contact: Calle de la Granja 3, 28108 Alcobendas, Madrid – Spain.
https://www.danosa.com

Description of the organisation: **DANOSA, Derivados Asfálticos Normalizados, SA** has over four decades of working experience with constant developments to improve and diversify its activities.

The first line of work was the manufacture of waterproofing materials. Nowadays, it meets construction and civil engineering needs in waterproofing, acoustic insulation, drainage and geotextiles and skylights, being the leader in the Spanish market and the sixth in Europe.

In acoustics related fields, DANOSA has extensive experience in research and has carried out more than 5,000 acoustic insulation projects in homes, public buildings, classrooms and audio-visual studios.

With the possession of advanced technologies, exportation is facilitated to five continents, with factories in Spain, Portugal and India and subsidiaries in France, Portugal, Morocco, Colombia, Mexico, and the United Kingdom.

DANOSA's commitment to sustainability.

DANOSA is committed to continuously improve the productivity of its facilities through the rational use of natural resources and energy by reducing, whenever possible, the waste generated in all operations, in addition to facilitating recycling.

DANOSA is the pioneering company in environmental performance communication, where the Environmental Product Declarations (EPDs) of a great number of its products are published. Not to mention, DANOSA participates in the online materials platform of the Spanish Green Building Council (http://materiales.gbce.es/) making available to the public all the information necessary to verify the compliance of its products with the different criteria established in the main and currently existing buildings environmental certifications (LEED, BREEAM and VERDE), thus, contributes to sustainability in the construction sector.

Product-related or management system-related certifications: DANOSA's products have prestigious certificates that guarantee compliance with the most demanding quality standards, such as the CE marking, «Avis Techniques» from CSTB (France), the «Documentos de Aplicação» from LNEC (Portugal), the «Agréments Techniques Européens » from EOTA (FM systèmes in Europe), certificates from British Board Agrément, as well as DIT and DITE by IETcc (Spain).

Simultaneously, the company has been certified with ISO 9001 Quality Management Systems since 2012 (registration number: ES044036-1) and ISO 14001 Environmental Management Systems (registration number ES069274-1).

Name and location of production site(s): Poligono Industrial Sector 9, 19290 Fontanar, Guadalajara, Spain.

Product information

Product name: This EPD covers 6 types of acoustic insulation sheets for the construction sector: MAD2, MAD4, MAD4 auto-adhesive, MAD6 and MAD6 auto-adhesive.
Product identification: the products' names start with the abbreviation MAD (Membrana Acústica Danosa – Danosa Acoustic Membrane) and the numeric codes that follow represent the thickness of each product type (2, 4 and 6 mm).

Product description: 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 (Fig. 1). 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).

Figure 1. DANOSA's acoustic sheet.

These sheets are commercialized in rolls of 1 m wide by 12 m long for MAD2, 6 m long for MAD4 and 4.5 m long for MAD6. 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 five products mentioned are produced in the same manufacturing site in Fontanar (Guadalajara, Spain).

Regarding the **emissions of VOC's** (volatile organic compounds), tests have been carried out on the MAD4 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 aforementioned legislation:

Description of the main components and / or constituent materials of the product

The following table indicates the composition of the acoustic insulation studied:

Component	MAD 2		MAD 4		MAD 4 auto-adh.		MAD 6		MAD 6 Auto-adh.	
	Kg/m²	%	Kg/m²	%	Kg/m²	%	Kg/m²	%	Kg/m²	%
Plastic film	0,02	0,62%	0,02	0,37%	0,02	0,41%	0,024	0,24%	0,024	0,26%
Modified bitumen	1,26	39,09%	2,56	39,51%	2,28	39,45%	3,451	34,73%	3,95	42,16%
Fiberglass felt	0,05	1,70%	0,05	0,85%	0,05	0,95%	0,055	0,55%	0,055	0,59%
Mineral fillers	1,88	58,59%	3,85	59,29%	3,43	59,19%	6,408	64,48%	5,34	57,00%

Modified bitumen is made up of 96.00% bitumen and 4.00% synthetic polymers. Of these 2 components, 21% of the bitumen and 100% of the synthetic polymers are of recycled origin. Likewise, the paper that covers the auto-adhesive sheets has been excluded.

The products do not include in its life cycle any dangerous substances included in the "Very High Impact Candidate List for Authorization (SVHC)" in a percentage greater than 0.1% of the weight of the product.

Installation components:

PARAMETER	WEIGHT (kg/m² declared)
Staples - Mechanical fixing:	0,00008 kg/m²
Glue	0,25 kg/m² (0,125 kg/m² per side)

The MAD2, MAD4 and MAD6 can be installed using staples or glue applied on both sides. The manufacturer recommends staple installation.

The auto-adhesive MAD4 and auto-adhesive MAD6 do not require any additional components in their installation.

Technical data

MAD2, MAD4, MAD4 auto-adhesive, MAD6 and MAD6 auto-adhesive sheets are manufactured under the UNE-EN 13707: 2014 Flexible sheets for waterproofing - Reinforced bitumen sheets for roof waterproofing - Definitions and characteristics

CLASSIFICATION ACCORDING TO EN STANDARDS	Bituminous sheets with mineral fillers, coated on both sides by a high-density polyethylene film. Reference standard: UNE-EN 13707				
NOMINAL WEIGHT	3,24 kg/m (MAD2)	6,49 kg/m² (MAD4)	5,79 kg/m² (MAD4 Autoadhesive)	9,94 kg/m² (MAD6)	9,37 kg/m² (MAD6 Autoadhesiva)
NOISE REDUCTION INDEX (ΔRw)	2 dB (MAD2)	4 dB (MAD4)	4 dB (MAD4 Autoadhesiva)	6 dB (MAD6)	6 dB (MAD6 Autoadhesiva)

UN CPC code: Not available.

Other codes for product classification: ECO Platform Nº 00001138.

LCA information

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

Reference service life: 50 years, being considered the same as the useful life of the building.

Time and geographical representativeness: The primary data used has been obtained from Danosa's production plants for the year 2018 and is representative for all five products, as well as the production processes.

This document will be used for B2B communication, with a global scope.

Data quality: All primary data has been provided by Danosa production center during the 2018 period. Secondary data were obtained using SimaPro 9.2 software and Ecoinvent 3.3 and 3.5 databases. The impact methodology used corresponds to CML-IA (baseline) v4.2 (September 2016).

The electricity mix considered corresponds to the year 2018 of the DANOSA Company (see Fig. 2.)

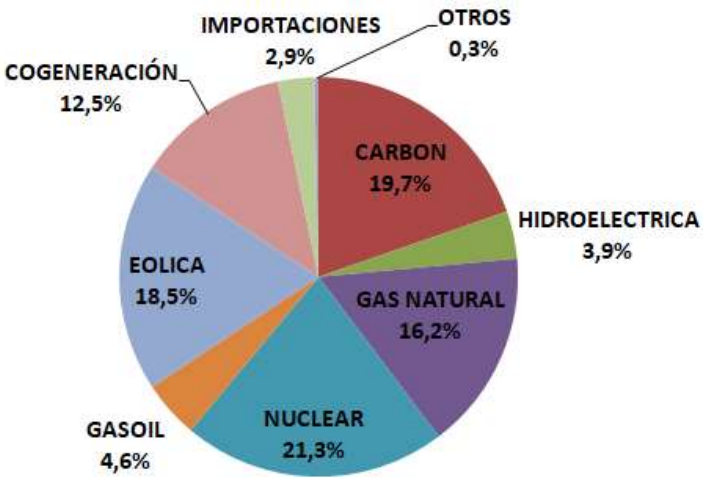


Figure 2. Electricity mix Danosa 2018. Source: Adaptation from Ecoinvent Database v3.3.

Cut-off rules and load assignation:
More than 95% of the data for the total upstream inflows and the central module have been included. The peel-off paper on MAD 4 Auto-adhesive and MAD 6 Auto-adhesive is excluded.

The general energy and waste data has been assigned based on the surface area of the product (m^2). The consumption of the specific process has been measured with specific measuring instruments. It is considered that for this production process there is no direct consumption of water nor diesel.

Database(s) and LCA software used: Simapro 9.2 calculation software and Ecoinvent v3.3 and v3.5 LCA database of international prestigious were used for the development of this study.

Description of system boundaries: Cradle to grave (A + B + C)

LCA: Scenarios and additional technical information

Stages of the Life Cycle

Life Cycle Flow Chart

A1. Supply of raw materials

Extraction of natural resources and manufacture of raw materials:
Modified bitumen, plastic film, fiberglass felt and cross-linked polyethylene foam.

A2. Transportation of raw materials

A3. Product manufacturing

1. **Coating:** Transfer of the bituminous mastic through the filter from the mixer to the coating basin.
2. **Reinforcements:** The fiber felt passes through the mastic coating raft.
3. **Lamination:** The laminating or carriage rollers provide the sheet with the necessary amount of mastic to achieve the weight of the sheet, a characteristic that defines the sheet and not the thickness.
4. **Water basin and cooling rollers:** The sheet is cooled by immersion in the water basin, in order for it to reach the compensator with a temperature close to room temperature.
5. **Finish:** Two-sided polyethylene coat.
6. **Sheet folder and palletizer:** The roll is made in the folder, cut to the preset length and applied the corresponding seals. The rolls are then automatically stored on the pallet in the palletizer.

A4. Transport of the products to the construction site

A5. Product installation

B1-B7. Use

C1. Demolition, deconstruction of the product

C2. Transport to the waste treatment site

C3. Waste treatment

C4. Landfill

Product Stage, A1-A3

Supply of raw materials (A1)

Extraction of natural resources and manufacture of raw materials: Modified bitumen, plastic film, fiberglass felt, cross-linked polyethylene foam.

21% of the modified bitumen is recycled. 4% of this content corresponds to recycled polymer. In the ACV model, only 4% of recycled polymers have been considered, while all bitumen is considered to be virgin material as there is no information available.

Raw material transportation (A2)

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.

Manufacturing (A3)

This module considers all the manufacturing processes of bituminous sheets, including the energy consumption of the manufacturing processes, the consumption of materials for packaging, as well as the treatment of the waste generated, and the reuse of materials produced in said processes.

Construction process stage A4-A5

Product transport (A4)

Transport of the product, from the production plant to the place of installation.

Taking into account the volume of distribution and distance to each country, the ratios of km traveled per m² of product during 2018 have been calculated.

As a result, an average of 250 km/m² by road has been obtained when the distribution is national, and an average distance of 142,66 km/m² by road and 321.58 km/m² by ship, when the distribution is international.

It is estimated that 80,35% of the distribution of MAD insulation membranes is national and 19.65% is international.

PARAMETER	VALUE (expressed in functional unit)	
Type of fuel and consumption of the vehicle or type of means of transport used	National distribution: Truck with trailer with an average load of 7,5-16 Tn	International distribution: Truck of 16-32 tn Euro 4 and a diesel consumption of 0,38 liters per km and Transoceanic Ship
Distance	National distribution: 250 km/m² (road)	International distribution: 321,58 km/m² (boat) 142,66 km/m² (road)
Usable capacity (includes return from unloaded transport)	% assumed in Ecoinvent	
Apparent density of the transported product	1612-1805 kg/m³	
Usability factor in volume	1 (default)	

Product installation and construction process (A5)

This module includes the consumption of auxiliary materials in the installation process, as well as the management of possible waste generated during this information module.

PARAMETER	VALUE (expressed in functional unit)				
Secondary materials for MAD2 and MAD4 installation (specified by type)	Staples: 0,00008 kg/m² or Glue: 0,25 kg/m²				
Consumption of other resources	None				
Quantitative description of the type of energy (regional mix) and its consumption during the installation process	Insignificant				
Waste of materials at the place of the work, before the waste processing, generated during the installation of the product (specified by type)	MAD2: 0,0435 kg/m²	MAD4: 00435 kg/m²	MAD4 auto-adhesive: 0,0535 kg/m²	MAD6: 0,085 kg/m²	MAD4 auto-adhesive: 0,107 kg/m²
Direct emissions to air, soil or water	Insignificant				

Packaging waste (plastic and wood) are transported to recycling plants located 50 km from the construction site by 3,5-7,5 tn trucks.

Use stage B1-B7

Being a passive product within a construction, the use stage (including modules B1 to B7) is considered negligible.

The reference useful life indicated in the applied PCRs, 50 years, is considered.

End of life

Demolition (C1)

The installed product is considered to be dismantle manually, therefore this stage does not require energy or water consumption.

Transport (C2)

Transportation from the construction site once the product has been uninstalled (both the sheet and the auxiliary installation materials (staples or glue) depends on the management system:

- 150 km in 3,5-7,5 tn trucks to waste treatment plant.
- 50 km in 3,5-7,5 tn trucks to landfill.

Treatment of waste for reuse, recovery or recycling (C3)

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

Final elimination (C4)

It is considered that by mass, 89% of the waste goes to treatment plants for subsequent recycling and 11% to landfill.

For the management of waste generated, the European scenario for the year 2017 published in the report of March 4th, 2019 (EUROSTAT 39/2019) was taken into consideration.

PARAMETER	VALUE (expressed in functional unit)
Waste collection process specified by type	11% to landfill, collected and mixed with the rest of construction waste.
Recovery system specified by type	89% to treatment plant.
Discharge specified by type	11% to landfill.
Assumptions for the development of the scenario	The demolition waste is transported 50 km in trucks of 3,5-7,5 tn Euro 4, to the place of final treatment or deposit.

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

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	NR	NR	NR	NR	NR	NR	NR	NR	X	X	X	MNE

(NR = Not Relevant, MNE = Module Not Evaluated)

Environmental Information

Potential environmental impact

Results in absolute values (MAD2)

Potential environmental impact

Parameter		Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
ENVIRONMENTAL IMPACTS	Abiotic resources depletion - elements	kg Sb eq	3,43E-06	6,60E-07	7,79E-07	NR							NR	1,37E-07	0	4,48E-08	MNE	5,05E-06
	Depletion of abiotic resources - fossil fuels	MJ, net calorific value	7,33E+01	3,37E+00	7,71E+00									5,11E-01	0	8,48E-01		8,58E+01
	Soil and water acidification	kg SO2 eq	1,00E-02	7,70E-04	1,38E-03									1,09E-04	0	2,31E-04		1,25E-02
	Depletion of the ozone layer	kg CFC-11 eq	7,79E-07	4,10E-08	7,80E-08									6,16E-09	0	9,28E-09		9,13E-07
	Global warming	GWP kg CO2 eq	1,92E+00	2,23E-01	2,67E-01									3,44E-02	0	3,41E-02		2,48E+00
	Eutrophication	EP kg (PO4)3- eq	1,35E-03	1,23E-04	1,80E-04									1,79E-05	0	3,95E-05		1,71E-03
	Photochemical ozone formation	kg ethylene eq	7,11E-04	3,80E-05	1,06E-04									5,70E-06	0	1,08E-05		8,72E-04

Resources use

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
RESOURCES USE	Use of renewable primary energy excluding primary renewable energy resources used as feedstock	MJ, net calorific value	5,20E+01	3,66E-02	4,49E+00									6,10E-03	0	1,35E-02		5,66E+01
	Use of renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	5,20E+01	3,66E-02	4,49E+00									6,10E-03	0	1,35E-02		5,66E+01
	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	8,20E+01	3,64E+00	8,63E+00									5,52E-01	0	9,27E-01		9,57E+01
	Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0				NR				NR	0	0	0	MNE	0
	Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	8,20E+01	3,64E+00	8,63E+00									5,52E-01	0	9,27E-01		9,57E+01
	Use of secondary materials	kg	2,66E-01	0	0									0	0	0		2,66E-01
	Use of renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Net use of freshwater resources	m3	4,69E-01	1,74E-02	9,11E-02									2,71E-03	0	3,77E-02		6,18E-01

Waste flow

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
WASTE	Hazardous waste eliminated	kg	4,52E-05	2,16E-06	5,43E-06	NR							NR	3,73E-07	0	6,70E-07	MNE	5,39E-05
	Non-hazardous waste eliminated	kg	3,01E-01	1,59E-01	3,39E-01									2,02E-02	0	3,25E+00		4,07E+00
	Radioactive waste eliminated	kg	4,28E-04	2,32E-05	4,18E-05									3,47E-06	0	5,29E-06		5,01E-04

Results in absolute values (MAD4)

Potential environmental impact

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
ENVIRONMENTAL IMPACTS	Abiotic resources depletion - elements	kg Sb eq	3,96E-06	1,32E-06	8,96E-07									2,75E-07	0	8,98E-08		6,54E-06
	Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1,25E+02	6,75E+00	1,25E+01									1,02E+00	0	1,70E+00		1,47E+02
	Soil and water acidification	kg SO2 eq	1,39E-02	1,54E-03	1,80E-03									2,19E-04	0	4,62E-04		1,80E-02
	Depletion of the ozone layer	kg CFC-11 eq	1,44E-06	8,22E-08	1,39E-07				NR				NR	1,23E-08	0	1,86E-08	MNE	1,69E-06
	Global warming	GWP kg CO2 eq	2,49E+00	4,46E-01	3,41E-01									6,90E-02	0	6,84E-02		3,42E+00
	Eutrophication	EP kg (PO4)3- eq	1,83E-03	2,46E-04	2,36E-04									3,59E-05	0	7,92E-05		2,43E-03
	Photochemical ozone formation	kg ethylene eq	9,83E-04	7,61E-05	1,34E-04									1,14E-05	0	2,17E-05		1,23E-03

Resources use

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
RESOURCES USE	Use of renewable primary energy excluding primary renewable energy resources used as feedstock	MJ, net calorific value	5,21E+01	7,33E-02	4,51E+00									1,22E-02	0	2,71E-02		5,68E+01
	Use of renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	5,21E+01	7,33E-02	4,51E+00									1,22E-02	0	2,71E-02		5,68E+01
	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	1,37E+02	7,29E+00	1,37E+01									1,11E+00	0	1,86E+00		1,61E+02
	Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0				NR				NR	0	0	0	MNE	0
	Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	1,37E+02	7,29E+00	1,37E+01									1,11E+00	0	1,86E+00		1,61E+02
	Use of secondary materials	kg	5,39E-01	0	0									0	0	0		5,39E-01
	Use of renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Net use of freshwater resources	m3	6,01E-01	3,48E-02	1,07E-01									5,42E-03	0	7,55E-02		8,24E-01

Waste flow

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
WASTE	Hazardous waste eliminated	kg	5,74E-05	4,33E-06	6,74E-06	NR							NR	7,47E-07	0	1,34E-06	MNE	7,06E-05
	Non-hazardous waste eliminated	kg	4,19E-01	3,19E-01	6,42E-01									4,05E-02	0	6,51E+00		7,93E+00
	Radioactive waste eliminated	kg	7,91E-04	4,64E-05	7,54E-05									6,96E-06	0	1,06E-05		9,31E-04

Results in absolute values (MAD4 autoadhesiva)

Potential environmental impact

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
ENVIRONMENTAL IMPACTS	Abiotic resources depletion - elements	kg Sb eq	3,85E-06	1,02E-06	5,55E-07	NR							NR	2,45E-07	0	8,01E-08	MNE	5,74E-06
	Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1,14E+02	5,34E+00	1,30E+01									9,14E-01	0	1,52E+00		1,35E+02
	Soil and water acidification	kg SO2 eq	1,31E-02	1,43E-03	1,62E-03									1,95E-04	0	4,12E-04		1,68E-02
	Depletion of the ozone layer	kg CFC-11 eq	1,29E-06	6,49E-08	1,48E-07									1,10E-08	0	1,66E-08		1,54E-06
	Global warming	GWP kg CO2 eq	2,37E+00	3,54E-01	3,05E-01									6,16E-02	0	6,10E-02		3,15E+00
	Eutrophication	EP kg (PO4)3- eq	1,73E-03	2,11E-04	2,18E-04									3,21E-05	0	7,07E-05		2,26E-03
	Photochemical ozone formation	kg ethylene eq	9,25E-04	6,64E-05	1,09E-04									1,02E-05	0	1,94E-05		1,13E-03

Resources use

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
RESOURCES USE	Use of renewable primary energy excluding primary renewable energy resources used as feedstock	MJ, net calorific value	5,21E+01	6,02E-02	5,59E+00									1,09E-02	0	2,42E-02		5,78E+01
	Use of renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	5,21E+01	6,02E-02	5,59E+00									1,09E-02	0	2,42E-02		5,78E+01
	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	1,25E+02	5,77E+00	1,43E+01									9,88E-01	0	1,66E+00		1,48E+02
	Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0				NR				NR	0	0	0	MNE	0
	Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	1,25E+02	5,77E+00	1,43E+01									9,88E-01	0	1,66E+00		1,48E+02
	Use of secondary materials	kg	4,80E-01	0	0									0	0	0		4,80E-01
	Use of renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Net use of freshwater resources	m3	5,74E-01	2,77E-02	7,21E-02									4,84E-03	0	6,74E-02		7,46E-01

Waste flow

Parameter		Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
WASTE FLOW	Hazardous waste eliminated	kg	5,48E-05	3,42E-06	6,43E-06	NR							NR	6,66E-07	0	1,20E-06	MNE	6,65E-05
	Non-hazardous waste eliminated	kg	3,94E-01	2,45E-01	6,94E-01									3,62E-02	0	5,81E+00		7,18E+00
	Radioactive waste eliminated	kg	7,13E-04	3,67E-05	8,19E-05									6,21E-06	0	9,47E-06		8,47E-04

Results in absolute values (MAD6)

Potential environmental impact

Parameter		Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
ENVIRONMENTAL IMPACTS	Abiotic resources depletion - elements	kg Sb eq	3,88E-06	2,02E-06	1,07E-06	NR							NR	4,20E-07	0	1,37E-07	MNE	7,53E-06
	Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1,64E+02	1,03E+01	1,65E+01									1,57E+00	0	2,60E+00		1,95E+02
	Soil and water acidification	kg SO2 eq	1,68E-02	2,36E-03	2,26E-03									3,35E-04	0	7,07E-04		2,25E-02
	Depletion of the ozone layer	kg CFC-11 eq	1,88E-06	1,26E-07	1,83E-07									1,89E-08	0	2,85E-08		2,23E-06
	Global warming	GWP kg CO2 eq	2,99E+00	6,83E-01	4,29E-01									1,06E-01	0	1,05E-01		4,31E+00
	Eutrophication	EP kg (PO4)3- eq	2,10E-03	3,77E-04	2,88E-04									5,50E-05	0	1,21E-04		2,94E-03
	Photochemical ozone formation	kg ethylene eq	1,12E-03	1,16E-04	1,61E-04									1,75E-05	0	3,32E-05		1,45E-03

Resources use

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
RESOURCES USE	Use of renewable primary energy excluding primary renewable energy resources used as feedstock	MJ, net calorific value	3,52E+01	1,12E-01	3,09E+00	NR							NR	1,87E-02	0	4,14E-02	MNE	3,84E+01
	Use of renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	3,52E+01	1,12E-01	3,09E+00									1,87E-02	0	4,14E-02		3,84E+01
	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	1,80E+02	1,11E+01	1,82E+01									1,69E+00	0	2,84E+00		2,14E+02
	Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	1,80E+02	1,11E+01	1,82E+01									1,69E+00	0	2,84E+00		2,14E+02
	Use of secondary materials	kg	7,25E-01	0	0									0	0	0		7,25E-01
	Use of renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Net use of freshwater resources	m3	8,47E-01	5,32E-02	1,45E-01									8,30E-03	0	1,16E-01		1,17E+00

Waste flow

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
WASTE	Hazardous waste eliminated	kg	6,05E-05	6,62E-06	7,62E-06	NR							NR	1,14E-06	0	2,06E-06	MNE	7,79E-05
	Non-hazardous waste eliminated	kg	4,89E-01	4,88E-01	9,63E-01									6,20E-02	0	9,96E+00		1,20E+01
	Radioactive waste eliminated	kg	1,04E-03	7,10E-05	9,99E-05									1,06E-05	0	1,62E-05		1,23E-03

Results in absolute values (MAD6 Autoadhesiva)

Potential environmental impact

Parameter		Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
ENVIRONMENTAL IMPACTS	Abiotic resources depletion - elements	kg Sb eq	3,87E-06	1,64E-06	6,30E-07	NR							NR	2,45E-07	0	1,29E-07	MNE	6,51E-06
	Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1,83E+02	8,63E+00	2,09E+01									9,14E-01	0	2,45E+00		2,16E+02
	Soil and water acidification	kg SO2 eq	1,81E-02	2,32E-03	2,27E-03									1,95E-04	0	6,67E-04		2,35E-02
	Depletion of the ozone layer	kg CFC-11 eq	2,12E-06	1,05E-07	2,42E-07									1,10E-08	0	2,68E-08		2,50E-06
	Global warming	GWP kg CO2 eq	3,14E+00	5,73E-01	4,14E-01									6,16E-02	0	9,87E-02		4,28E+00
	Eutrophication	EP kg (PO4)3- eq	2,24E-03	3,41E-04	2,91E-04									3,21E-05	0	1,14E-04		3,01E-03
	Photochemical ozone formation	kg ethylene eq	1,21E-03	1,07E-04	1,45E-04									1,02E-05	0	3,13E-05		1,50E-03

Resources use

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
RESOURCES USE	Use of renewable primary energy excluding primary renewable energy resources used as feedstock	MJ, net calorific value	3,52E+01	9,72E-02	3,78E+00									1,09E-02	0	3,91E-02		3,91E+01
	Use of renewable primary energy used as raw material	MJ, net calorific value	0	0	0									0	0	0		0
	Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	3,52E+01	9,72E-02	3,78E+00									1,09E-02	0	3,91E-02		3,91E+01
	Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	2,00E+02	9,32E+00	2,28E+01									9,88E-01	0	2,68E+00		2,36E+02
	Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0				NR				NR	0	0	0	MNE	0
	Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	2,00E+02	9,32E+00	2,28E+01									9,88E-01	0	2,68E+00		2,36E+02
	Use of secondary materials	kg	8,69E-01	0	0									0	0	0		8,69E-01
	Use of renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0									0	0	0		0
	Net use of freshwater resources	m3	7,82E-01	4,48E-02	1,01E-01									4,84E-03	0	1,09E-01		1,04E+00

Waste flow

	Parameter	Ud	A1-A3	A4-A5		B1-B7							C1-C4				(D)	Total
			A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
WASTE	Hazardous waste eliminated	kg	6,36E-05	5,53E-06	7,68E-06	NR							NR	6,66E-07	0	1,94E-06	MNE	7,94E-05
	Non-hazardous waste eliminated	kg	4,92E-01	3,95E-01	1,10E+00									3,62E-02	0	9,39E+00		1,14E+01
	Radioactive waste eliminated	kg	1,17E-03	5,93E-05	1,34E-04									6,21E-06	0	1,53E-05		1,38E-03

Conclusions

For the Danosa products evaluated, acoustic membranes MAD2, MAD4, MAD4 auto-adhesive, MAD6 and MAD6 auto-adhesive, most of the impacts occur during the product stage (obtaining raw materials, transport and manufacturing).

There are no impacts associated with the use stage in the life cycle since bituminous sheets are passive products within the building.

MAD2 acoustic insulation sheet

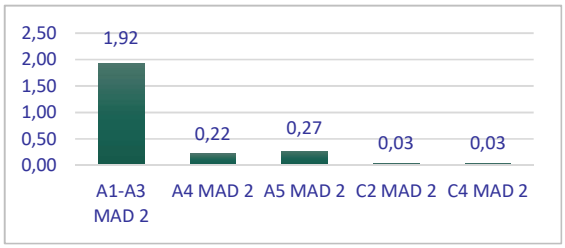
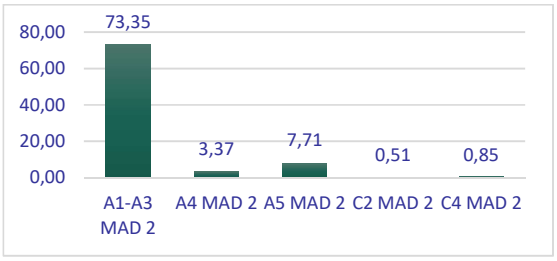
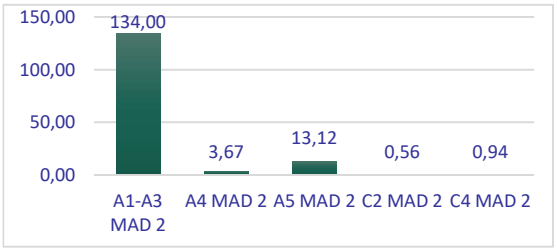
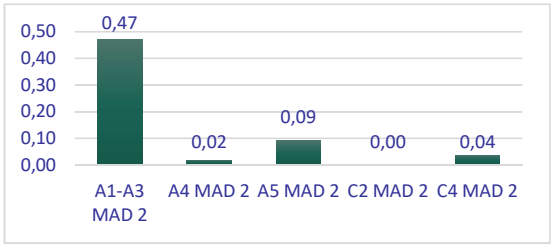
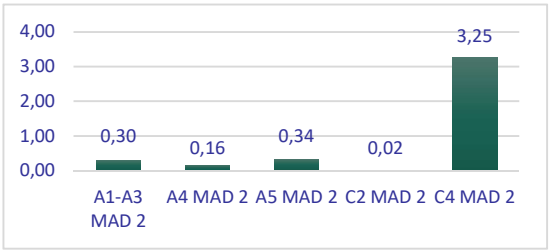
Most of the impacts occur during the product stage. In fact, during this stage there are 77.48% of the impacts associated with global warming, 85.50% of the impacts associated with the consumption of non-renewable resources, 87.99% of the impacts associated with the consumption of energy and 75.90% of the impacts associated with water consumption.

During the transportation stage there are 8.98% of the impacts associated with global warming, 3.93% of the impacts associated with the consumption of non-renewable resources, 2.41% of the impacts associated with the consumption of energy and 2.81% of the impacts associated with water consumption.

In the product installation stage, 10.78% of the impacts associated with global warming are produced, 8.98% of the impacts associated with the consumption of non-renewable resources, 8.62% of the impacts associated with the consumption of energy and 14.75% of the impacts associated with water consumption.

There are no impacts associated with the use stage in the life cycle since bituminous membranes are passive products within the building.

During the end-of-life stage, the main associated impact is the generation of waste, corresponding to 79.83% of its total impact.

Global Warming Potential		2,48 kgCO2 eq./FU
Consumption of non-renewable resources(1)		85,78 MJ/FU
Energy consumption(2)		152,30 MJ/FU
Water consumption(3)		0,62 m³/FU
Waste generated(4)		4,07 kg/FU

(1) This indicator corresponds to Abiotic depletion potential for fossil resources
(2) This indicator corresponds to total use of primary energy resources
(3) This indicator corresponds to net use of water
(4) This indicator corresponds to the sum of wastes (hazardous, non hazardous and radiactives)

MAD4 acoustic insulation sheet

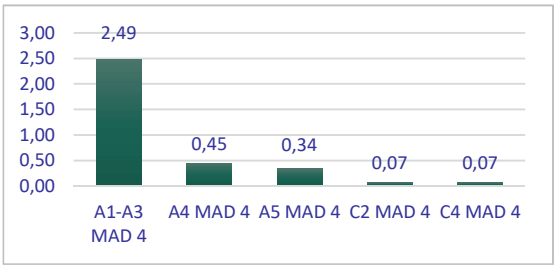
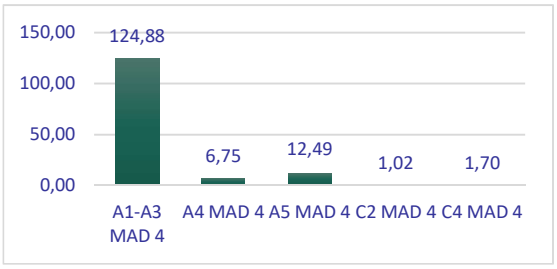
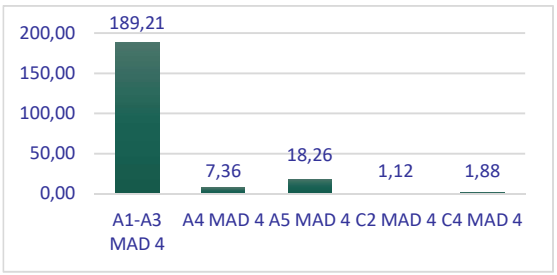
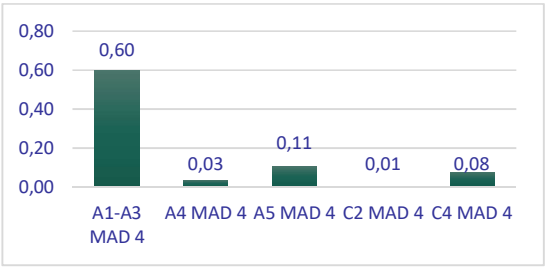
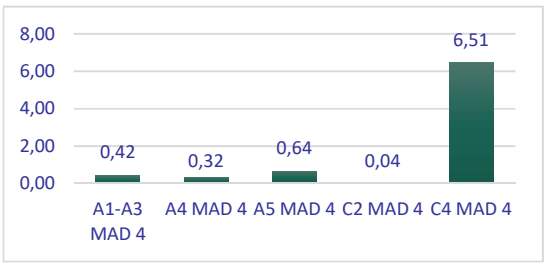
Most of the impacts occur during the product stage. In fact, during this stage there are 72.94% of the impacts associated with global warming, 85.04% of the impacts associated with the consumption of non-renewable resources, 86.86% of the impacts associated with the consumption of energy and 72.94% of the impacts associated with water consumption.

During the transportation stage, there is 13.06% of the impacts associated with global warming, 4.60% of the impacts associated with the consumption of non-renewable resources, 3.38% of the impacts associated with the consumption of energy and 4.22% of the impacts associated with water consumption.

In the product installation stage, 9.97% of the impacts associated with global warming occur, 8.51% of the impacts associated with the consumption of non-renewable resources, 8.38% of the impacts associated with the consumption of energy and 13.02% of the impacts associated with water consumption.

There are no impacts associated with the use stage in the life cycle since bituminous membranes are passive products within the building.

During the end-of-life stage, the main associated impact is the generation of waste, corresponding to 82.09% of its total impact.

Global Warming Potential		3,42 kgCO2eq./FU
Consumption of non-renewable resources(1)		146,85 MJ/FU
Energy consumption(2)		217,83 MJ/FU
Water consumption(3)		0,82 m³/FU
Waste generated(4)		7,93 kg/FU

(1) This indicator corresponds to Abiotic depletion potential for fossil resources

(2) This indicator corresponds to total use of primary energy resources

(3) This indicator corresponds to net use of water

(4) This indicator corresponds to the sum of wastes (hazardous, non hazardous and radiactives)

MAD4 auto-adhesive acoustic insulation sheet

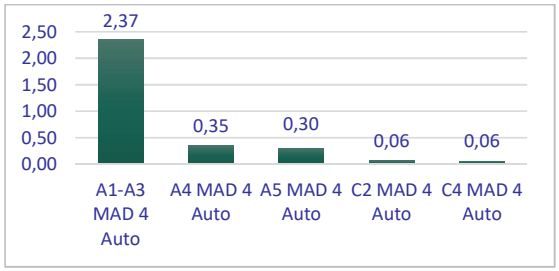
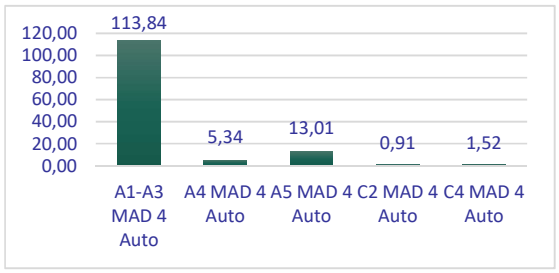
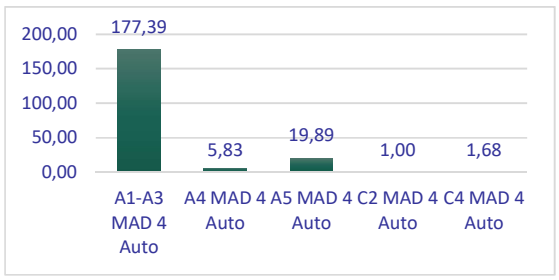
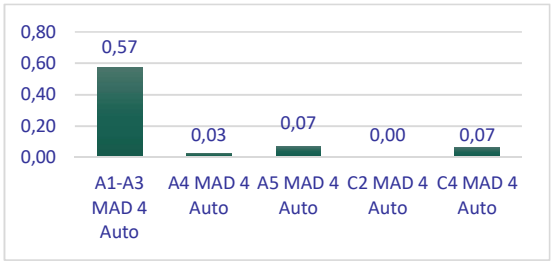
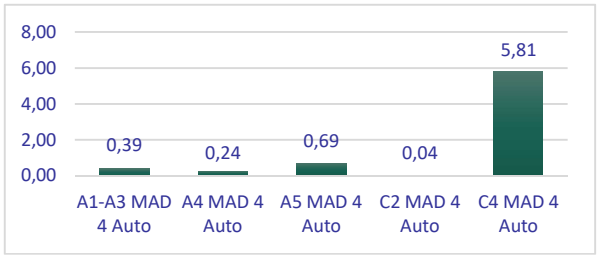
Most of the impacts occur during the product stage. In fact, during this stage there are 75.22% of the impacts associated with global warming, 84.56% of the impacts associated with the consumption of non-renewable resources, 86.20% of the impacts associated with the consumption of energy and 76.94% of the impacts associated with water consumption.

During the transportation stage, 11.23% of the impacts associated with global warming occur, 3.97% of the impacts associated with the consumption of non-renewable resources, 2.83% of the impacts associated with the consumption of energy and 3.72% of the impacts associated with water consumption.

In the product installation stage, the associated impacts are negligible since no auxiliary material is necessary for its installation.

There are no impacts associated with the use stage in the life cycle since bituminous membranes are passive products within the building.

During the end-of-life stage, the main associated impact is the generation of waste, corresponding to 80.93% of its total impact.

Global Warming Potential		3,15 kgCO2eq./FU
Consumption of non-renewable resources(1)		134,62 MJ/FU
Energy consumption(2)		205,79 MJ/FU
Water consumption(3)		0,75 m³/FU
Waste generated(4)		7,18 kg/FU

(1) This indicator corresponds to Abiotic depletion potential for fossil resources

(2) This indicator corresponds to total use of primary energy resources

(3) This indicator corresponds to net use of water

(4) This indicator corresponds to the sum of wastes (hazardous, non hazardous and radiactives)

MAD6 acoustic insulation sheet

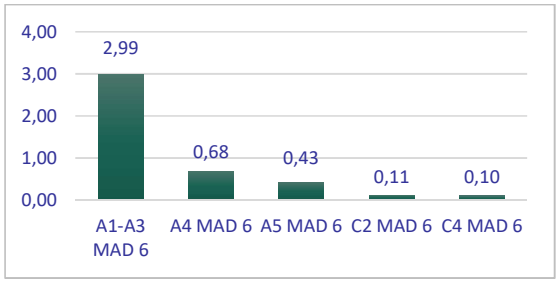
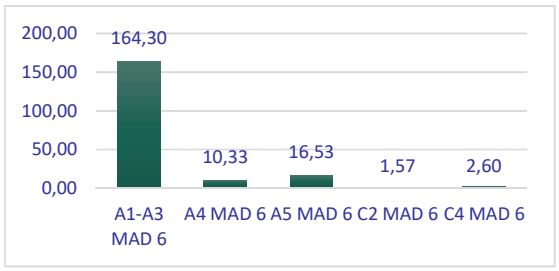
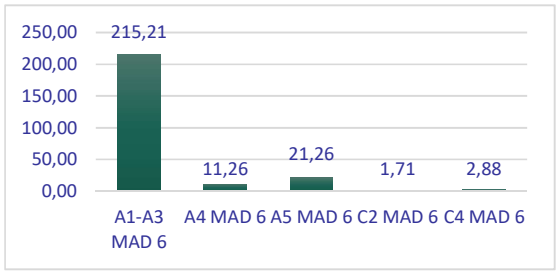
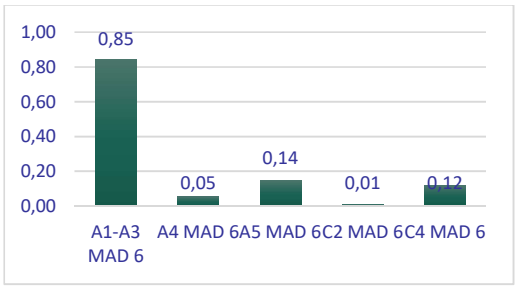
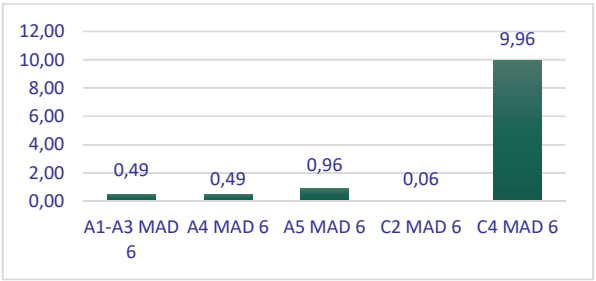
Most of the impacts occur during the product stage. In fact, during this stage there are 69.32% of the impacts associated with global warming, 84.11% of the impacts associated with the consumption of non-renewable resources, 85.29% of the impacts associated with the consumption of energy and 72.45% of the impacts associated with water consumption.

During the transportation stage there are 15.85% of the impacts associated with global warming, 5.29% of the impacts associated with the consumption of non-renewable resources, 4.46% of the impacts associated with the consumption of energy and 4.55% of the impacts associated with water consumption.

During the installation stage there are 9.95% of the impacts associated with global warming, 8.46% of the impacts associated with the consumption of non-renewable resources, 8.42% of the impacts associated with the consumption of energy and 12.40% of the impacts associated with the consumption of water from water.

There are no impacts associated with the use stage in the life cycle since bituminous membranes are passive products within the building.

During the end-of-life stage, the main associated impact is the generation of waste, corresponding to 83.26% of its total impact.

Global Warming Potential		4,31 kgCO2eq./FU
Consumption of non-renewable resources(1)		195,34 MJ/FU
Energy consumption(2)		252,33 MJ/FU
Water consumption(3)		1,17 m³/FU
Waste generated(4)		11,96 kg/FU

(1) This indicator corresponds to abiotic depletion potential for fossil resources
(2) This indicator corresponds to total use of primary energy resources
(3) This indicator corresponds to net use of water
(4) This indicator corresponds to the sum of wastes (hazardous, non hazardous and radiactives)

MAD6 auto-adhesive acoustic insulation sheet

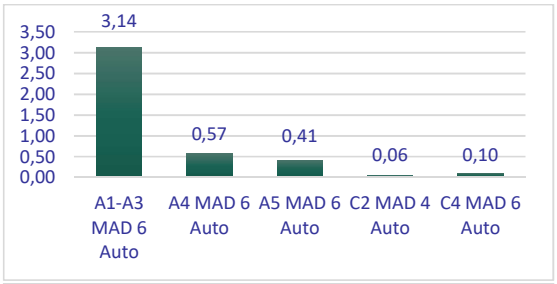
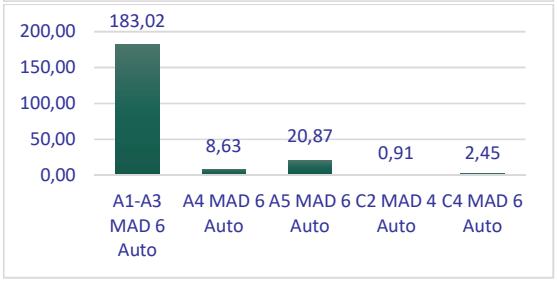
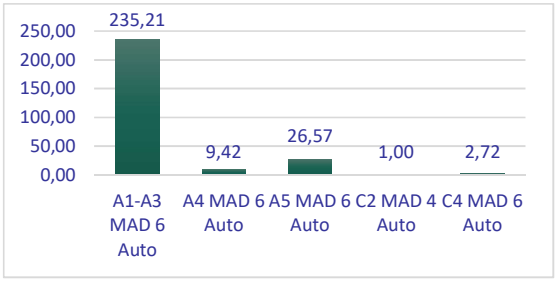
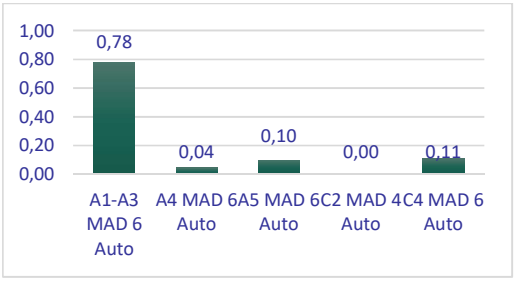
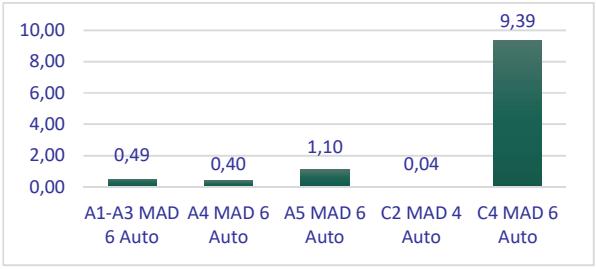
Most of the impacts occur during the product stage. In fact, during this stage there are 73.23% of the impacts associated with global warming, 84.78% of the impacts associated with the consumption of non-renewable resources, 85.56% of the impacts associated with the consumption of energy and 75.10% of the impacts associated with the consumption of water from water.

During the transportation stage, there is 13.36% of the impacts associated with global warming, 4.00% of the impacts associated with the consumption of non-renewable resources, 3.43% of the impacts associated with the consumption of energy and 14.31% of the impacts associated with water consumption.

In the product installation stage, the associated impacts are negligible since no auxiliary material is necessary for its installation.

There are no impacts associated with the use stage in the life cycle since bituminous membranes are passive products within the building.

During the end-of-life stage, the main associated impact is the generation of waste, corresponding to 82.24% of its total impact.

Global Warming Potential		4,28 kgCO2eq./FU
Consumption of non-renewable resources(1)		215,89 MJ/FU
Energy consumption(2)		274,92 MJ/FU
Water consumption(3)		1,04 m³/FU
Waste generated(4)		11,42 kg/FU

(1) This indicator corresponds to Abiotic depletion potential for fossil resources
(2) This indicator corresponds to total use of primary energy resources
(3) This indicator corresponds to net use of water
(4) This indicator corresponds to the sum of wastes (hazardous, non hazardous and radiactives)

Differences with previous versions

In this version, the scope of the EPD has been expanded to include two more products from the same range: MAD 6 and MAD 6 auto-adhesive;
Recycled bitumen has been modeled in Simapro v9.2 software, including 21% of recycled raw material; and,
The Ecoinvent database version v3.3 has been updated to v3.5.

Notes

Construction product EPDs may not be comparable if they do not comply with UNE-EN 15804.

Environmental claims for products within the same product category from different programs may not be comparable.

The verifier and the program operator have no responsibility for the legality of the product.

References

- UNE-EN 15804:2012, Sustainability in construction - Environmental Product Declarations - Basic product category rules for construction products.
- ISO 14025: 2010, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
- ISO 14040: 2016, Environmental management - Life cycle analysis - Principles and framework.
- ISO 14044: 2016, Environmental management - Life cycle analysis - Requirements and guidelines.
- Saint-Gobain Environmental Product Declaration Methodological Guide for Construction Products.
- ISO 21930: 2007 Sustainability in building construction - Environmental declaration of building products.
- General rules of the International EPD program (International EPD System GPIs v2.5).
- EUROSTAT 39/2019 report published on March 4, 2019, used for the management of waste generated in stage C4 (final disposal).

EPD®

www.environdec.com