GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION

AENOR

Natural Stone Slabs

Piedra Paloma and Ambra Varieties

Environmental
Product
Declaration

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Piedra Paloma

The holder of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included, throughout the validity period.

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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration (EPD) Programs

The European Standard UNE-EN 15804:2012+A2:2020 serves as the basis for this EPD

Independent verification of the declaration and data, in accordance with the UNE-EN ISO 14025:2010 standard.

☐ Internal ☒ External

Verification agency

AENOR

Product certification entity accredited by ENAC with accreditation No. 1/C-PR468.

1. General information

1.1. The organization

Piedra Paloma S.L.U. is a company dedicated to the commercialization of natural stone extracted from our own quarries.

We have been creating unique natural spaces for over 30 years and meeting the needs of architects, designers, and clients seeking valuable solutions.

We are one of the most recognized and prestigious companies in the natural stone industry, thanks to the beauty and quality of our materials.

Our quarry in Matagallar is located in the municipality of Pedrera, in the province of Seville. From this quarry, we directly extract our Piedra Paloma limestone and also our Ambra limestone, both in white shades, known for their impeccable appearance and undeniable technical characteristics.

Piedra Paloma's facilities hold various certifications and recognitions that support our commitment to sustainability in managing all of our processes:

- UNE-EN-ISO 9001:2015, Registration No. ER-0419/2016
- UNE-EN-ISO 14001:2015, Registration No. GA-2016/0165
- CE Marking

1.2. Scope of the declaration

This Environmental Product Declaration provides environmental information regarding the life cycle of natural stone slabs produced at the Piedra Paloma plant in Pedrera (Sevilla), within the Spanish geographic and technological context during the year 2023.

The natural stone slabs are used as cladding, both interior and exterior, in the construction of buildings and unique architectural works. The ornamental characteristics of natural stone make it highly valued by architects and interior designers.

The scope of the EPD is from cradle to gate, including modules C1-C4 and module D.

1.3. Life cycle and compliance

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010 and UNE-EN 15804:2012+A2:2020 standards and their amendments, and includes the following stages of the life cycle:

System boundaries. Information modules considered

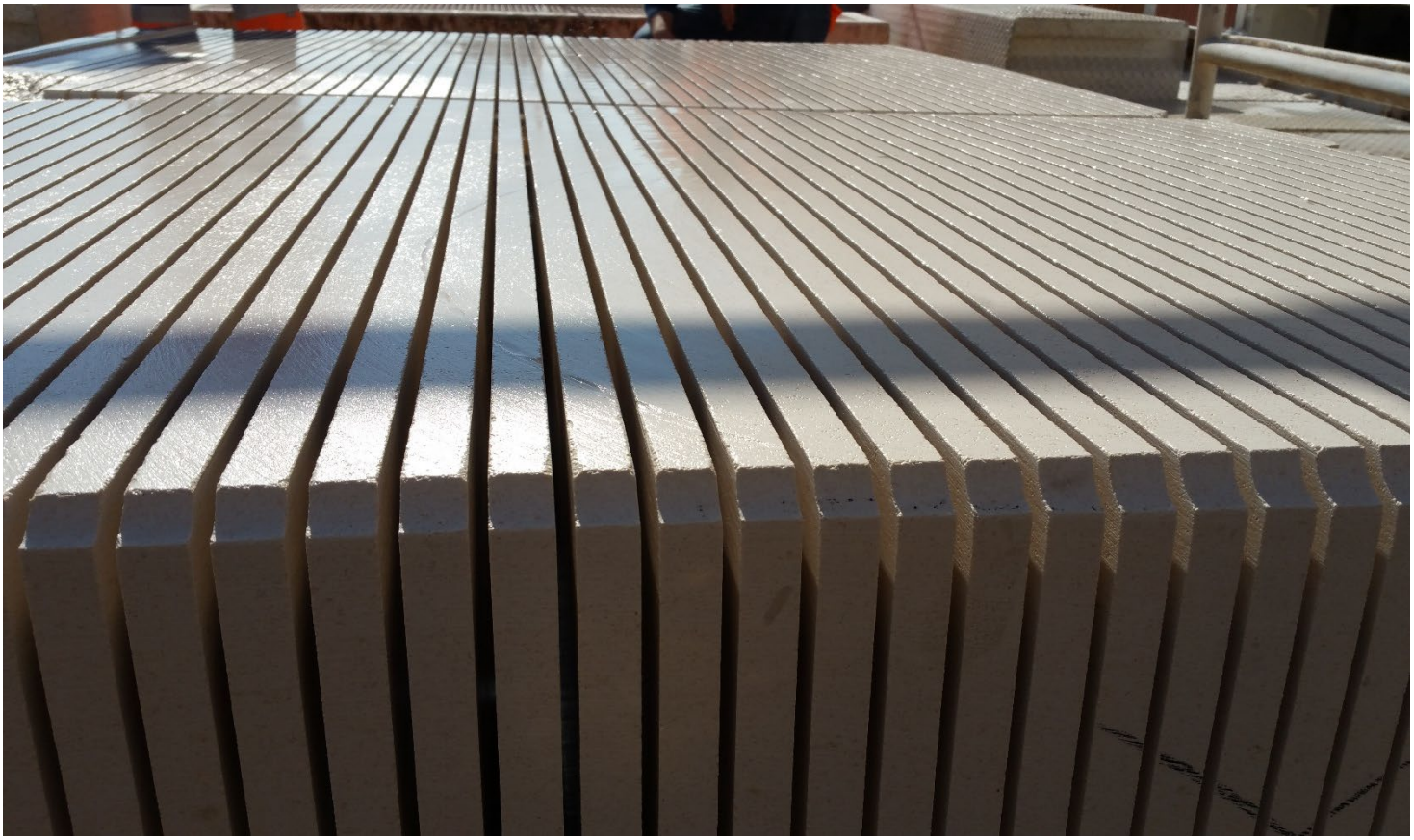
Product stage	A1	Supply of raw materials	X
	A2	Transport to factory	X
	A3	Manufacturing	X
Construction Stage	A4	Transport to site	MNE
	A5	Installation / construction	MNE
Use Stage	B1	Use	MNE
	B2	Maintenance	MNE
	B3	Repair	MNE
	B4	Replacement	MNE
	B5	Rehabilitation	MNE
	B6	Energy use in service	MNE
	B7	Water use in service	MNE
End of life	C1	Deconstruction / demolition	X
	C2	Transport	X
	C3	Waste treatment	X
	C4	Disposal	X
	D	Potential for reuse, recovery, and/or recycling	X

X = Module included in the LCA; NR = Module not relevant; MNE = Module not evaluated

This EPD may not be comparable to those developed under other programs or based on different reference documents. Specifically, it may not be comparable to EPDs that are not prepared in accordance with UNE-EN 15804+A2.

Similarly, EPDs may not be comparable if the data sources differ (e.g., databases), if not all relevant information modules are included, or if they are based on different scenarios.

The comparison of construction products must be carried out for the same function, applying the same functional unit and at the building level (or architectural or engineering work). This means considering the product's behavior throughout its entire life cycle, as well as the specifications outlined in section 6.7.2 of UNE-EN ISO 14025.



2. The product

2.1. Product information

Piedra Paloma and Ambra are two varieties of natural limestone extracted from the Matagallar quarry, composed of 99% calcite, along with accessory components of other minerals such as oxide and quartz.

Piedra Paloma stands out for its pure white color and high resistance. Its neutral tone allows for a wide range of combinations and styles, making any space unique and incomparable. Thanks to its versatile applications, this material can be incorporated into any architectural style, enhancing its full potential.

For several decades, architects and interior designers have used Piedra Paloma in both interior and exterior applications, as it is suitable for both warm and cold climates. Its thermal and ecological properties, combined with its elegance, natural beauty, strength, and distinctive character, have led prestigious brands such as Dior, Louis Vuitton, Ralph Lauren, and Zenith to select it for their boutiques, both indoors and outdoors. It is featured in constructions across multiple countries, including Spain, United States, Italy, United Kingdom, France, United Arab Emirates, Germany, Morocco, Denmark, Canada, China, and Russia.

The product classification according to the United Nations Central Product Classification (CPC) is as follows:

UN CPC code: 15120.

2.2. Product performance

The manufacturer declares the following information regarding the product's technical specifications:

Characteristic	Value	Unit
Density:	2.550	kg/m^3
Apparent density:	2.450	kg/m^3
Open porosity:	9,1	%
Absorption:	3,24	%
Compressive streght:	99	MPa
Flexural strength:	12,9	MPa
Breaking load at dowel hole:	1.600	N

Table 2. Product characteristics

2.3. Product composition

The composition of the natural stone slabs as declared by the manufacturer is as follows:

Substance	Content	Unit
Calcium carbonate	99	%
Other materials	1	%

Table 3. Product composition

The following table presents the average packaging materials used for the distribution of the product per m² of natural stone slab:

Packaging material	Content	Unit
Wood	0,768	kg
Polyethylene	0,004	kg
PET	0,003	kg
FOAM	0,003	kg
Polystyrene	0,001	kg

Table 4. Packaging material per ton of product

No substances classified as hazardous under the "Candidate List of Substances of Very High Concern (SVHC) for authorization" or subject to other regulations have been used in the manufacturing process.

3. Life cycle assessment (LCA) information

3.1. Life cycle assesment analysis

The Life Cycle Assessment (LCA) Report supporting this EPD was developed by Sinergy, based on specific data provided by Piedra Paloma S.L.U. for the natural stone slab production process at its Pedrera plant, corresponding to the year 2023. [12] LCA Report - Natural Stone Slabs. Piedra Paloma. February 2025. V01.

For the calculation of environmental impacts and indicators, the SimaPro 9.6 software was used in combination with the Ecoinvent 3.10 database.

The LCA follows a "cradle to gate" approach, covering modules C1-C4 and module D.

3.2. Declared unit

The declared unit is defined as **1 m²** of natural stone slab, as the slab's primary function is surface cladding. The m² is the characteristic parameter for this function and is commonly used in production, commercialization, and application of the product.

3.3. Allocation criteria

Wherever possible, allocation has been avoided. For processes shared between different varieties of natural stone, allocation rules based on produced m² have been applied.

For the quantification of material and energy flows, cut-off criteria aligned with EN 15804 +A2 have been used. Material flows below 1% of the total input and output mass may be excluded unless they have significant environmental relevance. Energy flows below 1% of the total input and output energy may also be excluded unless their environmental relevance is significant.

In any case, the total excluded flows do not exceed 5% of the total mass, energy, or overall environmental impact. The cut-off criterion was not applied to omit relevant impact data.

3.4. Data representativeness, quality, and selection

The data used for the LCA is representative of natural stone extraction technologies at the original quarries and the production of natural stone slabs at the Piedra Paloma plant in Pedrera, as well as the technologies and processes involved in the different life cycle stages analyzed.

The specific data for the extraction and production of natural stone slabs covers the entire year 2023 and was provided by Piedra Paloma.

As a source for generic data, the SimaPro 9.6 software and Ecoinvent 3.10 database were used, ensuring representativeness within the last 10 years.

The geographical scope of the data accurately reflects the operational reality of the different life cycle phases analyzed.

Following the data quality criteria of environmental footprint product category rules and considering that the processes represent the declared geographic area, the technological aspects are highly similar, requiring no significant technical modifications, and the data is less than three years old. The overall data quality is considered high.

3.5. Other calculation rules and assumptions

The Global Warming Potential (GWP) of the electricity mix specifically applied to A1-A3 is 0.39 kg CO_2e/kWh.

To determine the impacts associated with electricity consumption during the manufacturing stage, the energy mix of each supplier has been modeled without the use of Guarantees of Origin (GdO).

The GWP of the gas mix specifically applied to A1-A3 is 0.1 kg CO_2e/MJ.

4. System boundaries, scenarios, and additional technical information

4.1. Pre-manufacturing processes

Module A1 includes the extraction and processing of raw materials, as well as the generation of imported electricity consumed during the product manufacturing processes.

Quarry production is carried out by forming bench levels at different heights, progressively advancing as extraction continues. The natural stone is extracted in block form through cutting and tipping processes at the quarry benches.

In addition to the blocks, limestone surplus generated from cutting and tipping processes is commercialized as aggregates for construction.

Raw blocks are subjected to monowire cutting machines to obtain a prismatic shape with regular faces.

Module A2 includes the transportation of materials to the production plant. Cutting and finishing facilities are located at the Matagallar quarry itself, where the blocks are extracted.

4.2. Product manufacturing

Module A3 includes the production processes for natural stone slabs at the Piedra Paloma facilities.

Blocks are cut using frame saws and multi-wire machines to produce stone slabs.

These slabs can undergo further processing at the same facilities, including polishing, surface finishing, and cutting to produce slabs in various sizes.

Some slabs require an intermediate structural reinforcement process using fiberglass mesh and resin application before polishing.

Once reinforced, the slabs are polished, followed by robotic cutting machines that cut them to the required dimensions.

Water is used during cutting and polishing to prevent dust emissions and act as a coolant. The primary water source is rainwater collected at the quarry, supplemented by well water when necessary.

To maximize efficiency, water is treated in a closed circuit, where dust is removed and recovered for use as aggregate.

The machinery used for material handling in the quarries operates on diesel fuel, while the cutting, polishing, and resin application machines, as well as the overhead cranes for slab movement in storage, use electricity.

Matagallar has photovoltaic power generation facilities used for self-consumption in cutting and finishing processes.

The slabs are packed in wooden crates, placed on pallets, and protected with plastic sheeting. For container transport, wooden structures (bundles) are used as protective and securing elements.

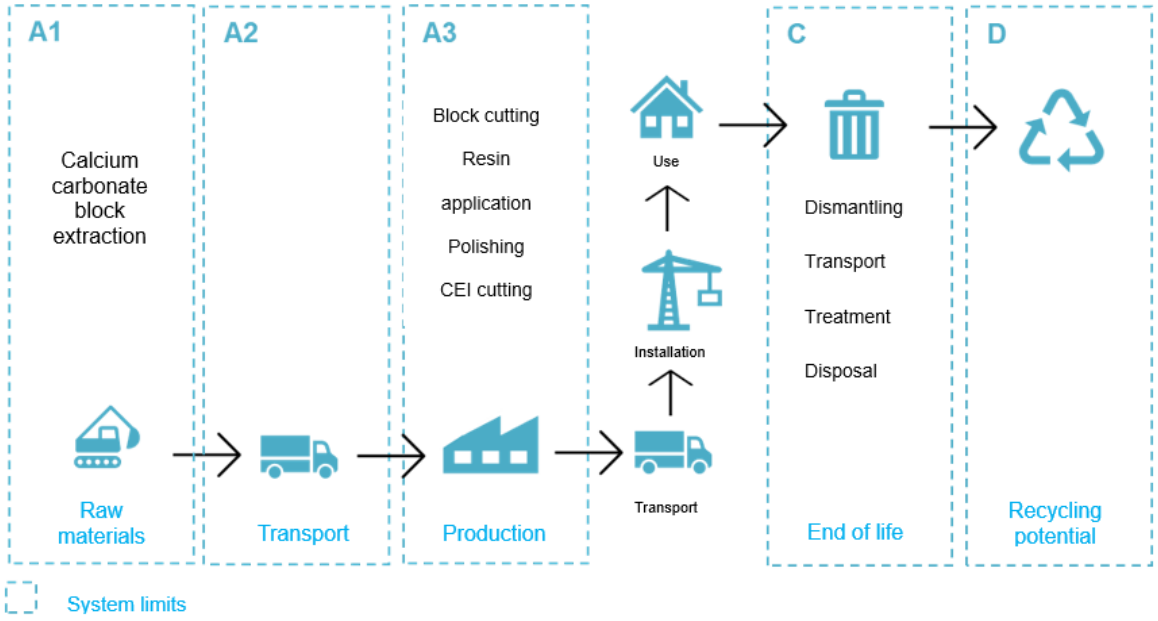
4.3. End of life stage

For Modules C1-C4, the following assumptions and scenarios have been considered:

- C1: The dismantling or demolition of the product from the building is assumed to occur indiscriminately alongside other enclosure materials, with on-site material classification.
- C2: A transport distance of 150 km is considered from the dismantling site to the treatment or final disposal plant.
- C3: 70% of the material is assumed to be processed for recycling into filling material or other uses, in accordance with Law 7/2022.
- C4: The remaining 30% of the material is considered to be disposed of in an inert landfill.

4.4. Benefits and burdens beyond the system

Module D: It is assumed that recovered material can be reused in filling applications or other uses, replacing an equivalent quantity of calcium carbonate aggregates extracted from a quarry. This process potentially avoids the environmental impacts associated with quarry extraction. The benefit calculation is based on the impacts associated with the replaced material, assuming a 5% material loss. The impacts of the crushing process (necessary to make the recovered material functionally similar to the replaced material) are deducted from the benefits.


A1
Calcium carbonate block extraction
Raw materials
A2
Transport
A3
Block cutting
Resin application
Polishing
CEI cutting
Production
Transport
Installation
Use
C
Dismantling
Transport
Treatment
Disposal
End of life
D
Recycling potential
System limits

5. Declaration of the Environmental Parameters of the LCA and LCI

1m² Piedra Paloma / Ambra

Environmental Impacts.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins, or risks.

Parameters	Units	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	3,50E+00	9,94E-07	-5,03E-01	2,99E+00	1,89E-01	1,11E+00	3,99E-01	4,40E-02	-7,85E-02
GWP-fossil	kg CO_2 eq	3,34E+00	9,93E-07	5,90E-01	3,93E+00	1,89E-01	1,11E+00	3,96E-01	4,39E-02	-7,85E-02
GWP-biogenic	kg CO_2 eq	1,53E-01	6,81E-10	-1,09E+00	-9,41E-01	2,93E-05	3,60E-04	2,21E-03	1,26E-04	-4,71E-05
GWP-luluc	kg CO_2 eq	2,63E-04	3,25E-10	1,33E-03	1,59E-03	6,51E-06	2,70E-05	1,56E-04	2,30E-06	-1,09E-08
ODP	kg CFC11 eq	3,55E-08	1,97E-14	1,96E-08	5,51E-08	2,98E-09	2,24E-08	8,06E-09	6,96E-10	-1,10E-09
AP	mol H^+ eq	1,54E-02	3,11E-09	3,78E-03	1,92E-02	1,77E-03	2,66E-03	2,91E-03	4,02E-04	-1,89E-03
EP-freshwater	kg P eq	3,36E-05	7,64E-12	3,21E-05	6,56E-05	1,79E-07	9,22E-07	6,54E-06	5,52E-08	5,31E-08
EP-marine	kg N eq	4,37E-03	1,03E-09	1,18E-03	5,55E-03	8,31E-04	1,01E-03	1,12E-03	1,89E-04	-6,80E-04
EP-terrestrial	mol N eq	5,40E-02	1,14E-08	1,32E-02	6,72E-02	9,11E-03	1,10E-02	1,22E-02	2,07E-03	-9,65E-03
POCP	Kg NMVOC eq	1,54E-02	4,87E-09	4,56E-03	1,99E-02	2,71E-03	4,66E-03	3,88E-03	6,17E-04	-2,10E-03
ADP-minerals& metals [2]	kg Sb eq	1,91E-06	3,18E-12	1,14E-05	1,33E-05	7,91E-09	3,63E-08	3,12E-08	1,82E-09	-2,50E-07
ADP-fossil [2]	MJ	3,82E+01	1,14E-06	1,83E+00	4,01E+01	2,67E-02	1,45E-01	8,79E-01	7,17E-03	3,07E-02
WDP [2]	m^3 worl eq depriv	1,35E+00	5,72E-08	3,86E+00	5,20E+00	1,96E-03	6,17E-03	-8,82E-01	4,59E-04	-9,20E-03

The **Global Warming Potential (GWP - total)** represents the overall impact on climate change, while the **GWP - fossil**specifically accounts for emissions from fossil fuels, and the **GWP - biogenic** reflects the contribution from biogenic sources. The **GWP - luluc** considers emissions resulting from land use and land-use change. The **Ozone Depletion Potential (ODP)** measures the impact on the stratospheric ozone layer. The **Acidification Potential (AP)** indicates the accumulation of acidifying substances. The **Eutrophication Potential** is divided into **EP-freshwater**, which quantifies the fraction of nutrients reaching freshwater, **EP-marine**, which accounts for nutrients in marine environments, and **EP-terrestrial**, which represents the accumulated surplus affecting land ecosystems. The **Photochemical Ozone Creation Potential (POCP)** assesses the formation of tropospheric ozone. The **Abiotic Depletion Potential** is categorized into **ADP-minerals & metals**, addressing the depletion of non-fossil abiotic resources, and **ADP-fossil**, which evaluates the depletion of fossil resources. The **Water Deprivation Potential (WDP)** measures the weighted consumption of deprived water resources. Finally, **NR (Not Relevant)** is used when a specific category does not apply.

Additional environmental impacts

Parameters	Units	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	Incidencia de enfermedades	1,59E-07	7,77E-14	6,89E-08	2,28E-07	4,68E-07	6,17E-08	3,55E-07	1,18E-08	-3,02E-08
IRP [1]	kBq U235 eq	7,41E-01	6,36E-09	1,05E-02	7,51E-01	2,23E-04	1,98E-03	1,07E-02	7,62E-05	9,78E-04
ETP-fw [2]	CTUe	6,23E+00	3,74E-06	5,03E+00	1,13E+01	8,61E-02	4,58E-01	1,25E+00	2,01E-02	-1,14E+00
HTP-c [2]	CTUh	4,71E-09	6,94E-15	3,53E-09	8,24E-09	1,32E-11	7,85E-11	1,21E-10	3,16E-12	-4,85E-10
HTP-nc [2]	CTUh	8,62E-09	8,69E-15	9,21E-09	1,78E-08	1,88E-10	6,23E-09	3,37E-09	4,86E-11	-2,40E-10
SQP [2]	-	1,52E+01	8,30E-06	1,16E+02	1,31E+02	5,28E-03	3,25E-02	3,88E+00	7,12E-01	-5,67E-01

PM: Potential disease incidence due to particulate matter emissions (PM). **IRP:** Human exposure efficiency potential relative to U235. **ETP-fw:** Comparative toxic unit potential for ecosystems - freshwater. **HTP-c**: Comparative toxic unit potential for ecosystems - cancer effects**. HTP-nc:** Comparative toxic unit potential for ecosystems - non-cancer effects. **SQP**: Soil quality potential index. **NR:** Not relevant.

Notice 1: This impact category primarily addresses the potential effects of low-dose ionizing radiation exposure on human health from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents or occupational exposure from the disposal of radioactive waste in underground facilities. Ionizing radiation potential from radon or certain construction materials is also not measured under this parameter.
Notice 2: The results of this environmental impact indicator should be used with caution, as uncertainties are high and experience with this parameter is limited.

Resource use

Parameters	Units	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,30E+00	5,32E-08	2,11E+01	2,24E+01	6,35E-04	6,32E-03	4,12E-02	1,33E-02	-4,47E-02
PERM	MJ	0,00E+00	0,00E+00	4,34E-02	4,34E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,30E+00	5,32E-08	2,12E+01	2,25E+01	6,35E-04	6,32E-03	4,12E-02	1,33E-02	-4,47E-02
PENRE	MJ	3,82E+01	1,14E-06	1,07E+00	3,93E+01	2,67E-02	1,45E-01	8,79E-01	7,17E-03	3,06E-02
PENRM	MJ	0,00E+00	0,00E+00	7,61E-01	7,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,82E+01	1,14E-06	1,83E+00	4,01E+01	2,67E-02	1,45E-01	8,79E-01	7,17E-03	3,06E-02
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,87E-02	1,91E-09	5,62E-02	7,49E-02	7,80E-05	3,72E-04	-1,83E-02	2,25E-05	-3,00E-03

PERE: Use of renewable primary energy excluding renewable primary energy used as raw material. **PERM**: Use of renewable primary energy used as raw material. **PERT**: Total renewable primary energy use. **PENRE**: Use of non-renewable primary energy excluding non-renewable primary energy used as raw material. **PENRM**: Use of non-renewable primary energy used as raw material. **PENRT**: Total non-renewable primary energy use. **SM**: Use of secondary materials. **RSF**: Use of renewable secondary fuels. **NRSF**: Use of non-renewable secondary fuels. **FW**: Net use of fresh water resources. **NR**: Not relevant.

Waste categories

Parameter	Units	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	3,51E-04	3,45E-10	2,00E-03	2,35E-03	1,86E-05	1,07E-04	8,48E-04	6,82E-06	-2,75E-05
NHWD	kg	3,67E-02	6,62E-07	6,35E-02	1,00E-01	7,12E-05	4,32E-04	6,84E+00	1,68E+01	-2,17E-03
RWD	kg	4,67E-04	4,44E-12	7,71E-06	4,74E-04	1,27E-07	1,36E-06	8,51E-06	4,43E-08	9,82E-07

HWD: Residuos peligrosos eliminados; **NHWD**: Residuos no peligrosos eliminados; **RWD**: Residuos radiactivos eliminados; **NR**: No relevante

Output flows

Parameter	Units	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	6,22E+01	6,22E+01	0,00E+00	0,00E+00	3,93E+01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU: Components for reuse. **MFR**: Materials for recycling. **MER**: Materials for energy recovery. **EE**: Exported energy. **NR**: Not relevant.

Biogenic Carbon Content

Biogenic Carbon Content	Units	Declared functional unit result
Biogenic carbon content in product	Kg C	0,00E+00
Biogenic carbon content in packaging	Kg C	3,84E-01

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