

GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental Product Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

EN 15804:2012+A2:2019/AC:2021

Alier

AENOR

Carton Wall

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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 during the period of validity



Holder of the Declaration

Alier S.A.
Polígono industrial, s/n
25124 Roselló (Lleida)
Spain

Tel. (+34) 973 732 705
Web <https://alier.com/>



LCA Project

Abaleo S.L.
D. José Luis Canga Cabañes
C/ Poza de la Sal, 8; 3º A
28031 Madrid
Spain

Tel. (+34) 639 901 043
Mail jlcanga@abaleo.es;
info@abaleo.es
Web www.abaleo.es



GlobalEPD Programme Operator

AENOR CONFÍA, S.A.U.
C/ Génova 6
28004 Madrid
Spain

Tel. (+34) 902 102 201
Mail aenordap@aenor.com
Web www.aenor.com

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Independent verification of the declaration and data in accordance with EN ISO 14025:2010

☐ Internal

☒ External

Verification body

AENOR

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

1. General information

1.1. The organisation

ALIER is a company specializing in the production of recycled paper from 100% recovered paper, with a high capacity for recycling papers that are difficult to process, such as moisture-resistant, laminated, bonded, liquid packaging, plastic-coated papers, etc. It has an annual production capacity of 180,000 tonnes of paper, in grammages ranging from 50 g/m² to 450 g/m², using two paper machines with useful widths of 2.52 m and 3.53 m.

ALIER specifically manufactures paper for the production of plasterboard. Its properties include a high moisture level, interlayer strength, as well as porosity and breaking load in both directions. It is manufactured in different colours, which helps distinguish the board's final use (standard, moisture-resistant, fire-resistant, etc.). From a production standpoint, the specific equipment and the differences compared with other papers are numerous. These include the strict selection and classification of fibres, direct humidification and cooling on the machine, and the reel size, with a diameter of more than 2 m.

The organisation has a Quality Management System and an Environmental Management System that comply with the requirements of UNE-EN ISO 9001:2015 and UNE-EN ISO 14001:2015, respectively. In addition, it holds PEFC and FSC chain-of-custody certificates for forest products.

ALIER holds B Corp certification and certificates as an approved company acting as a recoverer/recycler for ECOEMBES S.A. for paper-cardboard material and beverage/food cartons from selective collection.

ALIER, S.A. currently has an Energy Management System implemented based on UNE-EN ISO 50001:2018.

1.2. Scope of the Declaration

This environmental product declaration describes the environmental information relating to the cradle-to-gate life cycle, modules C1-C4 and module D (A1-A3 + C + D), of Alier's Carton Wall paper manufactured at its plant located at Pol. Industrial, s/n, 25124 Roselló, Lleida (Spain).

1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with EN ISO 14025:2010 and EN 15804:2012+A2:2019/AC:2021.

Table 1-1. Product Category Rule

Title	Sustainability in construction. Environmental product declarations. Core product category rules for construction products
Registration/version	EN 15804:2012+A2:2019 /AC:2021
Issue date	2021
Administrator	AENOR

Table 1-2 System boundaries. Information modules considered

Product Stage	A1	Raw material extraction	X
	A2	Transport to factory	X
	A3	Manufacture	X
Construction	A4	Transport to construction site	ND
	A5	Installation/construction	ND
Use Stage	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Use of energy in service	ND
	B7	Use of water in service	ND
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; ND = Module not evaluated

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be

comparable with EPDs not developed according to UNE-EN 15804.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products should be done on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 standard.

1.4. Differences from previous versions of this EPD.

This EPD corresponds to the second version of the study.

- 2022: Valid until 2028.
 - Based on production data for 2021.
 - Ecoinvent 3.8 database
 - SimaPro version 9.4.0.2.

2. The product

2.1. Identification of the product

Alier's Carton Wall is a 100% recycled, multi-layer paper with a profile and curl correction system for manufacturing paper for plasterboard or PBL (Plaster Board Liner). It has a highly glued external face and an internal face that adheres perfectly to plaster. Its high porosity allows the board to dry quickly during manufacture. The high quality of ALIER paper gives the PBL board the mechanical and structural strength required by customers.

The intended use of Carton Wall is as a component for plasterboard or PBL (Plaster Board Liner) in the construction sector.

This product is mainly divided into two families: Grey Carton Wall and Ivory Carton Wall, in different grammages and colours.

CPC code: 3215 – Corrugated paper and paperboard and containers of paper and paperboard.

2.2. Product composition

The product for which this EPD is prepared is 100% recovered paper-board, in accordance with UNE-EN 643:2014 (European list of standard grades of recovered paper and board).

Table 2-1. Composition

Material	% by weight
Recovered paper	96,20%
Additives	3,80%

During the product life cycle, no hazardous substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" are used in a percentage greater than 0.1% of the product weight.

2.3. Packaging

The primary packaging used for product shipment (distribution packaging) has been included in the study:

Table 2-2. Packaging

Material	kg / declared unit
Cardboard	3,90E+00
Wood	8,60E-01
PVC	3,58E-04
PS	2,86E-03
Anti-slip rubber	2,98E-02
Ink	2,33E-03
PE	7,45E-01
Polyester	2,48E-02
Steel	8,45E-01
Sealing tape	9,93E-04

2.4. Product performance

The technical specifications of the products included in this EPD are shown in the following tables.

IVORY CARTON WALL (CWY):

- Ivory CW, green ivory CW, pink ivory CW, yellow ivory CW, sky ivory CW:

WY / WR / WV / WN / WA / SK Paper Quality									
Technical Characteristics									
UNE / EN / ISO - 536	Grammage	g/m ²	160	170	180	190	200	210	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	10.0	10.0	10.0	10.0	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	19.0	20.0	21.5	21.5	22.5	22.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.4	6.5	7.5	7.5	8.5	8.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	25	25	25	25	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	70	70	70	70	70	70	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	52	52	52	52	52	52	MIN. 48
ISO 16260	Plybond	J/m ²	270	270	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	<30	<30	MAX. 30

- Ivory CW High Performance (ivory, pink ivory and green ivory):

HWY / HWR / HWV Paper Quality									
Technical Characteristics									
UNE / EN / ISO - 536	Grammage	g/m ²	120	140	150	160	170	180	± 3%
UNE / EN / ISO - 287	Moisture	%	9.0	10.5	10.5	10.5	10.5	10.5	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	18.0	20.0	20.5	21.5	22.5	23.0	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	5.7	6.5	7.0	7.2	7.7	8.0	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	25	25	25	25	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	60	60	60	60	60	60	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	52	52	52	52	52	52	MIN. 48
ISO 16260	Plybond	J/m ²	270	270	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	<30	<30	MAX. 30

- Ivory CW High Bond:

BWY Paper Quality				
Technical Characteristics				
UNE / EN / ISO - 536	Grammage	g/m²	190	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	21.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	7.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	70	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	52	MIN. 48
ISO 16260	Plybond	J/m ²	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	MAX. 30

- Ivory CW Antifungus (ivory, pink ivory and green ivory):

FWY / FWR / FWV Paper Quality									
Technical Characteristics									
UNE / EN / ISO - 536	Grammage	g/m²	160	170	180	190	200	210	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	10.0	10.0	10.0	10.0	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	19.0	20.0	21.5	21.5	22.5	22.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.4	6.5	7.5	7.5	8.5	8.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	25	25	25	25	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	70	70	70	70	70	70	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	52	52	52	52	52	52	MIN. 48
ISO 16260	Plybond	J/m ²	270	270	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	<30	<30	MAX. 30

- Ivory CW White Top Liner:

WTL Paper Quality					
Technical Characteristics					
UNE / EN / ISO - 536	Grammage	g/m²	170	200	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	20.0	22.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.5	8.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	70	70	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	73	73	MIN. 70
ISO 16260	Plybond	J/m ²	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	MAX. 30

- Ivory CW White Plus:

WP Paper Quality				
Technical Characteristics				
UNE / EN / ISO - 536	Grammage	g/m²	200	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	22.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	8.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	25	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	70	MAX. 90 / MIN. 40
ISO 2470-1	Whiteness	%	62	MIN. 56
ISO 16260	Plybond	J/m ²	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	MAX. 30

GREY CARTON WALL (HP):

- Grey CW, green grey Carton Wall, pink grey Carton Wall:

HP / HR / HV Paper Quality										
Technical Characteristics										
UNE / EN / ISO - 536	Grammage	g/m²	140	150	160	170	180	190	200	± 3%
UNE / EN / ISO - 287	Moisture	%	9.5	9.5	9.5	9.5	9.5	9.5	9.5	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	15.5	16.5	17.5	17.5	17.5	18.5	19.1	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.0	6.5	7.0	7.0	7.0	7.5	7.9	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	25	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	30	30	30	30	30	30	30	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	55	55	55	55	55	55	55	MAX. 70 / MIN. 40
ISO 16260	Plybond	J/m ²	270	270	270	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	<30	<30	<30	MAX. 30

- Grey CW High Performance (grey, pink grey and green grey):

HHP / HHR / HHV Paper Quality											
Technical Characteristics											
UNE / EN / ISO - 536	Grammage	g/m²	120	125	130	135	140	150	160	170	± 3%
UNE / EN / ISO - 287	Moisture	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	16.1	16.4	16.8	17.1	17.5	18.0	18.5	19.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.8	7.0	7.2	7.3	7.5	7.8	8.0	8.5	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m²	25	25	25	25	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m²	30	30	30	30	30	30	30	30	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	55	55	55	55	55	55	55	55	MAX. 65 / MIN. 40
ISO 16260	Plybond	J/m²	270	270	270	270	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	<30	<30	<30	<30	MAX. 30

- Grey CW High Bond:

BHP Paper Quality							
Technical Characteristics							
UNE / EN / ISO - 536	Grammage	g/m ²	150	160	170	180	± 3%
UNE / EN / ISO - 287	Moisture	%	9.5	9.5	9.5	9.5	± 1.0%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (MD)	kgf	16.0	17.5	17.5	17.5	-10%
UNE / EN / ISO - 1924 / 2	Dry Tensile Strength (CD)	kgf	6.5	7.0	7.0	7.0	-10%
UNE / EN / ISO - 535	Cobb 60 (Top Side)	g/m ²	25	25	25	25	MAX. 30 / MIN. 20
UNE / EN / ISO - 535	Cobb 60 (Reverse Side)	g/m ²	30	30	30	30	MAX. 35 / MIN. 20
UNE / ISO 5636-5	Gurley Porosity	s	55	55	55	55	MAX. 70 / MIN. 40
ISO 16260	Plybond	J/m ²	270	270	270	270	MAX. 325 / MIN. 220
IT04.08-40	Saturation	min	<30	<30	<30	<30	MAX. 30



3. LCA Information

3.1. Life Cycle Assessment

The Life Cycle Assessment Report for the EPD of Alier S.A.'s Carton Wall, dated March 2026, was prepared by Abaleo S.L.

The LCA study follows the recommendations and requirements of the international standards ISO 14040:2006, ISO 14044:2006 and the European Standard EN 15804:2012+A2:2019/AC:2021.

3.2. Scope of the study.

The scope of this EPD is the cradle-to-gate production and modules C and D (A1-A3 + C + D) of the average Carton Wall manufactured by Alier at its Roselló plant in Lleida.

The product is manufactured in Spain, although the LCA calculation has been carried out for Europe.

3.3. Study limitations.

The following have not been included in the LCA:

- The production of the aerobic and anaerobic sludge used in the WWTP, which accounts for 0.004% by weight of the total products consumed at the facility; its transport from the supplier to Alier is considered.
- The biogenic CO₂ content of starch.
- All equipment with a service life of more than 3 years.
- The construction of the plant buildings, or other capital goods.
- Staff business travel, or staff commuting to and from work.
- Research and development activities.
- Long-term emissions.

3.4. Declared unit.

The declared unit is one tonne (1,000 kg) of product, plus its distribution packaging.

3.5. Reference service life.

Reference Service Life (RSL): not specified, as the product use stage is not included in the study.

3.6. Allocation criteria.

In accordance with the criteria of the reference standard, the system inputs and outputs have been allocated on a mass basis. This allocation criterion has been applied to all general plant consumption, packaging, transport, waste and discharge.

The quantities of the different materials used and produced in the manufacturing process come from measurements carried out at the plant itself.

It has not been necessary to apply economic allocation criteria.

3.7. Cut-off criteria.

The LCA includes the gross weight/volume of all materials used in the manufacturing process, so that at least 99% of the environmental impacts are obtained.

There has been no exclusion of energy consumption.

3.8. Manufacturing process.

The manufacturing process begins with the receipt of recovered paper/cardboard, after which its quality is validated and it is stored in the designated raw material area.

From this recovered paper, paper pulp is obtained through the disintegration (shredding) of the material by mechanical action. This disintegration takes place in an

aqueous medium to separate the fibers from each other and from non-cellulosic (improper) materials.

Next, this paper pulp is sent to the purification circuit where, through mechanical processes, the non-cellulosic (improper) materials are separated from the fiber before it proceeds to the refining process.

From the refining stage, the fiber moves to the headstock circuit, where additives are added, resulting in a sheet of the desired basis weight.

After sheet formation, the water is removed by pressing and subsequent drying.

3.9. Representativeness, quality and selection of data.

To model the manufacturing process of the product studied, specific production data from the Roselló plant (Lleida, Spain) for 2025 were used. Data obtained from this plant includes raw material, packaging and energy consumption; transport, discharge and waste generation.

The study was prepared using the Ecoinvent 3.11 database (March 2025) and SimaPro 10.3.0.1 software.

The following criteria were applied when selecting the most representative processes:

- The data must be representative of the technological development actually applied in the manufacturing processes. If no information was available, data representative of an average technology were selected.
- The data must be as geographically close as possible and, where applicable, average regionalised data.
- The data must be as up to date as possible.

Data quality was assessed in accordance with Table 1 of Annex E of EN 15804:2012+A2:2019:

- Very good integrity. Score 1.
- Good methodological suitability and consistency. Score 2.
- Reasonable temporal representativeness. Score 1.
- Good technological representativeness. Score 2.
- Very good geographical representativeness. Score 1.
- Low data uncertainty. Score 2.

Based on the above data, the Data Quality Rating (DQR) has a value of 1.5, indicating that data quality is excellent.

4. System boundaries, scenarios and additional technical information

Module A1: Raw material production.

This module includes the raw material production process, which considers:

- Resource extraction and raw material production.
- Transport to the raw material treatment/production centres.
- Energy and fuel consumption during raw material production.
- Consumption of other resources, such as water, during raw material production.
- Generation of waste and emissions to air, and discharges to water and soil, during raw material production.
- Generation of the electricity used in the manufacturing process.

Module A2: Transport.

Truck transport of raw and auxiliary materials from the production sites (suppliers) to the production plant has been considered. The transport distances have been provided by the plant managers, based on the location of their suppliers' facilities.

Internal plant transport is also included.

Module A3: Manufacturing.

At this stage, the consumption of auxiliary production materials (auxiliary materials and general plant consumption), the production of the packaging required to distribute the product to the customer, and the transport and treatment by an authorised manager of the waste generated during this stage of the life cycle have been considered. Waste transport distances have been provided by plant managers, based on the location of their waste management facilities.

Module C1 – Deconstruction / demolition.

To model the demolition process of the products studied, the default values defined by *Erlandsson et al. (2015)* for building demolition are used.

Module C2: Transport to the waste treatment/recovery site.

Carton Wall waste is assumed to be transported an average distance of 80 km to the nearest waste management point, using EURO 5 trucks of 16–32 tonnes (*Erlandsson et al. 2015*).

Table 4-1. Life cycle stages and information modules according to EN 15804.

Life cycle information													Additional information	
A1 a 3			A4 - A5		B1 a 7					C1 a 4				D
Product stage			Construction process stage		Use stage					End-of-life stage				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Raw material extraction	Transport to factory	Manufacture	Transport to construction site	Construction / installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Deconstruction/demolition	Transport	Waste treatment	Disposal	Potential for reuse, recovery and/or recycling

B6. Use of energy in service

Scenario ND

X: Module evaluated

ND: Module not evaluated

B7. Use of water in service

Scenario ND

Module C3 – Waste treatment, and Module C4 – Waste disposal.

At the end of its service life, Carton Wall is sent to landfill.

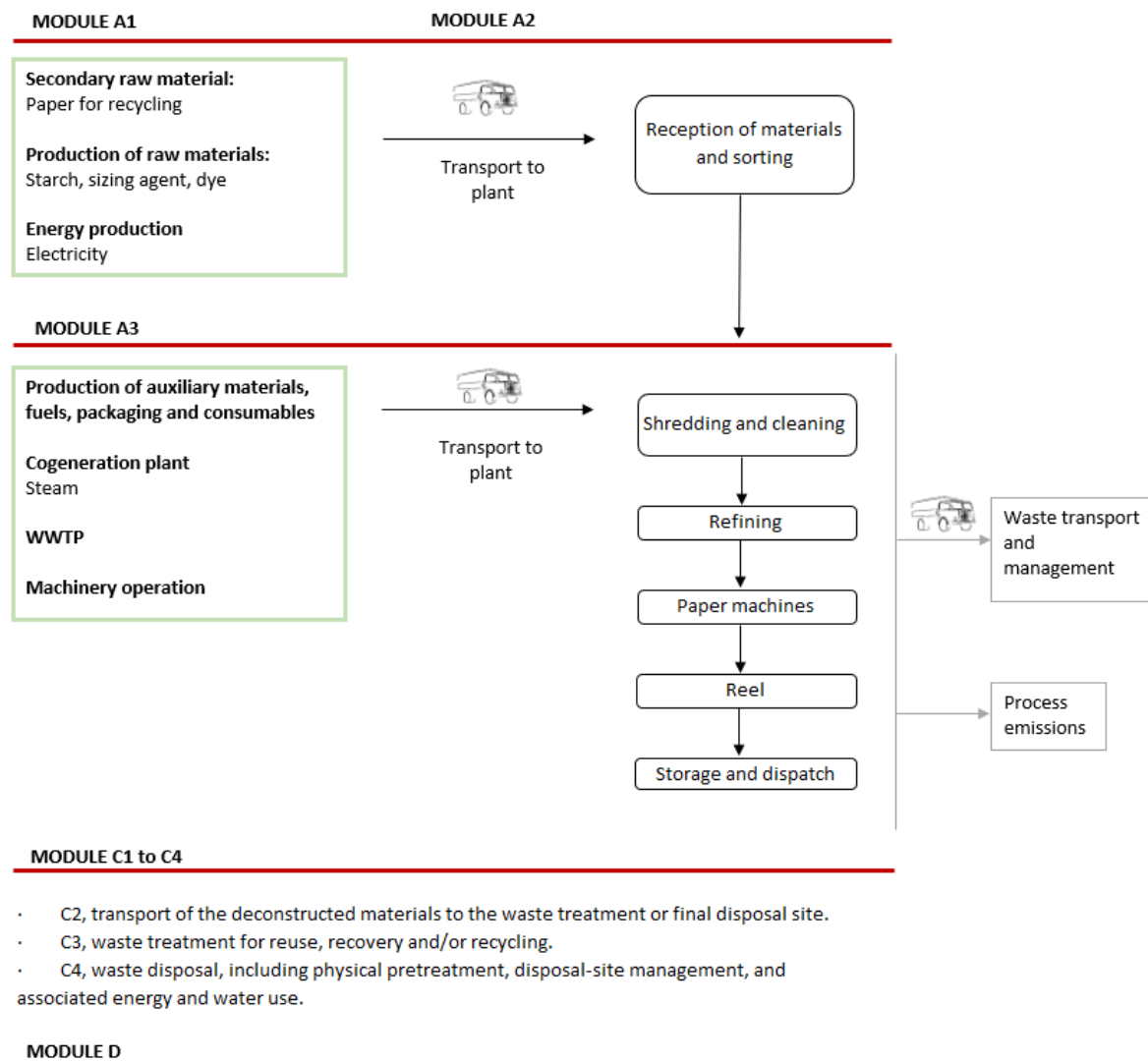
Table 4-2. Parameters for modules C1-C4

Parameter	Value / declared unit
Demolition	1,1 kWh
Collection process, specified by type	0 kg collected separately 1,000 kg collected mixed with construction waste
Recovery system, specified by type	0 kg for reuse 0 kg for recycling 0 kg for energy recovery
Disposal, specified by type	1,000 kg for landfill disposal 0 kg for incineration

Parameter	Value / declared unit
Hypotheses for the development of scenarios (for example transport)	Average distance – EURO 5 truck (16-32 ton) - incineration: 80 km - recycling and landfill: 80 km

Module D: Benefits and loads beyond the system boundary.

As there is no recovery system at the end of the service life of the product studied, the benefits beyond the system boundary are zero.



5. Declaration of LCA and LCI environmental parameters

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

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.

The EN 15804 characterization factors are based on EF 3.1.

Environmental Impacts

Parameter	A1-A3	C1	C2	C3	C4	D
GWP-total	-1.40E+03	3.75E-01	1.23E+01	0.00E+00	1.62E+03	0.00E+00
GWP-fossil	1.97E+02	3.75E-01	1.23E+01	0.00E+00	2.63E+00	0.00E+00
GWP-biogenic	-1.60E+03	1.88E-05	4.26E-04	0.00E+00	1.61E+03	0.00E+00
GWP-luluc	7.62E+00	1.54E-05	1.94E-04	0.00E+00	1.61E-04	0.00E+00
ODP	7.35E-05	5.70E-09	2.79E-07	0.00E+00	4.04E-08	0.00E+00
AP	1.96E+00	3.46E-03	3.17E-02	0.00E+00	2.38E-02	0.00E+00
EP-freshwater	1.37E-02	3.53E-07	7.57E-06	0.00E+00	2.53E-06	0.00E+00
EP-marine	5.46E-01	1.63E-03	1.21E-02	0.00E+00	1.12E-02	0.00E+00
EP-terrestrial	7.30E+00	1.79E-02	1.32E-01	0.00E+00	1.23E-01	0.00E+00
POCP	1.00E+00	5.34E-03	5.24E-02	0.00E+00	3.67E-02	0.00E+00
ADP-minerals&metals ²	4.19E-04	1.31E-08	3.20E-07	0.00E+00	9.10E-08	0.00E+00
ADP-fossil ²	2.59E+03	4.90E+00	1.63E+02	0.00E+00	3.44E+01	0.00E+00
WDP ²	1.11E+02	4.02E-03	5.36E-02	0.00E+00	2.84E-02	0.00E+00

GWP - total (kg CO₂ eq): Global warming potential; GWP - fossil (kg CO₂ eq): Global warming potential of fossil fuels; GWP - biogenic (kg CO₂ eq): Global warming potential of biogenic fuels; GWP - luluc (kg CO₂ eq): Global warming potential of land use and land-use change; ODP (kg CFC-11 eq): Stratospheric ozone depletion potential; AP (mol H⁺ eq): Acidification potential, cumulative surplus; EP-freshwater (kg P eq): Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; EP-marine (kg N eq): Eutrophication potential, fraction of nutrients reaching the final marine compartment; EP-terrestrial (mol N eq): Eutrophication potential, cumulative surplus; POCP (kg NMVOC eq): Tropospheric ozone formation potential; ADP-minerals&metals (kg Sb eq): Abiotic resource depletion potential for non-fossil resources; ADP-fossil (MJ, v.c.n): Abiotic resource depletion potential for fossil resources; WDP (m³): Water deprivation potential (user), weighted water deprivation consumption.

Additional environmental impacts

Parameter	A1-A3	C1	C2	C3	C4	D
GWP-GHG*	2.15E+02	3.75E-01	1.23E+01	0.00E+00	2.63E+00	0.00E+00
PM	1.90E-05	9.97E-08	8.16E-07	0.00E+00	6.98E-07	0.00E+00
IRP ¹	7.12E+00	4.07E-04	1.57E-02	0.00E+00	4.82E-03	0.00E+00
ETP-fw ²	5.61E+03	1.40E-01	5.83E+00	0.00E+00	9.91E-01	0.00E+00
HTP-c ²	1.76E-07	2.00E-11	8.27E-10	0.00E+00	1.47E-10	0.00E+00
HTP-nc ²	2.81E-06	3.68E-10	8.13E-08	0.00E+00	2.88E-09	0.00E+00
SQP ²	9.79E+03	8.32E-03	2.07E-01	0.00E+00	4.23E+01	0.00E+00

GWP-GHG: Global warming potential excluding biogenic carbon; PM (disease incidence): Potential for disease incidence due to particulate matter emissions; IRP (kBq U235 eq): Human exposure potential relative to U235; ETP-fw (CTUe): Comparative unit toxic potential for ecosystems - freshwater; HTP-c (CTUh): Comparative unit toxic potential for ecosystems - carcinogenic effects; HTP-nc (CTUh): Comparative unit toxic potential for ecosystems - non-carcinogenic effects; SQP (Pt): Soil quality potential index.

Notice 1: This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health, from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The ionizing radiation potential of the ground, due to radon or from some construction materials, is not measured with this parameter either.

Notice 2: The results of this indicator of environmental impact should be used with caution, since the uncertainties of the results are high and the experience with this parameter is limited.

**This indicator accounts for all greenhouse gases except for the absorption and emissions of biogenic carbon dioxide and biogenic carbon stored in the product. Therefore, the indicator is identical to the total GWP, except that the conversion factor for biogenic CO₂ is set to zero.*

Use of resources

Parameter	A1-A3	C1	C2	C3	C4	D
PERE	3.89E+03	0.00E+00	0.00E+00	0.00E+00	8.24E-01	0.00E+00
PERM*	1.67E+04	0.00E+00	0.00E+00	0.00E+00	-1.67E+04	0.00E+00
PERT	2.06E+04	1.05E-02	4.01E-01	0.00E+00	-1.67E+04	0.00E+00
PENRE	2.60E+03	4.90E+00	1.63E+02	0.00E+00	3.44E+01	0.00E+00
PENRM*	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	2.60E+03	4.90E+00	1.63E+02	0.00E+00	3.44E+01	0.00E+00
SM	1.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	2.46E+00	1.48E-04	3.16E-03	0.00E+00	1.25E-03	0.00E+00

PERE (MJ, v.c.n.): Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM (MJ, v.c.n.): Use of renewable primary energy used as raw materials; PERT (MJ, v.c.n.): Total use of renewable primary energy; PENRE (MJ, v.c.n.): Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials; PENRM (MJ, v.c.n.): Use of non-renewable primary energy used as raw materials; PENRT (MJ, v.c.n.): Total use of non-renewable primary energy; SM (kg): Use of secondary materials; RSF (MJ, v.c.n.): Use of renewable secondary fuels; NRSF (MJ, v.c.n.): Use of non-renewable secondary fuels; FW (m3): Net use of running water resources.

* The energy used as raw material was declared according to option A of PCR 2019:14.

The balance of biogenic CO₂ and energy used as raw material for packaging was calculated in modules A1-A3.

Waste categories

Parameter	A1-A3	C1	C2	C3	C4	D
HWD	3.47E-02	3.36E-05	1.08E-03	0.00E+00	2.35E-04	0.00E+00
NHWD	2.38E+02	1.75E-04	5.48E-03	0.00E+00	9.99E+02	0.00E+00
RWD	5.56E-03	2.29E-07	9.84E-06	0.00E+00	2.63E-06	0.00E+00

HWD (kg): Hazardous Waste Disposed; NHWD (kg): Non-hazardous waste disposed; RWD (kg): Radioactive waste disposed.

Output flows

Parameter	A1-A3	C1	C2	C3	C4	D
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	5.59E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	4.71E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	6.35E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU (kg): Components for reuse; MFR (kg): Materials for recycling; MER (kg): Materials for energy recovery; EEE (MJ): Electrical energy exported; EET (MJ): Thermal energy exported

6. Additional Environmental Information.

6.1. Other indicators.

The manufacture of the Carton Wall does not generate by-products.

6.2. Indoor air emissions.

The manufacturer declares that the product under study does not generate emissions into indoor air during its useful life.

6.3. Emissions to soil and water.

The manufacturer declares that the product under study does not generate significant emissions to the soil or water during its useful life.

6.4. Information on biogenic carbon content.

The biogenic carbon content of the product and packaging is declared in the following table.

Table 6-1. Biogenic carbon

Parameter	Kg C biogenic / declared unit
Product	4,40E+02
Packaging	2,09E+00

6.5. Electricity mix.

To represent the production of the electricity consumed in the plant, the GoO certificate issued by the CNMC for the year to which the data correspond has been considered:

- Eolic: 0,07%
- Solar photovoltaic: 50,25%
- Solar thermoelectric: 49,68%.

Table 6-2. Electricity mix

Mix - GWP - g CO ₂ eq/kWh	
Average Mix	17,024

6.6. Additional environmental information.

The values of the GWP-GHG indicator for 1m² of product according to grammage are detailed below:

Grammage g/m ²	GWP - GHG g CO ₂ e/m ²
120	25,77
125	26,85
130	27,92
135	28,99
140	30,07
150	32,22

Grammage g/m ²	GWP - GHG g CO ₂ eq/m ²
160	34,36
170	36,51
180	38,66
190	40,81
200	42,95
210	45,10

References

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