EPD

ENVIRONMENTAL PRODUCT DECLARATION

DIASEN

Environmental Product Declaration

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

EPD INFORMATION

Registration number of EPD(s):	EPD-IES-0030971:001
Product names:	*Finishes & Decoratives (Cork-Based) Line* Decork Mediterraneo Fine, Decork Façade, Decork Mediterraneo Deep e Decork Façade Reflex
EPD owner:	*DIASEN S.r.l.*
Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company, based on worst case results
EPD new version date:	*2026-10-02*
EPD valid until:	*2031-10-02*

GENERAL INFORMATION

The address of the programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
E-mail:	support@environdec.com

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product category rules (PCR):	PCR 2019:14 Construction products, Version 2.0.1
PCR review was conducted by:	The Technical Committee of the International EPD System. See www.environdec.com/TC for a list of members
Review chair:	Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat: www.environdec.com/contact

Third-party Verification

Independent third-party verification of the declaration and data, according to ISO 14025:2010	
☐ EPD process certification	☒ EPD verification
Third party verifier:	***Certiquality S.r.l.*** Via Gaetano Giardino, 4, 20123 - Milan Tel. +39 02 806 9171 www.certiquality.it
Accredited by:	***Accredia*** Accreditation Number: n.0027VV
Procedure for follow-up of data during EPD validity involves third party verifier	
☐ Yes	☒ No

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

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but published in different EPD programmes may not be comparable. For two EPDs to be comparable:

- they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs;
- cover products with identical functions, technical performances and use (e.g. identical declared/functional units);
- have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant);
- apply identical impact assessment methods (including the same version of characterisation factors);
- and be valid at the time of comparison.

EPDs of construction products may not be comparable if they are not compliant with EN 15804. For further information on comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: DIASEN S.R.L.

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Contact: Giulia Mengotti

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DESCRIPTION OF THE ORGANISATION

Diasen is an Italian company specialized in developing materials and innovative solutions for architecture and green building, focusing on energy efficiency and indoor comfort. The company operates in the construction materials sector, engineering thermal and acoustic insulation systems, waterproofing solutions, and coatings for public, residential, and sports buildings.

Corporate activities are driven by compliance with current environmental regulations and the mitigation of related environmental impacts.

Since 2007, Diasen has implemented an Environmental Management System certified to ISO 14001:2015, and operates in accordance with ISO 9001:2015 and ISO 45001:2018 standards. The company has achieved B Corp® certification, and completed LEED®, WELL®, and BREEAM® mapping for more than 40 products.

Manufacturing processes incorporate cork and other natural raw materials, utilizing low-environmental-impact technical solutions.

Research and Development activities focus on the utilization of production by-products or recoverable materials, as well as enhancing thermal insulation performance to lower building energy demand.

Management system-related certifications

ISO 9001:2015 – ISO 14001:2015 – ISO 45001:2018

PRODUCT INFORMATION

1

Product name	DECORK MEDITERRANEO FINE	
Product identification	See ***Table 1***	
Product description	Coloured decorative coating formulated with ultra-fine cork (0–300 µm) and clay; designed to provide mechanical resistance and water-repellency for facades and floors, featuring a textured surface. It actively contributes to the building envelope's energy balance.[1] Its elastic matrix (195% elongation at break, ISO 527-1) accommodates substrate micro-movements, providing a breathable solution classified as Fire Reaction Class **B-s_1, d_0** (UNI EN 13501-1) for interior and exterior applications.	
UN CPC code	35111 - Paints and varnishes (including enamels and lacquers) based on polymers, dispersed or dissolved in an aqueous medium (Finishes, coatings, and protective decorative paints for interior and exterior surfaces)	
Diasen product code	173	

[1] When used in combination with thermal plasters.

2

Product name	DECORK MEDITERRANEO DEEP[2)]	
Product identification	See ***Table 2***	
Product description	Coloured decorative coating formulated with fine grain cork (< 0.50 mm) and clay; designed to provide mechanical resistance and a textured surface. It actively contributes to the building envelope's energy balance.[1] Its elastic matrix accommodates crack-bridging up to 2.50 mm, providing a breathable coating classified as Fire Reaction Class **B-s_1, d_0** for interior applications.	
UN CPC code	35111 - Paints and varnishes (including enamels and lacquers) based on polymers, dispersed or dissolved in an aqueous medium (Finishes, coatings, and protective decorative paints for interior and exterior surfaces)	
Diasen product code	164	

3

Product name	DECORK FAÇADE	
Product identification	See ***Table 3***	
Product description	Coloured decorative coating formulated with fine grain cork (< 0.50 mm) and clay; engineered for mechanical resistance and water-repellency (Class W2 per UNI EN 1062-1) on exterior facades. Its elastic matrix (195% elongation at break) absorbs substrate movements to limit micro-cracking. Provides a breathable, weather-resistant coating (tested for 1680 hours of accelerated weathering per UNI EN ISO 11507) with Fire Reaction Class **B-s_1,d_0**.	
UN CPC code	35111 - Paints and varnishes (including enamels and lacquers) based on polymers, dispersed or dissolved in an aqueous medium (Finishes, coatings, and protective decorative paints for interior and exterior surfaces)	
Diasen product code	165	

4

Product name	DECORK FAÇADE REFLEX[3)]	
Product identification	See ***Table 4***	
Product description	White coating formulated with fine grain cork (< 0.50 mm) and clay, engineered for solar reflectance and facade protection. Characterized by a Solar Reflectance Index SRI = 99.5 – 100.1 (tested per ASTM E1980-11) and a Solar Reflectance SR = 0.806 (ASTM C1549-09), it reduces surface heat gain from solar radiation. Its elastic matrix provides crack-bridging capacity (1.17 mm before and 0.67 mm after freeze-thaw cycles), delivering a breathable, fire-rated coating (**B-s_1, d_0**) for exterior applications.	
UN CPC code	35111 - Paints and varnishes (including enamels and lacquers) based on polymers, dispersed or dissolved in an aqueous medium (Finishes, coatings, and protective decorative paints for interior and exterior surfaces)	
Diasen product code	136	

[2)] a.k.a DECORK ACOUSTIX
[3)] ex DECORK ALFAREFLEX

Table Section

***Table 1**: Decork Mediterraneo Fine*

Technical Feature	Value			Test method
Thermal Conductivity **λ**	0.057 W/mK			UNI EN 12667
Fire reaction	B-s_1,d_0			UNI EN 13501-1
Vapour permeability coefficient - **μ**	7			UNI EN 1062-1
Elongation at break (%)	195%			ISO 527-1
Bond strength on concrete	0,98 - 1,12 N/mm^2			UNI EN ISO 4624
Accelerated weathering test	1680 hours (10 years)			UNI EN ISO 11507
Slip Resistance Test	*Decork* sanded (s.p.[4] 400/600) + *Aquafloor ECO*	Wet surface (Barefoot)	16° classe A	DIN 51097
	Decork sanded (c.a.[4] 80/100) + *Aquafloor ECO*		11° classe A	
	Decork sanded (c.a.[4] 400/600) + *Aquafloor ECO*	Oil-covered surface (Shod)	14° classe R10	DIN 51130
	Decork sanded (c.a.[4] 80/100) + *Aquafloor ECO*		11° classe R10	
Test VOC *(see **Table 5**)*	VOC-*free*			EU Directive compliant 2004/42/CE *(EU Decopaint Directive)*
Hazardous substances	3-Iodo-2-Propynylbutylcarbamate; isoproturon (ISO); 1,2-benzisothiazol-3(2H)-one; Terbutryn; Reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) *(< 1% each)*			CE Regulation 878/2020

***Table 2**: Decork Mediterraneo Deep*

Technical Feature	Value	Test method
Thermal Conductivity **λ**	0.057 W/mK	UNI EN 12667
Fire reaction	B-s_1,d_0	UNI EN 13501-1
Vapour permeability coefficient - **μ**	15	UNI EN ISO 7783
Water permeability	Class W2	UNI EN 1062-1
Elongation at break (%)	60 %	ISO 527-1
Crack Bridging ability (mm)	2,50	-
Accelerated weathering test	1680 hours (10 year)	UNI EN ISO 11507
Test VOC *(see **Table 5**)*	VOC-*free*	EU Directive compliant 2004/42/CE *(EU Decopaint Directive)*
Hazardous substances	1,2-benzisothiazol-3(2H)-one; Reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) *(< 1% each)*	CE Regulation 878/2020

***Table 3**: Decork Façade*

Technical Feature	Value	Test method
Thermal Conductivity **λ**	0.057 W/mK	UNI EN 12667
Fire reaction	B-s_1,d_0	UNI EN 13501-1
Vapour permeability coefficient - **μ**	15	UNI EN ISO 7783
Water permeability	Class W2	UNI EN 1062-1
Elongation at break (%)	195 %	ISO 527-1

[4] s.pa. = Sandpaper

Crack Bridging ability (mm)	2,50	-
Adhesion test on concrete	0,98 - 1,12 N/mm^2	UNI EN ISO 4624
Accelerated weathering test	1680 hours (10 year)	UNI EN ISO 11507
Test VOC *(see **Table 5**)*	VOC-*free*	EU Directive compliant 2004/42/CE *(EU Decopaint Directive)*
Hazardous substances	3-Iodo-2-Propynylbutylcarbamate; isoproturon (ISO); 1,2-benzisothiazol-3(2H)-one; Terbutryn; Reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) *(< 1% each)*	CE Regulation 878/2020

***Table 4**: Decork Façade Reflex*

Technical Feature	Value				Test method
Thermal Conductivity **λ**	0.086 W/mK				UNI EN 12667
Fire reaction	B-s_1,d_0				UNI EN 13501-1
Vapour permeability coefficient - **μ**	Class W2				UNI EN 1062-1
Elongation at break (%)	60 %				ISO 527-1
Crack Bridging ability (mm)	1,17 *0,67 after freeze-thaw cycles*				UNI EN 1542
Accelerated weathering test	1680 hours (10 years)				UNI EN ISO 11507
Viscosity a 23 °C (mPa×s)	50000 – 65000 *Brookfiled DV-E*				UNI EN ISO 2555
Test VOC *(see **Table 5**)*	VOC-*free*				EU Directive compliant 2004/42/CE *(EU Decopaint Directive)*
Thermo-Optical Properties	SR *(Solar Reflectance)*	0.806 ± 0.010			ASTM C 1549-09
	IE (Infrared Emittance)	0.840			UNI EN 15976:2011
	SRI % (Solar Reflectance Index)	*Low wind*	*Medium wind*	*High wind*	ASTM E 1980-11
		99.5	99.8	100.1	
Hazardous substances	3-Iodo-2-Propynylbutylcarbamate; isoproturon (ISO); 1,2-benzisothiazol-3(2H)-one; Terbutryn; Reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) *(< 1% each)*				CE Regulation 878/2020

***Table 5:** VOC test results for "Decork" Line*

Technical Feature	Value			Test method
Organic Volatile Compounds (VOC) Test	**CDPH** (Standard Method)		Pass	CDPH/EHLB/Standard Method V1.2 (2017)
	Indoor Air Comfort GOLD®		Pass	Indoor Air Comfort GOLD® *(v7.0, 2020)*
	LEED v4 e v4.1 BETA		Compliant	LEED v4 and v4.1 BETA (2021)
	BREEAM	*International*	Compliant	BREEAM International *(New Construction 2016)*
		NOR	Compliant	BREEAM-NOR (2016)
	French Regulation		A+	DEVL1101903D and DEVL1104875A
	CAM Edilizia (Italy)		Pass	CAM Edilizia 11/10/2017
	AgBB / **ABG** (Germany)		Pass	AgBB 2011 and ABG norm
	Belgian Regulation		Pass	C-2014/24239

Additional Relevant Information

The products *Decork Mediterraneo Deep*, *Decork Façade* and *Decork Façade Reflex*, are supplied in plastic buckets containing an amount of product of 18 kg. *Decork Mediterraneo Fine* is supplied in plastic buckets containing an amount of product of about 10 kg.

References to any relevant websites for more information or explanatory materials

For more information, please refer to www.diasen.com

MANUFACTURING

The manufacturing process begins with the receipt and storage of raw materials from suppliers. Depending on their characteristics, materials arrive in plastic or metal buckets, kraft paper and plastic bags, or unpackaged in bulk; the latter are stored directly in dedicated silos.

These materials are fed into the liquid production mixer either automatically or manually. Packaged ingredients stored in the warehouse are subsequently transported to the mixing station via electric forklifts. For cork-based products, the raw cork undergoes a preliminary milling stage before being transferred to the final production phase.

Production is a batch (discontinuous) process where all components are mechanically blended. The finished product is then packaged in buckets, palletized on wooden pallets, secured with a protective polymer hooding film, and stored in the finished goods warehouse. Quality control is strictly performed both during production and prior to shipment.

This manufacturing process requires water and operates virtually as a closed-loop system, generating no material scraps. Water from the municipal aqueduct is used exclusively to clean the mixer between different production cycles and is subsequently discharged as industrial wastewater. For further details, please refer to the *Preliminary Production Phase Outline* for the *Cork-Based Finishes and Decoratives Line* (***Figure 1***).

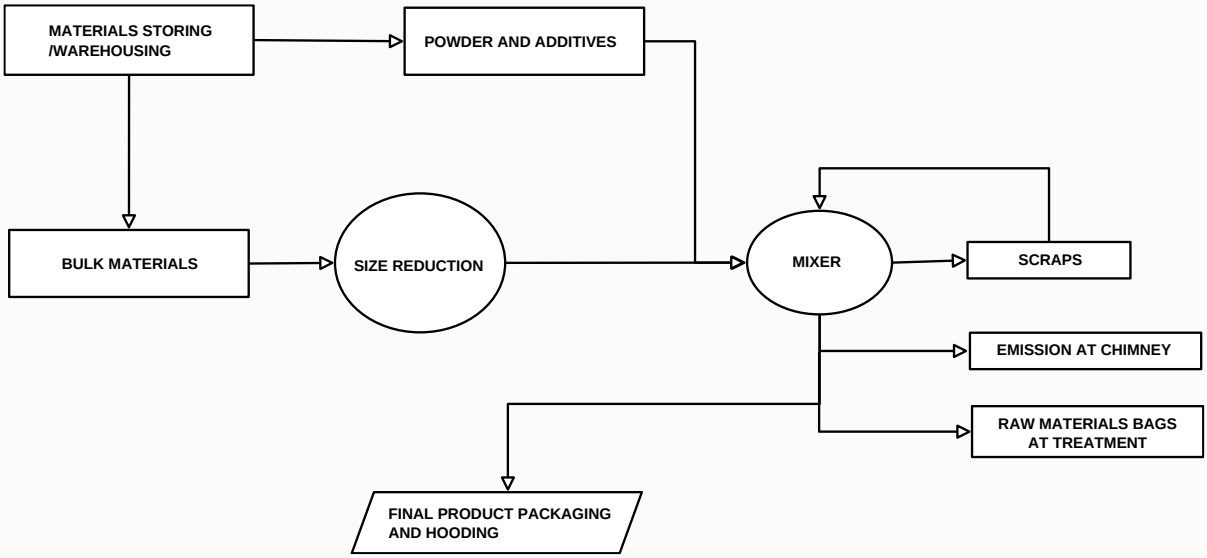

Figure 1: *Preliminary scheme of the* ***cork-based Finishes and Decoratives*** *Line production's phase*

CONTENT DECLARATION

Table 6: *Content declaration and substances list for the cork-based Finishes and Decoratives Line (the indicated mass values refer to the minimum and maximum found among all products included in the EPD)*

Product content	Mass, kg	Post-consumer recycled material mass % of product	Biogenic material mass % of product	Biogenic material kgC/product or declared unit
Cork	4.79×10^{-2} – 8.98×10^{-2}	4.79 – 8.98	2.59 –4.85	2.59×10^{-2} – 4.85×10^{-2}
Water	0.206 – 0.316	0	0	0
Quartz	6.39×10^{-2} – 0.138	0	0	0
Talcum powder	2.66×10^{-2} – 0.11	0	0	0
Kaolin	0.00 – 5.56×10^{-2}	0	0	0
Titanium dioxide	0.00 – 0.153	0	0	0
Acrylic resins	0.381 – 0.44	0	0	0
Cellulose fibers	0.00 – 1.87×10^{-2}	0	0 – 1.87	0 – 6.88×10^{-3}
Organic Additives	2.76×10^{-2} – 4.53×10^{-2}	0	0	0
Inorganic Additives	0 – 7.37×10^{-2}	0	0	0 – 3.88×10^{-2}

Table 7: *Content declaration and substances list for the used packaging of the cork-based Finishes and Decoratives Line.*

Packaging materials	Mass, kg	Mass % (versus the product)	Biogenic material kg C/product or declared unit
Wood	3.90×10^{-2} – 4.35×10^{-2}	3.90 – 4.35	1.53×10^{-2} – 1.71×10^{-2}
PP bucket	4.96×10^{-2} – 0.106	4.96 – 11.00	0
LDPE Film	6.30×10^{-4} – 7.00×10^{-4}	0.06 – 0.07	0

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Table 8: *Content of hazardous substances used in the cork-based Finishes and Decoratives Line.*

Declaration of Hazardous substances	EC No.	CAS No.	Mass % per product or declared unit
Acrylic resins	Not relevant	9063-87-0	38.00 – 44.00
Inorganic Additives	Not relevant	93763-70-3	0.00 – 4.00
	231-784-4	7727-43-7	
Organic Additives	220-120-9	2634-33-5	2.70 – 5.00
	212-950-5	886-50-0	
	259-627-5	55406-53-6	
	251-835-4	34123-59-6	
	Not relevant	55965-84-9	

The products are not classified as hazardous to human health or the environment in accordance with Regulation (EC) No **878/2020** (CLP). They do not contain any substances included in the Candidate List of Substances of Very High Concern (SVHC) for Authorization, nor any substances listed in Annex XIV (Authorization List) issued by the European Chemicals Agency (ECHA). Under normal storage and use conditions, these products can be handled without any specific precautions or personal protective equipment (PPE). The detailed composition of the products constitutes DIASEN S.r.l. proprietary know-how and remains strictly confidential.

LCA INFORMATION

The environmental performance of the products was assessed using the Life Cycle Assessment (LCA) method in accordance with the **EN ISO 14044:2021** standard. The Life Cycle Impact Assessment (LCIA) was performed according to the **EN 15804:2012+A2:2019** standard, which served as the core PCR. In this regard, the Product Category Rules (PCR) **2019:14** "Construction products" (**Version 2.0.1**) was used as the primary reference document

Among the other reference standards, the following ones have been taken into account for the development of the LCA and the LCIA other than to carry out this EPD:

- ISO 14025:2010 - Environmental labels and declarations - Type III environmental declarations – Principles and procedures;
- ISO 15942:2021 - Sustainability of construction works — Environmental product declarations — Communication format business-to-business;
- ISO 14020:2023 - Environmental labels and declarations — General principles;
- General Programme Instructions For The International EPD System - Version 5.0 2024-06-19;

The results of the estimated environmental impacts are relative statements and do not indicate the endpoints of impact categories, the exceeding of threshold values, safety margins, or risks. Although the specific properties of the various products may differ slightly, their fields of application are substantially equivalent.

Furthermore, each product can perform multiple functions or deliver varying levels of performance within a building component, making the definition of a single, specific functionality for each item highly complex. For this reason, and in accordance with the reference standards, a declared unit has been adopted instead of a functional unit.

For all products covered by this EPD, the declared unit is defined as **1.00 kg of product**, ready for sale and transport to the end-user (builder). This includes its packaging (bucket), along with its proportional share of plastic protective film, palletized on the Euro-pallet used for transport.

Finally, it should be noted that the manufacturing of all investigated systems takes place exclusively at the Diasen production plant in Sassoferrato (AN), Italy. Multiple products are included in the same EPD as they share the same core PCR, are manufactured by the same company, and undergo the same production process.

Declared unit

1 kg of product as liquid product mix is defined as Declared Unit (DU).

Reference service life

The environmental impact of 1 kg of liquid product (packaging included) for each products involved is described. According to the system boundary of this EPD, a Reference Service Life has not been provided.

Time representativeness

Data are referred to the production carried out in 2025 and have been provided by DIASEN S.R.L. Also, data regarding the geographic origin of any raw materials, packaging materials etc. have been provided, as well as the transportation media.

Database and LCA software used

Ecoinvent 3.11 used as a database and **SimaPro Version 10.3.0** as a software.

Geographical scope

Global.

Description of system boundaries

Cradle to gate (A1–A3) with the addition of Modules C1-C3 and Module D.

Within each of the assessed life cycle stages, all material and energy input and output flows have been included. No raw materials or components have been omitted, regardless of their individual contribution to the overall environmental impact or to any specific impact indicators. Lifecycle modules that were not evaluated in this LCA are explicitly marked as **"ND" (Not Declared)**, as shown in ***Table 9***.

Table 9: *Reporting table for cork-free Finishes and Decoratives Line.*

	Product stage				Distribution / installation stage				Use stage				End of life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	ND	X
Geography	GLO	GLO	IT	GLO	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	ND	X
Share of primary data	6.92 - 21.31 %			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Variation products	< 10 %			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Variation sites	0 %			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Cut-off criteria

The consumption of raw materials and energy related to ordinary and extraordinary maintenance operations was included, as well as energy consumption associated to illumination and heating of personnel, despite they were not relevant to environmental impact calculations.

No consumption of auxiliary materials and waste related to extraordinary activities (A3), having a periodicity exceeding 3 years, take place.

Allocation criteria

Each manufacturing cycle yields a single product output, with no co-products or by-products generated. Furthermore, since the manufacturer provided primary data regarding material and energy consumption, as well as scraps and waste, no allocation procedures were required.

Production is carried out strictly on a batch-by-batch basis (discontinuous process), even under steady-state operating conditions; therefore, only one specific product is manufactured inside the facility at any given time. After a straightforward cleaning procedure, the same equipment can be seamlessly used to process a completely different material.

Data quality

As previously stated, the background data used in this EPD were retrieved from the **Ecoinvent 3.11 database**, and **SimaPro 10.3.0** software was utilized for inventory modelling. The geographical reference is Italy or, where necessary, Central Europe, while the datasets used span the last 5 years.

Data collection involved analyzing internal production and environmental data from the Diasen S.r.l. manufacturing site, acquiring site-specific data for all production processes included in the LCA, and mapping the energy sources utilized (modeled via the Italian Residual Mix).[10] Regarding raw materials, the most relevant datasets are either European averages or specific to the suppliers.

The reference time period for all inventory data (product composition, transport, production rates, etc.) is 2025. Background data are based on EPDs compliant with EN 15804 and recognized LCA databases.

The data quality of the raw materials in A1 is presented in ***Table 10***.

Table 10: *Data quality of the raw materials in A1*

Material	Source	Quality	Reference year
Virgin Cork	Diasen	Ecoinvent 3.11	2025
Water	Diasen	Ecoinvent 3.11	2025
Expanded materials (Perlite, Pumice, etc.)	Diasen	Ecoinvent 3.11	2025
Kaolin	Diasen	Ecoinvent 3.11	2025
Quartz	Diasen	Ecoinvent 3.11	2025
Additives (Organic and Inorganic)	Diasen	Ecoinvent 3.11	2025
Acrylic resins	Diasen	Ecoinvent 3.11	2025
Packaging (Pallet, Bags, Film)	Diasen	Ecoinvent 3.11	2025

Data Quality Indicators (DQIs) are assessed based on five categories on a scale from 1 (excellent) to 5 (poor) (***Table 11***). In compliance with the extended system boundaries defined for this product (*Cradle-to-Grave*), the overall average score for the entire product line is **(1.8, 1.1, 1.2, 1.0, 1.7)**. The excellent methodological quality is reflected in the ideal scores for completeness and geographical correlation (1.1 and 1.0, respectively) and in the freshness of the temporal data (1.2). An expected increase in values is observed in the indicator for source reliability (1.8) and further technological correlations (1.7), motivated by the necessary reliance on secondary datasets and predictive literature scenarios for modeling the end-of-life stages (C1-C4 and D) and complex chemical components (such as acrylic resins).

Table 11: *Data Quality Indicators (DQIs) for the* ***cork-free Finishes and Decoratives Line***

Flow Category	***Approach / Data Source***	***DQIs*** *(Min – Max Range)*					***Qualitative Assessment***
		Reliability	Completeness	Temporal correlation	Geographical correlation	Further technological correlation	
Materials, Energy and Process (A1-A3)	Primary factory data and specific datasets	1.5	1.1	1.1	1.0	1.5	Excellent / Good
End of Life and Transport (C1-C4, D)	Scenario datasets from PCR and literature (Ecoinvent)	4.0	1.0	2.0	1.0	3.0	Good / Acceptable

Manufacturing operations are powered by an energy mix, of which **19.10%** is self–produced via a proprietary photovoltaic plant. The remaining **80.90%** is purchased from the national grid and has been modelled using the Italian Residual Mix.

The related details have been summarized in ***Table 12***.

Table 12: *Details on the used Electricity mix*

	Data Source			GWP-GHG	Unit
Diasen Electricity Mix	Diasen photovoltaic	Residual Mix (AIB)	Ecoinvent 3.11	0.486	Kg CO_2 eq./kWh

Table 13: *Share of primary data of the GWP-GHG*

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of product	Collected data	EPD owner	2025	Primary data	0%
Generation of electricity used in manufacturing of product	Collected data and Database	EPD Owner and AIB Residual Mix	2025	Primary data	6.92 - 21.31 %
Input Raw materials	Collected data	EPD Owner Ecoinvent 3.11	2025	Primary data, Secondary data	0%
Other processes	Databases	Ecoinvent 3.11	2025	Secondary data	0%
Total share of primary data, of GWP-GHG results for A1-A3					6.92 - 21.31 %

The share of primary data is calculated based on the GWP-GHG results. This simplified data quality indicator is intended to encourage the use of primary data, thereby enhancing both the representativeness and the comparability of EPDs. Please note that this indicator does not capture all aspects of data quality and is not comparable across different product categories.

ENVIRONMENTAL PERFORMANCE

This section presents the environmental profiles of the products covered by this EPD, calculated using the LCA methodology. In accordance with the system boundaries defined for this study, a "Cradle-to-gate with modules C1-C4 and module D" approach has been adopted, thereby including stages A1–A3, C1–C4, and D. All calculations were performed using compliant software tools, as required by the EPD Programme General Instructions.

LCA RESULTS OF THE PRODUCT – WORST CASE

The estimated impact results are relative statements and do not indicate the endpoints of impact categories, the exceeding of threshold values, safety margins, or potential risks. The characterization factors applied are based on the **Environmental Footprint (EF) 3.1 methodology**. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product's stage (modules A1-A3). Regarding the mandatory impact indicators — specifically biogenic carbon dioxide — the biogenic carbon leaving the product system in subsequent lifecycle stages not included in this study (such as A5 and C, in accordance with the PCR guidelines) has already been balanced out within modules A1–A3.

Disclaimer 1: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator;

Disclaimer 2: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 14: *Mandatory impact category indicators according to EN 15804+A2:2019*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1.99	$3.77x10^{-3}$	$4.22x10^{-3}$	0.17	$6.04x10^{-4}$	$-6.47x10^{-3}$
GWP-fossil	kg CO_2 eq.	2.15	$3.77x10^{-3}$	$4.22x10^{-3}$	$2.74x10^{-3}$	$6.03x10^{-4}$	$-6.46x10^{-3}$
GWP-biogenic	kg CO_2 eq.	-0.17	$3.67x10^{-6}$	$9.67\ x10^{-7}$	0.17	$5.88x10^{-7}$	$-6.43x10^{-6}$
GWP-luluc	kg CO_2 eq.	$2.62x10^{-3}$	$9.89x10^{-7}$	$1.51x10^{-6}$	$5.10x10^{-7}$	$1.58x10^{-7}$	$-6.67x10^{-6}$
ODP	kg CFC 11 eq.	$5.29x10^{-6}$	$5.48x10^{-11}$	$9.23x10^{-11}$	$5.28x10^{-11}$	$8.78x10^{-12}$	$-3.63x10^{-11}$
AP	mol H^+eq.	$1.05x10^{-2}$	$4.52x10^{-5}$	$1.40x10^{-5}$	$2.10x10^{-5}$	$7.22x10^{-6}$	$-4.85x10^{-5}$
EP-freshwater	kg P eq.	$6.24x10^{-4}$	$2.16x10^{-7}$	$2.98x10^{-7}$	$3.28x10^{-7}$	$3.45x10^{-8}$	$-1.76x10^{-6}$
EP-marine	kg N eq.	$1.84x10^{-3}$	$2.02x10^{-5}$	$4.74x10^{-6}$	$8.47x10^{-6}$	$3.23x10^{-6}$	$-1.41x10^{-5}$
EP-terrestrial	mol N eq.	$1.83x10^{-2}$	$2.21x10^{-4}$	$5.16x10^{-5}$	$9.23x10^{-5}$	$3.54x10^{-5}$	$-1.63x10^{-4}$
POCP	kg NMVOC eq.	$9.60x10^{-3}$	$6.20x10^{-5}$	$2.21x10^{-5}$	$2.69x10^{-5}$	$9.93x10^{-6}$	$-4.83x10^{-5}$
ADP-minerals &metals*	kg Sb eq.	$1.12x10^{-5}$	$1.43x10^{-8}$	$1.19x10^{-8}$	7.49×10-9	$2.29x10^{-9}$	$-4.09x10^{-8}$
ADP-fossil*	MJ	41.68	$4.95x10^{-2}$	$6.35x10^{-2}$	$4.08x10^{-2}$	$7.91\ x10^{-3}$	$-9.16x10^{-2}$
WDP*	m^3	0.79	$1.18x10^{-4}$	$2.80x10^{-4}$	$1.66x10^{-4}$	$1.89x10^{-5}$	$-7.07x10^{-3}$
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

Table 15: *Additional mandatory and voluntary impact category indicators*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	1.90	3.77×10^{-3}	4.20×10^{-3}	2.71×10^{-3}	6.03×10^{-3}	-6.39×10^{-3}
Note	This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide were updated in line with the guidance of PCR 2019:14 Construction products, version 2.0.1 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.						

Table 16*: Resource use indicators*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	10.83	5.51×10^{-4}	9.52×10^{-4}	3.57	8.82×10^{-5}	-5.01×10^{-3}
PERM	MJ	3.57	0.00	0.00	-3.57	0.00	0.00
PERT	MJ	14.40	5.51×10^{-4}	9.52×10^{-4}	1.30×10^{-3}	8.82×10^{-5}	-5.01×10^{-3}
PENRE	MJ	40.04	5.12×10^{-2}	6.56×10^{-2}	7.50×10^{-2}	1.47×10^{-2}	-8.34×10^{-2}
PENRM	MJ	2.91	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	42.96	5.12×10^{-2}	6.56×10^{-2}	7.50×10^{-2}	1.47×10^{-2}	-8.34×10^{-2}
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	2.88×10^{-3}	4.02×10^{-7}	3.20×10^{-6}	4.76×10^{-7}	1.16×10^{-7}	-4.82×10^{-6}
FW	m^3	0.78	1.20×10^{-4}	2.81×10^{-4}	1.70×10^{-4}	1.91×10^{-5}	-7.08×10^{-3}
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy r×10-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

***Table 17** : Waste indicators*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	0	0.00	0.00	0.00	0.00	0.00
NHWD	kg	2.91	0.00	0.00	0.00	0.00	0.00
RWD	kg	3.62×10^{-5}	6.04×10^{-9}	1.70×10^{-8}	4.80×10^{-8}	9.67×10^{-10}	-8.76×10^{-8}
Acronyms	HWD = Hazardous waste disposed; NHWD =Non azardous waste disposed; RWD = Radiactive waste disposed;						

***Table 18** : Output flow indicators*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
CRU	kg	0.00	0.00	0.00	0.00	ND	0.00
MFR	kg	0.00	0.00	0.00	0.00	ND	0.60
MER	kg	0.00	0.00	0.00	0.00	ND	0.00
EEE	MJ	0.00	0.00	0.00	0.00	ND	0.00
EET	MJ	0.00	0.00	0.00	0.00	ND	0.00
Acronyms	CRU = Componentsfor r×10-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy;						

***Table 19:** Additional environmental performance indicators according to EN 15804+A2:2019*

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidence	3.31×10^{-8}	8.80×10^{-11}	4.27×10^{-10}	8.29×10^{-11}	1.41×10^{-11}	-8.21×10^{-10}
IRP[1]	kBq U235 eq.	6.62×10^{-2}	2.46×10^{-5}	6.91×10^{-5}	1.71×10^{-4}	3.93×10^{-6}	-3.86×10^{-4}
ETP-fw[2]	CTUe	10.81	4.22×10^{-3}	7.23×10^{-3}	5.45×10^{-3}	6.76×10^{-4}	-2.23×10^{-2}
HTP-c[2]	CTUh	6.02×10^{-10}	4.53×10^{-13}	6.89×10^{-13}	5.46×10^{-13}	7.25×10^{-14}	-2.89×10^{-12}
HTP-nc[2]	CTUh	1.09×10^{-7}	1.38×10^{-11}	3.97×10^{-11}	1.70×10^{-11}	2.21×10^{-12}	-6.60×10^{-11}
SQP	-	12.51	3.78×10^{-3}	6.21×10^{-2}	8.62×10^{-3}	6.04×10^{-4}	-8.25×10^{-2}
Acronyms	PM = Particulate matter Emission; IRP = Ionizing radiation, human health; ETP-fw = Ecotoxicity (Freshwater); HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Soil quality potential/Land use related impacts;						

***Table 20:** End-of-life scenario - recovery and landfill*

Indicator	**% Recovery**					**% Landfill**				
	100%					100%				
	C1	C2	C3	C4	D	C1	C2	C3	C4	D
Climate change	$3,77\times10^{-3}$	$4,22\times10^{-3}$	$2,75\times10^{-3}$	0,00	$-8,09\times10^{-3}$	$3,77\times10^{-3}$	$4,22\times10^{-3}$	0,00	$7,78\times10^{-3}$	0,00
Climate change - Biogenic	$3,67\times10^{-6}$	$9,67\times10^{-7}$	$1,59\times10^{-6}$	0,00	$-8,03\times10^{-6}$	$3,67\times10^{-6}$	$9,67\times10^{-7}$	0,00	$6,32\times10^{-6}$	0,00
Climate change - Fossil	$3,77\times10^{-3}$	$4,22\times10^{-3}$	$2,74\times10^{-3}$	0,00	$-8,07\times10^{-3}$	$3,77\times10^{-3}$	$4,22\times10^{-3}$	0,00	$7,77\times10^{-3}$	0,00
Climate change - Land use and LU change	$9,89\times10^{-7}$	$1,51\times10^{-6}$	$5,10\times10^{-7}$	0,00	$-8,34\times10^{-6}$	$9,89\times10^{-7}$	$1,51\times10^{-6}$	0,00	$3,40\times10^{-6}$	0,00
Ozone depletion	$5,48\times10^{-11}$	$9,23\times10^{-11}$	$5,28\times10^{-11}$	0,00	$-4,53\times10^{-11}$	$5,48\times10^{-11}$	$9,23\times10^{-11}$	0,00	$2,24\times10^{-10}$	0,00
Acidification	$4,52\times10^{-5}$	$1,40\times10^{-5}$	$2,10\times10^{-5}$	0,00	$-6,07\times10^{-5}$	$4,52\times10^{-5}$	$1,40\times10^{-5}$	0,00	$6,84\times10^{-5}$	0,00
Eutrophication, freshwater	$2,16\times10^{-7}$	$2,98\times10^{-7}$	$3,28\times10^{-7}$	0,00	$-2,20\times10^{-6}$	$2,16\times10^{-7}$	$2,98\times10^{-7}$	0,00	$4,86\times10^{-6}$	0,00
Eutrophication, marine	$2,02\times10^{-5}$	$4,74\times10^{-6}$	$8,47\times10^{-6}$	0,00	$-1,77\times10^{-5}$	$2,02\times10^{-5}$	$4,74\times10^{-6}$	0,00	$2,28\times10^{-5}$	0,00
Eutrophication, terrestrial	$2,21\times10^{-4}$	$5,16\times10^{-5}$	$9,23\times10^{-5}$	0,00	$-2,04\times10^{-4}$	$2,21\times10^{-4}$	$5,16\times10^{-5}$	0,00	$2,48\times10^{-4}$	0,00

Photochemical ozone formation	$6,20\times10^{-5}$	$2,21\times10^{-5}$	$2,69\times10^{-5}$	0,00	$-6,03\times10^{-5}$	$6,20\times10^{-5}$	$2,21\times10^{-5}$	0,00	$8,69\times10^{-5}$	0,00
Resource use, minerals and metals	$1,43\times10^{-8}$	$1,19\times10^{-8}$	$7,49\times10^{-9}$	0,00	$-5,12\times10^{-8}$	$1,43\times10^{-8}$	$1,19\times10^{-8}$	0,00	$1,33\times10^{-8}$	0,00
Resource use, fossils	$4,95\times10^{-2}$	$6,35\times10^{-2}$	$4,08\times10^{-2}$	0,00	-0,11	$4,95\times10^{-2}$	6,35×10-2	0,00	0,19	0,00
Water scarcity	$1,18\times10^{-4}$	$2,80\times10^{-4}$	$1,66\times10^{-4}$	0,00	$-8,83\times10^{-3}$	$1,18\times10^{-4}$	$2,80\times10^{-4}$	0,00	$-2,88\times10^{-2}$	0,00
GHG	$3,77\times10^{-3}$	$4,20\times10^{-3}$	$2,71\times10^{-3}$	0,00	$-7,99\times10^{-3}$	$3,77\times10^{-3}$	$4,20\times10^{-3}$	0,00	$7,72\times10^{-3}$	0,00

DECLARATION OF THE VARIATION IN RESULTS

This EPD is characterized by high variability among the majority of the calculated impact indicators, with variations exceeding 10%. In accordance with **PCR 2019:14 "Construction products" (Version 2.0.1),** this variation has been formally declared within the EPD. The specific percent variations between the highest and lowest impacts across the included products are detailed in the tables below for both the core environmental indicators and the GWP-GHG indicator.

Table 21: *Environmental Impacts Results Variation*

Indicator	A1-A3 Results variation (%)
GWP-total	85.97
GWP-fossil	99.40
GWP-biogenic	85.95
GWP-luluc	97.23
ODP	98.38
AP	87.31
EP-freshwater	89.26
EP- marine	90.28
EP-terrestrial	88.85
POCP	82.06
ADP-minerals & metals	86.78
ADP-fossil	82.20
WDP	82.87
PERE	79.89
PERM	79.89
PERT	81.33
PENRE	96.37
PENRM	81.03
PENRT	98.44
NRSF	83.04
FW	89.78
PM	87.48
IRP	92.48
ETP-fw	92.17
HTP-c	53.41
HTP-nc	62.16
SQP	100.00
NHWD	92.65
RWD	87.75

Table 22: *GWP-GHG Impacts Results Variation*

Indicator	Unit	A1-A3 Results variation (%)
GWP-GHG	Kg CO_2eq.	87.67

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VERSION HISTORY

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