epd-norway
Global Program Operator

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2

Secil Betão, S.A. - Linhó
UniDren®

Owner of the declaration
Secil Betão, S.A. - Linhó
Impasse Fernão Lopes
2710-692 Sintra
Portugal

Product
UniDren®

Declared product / Declared unit
1 m³

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 020 PART B for concrete and concrete elements (v3.0)

Program operator:
EPD Norway
Majorstuen P.O. Box 5250
N-0303 Oslo
Norway

Declaration number
NEPD-10220-10220-2

Registration number
NEPD-10220-10220-2

Issue date
25.08.2025

Valid to
24.08.2030

EPD Software
Emidat EPD Tool v1.0.0

General Information

Product
UniDren®

Program Operator
EPD Norway
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Email: post@epd-norge.no

Declaration Number
NEPD-10220-10220-2

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 020 PART B for concrete and concrete elements (v3.0)

Statements
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit
1 m^3

General information on verification of EPD from EPD tools
Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPDNorway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

Verification of EPD tool
Charlotte Merlin, FORCE Technology
(no signature required)

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Impasse Fernão Lopes
2710-692 Sintra, Portugal

Place of production
Sintra, Portugal

Management system
ISO 9001, ISO 14001

Organisation no
23630

Issue date
25.08.2025

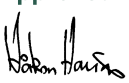
Valid to
24.08.2030

Year of study
2024

Comparability
EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database (including primary and secondary data).

Development and verification of EPD
The declaration was created using the Emidat EPD tool v1.0, developed by Emidat GmbH. The EPD tool has been approved by EPD Norway.

Developer of EPD: Daniela Faisca
Reviewer of company-specific input data and EPD: Raquel Sofia Venâncio Madeira do Nascimento Paulo

Approved

Håkon Hauan, CEO EPD-Norge

Product

Product description

Permeable Concrete is a environmentally friendly concrete mix designed to allow water to flow through the surface, facilitating natural drainage. The mixture is composed of high-quality aggregates, cement, and additives that create voids within the concrete structure. These voids enable water infiltration, reducing runoff and helping to prevent flooding. Ideal for areas that require stormwater management, it offers an eco-efficient solution for sustainable construction.

Key Features:

- High porosity for efficient water drainage
- Reduces surface water runoff and prevents flooding
- Environmentally friendly, promoting sustainable construction practices
- Supports urban green spaces and improved water quality
- Low maintenance
- Non-slip
- Can be produced in various colors

UniDren® is specially designed for:

- Outdoor areas in general
- Pathways and pedestrian traffic areas
- Cycle paths
- Parks, squares, terraces, and gardens
- Access routes and forest paths
- Urban planning arrangements.

Product specification

Name of ingredient	Share of total weight	Country of origin
Admixtures	0 - 2 %	Portugal
Aggregates	50 - 80 %	Portugal
Cement	10 - 25 %	Portugal
Water	2 - 10 %	Portugal

Technical data

	Unit	Value
Gross Density	kg / m³	1940.4
Compressive Strength (Cylinder)	N / mm²	23.2
Compressive Strength (Cube)	N / mm²	29.0

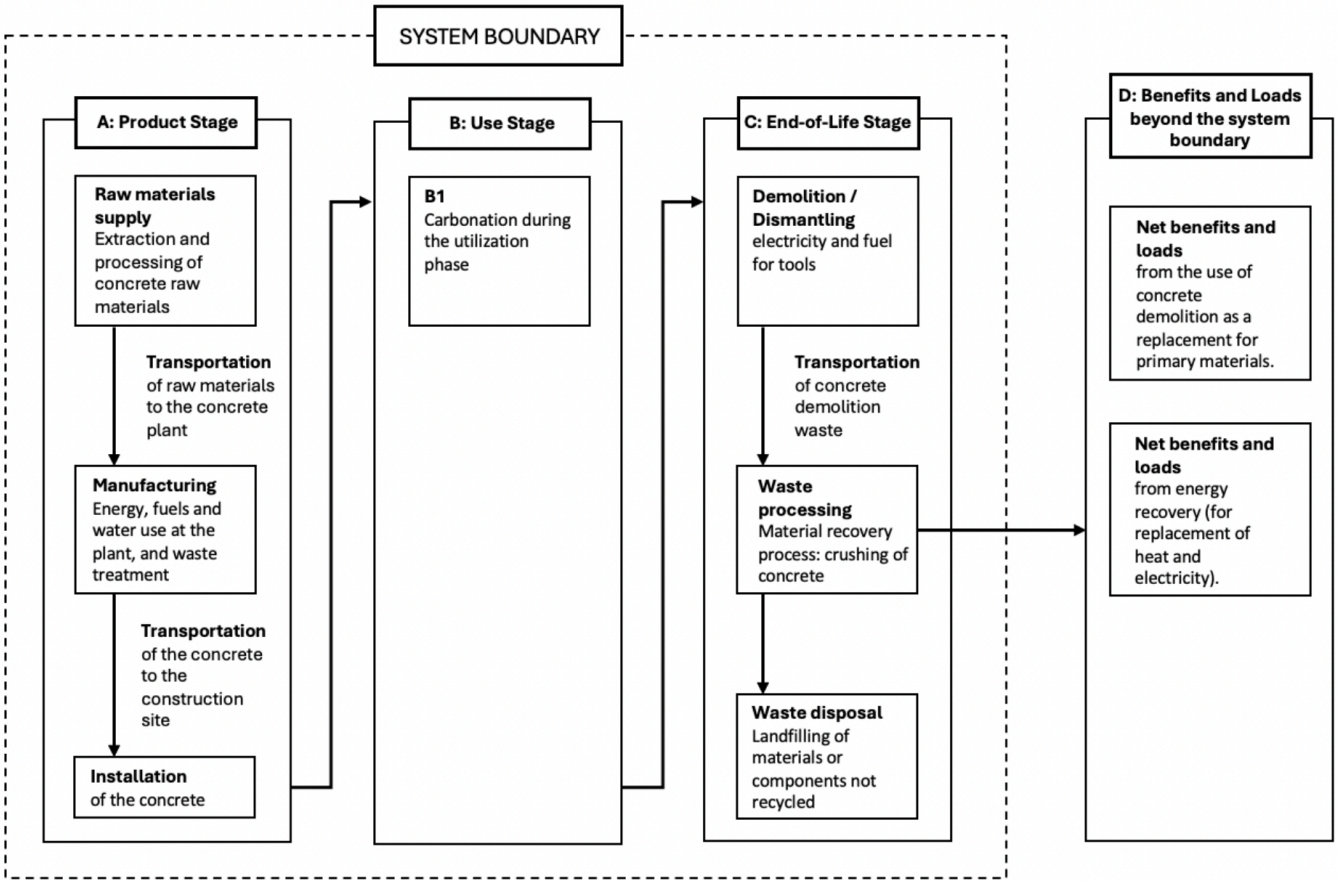
Market
Portugal

LCA: Calculation rules

Declared unit
1 m^3

Reference service life
50 years

System boundary



Data quality
The foreground data are based on extensive and detailed data collection at the production site of the manufacturer, covering key processes such as raw material sourcing, formulation, and manufacturing. These foreground data are fully linked with corresponding datasets from the background database (ecoinvent 3.10) or with EN15804+A2-compliant EPDs, ensuring consistency, reliability, and maintaining alignment with the latest industry standards.
The overall data representativeness is rated as good with an overall score of 3.92/5, in accordance with EN 15804+A2 Annex E guidance on data quality assessment, considering geographical, technical, and temporal representativeness.

System boundaries (X=included, MND=module not declared)

	Production			Installation		Use stage							End-of-Life				Next product system
	Raw material supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and loads beyond the system boundary
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	x	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography			PT	PT	PT	PT	MND	MND	MND	MND	MND	MND	PT	PT	PT	PT	PT

For the geographies modeled in A1 and A2, refer to *Product specification*.

Type of EPD: Cradle to gate with options A4, A5, B1, C1, C2, C3, C4 and D

Stage of Material Production and Construction

Module A1: Extraction and processing of raw materials

Module A2: Transportation of raw materials to the plant

Module A3: Concrete production at the plant and waste treatment

Module A4: Transportation to the construction site

Module A5: Includes processes associated with concrete installation (e.g., pumping on the construction site), as well as the production, transportation, and treatment of unused concrete

Use Stage

Module B1: Carbonation during the utilization phase

Disposal Stage

Module C1: Demolition/Dismantling

Module C2: Transportation of concrete demolition waste for processing

Module C3: Sorting of waste components and recycling of concrete

Module C4: Disposal of concrete

Credits and burdens outside the system boundaries

Module D: Credits and burdens from the use of demolished concrete as a replacement for primary materials

Cut-off criteria

Environmental impacts of the following processes are considered to be negligible: Production and use of formwork and falsework for the installation of concrete, Materials used for the curing of concrete (e.g. plastics, aluminum) .

Allocation

Elementary flows (energy and fuels, ancillary materials and waste) data was collected on production-process-level. Using the total output of the production process in 2024, elementary flows are assigned to 1 declared unit based on volume.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport to the building site (A4)	Value	Unit
Transported mass	1940.40	kg
Gross density of products transported	1940.40	kg / m³
Truck: Distance	16.08	km
Truck: Energy demand	1.58	MJ / t*km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%

Installation into the building (A5)	Value	Unit
Installation loss	1.50	%
Formwork	-	kg
Falsework	-	kg
Distance to waste landfill facility (for installation losses)	50.00	km
Amount of electricity to pour 1 m³ of concrete	3.00	kWh
Amount of diesel to pour 1 m³ of concrete	60.00	MJ
Water	0.29	m³
Wastewater treatment	0.29	m³

Formwork and Falsework each contribute less than 1% of the total product CO_2 emissions, and are therefore neglected under cut-off rules. (Kaethner, Burridge, 2012). Other sources: Concrete waste: Adams & Hobbs (2023). Electricity, Diesel: Ecoinvent benchmark average.

Use of the installed product (B1)	Value	Unit
Reference use period	50.00	years
Application	Building, in the ground	
Degree of carbonation (Dc)	0.85	-
Cement absorption factor	0.34	kg CO_2 / kg Cement
k-factor	0.80	mm / √year
Correction factor	1.00	-
Surface area of concrete	5.00	m²

Calculation of carbonization according to EN 16757. k-factor results from the concrete's compressive strength and its application. The cement absorption factor (maximum theoretical CO2 uptake) depends on the average clinker content in cement. The correction factor results from cement substitutes in the recipe.

Demolition (C1)	Value	Unit
Diesel for deconstruction	-	kg

The product remains in the ground at its end-of-life.

Reuse, recovery and/or recycling potentials (D)	Value	Unit
Substitution of electrical energy production	0.06	MJ
Substitution of thermal energy production	0.84	MJ

Calculation of benefits and loads per EN 15804+A2.

LCA: Results

Core environmental impact indicators

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	2.27e+02	3.23e+00	1.09e+01	-2.34e+00	0	0	0	0	-6.94e-02
GWP-fossil	kg CO_2-eq.	2.27e+02	3.23e+00	1.07e+01	-2.34e+00	0	0	0	0	-6.92e-02
GWP-biogenic	kg CO_2-eq.	9.71e-02	1.62e-03	1.30e-01	0	0	0	0	0	-4.02e-05
GWP-luluc	kg CO_2-eq.	7.45e-02	1.15e-03	1.81e-02	0	0	0	0	0	-9.72e-05
ODP	kg CFC-11-Eq	5.14e-06	6.73e-08	1.98e-07	0	0	0	0	0	-2.89e-09
AP	mol H+-Eq	6.71e-01	7.63e-03	7.07e-02	0	0	0	0	0	-6.59e-05
EP-freshwater	kg P-Eq	1.15e-02	2.27e-04	9.18e-04	0	0	0	0	0	-1.75e-06
EP-marine	kg N-Eq	6.51e-02	2.00e-03	3.27e-02	0	0	0	0	0	-1.96e-05
EP-terrestrial	mol N-Eq	2.34e+00	2.16e-02	3.26e-01	0	0	0	0	0	-2.08e-04
POCP	kg NMVOC-Eq	6.18e-01	1.32e-02	9.73e-02	0	0	0	0	0	-1.29e-04
ADPE	kg Sb-Eq	1.91e-04	9.23e-06	8.90e-06	0	0	0	0	0	-3.34e-08
ADPF	MJ, net calorific value	1.36e+03	4.85e+01	1.22e+02	0	0	0	0	0	-1.10e+00
WDP	m^3 world Eq deprived	1.68e+01	2.44e-01	1.02e+00	0	0	0	0	0	-3.94e-03

GWP-total: Global Warming Potential - total **GWP-fossil**: Global warming potential - fossil **GWP-biogenic**: Global Warming Potential - biogenic **GWP-luluc**: Global Warming Potential - luluc **ODP**: Depletion potential of the stratospheric ozone layer **AP**: Acidification potential, Accumulated Exceedance **EP-freshwater**: Eutrophication potential - freshwater **EP-marine**: Eutrophication potential - marine **EP-terrestrial**: Eutrophication potential - terrestrial **POCP**: Photochemical Ozone Creation Potential **ADPE**: Abiotic depletion potential - non-fossil resources **ADPF**: Abiotic depletion potential - fossil resources **WDP**: Water (user) deprivation potential

Additional indicators

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
PM	disease incidence	1.43e-05	3.15e-07	1.83e-06	0	0	0	0	0	-3.97e-10
IRP	kBq U235-Eq	2.59e+03	5.89e-02	3.91e+01	0	0	0	0	0	-1.14e-03
ETP-fw	CTUe	3.41e+02	1.15e+01	3.37e+01	0	0	0	0	0	-6.31e-02
HTP-c	CTUh	1.44e-06	2.07e-08	5.31e-08	0	0	0	0	0	-1.13e-10
HTP-nc	CTUh	1.34e-05	3.20e-08	2.44e-07	0	0	0	0	0	-1.04e-10
SQP	dimensionless	8.68e+02	4.88e+01	3.56e+01	0	0	0	0	0	-3.94e-02

PM: Potential incidence of disease due to PM emissions **IRP**: Potential Human exposure efficiency relative to U235 **ETP-fw**: Potential Comparative Toxic Unit for ecosystems **HTP-c**: Potential Comparative Toxic Unit for humans - cancer effects **HTP-nc**: Potential Comparative Toxic Unit for humans - non-cancer effects **SQP**: Potential Soil quality index

IRP: 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.

ETP-fw, **HTP-c**, **HTP-nc** and **SQP**: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.

Use of resources

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
PERE	MJ	1.01e+02	7.70e-01	1.09e+01	0	0	0	0	0	-5.30e-02
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	1.01e+02	7.70e-01	1.09e+01	0	0	0	0	0	-5.30e-02
PENRE	MJ	1.25e+03	4.85e+01	1.20e+02	0	0	0	0	0	-1.10e+00
PENRM	MJ	5.89e+01	0	8.84e-01	0	0	0	0	0	0
PENRT	MJ	1.31e+03	4.85e+01	1.21e+02	0	0	0	0	0	-1.10e+00
SM	kg	6.25e+01	0	9.38e-01	0	0	0	0	0	0
RSF	MJ	1.33e+02	0	2.00e+00	0	0	0	0	0	0
NRSF	MJ	1.78e+02	0	2.67e+00	0	0	0	0	0	0
FW	m^3	7.94e-01	7.05e-03	3.49e-02	0	0	0	0	0	-1.02e-04

PERE: Primary energy resources - renewable: use as energy carrier **PERM**: Primary energy resources - renewable: used as raw materials **PERT**: Primary energy resources - renewable: total **PENRE**: Primary energy resources - non-renewable: use as energy carrier **PENRM**: Primary energy resources - non-renewable: used as raw materials **PENRT**: Primary energy resources - non-renewable: total **SM**: Use of secondary material **RSF**: Renewable secondary fuels **NRSF**: Non-renewable secondary fuels **FW**: Net use of fresh water

Waste flows

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
HWD	kg	3.74e+00	7.05e-02	2.05e-01	0	0	0	0	0	-5.96e-04
NHWD	kg	1.08e+02	1.41e+00	3.25e+02	0	0	0	0	0	-1.05e-02
RWD	kg	4.53e-04	1.46e-05	6.06e-05	0	0	0	0	0	-2.73e-07

HWD: Hazardous waste disposed **NHWD**: Non hazardous waste disposed **RWD**: Radioactive waste disposed

Output flows

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	1.16e+02	0	1.74e+00	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	6.13e-02	0	9.19e-04	0	0	0	0	0	0
EET	MJ	8.26e-01	0	1.24e-02	0	0	0	0	0	0

CRU: Components for re-use **MFR**: Materials for recycling **MER**: Materials for energy recovery **EEE**: Exported electrical energy **EET**: Exported thermal energy

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Electricity consumption in the manufacturing phase is composed from the source below. Electricity is represented by data in ecoinvent 3.10 regionalised for Portugal.

Electricity	Unit	Value
Electricity from grid	kg CO_2-eq. / kWh	0.60

Dangerous substances

The product contains no hazardous substances given by the REACH Candidate List or the Norwegian Priority List.

Additional environmental information

Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	ND	3.23e+00	ND	-2.34e+00	0	0	0	0	-6.93e-02

GWP-IOBC: Global Warming Potential - Instantaneous oxidation of biogenic carbon

Bibliography

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DIN CENTR 15941:2010-11	Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data
DIN EN 15942:2022-04	Sustainability of construction works - Environmental product declarations - Communication format business-to-business
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	ILCD Handbook: https://eplca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf

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