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ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2

Zinco GmbH
Green Roof System “Stormwater Management Roof ” type “Roof Garden" with Retention Spacer RSX 70

Owner of the declaration
Zinco GmbH
Lise-Meitner-Straße 2
72622 Nürtingen
Germany

Product
Green Roof System “Stormwater Management Roof ” type “Roof Garden" with Retention Spacer RSX 70

Declared product / Functional unit
1 m²

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR Part A:2021 ,
IBU PCR Part B: Requirements on the EPD for Green Roof Systems

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

Declaration number
NEPD-11182-11182-2

Registration number
NEPD-11182-11182-2

Issue date
17.03.2026

Valid to
16.03.2031

EPD Software
Emidat Platform v1.0.0

General Information

Product
Green Roof System “Stormwater Management Roof ” type “Roof Garden" with Retention Spacer RSX 70

Program Operator
EPD Global
Majorstuen P.O. Box 5250
N-0303 Oslo
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Phone: +47 23 08 80 00
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Declaration Number
NEPD-11182-11182-2

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EN 15804:2012 + A2:2019,
NPCR Part A:2021 ,
IBU PCR Part B: Requirements on the EPD for Green Roof Systems

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

Functional unit
1 m^2

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 EPD Global'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 Global, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD Global's General Programme Instructions for further information on EPD tools.

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

Owner of the declaration
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Manufacturer
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Place of production
Nürtingen, Germany

Management system
-

Organisation no
HRB 789793

Issue date
17.03.2026

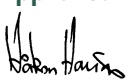
Valid to
16.03.2031

Year of study
2023

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 Global.

Developer of EPD: Heike Schäfer
Reviewer of company-specific input data and EPD: Petra Bigoh

Approved

Håkon Hauan, The Norwegian EPD Foundation

Product

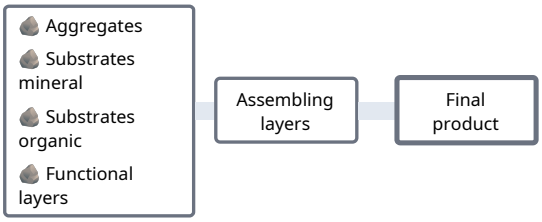
Product description

A green roof system refers to the various components and layers that together create a functional green roof with a vegetated area which is functionally integrated onto a roof. The considered system build-up consists of the Filter Sheet PV as protection layer, Retention Spacer RSX 70, Filter Sheet PV, sub-substrate "Zincolit Plus" (150 mm) and "System Substrate Roof Garden" (350 mm).

Application description

System Build-up combining the advantages of intensive green roofs with an effective stormwater management.

Production process



Product specification

Name of ingredient	Share of total weight	Country of origin
Aggregates	25 - 50 %	Germany
Functional layers	0 - 2 %	Various
Substrates mineral	50 - 80 %	Germany
Substrates organic	10 - 25 %	Germany

Technical data

	Unit	Value
Water storage capacity	Vol.-%	50
System sound absorption	dB	0
System height	mm	57
System weight saturated	kg / m²	792.1
System weight unsaturated (dry)	kg / m²	508.6
Water retention capacity	l / m²	283.5
pH value of the growing media (CaCl2)	-	7.5
Fire resistance class for growing media	-	A2 - s1, d0
Salt content of the growing media	g / l	1.5
Runoff coefficient C	-	0.2

Market

Global

Recipients

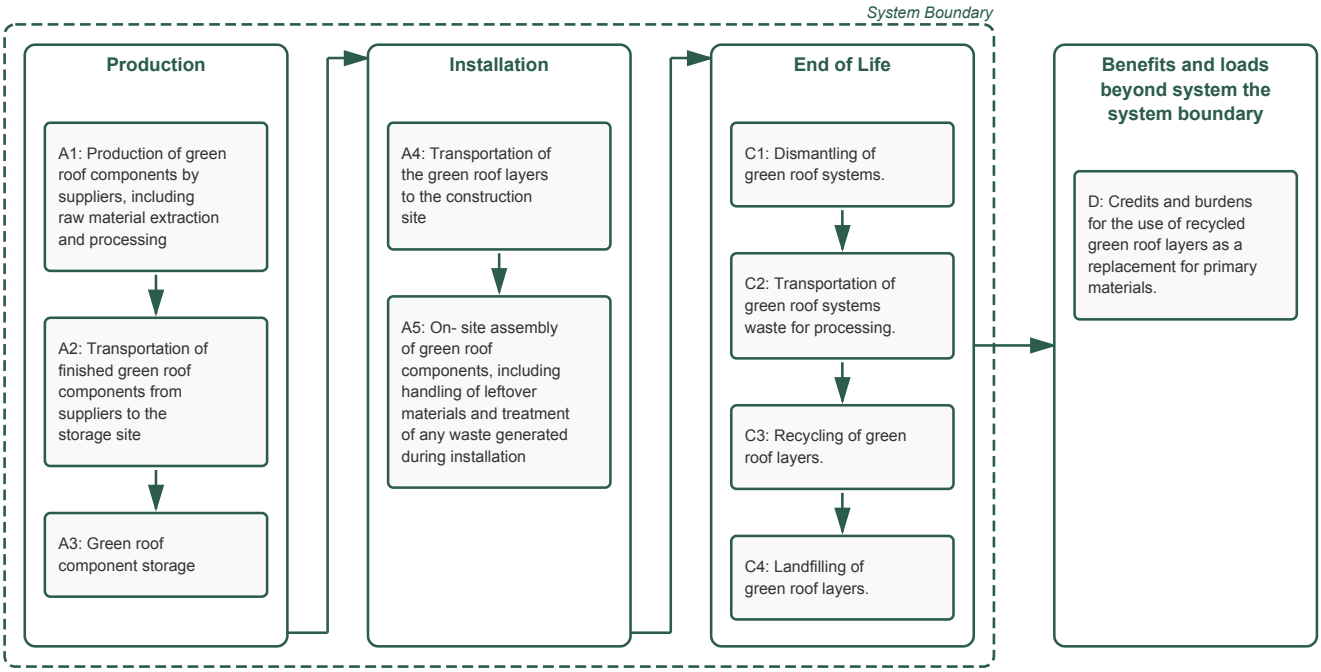
B2B

LCA: Calculation rules

Functional unit
1 m²

Reference service life
Not defined

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 4.00/5 , in accordance with EN 15804+A2 Annex E guidance on data quality assessment, considering geographical, technical, and temporal representativeness.

The following table discloses all processes or activities assessed with very poor or poor data representativeness according to EN 15804+A2, as well as those assessed as fair that contribute more than 30 % to any core impact indicator in A1–A3:

Element	Minimal Representativeness	Source	Year
Aggregates	Poor	ecoinvent 3.10	2023
Functional layers	Poor	ecoinvent 3.10	2023
Substrates mineral	Poor	ecoinvent 3.10	2023
Substrates organic	Poor	ecoinvent 3.10	2023
Functional layers	Fair	ecoinvent 3.10	2023

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	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography			DE	Global	Global	MND	MND	MND	MND	MND	MND	MND	Global	Global	Global	Global	Global

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

Type of EPD: Cradle to gate with options, modules A4-5, C1-C4, and D

Stage of Material Production and Construction

Module A1: Production of green roof components by suppliers, including raw material extraction and processing

Module A2: Transportation of finished green roof components from suppliers to the storage site

Module A3: Green roof component storage

Module A4: Transportation of the green roof layers to the construction site

Module A5: On-site assembly of green roof components, including handling of leftover materials and treatment of any waste generated during installation

Disposal Stage

Module C1: Dismantling of green roof systems.

Module C2: Transportation of green roof systems waste for processing.

Module C3: Recycling of green roof layers.

Module C4: Landfilling of green roof layers.

Credits and burdens outside the system boundaries

Module D: Credits and burdens for the use of recycled green roof layers as a replacement for primary materials.

Cut-off criteria

No cut-offs were applied.

Allocation

Foreground inventory data (energy and fuels, ancillary materials, emissions and waste) was collected at the production-process level. Using the total output of the production process in 2023, these flows are allocated to the reference product based on area.

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	508.60	kg
Truck: Distance	100.00	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	6.00	%
Diesel consumption	1.77	l

Substrate is transported on top of the roof with vacuum. The installation of a green roof system involves preparing the roof surface with protective and waterproofing layers, then adding components that enable drainage, support plant growth, and sustain vegetation.

Demolition (C1)	Value	Unit
Diesel consumption	1.77	l

Substrate layer is assumed to be vacuumed off the roof (Diesel consumption). All other system components are deconstructed manually (no loads).

Transport to the waste facility (C2)	Value	Unit
Mass to landfill	495.38	kg
Mass to incineration	13.22	kg
Distance to incineration	50.00	km
Distance to landfill	50.00	km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%
Truck: Distance	50.00	km
Truck: Energy demand	1.58	MJ / t*km

Waste processing (C3)	Value	Unit
Material for incineration	13.22	kg

Disposal (C4)	Value	Unit
Material for landfill	495.38	kg

Reuse, recovery and/or recycling potentials (D)	Value	Unit
Substitution of electrical energy production	51.46	MJ
Substitution of thermal energy production	100.43	MJ

Calculation of benefits and loads per EN 15804+A2.

LCA: Results

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	1.97e+01	5.29e+00	9.43e+00	6.43e+00	2.64e+00	3.19e+01	2.18e+01	-1.66e+01
GWP-fossil	kg CO_2-eq.	1.94e+01	5.28e+00	8.42e+00	6.43e+00	2.64e+00	3.15e+01	5.65e+00	-1.66e+01
GWP-biogenic	kg CO_2-eq.	2.47e-01	8.28e-05	1.01e+00	6.42e-04	4.14e-05	4.31e-01	1.61e+01	-9.39e-04
GWP-luluc	kg CO_2-eq.	1.00e-02	2.21e-03	1.56e-03	5.59e-04	1.10e-03	2.04e-04	3.19e-03	-8.95e-04
ODP	kg CFC-11-Eq	4.89e-07	8.49e-08	1.44e-07	9.84e-08	4.25e-08	1.16e-08	1.41e-07	-3.58e-07
AP	mol H+-Eq	6.23e-02	1.35e-02	6.67e-02	5.80e-02	6.73e-03	7.17e-03	6.00e-02	-1.98e-02
EP-freshwater	kg P-Eq	2.80e-03	4.28e-04	9.29e-04	1.87e-04	2.14e-04	9.89e-05	8.68e-03	-2.79e-04
EP-marine	kg N-Eq	1.68e-02	3.42e-03	2.92e-02	2.69e-02	1.71e-03	4.08e-03	1.50e-02	-5.19e-03
EP-terrestrial	mol N-Eq	1.78e-01	3.70e-02	3.19e-01	2.95e-01	1.85e-02	3.48e-02	1.61e-01	-5.55e-02
POCP	kg NMVOC-Eq	9.38e-02	2.04e-02	9.88e-02	8.79e-02	1.02e-02	8.74e-03	5.67e-02	-3.97e-02
ADPE	kg Sb-Eq	9.47e-05	1.53e-05	1.01e-05	2.31e-06	7.63e-06	2.26e-06	1.28e-05	-1.25e-05
ADPF	MJ, net calorific value	4.37e+02	7.95e+01	1.25e+02	8.41e+01	3.98e+01	6.15e+00	1.23e+02	-2.61e+02
WDP	m^3 world Eq deprived	4.93e+00	3.81e-01	5.74e-01	2.06e-01	1.91e-01	2.07e+00	6.19e-01	-7.77e-01

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-A3	A4	A5	C1	C2	C3	C4	D
PM	disease incidence	3.33e-06	5.18e-07	1.95e-06	1.65e-06	2.59e-07	3.70e-08	9.10e-07	-1.19e-07
IRP	kBq U235-Eq	1.09e+00	7.01e-02	1.16e-01	3.76e-02	3.51e-02	1.12e-02	1.10e-01	-4.32e-02
ETP-fw	CTUe	1.07e+02	1.91e+01	2.80e+01	1.19e+01	9.56e+00	6.32e+01	1.29e+02	-1.88e+01
HTP-c	CTUh	1.04e-07	2.72e-08	3.59e-08	2.51e-08	1.36e-08	7.22e-09	3.26e-08	-2.22e-08
HTP-nc	CTUh	1.81e-07	5.22e-08	3.69e-08	1.14e-08	2.61e-08	9.43e-08	1.61e-07	-2.76e-08
SQP	dimensionless	3.34e+02	7.99e+01	5.08e+01	5.89e+00	4.00e+01	1.73e+00	2.87e+02	-4.74e+00

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-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.32e+01	1.04e+00	1.51e+00	5.15e-01	5.21e-01	2.45e-01	1.73e+00	-6.07e-01
PERM	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
PERT	MJ	1.32e+01	1.04e+00	1.51e+00	5.15e-01	5.21e-01	2.45e-01	1.73e+00	-6.07e-01
PENRE	MJ	1.53e+02	7.95e+01	1.08e+02	8.41e+01	3.98e+01	6.15e+00	1.23e+02	-2.61e+02
PENRM	MJ	2.84e+02	0.00e+00	1.70e+01	0.00e+00	0.00e+00	-7.38e+00	0.00e+00	0.00e+00
PENRT	MJ	4.37e+02	7.95e+01	1.25e+02	8.41e+01	3.98e+01	-1.24e+00	1.23e+02	-2.61e+02
SM	kg	5.00e+00	0.00e+00	3.00e-01	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
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
FW	m^3	3.34e-01	1.17e-02	-8.64e-02	5.46e-03	5.85e-03	3.55e-02	-1.83e+00	-1.91e-02

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-A3	A4	A5	C1	C2	C3	C4	D
HWD	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
NHWD	kg	0.00e+00	0.00e+00	3.05e+01	0.00e+00	0.00e+00	1.32e+01	4.95e+02	0.00e+00
RWD	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

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

Output flows

Indicator	Unit	A1-A3	A4	A5	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
MFR	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
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
EEE	MJ	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.20e+01	0.00e+00	0.00e+00
EET	MJ	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.01e+02	0.00e+00	0.00e+00

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	4.52e+00	kg C
Biogenic carbon content in accompanying packaging	0.00e+00	kg C

Additional requirements

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

None.

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-A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	1.95e+01	5.29e+00	8.43e+00	6.43e+00	2.64e+00	3.15e+01	5.68e+00	-1.66e+01

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

Bibliography

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EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
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