

ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	ZinCo GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ZIC-20200082-CCA1-EN
Issue date	31.07.2020
Valid to	30.07.2025

“Heather with Lavender” Green Roof System
ZinCo GmbH

www.ibu-epd.com | <https://epd-online.com>



General Information

ZinCo GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-ZIC-20200082-CCA1-EN

This declaration is based on the product category rules:

green roof systems, 12.2019
(PCR checked and approved by the SVR)

Issue date

31.07.2020

Valid to

30.07.2025



Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)



Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

“Heather with Lavender” Green Roof System

Owner of the declaration

ZinCo GmbH
Lise-Meitner-Straße 2
72622 Nürtingen
Germany

Declared product / declared unit

1 m² “Heather with Lavender” Green Roof System

Scope:

This declaration covers the products of ZinCo GmbH, which is based in Nürtingen. The system components are mainly produced in Germany. The “Heather with Lavender” system, which involves simple intensive roof greening, was selected as a representative system. Information on further system variants can be obtained from the manufacturer on request. The planting of the green roof system does not form a part of this declaration.

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

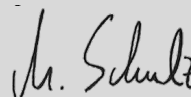
The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as EN 15804.

Verification

The standard EN 15804 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025:2010

☐ internally ☒ externally



Matthias Schulz
(Independent verifier appointed by SVR)

Product

Product description/Product definition

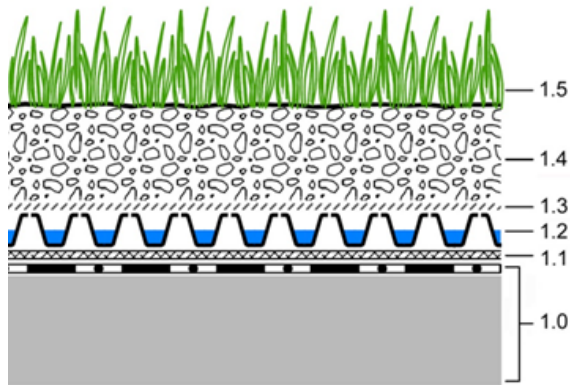
A green roof type “Heather with Lavender” serves to offer a permanent habitat on flat and slightly sloping roofs for a certain kind of vegetation, to store water, to discharge excess water and to protect the underlying roof construction. The system consists of four or five layers depending on whether the roof to be planted is protected against root penetration or not (see the graphic 1). In the case of standard root resistant waterproofing, the Protection Mat SSM 45 is first laid to protect the waterproofing against mechanical damage and to store rainwater. The mat is covered with 40 mm high Floradrain® FD 40 drainage and water storage elements, equipped on the upper side with recesses and channels on the lower side. These elements are in turn covered with the Filter Sheet SF to permanently guarantee the drainage function. The Filter Sheet is followed by a layer of System

Substrate of at least 100 mm in height. It consists mainly of crushed mineral aggregates and selected organic components.

The system substrate layer is finally greened by sowing, planting or applying pre-grown vegetation mats; the vegetation itself does not form part of this EPD.

In exceptional cases of not root resistant waterproofing, the waterproofing is first covered with the Root Barrier WSF 40 or the Root Barrier WSB 100-PO, depending on the roof situation and/or planting, before the Protection Mat SSM 45 is laid. The Root Barriers are not part of this declaration.

Key Graphic 1:



- 1.0 Roof construction with root resistant waterproofing
- 1.1 Protection Mat SSM 45
- 1.2 Floradrain® FD 40
- 1.3 Filter Sheet SF
- 1.4 System Substrate, at least 100 mm thick
- 1.5 Vegetation

Product according to CPR with ETA

EU regulation no. 305/2011 (CPR) applies for putting the product on the market in the European Union/European Free Trade Association EU/EFTA (with the exception of Switzerland). The product requires a Declaration of Performance taking into account European Technical Assessment ETA-13/0668 entitled "Kits for Green Roofs" dated 12th June 2018 and CE labelling. The respective national regulations apply to use.

Application

The "Heather with Lavender" green roof system is applied above the usually root resistant waterproofing on sufficiently stable flat or slightly sloping roofs in accordance with the sequence of components described in "Product description/Product definition". Roofs greened with this system provide ecological, urban development and constructional benefits such as the creation of new living space for flora and fauna, buffering of areas for microclimate improvement, areas for water retention or urban gardening.

Technical Data

Amongst others, the requirements of European Technical Assessment *ETA-13/0668* entitled "Kits for Green Roofs" of 12th June 2018 apply for the "Heather with Lavender" green roof system. The performance characteristics which this assessment requires are shown in the following table:

Constructional data

Name	Value	Unit
System height	≥ 140	mm
System weight saturated	≥ 163	kg/m ²
Dry system weight	≥ 103	kg/m ²
Maximum system water retention capacity	≥ 60	l/m ²
Run-off coefficient Cs of the system according to the FLL Green Roof Guidelines (Roof slope up to 5°; System Substrate	0.4	-

height 100 – 150 mm)		
Protection Mat SSM 45 protection effectiveness in accordance with EN ISO 13428	≥ 25	Residual thickness in %
Floradrain® FD 40 compressive strength in accordance with EN ISO 25619-2	≥ 115	kPa
Floradrain® FD 40 drainage capacity in accordance with EN ISO 12958 at i = 0.02 (rigid/rigid; 20 kPa; bottom side)	1.282	l/(m ² s)
Filter Sheet SF penetration force in accordance with EN ISO 12236	1100	N
System Substrate water storage capacity	approx. 50	Vol.-%
System Substrate salt content (KCl in water extract)	< 2.5	g/l
System Substrate pH (CaCl ₂)	6,5-8	-
Fire resistance class for growing media (EN 13501-1)	A2 - s1,d0	-
System sound absorption (EN ISO 10140-1, EN ISO 10140-2)	npd	dB

Delivery status

Protection Mat SSM 45 is supplied in 100 m² rolls, Floradrain® FD 40 drainage and water storage elements in 2 m² panels and the Filter Sheet SF in 100 m² or 200 m² rolls. System Substrate is supplied either as 24 m³ loose by the truck or in Big Bags containing 1 m³.

Base materials/Ancillary materials

The "Heather with Lavender" green roof system consists of the following components:

97.4 mass % System Substrate

(consisting of approximately 40 % mineral recycling granulate, approximately 40 % volcanic loose bulk materials, approximately 10 % substrate compost, 9 % sand and approximately 1 % peat)

0.1 mass % Filter Sheet SF

(consisting of 100 % polypropylene (PP))

2.0 mass % Floradrain® FD 40

(consisting of 100 % recycling polyolefin (70 % HDPE, 30 % PP))

0.5 mass % Protection Mat SSM 45

(consisting of 70 % polyester (PES) and 30 % polypropylene (PP))

No ancillary materials are required to build the "Heather with Lavender" green roof system.

This product contains substances listed in the candidate list (date: 16.01.2020) exceeding 0.1 percentage by mass: no.

This product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no.

No verification was available for the System Substrate. However, no negative consequences have become known in thirty years of use.

Reference service life

Professionally fitted Green Roofs last for the life of the building if cared for and maintained appropriately; ≥ 50 years are possible.

LCA: Calculation rules

Declared Unit

The declared unit is one square meter of installed green roof system without root protection and vegetation layer.

Name	Value	Unit
Grammage (dry)	102.7035	kg/m ²
Conversion factor to 1 kg (kg/m ²)	102.7035	-
Declared unit	1	m ²

System boundary

Cradle to gate with options, modules C1-C4 and D.

Description of the system boundaries

Module A1: Manufacturing processes of system components incl. packaging and treatment of manufacturing losses from suppliers. Module A2: Transport to ZinCo Warehouse.

Module A3: no loads or benefit

Module A4: Transport to building site (100 km standard distance, needs to be adapted on building level if relevant).

Module A5: Installation of Substrate (by vacuum with Diesel consumption) and treatment of installation losses. Treatment of packaging.

Module B1: Manufacturing of a representative amount of fertilizer (10 grams of nitrogen per year). Emissions are not declared since vegetation is not under study.

Module C1: Deconstruction of the system. Substrate layer is assumed to be vacuumed off the roof (Diesel consumption). All other system components are deconstructed manually (no loads).

Module C2: Transport to EoL treatment (50km standard distance; may be adapted on building level).

Module C3: Thermal treatment of plastics (European Scenario).

Module C4: Disposal of inert and biodegradable waste (European Scenario).

Module D: Benefits & loads beyond the system boundaries.

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

The *GaBi* background database Service Pack 40 has been used to calculate the EPD results.

LCA: Scenarios and additional technical information

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.134	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61 - 90	%
Gross density of products transported	856.67	kg/m ³

Installation into the building (A5)

Name	Value	Unit
Material loss	0.082	kg
Diesel consumption	0,15	l/m ²

Use or application of the installed product (B1)

Name	Value	Unit
Average fertilizer use per year	0,556	kg/a

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	40	a

End of life (C1-C4)

Name	Value	Unit
Average transport distance to waste treatment facility	50	km
Collected separately waste type	102.8	kg
Energy recovery	2.813	kg
Landfilling	100	kg

Information on biogenic Carbon

Biogenic carbon content in packaging (wooden pallets): 0,054 kg

Biogenic carbon content in substrate layer (compost): 1,491 kg

LCA: Results

Disclaimer:

EP-freshwater: This indicator has been calculated as "kg P eq" as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; <http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>)

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² "Heather with Lavender" Green Roof System

Core Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	-2.67E+0	4.76E-1	6.94E-1	9.94E-2	5.12E-2	2.38E-1	6.85E+0	1.15E+1	-3.66E-1
GWP-fossil	[kg CO ₂ -Eq.]	2.64E+0	4.74E-1	3.92E-1	9.65E-2	7.26E-2	2.37E-1	6.85E+0	2.17E+0	-3.66E-1
GWP-biogenic	[kg CO ₂ -Eq.]	-5.32E+0	1.90E-4	3.00E-1	2.82E-3	-2.36E-2	9.54E-5	-3.16E-4	9.31E+0	-9.54E-4
GWP-luluc	[kg CO ₂ -Eq.]	6.43E-3	1.99E-3	2.24E-3	7.05E-5	2.23E-3	9.93E-4	2.30E-4	4.53E-3	-3.29E-4
ODP	[kg CFC11-Eq.]	3.37E-14	1.16E-16	2.36E-16	6.16E-16	1.31E-16	5.82E-17	1.91E-15	6.81E-15	-4.94E-15
AP	[mol H ⁺ -Eq.]	5.97E-3	3.94E-4	3.72E-4	6.94E-4	2.87E-4	1.97E-4	8.97E-4	1.31E-2	-5.90E-4
EP-freshwater	[kg PO ₄ -Eq.]	8.15E-6	1.03E-6	1.18E-6	2.26E-6	1.16E-6	5.17E-7	3.22E-7	4.58E-4	-6.06E-7
EP-marine	[kg N-Eq.]	2.43E-3	1.13E-4	7.42E-5	8.21E-5	4.94E-5	5.65E-5	2.41E-4	6.55E-3	-1.45E-4
EP-terrestrial	[mol N-Eq.]	2.68E-2	1.39E-3	1.09E-3	8.94E-4	7.01E-4	6.99E-4	4.01E-3	3.83E-2	-1.54E-3
POCP	[kg NMVOC-Eq.]	6.39E-3	3.16E-4	2.65E-4	2.58E-4	1.95E-4	1.58E-4	6.90E-4	1.33E-2	-4.10E-4
ADPE	[kg Sb-Eq.]	5.24E-7	3.94E-8	4.59E-8	1.91E-7	4.43E-8	1.97E-8	2.82E-8	1.75E-7	-7.23E-8
ADPF	[MJ]	4.74E+1	6.30E+0	7.24E+0	2.04E+0	7.08E+0	3.15E+0	2.56E+0	2.91E+1	-6.26E+0
WDP	[m ³ world-Eq deprived]	1.44E-1	2.04E-3	6.74E-2	3.17E-3	2.30E-3	1.02E-3	7.09E-1	1.71E-1	-4.91E-2

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water use

RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A2: 1 m² "Heather with Lavender" Green Roof System

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
PERE	[MJ]	1.27E+1	3.66E-1	3.68E+0	1.50E-1	4.12E-1	1.83E-1	5.22E-1	3.12E+0	-1.76E+0
PERM	[MJ]	3.24E+0	0.00E+0	-3.24E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	1.59E+1	3.66E-1	4.44E-1	1.50E-1	4.12E-1	1.83E-1	5.22E-1	3.12E+0	-1.76E+0
PENRE	[MJ]	3.20E+1	6.30E+0	8.75E+0	2.04E+0	7.08E+0	3.15E+0	6.96E+0	3.75E+1	-6.26E+0
PENRM	[MJ]	1.43E+1	0.00E+0	-1.50E+0	0.00E+0	0.00E+0	0.00E+0	-4.40E+0	-8.40E+0	0.00E+0
PENRT	[MJ]	4.63E+1	6.30E+0	7.25E+0	2.04E+0	7.08E+0	3.15E+0	2.56E+0	2.91E+1	-6.26E+0
SM	[kg]	5.28E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m ³]	6.94E-3	3.28E-4	1.91E-3	6.34E-4	3.69E-4	1.65E-4	1.68E-2	5.51E-3	-2.03E-3

Caption: 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A2: 1 m² "Heather with Lavender" Green Roof System

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
HWD	[kg]	4.51E-7	2.36E-7	2.65E-7	1.66E-9	2.65E-7	1.18E-7	8.58E-9	3.12E-7	-2.52E-9
NHWD	[kg]	2.10E-1	1.11E-3	2.31E-2	2.15E-1	1.24E-3	5.53E-4	6.27E-1	9.83E+1	-3.32E-3
RWD	[kg]	1.18E-3	6.64E-6	1.55E-5	2.45E-5	7.46E-6	3.31E-6	1.06E-4	3.39E-4	-6.01E-4
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	1.16E+0	0.00E+0	0.00E+0	0.00E+0	1.51E+1	2.71E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	2.08E+0	0.00E+0	0.00E+0	0.00E+0	2.72E+1	0.00E+0	0.00E+0

Caption: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² "Heather with Lavender" Green Roof System

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans; HTP-nc = Potential comparative Toxic Unit for humans; SQP = Potential soil quality index									

References

DIN EN ISO 13428

DIN EN ISO 13428:2005-05, Geosynthetics - Determination of the protection efficiency of a geosynthetic against impact damage

EN 13501-1

EN 13501-1:2010, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 13948

EN 13948:2008, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of resistance to root penetration

EN 15804

EN 15804:2012-04+A1 2013, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

EN 15804

EN 15804:2019-04+A2 (in print), Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

EN ISO 10140-1

EN ISO 10140-1:2016, Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products

EN ISO 10140-2

EN ISO 10140-2:2010, Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation

ISO 12236

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ISO 12958

EN ISO 12958:2010, Geotextiles and geotextile-related products - Determination of water flow capacity in their plane

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 25619-2

ISO 25619-2:2008, Geosynthetics - Determination of compression behaviour - Part 2: Determination of short-term compression behaviour

IBU 2016, PCR Part A

Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt e.V. (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements of the Background Report. 03/2016, www.bau-umwelt.com

IBU 2019, PCR Part B

PCR-Part B: requirements on the EPD for Green Roof Systems, Institut Bauen und Umwelt e.V. (IBU); 12/2019

GaBi

GaBi 9 software-system and databases, LBP, University of Stuttgart and thinkstep, Leinfelden-Echterdingen, 2019 (<http://documentation.gabi-software.com/>)

ETA-13/0668

European Technical Assessment ETA-13/0668:2018-06-12: "Kits for Green Roofs"

FLL Green Roof Guidelines

"Guidelines for the Planning, Construction and Maintenance of Green Roofs" (2018 edition)

REACH

REACH EU chemicals directive (EC 1907/2006)

Regulation (EU) no. 305/2011

Regulation (EU) no. 305/2011 of the European Parliament and of the Council - Council Directive 89/106/EEC

ZinCo System Data Sheet

"Heather with Lavender with Floradrain® FD 40"

ZinCo Installation Instructions

"System Build-up "Heather with Lavender" with Floradrain® FD 40"

ZinCo Product Data Sheets

"Root Barrier WSB 100-PO"; "Protection Mat SSM 45";
"Floradrain® FD 40"; "Filter Sheet SF"; "System
Substrate Heather with Lavender"

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