

# Environmental Product Declaration

In accordance with 14025 and EN15804 +A2

Green roof substrate



**Owner of the declaration:**  
Utomhus Østfold Gress AS

**Product name:**  
Green roof substrate

**Declared unit:**  
1 kg roof substrate

**Product category /PCR:**  
EN 15804:2012 + A2:2019

**Program holder and publisher:**  
The Norwegian EPD foundation

**Declaration number:**  
NEPD-5905-5179-EN

**Registration number:**  
NEPD-5905-5179-EN

**Issue date:**  
05.02.2024

**Valid to:**  
05.02.2029

## General information

### Product:

Green roof substrate

### Program operator:

The Norwegian EPD Foundation  
Post Box 5250 Majorstuen, 0303 Oslo, Norway  
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e-mail: post@epd-norge.no

### Declaration number:

NEPD-5905-5179-EN

### This declaration is based on Product

#### Category Rules:

CEN Standard EN 15804+A2 serves as core PCR, as well as NPCR Part A Construction products and services

### 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 kg green roof substrate

### Declared unit with option:

-

### Functional unit:

-

### Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal

external



Julie Lyslo Skullestad

Independent verifier approved by EPD Norway

### Owner of the declaration:

Utomhus Østfold Gress AS  
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### Manufacturer:

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### Place of production:

Rygge, Moss, Norway

### Management system:

-

### Organisation no:

952 279 475

### Issue date:

05.02.2024

### Valid to:

05.02.2029

### Year of study:

2022

### Comparability:

EPDs from other programmes than the Norwegian *Næringslivets stiftelse for miljødeklarasjoner* may not be comparable.

### The EPD has been worked out by:

Kjartan Steen-Olsen, Asplan Viak AS

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Approved



Manager of EPD Norway

## Product

### Product description:

Utomhus Østfold Gress Takhagejord – green roof substrate – is a soil substrate developed for use in green roof systems. It is based on reclaimed clay from demolished brick buildings, expanded clay, amorphous volcanic glass, and compost.

### Product specification:

The marketed soil substrate consists of crushed clay bricks, expanded clay (“Leca”), amorphous volcanic glass (“Perlite”), and compost. The crushed bricks, the expanded clay, and the perlite are all reused or waste products.

Materials	KG	%
Clay (crushed bricks)	N/A	N/A
Light expanded clay aggregate (Leca)	N/A	N/A
Amorphous volcanic glass (Perlite)	N/A	N/A
Compost	N/A	N/A
Packaging: Big-bag (PP)	0,002	

Amounts are not specified in the table due to confidentiality concerns.

### Technical data:

The soil has a dry density of 800 kg/m<sup>3</sup>, and a waterlogged density of 1390 kg/m<sup>3</sup>. Density as marketed is around 1000 kg/m<sup>3</sup>. It is marketed in 1 m<sup>3</sup> big-bags.

### Market:

Norway

### Reference service life, product:

-

### Reference service life, building:

-

## LCA: Calculation rules

### Declared unit:

1 kg

### Data quality:

Data has been collected in 2022-2023 and is representative for 2022. Data for the raw material and production and transport (A1-A3 and A4) is based on specific consumption data and technical data sheets. The yearly averages for 2022 are referred to. Generic data is from

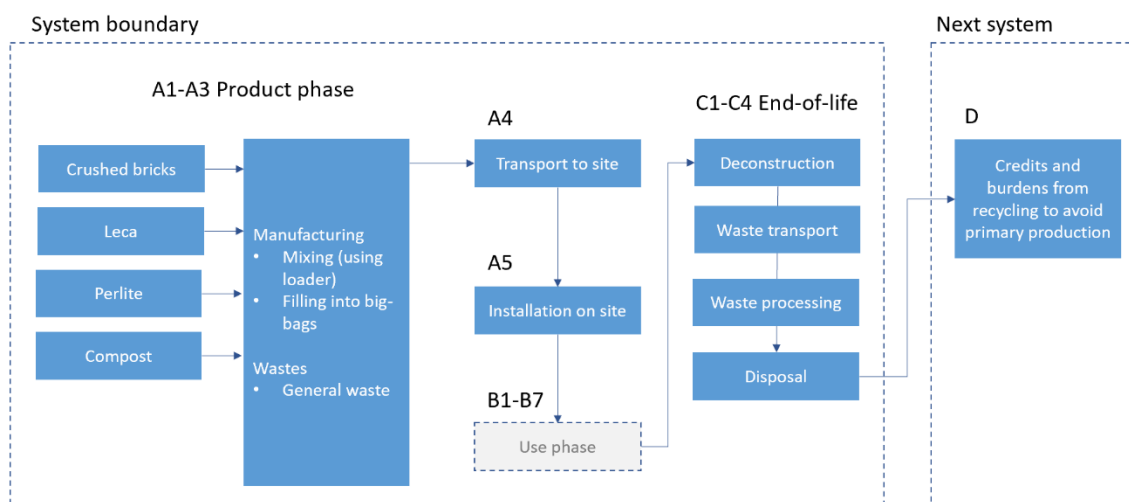
ecoinvent v3.8, Allocation, Cut-Off by classification, SimaPro v 9.4.0.2. Characterization factors from EN15804: 2012 + A2: 2019

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used.

### System boundary:

The system boundary is from cradle to gate with options, A1-A3, A4, A5, C1, C2, C3, C4 and D. The flow chart for production, transport and end of life is shown in the figure below.



### Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

## LCA: Scenarios and additional technical information

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

Scenarios have been developed to account for downstream processes such as demolition and waste treatment in accordance with the requirements of EN 15804 and NPCR PART A.

### Transport from production place to assembly/user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck	50 %	Lorry 24 metric ton, EURO 6	62	0,029 l/tkm	1,8

## Assembly (A5)

	Unit	Value
Electricity consumption	kWh	5,64E-03
Other energy carriers	MJ	8,88E-02

## End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	Kg	N.R.
Collected as mixed construction waste	Kg	N.R.
Reuse	Kg	N.R.
Recycling	Kg	N.R.
Energy recovery	Kg	N.R.
To landfill	Kg	1

## Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Waste collection	50 %	Lorry 21 t	19	0,3 l/tkm	5,5
Truck	50 %	Lorry, 16-32t EURO 5	54	0,03 l/tkm	1,7

To provide a plausible scenario for transportation to waste processing, a study of Norwegian waste treatment was used as proxy data (Raadal et al., 2009).

## Benefits and loads beyond the system boundaries (D)

	Unit	Value
-		

None assumed.

## Additional technical information

Note that the soil substrate is manufactured from reclaimed/waste products; this is the case both for the crushed clay bricks, the expanded clay (Leca), and the perlite.

## LCA: Results

The result is valid for the declared unit, 1 kg of green roof substrate.

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

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	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	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X	

### Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-6,42E-01	7,58E-03	1,33E-02	2,37E-02	3,91E-02	5,04E-04	6,72E-01	0,00E+00
GWP-fossil	kg CO2 eq.	1,75E-02	7,56E-03	1,33E-02	2,37E-02	3,90E-02	4,87E-04	1,22E-02	0,00E+00
GWP-biogenic	kg CO2 eq.	-6,60E-01	1,15E-05	8,72E-06	9,55E-06	4,56E-05	1,65E-05	6,60E-01	0,00E+00
GWP-LULUC	kg CO2 eq.	4,83E-06	2,17E-06	1,08E-06	2,62E-06	7,41E-06	8,91E-07	8,63E-06	0,00E+00
ODP	kg CFC11 eq.	4,92E-10	1,67E-10	1,45E-10	3,68E-10	7,14E-10	1,09E-11	2,75E-10	0,00E+00
AP	mol H <sup>+</sup> eq.	6,41E-05	1,59E-05	8,28E-05	2,14E-04	1,62E-04	4,34E-06	8,34E-05	0,00E+00
EP-freshwater	kg P eq.	1,48E-07	4,34E-08	3,44E-08	8,35E-08	1,32E-07	1,15E-08	1,68E-07	0,00E+00
EP-marine	kg N eq.	1,65E-05	4,35E-06	3,83E-05	9,92E-05	7,24E-05	1,48E-06	3,09E-05	0,00E+00
EP-terrestrial	mol N eq.	1,73E-04	4,52E-05	4,17E-04	1,08E-03	7,83E-04	1,63E-05	3,34E-04	0,00E+00
POCP	kg NMVOC eq.	8,72E-05	2,74E-05	1,23E-04	3,20E-04	3,38E-04	4,97E-06	1,13E-04	0,00E+00
ADP-M&M	kg Sb eq.	2,82E-08	1,01E-08	3,56E-09	8,07E-09	4,81E-08	1,47E-08	2,38E-08	0,00E+00
ADP-fossil	MJ	4,41E-01	1,10E-01	1,17E-01	3,03E-01	4,72E-01	6,89E-03	2,54E-01	0,00E+00
WDP	m <sup>3</sup>	1,28E-03	3,96E-04	5,33E-04	6,18E-04	1,15E-03	1,21E-04	1,07E-02	0,00E+00

**GWP-total:** Global Warming Potential; **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; See "additional requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication

potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial**: Eutrophication potential, Accumulated Exceedance; **POCP**: Formation potential of tropospheric ozone; **ADP-M&M**: Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil**: Abiotic depletion potential for fossil resources; **WDP**: Water deprivation potential, deprivation weighted water consumption

## Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	7,57E-10	4,89E-10	2,26E-09	5,91E-09	3,84E-09	4,05E-09	1,73E-09	0,00E+00
IRP	kBq U235 eq.	1,13E-04	4,50E-05	2,61E-05	6,19E-05	1,35E-04	5,04E-05	1,31E-04	0,00E+00
ETP-fw	CTUe	1,53E-01	5,67E-02	6,71E-02	1,54E-01	2,22E-01	3,55E-03	1,15E-01	0,00E+00
HTP-c	CTUh	4,22E-12	2,13E-12	3,21E-12	7,08E-12	7,92E-12	9,21E-13	6,54E-12	0,00E+00
HTP-nc	CTUh	1,52E-10	8,43E-11	7,49E-11	1,56E-10	2,76E-10	1,86E-11	1,39E-10	0,00E+00
SQP	Dimensionless	9,87E-02	9,58E-02	8,11E-03	2,02E-02	1,20E-01	1,64E-02	5,80E-01	0,00E+00

**PM**: Particulate matter emissions; **IRP**: Ionising radiation, human health; **ETP-fw**: Ecotoxicity (freshwater); **ETP-c**: Human toxicity, cancer effects; **HTP-nc**: Human toxicity, non-cancer effects; **SQP**: Land use related impacts / soil quality

## Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
ILCD type / level 2	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

**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 experienced with the indicator

## Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	3,55E-03	1,26E-03	2,21E-02	1,72E-03	3,98E-03	1,50E-02	4,36E-03	0,00E+00
RPEM	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
TPE	MJ	3,55E-03	1,26E-03	2,21E-02	1,72E-03	3,98E-03	1,50E-02	4,36E-03	0,00E+00
NRPE	MJ	3,57E-01	1,10E-01	1,17E-01	3,03E-01	4,72E-01	6,89E-03	2,54E-01	0,00E+00
NRPM	MJ	8,38E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	4,41E-01	1,10E-01	1,17E-01	3,03E-01	4,72E-01	6,89E-03	2,54E-01	0,00E+00
SM	kg	8,00E-01	0,00E+00	0,00E+00	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
W	m <sup>3</sup>	3,32E-05	1,31E-05	1,76E-04	2,14E-05	6,69E-05	1,06E-04	2,58E-04	0,00E+00

*RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water*

## End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	KG	4,51E-06	2,31E-06	3,78E-05	2,64E-06	6,79E-06	5,54E-07	6,32E-06	0,00E+00
NHW	KG	7,45E-03	8,23E-03	3,57E-04	4,33E-04	8,68E-03	1,23E-04	1,00E+00	0,00E+00
RW	KG	6,96E-08	2,81E-08	1,42E-08	3,32E-08	7,98E-08	2,33E-08	8,06E-08	0,00E+00

*HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed*

## End of life – output flow

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CR	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
MR	kg	0,00E+00	0,00E+00	1,90E-03	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	0,00E+00	0,00E+00	0,00E+00
ETE	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

*CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy*

Reading example:  $9,0 \text{ E-03} = 9,0 \cdot 10^{-3} = 0,009$



## Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0,18
Biogenic carbon content in the accompanying packaging	kg C	0

## Additional requirements

### Location based electricity mix from the use of electricity in manufacturing

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (foreground/core) per functional unit.

National electricity grid	Data source	Foreground / core [kWh]	GWP <sup>total</sup> [kg CO <sub>2</sub> - eq/kWh]	SUM [kg CO <sub>2</sub> - eq]
<i>Norwegian electricity, low voltage</i>	ecoinvent v3.8	0	0,039	0

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

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO <sub>2</sub> eq.	7,54E-03	7,58E-03	1,33E-02	2,37E-02	3,91E-02	5,04E-04	2,23E-02	0,00E+00

**GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation.

### Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- ✓ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

### Indoor environment






No tests have been carried out on the product concerning indoor climate - not relevant.

### Carbon footprint

Carbon footprint has not been worked out for the product.

## Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
PCR PART A	Construction products and services Ver 2
Steen-Olsen (2023)	Life cycle assessment (LCA) report for Green roof substrate
Utomhus Østfold Gress AS	Bill of materials – data collection

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