

Environmental product declaration

In accordance with ISO 14025 and EN 15804 +A2

Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock, Benders Sweden

**Owner of the declaration:**

Leca International

Declared unit:

1 m³ Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock, Benders Sweden

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR Part A: Construction products and services. Ver. 1.0.
March 2021

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-3827-2781-EN

Registration number:

NEPD-3827-2781-EN

Issue date: 14.10.2022

Valid to: 14.10.2027

EPD Software:

LCA.no EPD generator

System ID:

50797

General information

Product

Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock, Benders Sweden

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
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Declaration number:

NEPD-3827-2781-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR Part A: Construction products and services. Ver. 1.0. March 2021

Statement of liability:

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

Declared unit:

1 m3 Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock,

Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D
Benders Sweden

Functional Unit

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. Individual third party verification of each EPD is not required when the EPD tool is i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPDNorway, and iii) the process is reviewed annually. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Anne Rønning, Norsus AS
(no signature required)

Owner of the declaration:

Leca International
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Phone: +47 41 43 71 00
e-mail: info@leca.no

Manufacturer:

Benders Sverige AB
Fridhem Stadsfjället 306, 451 93 Uddevalla
Sweden

Place of production:

Benders Sverige AB
Fridhem Stadsfjället 306, 451 93 Uddevalla
Sweden

Management system:

ISO 14001/ISO 9001

Organisation no:

918 799 141

Issue date:

14.10.2022

Valid to:

14.10.2027

Year of study:

2021

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD:

Ana Raquel Fernandes

Reviewer of company-specific input data and EPD:

Tone Storbråten

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock, are produced of Leca® lightweight aggregate, cement, sand and water. Leca® block is a fast and efficient solution for loadbearing and non-bearing walls.

Product specification

Materials	
Leca® LWA, % volume by volume	70-90
Binder, % weight by weight	10-20
Sand, % weight by weight	20-40
Wooden pallet, unit per DU	1
Wrap film, kg per DU	0,1

Technical data:

Leca® Murblock 7 cm, 9 cm, 12 cm, 15 cm, 19 cm, 25 cm and 30 cm
Block: 587 mm x 68-298 mm x 190 mm

Leca® Sulblock 25 cm
Block: 250 mm x 587 mm x 190 mm

Leca® Block 9 cm, 15 cm, 20 cm, 25 cm, 30 cm and 35 cm
Block: 498 mm x 88-348 mm x 198 mm

Leca® Balkblock 30 cm and 35 cm
Block: 248 mm x 298-348 mm x 190 mm

Compressive strength:
Block: 3,0 Mpa
Block density: 650 kg/m³

Market:

Sweden

Reference service life, product

>50 years

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 m³ Leca® Murblock, Leca® Sulblock, Leca® Block and Leca® Balkblock, Benders Sweden

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

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 is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

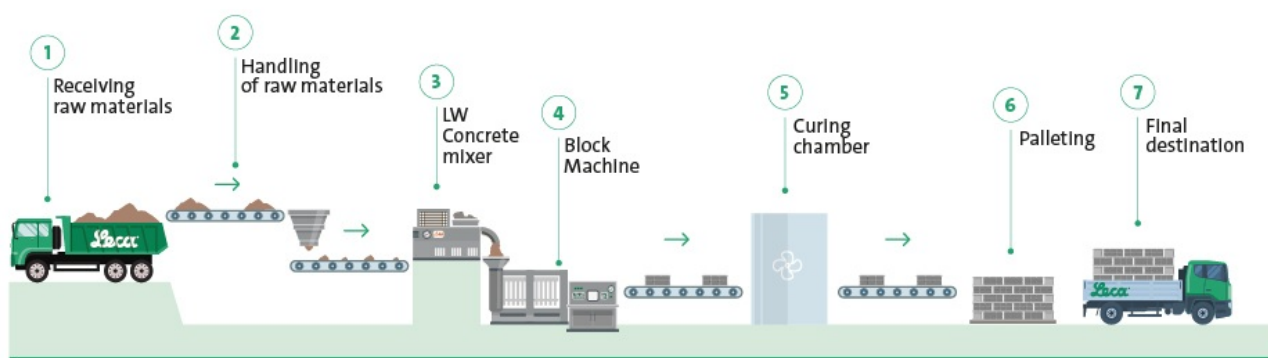
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Aggregate	ecoinvent 3.6	Database	2019
Packaging	ecoinvent 3.6	Database	2019
Water	ecoinvent 3.6	Database	2019
Cement	EPD-HCG-20210157-CAA1-EN	EPD	2021
Lightweight Aggregate (LWA)	Leca	EPD	2022

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

Product stage			Construction installation stage	Use stage								End of life stage				Beyond the system boundaries
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	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:



Additional technical information:

LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonn)
Truck, 16-32 tonnes, EURO 5 (km)	36,7 %	100	0,044	l/tkm	4,40
End of Life (C1, C3, C4)	Unit	Value			
Demolition of building per kg of LWA block (kg)	kg/DU	650,00			
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonn)
Truck, 16-32 tonnes, EURO 5 (km)	36,7 %	50	0,044	l/tkm	2,20
Waste processing (C3)	Unit	Value			
Waste treatment per kg of LWA block after demolition (kg)	kg	487,50			
Disposal (C4)	Unit	Value			
Disposal, landfilling of waste LWA (kg)	kg	162,50			
Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary aggregates (kg)	kg	487,50			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact											
Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
GWP-total	kg CO ₂ -eq	1,49E+02	8,31E+00	1,92E+00	1,08E+01	2,60E+00	5,42E+00	3,51E-01	1,33E+00	-1,14E+00	
GWP-fossil	kg CO ₂ -eq	1,50E+02	8,31E+00	1,83E+00	1,08E+01	2,60E+00	5,42E+00	3,46E-01	1,33E+00	-1,12E+00	
GWP-biogenic	kg CO ₂ -eq	-5,38E-01	3,81E-03	3,51E-02	4,42E-03	4,88E-04	2,21E-03	2,99E-03	1,56E-03	-2,23E-02	
GWP-luluc	kg CO ₂ -eq	2,77E-02	2,53E-03	5,42E-02	3,79E-03	2,05E-04	1,89E-03	4,79E-04	3,28E-04	-7,55E-04	
ODP	kg CFC11 -eq	2,14E-06	2,00E-06	6,05E-07	2,47E-06	5,62E-07	1,24E-06	6,83E-08	5,05E-07	-2,03E-07	
AP	mol H ⁺ -eq	4,03E-01	2,67E-02	1,49E-02	4,43E-02	2,72E-02	2,21E-02	2,80E-03	1,19E-02	-1,00E-02	
EP-FreshWater	kg P -eq	9,94E-03	6,61E-05	6,06E-05	8,51E-05	9,47E-06	4,25E-05	2,19E-05	1,51E-05	-2,97E-05	
EP-Marine	kg N -eq	1,10E-01	5,86E-03	5,12E-03	1,31E-02	1,20E-02	6,57E-03	8,21E-04	4,41E-03	-3,48E-03	
EP-Terrestrial	mol N eq	1,73E+00	6,53E-02	5,78E-02	1,45E-01	1,30E-01	7,26E-02	9,46E-03	4,86E-02	-4,09E-02	
POCP	kg NMVOC -eq	4,47E-01	2,57E-02	1,53E-02	4,45E-02	3,62E-02	2,22E-02	2,53E-03	1,39E-02	-1,08E-02	
ADP-minerals&metals ¹	Kg Sb-eq	1,18E-04	1,48E-04	3,52E-05	2,93E-04	3,99E-06	1,47E-04	4,39E-06	1,20E-05	-9,91E-05	
ADP-fossil ¹	MJ	6,59E+02	1,35E+02	1,10E+02	1,63E+02	3,58E+01	8,17E+01	1,07E+01	3,67E+01	-1,89E+01	
WDP ¹	m ³	1,45E+03	1,03E+02	9,91E+03	1,56E+02	7,61E+00	7,79E+01	1,19E+03	2,26E+02	-8,85E+02	

GWP total Global Warming Potential total; GWP fossil Global Warming Potential fossil fuels ; GWP biogenic Global Warming Potential biogenic; GWP luluc Global W Potential land use change; ODP Ozone Depletion; AP Acidification; EP freshwater Eutrophication aquatic freshwater; EP marine Eutrophication aquatic marine; EP terrestrial Eutrophication terrestrial ;POCP Photochemical zone formation; ADPE Abiotic Depletion Potential minerals and metals; ADPf Abiotic Depletion Potential fossil fuels;

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. 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

3. Eutrophication aquatic freshwater shall be in kg P-eq., there is a typo in EN 15804:2012+A2:2019 regarding this unit. Eutrophication calculated as PO4-eq is presented on page 11

Remarks to environmental impacts

Additional environmental impact indicators

Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
 PM	Disease incidence	3,36E-06	7,54E-07	2,87E-07	7,80E-07	3,29E-06	3,90E-07	4,49E-08	2,53E-07	-2,14E-07
 IRP ²	kgBq U235 eq.	5,81E+03	5,90E-01	3,40E+00	7,14E-01	1,56E-01	3,57E-01	1,80E-01	1,67E-01	-1,73E-01
 ETP-fw ¹	CTUe	7,43E+02	9,86E+01	5,90E+01	1,20E+02	1,96E+01	6,02E+01	7,62E+00	2,00E+01	-1,94E+01
 HTP-c ¹	CTUh	1,47E-07	0,00E+00	1,80E-09	0,00E+00	6,50E-10	0,00E+00	4,88E-10	8,13E-10	-9,75E-10
 HTP-nc ¹	CTUh	1,28E-06	9,54E-08	4,35E-08	1,30E-07	1,82E-08	6,50E-08	6,83E-09	1,45E-08	-2,39E-08
 SQP ¹	Pt	3,01E+02	1,55E+02	4,50E+01	1,13E+02	4,35E+00	5,63E+01	6,08E+00	1,41E+02	4,29E+01

PM Particulate Matter emissions; IRP Ionizing radiation – human health; ETP-fw Eco toxicity – freshwater; HTP-c Human toxicity – cancer effects; HTP-nc Human toxicity – non cancer effects; SQP Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. 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
2. 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.

Resource use											
Parameter		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	PERE	MJ	1,01E+02	1,70E+00	4,70E+01	2,31E+00	1,95E-01	1,15E+00	5,53E+00	1,31E+00	-4,42E+00
	PERM	MJ	2,75E+01	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	1,29E+02	1,70E+00	4,70E+01	2,31E+00	1,95E-01	1,15E+00	5,53E+00	1,31E+00	-4,42E+00
	PENRE	MJ	7,56E+02	1,35E+02	1,10E+02	1,63E+02	3,58E+01	8,17E+01	1,08E+01	3,67E+01	-1,99E+01
	PENRM	MJ	4,25E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	7,60E+02	1,35E+02	1,10E+02	1,63E+02	3,58E+01	8,17E+01	1,08E+01	3,67E+01	-1,99E+01
	SM	kg	2,23E+01	4,35E-03	7,78E-03	0,00E+00	1,76E-02	0,00E+00	9,24E-03	1,59E-02	-3,82E-02
	RSF	MJ	8,94E+01	5,94E-02	1,85E-01	8,25E-02	4,76E-03	4,13E-02	1,12E-01	2,73E-02	-9,04E-02
	NRSF	MJ	6,18E+02	1,99E-01	6,01E-01	2,95E-01	-7,15E-02	1,47E-01	-6,95E-03	5,88E-02	-9,29E-02
	FW	m ³	7,07E-01	1,54E-02	1,27E-01	1,72E-02	1,84E-03	8,60E-03	1,84E-02	4,51E-02	-6,94E-01

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 materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; FW Use of net fresh water

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Waste											
Parameter		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	HWD	kg	5,01E-02	7,38E-03	4,47E-02	8,33E-03	1,05E-03	4,17E-03	1,07E-03	2,58E-03	-4,55E-03
	NHWD	kg	5,78E+02	1,17E+01	3,81E-01	7,81E+00	4,24E-02	3,90E+00	3,39E-02	1,63E+02	-1,38E-01
	RWD	kg	6,25E-04	9,21E-04	1,56E-03	1,11E-03	2,49E-04	5,57E-04	1,14E-04	2,39E-04	-1,50E-04

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed;

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

*INA Indicator Not Assessed

End of life - Output flow											
Parameter		Unit	A1	A2	A3	A4	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	0,00E+00
	MFR	kg	5,89E-02	6,11E-05	3,16E-01	0,00E+00	1,73E-02	0,00E+00	4,88E+02	1,45E-02	-8,94E-04
	MER	kg	6,04E-01	3,77E-03	5,91E-03	0,00E+00	5,35E-05	0,00E+00	1,12E-03	2,73E-04	-3,34E-02
	EEE	MJ	4,02E-02	6,57E-04	1,93E-01	0,00E+00	1,83E-04	0,00E+00	1,92E-03	2,25E-02	-8,07E-03
	EET	MJ	6,08E-01	9,99E-03	2,92E+00	0,00E+00	2,78E-03	0,00E+00	2,91E-02	3,41E-01	-1,22E-01

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported energy Thermal

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

*INA Indicator Not Assessed

Biogenic Carbon Content		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	8,19E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

Additional Norwegian requirements

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

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 (A3).

Electricity mix	Data source	Amount	Unit
Electricity, Sweden (kWh)	ecoinvent 3.6	54,94	g CO ₂ -eq/kWh

Dangerous substances

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

Indoor environment

Additional Environmental Information

Environmental impact indicators EN 15804+A1 and NPCR Part A v2.0										
Parameter	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP	kg CO ₂ -eq	1,64E+02	8,23E+00	1,83E+00	1,07E+01	2,57E+00	5,36E+00	3,41E-01	1,31E+00	-1,19E+00
ODP	kg CFC11 -eq	2,77E-06	1,62E-06	8,75E-07	1,95E-06	4,46E-07	9,75E-07	8,43E-08	4,06E-07	-1,85E-07
POCP	kg C ₂ H ₄ -eq	4,98E-02	1,02E-03	3,49E-04	1,43E-03	3,96E-04	7,16E-04	7,59E-05	3,07E-04	-2,49E-04
AP	kg SO ₂ -eq	2,54E-01	1,73E-02	5,47E-03	2,13E-02	3,80E-03	1,06E-02	1,28E-03	3,63E-03	-2,92E-03
EP	kg PO ₄ ³⁻ -eq	7,76E-02	1,88E-03	8,06E-04	2,27E-03	4,22E-04	1,14E-03	1,70E-04	4,28E-04	-3,42E-04
ADPM	kg Sb -eq	1,12E-04	1,48E-04	3,51E-05	2,93E-04	3,99E-06	1,47E-04	4,39E-06	1,20E-05	-9,91E-05
ADPE	MJ	6,76E+02	1,33E+02	1,87E+01	1,60E+02	3,56E+01	8,00E+01	4,13E+00	3,52E+01	-1,89E+01
GWPIOBC	kg CO ₂ -eq	1,15E+02	8,31E+00	1,75E+00	1,08E+01	3,49E+03	5,42E+00	0,00E+00	0,00E+00	-1,19E+00

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources; GWP-IOBC/GHG Global warming potential calculated according to the principle of instantaneous oxidation (except emissions and uptake of biogenic carbon)

Bibliography

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EPD for the best environmental decision

The Norwegian EPD Foundation
www.epd-norge.no

