epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Leca®-sora 0-4 mm, Leca Finland



The Norwegian EPD Foundation

Owner of the declaration:
Leca International

Product:
Leca®-sora 0-4 mm, Leca Finland

Declared unit:
1 m3

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2018 Part B for Thermal insulation products

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 190104

General information

Product

Leca®-sora 0-4 mm, Leca Finland

Owner of the declaration:

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

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Manufacturer:

Leca International
Årnesvegen 1
2009 Nordby, Norway

Declaration number:

Place of production:

Leca Finland
Helsingintie 235
45740 Kuusankoski Finland, Finland

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2018 Part B for Thermal insulation products

Management system:

ISO 14001ISO 9001

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.

Organisation no:

918 799 141

Declared unit:

1 m3 Leca®-sora 0-4 mm, Leca Finland

Issue date:

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Valid to:

Year of study:

2023

Functional unit:

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804:2012+A2:2019 and seen in a building context.

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-Norway'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

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: Geir Norden

Verification of EPD tool:

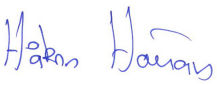
Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Approved:



Product

Product description:

Lightweight expanded clay aggregate is a granular ceramic material made from natural clay. The clay is mixed with organic material, dried and expanded to 3-4 times its original volume in rotary kilns at temperatures of about 1150 °C. The output lightweight expanded clay aggregate granules, in the range 0-32 mm, are sieved and blended into different grades of products and distributed in bulk or in bags.

Product specification

The EPD describes results for production of lightweight expanded clay aggregate, grading 0-4 mm, at Leca Kuusankoski.

Materials	Value	Unit
Additives/Waste materials	1	%
Clay	99	%
Limestone	< 1	%

Technical data:

The relevant technical properties for Leca®-sora 0-4 mm are provided below:

Loose bulk density (Test method: NS-EN 1097-3): 370 kg/m^3
Grading (Test method: NS-EN 933-1): 0-4 mm
Reaction to fire (Test method:NS-EN 13820): A1

Market:

Finland

Reference service life, product

Not relevant.

Reference service life, building or construction works

Not relevant.

LCA: Calculation rules

Declared unit:

1 m3 Leca®-sora 0-4 mm, Leca Finland

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+A2. 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:

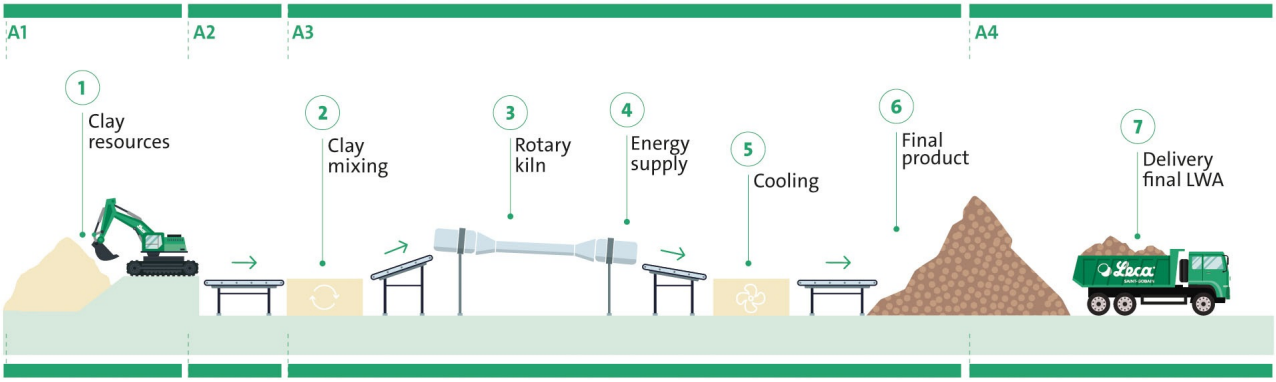
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Clay	LCA.no	Database	2021
Filler	ecoinvent 3.6	Database	2019

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	X	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/tonne)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	50	0,023	l/tkm	1,15

Assembly (A5)	Unit	Value			
Blowing, Machine operation, diesel, > 18.64 kW (per hour)	h/DU	0,03			
Bulldozer, Machine operation, diesel, >=74.57 kW (per hour)	h/DU	0,02			
Crane, Machine operation, diesel, >=74.57 kW (per hour)	h/DU	0,01			
Vibrating plate (per liter diesel)	L/DU	0,01			

De-construction demolition (C1)	Unit	Value			
Removal of LWA, Machine operation, diesel, >= 74.57 kW (per hour)	h/DU	0,04			
Sorting per kg of LWA, for waste treatment after removal (kg)	kg/DU	370,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (km)	36,7 %	50	0,044	l/tkm	2,20

Waste processing (C3)	Unit	Value			
Waste treatment, reuse of LWA (kg)	kg	277,50			

Disposal (C4)	Unit	Value			
Disposal, landfilling of waste LWA (kg)	kg	92,50			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary expanded clay (kg)	kg	277,50			

LCA: Results

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

Environmental impact												
	Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	1,09E-02	1,04E+00	5,93E+01	1,61E+00	1,27E+00	8,67E-01	3,09E+00	0,00E+00	7,60E-01	-6,97E+01
	GWP-fossil	kg CO_2 -eq	9,19E-03	1,04E+00	5,92E+01	1,61E+00	1,27E+00	8,67E-01	3,08E+00	0,00E+00	7,59E-01	-6,95E+01
	GWP-biogenic	kg CO_2 -eq	1,72E-03	4,42E-04	4,32E-02	6,90E-04	2,39E-04	1,61E-04	1,26E-03	0,00E+00	8,86E-04	-1,71E-01
	GWP-luluc	kg CO_2 -eq	1,15E-05	3,20E-04	6,87E-02	4,91E-04	9,96E-05	6,79E-05	1,08E-03	0,00E+00	1,86E-04	-2,71E-02
	ODP	kg CFC11 -eq	1,63E-09	2,48E-07	4,24E-06	3,89E-07	2,73E-07	1,86E-07	7,03E-07	0,00E+00	2,87E-07	-4,09E-06
	AP	mol H+ -eq	1,32E-04	3,30E-03	7,09E-01	5,19E-03	5,70E-03	3,16E-03	1,26E-02	0,00E+00	6,75E-03	-5,54E-01
	EP-FreshWater	kg P -eq	4,47E-07	8,24E-06	1,36E-03	1,28E-05	4,60E-06	3,13E-06	2,42E-05	0,00E+00	8,60E-06	-3,45E-03
	EP-Marine	kg N -eq	4,03E-05	7,17E-04	2,11E-01	1,14E-03	2,09E-03	1,05E-03	3,74E-03	0,00E+00	2,51E-03	-6,93E-02
	EP-Terrestial	mol N -eq	5,64E-04	8,00E-03	2,41E+00	1,27E-02	2,31E-02	1,16E-02	4,13E-02	0,00E+00	2,77E-02	-8,35E-01
	POCP	kg NMVOC -eq	1,22E-04	3,14E-03	6,02E-01	4,98E-03	6,70E-03	3,56E-03	1,27E-02	0,00E+00	7,92E-03	-2,26E-01
	ADP-minerals&metals[1]	kg Sb-eq	1,14E-07	1,93E-05	3,03E-04	2,87E-05	1,94E-06	1,32E-06	8,35E-05	0,00E+00	6,83E-06	-9,20E-04
	ADP-fossil[1]	MJ	2,19E-01	1,67E+01	4,46E+02	2,62E+01	1,74E+01	1,18E+01	4,65E+01	0,00E+00	2,09E+01	-7,05E+02
	WDP[1]	m^3	7,91E+01	1,31E+01	6,96E+03	2,01E+01	3,70E+00	2,52E+00	4,44E+01	0,00E+00	1,29E+02	-1,30E+03

GWP-total = Global Warming Potential total; 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: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"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

Remarks to environmental impacts

Due to the polluter-pay-principle, the emissions from waste are not included.
Biogenic carbon from biofuels are balanced to zero since they have their input and output in the same module.

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1,66E-09	9,23E-08	2,39E-05	1,48E-07	9,99E-08	6,20E-08	2,22E-07	0,00E+00	1,44E-07	-5,16E-06
IRP[2]	kgBq U235 -eq	3,17E-03	7,30E-02	2,69E+00	1,14E-01	7,45E-02	5,08E-02	2,03E-01	0,00E+00	9,53E-02	-1,46E+00
ETP-fw[1]	CTUe	4,45E+00	1,22E+01	5,92E+03	1,91E+01	9,52E+00	6,48E+00	3,42E+01	0,00E+00	1,14E+01	-1,70E+03
HTP-c[1]	CTUh	1,20E-11	0,00E+00	7,98E-08	0,00E+00	1,08E-09	7,22E-10	0,00E+00	0,00E+00	4,63E-10	-3,11E-08
HTP-nc[1]	CTUh	2,42E-10	1,20E-08	3,39E-06	1,85E-08	8,04E-09	5,15E-09	3,70E-08	0,00E+00	8,23E-09	-8,42E-07
SQP[1]	dimensionless	7,13E-02	1,85E+01	4,40E+03	3,00E+01	2,21E+00	1,50E+00	3,21E+01	0,00E+00	8,04E+01	-9,81E+02

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 = Potential Soil Quality Index (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												
Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	2,16E-01	2,13E-01	9,88E+02	3,29E-01	9,41E-02	6,41E-02	6,56E-01	0,00E+00	7,48E-01	-1,91E+02
	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	0,00E+00	0,00E+00
	PERT	MJ	2,16E-01	2,13E-01	9,88E+02	3,29E-01	9,41E-02	6,41E-02	6,56E-01	0,00E+00	7,48E-01	-1,91E+02
	PENRE	MJ	2,35E-01	1,67E+01	4,49E+02	2,62E+01	1,74E+01	1,18E+01	4,65E+01	0,00E+00	2,09E+01	-7,05E+02
	PENRM	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	0,00E+00	0,00E+00
	PENRT	MJ	2,35E-01	1,67E+01	4,49E+02	2,62E+01	1,74E+01	1,18E+01	4,65E+01	0,00E+00	2,09E+01	-7,05E+02
	SM	kg	0,00E+00	0,00E+00	1,21E+00	0,00E+00	8,54E-03	5,82E-03	0,00E+00	0,00E+00	0,00E+00	-1,04E+00
	RSF	MJ	1,96E-03	7,45E-03	1,95E+00	1,15E-02	2,32E-03	1,58E-03	2,35E-02	0,00E+00	1,55E-02	-5,04E+00
	NRSF	MJ	6,12E-04	2,51E-02	4,53E+02	3,86E-02	3,41E-02	2,32E-02	8,38E-02	0,00E+00	3,35E-02	-3,95E+00
	FW	m^3	2,06E-03	1,89E-03	4,18E-01	2,98E-03	8,95E-04	6,10E-04	4,90E-03	0,00E+00	2,57E-02	-4,69E-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 = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	1,71E-04	9,10E-04	5,82E-01	1,43E-03	5,12E-04	3,49E-04	2,37E-03	0,00E+00	0,00E+00	-7,77E-02
	NHWD	kg	1,10E-03	1,40E+00	4,81E+00	2,27E+00	2,06E-02	1,40E-02	2,22E+00	0,00E+00	9,25E+01	-4,89E+00
	RWD	kg	2,12E-06	1,14E-04	2,63E-03	1,79E-04	1,21E-04	8,22E-05	3,17E-04	0,00E+00	0,00E+00	-2,10E-03

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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1	A2	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	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	3,00E-01	0,00E+00	8,26E-03	5,71E-03	0,00E+00	2,78E+02	0,00E+00	-8,45E-01
	MER	kg	0,00E+00	0,00E+00	5,41E-02	0,00E+00	1,55E-04	1,77E-05	0,00E+00	0,00E+00	0,00E+00	-5,06E-02
	EEE	MJ	0,00E+00	0,00E+00	5,84E-02	0,00E+00	8,92E-05	6,07E-05	0,00E+00	0,00E+00	0,00E+00	-1,10E-01
	EET	MJ	0,00E+00	0,00E+00	8,83E-01	0,00E+00	1,35E-03	9,19E-04	0,00E+00	0,00E+00	0,00E+00	-1,67E+00

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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

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

Additional 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
Renewable electricity Saint-Gobain, based on 100% hydro power, with Guarantee of Origin from LOS 2021 (kWh)	ecoinvent 3.6	4,26	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	1,21E-02	1,04E+00	6,04E+01	1,61E+00	1,99E-01	1,98E-01	3,09E+00	0,00E+00	7,59E-01	-6,97E+01

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

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 Environmental product declaration - Core rules for the product category of construction products.
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
Vold et. al., (2022) EPD generator for NPCR 012 Thermal insulation, Background information for EPD generator application and LCA data, LCA.no report number: 07.22.
NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.
NPCR 012 Part B for Part B for Thermal insulation products, Ver. 2.0, 31.03.2022, EPD Norway.

	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web: www.epd-norge.no
	Owner of the declaration: Leca International Årnesvegen 1, 2009 Nordby	Phone: +47 41 43 71 00 e-mail: info@leca.no web: www.leca.no
	Author of the Life Cycle Assessment LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	Developer of EPD generator LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal