ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Leca International
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	
Registration number:	NA
ECO Platform reference number:	NA
Issue date:	
Valid to:	14.09.2023

Leca® L; Arlita 10/20; Avelar-Kings Lynn + 50 miles

Leca International

www.epd-norge.no

General information

Product:

Leca® L; Arlita 10/20; Avelar-Kings Lynn + 50 miles

Owner of the declaration:

Leca International
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Program operator:

The Norwegian EPD Foundation
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Manufacturer:

Leca International
Årnesvegen 1 , 2009 Nordby
Norway

Declaration number:

Place of production:

Leca International
Årnesvegen 1 , 2009 Nordby
Norway

ECO Platform reference number:

Management system:

ISO 14001 ISO 9001

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A1:2013 serves as core PCR
NPCR 012:2018 Part B for Thermal insulation products

Organisation no:

918 799 141

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.

Issue date:

Valid to:

14.09.2023

Declared unit:

1 m3 Leca® L; Arlita 10/20; Avelar-Kings Lynn + 50 miles

Year of study:

2018

Declared unit with option:

A1,A2,A3,A4

Comparability:

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

Functional unit:

Development and verification of EPD:

The declaration has been developed and verified using EPD tool lca.tools ver EPD2020.11, developed by LCA.no AS. The EPD tool is integrated into the company's environmental management system, and has been approved by EPD-Norway

Developer of EPD:

Tone Storbråten

Reviewer of company-specific input data and EPD:

Jan Szanser

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 proccess is reviewed annualy. 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.

Anne Rønning, Norsus AS

(no signature required)

Approved:

Sign

Håkon Hauan, CEO EPD-Norge

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 4-5 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. Each granule has a hard ceramic shell that surrounds a honeycomb core.

Product specification

Lightweight expanded clay aggregate is a durable product with an unlimited lifespan and 100% of the installed product can be reused or recycled.

Lightweight expanded clay aggregate has low density (typical loose bulk density range depending on grain size 200-800 kg/m^3) and relatively high strength.

Materials	%
Clay	92-98 %
Waste	2-5 %
Dolomite	1 - 3 %

Technical data:

The relevant technical properties for Geo Leca® are provided below:
Technical property.....Test method.....Typical value
Loose bulk density.....(EN 1097-3).....275 kg/m^3
Grading.....(EN 933-1).....10-20 mm
Percentage of crushed particles...(EN 13055-1)..... <= 25 %
Compressibility and
confined compressive strength.....(NS-EN 13055-1)...>= 0,7 N/mm^2
Thermal conductivity .....(NS-EN 14063-1)...0,110 W/mK
Reaction to fire.....(NS-EN 13820).....A1
.
Grading - Density [kg/m^3]
Leca® 0/3..... 610
Leca® XS..... 455
Leca® S..... 430
Leca® M..... 330

Market:

Portugal and Spain

Reference service life, product

Not relevant

Reference service life, building

Not relevant

LCA: Calculation rules

Declared unit:

1 m3 Leca®L; Arlita 10/20; Avelar-Kings Lynn + 50 miles

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.

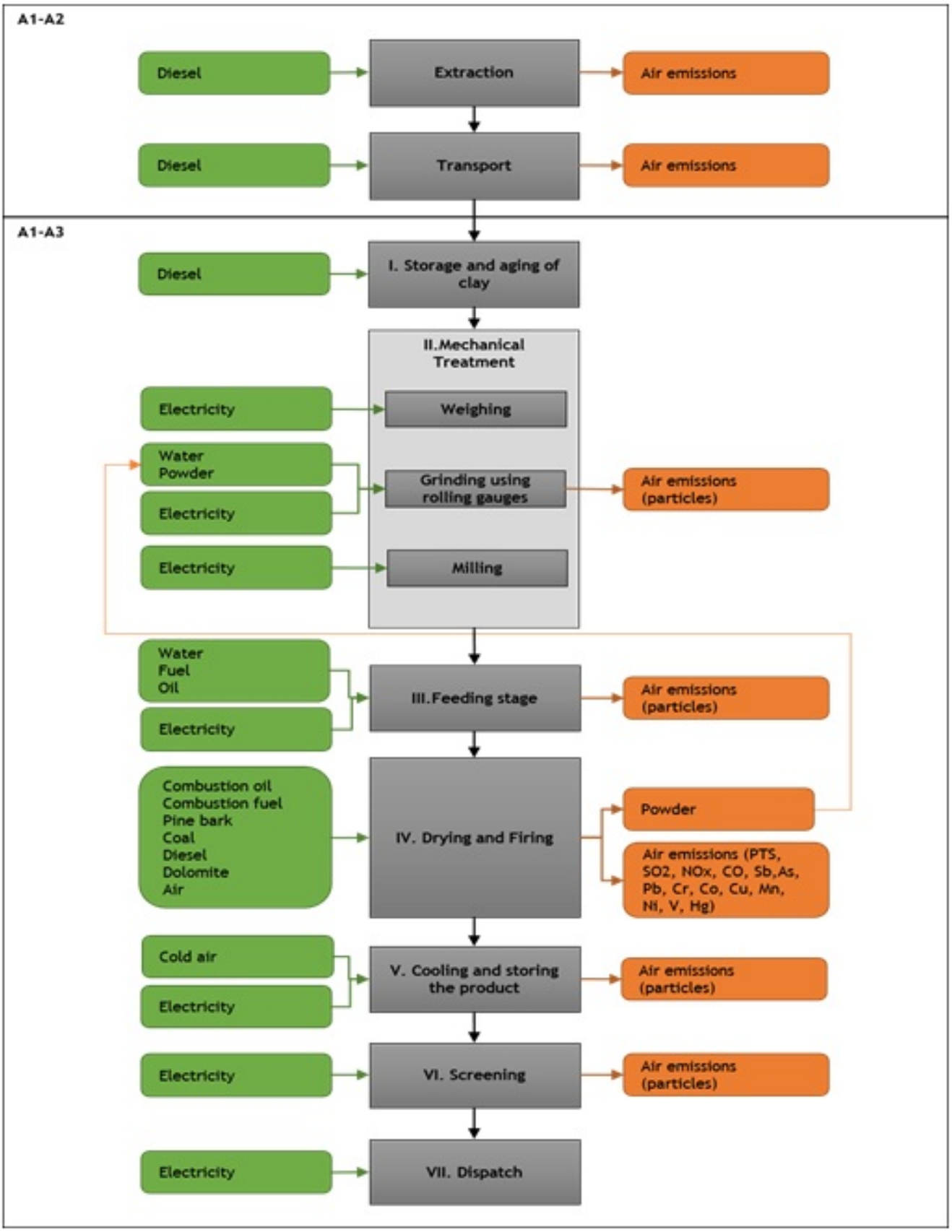
Data quality:

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

Materials	Source	Data quality	Year
Dolomite	ecoinvent 3.4	Database	2017
Oxygen	ecoinvent 3.4	Database	2017
Additives	ecoinvent 3.5	Database	2018
Clay	Specific data	Database	2018
Waste products	LCA.no	Database	2019

System boundary:

The system boundary of the EPD follows the modular structure in line with EN 15804. This section describes the modules which are contained within the scope of this study. As the scope of the assessment is up to the point at which the lightweight clay aggregate is manufactured modules A1- A4 have been considered in this LCA



Additional technical information:

Geo Leca® is a ceramic material with good resistance to frost, high temperatures and chemicals etc. Geo Leca® has good insulation and drainage properties.

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)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit	Value (l/t)
Truck	55,0 %	Truck, lorry over 32 tonnes, EURO 6	166	0,022606	l/tkm	3,74
Railway					l/tkm	
Boat	50,0 %	Ship, bulk ship, 5000 DWT (3500-4000 tonne load)	1919	0,004604	l/tkm	8,83
Other Transportation					l/tkm	

Assembly (A5)

.	Unit	Value
Auxiliary	kg	
Water consumption	m^3	
Electricity consumption	kWh	
Other energy carriers	MJ	
Material loss	kg	
Output materials fr ste treatment	kg	
Dust in the air	kg	
VOC emissions	kg	

Use (B1)

.	Unit	Value

Maintenance (B2)/Repair (B3)

.	Unit	Value
Maintenance cycle*		
Auxiliary		
Other resources		
Water consumption	m^3	
Electricity consumption	kWh	
Other energy carriers	MJ	
Material loss	kg	
VOC emissions	kg	

Replacement (B4)/Refurbishment (B5)

.	Unit	Value
Replacement cycle*		
Electricity consumption	kWh	
Replacement of worn parts		

* Described above if relevant

Operational energy (B6) and water consumption (B7)

.	Unit	Value
Water consumption	m^3	
Electricity consumption	kWh	
Other energy carriers	MJ	
Power output of equipment	kW	

End of Life (C1, C

.	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction wa	kg	
Reuse	kg	
Recycling		
Energy recovery		
To landfill	kg	

Scenarios after A1-A4 are not included

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit	Value (l/t)
Truck					l/tkm	
Railway					l/tkm	
Boat					l/tkm	
Other Transportation					l/tkm	

LCA: Results

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

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

Product stage				Construction installation stage	User stage							End of life stage				.	Beyond the system bondaries
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	MND	MND	MND	MND	.	MND

Environmental impact

Parameter	Unit	A1	A2	A3	A4
GWP	kg CO_2 -eq	7,33E-01	7,91E-01	6,40E+01	1,88E+01
ODP	kg CFC11 -eq	9,97E-07	1,49E-08	1,19E-06	3,41E-06
POCP	kg C_2H_4-eq	3,10E-04	1,27E-04	2,44E-02	1,08E-02
AP	kg SO_2 -eq	7,28E-03	2,57E-03	4,53E-01	2,95E-01
EP	kg PO_4^{3-} -eq	1,78E-03	4,31E-04	5,03E-02	3,85E-02
ADPM	kg Sb -eq	1,49E-06	2,18E-06	6,54E-06	1,16E-05
ADPE	MJ	7,87E+01	1,24E+01	4,26E+02	2,75E+02

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

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

Resource use

Parameter	Unit	A1	A2	A3	A4
RPEE	MJ	1,34E+00	2,24E-01	6,44E+02	2,14E+00
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	1,34E+00	2,24E-01	6,44E+02	2,14E+00
NRPE	MJ	8,20E+01	1,28E+01	4,41E+02	2,79E+02
NRPM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	8,20E+01	1,28E+01	4,41E+02	2,79E+02
SM	kg	1,13E+01	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	1,77E-03	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	1,42E+02	0,00E+00
W	m^3	6,08E-03	3,01E-03	1,13E-01	3,61E-02

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

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
HW	kg	2,64E-05	6,66E-06	2,55E-02	1,18E-04
NHW	kg	2,20E-01	1,16E+00	2,27E+01	6,49E+00
RW	kg	INA*	INA*	INA*	INA*

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

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

End of life - Output flow

Parameter	Unit	A1	A2	A3	A4
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	0,00E+00	0,00E+00	2,05E-01	0,00E+00
MER	kg	0,00E+00	0,00E+00	3,85E-04	0,00E+00
EEE	MJ	INA*	INA*	INA*	INA*
ETE	MJ	INA*	INA*	INA*	INA*

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 E-03 = 9,0*10-3 = 0,009
*INA Indicator Not Assessed

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, Portugal (kWh)	ecoinvent 3.6	417,72	g CO2-ekv/kWh

Dangerous substances

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

Indoor environment

Bibliography

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NPCR 012:2018 Part B for Thermal insulation products

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