

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:	NEP D-2249-1030-EN
Registration number:	NEPD-2249-1030-EN
ECO Platform reference number:	-
Issue date:	15.06.2020
Valid to:	15.06.2025

Leca® Letklinker 10-20; Hinge

Leca International

www.epd-norge.no

Leca





General information

Product:

Leca® Letklinker 10-20; Hinge

Program operator:

The Norwegian EPD Foundation Pb. 5250 Majorstuen, 0303 Oslo Phone: +47 23 08 80 00 e-mail: post@epd-norge.no

Declaration number:

NEPD-2249-1030-EN

ECO Platform reference number:

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

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® Letklinker 10-20; Hinge

Declared unit with option:

A 1 , A 2 , A 3 , A 4

Functional unit:

Verification:

Independent verification of data, other environmental information and the declaration according to ISO14025:2010, § 8.1.3 and § 8.1.4

External

Third party verifier:

Sign

anc Konny

Senior Research Scientist, Anne Rønning

(Independent verifier approved by EPD Norway)

Owner of the declaration:

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

Manufacturer:

Leca International

Place of production:

Leca Denmark A/S Randersvej 75 Hinge 8940 Randers Denmark

Management system:

ISO 14001 ISO 9001

Organisation no:

918 799 141

Issue date:

15.06.2020

Valid to:

15.06.2025

Year of study:

2018

Comparability:

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

Author of the Life Cycle Assessment:

The declaration is developed using eEPD v4.0 from LCA.no Approval: Company specific data are:

Collected/registered by: Tone Storbråten

Internal verification by: Jan Szanser

Approved:





Product

Product description:

The EPD describes results for production of lightweight expanded clay aggregate, labelled Leca letklinker, Leca 10-20, from the factory in Hinge, Denmark.

Lightweight expanded clay aggregate is a granular ceramic material made from natural clay (see process description below). The main characteristic of expanded clay is low density combined with high strength.

Leca® letklinker is used in lightweight blocks and slabs, insulation fill, water treatment, lightweight fillings and geotechnical fills for thermal and sound insulation purposes. Thus Leca® letklinker is typically hidden in buildings or cast into concrete.

The density of Leca \circledast 10-20 is 0.245 tonnes per m³. The thermal conductivity is 0.095 W/mK.

Further information or explanatory material may be obtained by contacting Leca Danmark A/S.

Product specification

The water content of the Leca® letklinker is 0% when the Leca® letklinker is produced at Leca Danmark A/S in Hinge. The storage conditions can change the water content of the Leca® letklinker up to 25%.

Different waste are recovered in the production process both as fuels as clay additives. See additional Tech info.

Leca \circledast 10-20 is produced by using nearby clay and transported by using a conveyer belt to the factory.

Negligible amounts of packaging material is used for raw materials and auxiliaries received at Leca Danmark A/S so the potential

environmental impacts from packaging is not included. Furthermore the final product Leca® letklinker is sold in bulk, so no packaging is used.

Materials	%
Clay	93 %
Waste/bio raw materials	7 %
Lime	<0,5 %

Technical data:

TECHNICAL DATA

PARAMETER - TEST METHOD VALUE UNIT GRADING²

VALUE UNIT GRADING
Loose bulk density - EN 1097-3 0,67 ton/m ³ 0-2 0,28 ton/m ³ 2-4 0,29 ton/m ³ 4-10 0,24 ton/m ³ 10-20
Particle density - EN 1097-6 Annex C & E 1,210 kg/m ³ 0-2 500 kg/m ³ 2-4 560 kg/m ³ 4-10 400 kg/m ³ 10-20
Compressibility and confined compressive strength - EN 13055-1 Annex A N/A ³ MPa 0-2 N/A ³ MPa 2-4 1.06 MPa 4-10 0.75 MPa 10-20
Thermal conductivity - EN 12667 N/A(4) W/mK 0-2 0,095 W/mK 2-4 0,095 W/mK 4-10 0,095 W/mK 10-20
Reaction to fire - A1 All gradings

² The grading is tested according to EN 933-1
³ Compressibility and confined compressive strength are not determined for gradings 0-2 and 2-4
(4) Thermal conductivity are not determined for grading 0-2

Market:

Denmark

Reference service life, product

Not relevant

Reference service life, building

Not relevant

LCA: Calculation rules

Declared unit:

1 m3 Leca® Letklinker 10-20; Hinge

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, econvent and other LCA databases. The data guality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Dolomite	ecoinvent 3.4	Database	2017
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:

Clay is excavated and transported through a stone separator from the clay pit to the clay storage. In the pretreatment plant the clay and additives are mixed and transported to the kiln. The clay mix is dried in the first part of the kiln.

To promote circular economy, Leca A/S uses various resources as clay additives. Additives are typically waste fractions for example various sludge's substituting heavy fuel oil, mill scale as well as waste granulated mineral wool.

In the second part of the kiln the clay mix is expanded and burned at 1,150 °C. The expanded clay is cooled and stored until it is crushed and sorted into saleable fractions.

Expanded clay is delivered in bulk.

Leca Danmark A/S uses various resources as fuels. Fuel is waste solvents from medical industry, waste coal from aluminium industry, and other waste biofuels such as grinded wood, substituting fossil fuels. Besides these waste types, coal and natural gas is also needed as fuel.



Value

kg

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)

Туре	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit	Value (I/t)
Truck	55,0 %	Truck, lorry over 32 tonnes, EURO 6	100	0,022606	l/tkm	2,26
Railway					l/tkm	
Boat					l/tkm	
Other Transportation					l/tkm	

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Dust in the air

VOC emissions

Use (B1)				-	_	-
USE (B1)		-	-			
		52	8		-	
	~	-	•		_	

•	Unit	Value	•	Unit	Value
Auxiliary	kg				
Water consumption	m ³				
Electricity consumption	kWh				
Other energy carriers	MJ				
Material loss	kg]		
Output materials fr ste treatment	kg				

Maintenance (B2)/Repair (B3)			Replacement (B4)/Refurbishment (B5)	
•	Unit	Value		Unit
Maintenance cycle*	UCO.		Replacement cycle*	
Auxiliary	Char.		Electricity consumption	kWh
Other resources	4/10		Replacement of worn parts	
Water consumption	m ³	NG R	* Described above if relevant	
Electricity consumption	kWh	6	T a	
Other energy carriers	MJ		47.	
Material loss	kg		AA	
VOC emissions	kg		- are	
Operational energy (B6) and water consu	mption (B7)		End of Life (C1, 70+	

kg

kg

Operational energy (B6) and water consumption (B7)

operational energy (Do) and water conse	imption (Br)				
•	Unit	Value	in inc.	Unit	Value
Water consumption	m ³		Hazardous waste disposed	kg	
Electricity consumption	kWh		Collected as mixed construction was	kg	
Other energy carriers	MJ		Reuse	kg	
Power output of equipment	KW		Recycling		
			Energy recovery		
			To landfill	kg	

Transport to waste processing (C2)

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



LCA: Results

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

Pro	oductsta	age	Const insta sta	ruction llation age		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	W aste processing	Disposal	Reuse-Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Х	Х	Х	Х	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	2,57E-02	5,34E-02	9,64E+01	2,03E+00
ODP	kg CFC11 -eq	2,34E-09	1,01E-08	5,35E-07	4,17E-07
POCP	kg C ₂ H ₄ -eq	6,79E-06	8,09E-06	5,03E-02	3,17E-04
AP	kg SO ₂ -eq	1,72E-04	1,26E-04	1,07E+00	5,23E-03
EP	kg PO ₄ ³⁻ -eq	7,22E-05	1,65E-05	4,85E-02	7,22E-04
ADPM	kg Sb -eq	1,19E-06	1,66E-07	1,44E-06	4,83E-06
ADPE	MJ	2,76E-01	8,07E-01	8,75E+02	3,33E+01

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	6,88E-02	1,19E-02	5,56E+01	6,05E-01
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	6,88E-02	1,19E-02	5,56E+01	6,05E-01
NRPE	MJ	4,29E-01	8,26E-01	8,82E+02	3,43E+01
NRPM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	4,29E-01	8,26E-01	8,82E+02	3,43E+01
SM	kg	3,04E+01	0,00E+00	1,90E-01	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	2,08E+02	0,00E+00
W	m ³	1,47E-04	1,56E-04	8,10E-02	8,13E-03

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	5,00E-07	4,86E-07	1,27E-04	1,83E-05	
NHW	kg	9,90E-03	4,42E-02	3,90E+01	3,14E+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	2,17E-04	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	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, renewable electricity with Guarantee of Origin, DK (kWh)	Modified ecoinvent 3.6	16,90	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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