ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025 ISO 21930 EN 15804

Owner of the declaration	Saint-Gobain Byggevarer AS
Program holder	The Norwegian EPD Foundation
Publisher	The Norwegian EPD Foundation
Declaration number	00120 rev1
Issue date	25.10.2013
Valid to	25.10.2018

Leca® Lettklinker ISO 10-20

Product

Saint-Gobain Byggevarer AS

Manufacturer

General information

Leca® Lettklinker ISO 10-20
Product

Saint-Gobain Byggevarer AS
Manufacturer

Program holder:
The Norwegian EPD Foundation
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Owner of the declaration:
Saint-Gobain Byggevarer AS
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Declaration number:
00120 rev1

Place of production:
Weber Leca Rælingen
Årnesvegen
2009 Nordby

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serve as core PCR
Requirements on the EPD for www.bau-umwelt.com
Lightweight aggregates / Bulk granulate

Management system:
ISO 90001 and 14001-certified

Declared unit:
1 m^3 of Light Weight Aggregate (LWA), bulk

Org. No:
940 198 178 MVA

Declared unit with option:

Issue date:
25.10.2013

Functional unit:

Valid to:
25.10.2018

The environmental product declaration has been worked out by:
Clara Valente and Mie Vold

Østfoldforskning

Comparability:
EPD of construction products may not be comparable if they not comply with EN 15804

Year of study:
2013

Verification:
Independent verification of data and other environmental information has been carried out in accordance with ISO14025, 8.1.3.

externally ☑ internally ☐

Approved according to ISO14025, 8.1.4

Erik Svanes
Seniorforsker Erik Svanes
(Independent verifier approved by EPD Norway)

Sverre Fossdal
Dr. ing Sverre Fossdal
(Chairman of the Verification Group of EPD-Norway)

Declared unit:
1 m^3 of Light Weight Aggregate (LWA), bulk

Key environmental indicators	Unit	Cradle to gate A1 - A3	Transport to central warehouse Norway
Global warming	kg CO_2 -eqv	54	1,28
Energy use	MJ	931	20
Dangerous substances	*		
Share of renewable energy	%	28	

* The product contains no substances from the REACH Candidate list or the Norwegian priority list

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.

Product specification

The EPD describes results for production of lightweight expanded clay aggregate, grading 10-20 mm, at Weber Leca Rælingen. For calculations of environmental data for other types of Leca® Lettklinker than grading ISO 10-20, densities from the table of different gradings should be used. The average annual production of lightweight expanded clay kiln material at Weber Leca Rælingen has a weight of 0,30 tonne/m^3.

Materials	%
Clay	98
Dolomite	2
NaOH	<1%
Soap	<1%
Glycerol	<1%
Packaging	<1%

Technical data:

The relevant technical properties for Leca® Lettklinker ISO 10-20 are provided in the table below:

Technical property	Test method	Typical value
Loose bulk density	NS-EN 1097-3	220 kg/m³
Particle density	NS-EN 1097-6 Annex C & E	500 kg/m³
Grading	NS-EN 933-1	10-20 mm
Compressibility and confined compressive strength for ISO 10-20 mm	NS-EN 13055-1 Annex A	0,9 MPa
Thermal conductivity for ISO 10-20 mm	NS-EN 14063-1	0,107 W/mK
Reaction to fire	NS-EN 14063-1	A1

Factor(s) to apply to EPD results for different grading(s) are:

Grading [mm]	Dencity [tonn/m^3]
0-32	0,28
0-2	0,60
2-4	0,32
4-10	0,26
10-20	0,22
Filtralite'	0,80

Market:

Norway

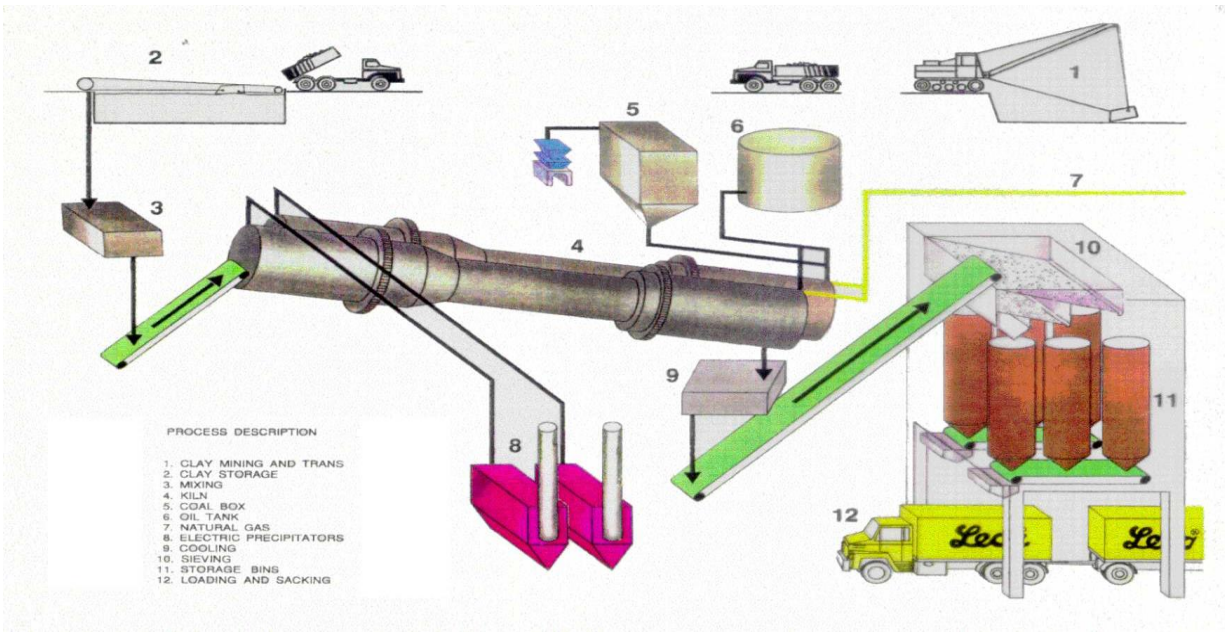
LCA: Calculation rules

Declared unit:

1 m^3 of Light Weight Aggregate (LWA), bulk

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-A3 have been considered in this LCA.



Data quality:

Raw material	Data quality	Source of data
Clay	Spesific data	Weber
Dolomite	Literature data	EcoInvent
NaOH	Literature data	EcoInvent
Soap	Literature data	EcoInvent
Glycerol	Literature data	EcoInvent
Data in all processes are less than 5 years of age and of good quality		

Cut-off criteria:
All input data are included

Allocation:
• In cases where waste products from another production are used, matters related to the original production are allocated to the original product
• Alternative energy is regarded as waste products from another production. Impacts associated with the production are allocated to the original production, while impacts due to incineration are allocated to the activities that take advantage of the energy.
• All emissions and consumption of resources associated with the production of electricity and other energy carriers used in the production of the raw materials in the LWA are allocated to the raw materials and then LWA in the next stage.

LCA: Scenarios and additional technical information

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

Additional information: Transport from production site to central warehouse in Norway 50 km

Additional technical information
Leca® Lettklinker ISO 10-20 is a ceramic material with good resistance to frost, high temperatures and chemicals etc. Leca® Lettklinker ISO 10-20 has good insulation and drainage properties.

LCA: Results

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	Construction installation stage	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impact

Parameter	A1	A2	A3	A1-A3					
GWP	3,01	0,33	50,43	53,77					
ODP	5,22E-07	2,44E-09	3,36E-07	8,60E-07					
POCP	3,67E-03	5,19E-04	1,67E-02	2,09E-02					
AP	4,05E-03	4,35E-04	1,51E-02	1,96E-02					
EP	1,78E-02	1,83E-03	2,95E-01	3,15E-01					
ADPM	6,91E-06	4,78E-09	2,86E-05	3,55E-05					
ADPE	43,31	4,37	260,54	308,23					

GWP Global warming potential (kg CO_2-eqv.); **ODP** Depletion potential of the stratospheric ozone layer (kg CFC11-eqv.); **POCP** Formation potential of tropospheric photochemical oxidants (kg C_2H_4-eqv.); **AP** Acidification potential of land and water (kg SO_2-eqv.); **EP** Eutrophication potential (kg PO_4^{-3}-eqv.); **ADPM** Abiotic depletion potential for non fossil resources (kg Sb -eqv.); **ADPE** Abiotic depletion potential for fossil resources (MJ)

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

Resource use

Parameter	A1	A2	A3	A1-A3					
RPEE	5,81	0,00	250,32	256,13					
RPEM	0,00	2,08E-09	0,00	0,00					
TPE	*5,81*	*8,22E-04*	*250,32*	*256,13*					
NRPE	43,76	4,38	396,46	444,61					
NRPM	0,00	0,00	0,00	0,00					
TRPE	*43,76*	*4,38*	*396,46*	*444,61*					
SM	8,25E-09	0,00E+00	7,78E-11	8,33E-09					
RSF	0,00	0,00	0,00	0,00					
NRSF	0,00	0,00	230,49	230,49					
W	2,63	1,89E-03	18,41	21,03					

RPEE Renewable primary energy resources used as energy carrier (MJ); **RPEM** Renewable primary energy resources used as raw materials (MJ); **TPE** Total use of renewable primary energy resources (MJ); **NRPE** Non renewable primary energy resources used as energy carrier (MJ); **NRPM** Non renewable primary energy resources used as materials (MJ); **TRPE** Total use of non renewable primary energy resources (MJ); **SM** Use of secondary materials (kg); **RSF** Use of renewable secondary fuels (MJ); **NRSF** Use of non renewable secondary fuels (MJ); **W** Use of net fresh water (m^3)

End of life - Waste

Parameter	A1	A2	A3	A1-A3					
HW	3,20E-04	1,79E-05	1,36E-04	4,74E-04					
NHW	1,18E-01	0,00	11,53	11,65					
RW									

HW Hazardous waste disposed (kg); **NHW** Non hazardous waste disposed (kg), **RW** Radioactive waste disposed (kg)

End of life - Output flow

Parameter	A1	A2	A3	A1-A3					
CR	0,00	0,00	0,00	0,00					
MR	0,00	0,00	0,07	0,07					
MER									
EEE									
ETE									

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

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

Specific Norwegian requirements

Electricity
Nordic electricity-mix for electricity used in production of the mortar

Greenhouse gas emissions 0,038 kg CO_2 eqv/MJ

Dangerous substances
None of the following substances have been added to the product: Substances on the REACH Candidate list of substances of very high concern (of 25.10.2013) substances on the Norwegian Priority list (of.25.10.2013) and substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations.

Transport
Transport from production site to central warehouse in Norway is 50 km

Indoor environment
The product has no influence on indoor climate

Carbon footprint
Is not developed

Bibliography

ISO 14025:2006	*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	*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*
Vold, M and Valente C.:	EPD for Leca® Lettklinker, Background information , Ostfold Research (Østfoldforskning as), Okt 2013, Fredrikstad
PCR	Part B: Requirements on the EPD for Lightweight aggregates / Bulk granulates, version 1.1, 29.10.2012 , (www.bau-umwelt.com)

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