Wienerberger

Project EPD, Light clay bricks

Scope of the declaration

This environmental product declaration covers the environmental impacts of light clay bricks. The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 18.6.2018). This declaration covers the life cycle stages from cradle-to-gate with options including transportation to installation site, deconstruction, transportation, treatment and recovery of the product at its end-of-life.

17.2.2021

This verified Environmental Product Declaration was created with One Click LCA - the world leading life-cycle assessment, life-cycle costing and sustainability metrics tool designed by Bionova Ltd, Finland, www.oneclicklca.com.

General information, declaration scope and verification (7.1)

1. **Owner of the declaration, manufacturer**

Wienerberger Oy Ab
Kumpulantie 15, 00520 HELSINKI, FINLAND
Juha Karilainen
+358 207 489 271
juha.karilainen@wienerberger.com

2. **Product name and number**

Bricks from light clay with minimum lime content: Kuura, Pellava, Tummapellava, Utu, Kajo, Tunturi, Hilla

Bricks from light clay with maximum lime content: Tuohi, Superwhite, Harmaa

3. **Place of production**

Koria, Finland

4. **Additional information**

More information can be found at webpage of the company www. www.wienerberger.fi/

5. **Product Category Rules and the scope of the declaration**

This EPD has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards together with the RTS PCR (English version, 18.6.2018). Product specific category rules have not been applied in this EPD. EPD of construction materials may not be comparable if they do not comply with EN15804 and seen in building context.

6. **Author of the life-cycle assessment and declaration**

Sara Tikka
Bionova Oy

7. **Verification**

This EPD has been verified by an internal verifier against the ISO 14025:2010, EN 15804: 2012+A1:2013 standards and RTS PCR.

Verification date: 15.2.2021

8. **Declaration issue date**

17.2.2021

European standard EN 15804: 2014 A1 serves as the core PCR
Independent verification of the declaration and data, according to ISO14025:2010
☑ Internal ☐ External
Internal verifier: Valtteri Kainila

Product information

9. Product description

This document refers to perforated and whole bricks produced in Koria at Wienerberger Oy Ab from light clay.

10. Technical specifications

The lime content of a light brick recipe can vary. Effect of recipe variation on product stage (A1-A3) and benefit (D) results can be seen from scoreboards.
Burnt bricks can be used for façade and frame construction, chimney masonry as well as interior and exterior structures.

11. Product standards

Wienerberger bricks are CE marked and their properties can be found on the product packaging and on the website: www.wienerberger. The products comply with the standard SFS-EN 771-1 + A1 for burnt bricks.

12. Physical properties

The size of the brick may vary depending on the application. The amount of brick used per square meter of wall depends on the size of the brick. The most common brick sizes and brick consumption in façade construction and chimney masonry are shown in the table below. Consumption calculated with 15 mm mortar joints and losses about 4-5%. More information can be found on the manufacturer's website.

Tiili	Name	Dimensions, mm	Mass, kg/brick	Consumption, bricks/m2
Façade cladding	MRT 60	285 x 85 x 60	1,9	47
	RT 60	285 x 135 x 60	2,8	47
	MRT 65	285 x 85 x 75	2,4	39
	RT 60	285 x 135 x 75	3,8	39
Chimney and fireplace bricks	PRT/PT	257X123X57	2,8	55
	NRT	270X130X75	3,6	42
Brick tile	MTL	285X45X60	1,5	47

13. Raw-materials of the product

Product structure / composition / raw-material	Light brick (min. lime content)	Light brick (max. lime content)
Clay	56,7 %	48,7 %
Sand	27,7 %	22,5 %
Crushed brick	12,2 %	8,6 %
Lime	2,6 %	19,5 %
Sawdust	0,8 %	0,7 %

14. Substances under European Chemicals Agency's REACH, SVHC restrictions

Name	EC Number	CAS Number
The product does not contain REACH SVHC substances.		

15. Functional / declared unit

1 ton of clay brick

16. System boundary

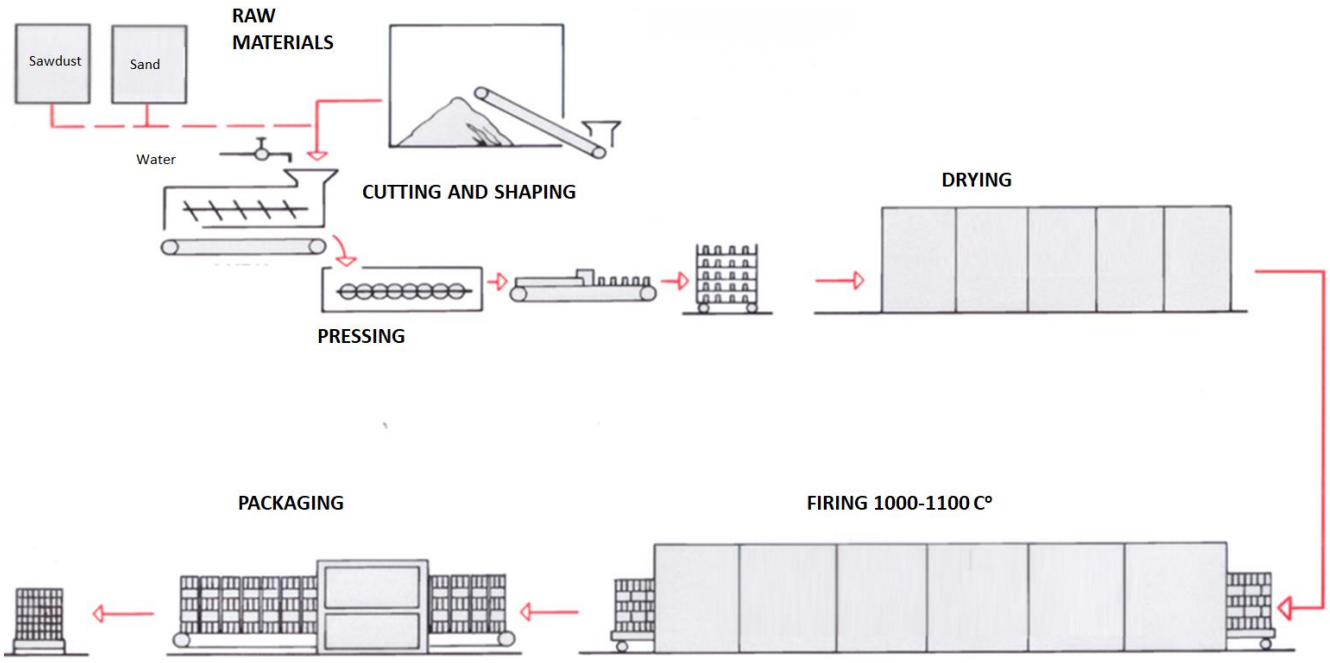
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) and A4 (Transportation of the product to the building site) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary - have been included. Only primary materials were taken into account in benefits calculations.

17. Cut-off criteria

All used materials, energy, packaging, transportation fuel and waste treatment until the end-of waste state have been included in the product stage (A1-A3). Results for the product stage have been provided as an aggregate. A4 transportation has been estimated to be 130 km, the return trip has not been considered. Module B information has not been presented or included in the LCA calculation. Of module C all impacts have been calculated (C1-C4). C1 includes the deconstruction using energy 0,011 kWh/kg. The distance for C2 has been estimated to be 50 km. C3 includes bricks crushing. C4 includes the landfilling of the product which cannot be separated. Module D considers the benefits of brick recycling.

18. Production process

The product manufacturing includes following stages: clay homogenizing, mixing the recipe components, pressing and cutting the brick mass to the required size and shape, drying, burning and cooling the bricks, and finally, packaging.



Scope of the Life-Cycle Assessment (7.2.1-2)

Mark all the covered modules of the EPD with X. Mandatory modules are marked with blue in the table below. This declaration covers “cradle-to-gate with options”. For other fields mark MND (module not declared) or MNR (module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
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

Mandatory modules
Mandatory as per the RTS PCR section 6.2.1 rules and terms
Optional modules based on scenarios

Environmental impacts and raw-material use (7.2.3-7.2.4)

19. Environmental impacts

The results of a life cycle assessment are relative. They do not predict impact on category endpoints, exceeding of limit values, safety margins, or risks. The impacts are presented per declared unit, 1 ton of product. The impacts are mainly caused by the manufacturing process (A3) energy consumption.

Environmental impact, Light brick (min. lime content)								
Parameter	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO2 -eqv	8,98E+1	1,21E+1	2,59E+0	4,33E+0	4,96E+0	2,25E+0	-9,49E+0
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,27E-5	2,40E-6	5,71E-7	8,56E-7	8,78E-7	7,43E-7	-1,00E-6
Formation of photochemical ozone	kg C2H4 -eqv	3,03E-2	1,92E-3	3,89E-4	6,87E-4	1,11E-3	8,16E-4	-2,87E-3
Acidification	kg SO2 -eqv	2,04E+0	3,23E-2	8,44E-3	1,15E-2	3,22E-2	1,66E-2	-5,39E-2
Eutrophication	kg PO4 3--eqv	3,89E-1	4,32E-3	1,14E-3	1,54E-3	6,06E-3	2,85E-3	-7,70E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	8,4E-4	7,59E-5	4,24E-6	2,71E-5	1,40E-5	7,53E-6	-1,97E-4
Abiotic depletion of fossil resources	MJ	1,12E+3	1,98E+2	3,04E+1	7,06E+1	8,30E+1	6,36E+1	-1,36E+2

Environmental impact, Light brick (max. lime content)								
Parameter	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO2 -eqv	9,86E+1	1,21E+1	2,59E+0	4,33E+0	4,96E+0	2,25E+0	-9,82E+0
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,31E-5	2,40E-6	5,71E-7	8,56E-7	8,78E-7	7,43E-7	-1,04E-6
Formation of photochemical ozone	kg C2H4 -eqv	3,43E-2	1,92E-3	3,89E-4	6,87E-4	1,11E-3	8,16E-4	-2,97E-3
Acidification	kg SO2 -eqv	2,07E+0	3,23E-2	8,44E-3	1,15E-2	3,22E-2	1,66E-2	-5,57E-2
Eutrophication	kg PO4 3--eqv	3,95E-1	4,32E-3	1,14E-3	1,54E-3	6,06E-3	2,85E-3	-7,96E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	7,69E-4	7,59E-5	4,24E-6	2,71E-5	1,40E-5	7,53E-6	-2,04E-4
Abiotic depletion of fossil resources	MJ	1,24E+3	1,98E+2	3,04E+1	7,06E+1	8,30E+1	6,36E-1	-1,40E+2

20. Use of natural resources

Resource use, Light brick (min. lime content)								
Parameter	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Renewable primary energy resources used as energy carrier	MJ	7,63E+0	2,89E+0	0E0	1,03E+0	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	4,4E+2	0E0	2,56E+1	0E0	4,72E+0	1,64E+0	-6,77E+0
Total use of renewable primary energy resources	MJ	4,48E+2	2,89E+0	2,56E+1	1,03E+0	4,72E+0	1,64E+0	-6,77E+0
Nonrenewable primary energy resources used as energy carrier	MJ	4,34E+2	2,02E+2	0E0	7,20E+1	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,26E+3	0E0	9,15E+1	0E0	9,38E+1	6,45E-1	-1,46E+2
Total use of non-renewable primary energy resources	MJ	1,7E+3	2,02E+2	9,15E+1	7,20E+1	9,38E+1	6,45E-1	-1,46E+2
Use of secondary materials	kg	2,18E+2	5,86E-2	7,86E-2	2,09E-2	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Use of non-renewable secondary fuels	MJ	2,9E+0	3,13E-1	1,87E-2	1,12E-1	1,44E-1	6,02E-2	-3,85E-1
Use of net fresh water	m3	1,59E+0	4,11E-2	7,45E-2	1,47E-2	5,14E-2	7,12E-2	-2,03E-1

Resource use, Light brick (max. lime content)								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	8,28E+0	2,89E+0	0E0	1,03E+0	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	4,59E+2	0E0	2,56E+1	0E0	4,72E+0	1,64E+0	-7,00E+0
Total use of renewable primary energy resources	MJ	4,67E+2	2,89E+0	2,56E+1	1,03E+0	4,72E+0	1,64E+0	-7,00E+0
Nonrenewable primary energy resources used as energy carrier	MJ	4,45E+2	2,02E+2	0E0	7,20E+1	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,38E+3	0E0	9,15E+1	0E0	9,38E+1	6,45E+1	-1,51E+2
Total use of non-renewable primary energy resources	MJ	1,82E+3	2,02E+2	9,15E+1	7,20E+1	9,38E+1	6,45E+1	-1,51E+2
Use of secondary materials	kg	2,18E+2	5,86E-2	7,86E-2	2,09E-2	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Use of non-renewable secondary fuels	MJ	3,01E+0	3,13E-1	1,87E-2	1,12E-1	1,44E-1	6,02E-2	-3,98E-1
Use of net fresh water	m3	1,74E+0	4,11E-2	7,45E-2	1,47E-2	5,14E-2	7,12E-2	-2,10E-1

21. End of life – Waste

Waste, Light brick (min. lime content)								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	8,75E-2	5,26E-3	4,07E-4	1,88E-3	7,13E-3	3,80E-3	-6,42E-3
Non-hazardous waste	kg	5,33E+1	1,70E+1	1,79E-1	6,09E+0	1,02E+2	4,20E+2	-3,31E+0
Radioactive waste	kg	1,29E-2	1,37E-3	9,56E-4	4,90E-4	5,86E-4	4,22E-4	-6,27E-4

Waste, Light brick (max. lime content)								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	8,81E-2	5,26E-3	4,07E-4	1,88E-3	7,13E-3	3,80E-3	-6,63E-3
Non-hazardous waste	kg	4,32E+1	1,70E+1	1,79E-1	6,09E+0	1,02E+2	4,20E+2	-3,42E+0
Radioactive waste	kg	1,3E-2	1,37E-3	9,56E-4	4,90E-4	5,86E-4	4,22E-4	-6,48E-4

22. End of life - Output flow

Output flow, Light brick (min. lime content)								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	6,10E-2	0E0	0E0	0E0	5,80E+2	0E0	0E0
Materials for energy recovery	kg	1,80E-10	0E0	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

Output flow, Light brick (max. lime content)								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	6,12E-2	0E0	0E0	0E0	5,80E+2	0E0	0E0
Materials for energy recovery	kg	1,79E-10	0E0	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

Scenarios and additional technical information (7.3)

23. Electricity in the manufacturing phase (7.3. A3)

A3 data quality of electricity and CO2 emission kg CO2 eq. / kWh	**FI 0,24**	The environmental impact of average Finnish electricity in Finland is based on the ecoinvent 3.4 database resource “Market for electricity, medium voltage”, Finland, 2018

24. Transport from production place to user (7.3.2 A4)

Variable	Amount	Data quality
Fuel type and consumption in **liters / 100 km**	50	Data source:lipasto.vtt.fi
Transportation distance **km**	140	Manufacturer data
Transport capacity utilization **%**	100	Assumption
Bulk density of transported products **kg/m^3**	vary	Manufacturer data
Volume capacity utilization factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	1	Assumption

25. End-of-life process description (7.3.4)

Processes	**Unit** (expressed per functional unit or per declared unit of components products or materials and by type of material)	**Amount kg/ton** **Data quality**
Collection process specified by type	kg collected separately	580
	kg collected with mixed construction waste	420
Recovery system specified by type	kg for re-use	0
	kg for recycling	580
	kg for energy recovery	0
Disposal specified by type	kg product or material for final deposition	420
Assumptions for scenario development, e.g. transportation	units as appropriate	Transportation distance estimation based on average recycling facility locations in Helsinki region; 50 km

26. Additional technical information

More information can be found on the company's website. www.wienerberger.fi/

27. Product data sheet

More information on the products can be found in the brick brochure via the following link: https://www.wienerberger.fi/myynti-ja-palvelut/ladattavat-aineistot.html

28. Additional information (7.4)

Air, soil and water impacts during the use phase have not been studied.

29. Bibliography

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines. EN 15804:2012+A1 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products. RTS PCR 18.6.2018 RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr. PT 18 RT EPD Committee. (English version)
NS-EN 16449:2014 Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide