ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

KAOLINITIC CLAY BRICK

TIILERI

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Tiileri
Address	Mjösundintie 1101, 25730 Mjösund
Contact details	ulrika@tiileri.fi
Website	www.tiileri.fi

PRODUCT IDENTIFICATION

Product name	Arizona, Alaska, Edelweiss,Fenix, Laava, Luoto, Preeria, Pusta, Safari, Sahara, Savanni, Tuhka, Tundra Polar, Ruska, Ruukunpunainen Ruukintiili; Harmaa, Keltainen, Keltainenkirjava, TummanharmaaKirjava, Vaalea
Place(s) of production	Mjösund & Ylivieska, Finland

Jessica Karhu

RTS EPD Committee secretary

Laura Apilo

Managing Director

EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The Building Information Foundation RTS sr / Building Information Ltd.
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804+A2 serves as the core PCR. In addition, the RTS PCR (Finnish version, 26.8.2020) is used.
EPD author	Ulrika Theqvist-Fromholdt, Keramia Oy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	23.04.2021
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
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EPD valid until	23.04.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

This environmental product declaration covers perforated and solid bricks manufactured by Tiileri in Keramia Oy, Mjösund and Ylivieskan Tiili Oy, Ylivieska.

PRODUCT APPLICATION

Fired bricks for indoors and outdoors use. The bricks can be used for facade and frame construction and for chimneys and fireplaces.

TECHNICAL SPECIFICATION

More information about the products in declaration of performance on the website: www.tiileri.fi.

PRODUCT STANDARDS

Tiileri bricks are CE-marked and comply with standard SFS-EN 771-1 + A1.

PHYSICAL PROPERTIES OF THE PRODUCT

Product name:	Dimensions, mm	Weight kg/brick	Consumption bricks/m2
Facade bricks:			
MRT60	285 x 85 x 60	2,1	47
MRT75	285 x 85 x 75	2,4	39
RT60	285 x 135 x 60	3,1	47
RT75	285 x 135 x 75	4,0	39
MT60	285 x 85 x 60	2,7	47
NT60	270 x 130 x 60	3,8	50
ET60	285 x 130 x 60	4,0	47
SNF	250 x 120 x 62	3,5	55
DNF	228 x 108 x 54	2,3	63
Chimney and fireplace bricks:			
NRT	270 x 130 x 75	3,6	42
PRT	257 x 123 x 57	2,8	55
PT	257 x 123 x 57	3,5	55

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at https://tiileri.fi.

PRODUCT RAW MATERIAL COMPOSITION

Material	Amount %	Usability			
		Renewable	Non-renewable	Recycled	Origin of the raw materials
Clay	65,4		x		EU
Sand	26,6		x		EU
$CaCO_3$	7,0		x		EU
Saw dust	1,0	x			EU

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	
Minerals	99,0	EU
Fossil materials	0	
Bio-based materials	1,0	EU

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts of raw material supply include emissions generated during raw materials taking from nature, transportation to factory for processing and processed, storage and preparation of raw material, shaping, drying, firing, quality control and packaging of products. A1-A3-stages includes all raw materials which end up in the final products as well as the electricity and heat production which are consumed during the manufacturing at production facilities.

TRANSPORT & INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transportation distance is defined according to data given by the Manufacturer. According to the Manufacturer transportation doesn't cause losses as Products are packaged.

Plastic packaging, wooden pallets and waste bricks leave the system during installation (A5). Biogenic carbon for wooden pallets has been declared. The impact of use of mortar are evaluated by the manufacturer. The energy consumption of the installation stage is excluded from this study.

PRODUCT END OF LIFE (C1-C4, D)

End of life stage includes deconstruction (C1), transport to waste processing (C2), waste processing for reuse, recovery and/or recycling (C3) and disposal (C4). D includes reuse of crushed waste bricks as raw materials replacing sand and gravel.

MANUFACTURING PROCESS

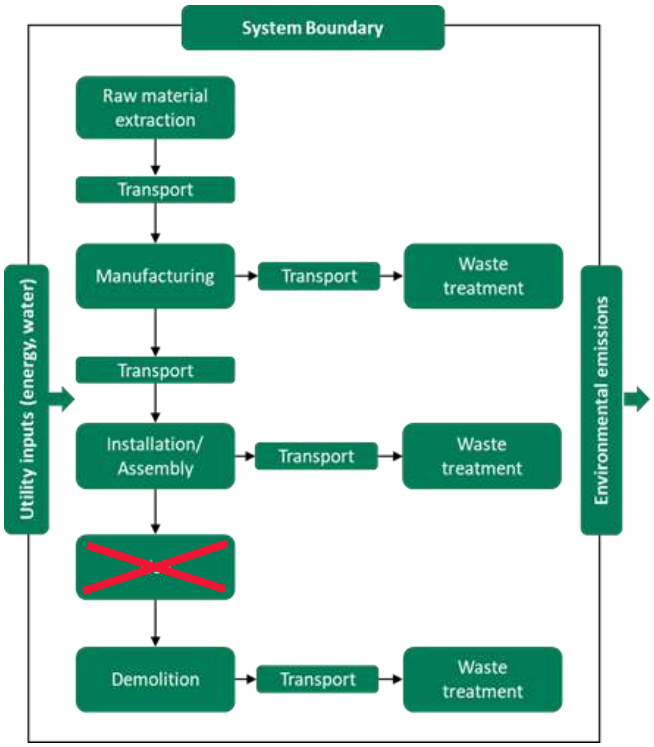

Figure 1. Life cycle stages diagram

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Year 2019

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 ton
Mass per declared unit	1000 kg

Conversion factors to calculate the results for different product sizes can be found under the physical properties section.

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	4,3

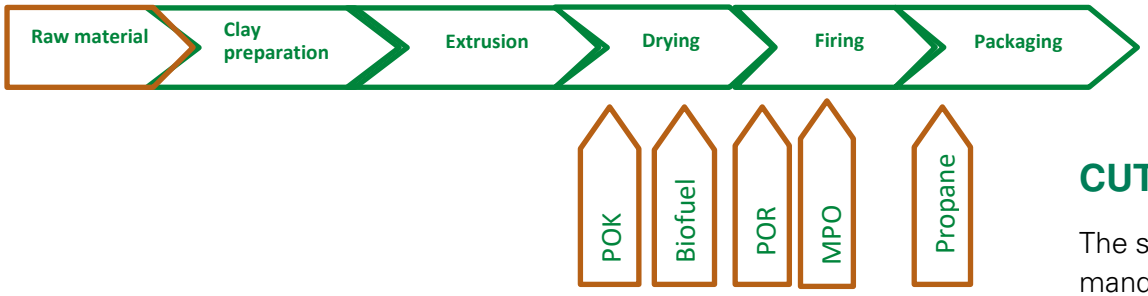

Figure 2. Manufacturing process diagram

SYSTEM BOUNDARY

This EPD covers cradle to gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4-A5 (Transport and Installation) 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 is included.

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	x	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	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and RTS PCR. The study does not exclude any hazardous materials or substances

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages.

Excluded stages from this study are in use stage B1-B7. Biogenic carbon in product is less than 5% and therefore excluded. Energy consumption of the installation stage (A5) is also excluded as its emissions are negligible.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

The production-related energy, packaging material and waste data is based on the total annual production rate (ton). The flows allocated to the products were divided among production rate according to their masses.The data for raw material flows is per product, therefore no allocation was needed.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

Stage C1: Includes the energy consumption for the building machines during demolition process. The amount energy: 0,01 kWh/kg bricks.

Stage C2: The demolished bricks will be delivered to nearest waste treatment facility. The transport distance is estimated to 50 km. Transport method: by truck.

Stage C3-C4: It`s assumed that 58% of all waste bricks will be recycled and the rest are sent to landfill.

Stage D: Benefits of recycled waste generated in the phase C3 is taken into account in the phase D. The recycled bricks have been modelled to avoid use of primary materials. Crushed bricks can be used as sand and gravel in, for example, road constructions. Crushed
bricks can also be used in brick manufacturing as a secondary raw material.

AVERAGES AND VARIABILITY

Data covers both production facilities. Data for the products were allocated according to annual production rate per facility. Then, weighted average is calculated according to their annual production rate (ton).

The studied product is an average of all variations such as different size and weight.There are no distinguished impacts between bricks of different sizes and weights. Solid and perforated bricks are produced using materially same clay bodies. Variation is less than 5%.

ENVIRONMENTAL IMPACT DATA

NOTE : ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 ARE PRESENTED IN ANNEX.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	7,59E0	1,82E1	1,74E2	2E2	2,81E1	1,11E2	MND	MND	MND	MND	MND	MND	MND	3,3E0	1,08E1	4,85E0	3,54E0	−1,34E0
Climate change – fossil	kg CO2e	7,61E0	1,82E1	1,89E2	2,15E2	2,84E1	9,21E1	MND	MND	MND	MND	MND	MND	MND	3,3E0	1,08E1	4,83E0	3,54E0	−1,33E0
Climate change – biogenic	kg CO2e	−2,98E−2	−5,03E−3	−1,57E1	−1,57E1	2,55E−3	1,9E1	MND	MND	MND	MND	MND	MND	MND	2,42E−4	−4,11E−3	1,16E−2	2,97E−3	−2,56E−3
Climate change – LULUC	kg CO2e	8,18E−3	9,33E−3	1,17E−1	1,35E−1	8,86E−3	4,7E−2	MND	MND	MND	MND	MND	MND	MND	2,79E−4	4,67E−3	3,21E−3	1,42E−3	−1,43E−3
Ozone depletion	kg CFC11e	1E−6	4E−6	3,8E−5	4,3E−5	6,43E−6	5,49E−6	MND	MND	MND	MND	MND	MND	MND	7,12E−7	2,37E−6	1,02E−6	1,18E−6	−1,35E−7
Acidification	mol H+e	4,43E−2	2,28E−1	1,52E0	1,79E0	1,05E−1	3,23E−1	MND	MND	MND	MND	MND	MND	MND	5,64E−3	2,54E−2	1,61E−2	1,81E−2	−5,37E−3
Eutrophication, aquatic freshwater	kg PO4e	3,51E−3	1,15E−3	1,03E−2	1,49E−2	2,31E−3	1,47E−2	MND	MND	MND	MND	MND	MND	MND	1,2E−4	9,24E−4	1,44E−3	3,97E−4	−3,95E−4
Eutrophication, aquatic marine	kg Ne	7,59E−3	4,99E−2	1,6E−1	2,18E−1	2,94E−2	7,38E−2	MND	MND	MND	MND	MND	MND	MND	7,58E−4	3,49E−3	2,83E−3	4,76E−3	−8,37E−4
Eutrophication, terrestrial	mol Ne	9,47E−2	5,54E−1	1,77E0	2,42E0	3,2E−1	7,88E−1	MND	MND	MND	MND	MND	MND	MND	8,11E−3	3,69E−2	2,91E−2	5,17E−2	−9,55E−3
Photochemical ozone formation	kg NMVOCe	2,77E−2	1,56E−1	5,59E−1	7,43E−1	1,07E−1	2,15E−1	MND	MND	MND	MND	MND	MND	MND	8,07E−3	1,78E−2	1,34E−2	1,75E−2	−3,32E−3
Abiotic depletion, minerals & metals	kg Sbe	8,48E−4	2,75E−4	2,61E−4	1,38E−3	4,77E−4	5,74E−3	MND	MND	MND	MND	MND	MND	MND	5,03E−6	3,86E−4	3,8E−5	4,97E−5	−7,11E−5
Abiotic depletion of fossil resources	MJ	1,05E2	2,6E2	2,42E3	2,78E3	4,35E2	7,12E2	MND	MND	MND	MND	MND	MND	MND	4,48E1	1,58E2	7,9E1	8,14E1	−1,81E1
Water use	m3e depr.	3,72E2	1,43E2	1,17E5	1,18E5	1,53E2	3,99E3	MND	MND	MND	MND	MND	MND	MND	9,62E0	1,91E2	3,02E2	2,85E1	−2,25E1

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	8,62E0	2,86E0	1,21E3	1,22E3	4,66E0	1,38E2	MND	MND	MND	MND	MND	MND	MND	2,45E−1	2,72E0	4,46E0	8,67E−1	−8,8E−1
Renewable PER used as materials	MJ	0E0	0E0	2,29E2	2,29E2	0E0	5,77E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renewable PER	MJ	8,62E0	2,86E0	1,44E3	1,45E3	4,66E0	1,44E2	MND	MND	MND	MND	MND	MND	MND	2,45E−1	2,72E0	4,46E0	8,67E−1	−8,8E−1
Non-renew. PER used as energy	MJ	1,18E2	2,64E2	2,71E3	3,09E3	4,41E2	7,53E2	MND	MND	MND	MND	MND	MND	MND	4,51E1	1,62E2	8,9E1	8,25E1	−1,88E1
Non-renew. PER used as materials	MJ	0E0	0E0	4,06E1	4,06E1	0E0	9,56E−1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-renewable PER	MJ	1,18E2	2,64E2	2,75E3	3,14E3	4,41E2	7,54E2	MND	MND	MND	MND	MND	MND	MND	4,51E1	1,62E2	8,9E1	8,25E1	−1,88E1
Use of secondary materials	kg	0E0	0E0	8,92E−2	8,92E−2	0E0	2,15E−3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of non-renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	6,34E−1	4,45E−2	3,47E−1	1,03E0	9,06E−2	1,97E0	MND	MND	MND	MND	MND	MND	MND	4,01E−3	2,78E−2	3,9E−2	7,18E−2	−4,84E−1

PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	Kg	6,78E−1	2,98E−1	1,81E0	2,78E0	5,24E−1	2,48E0	MND	MND	MND	MND	MND	MND	MND	4,88E−2	1,88E−1	0E0	9,48E−2	−9,3E−2
Non-hazardous waste	Kg	1,9E1	1,94E1	4,39E1	8,24E1	4,76E1	9,66E1	MND	MND	MND	MND	MND	MND	MND	5,22E−1	1,05E1	0E0	4,23E2	−1,98E0
Radioactive waste	Kg	5,46E−4	1,8E−3	2,13E−2	2,36E−2	2,9E−3	2,82E−3	MND	MND	MND	MND	MND	MND	MND	3,18E−4	1,09E−3	0E0	5,33E−4	−6,22E−5

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for reuse	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	0E0	0E0	0E0	3E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5,8E2	0E0	0E0
Materials for energy recovery	Kg	0E0	0E0	4,3E−1	4,3E−1	0E0	1,3E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	7,59E−3	1,82E−2	1,74E−1	2E−1	2,84E−2	1,11E−1	MND	MND	MND	MND	MND	MND	MND	3,3E−3	1,08E−2	4,85E−3	3,54E−3	−1,34E−3
Abiotic depletion, minerals & metals	kg Sbe	8,48E−7	2,75E−7	2,61E−7	1,38E−6	4,77E−7	5,74E−6	MND	MND	MND	MND	MND	MND	MND	5,03E−9	3,86E−7	3,8E−8	4,97E−8	−7,11E−8
Abiotic depletion of fossil resources	MJ	1,05E−1	2,6E−1	2,42E0	2,78E0	4,35E−1	7,12E−1	MND	MND	MND	MND	MND	MND	MND	4,48E−2	1,58E−1	7,9E−2	8,14E−2	−1,81E−2
Water use	m3e	3,72E−1	1,43E−1	1,17E2	1,18E2	1,53E−1	3,99E0	MND	MND	MND	MND	MND	MND	MND	9,62E−3	1,91E−1	3,02E−1	2,85E−2	−2,25E−2
Use of secondary materials	kg	0E0	0E0	8,92E−5	8,92E−5	0E0	2,15E−6	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Biogenic carbon content in product	kg C	N/A	N/A	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content in packaging	kg C	N/A	N/A	4.30E-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	-Electricity production hydro, run-of-river (Reference product: electricity, high voltage), Finland, Ecoinvent 3.6, 2019 -Electricity production, nuclear, boiling water reactor (Reference product: electricity, high voltage), Finland, Ecoinvent 3.6, 2019 -Heat and power cogeneration wood chips, dry, measured as dry mass (Reference product; wood chips, dry, measured as dry mass), Finland, Ecoinvent 3.6, 2019 -Market for electricity, medium voltage (Reference product; electricity, medium voltage), Finland, Ecoinvent 3.6, 2019
Electricity CO2e / kWh	0,12
District heating data source and quality	Not used
District heating CO2e / kWh	-

Transport scenario documentation

Scenario parameter	Value
A4 specific transport CO2e emissions, kg CO2e / tkm	0.0901
A4 average transport distance, km	290
A4 Capacity utilization (including empty return) %	100%
A4 Bulk density of transported products kg/m^3	650
A4 Volume capacity utilization factor %	100%

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	580
Collection process – kg collected with mixed waste	420
Recovery process – kg for re-use	0
Recovery process – kg for recycling	580
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	420
Scenario assumptions e.g. transportation	50 km

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.

Ecoinvent database v3.6 and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS 1.6.2020.

Gaia Consulting Oy, 2020, Vähähiilinen rakennusteollisuus 2035, osa 2. Vähähiilisyyden mahdollisuuksien tarkastelu

Ympäristöministeriö,2019, Rakennuksen vähähiilisyyden arviointimentelmä, 2019:22

Bozdağ, Ö & Seçer, M,2007, Energy consumption of RC buildings during their life cycle.

Government decree on waste 179/2012, Directive 2008/98/EC on waste (Waste Framework directive)

Kojo, R. & Lilja, R. Ympäristöministeriön raportti 21/2011. Talonrakentamisen materiaalitehokkuuden edistäminen.

ABOUT THE MANUFACTURER

www.tiileri.fi

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Tiileri
EPD author	Ulrika Theqvist-Fromholdt, Keramia Oy
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD program operator	The Building Information Foundation RTS sr / Building Information Ltd.
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Ceramics, Clay, Gypsum, Limestone and Porcelain based products.

ANNEX : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential	kg CO2e	7,47E0	1,81E1	1,88E2	2,14E2	2,81E1	9,23E1	MND	MND	MND	MND	MND	MND	MND	3,27E0	1,07E1	4,77E0	3,48E0	−1,3E0
Depletion of stratospheric ozone	kg CFC11e	8,45E−7	3,18E−6	3,12E−5	3,53E−5	5,11E−6	4,49E−6	MND	MND	MND	MND	MND	MND	MND	5,63E−7	1,89E−6	8,4E−7	9,39E−7	−1,1E−7
Acidification	kg SO2e	3,81E−2	1,86E−1	1,32E0	1,54E0	8,49E−2	2,73E−1	MND	MND	MND	MND	MND	MND	MND	4,87E−3	2,22E−2	8,21E−2	1,46E−2	−4,71E−3
Eutrophication	kg PO4 3e	1,44E−2	2,18E−2	9,92E−2	1,35E−1	1,92E−2	8,77E−2	MND	MND	MND	MND	MND	MND	MND	8,57E−4	4,88E−3	5,76E−3	3,22E−3	−1,6E−3
Photochemical ozone formation	kg C2H4e	2,27E−3	5,95E−3	5,19E−2	6,01E−2	3,64E−3	1,16E−2	MND	MND	MND	MND	MND	MND	MND	5,01E−4	1,45E−3	8,98E−4	8,48E−4	−4,68E−4
Abiotic depletion of non-fossil	kg Sbe	8,48E−4	2,75E−4	2,61E−4	1,38E−3	4,77E−4	5,74E−3	MND	MND	MND	MND	MND	MND	MND	5,03E−6	3,86E−4	3,8E−5	4,97E−5	−7,11E−5
Abiotic depletion of fossil	MJ	1,05E2	2,6E2	2,42E3	2,78E3	4,35E2	7,12E2	MND	MND	MND	MND	MND	MND	MND	4,48E1	1,58E2	7,9E1	8,14E1	−1,81E1