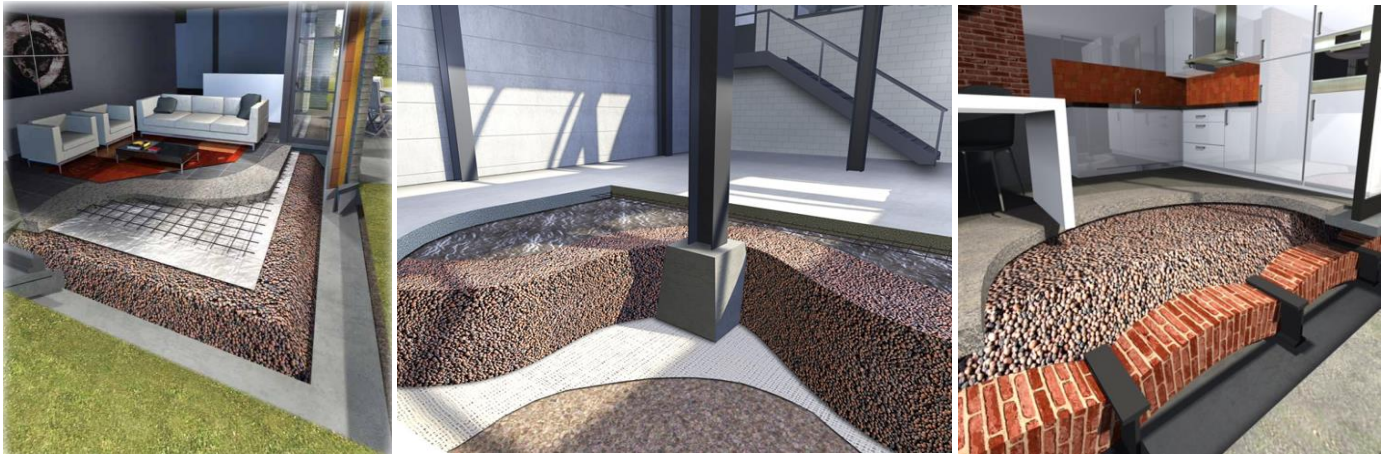


ENVIRONMENTAL PRODUCT DECLARATION

Lightweight Expanded Clay Aggregate ARGEX Thermal insulation applications



Issued

06 October 2021

Valid until

05 October 2026

Conform to EN 15804+A2 and the national complement "Guide to environmental performance calculations" from national Milieudatabase and ISO 14025.



1 GENERAL INFORMATION

EPD Owner

ARGEX
Kruibeeksesteenweg162
B-2070 Burcht
Belgique

Author of the LCA

WeLOOP
254 Rue du Bourg, Lambersart - 59130
France

Functional Unit

Thermal insulation of 1 m² for buildings (roofs, floors, foundations, etc) applied with a thickness of 11.4 cm that gives a thermal resistance (R-value) of 1 (m².K/W), with a life span of 100 years.

Scope of the study

The life cycle assessment (LCA) has been realised conform the EN 15804+A2. Data came from Argex Belgium for specific data and Ecoinvent 3.6 for generic data. This EPD is cradle to grave. Lightweight expanded clay aggregates Argex can be used in applications of thermal insulation according to EN 14063-1, and of lightweight filling in civil engineering works (roads, railways, buildings and its surroundings, backfilling for structures, etc.) according to EN 15732, adding functions of draining, hydro-retention, quality of soil, with a life span of 100 years. End of life scenario consists of 95% reuse and 5% landfilling, if not contaminated.

PCR

EN 15804+A2 and the national complement "Guide to environmental performance calculations."

Product Commercial References

AR 8/16 - 340 GEO

Issue

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Verification

Standard EN 15804+A2 as core PCR

Independent verification of the environmental declaration and data according to standard EN ISO 14025 :2010.

internal

external

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2 PRODUCT NAME

This EPD contains the environmental impact of the following four ARGEX lightweight expanded clay aggregate product AR 8/16 – 340 GEO.

3 PRODUCT DESCRIPTION

Lightweight expanded clay aggregate ARGEX is a granular ceramic material made from clay. The product is distributed in bulk or bags.

Composition	Quantity
Clay (site Argex)	87%
Iron oxides (Europe)	11-12%
Additifs (Europe)	1-2%



Figure 1: Lightweight expanded clay aggregates ARGEX

4 INTENDED USE

This product is used for thermal applications of roofs, floors and foundations, etc.*

* For the full list of thermal insulation applications, please refer to EN 14063-1.

For technical data, see DoP2 (following EN 14063-1) and technical sheets (www.argex.eu).

5 REFERENCE FLOW / FUNCTIONAL UNIT

The functional unit is the thermal insulation of 1 m² for buildings (roofs, floors, and foundations, etc.), using AR 8/16 – 340 GEO, applied with a thickness of 11.4 cm that gives a thermal resistance (R-value) of 1 (m²K/W), with a lifespan of 100 years.

The most important part of the products is sold in bulk. The packaging is included for the 1.60% of the final product sold in big bags.

The weight per reference flow is 38.76 kg.

The loose bulk density of the product is 340 kg/m³.

The environmental assessment is conducted for AR 8/16 GEO with 11.4 cm thickness as reference product, providing a thermal resistance equals to 1 m²K/W. A range of thickness is applicable for this product (0.1 – 2 m). To obtain the impacts related to the different thicknesses, conversion factor should be multiplied by the results presented in this EPD. Conversion factor is calculated dividing the actual weight by the reference flow weight (38.76 kg). Table below includes conversion factors for different thicknesses.

Functional Units	Product Reference	AR 8/16
R = 1 m ² K/W thickness = 11.4 cm	Conversion factor	1
	Weight (kg)	38.76
R = 1.75 m ² K/W thickness = 20 cm	Conversion factor	1.75
	Weight (kg)	68
R = 2.63 m ² K/W thickness = 30 cm	Conversion factor	2.63
	Weight (kg)	102
R = 3.51m ² K/W thickness = 40 cm	Conversion factor	3.51
	Weight (kg)	136

Parameters	Values
Reference Service Period	100 years
Composition	Clay 87% Iron oxides 11-12% Additifs 1-2%
Packaging (kg/kg of packed product)	PE film (2.17E-4 kg/kg) PP bags (4.25E-3 kg/kg) Wooden pallets (3.94E-2 kg/kg) HDPE bags (4.83E-3 kg/kg)
Use conditions	Not applicable
Maintenance	Not applicable

6 INSTALLATION

This EPD includes the impacts of all materials and processes necessary for installing/mounting the product accordingly. A single scenario was defined for this EPD based on the following options:

- blowing followed by a vibrating plate for levelling and compaction,
- excavator followed by a vibrating plate for levelling and compaction.

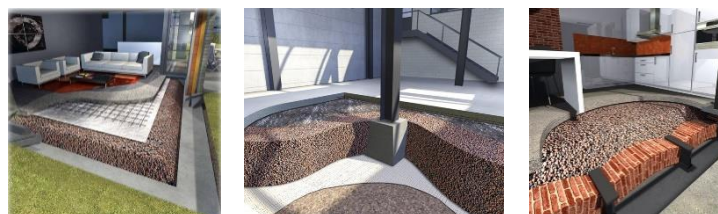


Figure 2: Examples of lightweight expanded clay aggregate in thermal insulation applications





Figure 3: Blowing and vibrating plate levelling compactation installation



Figure 4: Blowing with manual levelling installation

7 REFERENCE SERVICE LIFE

Expanded clay ARGEX products are already installed in existing construction works in previous decades (product intrinsic material properties lead to adequate long-term performances). Several construction works maybe find in Europe containing the product from decades ago. Examples are provided in the LCA background report.

The reference service life is estimated at 100 years (installed products are still in use) if the product is installed according to the manufacturers' and suppliers' guidelines. The RSL is based on available average EPDs, expert judgment, EXCA internal guidance for EPDs (2021), and corresponding to the average lifespan of the construction work.

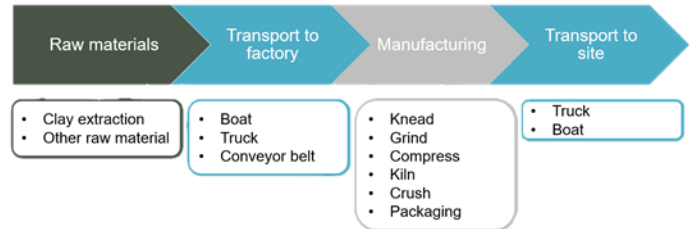
8 GEOGRAPHICAL REPRESENTATIVITY

This EPD is representative for the Dutch market.

9 PRODUCTION PROCESS AND TECHNOLOGY

The clay is mixed with organic material, dried and expanded to 4-5 times its original volume in a rotary kiln at a temperature of about 1150°C. The output expanded clay aggregate granules are sieved and blended into different grades of products.

Product stage (A1-3): The extracted clay is transported by conveyor belt to the production plant. Iron oxides and additives (clay substitute) are transported to the production plant by truck and boat. The manufacturing is composed of kneading, grind, compress, kiln and crush processes. Some of the final product is packed. All production is then transported to the construction site.



10 TECHNICAL DATA / PHYSICAL CHARACTERISTICS

Technical property	Standard	Value	Unit
Thickness*	EN 14063-1	11.4	Cm
Thermal resistance (R)		1	m ² K/W
Thermal conductivity (λ)**		0.114	W/(m.K)
Loose bulk dry density		340	kg/m ³

* Typical thickness range applied for thermal insulation: 0.1 – 2 meters.

** Thermal conductivity declared (in accordance with EN 14063-1 (<https://www.argex.eu>)).



11 LCA STUDY

Used PCR	EN 15804+A2
System boundaries	Cradle to grave LCA. The system boundaries respect the limits imposed by the standard EN 15804+A2.
Allocation	No co-product allocation occurs in the product foreground system. No multi-input allocation occurs in the product system. The allocations from the background database are kept intact. During the excavation, the process of refilling the clay pit with inert waste happens simultaneously. Thus, the energy used to extract the clay is allocated 50/50 to clay (as the product raw material) and landfilling operations.
Geographical and temporal representativeness	Software: SimaPro 9.1.0.7 Database: Ecoinvent version 3.6 Primary data: 2020
Cut-off	Argex provided the data used in this study. Some plausibility and completeness assessments and checks were conducted for some inputs. For a few remaining data, no extended assessment was conducted, therefore accepting data gaps. In all cases, it is assumed that the cut-off criteria of EN 15804 are met.
Excluded processes	The following processes are excluded: <ul style="list-style-type: none"> - The effects of capital goods and infrastructural processes have been excluded. - Flows related to human activities such as employee transport and administration activities are excluded.

12 DETAILS OF THE UNDERLYING SCENARIOS USED TO CALCULATE THE IMPACTS

PRODUCTION, A1-A3

12.1.1 A1 – RAW MATERIALS SUPPLY

Clay is extracted close to ARGEX plant (1 km). Iron oxides and additives are also part of the final product composition and are considered as waste, without economic value; hence no environmental impacts are attributed to the waste used as additives in conformity with EN15804.

12.1.2 A2 – TRANSPORT TO THE MANUFACTURER

Clay is transported by conveyor belt. Iron oxides and additives are transported by truck and boat.

12.1.3 A3 – MANUFACTURING

The manufacturing is composed of kneading, grind, compress, kiln and crush processes. The fuels consumption and their emissions in the kiln, as well as electricity and water for the rest of the processes, are considered in this module.

1.60% of the final product is packed. Products are transported to the construction site.

12.2 CONSTRUCTION, A4-A5

12.2.1 A4 - TRANSPORT TO THE BUILDING SITE

Transport scenario is modelled based on the Dutch market. Primary data for the average distances for Dutch sales are provided.

Parameters	Values
Vehicle used for transport	Lorry 16-32 metric ton
Distance (km)	111
Volume capacity and capacity utilisation	Default values from Ecoinvent 3.6

12.2.2 A5 – INSTALLATION IN THE BUILDING

At the construction site, packaging materials are released and treated.

No material losses are identified in the installation phase if the installation procedures are respected.

Installation type	Share	Generic data	Value
Blowing with vibrating plate levelling-compaction	10%	Machine operation, diesel	0.033 hr
		Petrol and combustion emissions	1.279 kg
Blowing with manual levelling	90%	Machine operation, diesel	0.033 hr

Packaging	Recycling	Landfill	Incineration
PE	35 %	5 %	60 %
PP	35 %	5 %	60 %
Wooden pallets	40 %	20 %	40 %

12.3 USE STAGE, B1-B7

If installed correctly according to the manufacturers' and suppliers' guidelines, normal expanded clay aggregate products need no further maintenance, repair, replacement or refurbishment during the full life span of the product. If



the product is applied following the installation instructions, the life span of 100 years is applicable.

12.4 END OF LIFE, C1-C4

After a service life of 100 years, the construction works are stripped for recoverable materials and products, and the remaining construction subsequently refurbished. The product can be removed separately from the other parts of the construction. The valuable sorted materials are 95% reused and 5% landfilled.

C1: dismantling considers a crane machine to remove expanded clay aggregates from the deconstruction site. Ecoinvent data used is "Machine operation, diesel, > 18.64 kW, steady-state {GLO} |market for |Cut-off, U" (1 day for 620 m3);

C2: end of life transport considers 50km for landfilling;

C3: -;

C4: 5% of the product for final disposal.

Module C2 – Transport to waste processing		
Type of vehicle	Distance	Capacity use
(Camion, bateau...)	(km)	(%)
Transport, freight, lorry 16-32 metric ton, EURO5 {RER} transport, freight, lorry 16-32 metric ton, EURO5 Cut-off, S	50 km for sorting and 50 km for landfilling	Ecoinvent 3.6

Parameters	Values
Wastes collected separately	100 %
Wastes collected as mixed construction waste	0%
Waste for re-use	95 %
Waste for recycling	0 %
Waste for energy recovery	0 %
Waste for final disposal	5 %
Transport distance for landfilling (km)	50
Transport distance for reuse (km)	30

12.5 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES, D

The reuse of normal expanded clay aggregate is considered as benefits beyond system boundary, calculated in module D.

The packaging incineration with energy recovery is also considered as benefits beyond system boundary. Credits are assigned for power and heat outputs using the Dutch grid mix and thermal energy from natural gas. The latter represents cleanest fossil fuel and therefore results in a conservative estimate of avoided burdens. For regional efficiencies and heat-to-power output ratios, 20% is considered for avoided heat from natural gas, and 10% is considered for electricity production.

13 ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES

13.1 INDOOR AIR

Not applicable as this product does not contain any dangerous substances.

13.2 SOIL AND WATER

Argex expanded clay aggregates has a NL BSB Productcertificaat K73820/02 Argex-Kiwa.



14 LIFE CYCLE ASSESSMENT RESULTS

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	Deconstruction 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 = included in the EPD

MND = module not declared

14.1.1.1 Potential Environmental Impacts for 1m2 of AR 8/16 – 340 GEO in thermal insulation applications.

The results of the LCIA are calculated for AR 8/16- 340 GEO lightweight expanded clay aggregate. The results are provided for 1m2 of the lightweight expanded clay aggregate product. The average installed density for the assessed product is 340 kg/m3.

Environmental Indicators according to EN 15804 + amendment A1

Potential Environmental Impacts		Production			Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
	ADPE (kg Sb equiv/FU)	1.55E-07	9.19E-07	5.53E-06	5.68E-06	4.76E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-08	6.21E-07	0.00E+00	1.08E-07	-2.00E-06
	ADPF (MJ/FU)	1.79E+00	9.90E-01	5.35E+01	7.59E+00	6.21E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-01	4.81E-01	0.00E+00	4.85E-01	-4.97E+01
	GWP (kg CO2 equiv/FU)	1.32E-01	6.98E-02	9.91E+00	4.96E-01	1.17E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-02	3.20E-02	0.00E+00	2.01E-02	-9.38E+00
	ODP (kg CFC 11 equiv/FU)	2.90E-08	1.08E-08	3.89E-07	9.22E-08	7.05E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.54E-09	5.86E-09	0.00E+00	5.06E-09	-3.70E-07
	POCP (kg ethene equiv/FU)	8.11E-05	3.19E-05	9.70E-04	2.61E-04	2.39E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-05	1.38E-05	0.00E+00	1.59E-05	-9.20E-04
	AP (kg SO2 equiv/FU)	7.25E-04	3.37E-04	1.52E-02	1.79E-03	2.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.02E-05	1.02E-04	0.00E+00	1.32E-04	-1.45E-02
	EP (kg (PO4)3- equiv/FU)	1.57E-04	6.34E-05	4.96E-03	3.08E-04	5.96E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-05	1.66E-05	0.00E+00	2.30E-05	-4.78E-03











Indicators describing toxicity (specific for Dutch market)




Resource Use	Production			Construction process		Use stage							End-of-life stage				
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
<i>HTP</i> (kg DCB- eq)	7.10E-02	2.73E-02	2.44E+00	2.52E-01	7.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.77E-03	1.46E-02	0.00E+00	1.65E-02	-2.30E+00
<i>FAETP</i> (kg DCB- eq)	5.36E-05	4.67E-05	1.26E-03	4.02E-04	1.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-05	2.40E-05	0.00E+00	1.89E-05	-1.13E-03
<i>MAETP</i> (kg DCB- eq)	7.08E-05	1.53E-04	1.82E-03	2.21E-03	6.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-05	1.15E-04	0.00E+00	2.27E-05	-1.17E-03
<i>TETP</i> (kg DCB- eq)	3.27E-05	2.45E-05	1.92E-03	3.40E-04	5.89E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.25E-06	1.78E-05	0.00E+00	4.27E-06	-1.76E-03

Indicators shown on the MRPI®-EPD

Resource Use	Production			Construction process		Use stage							End-of-life stage				
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
<i>ADPF</i> (kg Sb eq)	8.63E-04	4.77E-04	2.57E-02	3.66E-03	2.99E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-04	2.32E-04	0.00E+00	2.33E-04	-2.39E-02






Core Environmental Indicators according to EN 15804 + amendment A2

Potential Environmental Impacts		Production			Construction process stage		Use stage							End-of-life stage			D Reuse, recovery, recycling	
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing		C4 Disposal
	GWP total (kg CO2 equiv/FU)	1.34E-01	7.07E-02	9.95E+00	5.01E-01	1.17E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-02	3.23E-02	0.00E+00	2.06E-02	-9.42E+00
	GWP fossil (kg CO2 equiv/FU)	1.33E-01	7.06E-02	9.98E+00	5.00E-01	5.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.25E-02	3.23E-02	0.00E+00	2.04E-02	-9.43E+00
	GWP biogenic (kg CO2 equiv/FU)	6.98E-04	8.68E-05	-2.77E-02	4.18E-04	6.72E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.98E-06	1.72E-05	0.00E+00	1.65E-04	1.28E-02
	GWP luluc (kg CO2 equiv/FU)	1.15E-04	8.75E-05	3.08E-03	2.08E-04	1.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.55E-06	1.13E-05	0.00E+00	9.11E-06	-2.98E-03
	ODP (kg CFC 11 equiv/FU)	2.86E-08	1.34E-08	3.81E-07	1.16E-07	8.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.98E-09	7.34E-09	0.00E+00	6.34E-09	-3.50E-07
	AP (mol H+ equiv/FU)	1.01E-03	4.51E-04	3.60E-01	2.34E-03	3.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-04	1.32E-04	0.00E+00	1.74E-04	-3.42E-01
	EP freshwater (kg P equiv/FU)	1.33E-06	1.01E-06	4.95E-04	4.01E-06	3.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-07	2.54E-07	0.00E+00	3.42E-07	-4.70E-04
	EP - marine (kg N equiv/FU)	4.28E-04	1.64E-04	9.72E-03	7.54E-04	1.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.94E-05	3.92E-05	0.00E+00	5.90E-05	-9.44E-03
	EP terrestrial (mol N equiv/FU)	4.73E-03	1.81E-03	1.08E-01	8.33E-03	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-04	4.33E-04	0.00E+00	6.50E-04	-1.05E-01
	POCP (kg NMVOC equiv/FU)	1.29E-03	4.94E-04	4.77E-02	2.56E-03	3.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-04	1.33E-04	0.00E+00	1.88E-04	-4.58E-02

	ADP Elements (kg Sb equiv/FU)	1.50E-07	9.18E-07	5.47E-06	5.67E-06	4.75E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-08	6.20E-07	0.00E+00	1.08E-07	-2.00E-06
	ADP fossil fuels (MJ/FU)	3.04E+00	9.85E-01	5.99E+01	7.68E+00	6.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.45E-01	4.87E-01	0.00E+00	4.80E-01	-5.71E+01
	WDP (m³ water deprived /FU)	1.81E-02	4.05E-03	5.62E-01	2.52E-02	8.91E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.96E-04	1.36E-03	0.00E+00	2.08E-02	-5.40E-01

GWP total = total Global Warming Potential (Climate Change); GWP-luluc = Global Warming Potential (Climate Change) land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels; WDP = water use (Water (user) deprivation potential, deprivation-weighted water consumption)

Additional Environmental Indicators according to EN 15804 + amendment A2

Additional Impact Categories		Production			Construction process		Use stage							End-of-life stage				
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	PM (disease incidence)	2.48E-08	3.45E-09	2.23E-06	4.25E-08	4.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-09	2.25E-09	0.00E+00	3.33E-09	-2.10E-06
	IRHH (kg U235 eq/FU)	2.61E-02	4.32E-03	3.54E-01	3.37E-02	2.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-03	2.13E-03	0.00E+00	1.88E-03	-3.50E-01
	ETF (CTUe/FU)	1.31E+00	8.65E-01	2.73E+01	6.12E+00	5.82E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-01	3.90E-01	0.00E+00	3.54E-01	-2.51E+01
	HTCE (CTUh/FU)	3.54E-11	2.82E-11	2.27E-09	1.59E-10	6.70E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.70E-11	1.10E-11	0.00E+00	1.26E-11	-2.10E-09
	HTnCE (CTUh/FU)	8.80E-10	7.69E-10	1.95E-08	6.79E-09	2.05E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-10	4.25E-10	0.00E+00	2.63E-10	-1.70E-08

<i>RSF</i> (MJ/FU, net calorific value)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRSF</i> (MJ/FU, net calorific value)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>FW</i> (m ³ water eq/FU)	5.39E-04	1.03E-04	9.10E-03	6.40E-04	1.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-05	3.72E-05	0.00E+00	4.73E-04	-8.86E-03	

PERE = use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water



Environmental information describing output flows and waste categories according to EN 15804 + amendment A2

Waste Categories & Output Flows	Production			Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
<i>Hazardous waste disposed (kg/FU)</i>	1.38E-03	1.12E-03	2.07E-02	5.01E-03	1.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	3.13E-04	0.00E+00	5.76E-04	-1.92E-02
<i>Non-hazardous waste disposed (kg/FU)</i>	1.40E-02	3.80E-02	3.46E-01	6.61E-01	3.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-03	2.56E-02	0.00E+00	1.95E+00	-2.04E-01
<i>Radioactive waste disposed (kg/FU)</i>	2.62E-05	6.29E-06	3.50E-04	5.24E-05	3.78E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.09E-06	3.32E-06	0.00E+00	2.88E-06	-3.40E-04
<i>Components for reuse (kg/FU)</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.68E+01	0.00E+00	0.00E+00

15 BIBLIOGRAPHY

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- ISO 14044:2006: Management environnemental-Analyse du Cycle de Vie- Exigences et lignes directrices.
- ISO 14025:2006: Étiquettes et déclarations environnementales-Déclarations environnementales de type III-Principes et procédures environnementaux.
- EN 15804+A2:2019
- Bepalingsmethode Milieuprestatie Bouwwerken - Stichting NMD
- Background report Expanded clay aggregate ARGEX v3.8



<p>EPD Owner</p>	<p>ARGEX Kruibeeksesteenweg162 B-2070 Burcht Belgium</p> 
<p>Author of the LCA</p>	<p>WeLOOP 254 Rue du Bourg 59130 - Lambersart France</p> 
<p>Confidential Report</p>	<p>Background Report Expanded Clay Aggregate V3.8</p>
<p>Verification Verifier name Date</p>	<p>15804:2012+A2:2019 Agrodome 06 October 2021</p>

