

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Argeton GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-AGT-20250103-CBC1-EN
Issue date	04/04/2025
Valid to	03/04/2030

Ceramic facade elements Argeton GmbH

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General Information

Argeton GmbH

Programme holder

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Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-AGT-20250103-CBC1-EN

This declaration is based on the product category rules:

Ceramic panelling, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

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Valid to

03/04/2030



Dipl.-Ing. Hans Peters
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Florian Pronold
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Ceramic facade elements

Owner of the declaration

Argeton GmbH
Oldenburger Allee 26
30659 Hannover
Germany

Declared product / declared unit

1 m² ceramic facade elements

Scope:

The EPD applies an average ceramic facade element of the Görlitz production facility (Am Dachziegelwerk 1, 02829 Schöpstal, Germany), which is carried by Argeton GmbH. The collected production data refers to 2022. The life cycle assessment based on plausible, transparently comprehensible base data represents the mentioned products at 100%.

The holder of the declaration is liable for the underlying information and evidence; a liability of IBU regarding manufacturer information, life cycle assessment data and evidence is excluded.

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The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2011	
☐	internally
☒	externally



Dr.-Ing. Nikolay Minkov,
(Independent verifier)

Product

Product description/Product definition

Argeton clay brick facades consist of plane ceramic facade panels manufactured from different clay mixtures.

Both single-leaf panels and panels with cavities are produced for ventilated facade linings.

The facade panels are fit to a primary facade strapping by use of system-oriented aluminium structural systems, which is not part of this study.

Argeton facade panels are available in different shipping sizes and dimensions with or without cavities, hence they differentiate in area density.

The raw materials utilized according to the recipe and manufacturing process are identical.

The declared area density makes up an annual average based on the production volume manufactured in 2022. For the placing on the market the national regulations at the place of use apply, in Germany for instance the building regulations of the federal states, as well as the technical specifications based on these regulations.

Application

Argeton clay brick panels are used as lining material with ventilated facade linings, and with decorative linings for interior work. The facade panels are also used with ceilings, window reveals, window lintels, cover panels, or in the roof section.

Technical Data

The technical specifications of the product within the scope of the EPD are listed below.

Name	Value	Unit
Gross density	2000 - 2200	kg/m ³
Bending strength	12-20	N/mm ²
Water absorption /DIN 10545-3/	3-8	%

The sound absorption coefficient is not relevant to the ceramic facade panels case of application.

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision.

Base materials/Ancillary materials

The Argeton ceramic facade panels comprise 96 % of clay (weathered products of feldspathic stones), 1.5 % of chamotte (burnt and ground clays), 1 % of feldspar, 1.5 % of coloured pigments (metallic oxides for pigmentation of the raw material), and 0.2 % of surface colour coating (engobes or glazes).

Clays and chamottes originate from the site of Görlitz and the regional facility surrounding. A quantity proportion of approx. 15 % originates from Westerwald in Germany. Coloured pigments and surface coatings are additionally purchased from renowned manufacturers of those materials.

No REACH-relevant substances according to the candidate list dated 21 June 2013 are used in production.

Reference service life

Argeton facade elements are long-lasting without visual changes.

They are indefinitely consistent under normal use.

The reference service life (RSL) of the façade panels is over 50 years according to *BNB*.

Facade elements are frost-resistant as per *DIN EN ISO 10545-12*, resistant to chemical attack as per *DIN EN ISO 10545-13* and acid-proof/alkali-proof *DIN V 105-100*.

LCA: Calculation rules

Declared Unit

The declaration refers to 1 m² of a ceramic façade panel without substructures.

The average area density of ceramic façade panels is 40.35 kg/m².

Declared Unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	40.35	kg/m ²
Gross density	2100	kg/m ³
Conversion factor to 1 kg	40.35	-

The calculated average is based on the yearly production amount in 2022 (by mass) of one production site, located in Schöpstal/Germany. The energy data was allocated according to the yearly production amount.

System boundary

EPD type: Cradle to grave and module D (A+B+C+D)

Modules A1 to A3:

The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.

These modules consider the manufacturing of raw materials in particular clay-based components (A1), the transport to the production site (A2 – DE scenario) and the production

processes of the product (A3) under study. The recycling of thermal breakage losses leads to credits in module D. The impact of packaging materials is included (A5).

Module A4 (DE Scenario):

This module considers 100 km truck transport to construction site (diesel driven, EURO 6, 40 tons total load, 61% utilization). The transport distance can be modified project specific if required by linear scaling.

Module A5:

Module A5 contains treatment and disposal of packaging material as well as manual installation of the product. Credits for potential avoided burdens of the packaging due to energy substitution of electricity and thermal energy generation due to packaging incineration are declared in module D.

Modules B1 to B5:

According to the manufacturer, the product components do not have to be replaced (B4) during the considered service life. According to the manufacturer's information, a renewal of the whole Argeton system (B5) is not necessary during the RSL of > 50 years.

In individual cases, a replacement of single or several panels may be necessary or required. This can be the case e.g. in the event of damage or optical impairment of the panels. No expenditures are expected during use, therefore no efforts are considered in modules B1 to B5 within the life cycle assessment framework at all.

Modules C1 to C4:

De-construction/demolition (C1): Manual dismantling, therefore no loads are considered.

Transport (C2): 50 km EURO 6 Truck (DE Scenario).

Waste processing (C3): not relevant. A re-utilisation of square bricks for façade linings is basically possible even after many years. Varietal brick residues that have been manufactured into chamotte may be recycled in brick production. Further uses of chamotte can be found e.g. in traffic and civil engineering, with flooring materials or with tennis courts.

Disposal (C4): construction waste is deposited in landfill.

Module D:

Benefits and loads from modules A5 and A3.

The modules B6 and B7 are set to 0 in the EPD for the Argeton façade system because the product in scope does not consume any energy and water during its use stage.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Germany

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The software LFE with MLC databases, version 2024.1 was used for the calculation, see *Sphera LCA FE (fka GaBi)*.

A comparison or evaluation of EPD data is basically only possible if all data sets to be compared have been created according to *EN 15804* and if the context of the building or product-specific features are considered.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.16	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

The following technical information are the basis for the declared modules.

Information about electricity grid mix in module A3:

GWP total equals 0,0101 kg CO₂e/kWh

Transport to the building site (A4)

Name	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Installation into the building (A5)

At the construction site, the following packaging materials arise per m² of ceramic façade panel:

Name	Value	Unit
Wooden pallets	0.228	kg
Plastic waste	0.033	kg
Waste paper	0.14	kg

End of life (C1-C4)

Name	Value	Unit
Landfilling for disposal (facade panel)	40.35	kg

The façade panel is manually dismantled in order to guarantee a selective removal. After the transport of the dismantled product, the façade panel is destined for disposal on an inert waste disposal (module C4).

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D includes the benefits resulting from the energy recovery of the packaging materials (from A5).

LCA: Results

The following tables show the results of the indicators of impact assessment, use of resources, as well as waste and other output flows related to 1 m² ceramic façade panels.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1m² ceramic façade element

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	3.09E+01	3.16E-01	9.61E-01	0	0	0	0	0	0	0	0	1.56E-01	0	6.08E-01	-3.88E-01
GWP-fossil	kg CO ₂ eq	3.14E+01	3.09E-01	3.29E-01	0	0	0	0	0	0	0	0	1.53E-01	0	6.04E-01	-3.86E-01
GWP-biogenic	kg CO ₂ eq	-5.47E-01	1.77E-03	6.32E-01	0	0	0	0	0	0	0	0	8.73E-04	0	0	-2.49E-03
GWP-luluc	kg CO ₂ eq	3.07E-02	5.94E-03	7.21E-06	0	0	0	0	0	0	0	0	2.93E-03	0	3.62E-03	-1.14E-04
ODP	kg CFC11 eq	1.54E-11	9.75E-14	1.51E-13	0	0	0	0	0	0	0	0	4.82E-14	0	1.65E-12	-4.98E-12
AP	mol H ⁺ eq	6.05E-01	4.07E-04	2E-04	0	0	0	0	0	0	0	0	2.01E-04	0	4.29E-03	-4.04E-04
EP-freshwater	kg P eq	1.78E-05	8.4E-07	3.55E-08	0	0	0	0	0	0	0	0	4.15E-07	0	1.38E-06	-1.02E-06
EP-marine	kg N eq	1.04E-01	1.44E-04	5.46E-05	0	0	0	0	0	0	0	0	7.13E-05	0	1.1E-03	-1.46E-04
EP-terrestrial	mol N eq	1.14E+00	1.75E-03	9.37E-04	0	0	0	0	0	0	0	0	8.67E-04	0	1.22E-02	-1.56E-03
POCP	kg NMVOC eq	2.97E-01	3.96E-04	1.44E-04	0	0	0	0	0	0	0	0	1.95E-04	0	3.38E-03	-3.85E-04
ADPE	kg Sb eq	1.53E-04	5.25E-08	1.28E-09	0	0	0	0	0	0	0	0	2.6E-08	0	3.92E-08	-3.91E-08
ADPF	MJ	4.65E+02	4.05E+00	2.17E-01	0	0	0	0	0	0	0	0	2E+00	0	7.96E+00	-5.82E+00
WDP	m ³ world eq deprived	5.84E-01	2.21E-03	1E-01	0	0	0	0	0	0	0	0	1.09E-03	0	6.89E-02	-5.6E-03

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1m² ceramic façade element

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1.48E+02	4.48E-01	5.91E+00	0	0	0	0	0	0	0	0	2.22E-01	0	1.39E+00	-2.4E+00
PERM	MJ	5.84E+00	0	-5.84E+00	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1.54E+02	4.48E-01	7.28E-02	0	0	0	0	0	0	0	0	2.22E-01	0	1.39E+00	-2.4E+00
PENRE	MJ	4.6E+02	4.05E+00	4.86E+00	0	0	0	0	0	0	0	0	2E+00	0	7.96E+00	-5.82E+00
PENRM	MJ	4.65E+00	0	-4.65E+00	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	4.65E+02	4.05E+00	2.17E-01	0	0	0	0	0	0	0	0	2E+00	0	7.96E+00	-5.82E+00
SM	kg	2.25E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	3.67E+00
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	2.05E-02	4.19E-04	2.36E-03	0	0	0	0	0	0	0	0	2.07E-04	0	2.11E-03	-7.73E-04

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 = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1m² ceramic façade element

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	7.93E-07	1.97E-10	1.69E-10	0	0	0	0	0	0	0	0	9.75E-11	0	2E-09	-5.55E-09

NHWD	kg	3E+00	6.85E-04	9.32E-03	0	0	0	0	0	0	0	0	0	3.39E-04	0	4.04E+01	-1.65E-01
RWD	kg	1E-03	6.45E-06	6.49E-06	0	0	0	0	0	0	0	0	0	3.19E-06	0	8.24E-05	-2.13E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	3.89E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.37E+00	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	3.19E+00	0	0	0	0	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1m² ceramic façade element

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	3.42E-06	3.85E-09	1.13E-09	0	0	0	0	0	0	0	0	1.9E-09	0	5.38E-08	-4.91E-09
IR	kBq U235 eq	1.26E-01	6.8E-04	6.9E-04	0	0	0	0	0	0	0	0	3.36E-04	0	9.39E-03	-2.27E-02
ETP-fw	CTUe	4.08E+01	3.14E+00	8.43E-02	0	0	0	0	0	0	0	0	1.55E+00	0	4.59E+00	-9.17E-01
HTP-c	CTUh	6.76E-09	6.27E-11	6.76E-12	0	0	0	0	0	0	0	0	3.1E-11	0	1.08E-10	-6.36E-11
HTP-nc	CTUh	2.25E-07	2.64E-09	9.96E-11	0	0	0	0	0	0	0	0	1.31E-09	0	4.19E-09	-2.28E-09
SQP	SQP	9.84E+01	2.7E+00	7.44E-02	0	0	0	0	0	0	0	0	1.33E+00	0	2.27E+00	-1.61E+00

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

The results of the impact assessment represent relative details/potentials and do not illustrate information on concrete environmental impacts (endpoint); neither limit value violations nor risk analyses may be derived from it.

References

IBU 2021

IBU (2021) Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021, www.ibu-epd.com

ISO 14025

DIN EN/ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

EN 15804

EN 15804:2012+A2:2019: Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products

PCR 2024, part A

Product category rules for building- related products and services. Part A, PCR -Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.4 "Revision of PCR, Part A – Integration of SVR and ECO Platform resolutions", Institut Bauen und Umwelt e.V., www.ibu-epd.com, 15.04.2024

PCR 2023, Part B

Requirements of the EPD for Ceramic panelling, version/v 4, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 11.07.2023

ISO 9001

ISO 9001:2008, Quality management systems - Requirements (ISO 9001:2008); trilingual version EN ISO 9001:2008

ISO 14001

ISO 14001:2004, Environmental management systems - Requirements with guidance for use

ISO 50001

ISO 50001:2011-12, Energy management systems - Requirements with guidance for use (ISO 50001:2011)

OHSAS 18001

OHSAS 18001 - Zertifizierungsgrundlage für Managementsysteme zum Arbeitsschutz (Occupational Health and Safety Assessment Series), 2010-02

DIN EN 13501

DIN EN 13501-1:2010-01: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests on building products, German version EN 13501- 1:2007+A1:2009

DIN EN 10545-3

DIN EN 10545-3:1997-12, Determination of water absorption, apparent porosity, apparent relative density and bulk density (ISO 10545-3:1995, including Technical Corrigendum 1:1997); German version EN ISO 10545- 3:1997

DIN EN 14411

DIN EN 14411:2012-12, Ceramic tiles - Definitions, classification, characteristics, evaluation of conformity and marking

General building inspectorate approval

General building inspectorate approval no. Z-33.1- 1032 of the German Institut for Civil Engineering (DIBT) dated 2 May 2013

DIN EN ISO 10545-12

DIN EN ISO 10545-12:1997-12 Title: Ceramic tiles - Part 12: Determination of frost resistance (ISO 10545-12:1995); German version DIN EN ISO 10545-12:1997-12

DIN EN ISO 10545-13

DIN EN ISO 10545-13:1997-12 Title: Ceramic tiles - Part 13: Determination of chemical resistance (ISO 10545-13:1995); German version EN ISO 10545-13:1997

DIN V 105-100

DIN 105-100:2012-01 Title: Clay masonry units - Part 100: Clay masonry units with specific properties.

N EN 7375

NEN 7375:2004 NL, Leaching characteristics - Determination of the leaching of inorganic components from moulded or monolithic materials with a diffusion test - Solid earthy and stony materials

REACH Candidate List

REACH - Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, Candidate List of Substances of Very High Concern for Authorisation, Candidate List of substances of very high concern for Authorisation - ECHA, 12-2024

European Waste Catalogue

Europäisches Abfallverzeichnis EAV or 'European Waste Catalogue EWC and hazardous waste list', 2002

Sphera LCA FE (fka GaBi)

Sphera LCA for Experts, LCA FE, software -system and databases, Managed LCA content MLC (fka GaBi database), University of Stuttgart and Sphera Solutions GmbH, 2024, CUP Version: 2024.1, MLC data set documentation under

<https://sphera.com/product-sustainability-gabi-data-search/> (Nov 2024)

LCA FE documentation

LCAFE life cycle inventory data

documentation(<https://sphera.com/product-sustainability-gabi-data-search/>)

Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

BNB

BBSR table (german): 'Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB', Bundesinstitut für Bau-, Stadt- und Raumforschung, Referat II Nachhaltiges Bauen; online available under [https://www.nachhaltigesbauen.de/austausch/nutzungsdauern-von-bauteilen/Deutsche Gesellschaft für Nachhaltiges Bauen | DGNB](https://www.nachhaltigesbauen.de/austausch/nutzungsdauern-von-bauteilen/Deutsche_Gesellschaft_für_Nachhaltiges_Bauen_|_DGNB)

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