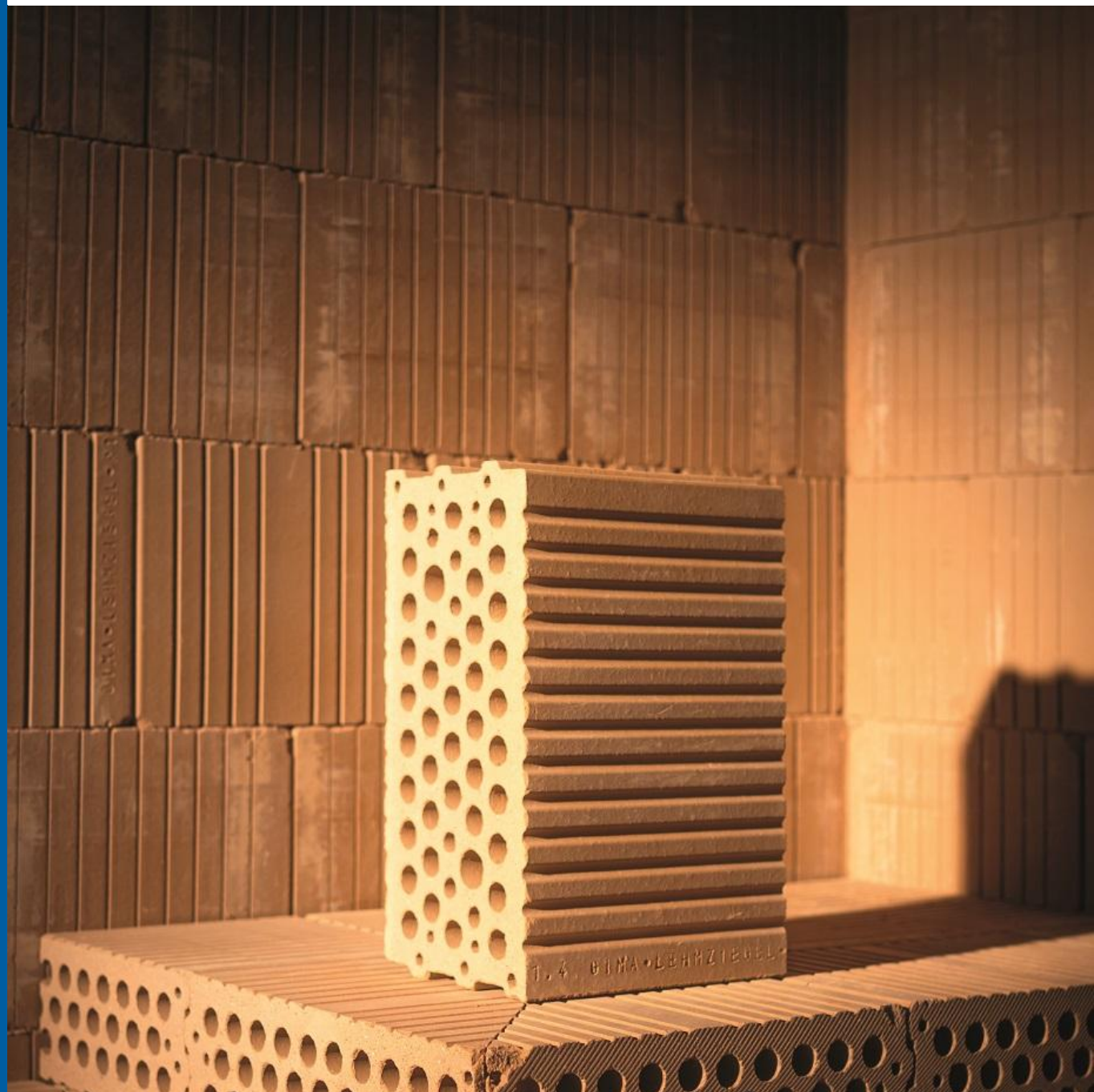
Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

GIMA Lehmziegel (unfired clay brick)



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Issue date:	02-04-2025
Valid until:	02-04-2030
Declaration owner:	Girnghuber GmbH
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

GIMA Lehmziegel (unfired clay brick)

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-188760-EN

1.3 VALIDITY

Issue date: 02-04-2025

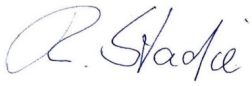
Valid until: 02-04-2030

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: Girnghuber GmbH

Address: Ludwig-Girnghuber-Straße 1, 84163 Marklkofen

E-mail: info@gima-ziegel.de

Website: https://www.gima-ziegel.de/de/

Production location: Girnghuber GmbH

Address production location: Ludwig-Girnghuber-Straße 1, 84163 Maklkofen, DE

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Lucas Pedro Berman, Senda

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

General Product Category Rules: Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

Specific Product Category Rules: PCR Guidance texts for building-related products and services - From the programme for environmental product declarations of the Institut Bauen und Umwelt e.V. (IBU) - PCR B: Requirements on the Environmental Product Declarations for bricks v11

1 General information

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.1

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: EcoInvent version 3.6

Version database: v3.19 (20250306)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'GIMA Lehmziegel (unfired clay brick)' with the calculation identifier ReTHiNK-88760.

2 Product

2.1 PRODUCT DESCRIPTION

Unfired GIMA clay bricks provide a sustainable solution in construction, combining ecological benefits with functional properties. They are fully recyclable, as clay masonry bonded with clay mortar and finished with clay plaster can be seamlessly reintegrated into the raw material cycle. Even broken material can be reused, for instance, in the production of new bricks, thereby minimizing the need for additional raw material extraction. The extraction of clay is conducted in a resource-efficient manner by first removing the fertile topsoil, with immediate renaturation and reclamation of depleted extraction sites. Furthermore, the natural properties of the material contribute to a balanced indoor climate, fostering a sense of tranquility and closeness to nature. Unfired clay bricks thus represent an environmentally friendly and forward-looking choice for construction projects.

The following components are used in the production of unfired clay bricks:

Component	Share m.%
Clay mixture	70%
Natural mineral additives	30%

GIMA vertically perforated clay bricks can be used for residential buildings in building class 4 in accordance with DIN 18945. GIMA thus offers the market a mass-produced, industrially producible and affordable building material which, as a recyclable product made from 100 percent clay.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The application of Gima clay brick masonry is regulated in the approval Z-17.6-1306 and in the ABP P-BWU03-I 17.2.60. Furthermore, the application areas of DIN 18945 apply.

- Structurally protected exterior masonry

- Interior masonry with water exposure classes W0-I and W1-I -DIN 18534-1:2017-07

This includes all walls in kitchens and bathrooms, as well as wall surfaces above washbasins, bathtubs or showers.

GIMA clay blocks are tested as fire walls F90-M and are also regulated in the approval. Gima clay bricks can be used as non-load-bearing and load-bearing masonry.

GIMA recommends planning the facade as double-skin masonry. This protects the clay brick from external environmental influences, while the curtain wall allows for the bond-free assembly of coordinated clay building materials, which can be separated by type at the end of the building's service life.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The declared scenarios represent the life cycle stages "Cradle to gate with modules C1–C4 and module D". Therefore, according to PCR, no indication of the reference service life is required. If used according to good engineering practice, no ageing of the products is to be expected.

USED RSL (YR) IN THIS LCA CALCULATION:

50

2.4 TECHNICAL DATA

Fire

GIMA Lehmziegel comply with the
requirements of building material class A1 in accordance with DIN 4102 'not flammable'.

Name	Value
Building material class	A1
Burning droplets	
Smoke gas development	

Water

Warter-polluting substances will not be released due to the influence of water.

Mechanical destruction

Mechanical destruction will not cause risks to the environment or living organisms.

Technical data

Characteristic	GIMA unfired clay brick
	compressive strength class 5 (average value 7.1 N/mm²)

2 Product

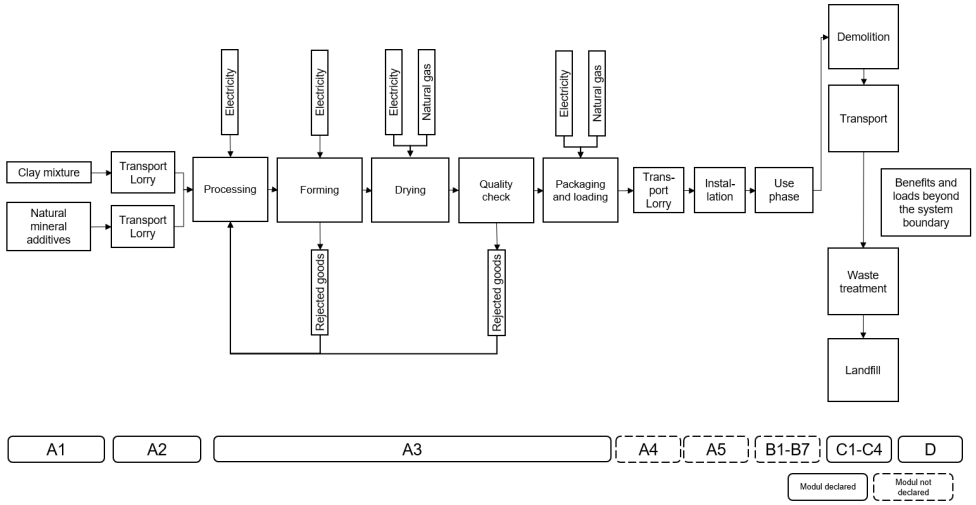
Characteristic	GIMA unfired clay brick
Compressive strength according to DIN 18945:2024-03	
Bulk density	1,6 kg/m³
Thermal conductivity	0.73 W/(mK) according to DIN 4108-4:2020-11
Water vapor diffusion resistance according to DIN ISO 12572:2017-05	μ 36
Equilibrium moisture content	LND
Sound absorption coefficient	LND
Behavior under the influence of moisture and frost	AKI Ia, AK Ib
Absorption test	AKII
Abrasion resistance	LND
Bending load	LND
Active soluble salts	≤0.12 - Clay blocks meet the requirements for the limit values of the content of building-damaging salts for application classes AK Ia, AK Ib and AK II

2.5 SUBSTANCES OF VERY HIGH CONCERN

None of the substances contained in the product with a content of more than 0.1% of the total weight is on the “List of Substances of Very High Concern” (SVHC) that are eligible for authorization under the REACH Regulation.

2.6 DESCRIPTION PRODUCTION PROCESS

Clay is formed by the weathering of clay, gravel, sand and silt and is easy to process as a plastic mass with the right amount of water, sand and other additives. When moulding the clay bricks, GIMA follows the usual brick formats so that the existing brick production lines are used in manufacturing. After moulding, clay bricks dry for four days at 80°C in the drying chambers; the subsequent firing process is eliminated.



3 Calculation rules

3.1 DECLARED UNIT

1 ton of GIMA Lehmziegel (unfired clay brick)

The declared unit is 1 ton of GIMA Lehmziegel (unfired clay brick).

Reference unit: ton (ton)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	ton
Weight per reference unit	1000.000	kg
Conversion factor to 1 kg	0.001000	ton

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for GIMA Lehmziegel (unfired clay brick), a product of Girnghuber GmbH. The results of this EPD are representative for Germany.

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

3 Calculation rules

The following processes are also excluded:

- Manufacture of means of production, buildings or other capital goods;
- Transportation of personnel to the plant;
- Transportation of personnel within the plant;
- Research and development activities;
- Long-term emissions.

Construction process stage (A4-A5)

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use)of energy use for assembly , etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Use stage (B1-B3)

All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

End of life stage (C1-C4)

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Benefits and loads beyond the system boundary (Module D)

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

3.6 ALLOCATION

Allocation was avoided wherever possible. In this LCA study, the allocation is based on physical properties. The declared unit of 1 t was taken into account. The raw material, energy and production data were calculated according to the annual production volume using this allocation key. The differences in the composition, diameter and shape of clay bricks were neglected by using annual average production data.

3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data was collected from 01.01.2024 to 31.12.2024. The quantities of raw materials, auxiliary and process materials used and the energy consumption were collected and averaged over the entire operating year 2024. The reference area is Germany.

Representative and average data for Germany was used for most inputs (raw materials and external inputs). For inputs for which there was no corresponding German data set, a data set for a neighbouring country (e.g. Switzerland or the Netherlands) or a regional data set (e.g. for the EU) was used. In a few cases, a global dataset was used. If data was provided by a manufacturer (e.g. an EPD), this was used as the data source.

All specific transport distances of the source materials were recorded and taken into account.

3.8 ESTIMATES AND ASSUMPTIONS

Heat used for drying air-dried bricks is a co-product of the production of fired bricks. The share of heat used in the air drying process is based on the energy content of the heat stream fed into the air dryer.

For packaging of the products, the majority of the products are not individually packaged. The resulting values are derived from the calculation of average values, which are determined by considering all relevant variables such as weight, volume, or specific product characteristics. These averages are based on the annual production data.

For the deconstruction of the product (module C1) a scenario was used that reflects an average deconstruction process. The weight of the raw material was set in relation to the hourly deconstruction potential of the construction machine. The value of the environmental impact was taken from a Nationale Milieudatabase (NMD) dataset stored in R<THiNK. The NMD is the Netherlands' national environmental database, providing standardized data for assessing the environmental impact of building materials. The assumptions regarding the deconstruction potential of the construction machine were taken from a study, carried out by the NMD, listed in the references. Here, 99 % recycling and 1 % landfill were assumed as the most likely waste scenario for the clay bricks.

3 Calculation rules

3.9 DATA QUALITY

All process-specific data was collected for the 2024 operating year and is therefore up to date. The values are based on the annual average. To ensure the comparability of the results, only consistent background data from the Ecoinvent database v3.6 was used in the LCA (e.g. data records for energy, transport and process materials), which relate to the reference year 2019. The database is checked regularly and therefore complies with the requirements of EN 15804 (background data not older than 10 years). All consistent data sets contained in the Ecoinvent database are documented and can be viewed in the Ecoinvent online documentation. The primary data was provided by Girnghuber GmbH.

The quality of the data used for this EPD can be divided into three categories according to the criteria of the UN Global Environmental Guideline for the Development of a Life Cycle Assessment Database (as described in EN 15804+A2).

The quality level of geographical representativeness can be considered ‘good’, the quality level of technical representativeness can be considered ‘medium’ and the temporal representativeness can also be considered ‘good’. Therefore, the overall data quality for this EPD can be described as ‘good’.

3.10 POWER MIX

The electricity mix considered in this EPD follows the market-based approach and therefore corresponds to the electricity mix that Girnghuber GmbH purchased from an electricity supplier for production in 2023. Based on a conservative calculation approach including direct, upstream and downstream emissions, this electricity mix had a global warming potential (GWP-100) of 0.425 kg CO2eq/kWh.

4 Scenarios and additional technical information

4.1 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

Description	Amount	Unit
(ei3.6) Diesel, burned in machine (incl. emissions)	0.000	l

4.2 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
(ei3.6) coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.3 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
(ei3.6) coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	NL	0	1	0	99	0

4 Scenarios and additional technical information

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
(ei3.6) coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	0.000	10.000	0.000	990.000	0.000
Total	**0.000**	**10.000**	**0.000**	**990.000**	**0.000**

4.4 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
(ei3.6) coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	990.000	0.000
Total	**990.000**	**0.000**

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER TON

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	4.08E+0	1.17E+1	2.94E+1	4.52E+1	4.00E-6	6.82E+0	1.61E+0	5.27E-2	-4.17E+0
GWP-f	kg CO_2 eq.	4.04E+0	1.17E+1	3.27E+1	4.84E+1	4.00E-6	6.82E+0	1.61E+0	5.27E-2	-4.15E+0
GWP-b	kg CO_2 eq.	3.99E-2	4.73E-3	-3.33E+0	-3.28E+0	7.25E-10	2.75E-3	2.55E-3	3.33E-5	-1.06E-2
GWP-luluc	kg CO_2 eq.	4.52E-3	4.30E-3	3.74E-2	4.63E-2	3.15E-10	2.50E-3	3.06E-4	1.47E-5	-4.46E-3
ODP	kg CFC 11 eq.	6.08E-7	2.59E-6	3.50E-6	6.70E-6	8.64E-13	1.50E-6	2.09E-7	2.17E-8	-4.15E-7
AP	mol H+ eq.	4.32E-2	6.81E-2	1.15E-1	2.27E-1	4.18E-8	3.95E-2	1.01E-2	5.00E-4	-3.00E-2
EP-fw	kg P eq.	1.86E-4	1.18E-4	2.78E-3	3.09E-3	1.45E-11	6.87E-5	5.02E-5	5.90E-7	-1.53E-4
EP-m	kg N eq.	1.41E-2	2.40E-2	3.00E-2	6.81E-2	1.85E-8	1.39E-2	4.02E-3	1.72E-4	-8.59E-3
EP-T	mol N eq.	1.75E-1	2.64E-1	3.43E-1	7.82E-1	2.03E-7	1.54E-1	4.47E-2	1.90E-3	-9.97E-2
POCP	kg NMVOC eq.	4.35E-2	7.55E-2	1.18E-1	2.37E-1	5.57E-8	4.38E-2	1.21E-2	5.51E-4	-2.75E-2
ADP-mm	kg Sb-eq.	2.99E-4	2.97E-4	5.49E-4	1.15E-3	6.14E-12	1.73E-4	4.54E-6	4.82E-7	-2.07E-4
ADP-f	MJ	5.67E+1	1.77E+2	4.81E+2	7.15E+2	5.50E-5	1.03E+2	2.16E+1	1.47E+0	-5.18E+1
WDP	m3 world eq.	2.25E+0	6.33E-1	-1.17E+1	-8.83E+0	7.38E-8	3.68E-1	9.80E-2	6.60E-2	-5.96E+1

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	disease incidence	7.65E-7	1.05E-6	1.27E-6	3.09E-6	1.11E-12	6.11E-7	2.23E-7	9.72E-9	-5.17E-7
IR	kBq U235 eq.	2.79E-1	7.42E-1	1.13E+0	2.15E+0	2.36E-7	4.31E-1	6.86E-2	6.04E-3	-2.09E-1
ETP-fw	CTUe	5.50E+2	1.58E+2	5.66E+2	1.27E+3	3.32E-5	9.17E+1	1.75E+1	9.55E-1	-8.36E+1
HTP-c	CTUh	5.13E-9	5.12E-9	1.31E-8	2.34E-8	1.16E-15	2.97E-9	4.16E-10	2.21E-11	-3.09E-9
HTP-nc	CTUh	1.08E-7	1.73E-7	3.76E-7	6.57E-7	2.85E-14	1.00E-7	1.18E-8	6.79E-10	-8.72E-8
SQP	Pt	6.84E+2	1.53E+2	8.19E+2	1.66E+3	7.02E-6	8.91E+1	3.61E+0	3.09E+0	-6.69E+1

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	5.50E+0	2.22E+0	1.71E+2	1.78E+2	2.98E-7	1.29E+0	1.23E+0	1.19E-2	-3.59E+0
PERM	MJ	0.00E+0	0.00E+0	3.13E+1	3.13E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	5.50E+0	2.22E+0	2.02E+2	2.10E+2	2.98E-7	1.29E+0	1.23E+0	1.19E-2	-3.59E+0
PENRE	MJ	6.02E+1	1.88E+2	4.52E+2	7.00E+2	5.85E-5	1.09E+2	2.31E+1	1.56E+0	-5.50E+1
PENRM	MJ	0.00E+0	0.00E+0	6.93E+1	6.93E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	6.02E+1	1.88E+2	5.21E+2	7.69E+2	5.85E-5	1.09E+2	2.31E+1	1.56E+0	-5.50E+1
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	1.29E-1	2.16E-2	-1.95E-1	-4.44E-2	2.83E-9	1.25E-2	7.23E-3	1.57E-3	-1.40E+0

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

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	Kg	1.66E-4	4.49E-4	8.59E-1	8.59E-1	1.50E-10	2.61E-4	3.77E-5	2.20E-6	-1.05E-4
NHWD	Kg	4.86E-1	1.12E+1	1.07E+1	2.24E+1	6.52E-8	6.52E+0	3.01E+0	1.00E+1	-5.62E-1
RWD	Kg	3.44E-4	1.17E-3	1.57E-3	3.08E-3	3.82E-10	6.77E-4	9.71E-5	9.67E-6	-2.27E-4

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	7.27E-3	7.27E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	2.87E+2	2.87E+2	0.00E+0	0.00E+0	9.90E+2	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	9.22E+0	9.22E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	MJ	0.00E+0	0.00E+0	5.35E+0	5.35E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy, Thermic | **EEE**=Exported Energy, Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER TON

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per ton:

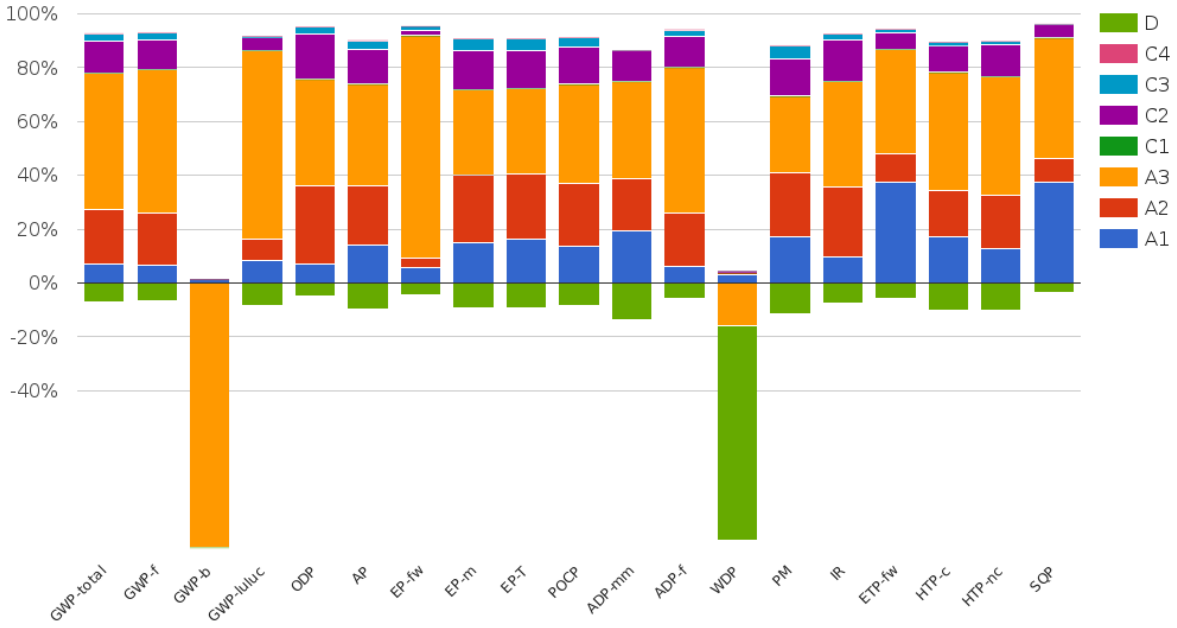
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.953	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	3.494	kg CO2 (biogenic)

6 Interpretation of results



The manufacturing (A3), and transport of raw materials (A2) predominate in almost all of the environmental impact categories analysed. For example, around 45 % of CO2eq emissions (GWP-total) are attributable to manufacturing, while the A2 module accounts for around 30 % of the GWP. Additives accounts for approx. 90 % of the total GWP in the transport of raw materials (A2) and electricity consumption accounts for aprox. 55 % in the manufacturing (A3).

7 References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2021-02, Environmental management - Life cycle assessment - Requirements and guidelines; ISO 14044:2006 + Amd 1:2017 + Amd 2:2020

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

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

DIN 4108-4
DIN 4108-4:2020-11: Thermal insulation and energy economy in buildings - Part 4: Hygrothermal design values

Nationale Milieudatabase (NMD)
Nationale Milieudatabase (NMD): Environmental Performance Assessment Method for Construction Works; Calculation method to determine environmental performance of construction works throughout their service life, based on EN 15804; Version 1.1 (March 2022)

Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen
Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen (BNB): https://www.nachhaltigesbauen.de/fileadmin/pdf/Nutzungsdauer_Bauteile/BNB_Nutzungsdauern_von_Bauteilen_2017-02-24.pdf

Specific Product Category Rules
PCR Guidance texts for building-related products and services - From the programme for environmental product declarations of the Institut Bauen und Umwelt e.V. (IBU) - PCR B: Requirements on the Environmental Product Declarations for bricks v11

General PCR Ecobility Experts
Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

LCA Database
Ecoinvent 3.6 (2019)

8 Contact information

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Kiwa-Ecobility Experts is established member of the ECO PLATFORM