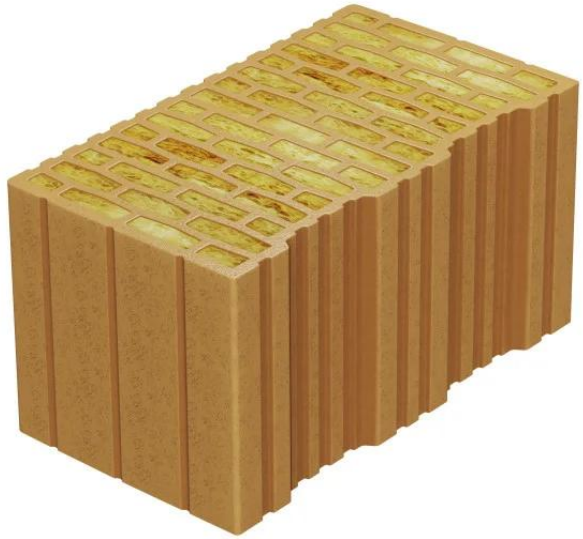


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

CEMACON FIRED CLAY BRICKS - EVOCERAMIC VB - PLANT RECEA
CEMACON SA



EPD HUB, HUB-7920
Published on 23.10.2026, last updated on 23.10.2026, valid until 22.10.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	CEMACON SA
Address	Calea Turzii 178 K -188 S Et. 1, Cluj-Napoca, county Cluj, Romania, Postal Code 400495
Contact details	office@cemacon.ro
Website	www.cemacon.ro

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
c-PCR	-
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Stefan Cosuta, Envirocert SRL, www.envirocert.ro
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Afzal khan Peerukhan as an authorized verifier for EPD Hub

This EPD is intended for business-to-business communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. 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.

PRODUCT

Product name	CEMACON FIRED CLAY BRICKS - EVOCERAMIC VB - PLANT RECEA
Additional labels	-
Product reference	-
Place(s) of raw material origin	ROMANIA
Place of production	Str. Fabricii, No. 1, Recea village, Virsolt Commune, Salaj County, Romania
Place(s) of installation and use	Romania, Hungary
Place(s) of end-of-life	-
Period for data	calendar year 2025
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	0
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	84,3

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 tone
Declared unit mass	1000 kg
Mass of packaging	2,232 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	109
GWP-total, A1-A3 ($kgCO_2e$)	106
Secondary material, inputs (%)	0,05
Total energy use, A1-A3 (kWh)	311
Net freshwater use, A1-A3 (m^3)	0,45

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

CEMACON is one of the leading Romanian manufacturers in the construction materials industry, with a history dating back to 1969 and more than five decades of experience. The company was the leader of the Romanian brick market in 2023, 2024 and 2025 and the leader of the Romanian masonry market in 2025(*), and it is the largest producer with Romanian capital. CEMACON operates 7 high-tech production lines across 3 industrial platforms.

As part of Paval Holding, CEMACON benefits from continuous strategic investment and the integration of innovative technologies aimed at sustainable development.

Core Values and Vision

The company's philosophy is built on the intersection of innovation and experience. CEMACON focuses on:

- Operational Excellence: Recognized with the "Best Managed Companies" certification for three consecutive years (2023, 2024 and 2025).
- Sustainability: Developing durable masonry solutions designed to support industry growth while ensuring the well-being of the community.
- Collaboration: Fostering a diverse work environment where ideas translate into high-quality products and solid professional relationships.

Manufacturing and Innovation

Beyond its core ceramic masonry block range, CEMACON has expanded its manufacturing footprint with a dedicated lintel production line at the Recea platform, opened in 2018, and a facing brick production line within the Recea Industrial Park, opened in 2023, alongside the Biharia platform, integrated into the group in 2023. The company's commitment to a sustainable future is reflected in its own photovoltaic park supplying renewable energy to production, the reintegration of production waste into the raw material recipe, and the use of recyclable raw materials and packaging.

(*)According to Neomar Analysis of Romanian Wall-Building Materials Market 2014 – 2025





PRODUCT DESCRIPTION

Product Description
This Environmental Product Declaration covers the Evoceramic VB ceramic masonry blocks range manufactured by CEMACON S.A. within its production plant in Recea (Vîrșolț Commune, Sălaj County), Romania. This EPD is limited to the basalt wool-filled configurations of the Evoceramic ceramic masonry line; the standard (non-VB) ceramic masonry blocks manufactured at the same plant are covered by a separate EPD. The Evoceramic VB sub-range integrates a basalt wool fill inside the hollow cavities of the fired clay blocks, combining the structural performance of fired clay with the added thermal and acoustic insulation properties of mineral wool, eliminating the need for a separate insulation layer in the wall assembly. As the raw clay mix, manufacturing methodology, and essential raw materials are standardized across the designated production line, the environmental impact results are presented for 1 ton (1,000 kg) of finished product.

Reference standard: EN 771-1+A1:2015
Products covered by this EPD:

Product	Compression resistance (N/mm2)	Thermal resistance (m^2K/W)
Evoceramic 44 VB	12.5	4.06
Evoceramic 30 VB	11	4.28
Evoceramic 29 VB	15	3.83
Evoceramic 24 VB	10	3.32
Evoceramic 15 VB	7.5	2.40
Evoceramic 12 VB	7.5	1.59
Evoceramic 1/2 44 VB	10	1.69

Additionally, the Annex to this EPD presents the specific GWP (Global Warming Potential) values obtained individually for each of the manufacturing configurations.

Construction and Materials
Cemacon Evoceramic VB blocks are engineered using specialized, optimized clay mixtures and burning processes, combined with an integrated basalt wool fill, to establish a highly durable, structurally stable, and thermally efficient configuration:
Fired Clay Core Matrix: Formulated from natural clay reserves and burned at high industrial temperatures to guarantee excellent mechanical load-bearing resistance, dimensional stability, and prolonged service longevity.
Optimized Perforation Geometry: Designed with variable internal volumes of hollow cavities to secure structural lightweight properties while maximizing thermal and acoustic resistance according to specific application requirements.
Integrated Basalt Wool Insulation: The hollow cavities of each unit are filled with basalt wool during manufacturing, combining the fired clay's mechanical and fire-safety performance with the mineral wool's superior thermal and acoustic insulation properties within a single masonry unit.

Manufacturing and Sustainability
The production process takes place specifically within Cemacon's dedicated ceramic manufacturing plant in Recea (Vîrșolț Commune, Sălaj County), Romania, operating under standardized, high-performance industrial procedures. The manufacturing process relies on natural, mineral-based raw materials, utilizing high-temperature firing processes that establish a chemically stable, inert, and ecological material profile.

Product Benefits
Optimized Thermal Performance: Due to the natural insulating properties of fired clay coupled with an advanced hollow core geometry, the blocks effectively maintain constant indoor living environments, lowering seasonal heating or cooling resource consumption and saving associated energy expenditures. The basalt wool integrated into the cavities achieves a

significant further reduction in thermal conductivity compared to unfilled hollow blocks, delivering superior energy performance and enabling single-layer wall assemblies without additional external insulation.
Acoustic Comfort: The basalt wool fill also contributes to improved sound insulation, enhancing acoustic comfort in both exterior and interior masonry applications.
Microclimate & Health Safety: Burned at extreme temperatures, the blocks achieve Euroclass A1 reaction to fire without emitting any toxic smoke or gases during fire exposure, and exhibit a safe mineral profile that respects surrounding air and water quality.
Longevity & Circular Economy: The structural durability and atmospheric wear resistance ensure that the masonry elements maintain structural stability over decades. At the end of the building life cycle, the masonry elements can be completely crushed, recycled, and diverted back into secondary industrial loops, preserving natural mineral reserves.
Precision & Execution Efficiency: Manufactured to strict dimensional tolerances, these masonry units allow for rapid interlocking alignments, significantly reduced mortar mix consumption, short on-site construction times, and cleaner structural jobsites.

Further information can be found at:
www.cemacon.ro



PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	100	Romania
Fossil materials	0	-
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0,016
Biogenic carbon content in packaging, kg C	0,78

1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 tone
Mass per declared unit	1000 kg
Functional unit	-
Reference service life	years

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

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

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		
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

A1 – Raw material supply

This stage includes the extraction, processing, and delivery of the primary materials that form the Cemacon Evoceramic VB fired clay masonry units. The formulation is based on a natural composition consisting primarily of clay as the structural mineral base, combined with coal as a combustible additive that supports the internal firing process. To optimize the internal porosity and thermal performance of the ceramic blocks, the mixture incorporates biogenic secondary materials and organic manufacturing residues — specifically sawdust, sunflower husks, and spent coffee grounds — alongside fly ash used as a filler. In addition to the fired clay body inputs, this range incorporates basalt wool insulation material sourced as a production reject/offcut purchased from basalt wool manufacturers, rather than virgin insulation material, representing a valorized secondary mineral input used to fill the hollow cavities of the finished blocks. The environmental burdens of all material inputs, including upstream extractions and the biogenic carbon storage of organic resources, are tracked and allocated to the declared unit of 1 tonne (1,000 kg) of finished product, utilizing the Ecoinvent database to model the upstream impacts of raw material production.

A2 – Transport to factory

This stage covers the transportation of raw materials from the suppliers to the Cemacon manufacturing plant in Recea (Vîrșolț Commune, Sălaj County). It includes inbound logistics for clay, coal, the biogenic and mineral pore-forming additives (sawdust, sunflower husks, spent coffee grounds, fly ash), the basalt wool insulation material, as well as facility operational components. Clay, the raw material with the highest volume share by far, is sourced from the company's own quarry located in the immediate vicinity of the plant, using diesel earth-moving equipment, ensuring minimal transport-

related impacts for the dominant input. The remaining raw materials, including the basalt wool, are sourced from domestic suppliers within Romania, delivered predominantly by heavy-duty trucks. Transport distances and vehicle types are derived directly from the company's internal logistics records, and load factors are defined based on actual operational data to ensure the highest level of accuracy. Assumptions on empty-return trips and consolidation of loads are specified for the LCA modelling to reflect the regional transport infrastructure.

A3 – Manufacturing, Finishing and Packaging

In this stage, the raw materials are transformed into finished fired clay masonry units. Key processes at the Cemacon Recea manufacturing facility include:

- Preparation and Mixing: crushing, grinding, and precise dosing of clay, water, coal, and the biogenic and mineral pore-forming agents, followed by intensive mixing to ensure a completely homogeneous composition.
- Shaping and Cutting: the prepared clay mass is extruded through specialized dies to form continuous columns with precise internal geometries, which are subsequently cut into specific unit dimensions.
- Drying and Firing: the green blocks undergo controlled drying across a series of tunnel dryers, followed by high-temperature firing in a tunnel kiln (preceded by a pre-kiln stage) where structural sintering and ceramic bonding occur, and where the coal content of the mix contributes to the internal combustion process during firing.
- Basalt Wool Shredding and Cavity Filling: following the firing stage, basalt wool reject material — sourced as production offcuts purchased from basalt wool manufacturers — is mechanically shredded on a dedicated processing line at the Recea facility, and the resulting shredded wool is used to fill the hollow cavities of the fired blocks, producing the finished Evoceramic VB unit.
- Quality Control and Sorting: final inspection, structural verification, and sorting of the fired clay units prior to final packaging and storage.

Energy modelling: The facility's energy mix combines natural gas — including a cogeneration unit — for the drying and firing processes, with grid electricity and self-generated solar power for auxiliary production processes and office needs, alongside diesel for internal forklift handling. The basalt wool shredding and cavity-filling line draws a dedicated electricity supply, tracked and allocated exclusively to the VB product range, separately from the shared production electricity common to all product configurations. 100% of the self-generated solar power is consumed entirely within the production facility for operational processes, with zero electricity being injected back into the national grid. This internal balancing ensures an accurate and representative footprint for the manufacturing phase impacts.

Packaging: Includes the use of wood pallets, protective plastic (shrink) films — including a dedicated film type for the VB range — PET strapping, and paper labels to ensure safe delivery, stable stacking, and weather-protected handling.

Direct process emissions and air quality: Firing generates direct process CO2 emissions from both clay decarbonation and the combustion of coal and ash within the clay body. Stack emissions at the kiln and dryer exhaust points are continuously monitored and reported, in line with the facility's environmental permit.

Waste Management: Manufacturing waste, including raw material losses re-routed directly back into production where possible, and packaging discards, is recorded and handled in accordance with internal environmental procedures. Wood pallets are largely recovered and reused (up to five cycles), while PET strapping and plastic films are sent for recycling. Residual raw material losses not reused internally (e.g., sawdust and fly ash fractions) are handed over to authorized local waste collectors. All waste transport uses standard road transport.

System boundary and cut-off criteria
For modules A1–A3, the system boundary includes all processes under Cemacon S.A.'s control at the Recea plant up to the factory gate (Cradle-to-Gate), including the basalt wool shredding and cavity-filling operation carried out after firing. Processes excluded include the manufacture of capital goods (machinery, buildings), infrastructure maintenance, and indirect company management overheads. Cut-off criteria ensure that all major raw materials and energy flows are included, confirming that no neglected individual process exceeds 1% of total mass or energy, and the total neglected input flows do not exceed 5% of each inventory module.

Data quality and representativeness
The data used reflect the actual production period of Cemacon S.A.'s Recea plant operations, specifically covering the calendar year 2025. Foreground data, including specific raw material consumption, the dedicated basalt wool shredding/filling line electricity, and specific packaging allocations, are collected directly from site-specific internal monitoring and operational records. Background data are derived from recognized LCA databases, specifically Ecoinvent 3.12 and One Click LCA. The representativeness of the data is verified, and all assumptions regarding regional transport volumes and allocation are thoroughly documented.

TRANSPORT AND 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.

A4 – Transport to Building Site
This stage includes the transportation of the finished Cemacon Evoceramic VB fired clay masonry units from the Recea manufacturing facility to the construction site. Based on operational data, this involves:
- Loading and securing: finished ceramic blocks are palleted and secured at the factory gate using the wood pallets, plastic films (including the dedicated VB film), and PET strapping documented in module A3, to prevent structural displacement or breakage during transit.
- Logistics and volume: transport modeling is based on the bulk volume and density of each masonry unit configuration. For the declared unit of 1 tonne, the product-specific physical density (varying by configuration, see Annex) is used to determine the transported volume relative to vehicle payload limits.
- Transport distances: consistent with the standard Evoceramic range manufactured at the same plant, the average transport distance is calculated as a sales-volume-weighted average across all Romanian counties supplied by the Recea plant, based on internal commercial delivery records, resulting in a representative distance of approximately 220 km.
- Delivery: the transport stage ends when the products reach the construction site. All packaging materials associated with the product are included up to this stage.

A5 – Installation into the Building / Infrastructure
This stage covers the on-site installation of Cemacon Evoceramic VB fired clay masonry units. The installation scenario is defined as follows:
- On-site handling: the installation process is predominantly manual, involving the unpacking, lifting, and precise positioning of the ceramic units by masonry workers to form walls.
- Energy consumption: installation energy use is minimal, limited to a small diesel input for on-site building machinery (e.g., mortar mixing/handling equipment); the manual placement of the blocks themselves requires no additional power tools.
- Auxiliary materials: to structurally bind the masonry units, the scenario incorporates auxiliary material inputs per declared unit of 138 kg of masonry mortar (silica sand based) and 10 kg of tap water (underground water, untreated).
- Installation losses: a product material loss rate of 5% (50 kg per tonne of declared unit) is factored into this module, accounting for scrap generation

during the manual laying phase. This installation waste is treated as inert construction debris, with 70% directed to recycling and 30% to sanitary landfill.

Waste Management of Packaging: accounts for the collection and processing of all packaging materials removed during installation (wood pallets and plastic films). The end-of-life treatment for these materials is modeled using a EU-level split scenario (source: EUROSTAT, via One Click LCA), reflecting regional waste practices:
- Wood packaging: 32% is recycled, 30% is directed to energy recovery (incineration), and 38% is landfilled;
- Plastic packaging: 40% is recycled, 37% is directed to energy recovery (incineration), and 23% is landfilled.

All packaging waste and installation material losses are assumed to be transported over a representative distance of 50 km from the site to authorized regional waste management facilities.

PRODUCT END OF LIFE (C1-C4, D)

C1 – Deconstruction / Disassembly
At the end of its service life, the Cemacon Evoceramic VB clay masonry wall structure is dismantled during building deconstruction primarily through mechanical and manual demolition operations. The specific scenario accounts for the deconstruction of 1,138 kg of total mass per declared unit, comprising 1,000 kg of fired clay brick — including the basalt wool insulation integrated within the block's hollow cavities during manufacturing, which remains embedded in the block and is not separated during demolition — and 138 kg of mortar. Disassembly relies on a modest diesel input for on-site demolition machinery, while the sorting and separation of the masonry units otherwise requires no additional energy input. Since the fired ceramic, the embedded basalt wool fill, and the mortar matrix are chemically inert and fully stable, no hazardous emissions or volatile compounds are released during disassembly.

C2 – Transport to Waste Processing Facilities
Following disassembly, the masonry waste (fired clay brick with integrated basalt wool, and mortar) is transported to authorized regional collection points, recycling centers, or treatment facilities. For the LCA model, transport is assumed to occur via standard heavy-duty road vehicles over a representative average distance of 50 km. Fuel consumption and logistics emissions are calculated based on the total mass of the combined materials, utilizing standard transport datasets from Ecoinvent to reflect regional waste logistics infrastructure.

C3 – Waste Processing
This stage involves the physical sorting, crushing, and preparation of the discarded structural masonry units. The fired clay brick fraction — including the embedded basalt wool fill, which is not mechanically separated at this stage and is processed together with the ceramic matrix — and the mortar fraction are processed separately: the ceramic brick is directed towards authorized construction and demolition waste processing facilities for mechanical crushing and screening into secondary mineral aggregates, while the mortar fraction is processed according to standard cement/mortar waste treatment routes (source: Eurostat 2022). Both streams require standard operational processing before recycling or final disposal.

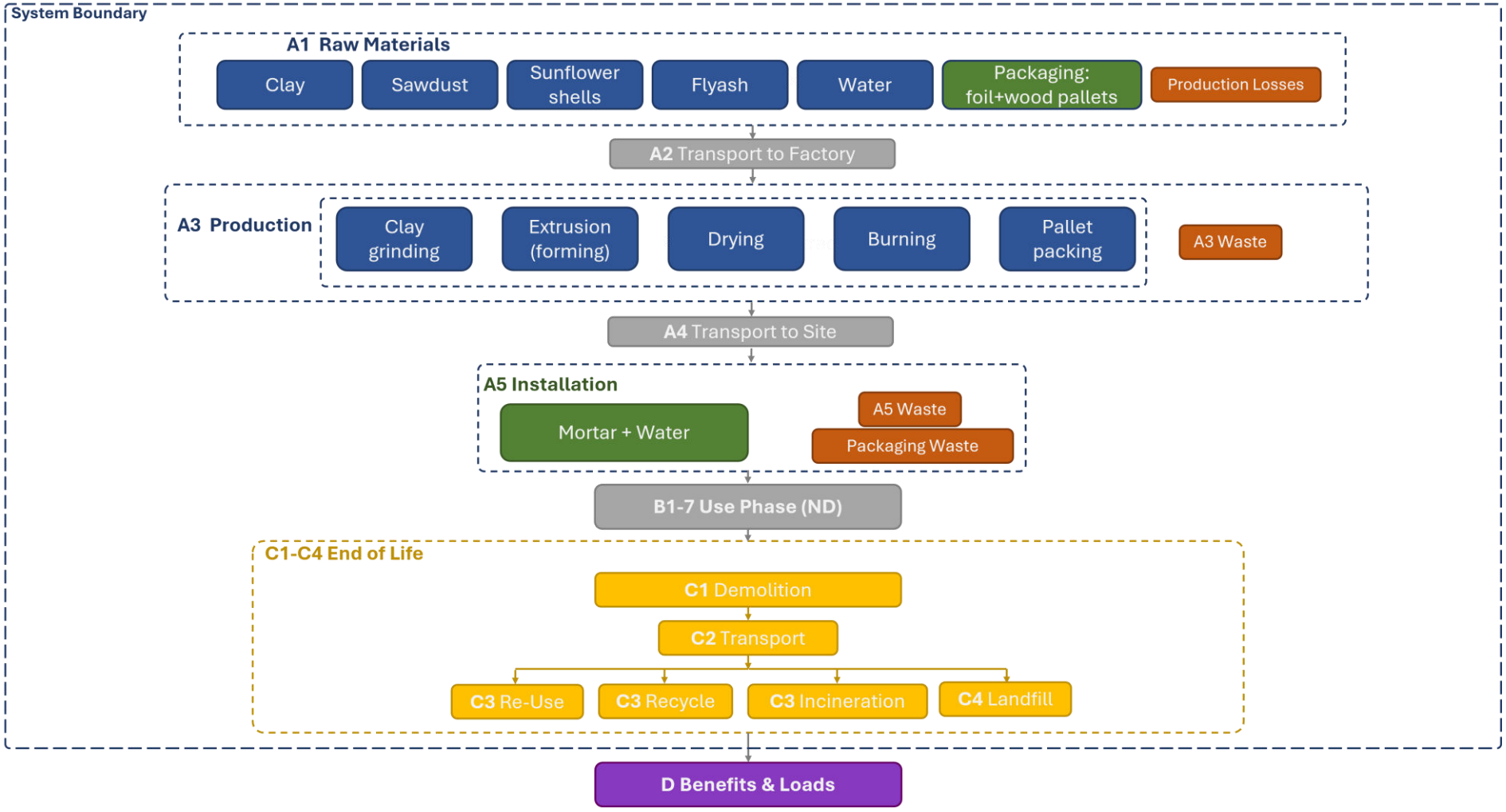
C4 – Final Disposal
The disposal scenario is defined according to representative regional construction and demolition waste practices, distinguished per material fraction: the fired clay brick fraction (including the integrated basalt wool content) follows a 70% recycling / 30% landfill split,while the mortar fraction follows an 80% recycling / 20% landfill split (Eurostat 2022 treatment data). Fired clay masonry, the embedded basalt wool insulation, and cured mortar are non-leaching, highly stable materials that do not undergo biochemical degradation; therefore, they do not generate greenhouse gas emissions, leachate, or environmental contamination when directed to compliant landfills or structural inert storage facilities. All waste is assumed to be

transported over a representative distance of 50 km from the site to authorized regional waste management facilities.

Module D – Benefits and Loads Beyond the System Boundary
The recovery of materials and energy at the end-of-life provides net benefits beyond the system boundary, reported as negative environmental impacts in Module D. The net-flow modelling accounts separately for each recovered material stream (fired clay brick with integrated basalt wool, mortar, wood packaging, plastic packaging), combining the environmental loads of processing/recycling with the benefits of avoided virgin material and energy production.
Net Flow Calculation: For each material stream, net flows for recycling and energy recovery are determined based on the specific recovery and disposal split defined in Modules A5 and C3-C4. This includes: for wood and plastic packaging, the transfer of the renewable/non-renewable energy content embodied in the material (PERM/PENRM) and, for wood packaging specifically, the release of the biogenic carbon content stored in the material; for the incinerated fraction of each packaging stream, credits for the exported electricity and heat replacing the regional energy mix; and for the recycled fraction of each stream, credits (net of any processing loads) reflecting the substitution of virgin material production.
Mineral Recycling Credits: The recycled fraction of the fired clay brick waste is modelled as an avoided production of virgin crushed gravel/aggregate, used to offset primary aggregate extraction for local road infrastructure and construction applications; the associated crushing/processing burden of the recycled brick fraction is accounted for within the same net flow, avoiding double counting. The mortar fraction follows an analogous recycling credit, based on its own Eurostat-sourced recovery split.
Packaging Recovery and Recycling: Benefits are also accounted for the recovery of packaging materials collected during the installation stage (Module A5):
- Wood packaging: the biogenic carbon and embodied renewable/non-renewable energy content of the material are transferred out of the system; the incinerated share (30%) is credited with avoided grid electricity and district heat production; the recycled share (32%) is credited with avoided production of wood chips/mulch for agricultural and landscaping applications, net of the energy required for processing.
- Plastic packaging: the embodied non-renewable energy content of the material is transferred out of the system; the incinerated share (37%) is credited with avoided grid electricity and district heat production; the recycled share (40%) is credited with avoided production of virgin high-density polyethylene granulate.

Data Quality and Representativeness
The scenarios for Modules C and D reflect representative construction and demolition waste management practices and packaging recovery infrastructures.
Total mass configurations, transport distance for waste processing (50 km), packaging material formulations, and regional recycling split assumptions are derived from operational records and site-specific project configurations.
Impact factors for mineral aggregate crushing, material recycling substitution, packaging incineration, and landfilling are sourced from the Ecoinvent database and One Click LCA, ensuring technological, geographical, and temporal relevance for the European market.

LIFE CYCLE FLOW DIAGRAM



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied 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, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

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.

In accordance with the PCR and EN 15804+A2 cut-off criteria, the following processes and infrastructure components have been excluded from the system boundaries of this study:
Capital goods and infrastructure: The manufacturing, maintenance, and disposal of production machinery, industrial buildings, kilns, and other capital equipment.
Corporate overheads: Administrative activities, corporate office energy consumption, business travel, and R&D activities that are not directly tied to the shop-floor manufacturing line.
Minor auxiliary inputs: Minor material or energy flows that contribute less than 1% to the total input mass or energy, and whose cumulative exclusion does not exceed 5% of any given inventory module.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Physical Properties
Packaging material	Physical Properties
Ancillary materials	Physical Properties
Manufacturing energy and waste	Physical Properties

Where primary operational data was unavailable, conservative engineering estimates and standard scenarios based on the Product Category Rules (PCR) and the One Click LCA platform were applied:
Installation Scenario (Module A5): The installation process of the Cemacon Evoceramic VB fired clay blocks into the building matrix is predominantly manual, with a minor diesel input modeled for on-site building machinery. Auxiliary materials used for jointing (masonry mortar and water) are modeled based on the facility's technical mortar-consumption data.
Deconstruction Scenario (Module C1): The building disassembly and demolition process is assumed to be primarily mechanical in nature (utilizing

standard heavy machinery), with a diesel input modeled for the structural clay masonry fraction's share per declared unit.
Basalt Wool Retention at End-of-Life: The basalt wool insulation integrated within the block's hollow cavities during manufacturing is assumed to remain embedded in the fired clay matrix throughout deconstruction and waste processing. It is therefore processed and allocated together with the fired clay brick fraction across Modules C3, C4, and D.
Mortar Inclusion at End-of-Life: For the end-of-life deconstruction, transport, and processing scenarios, it is assumed that the structural wall generates a combined waste flow. For every 1,000 kg of fired clay brick (including the integrated basalt wool content), an additional 138 kg of structural masonry mortar is assumed to be bound to the product, totaling 1,138 kg of mineral waste processed per declared unit.
End-of-Life Destination: In accordance with representative regional infrastructure practices, the end-of-life scenario for the inert masonry waste is modeled per material fraction: the fired clay brick fraction (including its embedded basalt wool content) follows a 70% recycling / 30% landfill split, directed to recycling facilities for crushing and sorting into secondary mineral aggregates (generating environmental benefits in Module D.

Transportation Parameters: For all standard logistics scenarios where specific vehicle profiles were not logistically restricted, transportation was modeled using generic Euro 5 or Euro 6 heavy-duty road freight datasets from Ecoinvent to maintain a representative and conservative carbon accounting approach.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on average results of product group - by total mass
Variation in GWP-fossil for A1-A3, %	0

This Environmental Product Declaration (EPD) represents a product-specific group average covering the Evoceramic VB (basalt wool-filled) portfolio of fired clay masonry units manufactured at a single production facility: Cemacon S.A. – Recea plant, Vîrșolț Commune, Sălaj County, Romania. This group excludes the standard (non-VB) Evoceramic range manufactured at the same plant, which is covered by a separate EPD.
The technical characteristics within this product group cover a bulk density range from approximately 600 kg/m³ to 810 kg/m³, resulting in different hollow geometries, wall thicknesses, and thermal/acoustic performance depending on the specific block layout.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.5. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

1. EN 15804:2012+A2:2019/AC:2021 – Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
2. ISO 14025:2006 – Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
3. EN 771-1:2011+A1:2015 – Specification for masonry units - Part 1: Fired clay masonry units.
4. Primary operational data from Cemacon S.A. for the calendar year 2025 (internal bills of materials, energy logs, transport, and waste records for the Recea manufacturing plant, Vîrșolț Commune, Sălaj County).
5. Ecoinvent 3.12 database and One Click LCA platform – Background datasets used for upstream raw materials, energy grids, transport logistics, and end-of-life scenarios.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	-2,73E+01	3,46E+00	1,30E+02	1,06E+02	2,32E+01	3,22E+01	ND	ND	ND	ND	ND	ND	ND	3,62E+00	1,04E+01	5,36E+00	3,62E+00	-9,14E+00
GWP – fossil	kg CO_2e	1,50E+01	3,46E+00	9,01E+01	1,09E+02	2,32E+01	2,90E+01	ND	ND	ND	ND	ND	ND	ND	3,62E+00	1,04E+01	5,35E+00	3,63E+00	-8,37E+00
GWP – biogenic	kg CO_2e	-4,23E+01	6,94E-04	3,94E+01	-2,92E+00	1,20E-02	3,14E+00	ND	ND	ND	ND	ND	ND	ND	6,90E-04	2,09E-03	-3,07E-03	-5,11E-03	-7,61E-01
GWP – LULUC	kg CO_2e	1,76E-02	1,54E-03	6,65E-03	2,58E-02	8,14E-03	1,02E-02	ND	ND	ND	ND	ND	ND	ND	3,71E-04	3,75E-03	5,28E-03	2,14E-03	-7,99E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}e$	1,32E-06	5,05E-08	2,97E-06	4,34E-06	5,26E-07	1,50E-06	ND	ND	ND	ND	ND	ND	ND	5,38E-08	2,04E-07	8,37E-08	1,06E-07	-8,07E-08
Acidification potential	mol H^+e	1,22E-01	1,20E-02	5,43E-01	6,77E-01	7,50E-02	1,55E-01	ND	ND	ND	ND	ND	ND	ND	3,24E-02	3,28E-02	4,27E-02	3,70E-02	-5,14E-02
EP-freshwater[2)]	kg Pe	1,21E-01	3,74E-04	3,53E-03	1,25E-01	1,65E-03	6,93E-03	ND	ND	ND	ND	ND	ND	ND	1,17E-04	7,00E-04	8,60E-04	5,08E-03	-2,94E-03
EP-marine	kg Ne	5,90E-02	3,98E-03	1,80E-01	2,43E-01	2,64E-02	4,45E-02	ND	ND	ND	ND	ND	ND	ND	1,51E-02	1,10E-02	1,81E-02	9,81E-03	-1,20E-02
EP-terrestrial	mol Ne	4,20E-01	4,30E-02	1,96E+00	2,42E+00	2,86E-01	4,82E-01	ND	ND	ND	ND	ND	ND	ND	1,65E-01	1,20E-01	1,98E-01	1,06E-01	-1,44E-01
POCP ("smog")[3)]	kg NMVOCe	1,13E-01	1,76E-02	5,31E-01	6,62E-01	1,24E-01	1,35E-01	ND	ND	ND	ND	ND	ND	ND	4,94E-02	5,12E-02	6,05E-02	3,81E-02	-4,13E-02
ADP-minerals & metals[4)]	kg Sbe	4,60E-04	9,90E-06	5,79E-05	5,28E-04	6,72E-05	1,20E-03	ND	ND	ND	ND	ND	ND	ND	1,30E-06	3,37E-05	7,41E-06	7,27E-06	-4,82E-05
ADP-fossil resources	MJ	8,25E+02	4,94E+01	7,41E+02	1,62E+03	3,37E+02	2,90E+02	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,47E+02	7,40E+01	8,04E+01	-1,12E+02
Water use[5)]	m^3e depr.	5,59E+00	2,88E-01	2,21E+01	2,79E+01	1,94E+00	5,87E+00	ND	ND	ND	ND	ND	ND	ND	1,21E-01	7,21E-01	3,09E-01	4,62E-01	-1,23E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and 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 experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,96E-06	3,39E-07	2,57E-06	4,87E-06	2,34E-06	2,11E-06	ND	ND	ND	ND	ND	ND	ND	9,25E-07	8,36E-07	7,14E-06	8,04E-07	-7,81E-07
Ionizing radiation[6)]	kBq U235e	8,67E-01	4,15E-02	8,27E+00	9,17E+00	3,63E-01	1,30E+00	ND	ND	ND	ND	ND	ND	ND	2,01E-02	1,83E-01	7,28E-02	1,01E-01	-8,12E-01
Ecotoxicity (freshwater)	CTUe	7,83E+02	1,02E+01	2,23E+02	1,02E+03	4,54E+01	5,72E+02	ND	ND	ND	ND	ND	ND	ND	2,69E+01	1,94E+01	1,69E+01	4,89E+01	-2,36E+02
Human toxicity, cancer	CTUh	2,92E-08	5,43E-10	6,56E-09	3,63E-08	3,66E-09	7,45E-09	ND	ND	ND	ND	ND	ND	ND	3,69E-10	1,77E-09	8,80E-10	1,42E-09	-2,21E-09
Human tox. non-cancer	CTUh	4,65E-07	3,07E-08	1,05E-07	6,01E-07	2,10E-07	2,19E-07	ND	ND	ND	ND	ND	ND	ND	5,80E-09	9,24E-08	2,99E-08	8,75E-08	-6,63E-08
SQP[7)]	-	5,08E+02	4,93E+01	2,78E+02	8,36E+02	3,41E+02	4,19E+02	ND	ND	ND	ND	ND	ND	ND	3,12E+00	9,18E+01	3,57E+01	1,84E+02	-9,15E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

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
Renew. PER as energy[8)]	MJ	-1,08E+02	6,87E-01	8,38E+01	-2,32E+01	5,24E+00	-1,58E+01	ND	ND	ND	ND	ND	ND	ND	2,96E-01	2,50E+00	1,20E+00	1,59E+00	-4,23E+00
Renew. PER as material	MJ	1,82E+02	0,00E+00	-1,54E+02	2,85E+01	0,00E+00	-2,85E+01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,57E+00
Total use of renew. PER	MJ	7,43E+01	6,87E-01	-6,97E+01	5,29E+00	5,24E+00	-4,42E+01	ND	ND	ND	ND	ND	ND	ND	2,96E-01	2,50E+00	1,20E+00	1,59E+00	3,34E+00
Non-re. PER as energy	MJ	3,71E+02	4,94E+01	7,23E+02	1,14E+03	3,37E+02	2,52E+02	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,47E+02	7,41E+01	8,04E+01	-1,12E+02
Non-re. PER as material	MJ	4,53E+02	0,00E+00	-4,37E+02	1,67E+01	0,00E+00	-1,67E+01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,45E+00
Total use of non-re. PER	MJ	8,25E+02	4,94E+01	2,86E+02	1,16E+03	3,37E+02	2,35E+02	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,47E+02	7,41E+01	8,04E+01	-1,06E+02
Secondary materials	kg	5,10E-01	2,07E-02	1,73E-01	7,04E-01	1,43E-01	5,49E-02	ND	ND	ND	ND	ND	ND	ND	1,95E-02	6,69E-02	3,02E-02	2,71E-02	3,96E-02
Renew. secondary fuels	MJ	2,01E-03	2,70E-04	9,74E-01	9,76E-01	1,89E-03	4,90E-02	ND	ND	ND	ND	ND	ND	ND	5,12E-05	8,45E-04	1,95E-04	4,71E-04	-7,90E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,72E-01	7,08E-03	2,68E-01	4,47E-01	4,46E-02	7,13E-01	ND	ND	ND	ND	ND	ND	ND	3,02E-03	1,99E-02	-1,04E-01	-8,39E-01	-2,83E-01

8) PER = 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	3,95E+00	3,16E-01	1,22E+00	5,48E+00	1,90E+00	1,00E+00	ND	ND	ND	ND	ND	ND	ND	5,29E-02	2,13E-01	1,26E-01	1,33E-01	-8,04E-01
Non-hazardous waste	kg	7,18E+02	6,24E+00	3,88E+01	7,63E+02	3,96E+01	1,12E+02	ND	ND	ND	ND	ND	ND	ND	7,71E-01	4,45E+00	1,52E+02	1,07E+03	-1,87E+01
Radioactive waste	kg	6,50E-04	9,93E-06	2,72E-03	3,38E-03	8,75E-05	8,59E-04	ND	ND	ND	ND	ND	ND	ND	4,93E-06	4,54E-05	1,77E-05	2,46E-05	-1,98E-04

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 re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,42E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	8,12E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,08E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,14E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,94E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Radioactive waste, high	kg	3,62E-05	2,87E-06	1,87E-03	1,91E-03	2,24E-05	1,31E-04	ND	ND	ND	ND	ND	ND	ND	1,43E-06	1,13E-05	5,39E-06	5,97E-06	-5,28E-05
Radioactive waste, int/low	kg	6,14E-04	7,06E-06	6,79E-04	1,30E-03	6,51E-05	7,19E-04	ND	ND	ND	ND	ND	ND	ND	3,50E-06	3,40E-05	1,24E-05	1,86E-05	-1,45E-04

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	1,50E+01	3,46E+00	9,01E+01	1,09E+02	2,32E+01	2,90E+01	ND	ND	ND	ND	ND	ND	ND	3,62E+00	1,04E+01	5,36E+00	3,63E+00	-8,38E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Natural gas, One Click LCA, 0.25 kgCO2e/kWh
2. Electricity, medium voltage, residual mix, Romania, Ecoinvent, 0.28 kgCO2e/kWh
3. Electricity production, photovoltaic, Romania, Ecoinvent, 0.0770 kgCO2e/kWh
4. Market for diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO2e/MJ
5. Heat and power co-generation, natural gas, Romania, Ecoinvent, 0.0392 kgCO2e/MJ

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry, >32 metric ton, diesel, EURO 5, 219.0 km

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (including empty return) %	85
Bulk density of transported products	696
Volume capacity utilization factor	<1

Installation at the building site (A5) - Scenario documentation

Scenario parameter	Value
Energy: type and consumption (MJ or kWh)	-
Water use (m^3)	tap water: 0.01 m3
Ancillary materials: type and mass (kg)	cement mortar: 138 kg
Waste materials: type and mass (kg)	50 kg ceramic bricks 1.88 kg wood pallets 0.35 kg plastic packaging
Waste materials: output routes	brick waste: 70% recycled, 30% landfill Wood packaging: 32% recycled, 30% incineration, 38% landfill Plastic packaging: 40% recycled, 37% incineration, 23% landfill
Direct emissions (kg)	-

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	1138 kg
Collection process: Mixed waste (kg)	-
Recovery: re-use (kg)	0
Recovery: recycling (kg)	812
Recovery: energy recovery (kg)	0
Disposal (kg)	328
Scenario assumptions e.g. transportation (mode, km) & other	Landfill: 50km, Recycling: 50km.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Afzal khan Peerukhan as an authorized verifier for EPD Hub Limited 23.10.2026



ANNEX 1 – GWP VARIATION ACROSS PRODUCTS

Product	Mass (kg/m^3)	GWP total $KgCO2e/m^3$	Width of the wall (cm)	Thermal resistance (m^2K/W)	GWP Total $KgCO2e/m^2$
Evoceramic 44 VB	685	72.6	44	4.06	31.9
Evoceramic 30 VB	800	84.8	30	4.28	25.4
Evoceramic 29 VB	800	84.8	29	3.83	24.6
Evoceramic 24 VB	600	63.6	24	3.32	15.3
Evoceramic 15 VB	800	84.8	15	2.40	12.7
Evoceramic 12 VB	760	80.6	12	1.59	9.7
Evoceramic 1/2 44 VB	810	85.9	44	1.69	37.8



