# Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## *Pozzolanic cement CEM IV/A (P) 42,5 R*

from

## *Cementerie Aldo Barbetti S.p.a.*

| | |
|---|---|
| Programme: | The International EPD System, www.environdec.com |
| Programme operator: | EPD International AB |
| Type of EPD: | EPD of a single product from a manufacturer |
| EPD registration number: | EPD-IES-0028260:001 |
| Version date: | 2026-03-06 |
| Approval date: | 2026-03-06 |
| Validity date: | 2031-03-05 |
| | *An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com* |

# GENERAL INFORMATION

| Programme Information | |
|---|---|
| **Programme:** | The International EPD® System |
| **Address:** | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| **Website:** | www.environdec.com |
| **E-mail:** | support@environdec.com |

| Product Category Rules (PCR) |
|---|
| **CEN standard EN 15804 serves as the Core Product Category Rules (PCR)** |
| **Product Category Rules (PCR): PCR 2019:14 Construction products, 2025-06-05 (version 2.0.1) UN CPC code 374** |
| **PCR review was conducted by: Greendesk, IVL Swedish Environmental Research Institute, Secretariat of the International EPD System, CTME, Concrete NZ, Monk Spaces, Aquafil SpA** |
| **c-PCR, if applicable: C-PCR-001 version:2025-04-08 cement & building lime (EN16908:2017+A1:2022) UN CPC code 374** |

| Third-party Verification |
|---|
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:<br><br>☒ **Individual EPD verification without a pre-verified LCA/EPD tool**<br>Third-party verification: DNV Business Assurance Italia S.r.l. is an approved certification body accountable for the third-party verification.<br>The certification body is accredited by: ACCREDIA Ente Italiano di Accreditamento. |
| Procedure for follow-up of data during EPD validity involves third party verifier:<br><br>☐ Yes ☒ No |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025. EPD complies with ISO 21930.

# INFORMATION ABOUT EPD OWNER

Owner of the EPD: Cementerie Aldo Barbetti S.p.A

Address: Corso Garibaldi, 81 – 06024 Gubbio (PG)
Tel: **+39 (075)92381** Fax: **+39 (075)9238271**

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LCA practitioner commissioned by the EPD owner:

| | |
|---|---|
| EPDSERVICE CONSULENZA CERTIFICAZIONI AMBIENTALI | Dott. Ing. Fabio Miseri<br>E-mail: fabio.miseri@epdservice.it<br>Phone:+39 3483532955<br>Web: www.epdservice.it |

Description of the organisation:

Cementerie Aldo Barbetti S.p.A. is a Gubbio-based business group that has invested heavily, aiming to improve energy consumption and product quality, with positive environmental impacts. The experience gained through years of constant research and development guarantees cutting-edge solutions with a production cycle that, thanks to the introduction of computerized systems, guarantees optimal and consistent processing parameters and consistent quality. In 2024, the total cement production of the Cementerie Aldo Barbetti S.p.A. group was 867,363 tonnes. The Gubbio plant has an integrated management system certified according to the UNI EN ISO 14001:2015 and UNI EN ISO 9001:2015 standards. Furthermore, it implements an occupational safety management system and a non-certified energy management system. The decision to pursue environmental certification, according to the ISO 14001 standard, is the result of CAB's commitment to making its management increasingly open and transparent through constant monitoring of all environmental aspects relating to its business. This approach has led to significant simplifications in terms of process control and the identification of environmental performance indicators. CAB has implemented the principles contained in the Environmental Policy by defining an organizational structure that clearly and unambiguously identifies roles, responsibilities, and competencies, enabling it to implement a management system aimed at continuously improving its environmental performance. To identify the sectors or the production process phases that have significant impacts, CAB periodically conducts an environmental analysis of all activities, processes, and services. For each of these, the direct and indirect environmental aspects are identified and the associated impacts (environmental resources consumed, emissions into the environment, waste produced) are quantified. This analysis verifies which of the aforementioned environmental aspects are most significant in terms of their impact on the external environment. Based on the analysis, environmental objectives and targets are identified, along with the actions required to achieve these objectives, the necessary resources, responsible parties, and deadlines. To regulate activities that may impact the plant's environmental performance, procedures and operating standards have been defined that describe appropriate management methods. Particular attention was also paid to defining and implementing procedures for the qualification of supplies relevant to environmental aspects (such as, for example, suppliers and waste disposers) and for the proper management of any environmental emergencies. Monitoring and measuring the environmental performance of the site's activities is conducted both to monitor the overall system and to assess the achievement of objectives and targets. This verification is implemented through extensive monitoring of all significant environmental aspects, described in a dedicated plan, which also details data archiving procedures. Compliance with the relevant regulations, procedures and their effectiveness in complying with the environmental policy, is assessed periodically through an annual program of internal environmental audits and the management of reports of any non-compliance or preventive and corrective actions. The results achieved, thanks to the maintenance of the EMS and the implementation of the environmental program, are verified by Management during the periodic review.

Product-related or management system-related certifications:
On September 4, 2013, the Gubbio plant obtained UNI EN ISO 9001:2008 certification for its quality management system and UNI EN ISO 14001:2004 certification for its environmental management system. In July 2019, the certifications were renewed in compliance with the 2015 version of the standards. The certifications were renewed for the following three-year periods in July 2022 and August 2025.
In 2016, authorization was obtained for the production and marketing of a concrete aggregate (filler), compliant with the EN 12620:2002+A1:2008 standard, which was then renewed on 26/11/2018, for which the related patent was obtained in 2019. Furthermore, in 2022, the ETA certification was obtained which gives the filler the possibility of being considered "a type II addition" in the production of concrete.
With Management Decision No. 13411 of the Umbria Region of December 29, 2021, which updated the Integrated Environmental Authorization for the Gubbio plant, the use of CSS-Combustibile was authorized as a partial replacement for fossil fuels, for a maximum quantity equal to 45% of the thermal requirement.

# PRODUCT INFORMATION

Product name:
Pozzolanic cement CEM IV/A (P) 42,5 R

Product identification:
*Cement produced according to the requirements defined by EN 197/1.*

**Requisiti meccanici e fisici definiti come valori caratteristici**

| Classe di resistenza | Resistenza a compressione MPa | | | | Tempo di inizio presa | Stabilità (espansione) |
|---|---|---|---|---|---|---|
| | Resistenza iniziale | | Resistenza normalizzata | | | |
| | 2 giorni | 7 giorni | 28 giorni | | min | mm |
| 32,5 L[a)] | - | ≥12,0 | ≥32,5 | ≤52,5 | ≥75 | ≤10 |
| 32,5 N | - | ≥16,0 | | | | |
| 32,5 R | ≥10,0 | - | | | | |
| 42,5 L[a)] | - | ≥16,0 | ≥42,5 | ≤62,5 | ≥60 | |
| 42,5 N | ≥10,0 | - | | | | |
| 42,5 R | ≥20,0 | - | | | | |
| 52,5 L[a)] | ≥10,0 | - | ≥52,5 | - | ≥45 | |
| 52,5 N | ≥20,0 | - | | | | |
| 52,5 R | ≥30,0 | - | | | | |

a) Classe di resistenza definita solo per i cementi CEM III.

UN CPC code:
374 Plaster, lime and cement

Product description:
For the purposes of this Environmental Product Declaration, the bulk Pozzolanic cement CEM IV/A (P) 42,5 R produced at the Cementeria Aldo Barbetti S.p.a. plant in Gubbio (PG) in the reference year 2024, produced in a quantity of 85.597 tons, was analysed.
Cement is a finely ground inorganic material composed of essentially different natural materials with a statistically homogeneous composition. It is a hydraulic binder that, when properly dosed and mixed with aggregate and water, reacts to form a progressively hardening mass. This mass is characterized by the ability to bind inert solids, such as sand and gravel, to form concrete mixes, premixes, and mortars, the basic components of every building structure.

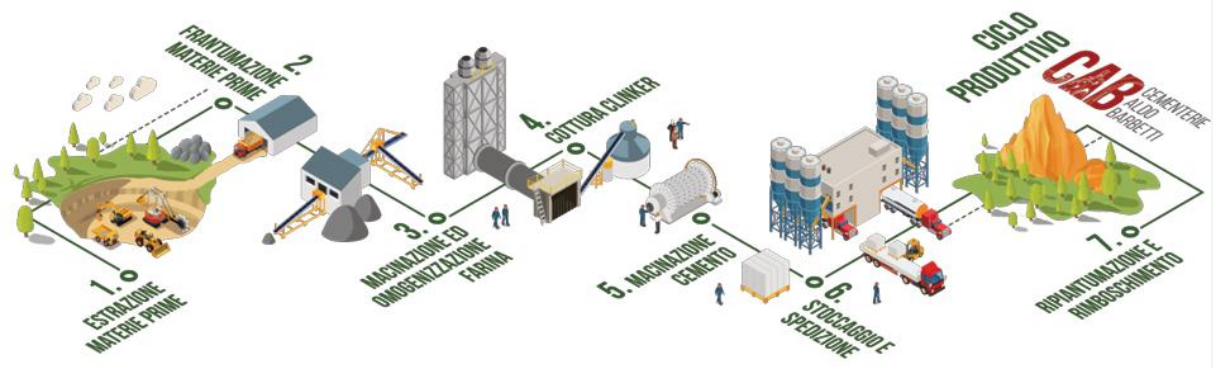



**Figure 1** – The cement production cycle

- Raw material extraction and transportation of raw materials, fuels, recovered waste, and corrective materials (1).
- Crushing and storage of raw materials (2).
- Grinding and storage of raw materials (3).
- Clinker firing and storage (4).
- Cement grinding and storage (5-6).
- Bulk cement shipping.
- Bagging, palletizing, and shipping of bagged cement.
- Replanting and reforestation.

The product is covered by the EN/197-1 standard and is grouped within the following family of cements:

**CEM IV Pozzolanic cement:** these cements consist of clinker between 45 and 89%, and natural or artificial pozzolanic material. Depending on the percentage of pozzolanic material, which varies from 11% to 55%, they are divided into two subtypes. The term "pozzolana" derives from Pozzuoli, a town in Campania where the material was mined, used since ancient times to produce hydraulic mortars. They exhibit high resistance to chemical attack. Pozzolanic cement is used in large-scale infrastructure, marine structures, dams, tunnels, and water-retaining elements (reservoirs, sewage) for enhanced durability in aggressive environments, offering better resistance to chemicals, sulfates, and water absorption, ideal for heavy foundations, roads, and precast items, though it sets slower than regular cement. It provides superior long-term strength and a better finish, making it great for decorative work and hydraulic structures.

Name and location of production site(s):
**Gubbio plant**: Via dell'Assino, 46 Frazione Semonte 06024 Gubbio (PG)

References to any relevant websites for more information or explanatory materials, if applicable.
Prodotti - Cementerie Aldo Barbetti

# CONTENT DECLARATION

- The mass (weight) of one unit of a product, as purchased or per declared unit:
  1000 kg

- Content of the product in the form of a list of materials and substances, and their mass:

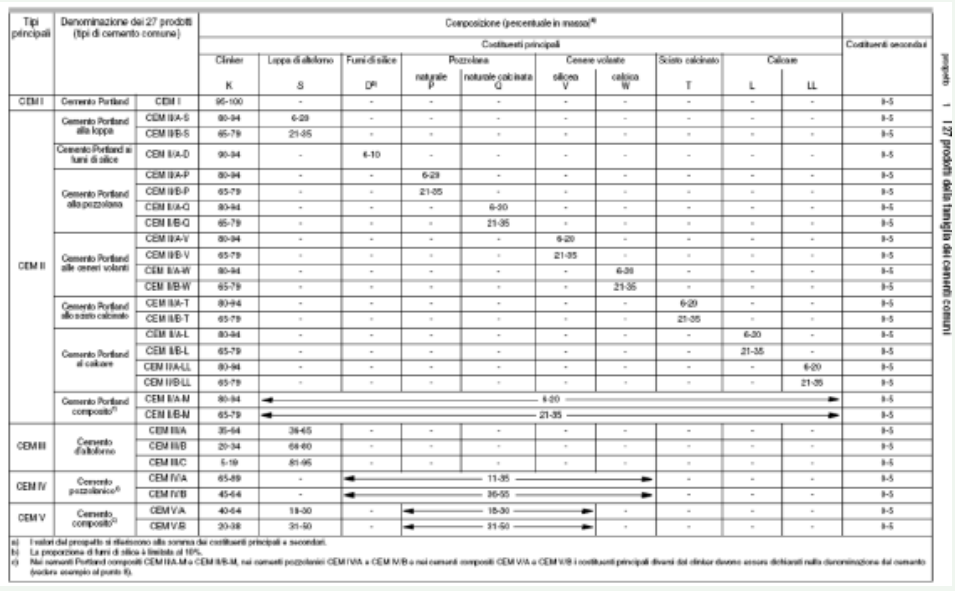
| Materials used | Name | [kg/t] | % | Hazardous environmental properties | Post-consumer recycled material, mass-% of product | Biogenic material mass-% of product | Biogenic material, kg C/product or declared unit |
|---|---|---|---|---|---|---|---|
| Natural raw materials | Limestone | 0 | 0 | NA | 0 | 0 | 0 |
| | Gypsum | 46,84 | 4,49 | NA | 0 | 0 | 0 |
| | Pozzolanic | 209,16 | 20,07 | NA | 0 | 0 | 0 |
| | Marl | 0 | 0 | NA | 0 | 0 | 0 |
| Products | Clinker | 783,52 | 75,19 | YES | 0 | 0 | 0 |
| | Ferrous sulfate, Additives, Blast furnace. | 2,53 | 0,24 | NA | 0 | 0 | 0 |
| Recovered waste | Flying ashes | 0 | 0 | NA | 0 | 0 | 0 |
| **TOTALI:** | | **1042,05** | **100** | | **0** | **0** | **0** |

- The mass and the content of distribution and/or consumer packaging:
  The product covered by the EPD is sold in bulk without packaging.

- Information on the environmental and hazardous/toxic properties of a substances contained in the product:

| Dangerous substances from the candidate list of SVHC for Authorisation | EC No. | CAS No. | Weight-% per declared unit |
|---|---|---|---|
| Clinker for Portland cement | 266-043-4 | 65997-15-1 | 5-100 |

The clinker content in the various types of cement is reported in the table below derived from the EN 197-1 standard. Materials used



| Tipi principali | Denominazione dei 27 prodotti (tipi di cemento comune) | | Composizione (percentuale in massa)[a] | | | | | | | | | | Costituenti secondari |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Costituenti principali | | | | | | | | | | |
| | | | Clinker K | Loppa di altoforno S | Fumi di silice D[b] | Pozzolana naturale P | Pozzolana naturale calcinata Q | Cenere volante silicea V | Cenere volante calcica W | Scisto calcinato T | Calcare L | Calcare LL | |
| CEM I | Cemento Portland | CEM I | 95-100 | - | - | - | - | - | - | - | - | - | 0-5 |
| CEM II | Cemento Portland alla loppa | CEM II/A-S | 80-94 | 6-20 | - | - | - | - | - | - | - | - | 0-5 |
| | | CEM II/B-S | 65-79 | 21-35 | - | - | - | - | - | - | - | - | 0-5 |
| | Cemento Portland ai fumi di silice | CEM II/A-D | 90-94 | - | 6-10 | - | - | - | - | - | - | - | 0-5 |
| | Cemento Portland alla pozzolana | CEM II/A-P | 80-94 | - | - | 6-20 | - | - | - | - | - | - | 0-5 |
| | | CEM II/B-P | 65-79 | - | - | 21-35 | - | - | - | - | - | - | 0-5 |
| | | CEM II/A-Q | 80-94 | - | - | - | 6-20 | - | - | - | - | - | 0-5 |
| | | CEM II/B-Q | 65-79 | - | - | - | 21-35 | - | - | - | - | - | 0-5 |
| | Cemento Portland alle ceneri volanti | CEM II/A-V | 80-94 | - | - | - | - | 6-20 | - | - | - | - | 0-5 |
| | | CEM II/B-V | 65-79 | - | - | - | - | 21-35 | - | - | - | - | 0-5 |
| | | CEM II/A-W | 80-94 | - | - | - | - | - | 6-20 | - | - | - | 0-5 |
| | | CEM II/B-W | 65-79 | - | - | - | - | - | 21-35 | - | - | - | 0-5 |
| | Cemento Portland allo scisto calcinato | CEM II/A-T | 80-94 | - | - | - | - | - | - | 6-20 | - | - | 0-5 |
| | | CEM II/B-T | 65-79 | - | - | - | - | - | - | 21-35 | - | - | 0-5 |
| | Cemento Portland al calcare | CEM II/A-L | 80-94 | - | - | - | - | - | - | - | 6-20 | - | 0-5 |
| | | CEM II/B-L | 65-79 | - | - | - | - | - | - | - | 21-35 | - | 0-5 |
| | | CEM II/A-LL | 80-94 | - | - | - | - | - | - | - | - | 6-20 | 0-5 |
| | | CEM II/B-LL | 65-79 | - | - | - | - | - | - | - | - | 21-35 | 0-5 |
| | Cemento Portland composito[c] | CEM II/A-M | 80-94 | ← 6-20 → | | | | | | | | | 0-5 |
| | | CEM II/B-M | 65-79 | ← 21-35 → | | | | | | | | | 0-5 |
| CEM III | Cemento d'altoforno | CEM III/A | 35-64 | 36-65 | - | - | - | - | - | - | - | - | 0-5 |
| | | CEM III/B | 20-34 | 66-80 | - | - | - | - | - | - | - | - | 0-5 |
| | | CEM III/C | 5-19 | 81-95 | - | - | - | - | - | - | - | - | 0-5 |
| CEM IV | Cemento pozzolanico[c] | CEM IV/A | 65-89 | - | ← 11-35 → | | | | | - | - | - | 0-5 |
| | | CEM IV/B | 45-64 | - | ← 36-55 → | | | | | - | - | - | 0-5 |
| CEM V | Cemento composito[c] | CEM V/A | 40-64 | 18-30 | - | ← 18-30 → | | | - | - | - | - | 0-5 |
| | | CEM V/B | 20-38 | 31-50 | - | ← 31-50 → | | | - | - | - | - | 0-5 |

a) I valori del prospetto si riferiscono alla somma dei costituenti principali e secondari.
b) La proporzione di fumi di silice è limitata al 10%.
c) Nei cementi Portland compositi CEM II/A-M e CEM II/B-M, nei cementi pozzolanici CEM IV/A e CEM IV/B e nei cementi compositi CEM V/A e CEM V/B i costituenti principali diversi dal clinker devono essere dichiarati nella denominazione del cemento (vedere esempio al punto 9).

prospetto 1 I 27 prodotti della famiglia dei cementi comuni

Common cements are produced according to EN 197-1 "Composition, specifications and conformity criteria for common cements"; hydraulic binders for non-structural applications (HB) are produced according to EN 15368; low heat of hydration (VLH) cements are produced according to EN 14216.

- Other information on substances with hazardous and toxic properties:
  The “Cement Safety Data Sheet” (ref. Regulation 453/2010/EC) contains detailed information on the methods of use and preventive measures to avoid any potential risk to the health and safety of workers, which can be downloaded from the website Cementerie Aldo Barbetti | CAB.

- The declared share of biogenic/recycled materials

| - Results per declared unit | | | | |
|---|---|---|---|---|
| **PARAMETERS** | **UNIT** | **A1-A3** | **kg $CO_2$ eq. 1000 kg** | **% by mass** |
| Biogenic carbon content W/O packaging | kg C | 0 | 0 | **0,00%** |
| Biogenic carbon content in accompanying packaging | kg C | 0 | 0 | **0,00%** |
| **Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of $CO_2$** | | | | |

# LCA INFORMATION

Functional unit or Declared unit:
Since cement is an intermediate product, it cannot be defined as a functional unit, and therefore no comparison with other construction materials can be made based on EPDs.
Declared unit: 1000 kg

Conversion factor to mass if mass is not used as functional/declared unit (not applicable for services).
NA

Reference service life:
EPD “cradle to gate” with RSL not declared because modules B1-B7 are not included.

Time representativeness:
Reference year of data (A3) 2024 for other data those of the related databases.

Geographical scope:
Italy

Database(s) and LCA software used:
The database used for model analysis is the **Ecoinvent V.3.11-EN15804** database, which provided all data relating to fuel and electricity production, material production, and transportation. For some products and waste used in the production process, it was necessary to reconstruct the processes performed to make the materials usable within the cement production cycle and thus allocate the share of environmental impacts deriving from the processes. **SimaPro CRAFT Analyst version 10.2.0.3**, provided by **PRé Consultants**, was the software used to develop the model and calculate the environmental impacts of the various indicators.

EPD/LCA Tool used:
NA

Description of system boundaries:
Cradle-to-gate.
The primary objective of the LCA study is to prepare the EPDs for the cements produced in the Company's two plants, to obtain certified data for the preparation of EPDs for derived products (concrete and mortars) for B2B communications. The study was designed to assess the environmental impact of

bulk cement production at the Gubbio cement plant. This was achieved through an LCA assessment incorporating cement production data from the Gubbio full-cycle cement plant. This assessment is based on the one developed to calculate the environmental impact of clinker production at the Gubbio cement plant.

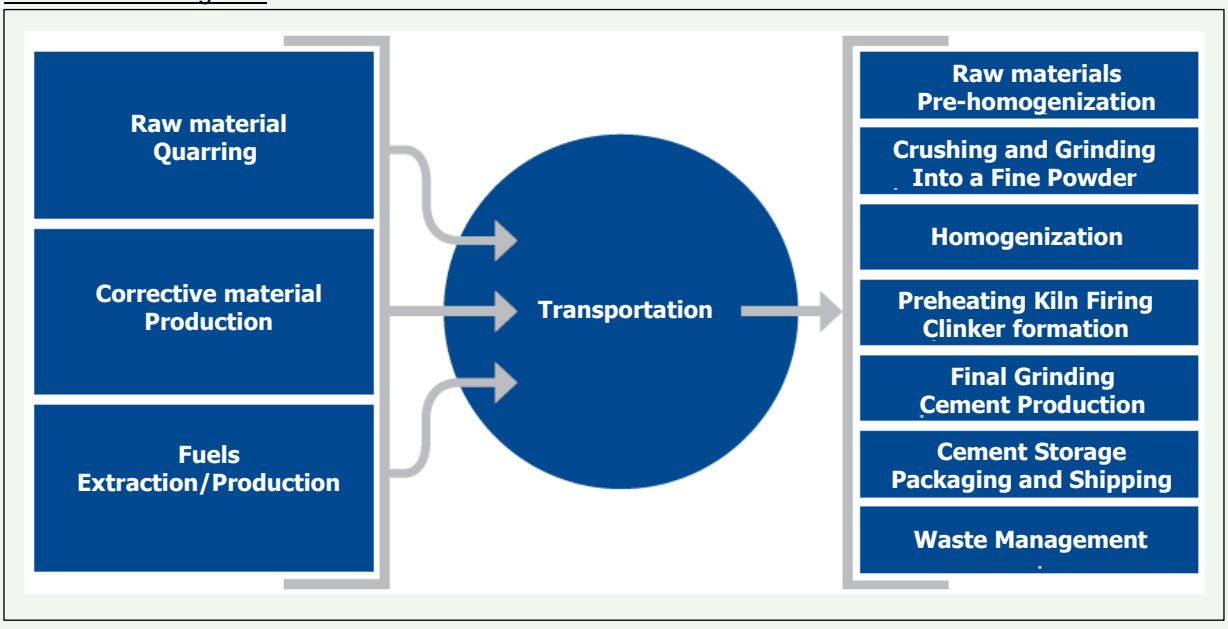
Excluded life cycle stages:
The environmental performances reported in the following chapters are schematically represented within the process flow diagram reproduced below and refer to the extraction and/or production phases of raw materials and fuels and the related transport operations as well as the activities carried out within the plant.
The life cycle phases included in this EPD range from raw material extraction to cement production, all the way to **the cradle-to-gate stage, thus excluding the use and end-of-life phases**. This is permitted by the **EN 15804:2012+A2:2019/AC:2021** standard. The **cradle-to-gate** life cycle is permitted because the following conditions are met:

- the product is physically integrated with other products during installation and cannot be physically separated from them at the end of its life cycle;
- the product is no longer physically identifiable at the end of its life cycle, following the physical and chemical transformation process;
- the product does not contain biogenic carbon;
- the EPD is not intended for business-to-consumer communication.

Cement does not contain biogenic carbon. The negligible value (<1% as demonstrated in the LCA study) of the product's biogenic carbon mass highlighted in the environmental indicator calculations is due to the contribution of the share of electricity production, linked to biogenic sources.
The product end-of-life scenarios (C1-C4 and D) can be found in the EPDs produced for concrete and mortar.
The LCA study adopted the modularity principle and complied with the PPP (Polluter Pays Principle).
The impacts resulting from the maintenance phases of production facilities were not considered, and can be ignored given their modest contribution, as demonstrated in the LCA study.
The following system limitations apply to production equipment and employees:

- Environmental impacts from infrastructure, buildings, production equipment, and tools that are not directly consumed in the production process should not be considered in the LCI;
- Personnel-related impacts, such as transportation to and from work, are not considered in the LCI.

Process flow diagram:

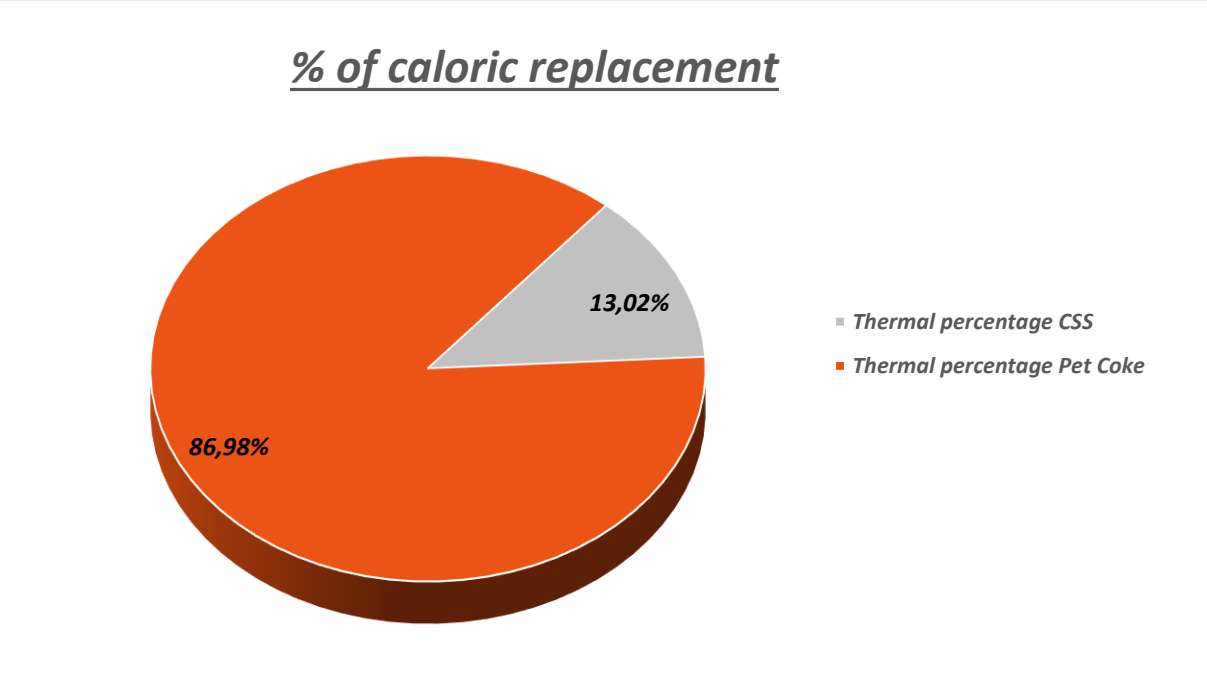


More information:

As regards the energy consumption of fuels, the following subdivision is available:

| Fuel energy consumption | |
|---|---|
| Coal + Petcoke: | 0,0676 t/t |
| CSS-Fuel | 0,0123 t/t |
| HFO: | 0,0005 t/t |
| Methane (natural gas): | 1,56 $m^3$/t |
| Others: | 0,0 t/t |

Energy consumption of fuels per ton of cement produced.
(Source: Company data net of clinker sales.)




Recycled material is not a main input to, or output from, the product system. Recycled material inputs contribute less than 10% to the GWP-GHG results of modules A1-A3.
Infrastructure/capital goods are not relevant.

| Climate impact in kg $CO_2$ eq./kWh using the GWP-GHG indicator | Ton produced | Electricity Consumption kW/ton | Total Electricity Consumption kW | Electricity Consumption kg CO2 eq./kWh |
|---|---|---|---|---|
| Pozzolanic cement CEM IV/A (P) 42,5 R | 85.597 | **37,84** | 3.239.326 | **0,672** |

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

| | Product stage | | | Distribution/ installation stage | | Use stage | | | | | | | End-of-life stage | | | | Beyond product life cycle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| **Module** | **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| Modules declared | X | X | X | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Geography | IT RER GLO | IT RER | IT | | | | | | | | | | | | | | |
| Share of primary data | >90% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | 0% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | 0% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |

## Evaluation of data quality level and adopted criteria

The assessment methods used are those indicated in Annex E of the EN 15804:2012+A2:2019/AC:2021 standard. The LCA study assessed the main raw material, energy, and transport flows, and based on this assessment, the average values per module reported below were determined. This assessment includes data that, taken together, contribute to at least 80% of the results for each of the declared environmental impact indicators.

| Modules | Geographical representativeness | Technical representativeness | Temporal representativeness |
|---|---|---|---|
| A1 | Good | Good | Good |
| A2 | Good | Good | Good |
| A3 | Very good | Very good | Very good |

Table E1: according to the UN Global Environmental Guidelines for LCA Database Development.

No proxy data were used to develop the LCA study.
The following additional information is required by the PCR for all processes contributing more than 10% of the GWP-GHG results for modules A1-A3.

| PROCESS | SOURCE TYPE | SOURCE | REFERENCE YEAR | DATA CATEGORY | Share of primary data, of GWP-GHG results for A1-A3 | **99,70%** |
|---|---|---|---|---|---|---|
| Clinker emissions | Data collected from ETS declaration | EPD owner | 2024 | Primary data | 94,49% | A3 |
| Electricity | Database | Ecoinvent 3.11 | 2024 | Primary data | 3,28% | A1 |
| Thermal energy | Database | Ecoinvent 3.11 | 2024 | Primary data | 0,91% | A3 |
| Raw materials | Database | Ecoinvent 3.11 | 2024 | Primary data | 0,12% | A1 |
| Transportation | Database | Ecoinvent 3.11 | 2024 | Primary data | 0,90% | A2 |
| Mapei Cement additives production | EPD | MAPEI MA.G.A. /C 167 EPD International AB S-P-05424 EPD valid until 2027-02-03 | 2021 | Primary data | 0,00% | A1 |
| Other processes | Database | Ecoinvent 3.11 safety data sheets | 2024 | Secondary data | 0,06% | |

“The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.”
The EPDs used to quantify the environmental impact of Mapei additives were provided by the manufacturer as well as the safety data sheets provided by Mapei and also by the manufacturer of Mastercem.
The reported share of primary data is not associated with uncertainty, as the EPDs used as data source the share of primary data is >90%.

# ENVIRONMENTAL PERFORMANCE

## LCA results of the product - main environmental performance results

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.
The company also uses alternative fuels (fuel from RDF), so their use also contributes biogenic carbon. According to the guidelines set out in paragraph 6.3.5.1 of EN 16908, CO2 emissions from biomass fuels (secondary fuels or waste) and the biogenic carbon content of blended fuels (secondary fuels and waste) must not be included in total CO2 emissions. The company has adopted a conservative approach by not deducting this contribution, in compliance with the legislative decrees in force in Italy.

## Mandatory impact category indicators according to EN 15804

| Indicator | Unit | A1-A3 |
|---|---|---|
| GWP-total | kg $CO_2$ eq. | 7,81E+02 |
| GWP-fossil | kg $CO_2$ eq. | 7,75E+02 |
| GWP-biogenic | kg $CO_2$ eq. | 6,39E+00 |
| GWP-luluc | kg $CO_2$ eq. | 9,86E-03 |
| ODP | kg CFC 11 eq. | 4,78E-06 |
| AP | mol $H^+$ eq. | 1,30E+00 |
| EP-freshwater | kg P eq. | 2,10E-03 |
| EP-marine | kg N eq. | 4,68E-01 |
| EP-terrestrial | mol N eq. | 5,41E+00 |
| POCP | kg NMVOC eq. | 1,62E+00 |
| ADP-minerals&metals* | kg Sb eq. | 3,61E-06 |
| ADP-fossil* | MJ | 3,98E+03 |
| WDP* | $m^3$ | 1,44E+01 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | |

* Outcomes of this environmental impact indicator should be used with caution as the uncertainty of these results is high and experience in using this indicator is limited.

## Additional mandatory and voluntary impact category indicators

| Indicator | Unit | A1-A3 |
|---|---|---|
| GWP-GHG[1] | kg $CO_2$ eq. | 7,74E+02 |
| PM | Disease incidence | 6,69E-06 |
| IRP** | kBq U235 eq | 1,39E+00 |
| ETP-fw* | CTUe | 1,82E+02 |
| HTPc* | CTUh | 2,06E-08 |
| HTPnc* | CTUh | 1,41E-06 |
| SQP | Pt Senza dimensione | 3,92E+01 |
| Acronyms | PM = Potential incidence of disease due to PM emissions; IRP = Ionizing radiation human health; ETP-fw = Potential Comparative toxic unit for ecosystem; HTPc = Potential comparative toxic unit for humans; HTPnc = Potential comparative toxic unit for humans; SQP = Potential soil quality index. | |

** This impact category mainly concerns the possible impact of a low dose of ionising radiation on human health from nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or effects related to the disposal of radioactive waste in underground facilities. This indicator also does not consider potential ionising radiation from soil, Radon or certain building materials.

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[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic $CO_2$ is set to zero.

## Resource use indicators

| Indicator | Unit | A1-A3 |
|---|---|---|
| PERE | MJ | 1,66E+01 |
| PERM | MJ | 1,39E+00 |
| PERT | MJ | 1,80E+01 |
| PENRE | MJ | 1,29E+03 |
| PENRM | MJ | 2,69E+03 |
| PENRT | MJ | 3,98E+03 |
| SM[2] | kg | 3,84E+00 |
| RSF | MJ | 6,34E+03 |
| NRSF | MJ | 0,00E+00 |
| FW | $m^3$ | 3,34E-01 |
| Acronyms | 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water | |

## Waste indicators

| Indicator | Unit | A1-A3 |
|---|---|---|
| Hazardous waste disposed | kg | 3,04E+00 |
| Non-hazardous waste disposed | kg | 9,33E+01 |
| Radioactive waste disposed | kg | 9,97E-04 |

[2] The "secondary material" indicator, included among the environmental performance indicators, considers all "material recovered from previous use or from waste that replaces primary materials" (from the EN 15804 standard) that enters the product system from another product system, and not just the material contained in the product, and is therefore a complementary indicator.

### Output flow indicators

| Indicator | Unit | A1-A3 |
|---|---|---|
| Components for re-use | kg | 0,00E+00 |
| Material for recycling | kg | 7,78E-01 |
| Materials for energy recovery | kg | 1,17E-03 |
| Exported energy, electricity | MJ | 1,14E-01 |
| Exported energy, thermal | MJ | 3,72E-02 |

## ADDITIONAL ENVIRONMENTAL INFORMATION

### Minimum content of recycled, recovered, and by-products in the product

In accordance with the requirements of AITEC guideline (2020):

| | RECYCLED PRE CONSUMER | RECYCLED POST CONSUMER | TOTAL RECYCLED | BY-PRODUCT | RECOVERED | TOTAL |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | % |
| Pozzolanic cement CEM IV/A (P) 42,5 R | 0,02 | 0,00 | 0,02 | 0,16 | 0,11 | 0,29 |

“External by-product (internal by-product equal to 0%)”.

## ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

Further information on this topic can be found in the "Sustainability Report", which is not subject to verification by DNV Business Assurance Italia S.r.l. and can be downloaded from the website Cementerie Aldo Barbetti | CAB.

## ABBREVIATIONS

| Abbreviation | Definition |
|---|---|
| **General Abbreviations** | |
| EN | European Norm (Standard) |
| EF | Environmental Footprint |
| GPI | General Programme Instructions |
| ISO | International Organization for Standardization |
| CEN | European Committee for Standardization |
| CLC | Co-location centre |
| CPC | Central product classification |
| GHS | Globally harmonized system of classification and labelling of chemicals |
| GRI | Global Reporting Initiative |
| SVHC | Substances of Very High Concern |

| | |
|---|---|
| ND | Not Declared |
| GWP | Global warming potential |
| GWP - biogenic | Global warming potential - biogenic |
| GWP - luluc | Global warming potential - land use and land use change |
| GWP - total | land use and land use change - total |
| ODP | Ozone depletion potential |
| AP | Acidification potential |
| EP - freshwater | Eutrophication potential - for freshwater compartment |
| EP - marine | Eutrophication potential - for marine compartment |
| EP - terrestrial | Eutrophication potential - for terrestrial compartment |
| POCP | Photochemical ozone creation potential |
| ADPE– materials & metals | Abiotic depletion potential |
| ADPF - fossil | Abiotic depletion potential - fossil |
| WDP | Water deprivation potential<br>Water deprivation potential |
| GWP - GHG | Global warming potential- accounts for all greenhouse gases except biogenic CO2 uptake and emissions and biogenic carbon stored in the product and/or the packaging. |
| PM | Particulate matter |
| IRP | Ionizing radiation potential |
| ETP - fw | Ecotoxicity potential- freshwater |
| HTP - c | Human toxicity potential- cancer |
| HTP - nc | Human toxicity potential- non cancer |
| SQP | Index of soil quality potential. |
| PERE | Use of primary energy excluding renewable primary energy resources used as raw materials |
| PERM | Use of renewable primary energy resources used as raw Materials |
| PERT | Use of 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 | Use of total use of non-renewable primary energy resources |
| SM | Use of secondary materials |
| RSF | Use of renewable secondary fuels |
| NRSF | Use of non-renewable secondary fuels |
| FW | Use of fresh water (net) |
| 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 energy - electrical |
| EET | Exported energy - thermal |
| SM | Use of secondary materials |
| RSF | Use of renewable secondary fuels |
| NRSF | Use of non-renewable secondary fuels |
| FW | Use of fresh water (net) |
| 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 energy - electrical |
| EET | Exported energy - thermal |
| MJ | Megajoule |
| kg | Kilogram |
| $m^3$ | Cubic Meter |
| NMVOC | Non-Methane Volatile Organic Compounds |
| Sb eq. | Antimony Equivalents |
| P eq. | Phosphorus Equivalents |
| N eq. | Nitrogen Equivalents |
| CFC-11 eq. | Chlorofluorocarbon-11 Equivalents |
| $CO_2$ eq. | Carbon Dioxide Equivalents |
| kg C | Kilograms of Carbon |
| kg $CO_2$ eq. | Kilograms of Carbon Dioxide Equivalent |
| NA | Not applicable |

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# VERSION HISTORY

**Original Version of the EPD, 2025-12-06**

EPD
INTERNATIONAL EPD SYSTEM
www.environdec.com