

Environmental Product Declaration

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

KolmosBertta, CEM III B 42.5 L – LH/SR
Parainen

 **EPD**[®]
THE INTERNATIONAL EPD[®] SYSTEM



FINNSEMENTTI
A CRH COMPANY

PROGRAMME:
The International EPD[®] System,
www.environdec.com

PROGRAMME OPERATOR:
EPD International AB

EPD REGISTRATION NUMBER:
EPD-IES-0014473

PUBLICATION DATE:
2025-06-24

VALID UNTIL
2030-06-24

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to continued registration and publication at www.environdec.com

GENERAL INFORMATION

Programme information

| | |
|-------------------|---|
| Programme: | The International EPD® System |
| Address: | EPD International AB Box 210 60 SE-100 31 Stockholm Sweden |
| Website: | www.environdec.com |
| E-mail: | info@environdec.com |

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

| | |
|---|---|
| Product category rules (PCR): | PCR 2019:14 Construction Products – Version 1.3.2 c-PCR-001 Cement and building limes (EN 16908) |
| PCR review was conducted by: | The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com . The review panel may be contacted via info@environdec.com . |
| Life Cycle Assessment (LCA) | The Global Concrete and Cement Association (GCCA) verified LCA Model (v5.1, International version, 31 March 2025) was used for the life cycle modelling of the considered product. |
| EN 15804 reference package | LCIA characterization factors using EF 3.1 for CFs used in the PEF framework |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006: | <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification |
| Third party verifier: | Hannu Karppi, Ramboll Finland Oy |
| Approved by: | The International EPD® System |
| Procedure for follow-up of data during EPD validity involves third party verifier: | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025

COMPANY INFORMATION

Owner of the EPD:

Finnsementti Oy, Skräbbölentie 18, 21600 Parainen, Finland

Contact:

Micaela Westén +358 206 201 363 (micaela.westen@finnsementti.fi)

Description of the organisation:

Finnsementti, A CRH company, is a Finnish manufacturer of cement. Harnessing our century-long experience, we produce consistently superior cement and create jobs within our industry. The majority of Finland's cement offering is produced at Finnsementti's plants in Parainen and Lappeenranta, in addition to which the company has eight terminals in Kirkkonummi, Koverhar, Mariehamn, Oulu, Jakobstad, Pori, Raahen and Vasa. In addition to cement, our offering includes various aggregates.

Product-related or management system-related certifications:

ISO 9001:2015, ISO 14001:2015

Name and location of production site(s):

Finnsementti Oy, Parainen cement plant, Skräbbölentie 18, 21600 Parainen, Finland

PRODUCT INFORMATION

Product name:

KolmosBertta

Product identification:

KolmosBertta, CEM III B 42.5 L – LH/SR (CE marked, DoP_PA_KolmosBertta_13955)

Product description:

Cement is a hydraulic binder, i.e. a finely ground inorganic material. When the cement is mixed with water, it forms a paste which sets and hardens by means of hydration reactions and processes. After hardening the formed paste, retains its strength and stability even under water.

UN CPC code:

3744 Cement

Geographical scope:

Europe

LCA INFORMATION

Functional unit / declared unit:

1 metric ton of bulk clinker (dry)

Reference service life:

NA

Time representativeness:

All material flows of the processes are based on site-specific data gathered for one year of operation, for the period 1st January 2024 – 31st December 2024.

Database(s) and LCA software used:

The Global Concrete and Cement Association (GCCA) verified LCA Model (v5.1, International version, 31 March 2025) was used for the life cycle modelling of the considered product.

The GCCA EPD Tool is a web based calculation tool for EPDs. The life cycle assessment in the tool has been implemented in compliance with EN 15804:A2, PCR 2019:14 Construction products (EN 15804:A2) and complementary PCRs c-PCR-001 Cement and building limes (EN 16908) and c-PCR-003 Concrete and concrete elements (EN 16757), as well as with the General Programme Instructions (GPI 4.0) of the International EPD® System. This tool is referred to throughout the document as the

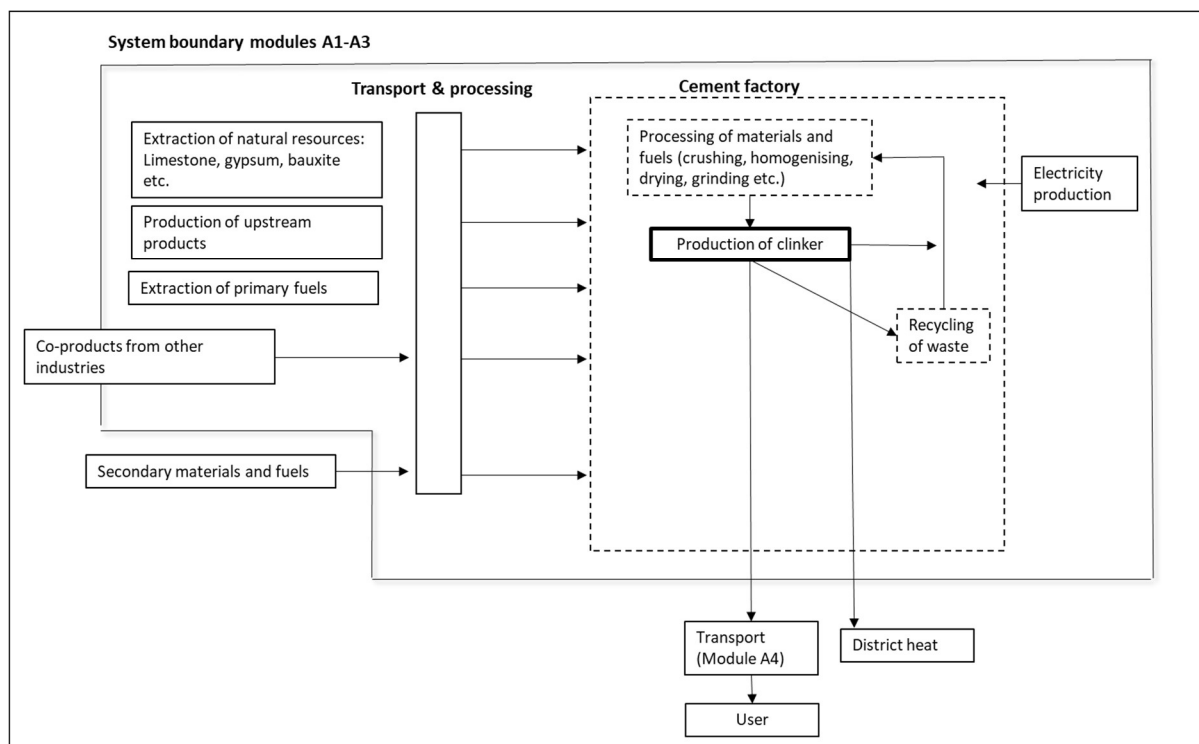
“GCCA EPD tool”. This tool was originally developed by WBCSD-CSI. Management of this tool has now been taken over by the Global Cement and Concrete Association (GCCA), of which CRH is a member.

Description of system boundaries:

The EPD covers the product stage, cradle to gate (A1–A3). The selected system boundaries comprise the production of cement including raw material extraction up to the finished product at the factory gate. They are in accordance with the system boundaries given in EN 16908.

As cement is an intermediate product, no other lifecycle phases are relevant to cover.

SYSTEM DIAGRAM:



Assumptions about electricity production:

Finnsementti Oy electricity mix is based on the Finnish 2024 Electricity breakdown (Energiatietoallisuus ry, Energiavuosi 2024). The electricity is market priced electricity. The emission factor used for the electricity is 74.1 g CO₂-eq./kWh. The emission factor includes the total CO₂-eq. emissions from electricity production and building the power plants.

Cut-off rules:

1 % cut-off rule was applied for input flows in the inventory.

Processes that have been excluded from the LCA study:

- Ball mill charge wear (less than 1% mass)
- Kiln refractory wear (less than 1% mass)
- Internal traffic (less than 1% of primary energy usage)

LCA approach applied

Finnsementti is reducing its use of virgin primary fuels by utilizing waste-derived fuels. Mineral recovery in clinker and cement production enables the use of waste and secondary materials, reducing the demand for virgin resources and avoiding landfill burdens. For transparency—and to accommodate users who prefer the “gross approach”—the Global Warming Potential (GWP) results including the burdens from waste combustion are provided in a footnote.

The LCA is based primarily on data collected directly from the manufacturer and external partners. Where primary data is unavailable, recent generic data from EcolInvent v3.10 is used to ensure consistency and reliability.

Averages and variability

EPD is based on plant specific data covering a full calendar year to eliminate risk of seasonality impact and random fluctuations. Burdens from internal clinker production is assigned to cement according to clinker factor. Minor inputs such as waste handling and internal transport is averaged over all clinker production, since no specific data was available.

For co-product allocation from upstream processes, the rules of EN 15804:2012+A2:2019/AC:2021 apply. Allocation is based on economic value.

MODULES DECLARED, GEOGRAPHICAL SCOPE AND SHARE OF SPECIFIC DATA:

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage |
|----------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
| | 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 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Geography | EU | EU | EU | | | | | | | | | | | | | | |
| Specific data used | >90 % | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | Not relevant | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | Not relevant | | | | | - | - | - | - | - | - | - | - | - | - | - | - |

X = included in LCA MND = Module Not Declared

PRODUCT DESCRIPTION

Cement

Cement is an inorganic material which is a hydraulic binder. Finely ground and mixed with water, it forms a paste which sets and hardens by means of hydration reactions and processes. After hardening it retains its strength and stability, even under water.

Use

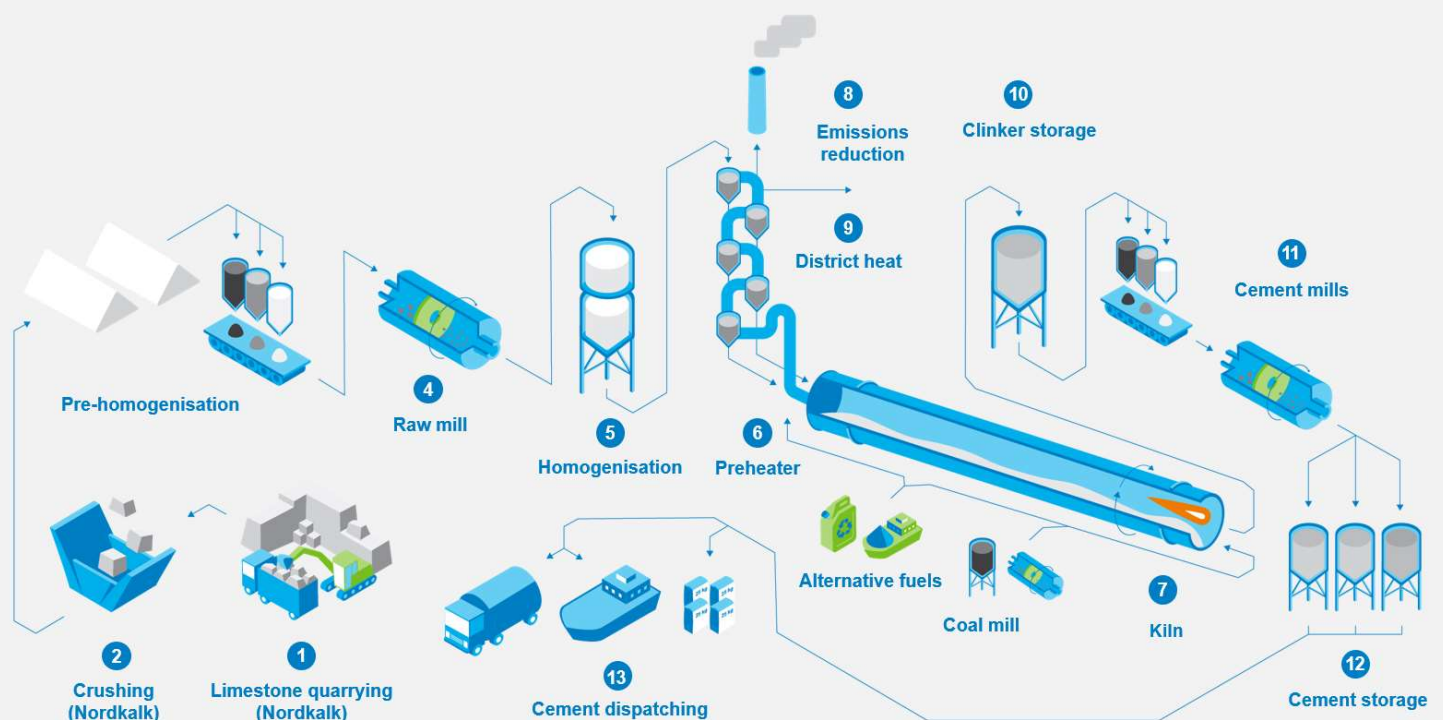
Cement is mainly used as a binder for concrete, mortar or cement screed.

Manufacturing process

The most important component of cement according to EN 197-1 is clinker. It is produced from raw materials such as limestone and industrial co-products or wastes which are crushed, homogenized and fed into a rotary kiln. The raw materials are sintered at a temperature of 1450°C to form new compounds. Clinker consists mainly of calcium-, silicium-, aluminium- and iron-oxides.

In a second phase calcium sulphates and possibly additional cementitious or inert materials are added to the clinker. All constituents are ground leading to a fine and homogenous powder, cement.

The following figure is a schematic representation of the cement manufacturing process from quarry to dispatch (production stage, information modules A1 to A3).



Content information

Cement according to EN 197-1 is produced by grinding and mixing the constituents defined in the standard.

This product does not contain substances listed in the Candidate List of Substances of Very High Concern for Authorisation (date: 5.6.2024) exceeding 0.1 percentage by mass.

CONSTITUENTS OF FINNSEMENTTI CEMENTS AS DEFINED IN EN 197-1

| | |
|-------------------------------|--|
| Main constituents | Portland cement clinker and limestone, blast furnace slag |
| Calcium sulphate (gypsum) | added to the other constituents of cement during its manufacture to control setting |
| Minor additional constituents | added to improve the physical properties of the cement, such as workability or water retention |
| Additives | the total quantity of additives shall not exceed 1.0 % by mass of the cement |

In **CEM III/B** - type cements the total of main constituents and minor additional constituents is composed of 20-34 M.-% cement clinker, 66-80 M.-% main constituent blast furnace slag and 0-5 M.-% minor additional constituents.

| | | CEM III B | CEM III B |
|---|-------------|--------------------|------------------|
| Product components | CAS number | Conc. Range (%w/w) | Conc. Range (kg) |
| Portland cement clinker | 65 997-15-1 | 20 - 34 | 200 - 340 |
| Blast Furnace Slag | 65 996-69-2 | 66 - 80 | 660 - 800 |
| Limestone | 1317-65-3 | 0 - 4 | 0 - 40 |
| Gypsum | 7778-18-9 | 1 - 4 | 10 - 40 |
| Flue dust from production of cement clinker | 68475-76-3 | 0 - 3 | 0 - 30 |

ENVIRONMENTAL INFORMATION

LCA results per 1 metric t of cement clinker (dry)

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.

| Core environmental impact indicators | | | |
|--|--------------------|--------------------------|----------|
| Global warming potential, total net * | GWP-tot-net | kg CO ₂ eq. | 244 |
| Global warming potential, GHG net ** | GWP-GHG-net | kg CO ₂ eq. | 244 |
| Global warming potential, fossil fuels net * | GWP-fos-net | kg CO ₂ eq. | 243 |
| Global warming potential, biogenic net * | GWP-bio-net | kg CO ₂ eq. | 1,92E-01 |
| Global warming potential, land use and land use change | GWP-luc | kg CO ₂ eq. | 5,25E-02 |
| Ozone depletion potential | ODP | kg CFC ₁₁ eq. | 1,76E-06 |
| Acidification potential | AP | mol H ⁺ eq. | 8,83E-01 |
| Eutrophication potential, freshwater | EP-fw | kg PO ₄ eq. | 4,45E-03 |
| Eutrophication potential, marine | EP-mar | kg N eq. | 1,02E-01 |
| Eutrophication potential, accumulated exceedance | EP-ter | mol N eq. | 3,05E+00 |
| Formation potential of tropospheric ozone | POCP | kg NMVOC _{eq.} | 8,66E-01 |
| Abiotic depletion potential for non-fossil resources | ADPE | kg Sb _{eq.} | 2,36E-03 |
| Abiotic depletion for fossil resources potential | ADPF | MJ | 1,93E+03 |
| Water deprivation potential | WDP | m ³ eq. | 2,04E+01 |

* The indicated values (net values) do not include the greenhouse gas emissions from the incineration of secondary fuels at clinker production. The gross GWP-tot (including the emissions from the incineration of secondary fuels at clinker production) is 2.5E2 kg CO₂-eq. The gross GWP-fos is 2.5E2 kg CO₂-eq. The gross GWP-bio is 2.17E-1 kg CO₂-eq.

** The indicated values (net values) do not include the greenhouse gas emissions from the incineration of secondary fuels at clinker production. The gross GWP-GHG (including the emissions from the incineration of secondary fuels at clinker production) is 2.5E2 kg CO₂-eq.

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

| Additional environmental impact indicators | | | |
|--|--------------|-------------------|----------|
| Potential incidence of disease due to pm emissions | PM | Disease incidence | 6,39E-06 |
| Potential human exposure efficiency relative to U235 | IRP | kBq U235 eq. | 2,46E+01 |
| Potential comparative toxic unit for ecosystems | ETP | CTUe | 2,08E+02 |
| Potential comparative toxic unit for humans | HTPC | CTUh | 1,62E-06 |
| Potential comparative toxic unit for humans | HTPNC | CTUh | 6,32E-06 |
| Potential soil quality index | SQP | dimensionless | 7,98E+02 |

| Parameters describing resource use | | | |
|--|--------------|-------------------------|----------|
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials | PERE | MJ, net calorific value | 2,90E+02 |
| Use of renewable primary energy resources used as raw materials | PERM | MJ, net calorific value | 0,00E+00 |
| Total use of renewable primary energy resources | PERT | MJ, net calorific value | 2,90E+02 |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | PENRE | MJ, net calorific value | 1,93E+03 |
| Use of non-renewable primary energy resources used as raw materials | PENRM | MJ, net calorific value | 0,00E+00 |
| Total use of non-renewable primary energy resources | PENRT | MJ, net calorific value | 1,93E+03 |
| Use of secondary material | SM | kg | 7,50E+02 |
| Use of renewable secondary fuels | RSF | MJ, net calorific value | 7,38E+01 |
| Use of non-renewable secondary fuels | NRSF | MJ, net calorific value | 9,14E+01 |
| Net use of fresh water | NFW | m ³ | 4,90E-01 |

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 CO₂ is set to zero.

| Other environmental information describing waste categories | | | |
|---|-------------|----|----------|
| Hazardous waste disposed | HWD | kg | 3,44E-02 |
| Non-hazardous waste disposed | NHWD | kg | 6,17E-01 |
| Radioactive waste disposed | RWD | kg | 5,50E-03 |

| Environmental information describing output flows | | | |
|---|-----|----|----------|
| Components for re-use | CRU | kg | 0,00E+00 |
| Materials for recycling | MR | kg | 8,30E+00 |
| Materials for energy recovery | MER | kg | 3,59E-02 |
| Exported energy | EE | MJ | 2,21E+01 |

Information on biogenic carbon content

The removals and emissions associated with biogenic carbon content of i) the product and ii) the packaging is not calculated. The latter is not significant or even not relevant for the cement sector.

| Extra indicators | | | |
|---|-------|------------------------|----------|
| Emissions from calcination and removals from carbonation | CC | kg CO ₂ eq. | 1,09E+02 |
| Emissions from combustion of waste from renewable sources | CWRS | kg CO ₂ eq. | 2,55E-02 |
| Emissions from combustion of waste from non-renewable sources | CWNRS | kg CO ₂ eq. | 6,46E+00 |

ADDITIONAL INFORMATION

The development of scenarios shall be made on the finished product (e.g. concrete) and not on the upstream product cement clinker.

Carbonation

During and after the lifetime of concrete structures or other clinker-containing products, hydrated clinker/cement contained within the product reacts with CO₂ in the air. Part of the CO₂ emitted during cement production is reabsorbed by the cement through carbonation, a reaction also referred to as cement carbonation. The quantity of CO₂ taken up will depend on the type of application and its treatment after its lifetime. This reaction takes place mainly on the surface of cement-based products. Structural concrete applications are designed according to strict codes which ensure that carbonation at the concrete surface does not lead to corrosion of reinforcement. Carbonation can nevertheless be particularly relevant after demolition when the surface in contact with air increases very significantly. Carbonation contributes to a reduced GWP impact of cement products over their whole life.

Since carbonation will depend on the application in question, please refer to the respective PCR/EPDs for ready-mix concrete, precast concrete, mortar, cement screed or other cement-based products.

Additional information on release of dangerous substances to indoor air, soil and water during the use stage

For additional information on emissions to indoor air, soil and water during the use stage, please refer to the respective EPDs for the downstream products such as ready-mix concrete, precast concrete, screed, plasters, mortars, grouts etc.

More information regarding Finnsementti's environmental objectives and activities as well as regarding safe and effective use and disposal of cement are available on www.finnsementti.fi.

REFERENCES

General Programme Instructions of the International EPD® System. Version 5.1.

PCR 2019:14

Construction Products. Construction Products – Version 1.3.2
c-PCR-001 Cement and building limes (EN 16908)

EN 15804:2012-04 + A2 2019/AC:2021

Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

EN 16908: 2017

Cement and building lime - Environmental product declarations – Product category rules complementary to EN 15804

EN 197-1: 2012

Cement. Part 1: Composition, specifications and conformity criteria for common cements.

Global Concrete and Cement Association (GCCA) verified LCA Model

(v5.1, International version, March 2025)

Candidate List of Substances of Very High Concern for Authorization European Chemical Agency www.echa.europa.eu