

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Standardsement FA, Brevik - CEM II/B-M (V-L) 42,5 R eng.



Owner of the declaration:

Heidelberg Materials Sement Norge AS

Product:

Standardsement FA, Brevik - CEM II/B-M (V-L) 42,5 R eng.

Declared unit:

1 tonne

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR and EN 16908 is used as PCR Part B
EN 16908:2017 Cement and building lime

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-3948-2907-EN

Registration number:

NEPD-3948-2907-EN

Issue date:

28.11.2022

Valid to:

28.11.2027

Updated 130224

EPD Software:

LCA.no EPD generator ID: 55670

The Norwegian EPD Foundation

General information

Product

Standardsement FA, Brevik - CEM II/B-M (V-L) 42,5 R eng.

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Declaration number:

NEPD-3948-2907-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR and EN 16908 is used as PCR Part B
EN 16908:2017 Cement and building lime

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 tonne Standardsement FA, Brevik - CEM II/B-M (V-L) 42,5 R eng.

Declared unit with option:

A1-A3,A4

Functional unit:

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Martin Erlandsson, IVL, Swedish Environmental Rese

(no signature required)

Owner of the declaration:

Heidelberg Materials Sement Norge AS
Contact person: Petter Thyholdt
Phone: +47 22 87 84 00
e-mail: petter.thyholdt@heidelbergmaterials.com

Manufacturer:

Heidelberg Materials Sement Norge AS
Lilleakerveien 2A
0283 Oslo, Norway

Place of production:

Heidelberg Materials Sement Norge prod.site Brevik sementfabrikk
Setreveien 2
3950 Brevik, Norway

Management system:

Miljøstyringssystem ISO 14001-sertifisert(S-007)
Kvalitetssikringssystem ISO 9001- sertifisert (S-006)

Organisation no:

934 949 145

Issue date:

28.11.2022

Valid to:

28.11.2027

Year of study:

2021

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Petter Thyholdt

Reviewer of company-specific input data and EPD: Sigrun Bremseth

Approved:



Håkon Hauan, Managing Director of EPD-Norway

Product

Product description:

Standardsement FA is adapted to Norwegian conditions and can be used for concrete in most exposure, durability and strength classes. Standardsement FA provides durable concrete even in combination with alkali-reactive aggregate.

Product specification

Portland-composite cement.

| Materials | Value | Unit |
|------------------|-------|------|
| Clinker | 71,3 | % |
| Gypsum | 4,7 | % |
| Fly ash | 18 | % |
| Limestone filler | 6 | % |

Technical data:

CEM II/B-M (V-L) 42,5 R Further information is available at <https://www.sement.heidelbergmaterials.no/no>

Market:

Norway, Iceland

Reference service life, product

Depending of the area of use.

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 tonne Standardsement FA, Brevik - CEM II/B-M (V-L) 42,5 R eng.

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

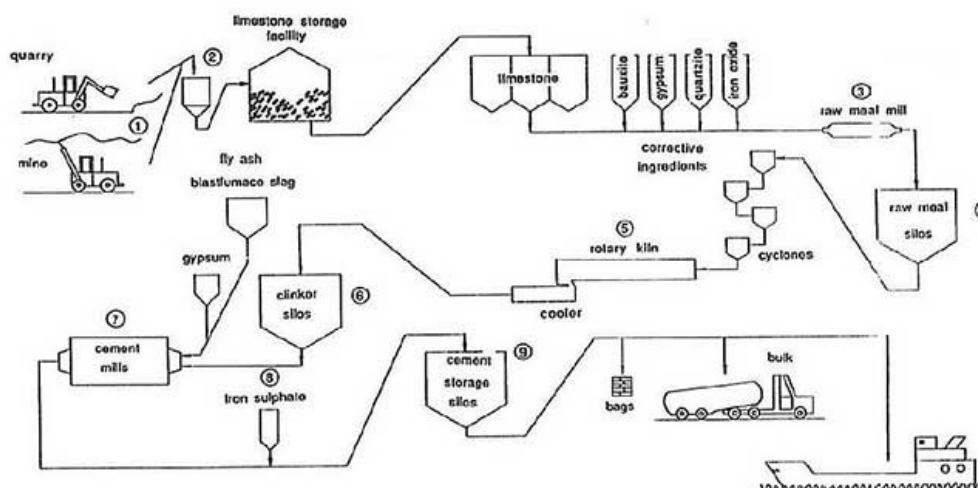
| Materials | Source | Data quality | Year |
|------------------------|---------------|--------------|------|
| Additives | ecoinvent 3.6 | Database | 2019 |
| Binder | ecoinvent 3.6 | Database | 2019 |
| Raw materials, Mineral | LCA.no | Database | 2021 |
| SCM | LCA.no | Database | 2021 |
| Waste products | LCA.no | Database | 2021 |
| SCM | MD-20026-DA | EPD | 2020 |

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

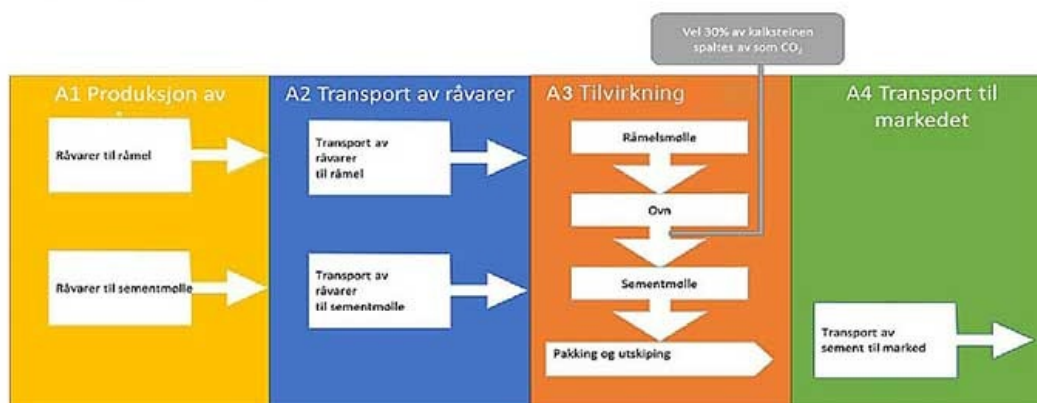
| Product stage | | | | Construction installation stage | Use stage | | | | | | | | | | End of life stage | | | | Beyond the system boundaries |
|---------------|-----------|---------------|-----------|---------------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|-------------------|------------------------------------|--|--|------------------------------|
| Raw materials | Transport | Manufacturing | Transport | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential | | | |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | | | |
| X | X | X | X | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | | | |

System boundary:

From raw materials extraction to market.



1. Uttak av kalkstein fra gruve og dagbrudd
2. Knusing av kalkstein
3. Maling av kalkstein og tilsetningstoffer til råmel
4. Siloer for lagring og homogenisering
5. Brenning av klinker i roterende ovn der materialene når en temperatur på 1450°C
6. Siloer for lagring av klinker
7. Maling av klinker med gips og andre tilsetninger for produksjon av sement
8. Tilsetning av jernsulfat
9. Lagring og utsendelse av sementen



Additional technical information:














LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

| Transport from production place to user (A4) | Capacity utilisation (incl. return) % | Distance (km) | Fuel/Energy Consumption | Unit | Value (Liter/tonne) |
|--|--|---------------|-------------------------|-------|------------------------|
| Ship, Cement boat | 50,0 % | 163 | 0,005 | l/tkm | 0,81 |

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

| Environmental impact | | | | |
|---|----------------------------------|------------------------|----------|----------|
| | Indicator | Unit | A1-A3 | A4 |
|  | GWP-total | kg CO ₂ -eq | 5,68E+02 | 2,50E+00 |
|  | GWP-fossil | kg CO ₂ -eq | 5,67E+02 | 2,50E+00 |
|  | GWP-biogenic | kg CO ₂ -eq | 1,16E-01 | 5,10E-04 |
|  | GWP-luluc | kg CO ₂ -eq | 2,92E-02 | 9,65E-04 |
|  | ODP | kg CFC11 -eq | 4,25E-06 | 4,88E-07 |
|  | AP | mol H ⁺ -eq | 7,10E-01 | 7,54E-02 |
|  | EP-FreshWater | kg P -eq | 4,40E-03 | 6,99E-06 |
|  | EP-Marine | kg N -eq | 1,89E-01 | 1,69E-02 |
|  | EP-Terrestrial | mol N -eq | 2,44E+00 | 1,90E-01 |
|  | POCP | kg NMVOC -eq | 5,57E-01 | 4,92E-02 |
|  | ADP-minerals&metals ¹ | kg Sb -eq | 3,89E-04 | 1,06E-05 |
|  | ADP-fossil ¹ | MJ | 1,02E+03 | 3,22E+01 |
|  | WDP ¹ | m ³ | 7,91E+03 | 7,17E+00 |

GWP-total = Global Warming Potential total; 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







"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

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

Remarks to environmental impacts

The GWP parameter (A1-A3) for the cement content includes 142,3 kg CO₂-eq. from the combustion of alternative fossil fuels during clinker production. In accordance with the "polluter pays" principle / EN 15804 /, the emissions will be added to the production system that caused the waste. In this EPD, the CO₂ contribution from alternative fossil fuels has not been deducted. This makes it easier to compare calculated global warming of the cement regardless of the status of the waste in different countries.











| Additional environmental impact indicators | | | | |
|---|---------------------|-------------------|----------|----------|
| | Indicator | Unit | A1-A3 | A4 |
|  | PM | Disease incidence | 3,03E-06 | 0,00E+00 |
|  | IRP ² | kgBq U235 -eq | 2,02E+00 | 1,40E-01 |
|  | ETP-fw ¹ | CTUe | 1,35E+04 | 1,67E+01 |
|  | HTP-c ¹ | CTUh | 1,26E-08 | 0,00E+00 |
|  | HTP-nc ¹ | CTUh | 3,54E-07 | 0,00E+00 |
|  | SQP ¹ | dimensionless | 1,98E+02 | 4,11E+00 |

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed




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

| Resource use | | | | |
|---|-----------|----------------|----------|----------|
| | Indicator | Unit | A1-A3 | A4 |
|  | PERE | MJ | 5,62E+02 | 1,59E-01 |
|  | PERM | MJ | 0,00E+00 | 0,00E+00 |
|  | PERT | MJ | 5,62E+02 | 1,59E-01 |
|  | PENRE | MJ | 1,03E+03 | 3,22E+01 |
|  | PENRM | MJ | 0,00E+00 | 0,00E+00 |
|  | PENRT | MJ | 1,03E+03 | 3,22E+01 |
|  | SM | kg | 1,69E+01 | 0,00E+00 |
|  | RSF | MJ | 8,84E+02 | 6,11E-03 |
|  | NRSF | MJ | 1,26E+03 | 4,18E-02 |
|  | FW | m ³ | 4,18E+00 | 9,08E-04 |

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"






*INA Indicator Not Assessed

| End of life - Waste | | | | |
|---|------|------|----------|----------|
| Indicator | | Unit | A1-A3 | A4 |
|  | HWD | kg | 7,36E-02 | 1,03E-03 |
|  | NHWD | kg | 4,43E+00 | 4,55E-02 |
|  | RWD | kg | 2,23E-03 | 2,28E-04 |

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

*Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3} = 0,009$

*INA Indicator Not Assessed

| End of life - Output flow | | | | |
|---|-----|------|----------|----------|
| Indicator | | Unit | A1-A3 | A4 |
|  | CRU | kg | 0,00E+00 | 0,00E+00 |
|  | MFR | kg | 3,80E-02 | 0,00E+00 |
|  | MER | kg | 1,13E-02 | 0,00E+00 |
|  | EEE | MJ | 7,38E-03 | 0,00E+00 |
|  | EET | MJ | 1,12E-01 | 0,00E+00 |

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

*Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3} = 0,009$

*INA Indicator Not Assessed

| Biogenic Carbon Content | | |
|---|------|---------------------|
| Indicator | Unit | At the factory gate |
| Biogenic carbon content in product | kg C | 0,00E+00 |
| Biogenic carbon content in accompanying packaging | kg C | 0,00E+00 |

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

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

| Electricity mix | Data source | Amount | Unit |
|---------------------------|---------------|--------|---------------------------|
| Electricity, Norway (kWh) | ecoinvent 3.6 | 24,33 | g CO ₂ -eq/kWh |

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Additional Environmental Information

| Additional environmental impact indicators required in NPCR Part A for construction products | | | |
|--|------------------------|----------|----------|
| Indicator | Unit | A1-A3 | A4 |
| GWPIOBC | kg CO ₂ -eq | 5,68E+02 | 2,50E+00 |

GWPI-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.

EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.

ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.






ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.

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Vold et al, (2022) EPD generator for CEN PCR EN 16908:2017 Cement and building lime - Background information for PCR application and LCA data, LCA.no report number: 01.22.

NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.

CEN PCR EN 16908:2017 Cement and building lime

| | | |
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