ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

AALBORG RAPID® FA CEMENT

CEM II/A-V 52,5 N

AALBORG PORTLAND A/S, CEMENTIR HOLDING

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Aalborg Portland A/S, Cementir Holding
Address	Aalborg Portland A/S, Rørdalsvej 44, 9220 Aalborg, Denmark
Contact details	cement@aalborgportland.dk
Website	www.aalborgportland.dk

PRODUCT IDENTIFICATION

Product name	Aalborg Rapid® FA cement
Additional label(s)	CEM II/A-V 52,5 N
Product number / reference	0615-CPR-9806.1
Place(s) of production	Aalborg, Denmark

Kai Renholm

RTS EPD Committee secretary

Laura Apilo

Managing Director

EPD INFORMATION

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.

EPD program operator	Rakennustietosäätiö RTS / Rakennustieto Oy Malminkatu 16 A, 00100 Helsinki http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Stefan Emil Danielsson, Research and Quality Center, Cementir Holding S.p.A Aalborg, Denmark
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	12.3.2021
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	RTS_102_21
Publishing date	25.03.2021
EPD valid until	12.03.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The Aalborg Rapid® FA cement is a CEM II/A-V 52,5 N reaching a 28-day strength of above 52,5 MPa.

PRODUCT APPLICATION

It can be used in concrete for all purposes and in all environmental classes, and is especially recommended for:

- Reinforced concrete structures
- Concreting in cold weather
- Precast concrete blocks
- Heavy precast concrete elements

TECHNICAL SPECIFICATIONS AND PHYSICAL PROPERTIES OF THE PRODUCT

Product sheet for the cement can be retrieved here: https://www.aalborgportland.dk/downloads/ydeevnedeklarationer/

Further information can be found at www.aalborgportland.dk

PRODUCT STANDARDS

The Aalborg Rapid® FA cement is manufactured according to the requirements in the European standard DS/EN 197-1

PRODUCT RAW MATERIAL COMPOSITION

Material	Amount %
Clinker	80 - 94
Fly ash	6 - 20
Other constituents	0 - 5

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	<0,1	Europe, World
Minerals	84,5	Denmark
Fossil materials	15,5	Denmark, Europe
Bio-based materials	0	-

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

MANUFACTURING AND PACKAGING (A1-A3)

Portland cement is made by heating, in a cement kiln, a mixture of raw materials (mainly limestone or chalk) to a calcining temperature of above 600°C and then a fusion temperature, which is about 1450°C to sinter the materials into grey clinker. The production process is a so-called wet process due to the wet limestone used. To achieve the desired setting qualities in the finished product, a quantity of gypsum or anhydrite is added to the clinker and the mixture is finely ground. Fly ash is finally added to the cement powder.

TRANSPORT AND INSTALLATION (A4-A5)

Only distribution to end customers is considered (A4). Transportation happens by ship to silo in Norway from where it is distributed by truck to several locations. The transport impact is partitioned according to flow volume and distances and displayed in the table at the "Scenario documentation" of this EPD.

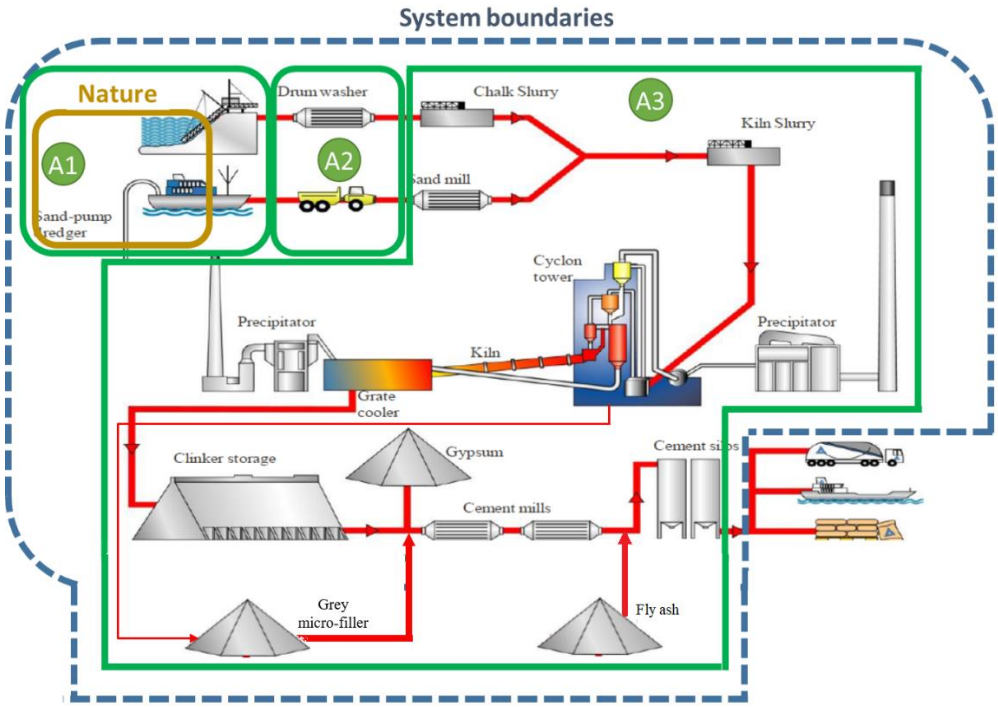
PRODUCT USE AND MAINTENANCE (B1-B7)

As cement is an intermediate product, no other lifecycle phases are relevant to cover. Air, soil and water impacts during the use phase have not been studied. As such they are marked as "Modules Not Relevant"

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life modules (C1-C4, and D) are omitted as the material fulfils the exemption criteria based on EN 15804+A2.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020
Declared unit	1 tonne
Mass per declared unit	1000 kg

BIOGENIC CARBON CONTENT

The product and its packaging do not have biogenic carbon content.

SYSTEM BOUNDARY

This EPD covers cradle-to-gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing). As cement is an intermediate product, no other lifecycle phases are relevant to cover. Only A4 is also included as per the recommendation in EN 15804+A2.

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	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

All major raw materials and essential energy flows are included. The 1% cut-off rule does not apply for hazardous materials and substances: as such, all flows with environmental significance are included. All solid waste emissions, including those that weight less than 1% of the sum of the masses of the inputs, are reported in the end-results.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is made in accordance with the provisions of EN 15804+A2 and the PCR. According to the "polluter pays principle" burdens from alternative fuels are excluded. However, the burden from its incineration is voluntarily added to the GWP category in A3 to be directly comparable with most other EPD's.

The data quality is generally high as most are retrieved directly from the Manufacturer and are well below the cut-off criteria. Additional background processes such as transportation and electricity consumption have been modelled using Ecoinvent v.3.6 LCI database, all with less than 2 years old data.

AVERAGES AND VARIABILITY

Essentially, for this EPD, minor inputs such as electricity, internal transport, and waste have been averaged over the entire cement and clinker production of Aalborg Portland.

ENVIRONMENTAL IMPACT DATA

NOTE: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 ARE PRESENTED IN ANNEX.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg $CO_{2\text{-eq}}$	1,03E+01	2,00E+01	6,90E+02	7,20E+02	1,30E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – fossil	kg $CO_{2\text{-eq}}$	1,03E+01	2,00E+01	6,91E+02	7,21E+02	1,31E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – biogenic	kg $CO_{2\text{-eq}}$	-2,88E-02	-1,39E-02	-6,73E-01	-7,16E-01	-4,07E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – LULUC	kg $CO_{2\text{-eq}}$	1,20E-02	1,22E-02	5,53E-02	7,95E-02	5,96E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Ozone depletion	kg $CFC11_{\text{-eq}}$	3,24E-06	4,13E-06	5,82E-06	1,32E-05	2,88E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Acidification	mol $H^{+}_{\text{-eq}}$	6,76E-02	3,04E-01	1,58E+00	1,95E+00	1,45E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, aquatic freshwater	kg $PO_{4\text{-eq}}$	4,08E-03	1,52E-03	7,60E-02	8,16E-02	8,50E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, aquatic marine	kg $N_{\text{-eq}}$	8,93E-03	7,11E-02	1,90E-01	2,70E-01	3,32E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, terrestrial	mol $N_{\text{-eq}}$	9,74E-02	7,88E-01	2,00E+00	2,88E+00	3,67E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Photochemical ozone formation	kg $NMVOC_{\text{-eq}}$	2,72E-02	2,14E-01	7,46E-01	9,88E-01	1,02E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg $Sb_{\text{-eq}}$	1,06E-03	3,21E-04	1,81E-04	1,57E-03	2,86E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	2,88E+02	2,74E+02	2,61E+03	3,17E+03	1,87E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Water use	$m^3_{\text{-eq}}$ depr.	4,94E+02	1,78E+02	6,74E+03	7,42E+03	1,46E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all 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 experienced with the indicator.

The GWP parameter (A1-A3) for the cement content includes 69,1 kg $CO_{2\text{-eq.}}$ from the combustion of fossil part of alternative 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 fossil CO_2 contribution from alternative fuels has not been deducted. This makes it easier to compare calculated global warming potential of the cement regardless of the status of the waste in different countries. The net total GWP (without alternative fuel contribution) is 651 kg $CO_{2\text{-eq}}$ per ton cement.

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

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	6,17E-07	1,07E-06	1,84E-05	2,01E-05	6,97E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Ionizing radiation, human health	kBq U235-eq	1,24E+00	1,37E+00	6,77E+00	9,38E+00	9,48E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eco-toxicity (freshwater)	CTU-eq	2,45E+00	5,65E+00	7,56E+00	1,57E+01	5,23E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Human toxicity, cancer effects	CTUh	8,26E-09	1,03E-08	4,98E-07	5,17E-07	4,93E-09	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Human toxicity, non-cancer effects	CTUh	7,27E-07	3,08E-07	5,13E-06	6,17E-06	2,10E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Land use related impacts/soil quality	-	1,04E+02	1,25E+02	2,15E+02	4,44E+02	1,19E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

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
Renewable PER used as energy	MJ	7,78E+00	3,86E+00	3,41E+02	3,53E+02	2,35E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Renewable PER used as materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Total use of renewable PER	MJ	7,78E+00	3,86E+00	3,41E+02	3,53E+02	2,35E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-renew. PER used as energy	MJ	2,98E+02	2,79E+02	2,70E+03	3,28E+03	1,90E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-renew. PER used as materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Total use of non-renewable PER	MJ	2,98E+02	2,79E+02	2,70E+03	3,28E+03	1,90E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of secondary materials	kg	5,84E-02	1,78E-01	5,91E-01	8,27E-01	7,91E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of non-renew. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of net fresh water	m^3	2,42E-01	4,41E-02	3,30E-01	6,17E-01	2,89E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

PER abbreviation stands for 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	9,18E-01	4,14E-01	1,80E+01	1,94E+01	2,02E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-hazardous waste	kg	1,01E+01	1,31E+01	3,69E+02	3,92E+02	1,07E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Radioactive waste	kg	1,28E-03	1,87E-03	2,70E-03	5,85E-03	1,31E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Materials for recycling	kg	2,41E-03	0,00E+00	0,00E+00	2,41E-03	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg $CO_{2\text{-eq}}$	1,03E-02	2,00E-02	6,90E-01	7,20E-01	1,31E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg $Sb_{\text{-eq}}$	1,06E-06	3,21E-07	1,81E-07	1,57E-06	2,86E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	2,88E-01	2,74E-01	2,61E+00	3,17E+00	1,87E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Water use	$m^3_{\text{-eq}}$ depr.	2,42E-04	4,41E-05	3,30E-04	6,17E-04	2,89E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of secondary materials	Kg	5,84E-05	1,78E-04	5,91E-04	8,27E-04	7,91E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Biogenic carbon content in product	kg C	N/A	N/A	0,00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content in packaging	kg C	N/A	N/A	0,00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Ecoinvent v.3.6 data has been applied as the only valid dataset
Electricity $CO_{2\text{-}eq}$ / kWh	0,32
District heating data source and quality	n/a
District heating $CO_{2\text{-}e}$q / kWh	n/a

Transport scenario documentation

Scenario parameter	Value
Transport, freight, lorry 16-32 tonnes, EURO 5, kg $CO_{2\text{-}eq}$ / t-km	0,1668
Transport, freight, sea, bulk carrier for dry goods, kg $CO_{2\text{-}eq}$ / t-km	0,00939
A4 average transport $CO_{2\text{-}eq}$ emissions, kg $CO_{2\text{-}eq}$ / t-km	0,0201
A4 average transport distance, km	459
Transport capacity utilization, %	36%
Bulk density of transported products, kg/m^3	2790
Volume capacity utilization factor for nested package products, %	100

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	n/a
Collection process – kg collected with mixed waste	n/a
Recovery process – kg for re-use	n/a
Recovery process – kg for recycling	n/a
Recovery process – kg for energy recovery	n/a
Disposal (total) – kg for final deposition	n/a
Scenario assumptions e.g. transportation	n/a

BIBLIOGRAPHY

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

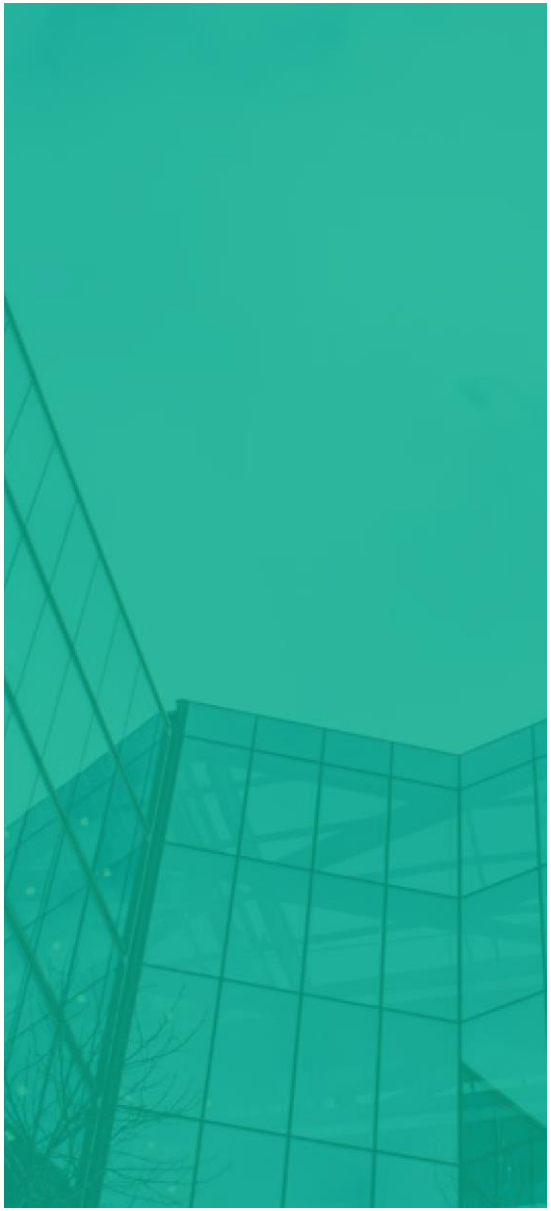
ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

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

Ecoinvent database v3.6 and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS (English version, 26.8.2020).



ABOUT THE MANUFACTURER

Aalborg Portland is the only cement factory in Denmark. The past 130 years it has been producing a wide variety of grey cements in its kiln and premium white cement in its six white cement kilns, where the main clinker raw material, limestone and sand, is sourced locally. Since 2004 it is owned by Cementir Group along with 10 other cement factories globally. The annual cement production is 2,4 million tons and the markets are both domestic, regional and global, and the domestic infrastructure is supported by seven Aalborg Portland owed silos across Denmark. In its Research and Quality Centre cements from all factories across the Group are being tested, and the development of low carbon cements is taking place, the latest one FUTURECEM™ launched in 2020 – a calcined clay cement with a 30% lower CO_2 footprint compared to traditional cements.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Aalborg Portland, Cementir Holding
EPD author	Stefan Emil Danielsson, Research and Quality Center, Cementir Holding S.p.A Aalborg, Denmark
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program operator	Rakennustietosäätiö RTS / Rakennustieto Oy Malminkatu 16 A 00100, Helsinki http://cer.rts.fi
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Cementitious Products

ANNEX

ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential	kg $CO_{2\text{-eq}}$	1,04E+01	1,99E+01	6,83E+02	7,14E+02	1,30E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of stratospheric ozone	kg CFC-11-eq	2,61E-06	3,28E-06	5,36E-06	1,12E-05	2,29E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Acidification	kg $SO_{2\text{-eq}}$	5,97E-02	2,46E-01	1,42E+00	1,72E+00	1,17E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication	kg $PO_{4\text{-eq}}$	1,88E-02	3,02E-02	3,05E-01	3,54E-01	1,48E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Photochemical ozone formation	kg $C_2H_{4\text{-eq}}$	2,69E-03	7,64E-03	7,32E-02	8,35E-02	3,69E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of non-fossil res.	kg $Sb_{\text{-eq}}$	1,06E-03	3,21E-04	1,81E-04	1,57E-03	2,86E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	2,88E+02	2,74E+02	2,61E+03	3,17E+03	1,87E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

The GWP parameter (A1-A3) for the cement content includes 69,1 kg $CO_{2\text{-eq.}}$ from the combustion of fossil part of alternative 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 fossil CO_2 contribution from alternative fuels has not been deducted. This makes it easier to compare calculated global warming potential of the cement regardless of the status of the waste in different countries. The net total GWP (without alternative fuel contribution) is 645 kg $CO_{2\text{-eq}}$ per ton cement.