Ali Pre Green

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804
Programme: The International EPD System, www.environdec.com
Programme operator: EPD® International AB
EPD registration no.: EPD-IES-0000404:006 (S-P-00404)
Geographical scope: Global

Date of emission: 2024/09/04
Version date: 2024/09/04
Validity: 2029/09/04

Heidelberg Materials

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM
EPD
VERIFIED

Ali Pre Green

Global warming potential	755 kg CO_2 eq/ton
Use of recycled materials	507 kg/ton
Recycled materials content (ISO 14021 compliant)	46.8%
Recycled pre-consumer materials (ISO 14021 compliant)	46.8%
Recycled post-consumer materials (ISO 14021 compliant)	0%

Company	Heidelberg Materials Italia Cementi S.p.A.
Website	heidelbergmaterials.it
EPD Registration No	**EPD-IES-0000404:006 (S-P-00404)**
Validity	2029/09/04
LCA coverage	Cradle-to-gate

Declaration of general information

This Environmental Product Declaration (EPD) covers the **ALI PRE GREEN**, a product with low CO_2 emissions (<550 $kgCO_2$ for A3 stage) and high recycled material content (>30%). The recycled material content is determined following guidelines in ISO 14021 whereas the CO_2 emissions threshold is derived from the third party verified country or regional specific database of the Global Cement and Concrete Association (GCCA), former Cement Sustainability Initiative (CSI).

Manufacturer information

Heidelberg Materials Italia Cementi Spa has been the leading company in Italy in the production of cement since 1864. Over one hundred years of history built on people, knowledge and innovation that have enabled the company to become a leading player in the construction material industry from the very beginning. Heidelberg Materials Italia Cementi Spa's widespread presence, rooted in the territory, and the ability of offering innovative, quality products, are at the base of integrated solutions and applications that meet the needs of the cement and concrete market. The industrial structure consists of eight plants for cement production, a plant for special products with a reduced environmental footprint compared to traditional cement and several grinding centres. The production sites have obtained the ISO 14001 environmental certificate and, in some geographical areas, also the CSC Certificate, which certifies the sustainable procurement process along the entire production chain according to the basic principles of Sustainability. The industrial network is complete and integrated, thanks to the remarkable presence in the concrete and aggregates industry with the company Heidelberg Materials Italia Calcestruzzi Spa.

Heidelberg Materials Italia Cementi Spa, alongside Heidelberg Materials Italia Calcestruzzi Spa, offers a wide range of products, applications, and solutions, from cement to ready-mixed concrete. The category of traditional cements consists of products suitable for specific construction types: road and marine infrastructures, civil and industrial floorings, dams, extraction wells and the most common applications for the construction sectors. Alongside traditional cement, Heidelberg Materials Italia Cementi Spa also offers a range of solutions for the renovation of buildings, with binders, natural lime, mortar and leveling compounds, products that stand out for their quality, durability, and ease of application. Additionally, there is a range of eco.build products on offer meeting the growing market demand for solutions oriented to environmental sustainability and promoting the circular economy.

Heidelberg Materials Italia Cementi Spa is a founding member of the Italian Green Building Council, the association that promotes the dissemination of the principles of the circular economy in the building industry, and is also a partner of the Global Compact, the international organisation that promotes the principles of sustainable development. Now Heidelberg Materials Italia Cementi Spa is part of the Heidelberg Materials, worldwide leader in the industry, with 53,000 employees in over 3,000 production plants in 50 countries in 5 continents. Among the sustainability goals of the Group there is the reduction by 30% of the CO_2 emissions per cement ton within 2025.

Further information on Heidelberg Materials and Heidelberg Materials Italia Cementi Spa can be accessed at the official website heidelbergmaterials.com/en and heidelbergmaterials.it

Product description

ALI PRE GREEN is manufactured by Heidelberg Materials Italia Cementi Spa in its cement plant situated at Guardiaregia in the South of Italy. **ALI PRE GREEN**, a Calcium Sulfoaluminate clinker (CSA), is the main component of **ALI CEM GREEN.**

ALI CEM GREEN and **ALI PRE GREEN** are highly technological products able to guarantee ultra-high performance in terms of strength and safety.

This EPD refers to **ALI PRE GREEN** used for rapid setting, high early strength development and shrinkage compensation.

ALI CEM GREEN in an effective solution for a wide variety of applications:

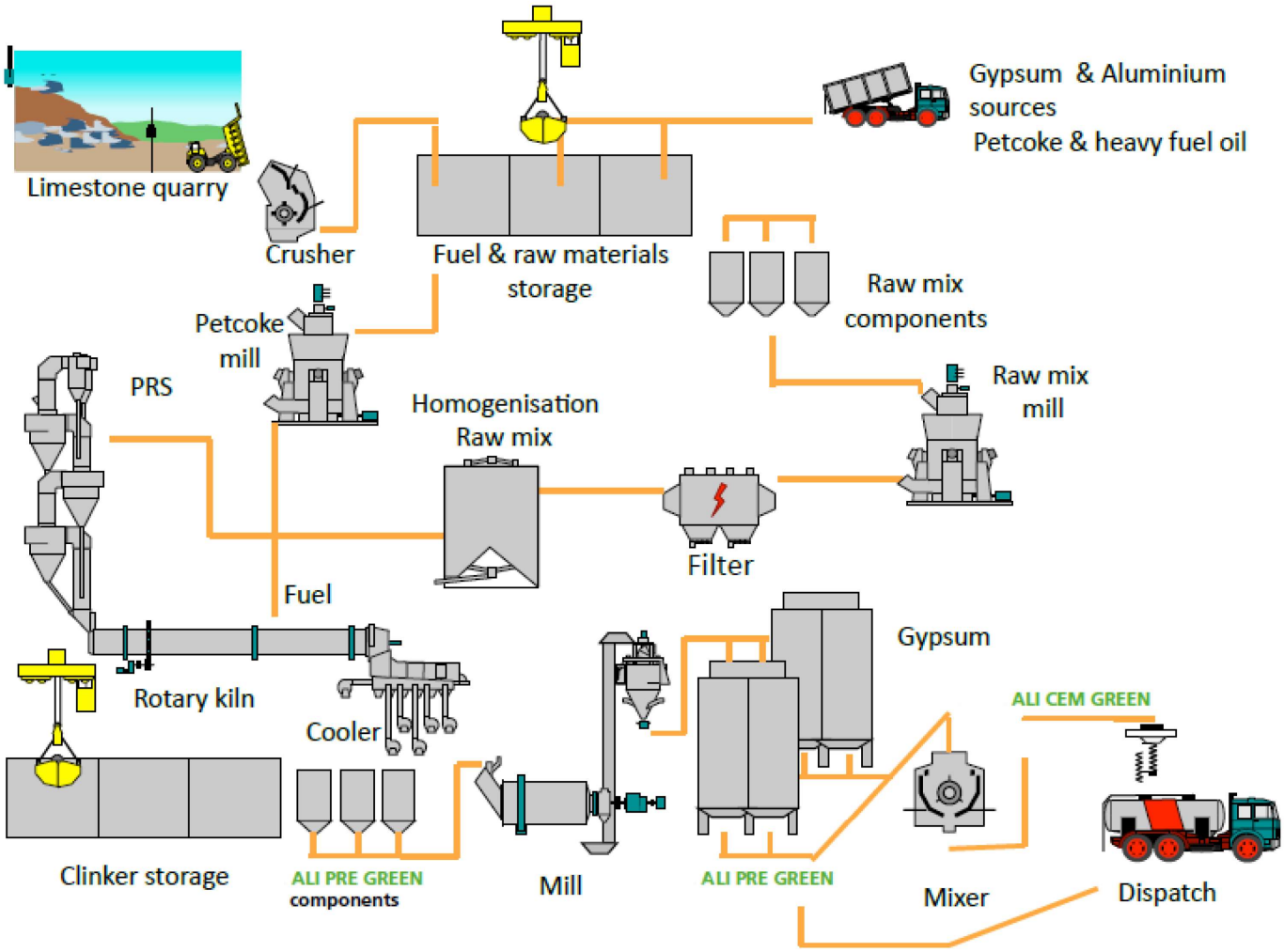
- Adhesives
- Rapid sealants and mortars
- Precasts
- Floor screeds
- Shotcrete
- Waste inertization

In addition ALI CEM GREEN is appropriate for products that are exposed to aggressive environments such as acid-resistant coatings.

Chemically, ALI CEM GREEN is mainly composed of tetracalcium aluminate sulphate and its composition is optimized to confer it the ability to achieve not only high early strength, but also a progressive strength development up to very high values (i.e 60 MPa at 28 days).

The production process of ALI CEM GREEN is similar to the general cement production process. Raw materials are combusted in a kiln producing clinker. In the case of ALI CEM GREEN, CSA is produced at reduced kiln temperatures (<1300°C vs 1450°C of portland clinker) due to lower required temperatures for the clinkerization reaction. CSA is ground together with selected additives to produce ALI PRE GREEN. The final production step involves the mixing of ALI PRE GREEN with gypsum to produce ALI CEM GREEN.

Production process



Main pre-products

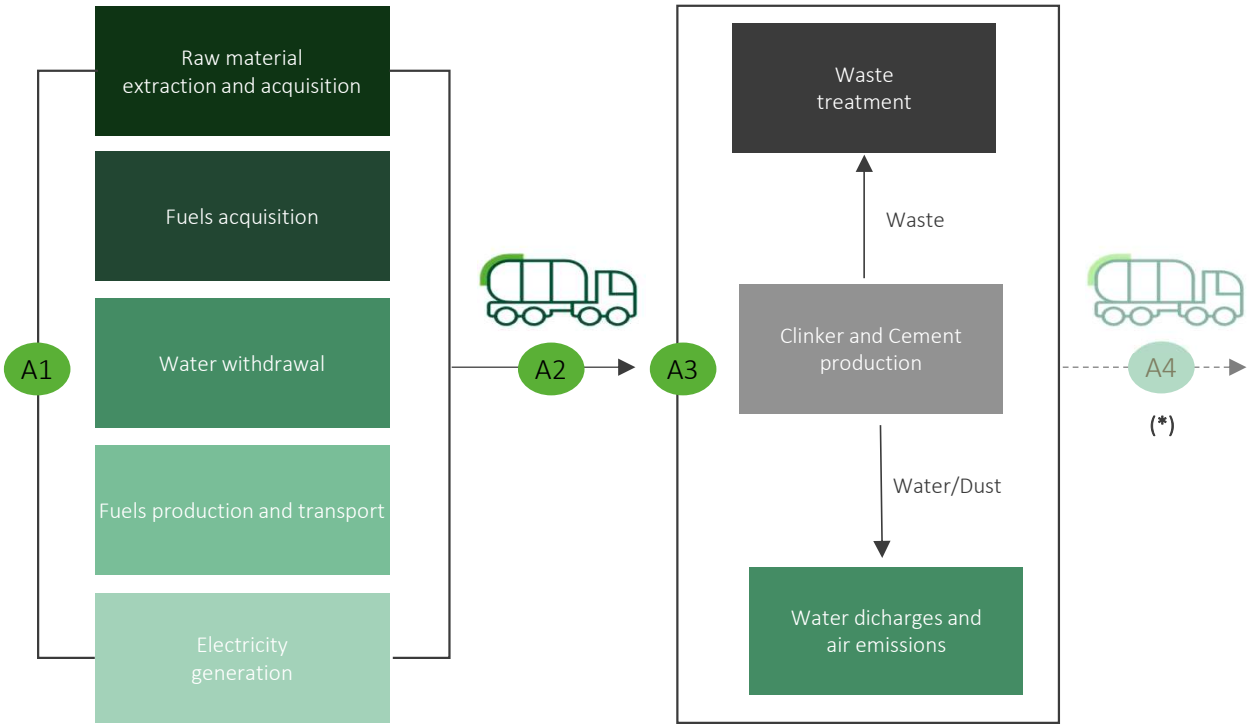
Burning in kiln *Grinding* *Mixing*

Raw mix	CSA	Ali Pre Green	Ali Cem Green
(Limestone, Alluminium sources, Gypsum sources)	(Calcium Sulfo Aluminate clinker)	(99,9% CSA)	(78,6% Ali Cem Green)

Additives *Mixing*

The overall composition of the products under study and the energy input involved are provided below. This shows relative percentages of materials and energy sources used in producing **ALI PRE GREEN** and **ALI CEM GREEN**, without considering loss in mass during combustion.

Process flow diagram



A1 _____

Raw material extraction & processing, processing of secondary material

A2 _____

Transport to manufacturer

A3 _____

Manufacturing process and treatment of waste generated

A4 _____

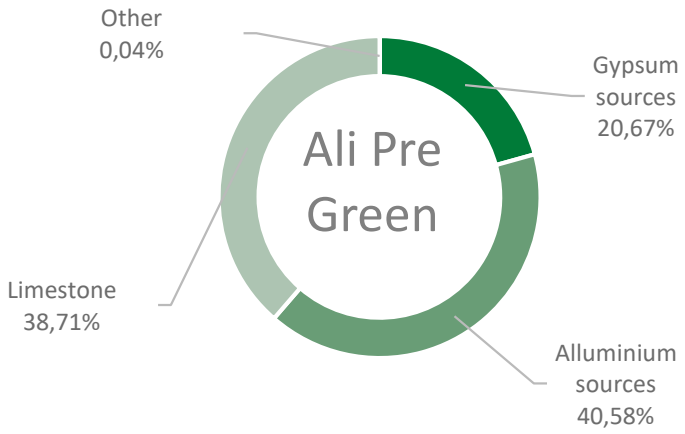
Transport to building site

(*) A4 stage not considered in this EPD

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	IT	IT	IT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

Product composition



ALI PRE GREEN contain a high percentage of recycled materials used as aluminum sources. This particularity implies savings in natural resources and energy which would otherwise have been consumed. The aluminum based recycled materials result from the production of secondary aluminum and as such are classified as pre-consumer recycled materials according to the standard ISO 14021. Following rules set in this standard, the recycled material content of **ALI PRE GREEN** at 46.8%.

Energy input (process)

	Diesel (l)	Electrical Energy (kWh)
Ali Pre Green	0.25	72.3

Energy source (%)					
Coal and Peat	22.72	Unspecified fossil	3.57	Solar	6.21
Oil	3.76	Nuclear	4.40	Wind	0.43
Gas	58.22	Hydro	0.00	Geothermal	0.00
Biomass	0.63	Lignite	0.05		

EPD type and programme operator

This is an Environmental Product Declaration (EPD) compliant to a Type III environmental declaration as defined by ISO 14025:2006. ALI PRE GREEN is a construction product therefore this EPD is compliant to EN 15804:2012+A2:2019.
The EPD is subject to the International EPD System (IES) which acts as the Programme Operator and is aligned to the Product Category Rules (PCR) for the assessment of the environmental performance of UN CPC 374 relative to cement (C-PCR-001 "Cement and building lime" (EN 16908) to PCR 2019:14 Construction products, version 1.3.2). The General Programme Instructions (version 4.0 dated 2021-03-29) of the IES have been implemented. Further information on IES is available on the official website www.environdec.com.
The EPD refers to a cradle-to-gate boundary so as to meet the following goals:

- Establish third party verified environmental information
- Provide information and data for business-to-business communication

This EPD applies to the production of ALI PRE GREEN in Italy during the year 2023. It results from the life cycle assessment study carried out following the principles contained in the ISO 14040 series of standards.
EPDs within the same product category but from different EPD Programmes shall not be comparable. Moreover, as stated in EN 15804:2012+A2:2019, the comparison of products on the basis of their EPD is defined by the contribution they make to the environmental performance of the building. Consequently, comparison of the environmental performance of construction products using this EPD information shall be based on the product's use in and its impacts on the building and shall consider the complete life cycle of the product within the building or construction works.

Declaration of environmental parameters derived from LCA

Scope

Declared unit	1000 kg (1 tonne) ALI PRE GREEN (bulk product)
Temporary boundary	Year 2023 production
System boundary	From cradle to gate A1-A3 A1 (Upstream processes) - Raw material and fuel acquisition, Electricity generation & distribution A2 (Upstream processes) - Transportation to plant. A3 (Core processes) - Manufacturing processes in plant, treatment waste from manufacturing processes.

The results in terms of environmental impacts, resource use and other environmental information are based on the declared unit.
The LCA model includes a representative inventory of the product system in line with cut-off requirements of the reference PCR. Input materials and energy input to the product system do not contain biogenic carbon, consequently there is no Greenhouse Gas emission from biogenic sources.

The Global Cement and Concrete Association (GCCA) Industry EPD Tool for Cement and Concrete v.4.2 (EPD Tool), pre-verified against requirements of the reference cement PCR, was used in computing Life cycle impacts of **ALI PRE GREEN**. The Tool applies specific datasets of the cement production process together with representative datasets in Ecoinvent version 3.5 to compute environmental parameters of the product under study.

Core environmental impact indicators

The following information on core environmental impacts are expressed in terms of impact category parameters using characterization factors. Additional indicators are not declared.

IMPACT CATEGORY PER TON	Unit	ALI PRE GREEN CRADLE TO GATE A1-A3
GWP-tot (Global Warming Potential total)	kg CO_2 eq.	7.57E2
GWP-fos (Global Warming Potential fossil fuels)	kg CO_2 eq.	7.57E2
GWP-bio (Global Warming Potential biogenic)	kg CO_2 eq.	1.89E-1
GWP-luc (Global Warming Potential land use and land use change)	kg CO_2 eq.	1.41E-1
ODP (Depletion potential of the stratospheric ozone layer)	kg CFC 11 eq.	4.20E-5
AP (Acidification potential, Accumulated Exceedance)	mol H+ eq.	2.57E0
EP-fw (Eutrophication potential, fraction of nutrients reaching freshwater end compartment)	kg PO2 eq.	5.82E-2
EP-mar (Eutrophication potential, fraction of nutrients reaching marine end compartment)	kg N eq.	4.43E-3
EP-ter (Eutrophication potential, Accumulated Exceedance)	mol N eq.	8.38E0
POCP (Formation potential of tropospheric ozone)	kg NMVOC eq.	2.11E0
ADPE (Abiotic depletion potential for non- fossil resources) (2)	kg Sb eq.	3.77E-4
ADPF (Abiotic depletion for fossil resources potential) (2)	MJ, net calorific value	6.44E3
WDP (Water (user) deprivation potential, deprivation-weighted water consumption) (2)	m^3 world eq. deprived	6.14E1

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

Additional environmental impact indicators

IMPACT CATEGORY PER TON	Unit	ALI PRE GREEN CRADLE TO GATE A1-A3
GWP-GHG (Global warming potential, GHG) (*)	kg CO2 eq.	7.57E2
PM (Potential incidence of disease due to pm emissions)	Disease incidence	ND
IRP (Potential human exposure efficiencyrelative to U235) (1)	kBq U235 eq.	ND
ETP (Potential comparative toxic unit forecosystems) (2)	CTUe	ND
HTPC (Potential comparative toxic unit forhumans) (2)	CTUh	ND
HTPNC (Potential comparative toxic unit forhumans) (2)	CTUh	ND
SQP (Potential soil quality index) (2)	dimensionless	ND

(*) GWP GHG for electricity used in the manufacturing process in stage A3: 7.29E-1 kg CO_2 eq/kWh

(1) 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 accident, occupational exposure not due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from the radon and from some construction materials is also not measured by this indicator.

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

Parameters describing resource use

The following environmental parameters apply data based on LCI. They describe the use of renewable and non- renewable material resources, renewable and non- renewable primary energy, water use and electricity use during manufacturing.

IMPACT CATEGORY PER TON	Unit	ALI PRE GREEN CRADLE TO GATE A1-A3
PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	1.88E2
PERM Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0E0
PERT Total use of renewable primary energy resources	MJ, net calorific value	1.88E2
PENRE Use Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw materials	MJ, net calorific value	6.44E3
PENRM Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	0E0
PENRT Total use of non-renewable primary energy resources	MJ, net calorific value	6.44E3
SM Use of secondary material	kg	5.07E2
RSF Use of renewable secondary fuels	MJ, net calorific value	0E0
NRSF Use of non-renewable secondary fuels	MJ, net calorific value	0E0
NFW Net use of fresh water	m^3	1.75E0

Other environmental indicators

The following parameters describe waste categories and other flows derived from LCI.

PRODUCTION PER TON	Unit	ALI PRE GREEN CRADLE TO GATE A1-A3
Hazardous waste	kg	3.95E-1
Non-hazardous waste	kg	2.97E1

Components for re-use, **Materials for recycling**, **Materials for energy recovery**, **Exported energy** and **Radioactive waste disposed** are zero for **ALI PRE GREEN**.

Additional information

Guardiaregia plant, certified according to ISO 14001:2015 and ISO 9001:2015, covers a total surface area of 96700 m^2 and has been in operation for 60 years. The quarry supplying limestone for production activities is at 4 km from the plant and has a surface area of 425.730 m^2. Safety data sheets of ALI CEM GREEN provide information on proper handling of these products. They are intended for use by professionals and enable them to take necessary measures as regards health, safety and environment at worksites.
Safety data sheets and other technical documents of ALI CEM GREEN can be consulted on the Heidelberg Materials Italia website heidelbergmaterials.it.
Product innovation is one of the strategic pillars of Heidelberg Materials Italia Cementi Spa and the parent Company, Heidelberg Materials.

Consequently, the production of ALI CEM GREEN is in line with Group Sustainability Commitments 2030 advocating product design suitable for energy efficiency in buildings, sustainable construction and optimizing the use of recycled materials. Moreover, new clinker, cements or binders alternative to Ordinary Portland Cement are under development. In particular, research focuses on the use of renewable and reusable raw materials and the development of specialty admixtures and special additions for concrete, also through investigations and experiments based on nano and biotechnologies applied to the construction materials sector. More information on Sustainability can be accessed at the official website. heidelbergmaterials.com/en/sustainability

Changes versus previous version

This release takes onboard the variations and the updates of the reference documents which occurred in recent years; the biggest variation is related to the implementation of new version of PCR and to the new version of GCCA EPD Tool v.4.2. Despite there are no relevant changes in the production process and in the mix of fuels and raw materials used, this version includes the core (and additional) environmental impact indicators defined by the amended standard.

References

- ISO 14025:2010- Environmental labels and declarations - Type III environmental declarations
- ISO 14040:2006- Environmental management - Life cycle assessment - Principles and Framework
- ISO 14044:2006 - Environmental management - Life cycle assessment - Requirements and Guidelines
- ISO 14021:2016 - Environmental labels and declarations – Self-declared environmental claims (Type II Environmental labelling)
- GPI General Programme Instructions of IES www.environdec.com (v 4.0)
- EN 15804:2012 + A2:2019/AC:2021 - Sustainability of construction works - Environmental product declarations Core rules for the product category of construction products
- PCR for cement - www.environdec.com PRODUCT CATEGORY RULES (PCR) for Product Group “Cement”, CPC 374, C-PCR-001 “Cement and building lime” (EN 16908) to PCR 2019:14 Construction products, version 1.3.2

Demostration of verification

Programme:	EPD® The international EPD® System
PCR	UN CPC 374 - C-PCR-001 ”Cement and building lime” (EN 16908) v. 2019-12-20 to PCR 2019:14 ”Construction Products” v.1.3.2
PCR Moderator	Martin Erlandson, IVL Svedish Environmental Research Institute, martin.erlandson@ivl.se
PCR Comitee	IVL Svedish Environmental Research Institute Secretariat of the International EPD® System
Independent verification of the declaration and data, according to ISO 14025:2010	● EPD Process Certification (Internal) ⊖ EPD Verification (External)
EPD Registration No.	EPD-IES-0000404:006 (S-P-00404)
Date of emission	2024/09/04
Version date	2024/09/04
Validity	2029/09/04
Third part Independent Verifier:	Certiquality Srl (Number of accreditation: 008PRD rev.000)
Accredited by:	Accredia

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Glossary

Ozone layer depletion 20a	*Destrattive effects on the stratospheric ozone layer over a time horizon of 20 years.*
Acidification	*Increase of soil and water acidity.*
Eutrophication	*Excessive levels of macronutrients in the environment caused by emissions of nutrients to air, water and soil.*
Photochemical oxidation	*Oxidizing of volatile compounds in the presence of nitrogen oxides (NOx) which frees ozone in the low atmosphere.*
Abiotic depletion	*Extraction of minerals and fossil fuels due to inputs in the system.*

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