Environmental Product Declaration

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

CEM I 52.5 R

from

CEMENTOS LA UNION S.A.

Programme:	The International EPD® System, www.environdec.com
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General information

Programme information

Programme:	The International EPD® System
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): **EN 16908:2017+A1:2022:** Cement and building lime. Environmental product declarations.
PCR review was conducted by: The Technical Committee of UNE CTN 80 *"cements and limes".* Lead by OFICEMEN A full list of members is available on www.une.org. The review panel may be contacted via info@une.org
Life Cycle Assessment (LCA)
LCA accountability: APPLUS – LGAI Technological Center S.A
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Marcel Gómez Ferrer | info@marcelgomez.com Approved by: The International EPD® System

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: CEMENTOS LA UNION S.A.
Contact: launion@launion.es
Avda. dels Gremis, 41. Pol. Ind. Sector 13
46394 Ribarroja de Turia, Valencia (Spain)

Description of the organisation:

Cementos La Unión is the first Valencian company in the sector created with Spanish capital since 1994. Its goal is to provide the best services and ensure the quality of its products in a constant growth rhythm.

Our facilities are equipped with the latest technological advances, allowing us to produce 1.8 million tons per year. Science and technology come together to consistently achieve one result: cement of the highest quality, highly competitive from processing plants in Egypt, and Santo Domingo.

Cementos La Unión receives the highest quality primary material for cement. The clinker, received by ship, undergoes the strictest quality controls both at its origin and destination.
After a short period of storage in six warehouses, separated by sources, the clinker is dosed together with the rest of the raw materials: limestone, gypsum, and pumice.

Grinding is carried out in four lines, with a total of five mills up to 3.8 meters in diameter and 11.4 meters in length, powered by three-thousand-horsepower motors operating continuously.
Thanks to these technological advances, the possibility of error or variation in production is practically nil. Day and night. From the control room, an exhaustive monitoring of the entire production process is carried out in a total of twenty silos with a capacity of forty-six thousand tons.

The cement is subsequently stored using hovercraft and bucket elevators. It is dispatched as bulk cement for automated loading in tanks. The two lines in the dispensing area have two surge hoppers of fifteen and thirty tons, a palletizer, and a founder.

The latest generation dryers have eight modular heavy extraction and electronic automatic dispensing groups, with a production capacity of up to four thousand eight hundred bags per hour. The quality control of the process, the verification of the products used, and the assurance that they are being offered. One of the best products on the market is the daily work of our laboratory staff.

At Cementos La Unión, we have fully equipped facilities to verify the quality of the products used in our manufacturing process. The samples used for quality controls are prepared following a standardized procedure, obtaining homogeneous controls that allow checking the characteristics of the cement produced by Cementos La Unión, a consolidated company with the latest technology and a guarantee of the highest quality standards.

Reliability in the supply chain, constant growth, and expansion, contributing to the construction of a progressive society where infrastructure, services, and facilities offer a quality of life and comfortable and safe spaces.

Product-related or management system-related certifications:
The ISO 9001, certificate nº EC-8231/15 certified by Applus with accreditation nº 02/C-SC032 and ISO 14001, certificate nº MA-3441/15 certified by Applus with accreditation nº 02/C-MA018. The product **CEM I 52.5 R** has certification of conformity according to EN 197-1:2011 "Cement - Part 1: Composition, specifications and conformity criteria for common cements" and RC-16 from Spain R.D. 256/2016 "Instruction for the reception of cements" and the European Regulation No. 305/2011 certified by Applus, certificate nº 0370-CPR-1854.

Name and location of production site(s): CEMENTOS LA UNION S.A.
Avda. dels Gremis, 41. Pol. Ind. Sector 13 - 46394 Ribarroja de Turia, Valencia (Spain)

Product information

Product name: CEM I 52.5 R

Product identification: Portland cement with slag for the manufacture of concrete and mortar according to UNE 197-1 and Royal Decree 256/2016, "RC-16".

Product description:
The CEM I 52.5 is a high-quality composite Portland cement renowned for its exceptional strength and versatility in demanding construction applications. With an impressive compressive strength of 52.5 megapascals (MPa) after 28 days of curing, this cement provides a solid foundation for structures requiring significant load-bearing capacity and long-term durability. Its unique ability to rapidly gain strength makes it ideal for projects that demand efficient and reliable commissioning.

This composite cement is distinguished by its balanced formula that includes specific additives, ensuring an optimal combination of mechanical and chemical properties. This makes it a reliable choice for a wide range of applications, from reinforcing concrete structures to constructing fences and barriers. Certified for compliance according to EN 197-1:2011 "Cement – Part 1: Composition, specifications and conformity criteria for common cements. as well as RC-16 from Spain's R.D. 256/2016 "Instructions for the reception of cements," this product meets rigorous standards of quality and performance, offering a trusted solution for high-level construction projects.

When performance and durability are paramount, choose the CEM I 52.5 R to ensure the success of your project. This composite Portland cement is the ideal choice for builders and construction professionals seeking a reliable, high-performance solution for their most demanding structural needs.

CEM I 52.5 R Portland cement in accordance with EN 197-1:2011 has the following performances:

CEM I 52.5 R		
Characteristics EN 197-1:2011	**Unit**	**Value**
Chemical Properties		
Loss on ignition	%	≤ 5.0
Insoluble residue	%	≤ 5.0
Sulphate (SO3) content	%	≤ 4.0
Chlorides (Cl)	%	≤ 0.1
Physical Properties		
Setting principle	Minutes	≥ 45
Final Setting time	Minutes	≤ 720 (RC-08)
Le-Chatelier expansion	mm	≤ 10
Consistency	-	NA
Blaine	Cm^2/gr	NA
Mechanical Properties		
Initial strength (2 days)	N/mm^2	≥ 30.0
(7 days)	N/mm^2	NA
Nominal strength (28 days)	N/mm^2	≥ 52.5

UN CPC code: **37440** Portland cement, aluminous cement, slag cement and similar hydraulic cements. Except in the form of clinkers. "Central Product Classification (CPC) Series M No. 77, Ver.2.1."

Geographical scope: Coverage of Spanish technologies and processes during the Product and Construction Process Stage (A1-A3).

LCA information

Functional unit / declared unit: In the present study, the declared unit is considered being 1000 kg of cement **CEM I 52.5 R** Manufactured by the company **CEMENTOS LA UNION** in their production centre. According to the PCR EN 16908:2017+A1:2022: Cement and building lime. Environmental product declarations.

Reference service life: The reference service life is not stated, as the scope of the study excludes the use stage of the product.

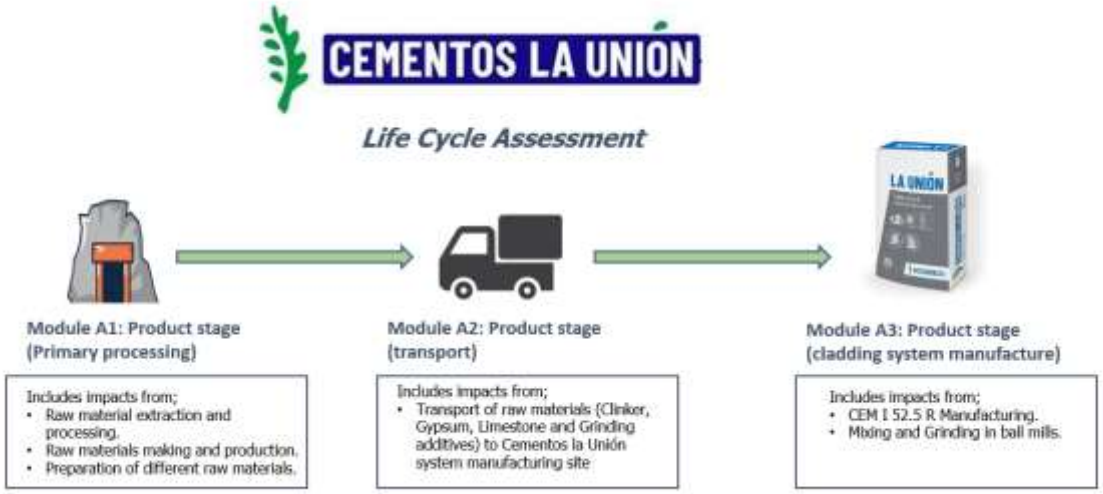
Time representativeness: The data collected are for the year 2023, based on the production from the same year.

Database(s) and LCA software used: The LCA database profile is EcoInvent version 3.6 (September 2019) and the LCA software is SimaPro 9.1.1 with the characterization method based in EN 15804 + A2 Method v1.0.

Description of system boundaries: The scope of the Declaration and the limits of the system apply from "Cradle to gate" covering all information modules A1 to A3.
The following processes have been excluded:

- Manufacture of equipment used in production, buildings or any other capital goods;
- The transportation of personnel to the plant;
- Transportation of personnel within the plant;
- Research and development activities;
- Long-term emissions.

System diagram:



The life cycle analysis is based on the EN 15804:2012+A2:2019/AC:2021 standard, where the following cutting criteria are applied:
PRODUCT STAGE (A1 - A3): The production stage consists of the extraction of raw materials, transportation of the raw materials, processing the raw materials into materials and the production of the product. The required energy for production, external treatments, ancillary materials, packing material and production emissions are included, energy consumed comes from ES national mix, with a value of 0,207 kg CO2 eq/kWh. The limits of the system to nature are related between the resources derived from petroleum and the Technosphere in the production of CEM I 52.5 R, where most of its content is Clinker.
With regards, to the production process of the Stages A1-A3, it can be described as the following:

The CEM I 52.5 R is a cement product used for applications such as: Reinforced concrete, Prestressed concrete, including structural precast, structural precast, High-strength concrete, concrete for rapid stripping and demoulding, shotcrete and concrete in cold weather. According to exposure class I and X0, XC and XA1.

For the manufacturing of CEM I 52.5 R, the raw materials used are the Clinker, with a content of as high as 92% in weight, limestone and gypsum with a content of 4% in weight for each one. Carried from the cement mill to storage and sent by lorry trucks.

The production process could be summed up as follows:

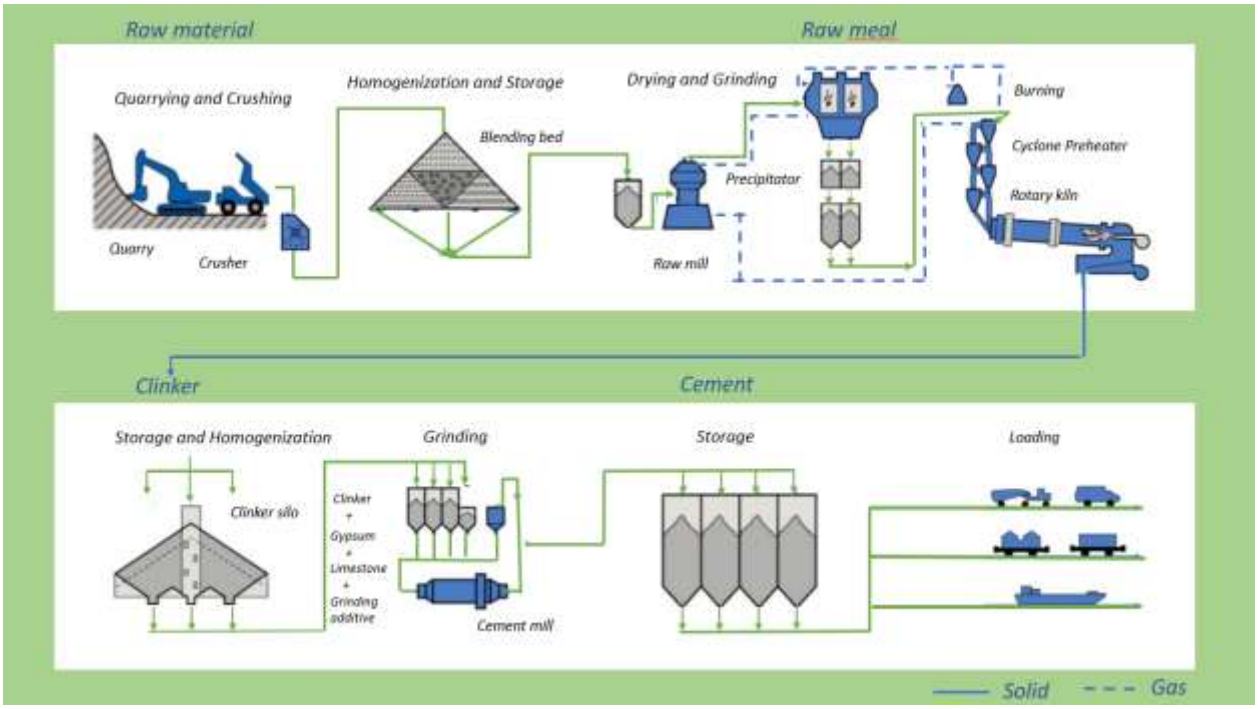
1. **Raw Materials Reception and Storage:** The production process begins with the reception of raw materials. These materials, essential for cement production, are carefully inspected and stored in designated areas within our facility. This initial step ensures that we have a steady and reliable supply of high-quality ingredients for our cement production.

2. **Weighing Raw Materials on the Scales:** Following the reception of raw materials, precise measurements are crucial for achieving the desired quality of cement. Our advanced weighing system accurately measures the required quantities of each raw material according to the specific grinding order and formulation. This meticulous process guarantees the consistency and reliability of our end product.

3. **Mixing and Grinding in Ball Mills:** Once the raw materials are accurately weighed, they undergo a crucial transformation through mixing and grinding. This process takes place in specialized ball mills, where the raw materials are combined and refined. The fineness of the resulting mixture is predetermined through precise settings on the separator and fan. This step is critical in achieving the desired characteristics and properties of the cement.

4. **Manufactured Cement Storage in Silos:** After the meticulous mixing and grinding process, the resulting cement is stored in dedicated silos. These silos are designed to protect the quality and integrity of the manufactured cement until it is ready for further processing or distribution. This storage phase ensures that our cement is readily available and maintains its high quality until it reaches our customers.

The production process is represented in the following system diagram:



In addition, the benefits of energy recovery are granted at this stage. The amount of avoided energy is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the NMD Determination method v1.0 or EcoInvent 3.6 (2019).

Therefore, it will be considered that in this EPD, of all the previously declared cut criteria, only modules **"A1-A3"** are declared; being the minimum required by the EN 15804:2012+A2:2019/AC:2021 standard.

Product classification according to EN 197-1:2011: The product is classified in accordance with EN 197-1:2011 as its composition, specifications and conformity criteria.

Data quality: All process-specific data was collected for the 2023 operating year and is therefore up-to-date.

The data is obtained from the company and verified by **APPLUS - LGAI Technological Center S.A**

The generic data were taken from the database EcoInvent (version 3.6). The data quality assessment covers geography representativeness, technology representativeness and time representativeness, and is based on the data quality criteria from the Annex E, Table E.2 of EN 15804:2012+A2:2019/AC:2021. The data quality overall can be classified as very good. Geographically, the data are Spanish. Temporally, the data are current, thus qualifying as very good. Technically, the same manufacturing systems and machinery is followed.

With regard to the exclusion criteria for inputs and outputs (cut-off rules), what is indicated in the EN 16908:2017+A1:2022 PCR standard is considered, which indicates that If there is not enough information, the energy of the process and the materials that represent less than 1% of the total energy and mass used can be excluded (if they do not cause significant impacts). The sum of all excluded inputs and outputs cannot exceed 5% of the total mass and energy used, as well as the environmental emissions produced. With other criteria, the polluter pays principle, the principle of modularity and that it does not consider the emissions generated in the long term have been considered.

The system's LCA calculation did not consider flows related to the construction of production plants, application machines and employee transport and the study cover at least 95% of the materials and energy per module and at least 99% of the total material and energy use of each unit process.

Allocation:
Whenever allocations could be avoided, primary data have been used. Where this has not been possible, mass-based physical allocations have been used.
The allocation for inputs of materials, such as raw materials or packaging materials, are direct.
The allocation for consumptions, such as energy, water and steam, have been allocated from 2023 production.

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

	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	ES	ES	ES	-													-
Specific data used	>90 % GWP			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

This EPD is representative for one ton cement with the trade name CEM I 52.5 R manufactured at the production site CEMENTOS LA UNIÓN S.A.

The data for CEM I 52.5 R has been used for the calculation as it is one of the main products manufactured by CEMENTOS LA UNIÓN S.A.

The components for CEMENTOS LA UNIÓN, CEM I 52.5 R product are detailed here and his explanation of each phase:

Products Component: Also known as raw material supply, The % for manufacturing one ton of CEM I 52.5 R

Packing Material: It is not included, because the product is sold in bulk.

Ancillary materials: Refers to those materials used during the life cycle of a product, but which are not directly part of the final product.

Energy consumption: Refers to the energy consumed to manufacture one ton of the product. From ES specific energy supplier mix from 2023.

Product components	**Weight, %**	**Post-consumer material, weight, %**	**Biogenic material, weight, % and kg C/kg**
Clinker	92	0	0
Limestone	4	0	0
Gypsum	4	0	0
Gridding additive	0 - 1	0	0
TOTAL	**100**	**0**	**0**
Packaging materials	**Mass per declared unit (kg/ton)**	**Weight, % (versus the product)**	**Weight biogenic carbon, kg C/ton**
None	-	-	-
TOTAL	**-**	**-**	**-**

Hazardous Materials Content:
During the life cycle of the product, no dangerous substance included in the "List of substances candidates for authorization (SVHC)" in a percentage greater than 0.1% of the weight of the product.

RESULTS:
ENVIRONMENTAL INFORMATION

CEM I 52.5 R

Results of the environmental performance indicators

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 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 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.

Disclaimer 2 – 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.

Mandatory impact category indicators according to EN 15804

** 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.*

Results of 1 ton CEM I 52.5 R			
Indicator	**Acronym**	**Unit**	**A1-A3**
GWP-fossil	**Global Warming Potential - fossil fuels**	kg CO_2 eq.	8,90E+02
GWP-biogenic	**Global Warming Potential - biogenic**	kg CO_2 eq.	-7,19E+00
GWP-luluc	**Global Warming Potential - land use and land use change**	kg CO_2 eq.	3,12E-01
GWP-total	**Global Warming Potential - total**	kg CO_2 eq.	8,83E+02
ODP	**Depletion potential of the stratospheric ozone layer**	kg CFC 11 eq.	3,06E-05
AP	**Acidification potential, Accumulated Exceedance**	mol H^+ eq.	2,01E+00
EP-freshwater	**Eutrophication potential, fraction of nutrients reaching freshwater end compartment**	kg P eq.	8,66E-03
EP-marine	**Eutrophication potential, fraction of nutrients reaching marine end compartment**	kg N eq.	5,32E-01
EP-terrestrial	**Eutrophication potential, Accumulated Exceedance**	mol N eq.	6,24E+00
POCP	**Formation potential of tropospheric ozone**	kg NMVOC eq.	1,57E+00
ADP-minerals&metals*	**Abiotic depletion potential for non-fossil resources**	kg Sb eq.	1,51E-03
ADP-fossil*	**Abiotic depletion for fossil resources potential**	MJ	3,48E+03
WDP*	**Water (user) deprivation potential, deprivation-weighted water consumption**	m^3	6,99E+01

Additional mandatory and voluntary impact category indicators

Results of 1 ton CEM I 52.5 R			
Indicator	**Acronym**	**Unit**	**A1-A3**
GWP-GHG[1]	**Global warming Potential – (Fossil fuels – total)**	kg CO_2 eq.	8,83E+02
ETP - fw	**Ecotoxicity, freshwater**	CTUe	5,40E+03
PM	**Particulate Matter**	disease incidence	1,01E-05
HTP - c	**Human toxicity, cancer**	CTUh	1,19E-07
HTP - nc	**Human toxicity, non-cancer**	CTUh	6,00E-06
IR	**Ionizing radiation, human health**	kBq U235 eqv.	1,66E+01
SQP	**Land use**	Pt	8,86E+02

Resource use indicators

Results of 1 ton CEM I 52.5 R			
Indicator	**Acronym**	**Unit**	**A1-A3**
PERE	**Use of renewable primary energy excluding renewable primary energy resources used as raw materials**	MJ	2,91E+02
PERM	**Use of renewable primary energy resources used as raw materials**	MJ	0,00E+00
PERT	**Total use of renewable primary energy resources**	MJ	2,91E+02
PENRE	**Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials**	MJ	3,68E+03
PENRM	**Use of non-renewable primary energy resources used as raw materials**	MJ	0,00E+00
PENRT	**Total use of non-renewable primary energy re-sources**	MJ	3,68E+03
SM	**Use of secondary material**	kg	0,00E+00
RSF	**Use of renewable secondary fuels**	MJ	0,00E+00
NRSF	**Use of non-renewable secondary fuels**	MJ	0,00E+00
FW	**Use of net fresh water**	m^3	1,96E+00

[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.

Waste indicators

Results of 1 ton CEM I 52.5 R			
Indicator	**Acronym**	**Unit**	**A1-A3**
HWD	**Hazardous waste disposed**	kg	2,51E-03
NHWD	**Non-hazardous waste disposed**	kg	1,04E+02
RWD	**Radioactive waste disposed**	kg	1,87E-02

Output flow indicators

Results of 1 ton CEM I 52.5 R			
Indicator	**Acronym**	**Unit**	**A1-A3**
CRU	**Components for re-use**	kg	0,00E+00
MFR	**Material for recycling**	kg	3,13E+01
MER	**Materials for energy recovery**	kg	0,00E+00
EEe	**Exported energy, electricity**	MJ	0,00E+00
EEt	**Exported energy, thermal**	MJ	0,00E+00

Other environmental performance indicators

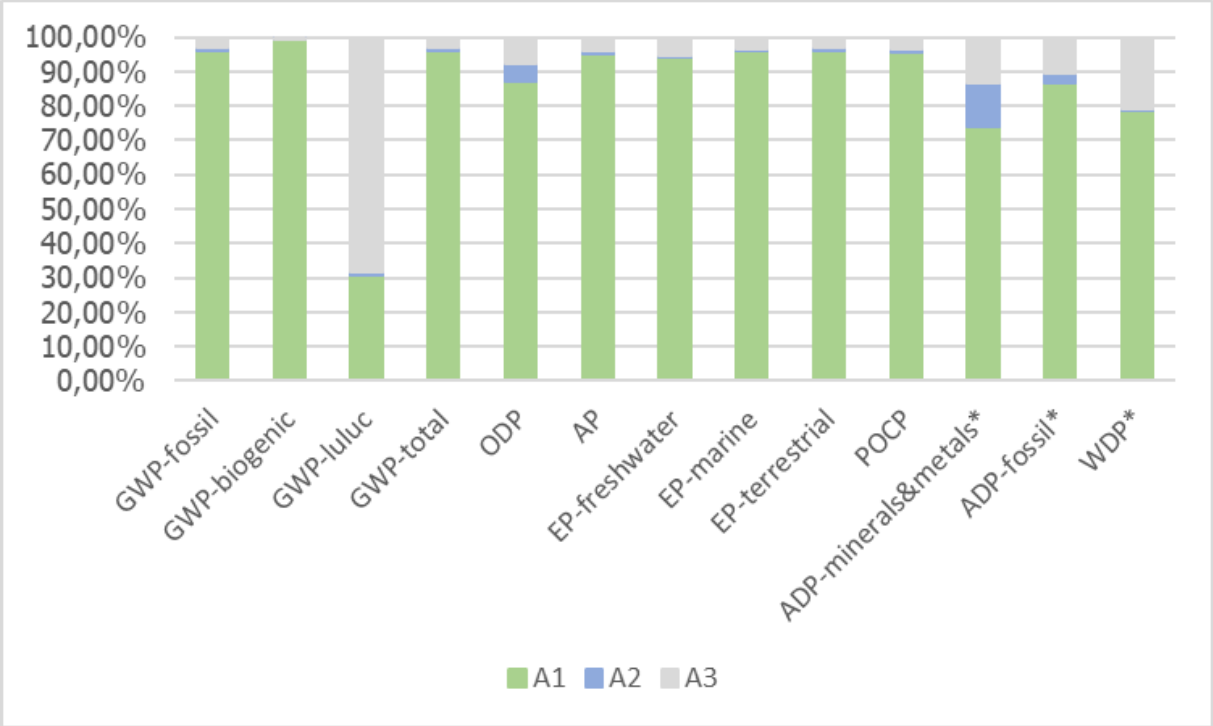
Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	0,00E+00

Estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Interpretation of results

As can be seen in the graph, the raw materials extraction (A1) is the Life cycle stage that causes of the highest impacts of the categories analyzed. Followed by manufacturing activities (A3) at Cementos La Unión location. Pointing out the relevance of the impacts Global Warming Potential – Land use and land use change (GWP-luluc), which accounts for 69% and water depletion portential (WDP), which acounts for 21%.

For the transportation stage (A2), the Life cycle stages that have been more affected are Abiotic depletion potential for non-fossil resources (ADP-minelrs&metals) and Depletion potential of the stratospheric ozone layer (ODP). Accounting a respective impact of 13% and 5%.



Information related to Sector EPD

- This is an individual EPD

Differences versus previous versions

- This is the first version of the EPD.

References

General Programme Instructions of the International EPD® System. Version 4.0

ISO 14040:2006, Environmental management – Life cycle assessment – Principles and Framework.

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

ISO 14025:2011, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products.

EN 16908:2017+A1:2022, Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804:2012+A2:2019/AC:2021

c-PCR-001: Cement and Building lime (EN 16908:2017+A1:2022) | The International EPD® System

PCR 2019:14 Version 1.3.3: Construction products | The International EPD® System

EN 197-1:2011 Cements – Part 1: Composition, specifications and conformity criteria for common cements

LCA report information for the environmental product declaration of CEM I 52.5 R, APPLUS – LGAI Technological Center, 68306 version 2, May 2024

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