DAPHABITAT SYSTEM ENVIRONMENTAL PRODUCT DECLARATION

WWW.DAPHABITAT.PT

[ACCORDING TO ISO 14025, EN 15804:2012+A2:2019 AND EN 15942]

Declaration number: DAP 002:2025

CEM I 52.5R PORTLAND CEMENT - MACEIRA-LIZ

ISSUE DATE: 2025-02-03 **VALID UNTIL: 2030-02-02**

SECIL - COMPANHIA GERAL DE CAL E CIMENTO, S.A.

Cluster Habitat Sustentável

Version 1.4.1. Ed. March 2024

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1. GENERAL INFORMATION

1.1. The DAPHAbitat System

Program operator:	Platform for Sustainable Construction Association www.centrohabitat.net centrohabitat@centrohabitat.net
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@centrohabitat.net
Telephone number:	(+351) 234 401576
Website:	www.daphabitat.pt
Logo	

1.2. EPD owner

Name of the owner:	SECIL - Companhia Geral de Cal e Cimento, S.A.
Production site:	Fábrica Maceira-Liz 2405-019, Maceira-Leiria
Address (head office):	Estrada do Outão, s/n 2901-864 Setúbal
Telephone:	(+351) 217 927 100
E-mail:	apoiotecnico@secil.pt
Website:	www.secil.pt
Logo:	
Information concerning the applicable management Systems:	NP EN ISO 9001 - Quality Management System NP ISO 14001 - Environmental Management System ISO 45001 - Health and Safety Management System EMAS | Eco-Management Audit Scheme
Specific aspects regarding the production:	CAE (economic activity code) 23510 - Manufacture of cement
Organization's environmental policy:	Commitments made by SECIL as part of its Environmental Responsibility and Protection policy: • To ensure a responsible performance standard that makes using natural resources compatible with the maintenance and development of the ecosystems in which the company operates. • To mitigate the impacts of its actions, through adopting the best technologies and best practices available and the appropriate training of its employees. • To promote biodiversity in the territories under its management. To reduce the carbon impact of its activity, including by promoting the use of secondary raw materials and alternative fuels. To provide the public with regular data on its environmental performance.

1.3. Information concerning the EPD

Authors:	Paula Quinteiro Secil – Companhia Geral de Cal e Cimento, S.A.
Contact of the authors:	Address: Universidade de Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal Telephone: 234 370 200 E-mail: p.sofia@ua.pt Address: Estrada do Outão s/n, 2901-864 Setúbal, Portugal E-mail: info.pssg@secil.pt
Issue date:	03/02/2025
Registration date:	14/02/2025
Registration number:	DAP 002:2025
Valid until:	02/02/2030
Representativity of the EPD (location, manufacturer, group of manufacturers):	EPD of one (1) product class, produced in one (1) industrial unit, belonging to one (1) single producer (Secil - Companhia Geral de Cal e Cimento, S.A)
Where to consult explanatory material:	www.secil.pt
Type of EPD:	Cradle-to-gate EPD (A1-A3)

1.4. Demonstration of the verification

External independent verification, accordingly, with the standard ISO 14025:2010 and EN 15804:2012+A2:2019	
Certification Body	Verifier(s)
	
(CERTIF – Associação para a Certificação)	(Marisa Almeida | José Dinis Silvestre)

1.5. EPD Registration

Programme operator

(Plataforma para a Construção Sustentável)

1.6. PCR (product category rules) basic model

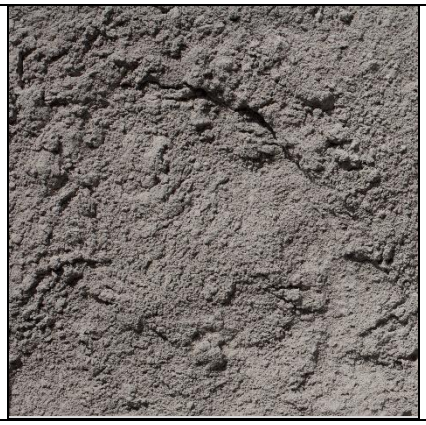
Name:	PCR: Basic module for construction products and services
Issue date:	Edition June 2024
Number of registration on the database:	RCP-mb001
Version:	Version 3.0
Identification and contact of the coordinator (s):	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt José Dinis Silvestre | jose.silvestre@ist.utl.pt
Identification and contact of the authors:	Marisa Almeida | marisa@ctcv.pt Luís Arroja | arroja@ua.pt José Silvestre | jds@civil.ist.utl.pt Fausto Freire Cristina Rocha Ana Paula Duarte Ana Cláudia Dias Helena Gervásio Victor Ferreira Ricardo Mateus António Baio Dias
Composition of the Sectorial Panel:	-
Consultation period:	18/11/2015 - 18/01/2016
Valid until:	01/06/2027

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

1.7. Relevant c-PCR (Complementary product category rules)

Name:	EN 16908:2017+A1 - Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804
Issue date:	March 2022
Number of registration on the database:	EN 16908:2017+A1:2022
Version:	EN 16908:2017+A1, March 2022
Identification and contact of the coordinator (s):	European Committee for Standardisation (CEN)
Identification and contact of the authors:	(…)
Composition of the Sectorial Panel:	(…)
Consultation period:	(…)
Valid until:	(…)

1.8. Information concerning the product/product class

<table>
<tr><td>Identification of the product:</td><td>CEM I 52.5R Portland Cement</td></tr>
<tr><td>Illustration of the product:</td><td>  </td></tr>
<tr><td>Brief description of the product:</td><td>CEM I 52.5R Portland Cement is an extraordinarily high-performance product. It is used to manufacture very high strength, reinforced or pre-stressed concrete and in situations where high strengths are required within 1 or 2 days of application.
CEM I 52.5R Portland cement is produced mainly from Portland clinker with a composition of 95%-100% clinker and 0%-5% other constituents (Table 1 of NP EN 197-1:2012). Most of the clinker comes from SECIL - Maceira-Liz Plant.
The cement does not contain any substance included on the Candidate List of Substances of Very High Concern (SVHC) above the limit for registration with the European Chemicals Agency, i.e. above 0.1 per cent (m/m).</td></tr>
<tr><td>Main technical characteristics of the product:</td><td>Table 1: Chemical, mechanical and physical characteristics of CEM I 52.5R Portland cement.
<table>
<tr><th>Designation</th><th>Units</th><th>CEM II/A-L 42.5R Portland Cement</th><th>Standards</th></tr>
<tr><td>Loss on Burning</td><td>%</td><td>≤ 5.0</td><td>NP EN 196-2</td></tr>
<tr><td>Insoluble Residue</td><td>%</td><td>≤ 5.0</td><td>NP EN 196-2</td></tr>
<tr><td>Sulphate Content (in SO_3)</td><td>%</td><td>≤ 4.0</td><td>NP EN 196-2</td></tr>
<tr><td>Chloride Content</td><td>%</td><td>≤ 0.10</td><td>NP EN 196-2</td></tr>
<tr><td>Compressive strength</td><td>MPa</td><td>First days:
2 days: ≥ 30
7 days: -
Reference: 28 days, ≥ 52.5</td><td>NP EN 196-1</td></tr>
<tr><td>Start of setting</td><td>min</td><td>≥ 45</td><td>NP EN 196-3</td></tr>
<tr><td>Expandability</td><td>min</td><td>≤ 10</td><td>NP EN 196-3</td></tr>
</table></td></tr>
<tr><td>Description of the product's application/use:</td><td>CEM I 52.5R Cement is used in:
ready-mixed or site-made concrete with high initial or final strength;
pre-stressed concrete at very early ages;
concrete cast in cold weather;
heavy prefabrication with high mould turnover.</td></tr>
<tr><td>Placing on the market / Rules of application in the market / Technical rules of the product:</td><td>NP EN 197-1: Composition, specifications and conformity criteria for ordinary cements
Conformity Certification</td></tr>
<tr><td>Quality control:</td><td>Not applicable</td></tr>
<tr><td>Special delivery conditions:</td><td>Not applicable</td></tr>
<tr><td>Components and substances to declare:</td><td>Not applicable</td></tr>
<tr><td>Where explanatory material may be obtained:</td><td>CEM I 52.5R Portland cement is available for sale to the general public.
Product information, see https://www.secil.pt</td></tr>
<tr><td>History of the LCA studies:</td><td>-</td></tr>
</table>

1.9. Calculation rules of the LCA

Functional unit:	Not applicable
Declared unit:	1000 kg of CEM I 52.5R Portland cement
System boundaries:	The evaluated system includes the A1-A3 module (product stage). Section 2.1 provides a more detailed description of the system boundary.
Criteria for the exclusion:	The LCA considered the extraction and processing of natural raw materials, the transport of secondary raw materials (forms of gypsum), the production of auxiliary materials and the energy consumed in manufacturing CEM I 52.5R Portland cement. As the Portland clinker is the main raw material, the extraction and processing of natural raw materials and the transport of secondary raw materials (waste from other industries) were also considered. The waste management processes generated in clinker production (until the end of waste status is reached) for which inventory data is available were considered. The processes not considered in the preparation of the Portland clinker DAP and the Portland cement CEM I 52.5R DAP identified in section 4.4.1 are covered by the exclusion criteria defined in EN 15804:2012+A2:2019+AC and in the RCP - Base Model document, namely if their mass is less than 1% of the total mass of the inputs, and if the total mass of the inputs of the unit processes does not exceed 5% of the mass utilisation of the module considered, example module A1-A3. For Portland cement CEM I 52.5R, filters, sleeves, and grinding bodies were excluded as they correspond to less than 1% of the total mass of inputs in modules A1-A3. For clinker, bag filters, the refractory lining of rotary kilns, lubricating oils and acetylene used in maintenance operations (welding) were excluded from the system boundary. Individually, each excluded process corresponds to a mass of less than 1% of the total mass of inputs and a mass of less than 5% of the total mass of inputs in module A1-A3. In the LCA for Portland cement, it should be noted that energy and water consumption in the administrative areas and the production of wastewater and waste from the system boundary were not included. In addition, environmental loads associated with the construction and maintenance of infrastructure and equipment (capital goods) were excluded.
Assumption and limitations	The results of the environmental impacts and other indicators presented in this EPD refer to the year 2021.
Quality and other characteristics about the information used in the LCA:	The quality of the inventory data was assessed taking into account the criteria of the PEF (Product Environmental Footprint) category rules (section 5.6 of the guide, Menfredi et al., 2012), as indicated in table E.2 (Data quality and criteria from the Product Environmental Footprint Category Rules) of EN 15804:2012+A2:2019+AC and in the guide to the software used, the GCCA EPD Tool for Cement and Concrete (V 4.0), and based on the recommendations of the PCR documents - Base Model. The data quality was broadly classified between reasonable and good on a 5-level qualitative scale from very bad to very good, in line with the data quality requirements - temporal, geographical and technological. The information on CEM I 52.5R Portland cement production is less than 5 years old, using mostly primary data collected directly from SECIL - Maceira – Liz Plant. Real and specific data from the production unit were used for the operations associated with manufacturing CEM I 52.5R Portland cement. The information for background processes not provided by SECIL and over which SECIL has no influence was obtained from generic data in the Ecoinvent database v3.5. These were selected to provide geographical and technological coverage that fulfils the data quality criteria stipulated in Annex E of EN 15804:2012+A2:2019. Electricity production was modelled in the GCCA with information obtained from SECIL's electricity producer and supplier.
Allocation rules:	To determine the inputs and outputs associated only with the production of CEM I 52.5R Portland cement, the procedure for subdividing the unit process was first adopted, following the recommendations of the PCR document - Base Model. Thus, only the operations associated with the production of the product being analysed were taken into account, and operations exclusive to other products were excluded. Then, an allocation procedure was applied for the operations included based on the mass of the different products produced. In the production process of CEM I 52.5R Portland cement, forms of gypsum (secondary raw material) are consumed, i.e., waste recovery from external suppliers. In this case of waste recovery, the "Cut-off" approach was adopted, which is compatible with EN 16908:2017+A1 and the PCR Base Model document.
Software used for the assessment:	GCCA EPD Tool for Cement and Concrete (V 4.0), International version
Background database used for the LCA:	Ecoinvent database version 3.5 published in December 2018; cut-off approach.

Variability of the results of LCA:	The main factor affecting the variability of LCIA results will be the clinker content used in CEM I 52.5R Portland cement production, which can vary from 91.6% to 93.3%, with the average clinker consumption being 92%. This cement composition variability resulted in less than 2 per cent in the LCIA results.
Comparability of EPD for construction products:	EPD for construction products and services may not be comparable if they are not produced in accordance with EN 15804 and EN 15942 and with the comparability conditions determined by ISO 14025.

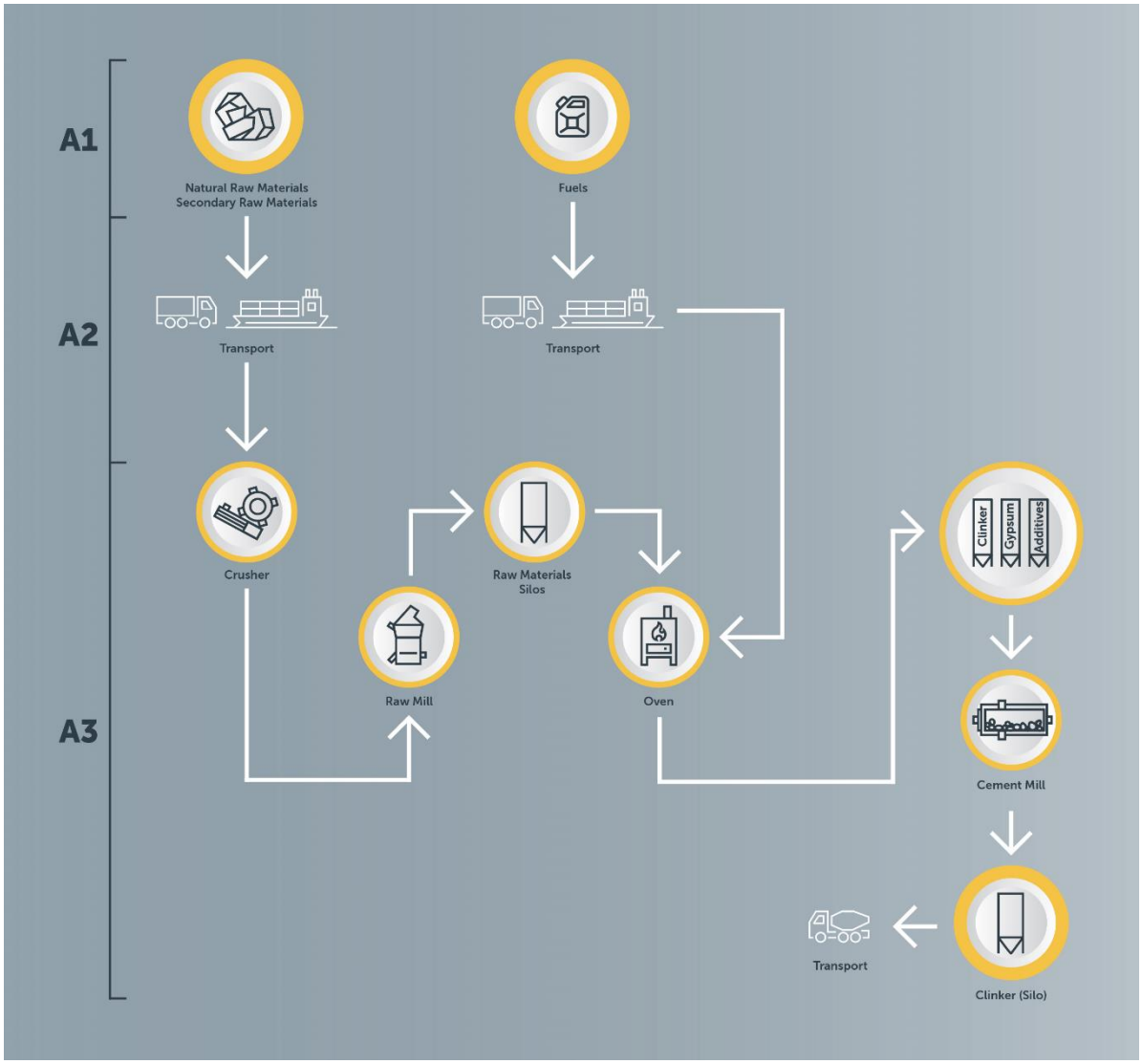
1.10. Use of average environmental performance

Not applicable

1.11. Technical information for Reference Service Life (RSL)

Not applicable

1.12. Flow diagram of input and output of the processes



1 1: Flowchart of the manufacturing process for CEM I 52.5R Portland cement

2. CORE ENVIRONMENTAL IMPACT INDICATORS

2.1. Description of the system boundaries

(✓= included; ND = module not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-constructions, demolition	Transport	Waste processing	Disposal	Re-use, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Module A1-A3 (production stage) of CEM I 52.5R Portland cement encompasses the extraction and processing of primary (natural) raw materials, the production of secondary raw materials, the transport of raw materials, additives, fuels and electricity to the production unit, and the manufacture of Portland cement CEM I 52.5R.

CEM I 52.5R Portland cement production requires clinker, gypsum and limestone as the main raw materials. Most of the clinker, 93%, used to produce I 52.5R Portland cement is produced at SECIL's Maceira-Liz plant. The remaining clinker used to produce the cement in question comes from Secil Pataias and Outão (7%). The limestone comes from quarries. Mining is carried out above ground, on plateaus, starting at the highest level. The plaster comes from external production.

The main raw materials used to produce Secil Portland clinker are marl or clay and limestone. Once the materials are extracted from the quarry, they are in the form of blocks measuring up to $1m^3$, so it is necessary to reduce their size to a dimension compatible with the transportation, storage and supply of the subsequent manufacturing phases; this operation is performed in the crusher. After crushing, the natural raw materials are stored, which is combined with a pre-homogenisation function so that the various uniform stockpiles.

This is followed by raw milling, in which the natural and secondary raw materials (materials derived from waste, e.g. foundry sands, ceramic shards, calcium carbonate sludge, construction and demolition waste, used refractory bricks) are subjected to a drying, milling and homogenising process. Once the proportion of raw materials has been defined, they are transported to mills where the "flour" or “raw” material is produced, i.e. a finely ground mixture, in well-defined proportions, of all the natural and secondary raw materials. At this stage, the raw material is dried using the heat contained in the exhaust gases from the rotary kilns.

This is followed by the preheating stage, in which the raw material is extracted from the storage silos and fed into the preheating system (cyclone tower), where it is heated by the exhaust gases resulting from the burning of the fuels in the rotary kiln.

The raw material then enters the kiln, moving along the kiln due to its rotation and slight inclination, continuing to heat up and carrying out the physical-chemical reactions of the clinker process at a temperature of up to 1450ºC, to ultimately obtain

clinker. As firing is an energy-intensive stage, primary fuels are used, i.e. fossil fuels, as well as secondary fuels (fuels derived from waste, e.g. used tyres, fluff and fuels derived from waste).

From 1450ºC onwards, the clinker begins to cool, still inside the kiln, and is completed in the cooler, where counter-current air is introduced, using this heated air as secondary firing air. In this way, the clinker's thermal content partially recovers to reduce energy consumption in the kilns. Particle matter emissions are controlled by dedusting systems and gas emissions into the air by automated control systems for driving the furnaces. The firing phase produces a powder that comes from a bypass of the gaseous effluent to remove chlorides from the raw material and fuels, which are then treated by a bag filter. This bypass powder is a by-product, partly sold and partly consumed internally in cement production (used as a component in cement mills).

Clinker is stored and then used to produce CEM I 52.5R Portland cement. To minimise diffuse dust emissions, clinker is transported to the mills with bag filters.

The cement is then produced in horizontal tubular mills. Clinker, gypsum (cement setting regulator) and the other constituents are ground (e.g. limestone, gypsum moulds, grinding aids), in well-defined proportions, according to the quality plan, to obtain CEM I 52.5R Portland cement, which is stored in silos. The cement is ground in a closed-circuit using 3rd generation separators. Also, to minimise diffuse dust emissions, the cement mill has bag filters. Spot monitoring of total suspended particulate emissions is carried out.

CEM I 52.5R Portland cement is sold in bulk in a tank for the customer.

The LCA considered the consumption of electricity, gases, and lubricating oils (in the case of clinker production), as well as internal movements in transport screens, such as transporting crushed natural materials to the warehouse.

Just like Portland clinker, cement is produced by the 'dry process', which is very small. However, during the production of Portland clinker, water is consumed through evaporation in the cooling towers that go to the clinker kiln's bag filter. This water comes from our own boreholes and requires treatment with sodium hypochlorite and sodium chloride.

During clinker production, diesel is used for internal movements at Secil. This diesel comes from a diesel refuelling station at the plant. In clinker production, pollutant emissions to rainwater from the hydrocarbon separators associated with the diesel refuelling station and the collection of oily water throughout the plant were therefore considered. The diesel consumption of emergency generators was also considered to guarantee the normal operation of clinker production processes in the event of a temporary power cut. The transport and treatment of waste resulting from the clinker production process, such as waste containing hydrocarbons, was considered.

The production of CEM I 52.5R Portland cement and its subsequent sale in bulk do not generate waste.

2.1.1. Justification for the exemption to declare modules C1, C2, C3, C4 and D

CEM I 52.5 R Portland cement fulfils all the conditions required by EN 15804:2012+A2:2019+AC, EN 16908:2017+A1, to consider the life cycle from cradle to gate, namely:

- cement is physically integrated into concrete, which means that cement and concrete cannot be physically separated at the end of their life;
- the physical and chemical transformation process that cement undergoes throughout its life cycle means that at the end of its life this material is not identifiable;
- the cement does not contain biogenic carbon.

2.2. Core environmental impact indicators

	Global warming potential total; GWP-total	Global warming potential fossil; GWP-fossil	Global warming potential biogenic; GWP-biogenic	Global warming potential land use and land use change; GWP-luluc	Depletion potential of the stratospheric ozone layer; ODP	Acidification potential; AP
Unit	kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CFC 11 eq.	mol H^+ eq.
Module A1-A3	7.97E+02	7.97E+02	5.68E-01	6.90E-02	1.50-05	1.86E+00

LEGEND:
Product stage

Units expressed per declared unit (1000 kg CEM I 52.5R Portland).

	Eutrophication potential aquatic freshwater; EP-freshwater	Eutrophication potential aquatic marine; EP-marine	Eutrophication potential terrestrial; EP-terrestrial	Formation potential of tropospheric ozone; POCP	Abiotic depletion potential for non-fossil resources ADP-minerals&metals	Abiotic depletion potential for fossil resources potential ADP-fossil	Water (user) deprivation potential; WDP
Units	kg P eq.	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m^3 World eq. deprived
Module A1-A3	2.34E-02	1.62E-03	6.25E+00	1.52E+00	1.59E-04	2.87E+03	1.86E+01

LEGEND:
Product stage

L.C.V. - Lower calorific value.
Units expressed per declared unit (1000 kg CEM I 52.5R Portland).
The results obtained for the indicators "Non-fossil Abiotic Depletion Potential (ADP-minerals&metals)", "Fossil Abiotic Depletion Potential (ADP-fossil)" and "Water Deprivation Potential (user) (WDP)" should be used with caution as the uncertainties associated with them are high or there is little experience with the indicator.

2.3. Additional environmental impact indicators

	Potential incidence of disease due to PM emissions PM	Potential Human exposure efficiency relative to U235 IRP	Potential Comparative Toxic Unit for ecosystems ETP-fw	Potential Comparative Toxic Unit for humans, cancer effects HTP-c	Potential Comparative Toxic Unit for humans, not cancer effects HTP-nc	Potential soil quality index SQP
Unit	Disease incidence	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Module A1-A3	4.06E-05	6.52E+03	7.99E+01	1.52E-06	4.19E-05	2.23E+03

LEGEND:

Product stage

L.C.V. - Lower calorific value.
Units expressed per declared unit (1000 kg CEM I 52.5R Portland cemen).
The impact indicator "Potential Human Exposure Efficiency in relation to U235 (IRP)" focuses mainly on the possible impact of a low dose of ionising radiation on human health resulting from the nuclear fuel cycle. It does not consider effects resulting from possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground installations. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.
The results obtained for the indicators "Potential Comparative Toxic Unit for Ecosystems (ETP-fw)", “Potential Comparative Human Toxicity Unit, Carcinogenic (HTP-c)", “Potential Comparative Human Toxicity Unit, Non-Carcinogenic (HTP-nc)" and "Soil Quality Potential Index (SQP)" should be used with caution as the uncertainties associated with them are high or there is little experience with the indicator.

2.4. Indicators describing resource use

	Primary energy					
	EPR	RR	TRR	EPNR	RNR	TRNR
Unit	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.
Module A1-A3	2.94+02	0.00E+00	2.94+02	2.87E+03	0.00E+00	2.87E+03

LEGEND:

Product stage

EPR = use of renewable primary energy excluding renewable primary energy resources used as raw materials; RR = use of renewable primary energy resources used as raw materials; TRR = total use of renewable primary energy resources (EPR + RR); EPNR = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; RNR = use of non-renewable primary energy resources used as raw materials; TRNR = total use of non-renewable primary energy resources (EPRN + RNR)
Units expressed per declared unit (1000 kg CEM I 52.5R Portland cement).

	Secondary materials and fuels, and use of water			
	MS	CSR	CSNR	Net use of fresh water
Unit	kg	MJ, P.C.I.	MJ, P.C.I.	m^3
Module A1-A3	1.12E+02	5.70E+02	7.51E+02	5.05E-01

LEGEND:

Product stage

Units expressed per declared unit (1000 kg CEM I 52.5R Portland cement).

MS = use of secondary material; CSR= use of renewable secondary fuels; CSNP = use of non-renewable secondary fuels; Freshwater = use of the net value of fresh water.

2.5. Other environmental information describing different waste categories

	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed
Unit	kg	kg	kg
Module A1-A3	5.22E-01	9.75E-03	0.00+00

LEGEND:

Product stage

Units expressed per declared unit (1000 kg CEM I 52.5R Portland cement).

The characteristics that make waste hazardous are described in the applicable legislation in force, for example in the European Waste Framework Directive.

2.6. Environmental information describing output flows

	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
Unit	kg	kg	kg	MJ
Module A1-A3	0.00E+00	4.43E-01	3.76E-01	0.00E+00

LEGEND:

Product stage

Units expressed per declared unit (1000 kg CEM I 52.5R Portland cement).
The characteristics that make waste hazardous are described in the applicable legislation in force, for example in the European Waste Framework Directive.

2.7. Information describing the biogenic carbon content at the factory gate

Biogenic carbon content*	Units**	Module A1-A3 (results)
Biogenic carbon content in product	Kg C	Not applicable
Biogenic carbon content in accompanying packaging	Kg C	Not applicable

* 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2.

** This information can be omitted whenever the content of biogenic carbon in the product, or in the respective packaging, is less than 5% of the mass of the product, or the respective packaging.

3. REFERENCES

- ✓ GCCA (2023). GCCA Industry EPD Tool for cement and concrete (V4.0). Global Cement and Concrete Association (GCCA). Quantis, Switzerland.
- ✓ **DAPHabitat System General Instructions**, Version 3.0, June 2024 (at www.daphabitat.pt);
- ✓ **NP ISO 14025:2009** Environmental labelling and declarations - Type III environmental declarations - Principles and procedures.
- ✓ **EN 15804:2012+A2:2019+AC** Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
- ✓ EN 16908:2017+A1 – Cement and building lime – Environmental product declarations – Product category rules complementary to EN15804. Comité Européen de Normalisation.
- ✓ **EN 15942:2021** Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ✓ Manfredi S., Allacker K., Chomkhamsri K., Pelletier N., Maia de Souza D. (2012). Product Environmental Footprint (PEF) Guide. European Commission (EC), Joint Research Centre (JRC), Ispra, Italy.
- ✓ **PCR - Base model for construction products and services.** DAPHabitat System. Version 3.0, 2024 (at www.daphabitat.pt).
- ✓ Secil (2023). Secil CO_2 Manual. Monitoring, calculating and reporting CO_2 emissions. Period 2021-2025. Version 06.