DAPHabitat System Environmental Product Declaration

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

Registration number: **DAP 004:2024**

CEM II/B-M (V-L) 42.5R COMPOSITE PORTLAND CEMENT- MACEIRA-LIZ

Issue date: **2024-05-20** VALID UNTIL: **2029-05-19**

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

Programme operator:	Platform for Sustainable Construction Association www.clusterhabitat.pt geral@clusterhabitat.pt
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@clusterhabitat.pt
Telephone number:	(+351) 234 401 576
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
Email address:	apoiotecnico@secil.pt
Website:	https://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
Organisation'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.
Authors' contact:	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:	20/05/2024
Registration date:	31/05/2024
Registration number:	DAP 004:2024
Valid until:	19/05/2029
Representativity of the EPD (location, product, group of producers):	EDP 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 product information:	https://www.secil.pt
Type of EPD	Cradle-to-gate EPD (A1-A3)

1.4. Demonstration of the verification

Independent external verification in accordance with the NP ISO 14025:2010 and EN 15804:2012+A2:2019 standards	
Certification Body	Verifier (s)
(CERTIF – Associação para a Certificação)	(Marisa Almeida | José Dinis Silvestre)

1.5. EPD Registration

Programme Operator
(Platform for Sustainable Construction)

1.6. PCR (product category rules) basic model

Name:	Base PCR model for construction products and services
Issue date:	Edition August 2023
Number of registration on the database:	RCP-mb001
Version:	Version 2.3
Identification and contact details 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 sector panel:	-
Consultation period:	18/11/2015 - 18/01/2016
Valid until:	01/06/2027

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

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

Name:	EN 16908:2017+A1:2022 - Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804
Issue date:	March 2022
Number of registration on the dataset:	EN 16908:2017+A1:2022 E
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 sector panel:	-
Consultation period:	-
Valid until:	-

1.8. Information concerning the product/product class

<table>
<tr><td>Identification of the product:</td><td>CEM II/B-M (V-L) 42,5R composite Portland cement</td></tr>
<tr><td>Illustration of the product:</td><td>  </td></tr>
<tr><td>Brief description of the product:</td><td>CEM II/B-M (V-L) 42.5R composite Portland cement is a product with good chemical resistance, produced mainly from Portland clinker - with a composition of 65%-79% Portland clinker, 21%-35% fly ash and limestone, 0%-5% minority constituents. Most of the clinker comes from SECIL - Maceira-Liz Plant.
CEM II/B-M (V-L) 42.5R composite Portland cement is a highly versatile product that can be used in various situations and types of concrete and mortar.
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 II/B-M (V-L) 42.5R composite Portland cement.
<table>
<tr><th>Designation</th><th>Units</th><th>CEM II/B-M (V-L) 42,5R Portland Cement</th><th>Standards</th></tr>
<tr><td>Sulphate Content (in SO3)</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: ≥ 20
7 days: -
Reference: 28 days,
≥ 42.5 and ≤ 62.5</td><td>NP EN 196-1</td></tr>
<tr><td>Start of setting</td><td>min</td><td>≤ 60</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 II/B-M (V-L) 42.5R composite Portland cement is used in:
▪ direct and indirect foundations, tunnels, tanks and other elements in moderately to very aggressive environments (water or soils rich in harmful salts);
▪ medium and high-strength ready-mixed or site-made structural concrete;
▪ industrial pavements and surfaces subject to chemical attack;
▪ shotcrete, lightweight concrete and blinding concrete;
▪ lightweight high turnover prefabrication;
▪ concrete for road floors, bases and wear layers;
▪ soil treatment and stabilisation, jetgrouting.</td></tr>
<tr><td>Placing on the market/Rules for application in the market/Technical product standards:</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 II/B-M (V-L) 42.5R composite Portland cement is not available for sale to the general public.
For detailed information on the product, please contact SECIL at info.pssg@secil.pt.</td></tr>
<tr><td>History of LCA studies:</td><td>-</td></tr>
</table>

1.9. Calculation rules of the LCA

Functional unit:	Not applicable
Declared unit:	1000 kg of CEM II/B-M (V-L) 42.5R composite Portland cement
System boundaries:	The system evaluated includes the A1-A3 module (product stage). A more detailed description of the system boundary is given in Section 2.1.
Criteria for the exclusion:	The LCA considered the extraction and processing of natural raw materials, the transport of clinker from Algeria to the Secil Maceira plant, the transport of secondary raw materials (bottom ash and gypsum forms), the production of auxiliary materials and the energy consumed in the manufacture of CEM II/B-M (V-L) 42.5R composite Portland cement. As the Portland clinker produced at Secil 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 taken into account. The waste management processes generated in the production of clinker (until the end of waste status is reached) for which inventory data is available were considered. In Portland clinker, bag filters, refractory lining for rotary kilns, lubricating oils, and acetylene used in maintenance operations (welding), which individually correspond to a mass of less than 1% of the total mass of inputs, were excluded from the system boundary. In the Portland cement compound CEM II/B-M (V-L) 42.5R, grinding bodies were also excluded because correspond to a mass of less than 1% of the total mass of the inputs in module A1-A3. The total mass of input from the unit processes does not exceed 5% of the total mass of inputs in module A1-, and is therefore covered by the exclusion criterion defined in document EN 16908:2017+A1 - Cement and building lime - Environmental product declarations - Product category rules, namely its mass is less than 1% of the total mass of inputs In the LCA for Portland cement, it should be noted that the energy and water consumption of the administrative areas, as well as the production of wastewater and waste from these areas, were not included. In addition, environmental loads associated with the construction and maintenance of infrastructure and equipment (capital goods) were excluded.
Assumptions and limitations:	The results of the environmental impacts and other indicators presented in this EPD refer to the period between May 2022 and June 2023
Quality and other characteristics of 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 quality of the data 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 the production of II/B-M (V-L) 42.5R Portland Cement 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 was used for the operations associated with the process of manufacturing II/B-M (V-L) 42.5R 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 databasev3.5. 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 II/B-M (V-L) 42.5R composite Portland cement, the procedure for subdividing the unit process was first adopted, following the recommendations of the PCR - Base Model document. 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, for the operations included, an allocation procedure was applied based on the mass of the different products produced. In the production process of CEM II/B-M (V-L) 42.5R Portland cement, forms of gypsum (secondary raw material) are consumed, i.e. the recovery of waste 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 LCIA:	The main factor affecting the variability of LCIA results will be the clinker content used in the production of CEM II/B-M (V-L) 42.5R composite Portland cement, which can vary from 69% to 76%, with the average clinker consumption being 73%. This variability in cement composition resulted in a variability of less than 10 per cent in the LCIA results. When assessing the possibility of clinker produced in Algeria being produced at SECIL-Maceira-Liz, there was a variability of less than 15 per cent in the LCIA results.
Comparability of EPD for construction products' EPD:	EPD for construction products and services may not be comparable if they are not produced following EN 15804 and EN 15942 and following 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

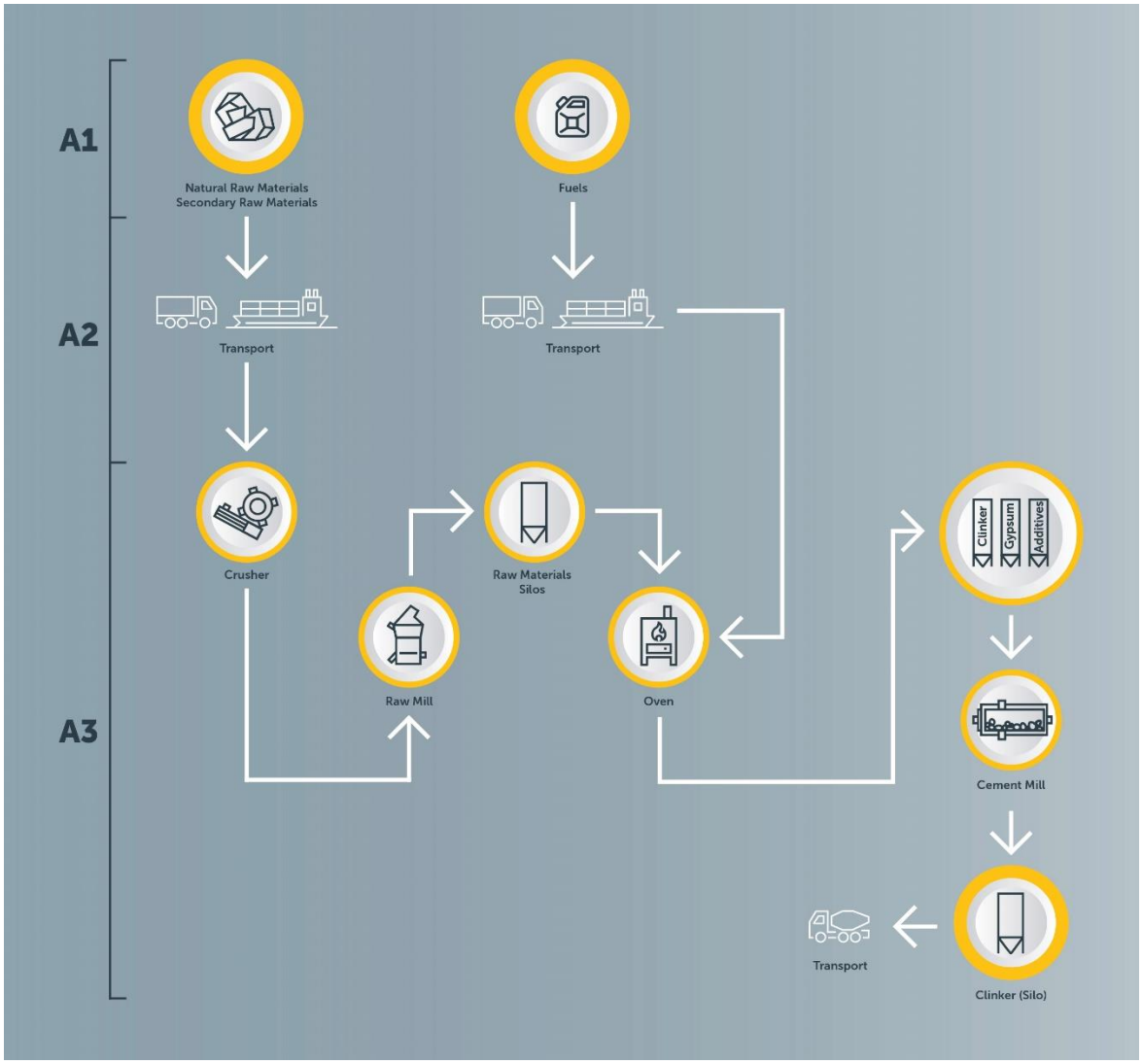

Figure 1: Flowchart of the manufacturing process for CEM II/B-M (V-L) 42.5R Portland cement

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 LOAD BEYOND THE SYSTEM BOUNDARY
Raw materials	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction, demolition	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Module A1-A3 (product stage) of CEM II/B-M (V-L) 42.5R composite Portland cement takes into account 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 CEM II/B-M (V-L) 42.5R composite Portland cement.

The production of CEM II/B-M (V-L) 42.5Rcomposite Portland cement requires clinker, gypsum and limestone as the main raw materials. Most of the clinker, 90 per cent, used to produce CEM II/B-M (V-L) 42.5R Portland cement is produced at SECIL's Maceira plant. The rest of the clinker used to produce the cement in question comes from Secil Pataias (3 per cent), Secil Outão (2 per cent) and clinker from Algeria (5 per cent). 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, there is a partial recovery of the clinker's thermal content 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).

The clinker is stored and then used to produce CEM II/B-M (V-L) 42.5R Portland cement. The transport of clinker to the mills is carried out with bag filters to minimise diffuse dust emissions.

The cement is then produced in horizontal tubular mills. The clinker, gypsum (cement setting regulator), limestone and the other constituents are ground (e.g. bottom ash, gypsum moulds, grinding aid, chromium reducer) in defined proportions, according to the quality plan, to obtain CEM II/B-M (V-L) 42.5R composite 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 II/B-M (V-L) 42.5R Composite Portland cement is sold in bulk in a tank to the group's company.

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, for example, the transport of crushed natural materials to the warehouse.

Just like the production of Portland clinker, cement is produced by the 'dry process' 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 taken into account. The diesel consumption of emergency generators was also taken into account in order 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 II/B-M (V-L) 42.5R composite Portland cement and its subsequent sale in bulk does not result in the generation of waste.

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

CEM II/B-M (V-L) 42.5R composite 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 (module A1-A3), namely:

- cement is physically integrated into concrete, which means that cement and concrete cannot be physically separated at the end of 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	6.53+02	6.53+02	6.27-02	7.11-02	1.46-05	1.57E+00

LEGEND:

Product stage

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R Portland cement).

	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
Unit	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	2.27E-02	1.72E-03	5.10E+00	1.24E+00	2.23E-04	2.56E+03	2.73E+01

LEGEND:

Product stage

P.C.I. – Net calorific value

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R Portland cement).
The results obtained for the indicators "Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)", "Abiotic depletion potential for fossil resources potential (ADP-fossil)" and "Water (user) deprivation potential (WDP)" should be used with caution since 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	Incidence of disease	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Module A1-A3	3.24E-05	8.91E+03	8.20E+01	1.67E-06	3.46E-05	1.34E+03

Legend:

Product stage

P.C.I. – Net calorific value

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R Portland cement).
The life cycle stages (or scenarios) not considered in the study can be eliminated of the table, through the function “eliminate lines” .
The impact indicator “potential human exposure efficiency relative to U235” 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 arising from possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.
The results of the indicators “potential comparative toxic unit for ecosystems (ETP-fw)”, “potential comparative toxic unit for humans, cancer effects”, “potential comparative toxic unit for humans, not cancer effects” and “potential soil quality index” 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 the utilisation of resources

	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	2.09+02	0.00E+00	2.09+02	2.56E+03	0.00E+00	2.56E+03

LEGEND:

Product stage

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R Portland cement).
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);

	Secondary material and fuel, and water use			
	MS	CSR	CSNR	Net use of fresh water
Unit	kg	MJ, P.C.I	MJ, P.C.I	m^3
Module A1-A3	2.15E+02	4.59E+02	6.12+02	7.14E-01

LEGEND:

Product Stage

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R Portland cement).

S = use of secondary material; CSR = use of renewable secondary fuels; CSNR = use of non-renewable secondary fuels.

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	3.95E-01	1.24-02	0,00+00

LEGEND:

Product stage

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R 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. Other environmental information describing output flows

	Components for reuse	Materials for recycling	Materials for energy recovery	Exported energy
Unit	kg	kg	kg	MJ
Module A1-A3	0.00E+00	3.34E-01	2.84E-01	0.00E+00

LEGEND

Product stage

Units expressed per declared unit (1000 kg cement CEM II/B-M (V-L) 42.5R 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**	Modules A1-A3 (results)
Biogenic carbon content in the product	Kg C	0
Biogenic carbon content in accompanying packaging	Kg C	0

* 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 2.0, June 2022 (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 EN 15804 European Committee for Standardisation.
- ✓ **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 2.3, 2023 (at www.daphabitat.pt).
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