

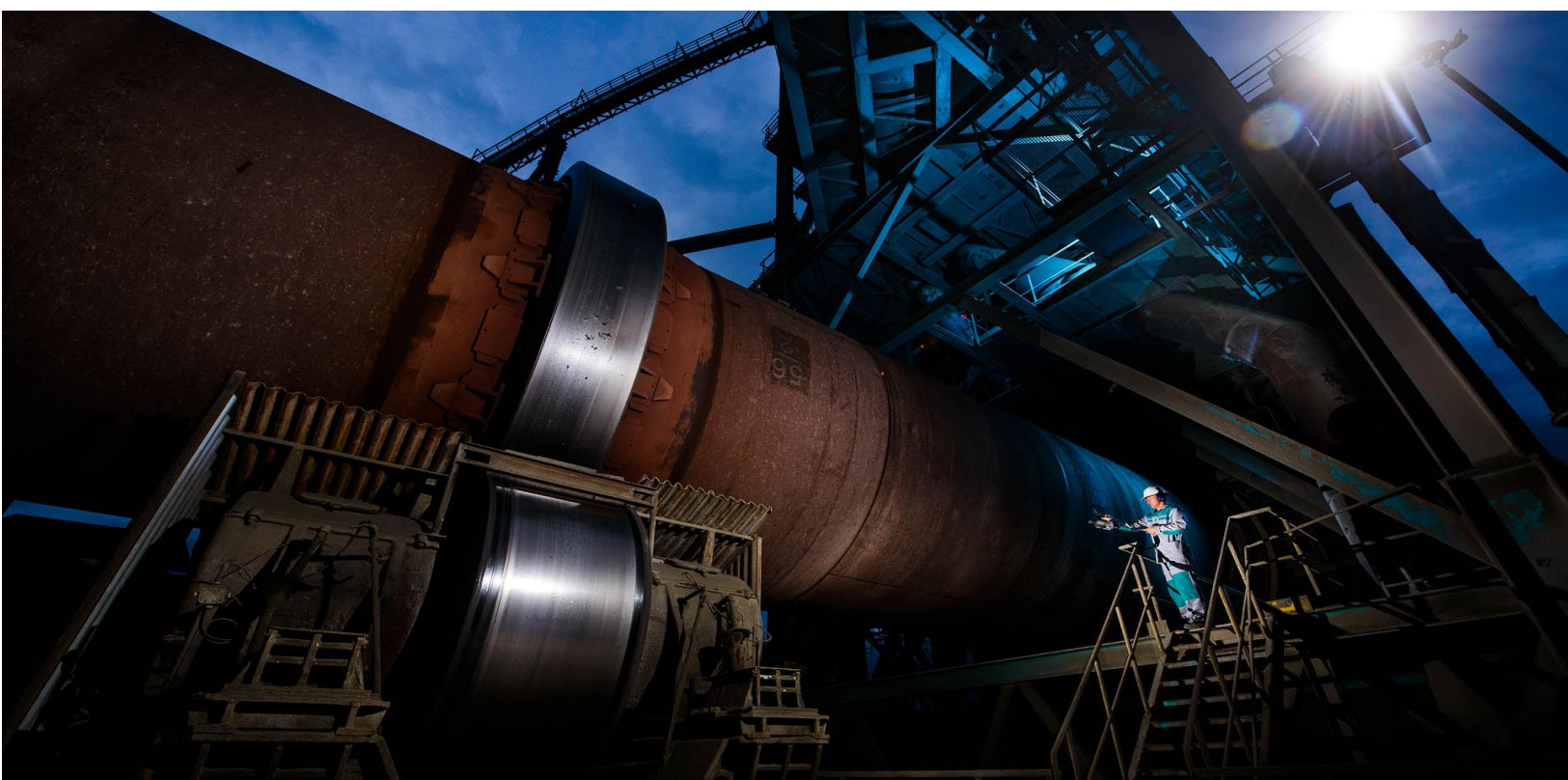
Environmental Product Declaration

Specific EPD

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

CEM I 42,5 R

Považská cementáreň, a.s.



Programme

EPD Square | www.epdsquare.com

Programme operator

EPD Square, s.r.o.

EPD Registration number

SQ 00-003

Publication date

30.07.2024

Valid until

29.07.2029

General information

Product

CEM I 42,5 R

Programme operator

EPD Square,
Karadžičova 16, 811 09, Bratislava, Slovakia
Email: info@epdsquare.com

Registration number

SQ 00-003

Publication date

30.07.2024

Valid until date

29.07.2029

Owner of the declaration

Považská cementáreň, a.s.
Contact person: Marcel Tvrdik
Email: tvrdik.m@pcla.sk

Manufacturer

Považská cementáreň, a.s.
Ul. Janka Kráľa, 018 63 Ladce, Slovakia
Email: tvrdik.m@pcla.sk
Website: <https://www.pcla.sk/sk/stranka/uvod>

Place of production

Ul. Janka Kráľa, 018 63 Ladce, Slovakia

Product Category Rules (PCR)

The CEN standard EN 15804+A2 serves as the core PCR.
In addition, EPD Square PCR v1.0, 2024 is used.

Declared unit (DU)/ Functional Unit

1 tonne

Mass per DU

1000 kg

UN CPC Code

37440

Year of study

2022

Geographical Scope

Europe

Comparability

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in the context of the building.

EPD author

Sarah Curpen, Silvia Vilčeková

Verification type

Independent verification of the declaration and data, according to ISO14025:2006

Internal: ☐

External: ☒

Verified by

Sigita Židonienė, Vesta Consulting UAB



System boundaries

This EPD is based on system boundary cradle to gate (A1-A3).

Modules declared and geographical scope

	Product stage			Constructi on process stage		Use stage							End of life stage				Beyond the system boundary
	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	✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography	SK	SK	SK	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Modules not declared = MND.

Description of organization

Established in 1889, Považská cementáreň produces around 10 types of products. Situated in the heart of the picturesque Považie region, Považská cementáreň has been a pivotal force in the construction and infrastructure development of Slovakia for decades. Committed to environmental stewardship and operational efficiency, Považská cementáreň integrates state-of-the-art technologies and best practices to minimize its ecological footprint while maximizing resource utilization. They currently harness the energy from alternative fuels such as RDF, meat-bone meal and used tires. Through strategic investments in research and development, the company remains at the forefront of sustainable cement production, setting benchmarks for responsible industrial practices.

Product information

Product name

CEM I 42,5 R

Product description

This is a Portland cement of high strength class with high initial strengths. It is especially suitable for strength-demanding structures, concrete of qualitatively higher classes C 30/37 – C 55/67, prestressed concrete, reinforced concrete, concrete products, prefabs and wherever quick demoulding to 24 hours. It enables concreting even in cold and frosty environments, below 5 °C, where it can be processed using special additives. Due to the higher development of heat of hydration, it is not suitable for large volume concreting.

Product specification

Standardized strength (28 days): 42,5-62,5 MPa

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

EN 197-2: 2020 Cement. Part 2: Demonstration of conformity

Geographical scope

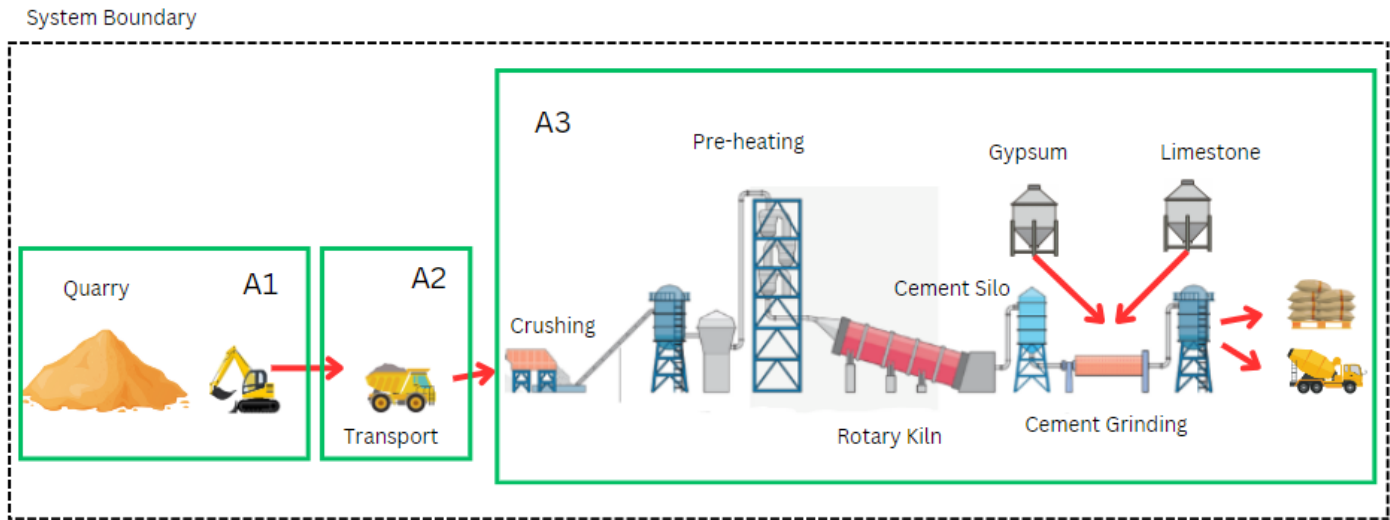
Slovakia

Product content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Clinker	897	0	0
Gypsum	60.1	0	0
Limestone	40.3	0	0
Others	2.6	0	0
TOTAL	1000	0	0

Manufacturing process

The basic raw materials are limestone and marl from the Butkov quarry, which, after grinding with the necessary additives, are ground into a fine meal and dispensed into the rotary kiln system in a controlled manner, and at a temperature of 1450°C Portland clinker is formed, it is then grounded with additives - gypsum, limestone, fly ash and others, and the resulting product is cement.



Life cycle assessment (LCA)

Cut-off criteria

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Allocation, estimations and assumptions

Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 tonne of the products which are used within this study are calculated by considering the total product weight per annual production. In the production plant, several kinds of products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the produced products output fixed to 1 tonne and the corresponding amount of product is used in the calculations.

Database(s) and LCA software

This EPD has been created using One Click LCA Pre-Verified EPD Generator. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data. Characterization factors CML-IA version 4.1 have been used throughout the study.

LCA scenario and additional environmental information

Manufacturing energy scenario

Electricity data source and quality	Electricity, Slovakia, residual mix
Electricity CO ₂ e / kWh	0.23
Energy data source and quality (Coal)	Heat production, at hard coal industrial furnace 1-10MW, Europe
Heat production (coal) kg CO ₂ e / kWh	0.14
Energy data source and quality (Heavy Fuel)	Heat production, heavy fuel oil, at industrial furnace 1MW
Heat production (heavy fuel) kg CO ₂ e / MJ	0.093
Energy data source and quality (Biomass)	Heat production, untreated waste wood, at furnace 1000-5000 kW
Heat production (Biomass) kg CO ₂ e / MJ	-

End of Life (C1-C4, D)

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

LCA results

Mandatory impact category indicators – EN 15804+A2, PEF 3.0

Indicator	Unit	A1	A2	A3	A1-A3
GWP-total	kg CO ₂ eq.	2.9E+00	1.1E+00	1.0E+03	1.0E+03
GWP-fossil	kg CO ₂ eq.	2.9E+00	1.1E+00	1.0E+03	1.0E+03
GWP-biogenic	kg CO ₂ eq.	5.0E-03	4.4E-04	2.5E+00	2.5E+00
GWP-LULUC	kg CO ₂ eq.	1.3E-03	4.2E-04	7.4E-02	7.6E-02
ODP	kg CFC11 eq.	4.0E-07	2.5E-07	3.0E-05	3.0E-05
AP	mol H ⁺ eq.	4.9E-02	4.0E-03	3.1E+00	3.2E+00
EP-freshwater	kg P eq.	3.1E-05	8.0E-06	2.8E-02	2.8E-02
EP-marine	kg N eq.	1.7E-02	1.1E-03	4.8E-01	4.9E-01
EP-terrestrial	mol N eq.	2.4E-01	1.2E-02	5.2E+00	5.4E+00
POCP	kg NMVOC eq.	5.2E-02	4.1E-03	1.4E+00	1.5E+00
ADP-M&M	kg Sb eq.	2.2E-03	3.1E-06	2.1E-05	2.3E-03
ADP-fossil	MJ	3.0E+01	1.6E+01	7.4E+02	7.9E+02
WDP	m ³	1.1E+00	7.7E-02	1.9E+03	1.9E+03

GWP-total: Global Warming Potential; **GWP-fossil:** Global Warming Potential fossil fuels; **GWP-biogenic:** Global Warming Potential biogenic; **GWP-LULUC:** Global Warming Potential land use and land use change; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO₄ eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional voluntary impact indicators – EN 15804+A2, PEF 3.0

Indicator	Unit	A1	A2	A3	A1-A3
PM	Disease Incidence	7.73E-07	1.11E-07	1.91E-05	2.00E-05
IRP	kBq U235 eq.	1.46E-01	8.34E-02	8.87E+02	8.87E+02
ETP-fw	CTUe	1.89E+03	1.39E+01	9.24E+03	1.12E+04
HTP-c	CTUh	1.07E-09	3.88E-10	1.31E-07	1.33E-07
HTP-nc	CTUh	3.34E-08	1.39E-08	3.62E-06	3.66E-06
SQP	[-]	1.18E+02	1.67E+01	4.13E+02	5.48E+02

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

Resource use indicators

Parameter	Unit	A1	A2	A3	A1-A3
RPEE	MJ	9.8E-01	2.2E-01	9.9E+02	9.9E+02
RPEM	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TPE	MJ	9.8E-01	2.2E-01	9.9E+02	9.9E+02
NRPE	MJ	3.0E+01	1.6E+01	2.2E+04	2.2E+04
NRPM	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TRPE	MJ	3.0E+01	1.6E+01	2.2E+04	2.2E+04
SM	kg	7.1E-01	5.1E-03	5.2E-02	7.7E-01
RSF	MJ	1.6E-03	5.0E-05	4.9E-04	2.1E-03
NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	m ³	2.6E-02	2.2E-03	2.2E+01	2.2E+01

RPEE: Renewable primary energy resources used as energy carrier; **RPEM:** Renewable primary energy resources used as raw materials; **TPE:** Total use of renewable primary energy resources; **NRPE:** Non-renewable primary energy resources used as energy carrier; **NRPM:** Non-renewable primary energy resources used as materials; **TRPE:** Total use of non-renewable primary energy resources; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **W:** Use of net fresh water

Waste indicators

Parameter	Unit	A1	A2	A3	A1-A3
HW	kg	8.8E-02	1.9E-02	4.7E+01	4.7E+01
NHW	kg	1.2E+00	3.3E-01	1.2E+03	1.2E+03
RW	kg	1.8E-04	1.1E-04	3.4E-01	3.4E-01

HW: Hazardous waste disposed; NHW: Non-hazardous waste disposed; RW: Radioactive waste disposed

Output flow indicators

Indicator	Unit	A1	A2	A3	A1-A3
CR	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MR	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MER	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ETE	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00

CR: Components for reuse; MR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported electric energy; ETE: Exported thermal energy

Information describing the biogenic carbon content at factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	-
Biogenic carbon content in the accompanying packaging	kg C	-

Specific data (GWP-GHG) and data variation for A1-A3

Specific data and data variation	
Specific data	>90%
Variation - product	Not relevant
Variation - site	Not relevant-

Hazardous substances

☒ The product does not contain any REACH SVHC substances in amounts greater than 0.1 %

Contact information

Programme operator

EPD Square, s.r.o.
Karadžičova 16, 811 09, Bratislava, Slovakia
Email: info@epdsquare.com

EPD owner

Považská cementáreň, a.s.
Contact person: Marcel Tvrdik
Email: tvrdik.m@pcla.sk

Author of Life Cycle Assessment (LCA)

Sarah Curpen, Silvia Vilčeková
Email: curpen@salvis.sk, vilcekova@salvis.sk

EPD verifier

Sigita Židonienė, Vesta Consulting UAB
Email: sigita@vestaconsulting.lt

LCA software

OneClickLCA

Bibliography

ISO 14020:2000

Environmental labels and declarations – General principles

ISO 14025:2010

Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2006

Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006

Environmental management - Life cycle assessment - Requirements and guidelines

EN 15804:2012+A2:2019

Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products

ISO 21930:2007

Sustainability in building construction - Environmental declaration of building products

EPD Square PCR v.1.0, 2024

EPD Square, General Programme Instructions v.1, 2024

Ecoinvent database v3.8 (2021) and One Click LCA database

LCA background report 26.2.2024

Annex

Environmental impacts – EN 15804+A1, CML/ISO 21930

Indicator	Unit	A1	A2	A3	A1-A3
GWP	kg CO ₂ e	2.9E+00	1.0E+00	1.0E+03	1.0E+03
ODP	kg CFC11e	3.2E-07	2.0E-07	2.4E-05	2.4E-05
AP	kg SO ₂ e	3.3E-02	3.2E-03	2.6E+00	2.7E+00
EP	kg PO ₄ e	8.3E-03	7.1E-04	1.0E+00	1.0E+00
POCP	kg Ethenee	6.7E-04	1.3E-04	1.0E-01	1.0E-01
ADP-non fossil	kg Sbe	1.1E-05	3.1E-06	1.7E-03	1.7E-03
ADP-fossil	MJ	3.0E+01	1.6E+01	2.2E+04	2.2E+04

GWP: Global Warming Potential; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO₄ eq. **EP:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **POCP:** Formation potential of tropospheric ozone; **ADP-non fossil:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources;

Environmental impacts – GWP-GHG

Indicator	Unit	A1	A2	A3	A1-A3
GWP - GHG	kg CO ₂ e	2.9E+00	1.1E+00	1.0E+03	1.0E+03

GWP- GHG: Global Warming Potential, greenhouse gases