

epd square .



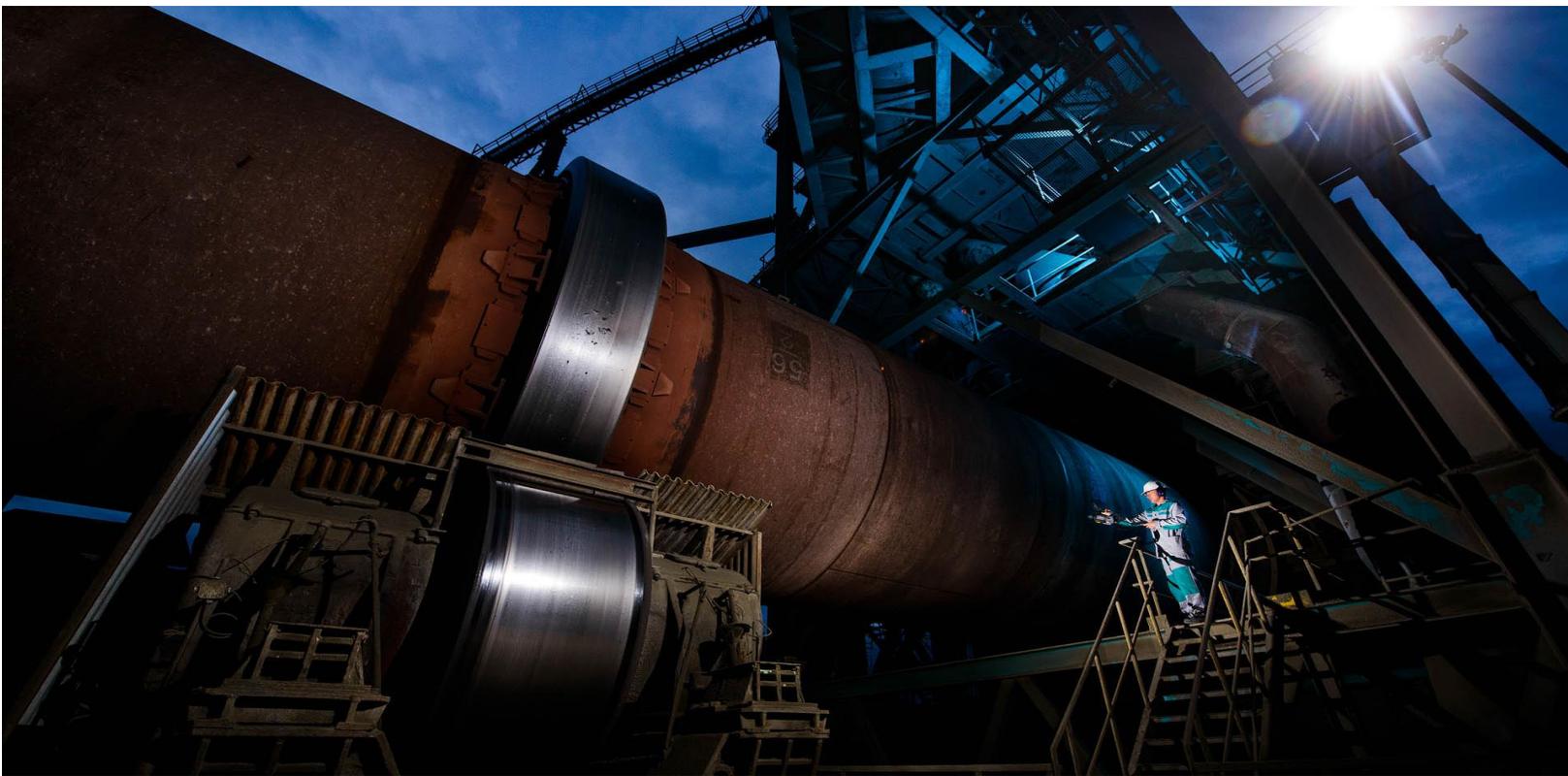
## Environmental Product Declaration

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](http://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](mailto: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](mailto:tvrdik.m@pcla.sk)

### Manufacturer

Považská cementáreň, a.s.  
Ul. Janka Kráľa, 018 63 Ladce, Slovakia  
Email: [tvrdik.m@pcla.sk](mailto: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

Module	Product stage			Construction 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
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

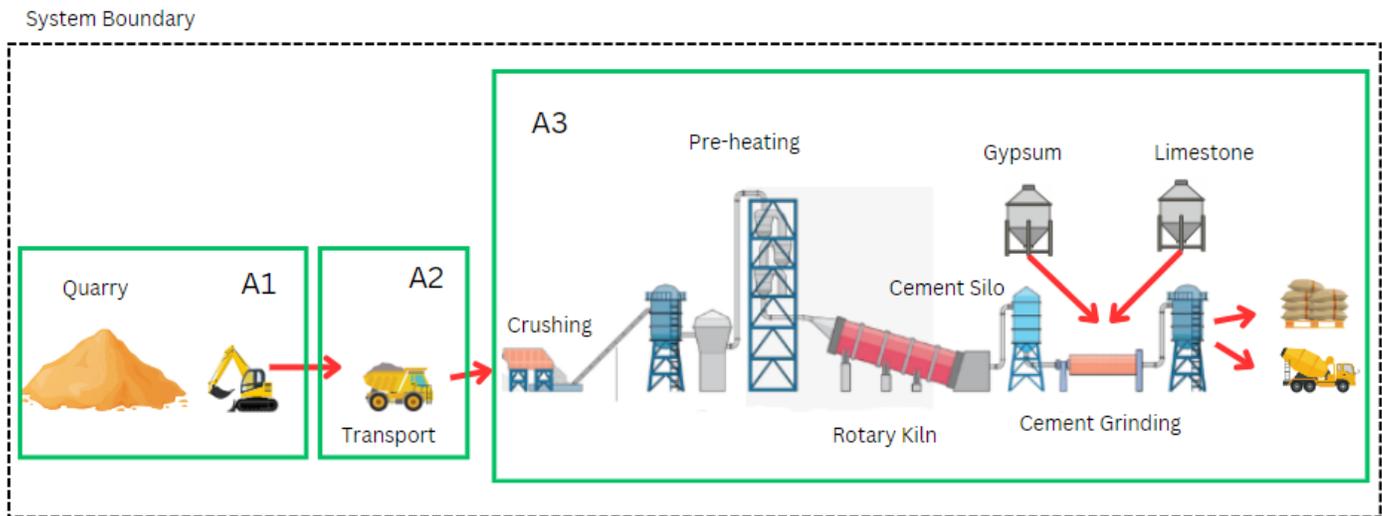
Slovakia

## 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 <sub>2e</sub> / kWh	0.23
Energy data source and quality (Coal)	Heat production, at hard coal industrial furnace 1-10MW, Europe
Heat production (coal) kg CO <sub>2e</sub> / 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 <sub>2e</sub> / MJ	0.093
Energy data source and quality (Biomass)	Heat production, untreated waste wood, at furnace 1000-5000 kW
Heat production (Biomass) kg CO <sub>2e</sub> / 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 CO2 eq.	2.9E+00	1.1E+00	1.0E+03	1.0E+03
GWP-fossil	kg CO2 eq.	2.9E+00	1.1E+00	1.0E+03	1.0E+03
GWP-biogenic	kg CO2 eq.	5.0E-03	4.4E-04	2.5E+00	2.5E+00
GWP-LULUC	kg CO2 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 <sup>+</sup> 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 <sup>3</sup>	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 <sup>3</sup>	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**

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Karadžičova 16, 811 09, Bratislava, Slovakia  
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### **EPD owner**

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### **EPD verifier**

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Email: [sigita@vestaconsulting.lt](mailto: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 CO2e	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 SO2e	3.3E-02	3.2E-03	2.6E+00	2.7E+00
EP	kg PO4e	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 CO2e	2.9E+00	1.1E+00	1.0E+03	1.0E+03

**GWP- GHG:** Global Warming Potential, greenhouse gases