epd square .

Environmental Product Declaration

Average EPD

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

CEM II/B-M (V-LL) 42,5 N
CEM II/B-M (V-LL) 32,5 N
CEM II/B-M (V-LL) 32,5 R

Danucem Slovensko a.s.



Programme
EPD Square | www.epdsquare.com

Programme operator
EPD Square, s.r.o.

EPD Registration number
SQ 00-025

Publication date
21.03.2025

Revision date
01.12.2025

Valid until
20.03.2030

epd square .

General information

Product
CEM II/B-M (V-LL) 42,5 N

CEM II/B-M (V-LL) 32,5 N

CEM II/B-M (V-LL) 32,5 R

Program operator
EPD Square, s.r.o.
Lermontovova 3
811 05 Bratislava
Slovakia
Email: info@epdsquare.com

Registration number
SQ 00-025

Publication date
21.03.2025

Valid until date
20.03.2030

Owner of the declaration
Danucem Slovensko a.s.
Contact person: Róbert Polc
Email: robert.polc@danucem.com

Manufacturer
Danucem Slovensko a.s.
906 38 Rohožník, Slovak Republic
www.danucem.com

Place of production
Danucem Slovensko a.s.
906 38 Rohožník, Slovak Republic

Product Category Rules (PCR)
EPD Square PCR v1.0, 2024

Declared unit
1 t

Mass per DU
1000 kg

UN CPC code
37440

Geographical scope
Europe

Year of study
2023

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
Ľudmila Vaculová Mečiarová, Silvia Vilčeková, EPD Clarity, s.r.o.

Verification type
Independent verification of the declaration and data, according to ISO14025:2006
Internal: ☐
External: ☒

Verified by
Mari Kirss



The owner of the declaration shall be liable for the underlying information and evidence.
EPD Square shall not be liable with respect to manufacturer, life cycle assessment data and evidence.

System boundaries

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

Modules declared and geographical scope

	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography	EU	SK	EU	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Modules not declared = MND

Description of Organization

DANUCEM Slovensko a.s. is the largest producer and supplier of building materials - cement, aggregates and ready-mixed concrete and related services in Slovakia. Premium quality cements are produced in DANUCEM cement plants Rohožník and Turňa nad Bodvou. DANUCEM Slovensko a.s. has implemented the quality management system EN ISO 9001, the environmental management system EN ISO 14001 and the occupational health and safety management system EN ISO 45001. For DANUCEM and CRH Company sustainability is the key value and we commit us to the highest standards of environmental management in all our activities. Our management systems are implemented optimally and checked regularly, with respect to the best available practices in this industry. Sharing of knowledge in the DANUCEM Group plays a significant role in this process. Our policy, applied in all our groups, obliges us to:

• to follow all relevant environmental regulations,
• to improve environmental management in order to achieve the best practices,
• to monitor and report on the performance of environmental management in accordance with our policy,
• to maintain open communication and ensure that our employees and contractors carry out their environmental obligations,
• to handle challenges of the climate change proactively,
• to prevent environmental pollution, reduce emissions and optimize the consumption of energy, water and other natural resources,
• to promote sustainable products, processes and new business innovations,
• to develop positive relationships with other parties and to aim to be good neighbors in every community in which we operate.

Product information

Product name
CEM II/B-M (V-LL) 42,5 N, CEM II/B-M (V-LL) 32,5 N, CEM II/B-M (V-LL) 32,5 R

Product description
Portland composite cement strength class of 42,5 R with high initial strength – guaranteed minimum compressive strength of 42,5 MPa after 28 days

Advantages:
- excellent workability
- excellent compatibility with plasticizing additives
- low volume changes

Product application
- production of plain concrete in residential and civil construction, as well as concrete of higher-strength classes and reinforced concrete structures
- building structures with required higher initial strength
- manufacture of building components and concrete goods

Geographical scope
Europe

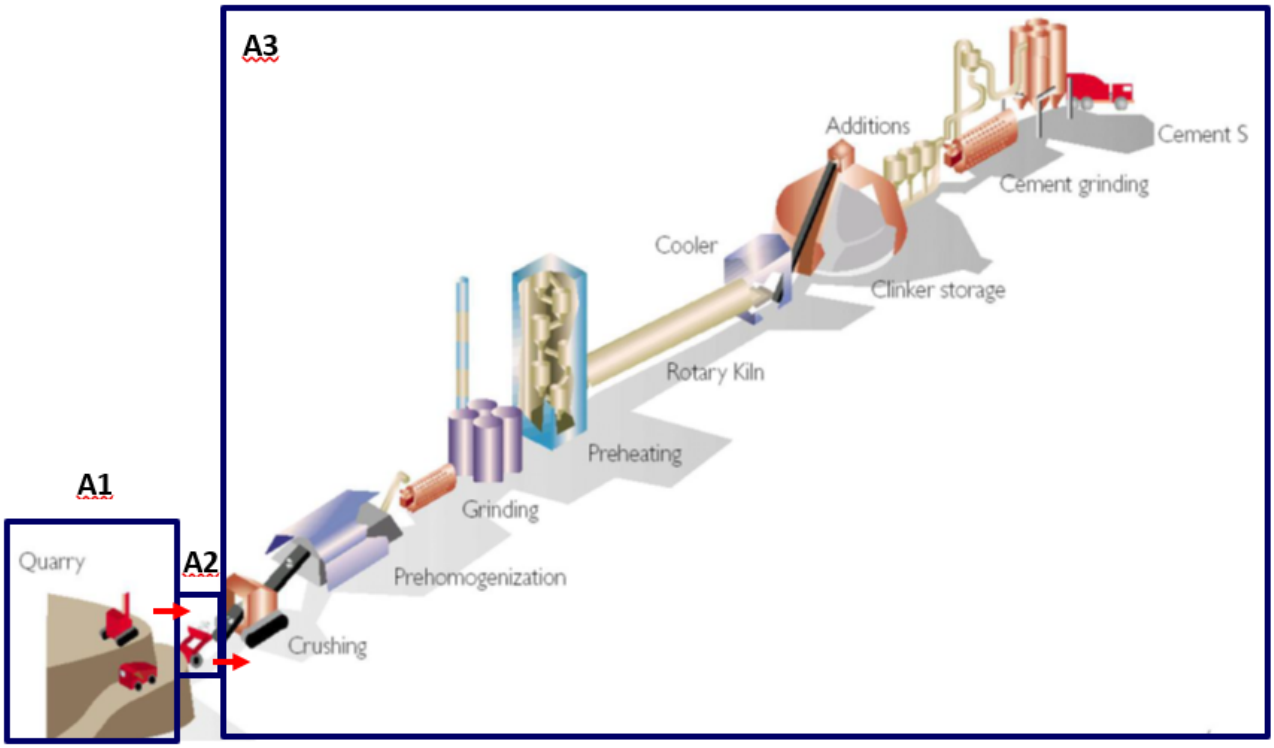
Product contents information
Product composition based on EN 197-1:2011:

Product components	Weight, %	Post-consumer material, weight-%	Renewable material, weight-%
Clinker	65 - 79	12	0
Limestone Fly ash	21 - 35	0	0
Others	0 - 5	0	0
TOTAL	100	12	0

Packaging materials	Weight, kg	Weight-% (versus the product)
Paper bags	19,3	1,93
Packaging film	0,7	0,07
Wooden pallets	10,1	1,01
TOTAL	30,1	3,01

Cements of CEM II/B-M (V-LL) 42,5 N, CEM II/B-M (V-LL) 32,5 N, and CEM II/B-M (V-LL) 32,5 R meet the requirements of Decree No. 275/2004 on Reduced Cr6+ Content.

Manufacturing process



Life cycle assessment

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 materials 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 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.

Module A1: This stage considers the extraction and processing of all raw materials. Within the product stage accurate data has been used. In the case of absence in the database, it was modelled as close to reality as possible using proxy, representative datapoint.

Module A2: This stage account for transport activities.

Module A3: In the plant, electricity, natural gas, petroleum coke, alternative fuels and diesel are allocated on yearly consumption.

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.

LCA Scenarios and additional technical information

Manufacturing energy scenario

Electricity data source and quality	Electricity, Slovakia, residual mix
Electricity kg CO_2e / kWh	0.23
Energy data source and quality	Heat production, natural gas, at industrial furnace >100kW
Heating kg CO_2e / MJ	0.0712
Energy data source and quality	Heat, from municipal waste incineration to generic market for heat district or industrial, other than natural gas
Heating kg CO_2e / MJ	0.0
Energy data source and quality	Heat production, wood chips from post-consumer wood, at furnace 300kW
Heating kg CO_2e / MJ	0.0055
Energy data source and quality	Heat production, at hard coal industrial furnace 1-10MW
Heating kg CO_2e / MJ	0.14
Energy data source and quality	Diesel, burned in building machine
Energy for mechanisms within the plant kg CO_2e / MJ	0.0919

End of Life (C1, C3, C4)

The end-of-life modules (C1-C4, D) are omitted as the material fulfils the exemption criteria based on EN 15804+A2. End of life scenarios for cement can be found in EPD for concrete and mortar.

LCA results

Core environmental impact indicators – EN 15804+A2

Indicator	Unit	A1	A2	A3	A1-A3
GWP-total	kg CO_2 eq.	1,09E+02	9,90E+00	3,99E+02*	5,18E+02*
GWP-fossil	kg CO_2 eq.	1,09E+02	9,89E+00	3,99E+02*	5,18E+02*
GWP-biogenic	kg CO_2 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-LULUC	kg CO_2 eq.	5,49E-02	4,15E-03	1,70E-02	7,60E-02
ODP	kg CFC11 eq.	5,75E-06	2,27E-06	3,14E-06	1,12E-05
AP	mol H^+ eq.	4,06E-01	2,84E-02	8,19E-01	1,25E+00
EP-freshwater	kg P eq.	2,25E-03	7,67E-05	2,53E-03	4,86E-03
EP-marine	kg N eq.	1,00E-01	5,64E-03	1,66E-01	2,72E-01
EP-terrestrial	mol N eq.	1,21E+00	6,27E-02	1,84E+00	3,11E+00
POCP	kg NMVOC eq.	2,97E-01	2,39E-02	4,88E-01	8,09E-01
ADP-M&M	kg Sb eq.	2,13E-03	3,55E-05	3,55E-05	2,31E-03
ADP-fossil	MJ	7,33E+02	1,47E+02	1,89E+03	2,77E+03
WDP	m^3	2,37E+01	7,14E-01	1,21E+02	1,46E+02

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

*Net values are declared for GWP indicators in A1-A3. The GWP indicator (A1-A3) for the cement content excludes 62,81 kg CO_2 eq. from the combustion of fossil part of alternative fuels during clinker production. In accordance with the "polluter pays" principle / EN 15804 /, the emissions will be added to the production system that caused the waste. The gross GWP-total as well as GWP-fossil, including the contribution from alternative fuels is 581 kg CO_2 eq. per ton cement.

Additional (optional) environmental impact indicators – EN 15804+A2, PEF 3.0

Indicator	Unit	A1	A2	A3	A1-A3
PM	Disease incidence	3,15E-06	7,91E-07	3,08E-05	3,47E-05
IRP	kBq U235 eq.	7,12E+00	7,82E-01	5,71E+01	6,50E+01
ETP-fw	CTUe	3,46E+03	1,24E+02	3,32E+03	6,90E+03
HTP-c	CTUh	2,45E-08	3,76E-09	3,32E-08	6,14E-08
HTP-nc	CTUh	9,02E-07	1,20E-07	1,69E-06	2,71E-06
SQP	Dimensionless	2,95E+02	1,03E+02	1,49E+02	5,47E+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

Use of Natural Resources

Parameter	Unit	A1	A2	A3	A1-A3
RPEE	MJ	6,21E+01	2,31E+00	8,13E+01	1,46E+02
RPEM*	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	6,21E+01	2,31E+00	8,13E+01	1,46E+02
NRPE	MJ	7,33E+02	1,47E+02	1,89E+03	2,77E+03
NRPM*	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	7,33E+02	1,47E+02	1,89E+03	2,77E+03
SM	kg	1,19E+02	4,96E-02	9,58E-02	1,19E+02
RSF	MJ	2,20E-03	5,45E-04	5,82E+02	5,82E+02
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m^3	6,20E-01	1,95E-02	1,43E+00	2,07E+00

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

**Primary energy resources used as materials were balanced within the system boundaries*

End of life – Waste

Parameter	Unit	A1	A2	A3	A1-A3
HW	KG	2,79E+00	1,76E-01	6,28E+00	9,25E+00
NHW	KG	1,00E+02	3,24E+00	8,59E+02	9,63E+02
RW	KG	3,13E-03	1,00E-03	2,21E-02	2,63E-02

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

End of life – Output flows

Parameter	Unit	A1	A2	A3	A1-A3
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	0,00E+00	0,00E+00	2,35E-01	2,35E-01
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

Information describing biogenic carbon content at factory gate

Biogenic carbon content	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in the accompanying packaging	0,097	kg C

*Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2

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

Specific data and data variation	
Specific data	24%
Variation - product	0%
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.
Lermontovova 3
811 05 Bratislava
Slovakia
Email: info@epdsquare.com

EPD owner
Danucem Slovensko a.s.
Email: robert.polc@danucem.com
Website: www.danucem.com

Author of Life Cycle Assessment (LCA)
Ľudmila Vaculová Mečiarová, Silvia Vilčeková,
EPD Clarity, s.r.o.
Email: meciarova@salvis.sk, vilcekova@salvis.sk

EPD verifier
Mari Kirss
Email: mari.kirss@meetripuu.ee

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 21930:2017
Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

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

Annex

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

Indicator	Unit	A1	A2	A3	A1-A3
GWP	kg CO_2 eq.	1,08E+02	9,80E+00	3,98E+02*	5,16E+02*
ODP	kg CFC11 eq.	4,89E-06	1,80E-06	2,53E-06	9,21E-06
AP	kg SO_2 eq.	3,07E-01	2,33E-02	6,71E-01	1,00E+00
EP	kg PO_4 eq.	1,05E-01	5,15E-03	1,76E-01	2,86E-01
POCP	kg C_2H_4 eq.	1,12E-02	1,17E-03	3,98E-02	5,21E-02
ADP-M&M	kg Sb eq.	3,13E-04	3,46E-05	1,48E-04	4,96E-04
ADP-fossil	MJ	7,33E+02	1,47E+02	1,89E+03	2,77E+03

Environmental impacts – GWP-GHG

Indicator	Unit	A1	A2	A3	A1-A3
GWP - GHG	kg CO_2e	1,09E+02	9,90E+00	3,99E+02*	5,18E+02*

GWP- GHG: Global Warming Potential, greenhouse gases - This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

Revision Note – 01 December 2025

This study was revised and updated on 01 December 2025. The gross GWP values have been replaced with net values in the Core Environmental Impact Indicators table, Environmental impacts – EN 15804+A1 table, and Environmental impacts – GWP-GHG table.