

Environmental Product Declaration

Average EPD

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

Sand & Gravel

Danucem Slovensko a.s.



Programme

EPD Square | www.epdsquare.com

Programme operator

EPD Square, s.r.o.

EPD Registration number

SQ 00-058

Publication date

01.02.2026

Valid until

31.01.2031

General information

Product

Sand & Gravel

Program operator

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Registration number

SQ 00-058

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Owner of the declaration

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Manufacturer

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

Gravel pit - Veľké Úľany
Nové Osady 925 22, Veľké Úľany, Slovakia

Gravel pit - Geča
Geča 359, 044 10 Geča, Slovakia

Product Category Rules (PCR)

EPD Square PCR v1.0.1, 2025

Declared unit

1 t

Mass per DU

1000 kg

UN CPC code

153

Geographical scope

Europe

Year of study

2024

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

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Verification type

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

Verified by

Shai Ben Aharon, KVS



*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). The Reference Service Life (RSL) of the product is 50 years.

Modules declared and geographical scope

	Product stage			Constructi on 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
Geographic scope	SK	SK	SK	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MND = Modules not declared.

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 aggregates are produced in DANUCEM quarries in Jablonica, Hubina, Čachtice and Mníchova Lehota and also sand & gravel pits in Veľké Úľany and Geča. 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 Slovensko a.s. 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 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 neighbours in every community in which we operate.

Product information

Product name

Sand and gravel

Product description

This LCA focuses on aggregates made entirely from natural materials — sand and gravel. Aggregates are categorized by particle size and consistency, and divided into:

Natural aggregates: sand and gravel

Crushed aggregates: stone chippings and crushed stone

They are typically supplied as homogeneous bulk products with standardized characteristics to ensure reliability and ease of processing.

Types and Sizes:

Sand: fine mineral particles (0/2 mm, 0/4 mm)

Gravel: loose rock fragments (4/8 mm, 8/16 mm, 16/22 mm, 22/63 mm)

Technical specifications

Sand and gravel are unconsolidated granular materials used extensively in concrete, asphalt, drainage systems, and as fill material.

Technical Parameters

- Grain Size Distribution:
 - Sand: 0.063 mm to 2 mm
 - Gravel: 2 mm to 63 mm
- Shape and Texture:
 - Rounded to sub-angular particles; affects workability and compaction.
- Mineralogy: Primarily quartz (SiO_2), with feldspar and other silicates.
- Cleanliness: Must meet limits for fines and clay content (e.g., <3% fines for concrete use).
- Specific Gravity: Typically 2.65–2.70

Physical Parameters

- Bulk Density:
 - Sand: ~1.5–1.7 g/cm³ (loose), ~1.6–1.9 g/cm³ (compacted)
 - Gravel: ~1.6–1.8 g/cm³ (loose), ~1.8–2.0 g/cm³ (compacted)
- Porosity: ~25–40% depending on gradation and compaction.
- Moisture Content: Varies with environmental conditions; typically <5%.
- Permeability: High, especially for well-graded gravel.

Product application

Aggregates are widely used across industries, primarily in:

- Concrete and asphalt production
- Road and railway construction
- As filter and fill materials

Product standards

Both crushed stone and sand & gravel production must adhere to rigorous quality control protocols as defined by STN EN standards (Slovak Technical Norms harmonized with European Norms).

Our aggregate products are certified according to Slovak Technical Standards (STN):

STN EN 13383 – Armourstone (Specifies the properties of aggregates used as armourstone in hydraulic engineering works)

STN EN 13043 – Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas

(Defines the requirements for aggregates used in asphalt and surface treatments)

STN EN 13242 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction (Covers aggregates used in both unbound and hydraulically bound applications in infrastructure projects)

STN EN 12620 – Aggregates for concrete (Specifies the properties of aggregates for use in concrete, including precast and pavement concrete)

These standards govern:

- Particle size distribution (EN 933 series)
- Shape and flakiness index (EN 933-3)
- Mechanical strength and durability (e.g., Los Angeles abrasion test – EN 1097-2)
- Cleanliness and fines content (EN 933-1)
- Water absorption and density (EN 1097-6)

Routine sampling and laboratory testing are mandatory to ensure compliance. These tests are conducted at various stages of production and stockpiling to verify that the aggregates meet the specifications required for structural applications, such as concrete, asphalt, and road base layers.

Geographical scope

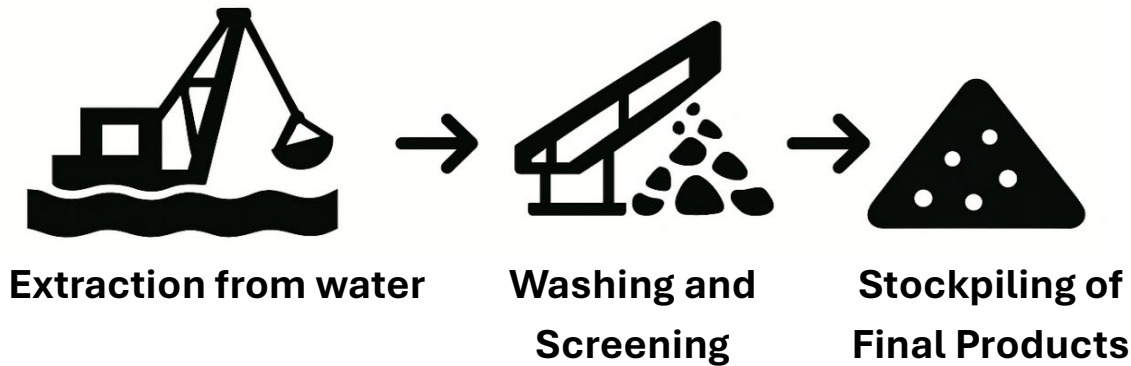
Slovak Republic, Europe

Product contents information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Excavated gravel	1000	0	0
TOTAL	1000	0	0

Manufacturing process

SAND & GRAVEL PRODUCTION



Sand and gravel production is typically associated with alluvial deposits and involves the extraction and processing of naturally occurring granular materials. These materials are widely used in concrete production, road construction, and landscaping.

1. Extraction from Water with Floating Dredger/Bucket excavator

The process begins with the extraction of raw material from riverbeds, lakes, or reservoirs using floating dredgers. These dredgers may operate with suction pumps or mechanical buckets to recover sand and gravel from underwater deposits. The dredging operation must be carefully managed to minimize ecological disruption and comply with environmental regulations.

2. Washing and Screening

Once extracted, the raw material is subjected to washing to remove impurities such as clay, silt, and organic matter. This is followed by screening, where the material is separated into various size fractions using vibrating or rotary screens. The washing and screening process enhances the quality and usability of the final product.

3. Stockpiling of Final Fractions

The cleaned and graded sand and gravel are then stockpiled in designated areas. As with crushed stone, careful handling and storage are essential to maintain the integrity of the material and prevent cross-contamination between fractions.

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 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 ton of the product which is used within this study are calculated by considering the total product weight per annual production. Results are calculated based on weighted average. The product output is fixed to 1 ton and the corresponding amount of product is used in the calculations.

Only aggregates are produced at the quarry. The annual production percentages are taken into consideration for allocation. According to the annual production of the declared product, the annual total energy consumption and the generated waste per declared product are allocated.

Database(s) and LCA software

This EPD has been created using One Click LCA Pre-Verified EPD Generator. Ecoinvent v3.10.1/v3.11 and One Click LCA databases were used as sources of environmental data.

LCA Scenarios and additional technical information

Module A1

This stage considers the extraction and processing of all raw materials. Within the product stage accurate data has been used.

Module A2

This stage accounts for transport activities.

Vehicle type used for transport	Transport, freight, conveyor belt/ Transport, freight, inland waterways, barge tanker
Distance	0.4/2.6
Capacity utilization	100
Capacity utilization factor	1

Module A3

In the plant, electricity and diesel are allocated on yearly consumption.

Manufacturing energy scenario (A3)

Electricity data source and quality	Electricity, Slovakia, residual mix
Electricity CO ₂ eq. / kWh	0,43
Energy data source and quality	Diesel, burned in building machine
Diesel CO ₂ eq. / MJ	0,1

End of Life (C1, C3, C4) and Benefits and Loads (D)

In accordance with EN 15804+A2, no end-of-life stages (Modules C1–C4) or benefits beyond the system boundary (Module D) are declared for gravel, as it is an inert material that remains in situ or is fully incorporated into other construction products, with its end-of-life addressed at the level of the final product.

Data quality

The data quality information has been provided according to the requirements of EN 15941. The data assessment was done using the Product Environmental Footprint Category Rules. The data has been collected internally, considering the latest available average production amounts and measurements during the time period of 2024. The quality level in this study is qualified as Good. Data quality rating procedure has been performed using a rating system where “1” means Very good quality, and “5” means Very poor quality. No fair, poor or very poor data was found during the assessment of relevant data.

Geographical rating	Technology rating	Time-related rating	Average rating
1,9	1,5	1,0	1,5

LCA results

Core environmental impact indicators – EN 15804+A2

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2,07E+00	MND	MND	MND	MND	MND
GWP-fossil	kg CO ₂ eq.	2,07E+00	MND	MND	MND	MND	MND
GWP-biogenic	kg CO ₂ eq.	0,00E+00	MND	MND	MND	MND	MND
GWP-LULUC	kg CO ₂ eq.	7,39E-04	MND	MND	MND	MND	MND
ODP	kg CFC11 eq.	1,55E-07	MND	MND	MND	MND	MND
AP	mol H ⁺ eq.	1,48E-02	MND	MND	MND	MND	MND
EP-freshwater	kg P eq.	3,27E-04	MND	MND	MND	MND	MND
EP-marine	kg N eq.	4,44E-03	MND	MND	MND	MND	MND
EP-terrestrial	mol N eq.	4,90E-02	MND	MND	MND	MND	MND
POCP	kg NMVOC eq.	1,44E-02	MND	MND	MND	MND	MND
ADP-M&M	kg Sb eq.	1,47E-05	MND	MND	MND	MND	MND
ADP-fossil	MJ	2,76E+01	MND	MND	MND	MND	MND
WDP	m ³	1,62E+01	MND	MND	MND	MND	MND

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 (optional) environmental impact indicators – EN 15804+A2

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PM	Disease incidence	2,37E-07	MND	MND	MND	MND	MND
IRP	kBq U235 eq.	1,54E+00	MND	MND	MND	MND	MND
ETP-fw	CTUe	4,33E+02	MND	MND	MND	MND	MND
HTP-c	CTUh	5,79E-10	MND	MND	MND	MND	MND
HTP-nc	CTUh	1,70E-08	MND	MND	MND	MND	MND
SQP	Dimensionless	2,74E+02	MND	MND	MND	MND	MND

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-A3	C1	C2	C3	C4	D
RPEE	MJ	1,64E+00	MND	MND	MND	MND	MND
RPEM	MJ	0,00E+00	MND	MND	MND	MND	MND
TPE	MJ	1,64E+00	MND	MND	MND	MND	MND
NRPE	MJ	3,72E+01	MND	MND	MND	MND	MND
NRPM	MJ	0,00E+00	MND	MND	MND	MND	MND
TRPE	MJ	3,72E+01	MND	MND	MND	MND	MND
SM	kg	1,43E-02	MND	MND	MND	MND	MND
RSF	MJ	9,31E-05	MND	MND	MND	MND	MND
NRSF	MJ	0,00E+00	MND	MND	MND	MND	MND
W	m ³	2,93E-01	MND	MND	MND	MND	MND

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

End of life – Waste

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HW	kg	5,52E-02	MND	MND	MND	MND	MND
NHW	kg	1,01E+01	MND	MND	MND	MND	MND
RW	kg	1,62E-04	MND	MND	MND	MND	MND

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

End of life – Output flows

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
CR	kg	0,00E+00	MND	MND	MND	MND	MND
MR	kg	3,23E-13	MND	MND	MND	MND	MND
MER	kg	1,69E-21	MND	MND	MND	MND	MND
EEE	MJ	0,00E+00	MND	MND	MND	MND	MND
ETE	MJ	0,00E+00	MND	MND	MND	MND	MND

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	0	kg C
Biogenic carbon content in the accompanying packaging	n/a	kg C

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

Specific data and data variation	Value-%
Specific data	83,6
Variation - product	-
Variation - site	12,36; -10,48

Hazardous substances

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

Contact information

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Bibliography

ISO 14020:2000

Environmental labels and declarations – General principles

ISO 14025:2006

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/AC:2021

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

EN 15941:2024

Sustainability of construction works – Data quality for environmental assessment of products and construction work – Selection and use of data

EPD Square PCR v.1.0.1, 2025

EPD Square, General Programme Instructions v.1, 2024

Ecoinvent database v3.10.1/v3.11 (2024) and One Click LCA database

epd square .

Annex

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

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP	kg	2,07E+00	MND	MND	MND	MND	MND
ODP	kg	1,87E-07	MND	MND	MND	MND	MND
AP	kg	1,14E-02	MND	MND	MND	MND	MND
EP	MJ	2,45E-03	MND	MND	MND	MND	MND
POCP	kg C ₂ H ₄ eq.	6,84E-04	MND	MND	MND	MND	MND
ADP-M&M	kg Sb eq.	1,37E-05	MND	MND	MND	MND	MND
ADP-fossil	MJ	2,71E+01	MND	MND	MND	MND	MND

Environmental impacts – GWP-GHG

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP - GHG	kg CO ₂ e	2,07E+00	MND	MND	MND	MND	MND

GWP- GHG: Global Warming Potential, greenhouse gases