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Ready-mix concrete



Owner of the EPD:

P.P.M.D. KRUSZBET S.A.
Address: ul. Bakalarzewska 86,
16-400 Suwałki, Poland
Tel.: +48 875663207
Website: <https://kruszbet.com.pl>
Contact: kruszbet@kruszbet.com.pl

EPD Program Operator:

Instytut Techniki Budowlanej (ITB)
Address: Filtrowa 1,
00-611 Warsaw, Poland
Website: www.itb.pl
Contact: Michał Piasecki
m.piasecki@itb.pl
energia@itb.pl

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804+A2
(Cradle-to-Gate with options)

Product standards: PN-EN 206, PN-S-96012, PN-EN 14227-1

The year of preparing the EPD: 2024

Service Life: no reference service life of concretes is declared as they are intermediate products

PCR: ITB-PCR A v. 1.6 (PCR based on EN 15804+A2)

Declared unit: 1 m³ of ready-mix concrete produced in two plants (Poland)

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2023

MANUFACTURER



Figure 1 The view of P.P.M.D. KRUSZBET S.A.

P.P.M.D. KRUSZBET S.A. has been producing concrete since 1992, constantly improving and modernizing production processes since the beginning of its activity. For concrete production, manufacturer uses own materials, local materials and rocks available on the market from various manufacturers. Company has two plants in Suwałki and Stożne.

KRUSZBET S.A. is a flexible and dynamically developing company on the market. It is characterized by an innovative approach to construction, has a committed team of employees who can present a solution to the investor's needs.

The company is one of the longest operating companies on the market, operating continuously for over 45 years. Therefore, they have extensive experience in the production of concrete, aggregates and prefabricated elements.

The company has a laboratory for a ready-mix concrete plant, a concrete prefabrication plant and an aggregate mine. Qualified staff and modern equipment enable the performance of a number of tests for building materials. Full mobility allows for control of the construction process at every stage - from the control of component raw materials, through checking the parameters of the fresh concrete mix during installation to testing the hardened concrete.

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PRODUCTS DESCRIPTION AND APPLICATION

The product covered by the EPD is ready-mix concrete in classes marked with compressive strength classes: C8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C50/60.

Application of ordinary concrete (C8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45): construction objects, road infrastructure. Properties:

- durability (resistance to external factors);
- quality (use of washed natural aggregates, cement and admixtures with proven properties);
- plasticity (possibility of shaping forms depending on the implementation needs);
- no spatial restrictions and ease of development. Made on washed aggregates.

Application of road concrete (C25/30, C30/37, C35/45, C40/50, C50/60), made on crushed aggregates, with the use of admixtures increasing frost resistance:

- engineering objects,
- road construction
- squares,
- parking lots,
- road surfaces and squares,
- technological, internal, service roads.

Natural aggregates of mineral origin should be used for the production of the concrete mix, which have not undergone any other processing apart from mechanical processing. The aggregate should be stored on a hardened surface, each fraction in a separate box (made of concrete slabs), with a plate specifying the grain size. The aggregate must be free of foreign contaminants such as: fragments of fabric, pieces of wood, fragments of plastics. The aggregate should meet the requirements of the PN-EN 12620 standard.

Cement compliant with PN-EN 197-1 should be used for the construction of cement concrete surfaces. The properties of concrete admixtures meet the requirements of the PN-EN 934-2 standard and should have documents authorizing their circulation. When selecting admixtures, it is absolutely necessary to take into account their compatibility with the cement used. The technical procedure and the amount of admixtures dosed should be in accordance with the Manufacturer's instructions. The composition of ready-mix concrete are presented in Table 1.

Table 1. Percentage composition of ready-mix concrete produced by P.P.M.D. KRUSZBET S.A.

CLASS	CEMENT	AGGREGATES	WATER	ADDITIVES	TOTAL [%]
C8/10	7,08	86,23	6,63	0,06	100
C12/15	7,96	86,23	5,75	0,06	100
C16/20	9,52	84,35	6,06	0,08	100
C20/25	10,29	83,62	6,00	0,08	100
C25/30	11,43	82,55	5,93	0,09	100
C30/37	11,80	82,20	5,90	0,09	100
C35/45	15,47	78,00	6,36	0,17	100
C40/50	17,06	76,34	6,40	0,21	100
C50/60	18,07	74,61	7,15	0,17	100

All additional technical information about the product is available on the [manufacturer's website](#).

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 m³ of product (9 ready-mix concrete classes based on compositions from Table 1). The results are presented for the ZPKiP Suwałki and WBT Stożne Plants in separate Tables.

System boundary

The EPD covers the product stage analysis (“cradle to gate”). The selected system boundaries comprise the production of input raw materials’ extraction up to the finished product at the factory gate (ready concrete). The product stage contains: Module A1: extraction and processing of raw materials (ash, sand, gravel, additives, water, and cement) and fuels, Module A2: transportation up to factory gate of raw materials and primary fuels, Module A3: concrete production (mixing). Inputs and processes of product system are presented in Figure 1. The EPD also includes end-of-life Tables with a scenario for average concrete.

Allocation

The allocation principles used in this EPD are based on the general standards ITB PCR A v. 1.6 and EN 15804+A2. Since no by-products are produced, the flow of materials and energy, as well as the associated release of substances and energy into the environment, are related exclusively to the produced concrete mix. The cement used is supplied by an external supplier. The concrete is produced in two plants ZPKiP Suwałki and WBT Stożne, and the average mass of concrete production was used for allocation.

The declaration covers ready-mix concrete produced in the above-mentioned plants. At least 99.5% of the impacts from the production lines have been attributed to the product covered by this declaration.

System limits

In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules A or D. Machines and facilities required during production are neglected. The packaging products (tapes, wooden pallets, etc.) are included.

Modules A1 and A2: Raw materials supply and transport

Concrete according to EN 206 + PN-B-06265 is made by mixing coarse and fine aggregates, cement and water in controlled proportions. Chemical admixtures are used to reduce water content and improve fresh and hardened concrete properties. Transport of input materials to 2 production plants was inventoried.

Module A3: Production

Substrates for concrete production are transported to the plant and then stored in silos. Electricity and oil are used for concrete production. Water consumption for the concrete mix by the plant was allocated in A1. The production processes are shown in Figure 2. Electricity supplied is from grid electricity.

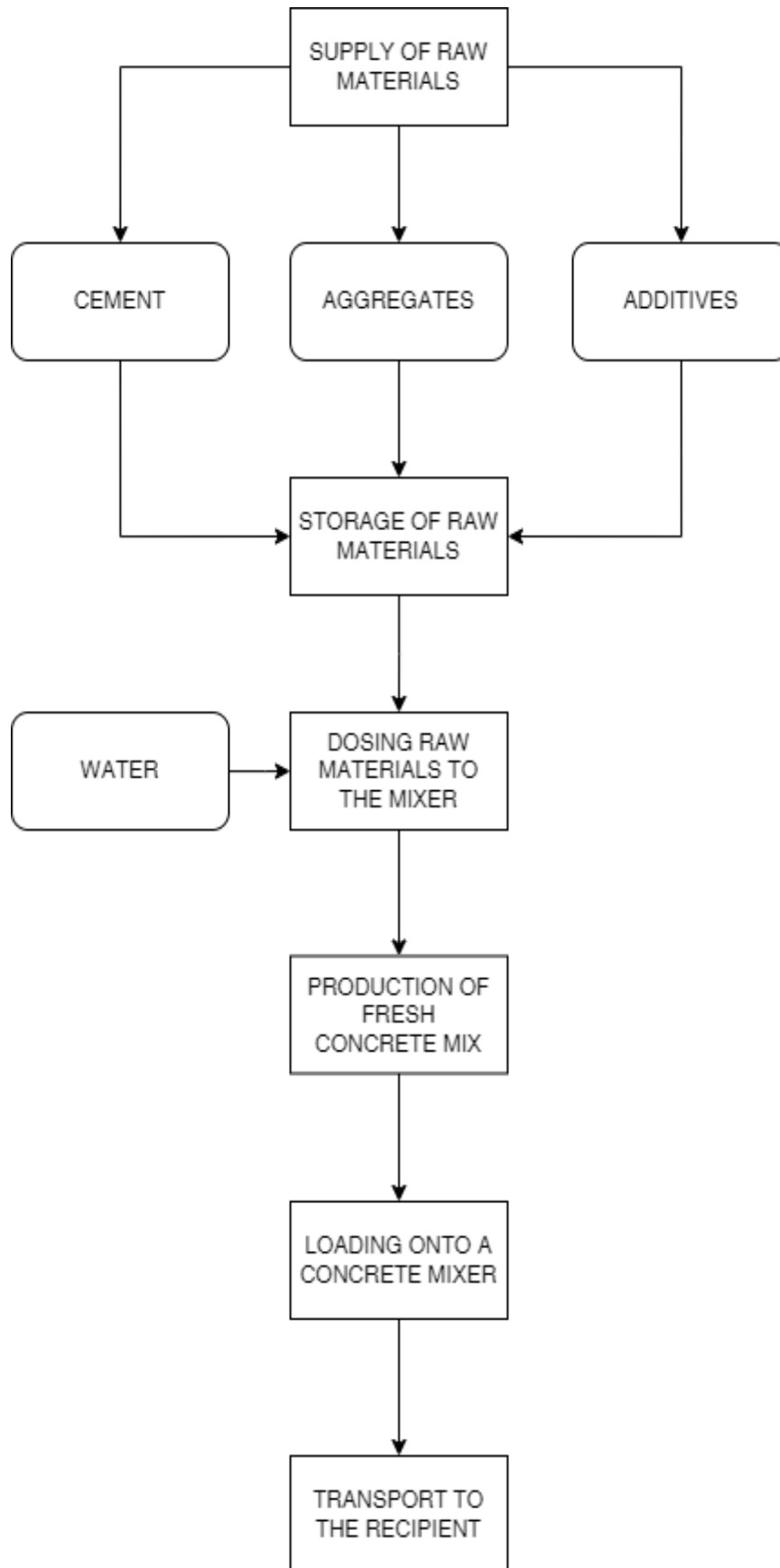


Figure 2. Diagram of the manufacturing process of ready-mix concrete

Modules C and D: End-of-life (EOL)

The product (at the end of life in building) is to be removed from an object using mechanical equipment. In the adapted end-of-life scenario, the de-constructed products are transported to a crushing plant distant by 100 km on > 16t lorry EURO 5, where undergo shredding with the use of crawler gear crusher (115 kW electric drive) – module C3. Recovered materials undergo recycling (new aggregate production, 95%) and landfilling (5%) according to the actual treatment practice of concrete wastes. Environmental impacts declared in module C4 are associated with landfill (5%). Module D presents potential credits resulting from the use of crushed concrete wastes as new aggregates for a road foundation

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2023 – 31.12.2023 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by P.P.M.D. KRUSZBET S.A. and verified during data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10 and specific suppliers (EPDs). Specific (LCI) data quality analysis was a part of the input data verification.

Assumptions and estimates

Data regarding production per 1 m³ of product were averaged for the analysed production in accordance with the manufacturer's declaration for each class and plant.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method

Databases

The background data for the processes come from the following databases: Ecoinvent v.3.10 (sand, water, transport, additives), specific data (EPDs for cement), specific emission reporting data for concrete production by ZPKiP Suwałki and WBT Stożne, KOBiZE (combustion factors for selected fuels, Polish electricity mix). Specific (LCI) data quality analysis was a part of audit. The time related quality of the data used is valid (5 years). Polish electricity mix used (production) is 0.685 kg CO₂/kWh (KOBiZE 2023).

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are considered. In practice, this means that concrete may be compared in a specific application with the selected usage scenario.

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LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m³ of the ready-mix concrete produced by P.P.M.D. KRUSZBET S.A. in Poland. The following life cycle modules (Table 2) were included in the analysis. The following Tables 3-5 show the environmental impacts of the life cycle of selected modules (A1-A3+C1-C4+D).

Table 2 System boundaries for the environmental characteristic of the product.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

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Table 3. Environmental product characteristic – 1 m³ of concrete classes C8/10 - C50/60 produced in Stożne manufacturing plant

Indicator	Unit	A1-A3 modules (product stage)								
		C8/10	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C50/60
Global Warming Potential	eq, kg CO ₂	1.48E+02	1.63E+02	1.88E+02	2.00E+02	2.19E+02	2.26E+02	2.86E+02	3.12E+02	3.39E+02
Greenhouse gas potential - fossil	eq, kg CO ₂	1.48E+02	1.62E+02	1.88E+02	2.00E+02	2.19E+02	2.26E+02	2.85E+02	3.11E+02	3.38E+02
Greenhouse gas potential - biogenic	eq, kg CO ₂	1.04E-01	1.13E-01	1.30E-01	1.38E-01	1.50E-01	1.99E-01	2.52E-01	2.75E-01	2.99E-01
Global warming potential - land use and land use change	eq, kg CO ₂	6.92E-02	7.64E-02	8.94E-02	9.58E-02	1.05E-01	7.47E-02	9.47E-02	1.03E-01	1.12E-01
Stratospheric ozone depletion potential	eq, kg CFC 11	1.95E-06	2.11E-06	2.41E-06	2.55E-06	2.77E-06	4.66E-06	5.92E-06	6.46E-06	7.03E-06
Soil and water acidification potential	eq, mol H ⁺	4.17E-01	4.53E-01	5.18E-01	5.50E-01	5.97E-01	6.26E-01	7.82E-01	8.50E-01	9.20E-01
Eutrophication potential - freshwater	eq, kg P	9.70E-03	1.01E-02	1.07E-02	1.11E-02	1.15E-02	7.90E-03	8.27E-03	8.43E-03	8.60E-03
Eutrophication potential - seawater	eq, kg N	1.32E-01	1.39E-01	1.65E-01	1.71E-01	1.80E-01	2.95E-01	4.08E-01	4.61E-01	4.64E-01
Eutrophication potential - terrestrial	eq, mol N	1.05E+00	1.13E+00	1.28E+00	1.35E+00	1.46E+00	2.63E+00	3.33E+00	3.63E+00	3.94E+00
Potential for photochemical ozone synthesis	eq, kg NMVOC	3.26E-01	3.47E-01	3.84E-01	4.02E-01	4.29E-01	7.01E-01	8.70E-01	9.43E-01	1.02E+00
Potential for depletion of abiotic resources - non-fossil resources	eq, kg Sb	2.78E-04	3.00E-04	3.39E-04	3.58E-04	3.87E-04	4.99E-04	6.23E-04	6.77E-04	7.32E-04
Abiotic depletion potential - fossil fuels	MJ	9.43E+02	1.00E+03	1.11E+03	1.16E+03	1.23E+03	9.33E+02	1.08E+03	1.14E+03	1.20E+03
Water deprivation potential	eq, m ³	7.85E+03	8.83E+03	1.06E+04	1.14E+04	1.27E+04	1.76E+04	2.31E+04	2.55E+04	2.80E+04
PERE	MJ	6.18E+01	6.80E+01	7.91E+01	8.46E+01	9.27E+01	1.03E+02	1.31E+02	1.44E+02	1.56E+02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumulative Energy Demand - renewable energy resources	MJ	6.18E+01	6.80E+01	7.91E+01	8.46E+01	9.27E+01	1.03E+02	1.31E+02	1.44E+02	1.56E+02
<i>PENRE</i>	MJ	9.44E+02	1.00E+03	1.11E+03	1.16E+03	1.24E+03	9.35E+02	1.08E+03	1.14E+03	1.21E+03
<i>PENRM</i>	MJ	1.94E-01	1.94E-01	2.10E-01	2.10E-01	2.10E-01	2.18E-01	2.80E-01	3.11E-01	2.80E-01
Cumulative Energy Demand - non-renewable energy resources	MJ	9.44E+02	1.00E+03	1.11E+03	1.16E+03	1.24E+03	9.36E+02	1.08E+03	1.14E+03	1.21E+03
Use of secondary material	kg	2.17E-01	2.20E-01	2.24E-01	2.26E-01	2.29E-01	1.83E+00	2.34E+00	2.56E+00	2.79E+00
Use of renewable secondary fuels	MJ	1.05E+01	1.18E+01	1.41E+01	1.52E+01	1.69E+01	1.17E+02	1.53E+02	1.69E+02	1.85E+02
Consumption of non-renewable secondary fuels	MJ	8.86E+01	9.96E+01	1.19E+02	1.29E+02	1.43E+02	7.19E+02	9.43E+02	1.04E+03	1.14E+03
use of net fresh water	m ³	4.36E-01	4.29E-01	4.59E-01	4.69E-01	4.85E-01	4.79E-01	5.47E-01	5.64E-01	6.04E-01
Hazardous waste, neutralized	kg	1.14E+00	1.15E+00	1.15E+00	1.16E+00	1.16E+00	1.16E+00	1.17E+00	1.18E+00	1.18E+00
Non-hazardous waste, neutralised	kg	4.01E+01	3.98E+01	4.02E+01	4.03E+01	4.05E+01	4.38E+01	4.58E+01	4.64E+01	4.75E+01
Radioactive waste	kg	1.02E-03	1.13E-03	1.32E-03	1.42E-03	1.56E-03	2.12E-03	2.74E-03	3.01E-03	3.28E-03
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	8.15E-03	8.71E-03	9.72E-03	1.02E-02	1.09E-02	5.22E-03	5.74E-03	5.96E-03	6.19E-03
Materials for energy recovery	kg	9.67E-04	1.08E-03	1.29E-03	1.39E-03	1.54E-03	2.24E-03	2.93E-03	3.23E-03	3.54E-03
exported energy (electricity + heat)	MJ	2.22E-01	2.23E-01	2.25E-01	2.26E-01	2.27E-01	2.26E-01	2.33E-01	2.36E-01	2.35E-01

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Table 4. Environmental product characteristic – 1 m³ of concrete groups C8/10 - C50/60 produced in Suwałki manufacturing plant

Indicator	Unit	A1-A3 modules (product stage)								
		C8/10	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C50/60
Global Warming Potential	eq, kg CO ₂	1.43E+02	1.58E+02	1.83E+02	1.95E+02	2.14E+02	2.21E+02	2.81E+02	3.07E+02	3.33E+02
Greenhouse gas potential - fossil	eq, kg CO ₂	1.43E+02	1.57E+02	1.83E+02	1.95E+02	2.14E+02	2.20E+02	2.80E+02	3.06E+02	3.33E+02
Greenhouse gas potential - biogenic	eq, kg CO ₂	1.01E-01	1.10E-01	1.27E-01	1.35E-01	1.47E-01	1.96E-01	2.49E-01	2.72E-01	2.95E-01
Global warming potential - land use and land use change	eq, kg CO ₂	6.75E-02	7.48E-02	8.78E-02	9.42E-02	1.04E-01	7.30E-02	9.31E-02	1.02E-01	1.11E-01
Stratospheric ozone depletion potential	eq, kg CFC 11	1.85E-06	2.01E-06	2.31E-06	2.45E-06	2.67E-06	4.56E-06	5.82E-06	6.36E-06	6.93E-06
Soil and water acidification potential	eq, mol H ⁺	4.01E-01	4.38E-01	5.02E-01	5.34E-01	5.81E-01	6.10E-01	7.66E-01	8.34E-01	9.04E-01
Eutrophication potential - freshwater	eq, kg P	9.37E-03	9.74E-03	1.04E-02	1.07E-02	1.12E-02	7.56E-03	7.93E-03	8.09E-03	8.26E-03
Eutrophication potential - seawater	eq, kg N	1.27E-01	1.34E-01	1.59E-01	1.66E-01	1.75E-01	2.90E-01	4.03E-01	4.56E-01	4.58E-01
Eutrophication potential - terrestrial	eq, mol N	9.90E-01	1.07E+00	1.22E+00	1.29E+00	1.40E+00	2.57E+00	3.27E+00	3.57E+00	3.88E+00
Potential for photochemical ozone synthesis	eq, kg NMVOC	3.02E-01	3.22E-01	3.59E-01	3.78E-01	4.05E-01	6.77E-01	8.46E-01	9.19E-01	9.94E-01
Potential for depletion of abiotic resources - non-fossil resources	eq, kg Sb	2.61E-04	2.83E-04	3.22E-04	3.42E-04	3.70E-04	4.83E-04	6.07E-04	6.60E-04	7.16E-04
Abiotic depletion potential - fossil fuels	MJ	8.72E+02	9.31E+02	1.04E+03	1.09E+03	1.16E+03	8.62E+02	1.01E+03	1.07E+03	1.13E+03
Water deprivation potential	eq, m ³	7.85E+03	8.83E+03	1.06E+04	1.14E+04	1.27E+04	1.76E+04	2.31E+04	2.55E+04	2.80E+04
PERE	MJ	6.06E+01	6.68E+01	7.79E+01	8.34E+01	9.15E+01	1.02E+02	1.30E+02	1.42E+02	1.55E+02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumulative Energy Demand - renewable energy resources	MJ	6.06E+01	6.68E+01	7.79E+01	8.34E+01	9.15E+01	1.02E+02	1.30E+02	1.42E+02	1.55E+02
<i>PENRE</i>	MJ	8.74E+02	9.33E+02	1.04E+03	1.09E+03	1.17E+03	8.65E+02	1.01E+03	1.07E+03	1.14E+03
<i>PENRM</i>	MJ	1.94E-01	1.94E-01	2.10E-01	2.10E-01	2.10E-01	2.18E-01	2.80E-01	3.11E-01	2.80E-01
Cumulative Energy Demand - non-renewable energy resources	MJ	8.74E+02	9.33E+02	1.04E+03	1.09E+03	1.17E+03	8.65E+02	1.01E+03	1.07E+03	1.14E+03
Use of secondary material	kg	1.85E-01	1.87E-01	1.92E-01	1.94E-01	1.97E-01	1.80E+00	2.31E+00	2.53E+00	2.76E+00
Use of renewable secondary fuels	MJ	1.05E+01	1.18E+01	1.41E+01	1.52E+01	1.69E+01	1.17E+02	1.53E+02	1.69E+02	1.85E+02
Consumption of non-renewable secondary fuels	MJ	8.86E+01	9.96E+01	1.19E+02	1.29E+02	1.43E+02	7.19E+02	9.43E+02	1.04E+03	1.14E+03
use of net fresh water	m ³	4.27E-01	4.20E-01	4.49E-01	4.59E-01	4.76E-01	4.70E-01	5.38E-01	5.55E-01	5.94E-01
Hazardous waste, neutralized	kg	1.04E+00	1.04E+00	1.05E+00	1.05E+00	1.06E+00	1.05E+00	1.07E+00	1.08E+00	1.08E+00
Non-hazardous waste, neutralised	kg	3.79E+01	3.76E+01	3.81E+01	3.82E+01	3.84E+01	4.16E+01	4.36E+01	4.42E+01	4.53E+01
Radioactive waste	kg	9.97E-04	1.11E-03	1.30E-03	1.39E-03	1.53E-03	2.10E-03	2.72E-03	2.98E-03	3.26E-03
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	7.62E-03	8.18E-03	9.19E-03	9.68E-03	1.04E-02	4.69E-03	5.21E-03	5.43E-03	5.66E-03
Materials for energy recovery	kg	9.63E-04	1.08E-03	1.29E-03	1.39E-03	1.54E-03	2.24E-03	2.93E-03	3.22E-03	3.53E-03
exported energy (electricity + heat)	MJ	1.93E-01	1.93E-01	1.96E-01	1.96E-01	1.97E-01	1.96E-01	2.03E-01	2.06E-01	2.06E-01

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Table 5 Environmental product characteristic – end of life – 1 m³ of all concrete classes

Environmental impacts: (DU) 1 m ³ – end of life stage and D						
Indicator	Unit	C1	C2	C3	C4	D
Global warming potential (gross value)	kg eq CO ₂	7,88E+00	5,41E+01	1,58E+01	2,55E+00	-2,07E+01
Depletion potential of the stratospheric ozone layer	kg CFC 11	1,55E-07	2,30E-06	3,10E-06	6,74E-07	-5,20E-06
Acidification potential of soil and water	kg SO ₂	3,31E-02	7,08E+00	6,62E-02	1,90E-02	-3,87E-01
Formation potential of tropospheric ozone	kg Ethene	4,14E-02	5,18E-01	8,28E-02	1,17E-03	-1,74E-02
Eutrophication potential	kg (PO ₄) ³⁻	9,69E-04	1,25E+00	1,94E-03	3,68E-03	-2,83E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	1,04E-01	0,00E+00	2,07E-01	2,88E-05	-3,63E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	2,88E+01	1,83E+02	5,75E+01	5,75E+01	-7,53E+02
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	6,21E+00	1,28E-01	1,24E+01	1,22E+01	-8,29E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2,99E+01	1,92E+02	5,98E+01	6,00E+01	-8,67E+02
Use of secondary material	kg	0,00E+00	5,70E+02	0,00E+00	3,10E+01	2,07E+03
Use of renewable secondary fuels	MJ	0,00E+00	9,59E-02	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m ³	2,07E-03	1,74E-02	4,14E-03	2,35E-03	-4,45E+00
Hazardous waste disposed	kg	8,05E-03	5,82E-08	1,61E-02	1,12E-04	-1,58E-03
Non-hazardous waste disposed	kg	8,05E-01	5,41E-05	1,61E+00	2,30E+02	-1,26E+01
Radioactive waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	3,77E-04	-3,05E-03
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recover	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.) <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: PhD. Eng. Halina Prejzner LCI audit and verification: Filip Poznański, M.Sc. Eng. LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., Eng.

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: Note: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- PN-EN 206 „Beton – wymagania, właściwości, produkcja i zgodność.”
- PN-S-96012 „Drogi samochodowe. Podbudowa i ulepszone podłoże z gruntu stabilizowanego cementem.”
- PN-EN 14227-1 „Mieszanki związane cementem”
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- KOBIZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2021
- World Steel Association 2017 Life Cycle inventory methodology report for steel products
- <https://ecoinvent.org/>

LCA, LCI, input data verification
Michał Piasecki, PhD. D.Sc.

Qualified electronic signature

Head of Thermal Physic, Acoustic and Environment Department
Agnieszka Winkler-Skalna, PhD.

Qualified electronic signature



Instytut Techniki Budowlanej

00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department

02-656 Warsaw, Ksawerów 21

CERTIFICATE No 662/2024 of TYPE III ENVIRONMENTAL DECLARATION

Products:

Ready-mix concrete

Manufacturer:

**Przedsiębiorstwo Produkcji Materiałów Drogowych
KRUSZBET S.A.**

ul. Bakalarzewska 86, 16-400 Suwałki, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2


Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

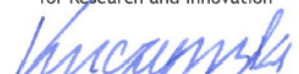
This certificate, issued on 13th September 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, September 2024