Environmental Product Declaration Type III ITB No. 674/2024

Issuance date: 20.09.2024
Validation: 21.10.2024
Validity date: 20.09.2029

Natural crushed and gravel aggregates and recycled crushed aggregates offered by Cemex Polska

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

Owner of the EPD:

CEMEX Polska Sp. z o.o.
Address: Ul. Krakowiaków 46, 02-255 Warsaw
Contact: +48 22 571 41 00
Piotr.cencek@cemex.com
Website: www.cemex.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 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. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3, in accordance with EN 15804+A2 (Cradle to Gate)

The year of preparing the EPD: 2024

Product standard: EN 12620:2002 + A1:2008, EN 13242:2002 + A1:2007, EN 13043:2002 + AC:2004, EN 13450:2002, EN 13139:2002, EN 13383-1:2003, EN 13055:2016

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

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

Declared unit: 1 ton of aggregate

Reasons for performing LCA: B2B

Representativeness: Polish product, year 2024

BASIC INFORMATION

Currently, CEMEX Polska is exploiting 6 aggregate deposits (Mirowo, Bierawa, Borzęcin, Borowce, Jaroszowiec and Łagów) and and recycled aggregates from various sources using mobile machines to obtain aggregates after deconstruction process. Cemex plants have implemented a Factory Production Control system, confirmed by the ZKP Certificate (Factory Production Control certificate), issued by the Institute of Building Materials and Concrete Technology.

Company combine activities with care for the natural environment and care to ensure that the spatial development of mine areas does not disrupt existing ecosystems. At the same time, Cemex makes every effort to ensure that the aggregates extracted are of high quality, guaranteeing satisfaction to Customers.

PRODUCTS DESCRIPTION

The aggregates covered in this EPD study consist of 100% natural and 100% recycled aggregates produced in Poland including specific fractions (see Table 1). A product that is a mixture resulting from a mixture of natural and recycled aggregate is also available. Recycled aggregates are products of mineral origin obtained by mechanical processing inorganic materials previously used in construction objects, e.g. concrete. Natural aggregates are mined in open pit mines or from water reservoirs. Aggregates are classified by particle size and consistency. They can be subdivided to natural stone aggregates (sand and gravel) and crushed aggregates (crushed stones). Aggregates are generally available in the form of a homogeneous bulk product. The product characteristics are standardized, to ensure the necessary levels of reliability and processability. Aggregates are broadly used in industries for a different purpose. They are a primary component in the production of concrete and asphalt, but also serve as a filter and fill material or as a basic material for road building and railway construction. Product-related or management system-related certifications: company produces aggregates in various sizes and quality. Aggregates has CE marking. The products are classified into product groups based on the stages of screening and crushing they pass. Products range and their compilation to EN Standards are listed in the table below

Table 1. Aggregates types produced by Cemex Polska covered by EPD

	Aggregates Cemex					
Source	natural				recycling	
Type	crushed	crushed	gravels	gravel crushed	recycled	
Specific Type	mix	grits and sands	gravels	gravel crushed	mix	grits and sands
Fractions	0/32 ; 0/63 ; 0/8 ; 0/16 ; 0/90 ; 0/120	0/2 ; 0/4 ; 2/8; 4/16 ; 8/16 ; 2/16; 16/32; 16/22 ;32/63 ; 4/32	0/2; 2/8; 8/16 ; 16/32 ; 0/32 ; 0/16 ;0/8 ;2/16 ; 0/1	0/5 ; 5/8 ;8/16 ; 16/63 ; 0/32 ; 0/63	0/32 ; 0/63 ; 0/8 ; 0/16 ; 0/90 ; 0/120	0/2 ; 0/4 ; 2/8; 4/16 ; 8/16 ; 2/16; 16/32; 16/22 ;32/63; 4/32
Requirements	PN-EN 13242 ; PN-EN12620 ; PN-EN 13043 ; PN-EN 13450					

Products covered by EPD comply with the following standards: EN 12620:2002 + A1:2008, EN 13242:2002 + A1:2007, EN 13043:2002 + AC:2004, EN 13450:2002, EN 13139:2002, EN 13383-1:2003, EN 13055:2016.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 ton of natural crushed aggregate, natural gravel aggregate and recycled crushed aggregates (averaged - all fractions). LCA results for natural and recycled products are provided separately in Table 3 and 4.

System boundary

The EPD covers the product stage analysis (“cradle to gate”, A1-A3) based on 6 concrete production plants data analyzed (declared by CEMEX). The selected system boundaries comprise the production of input raw materials’ extraction up to the finished product at the factory gate (ready aggregate). Since aggregates serve as a material for the production of construction products, there is no mandatory obligation under the standard to present their environmental impacts at the end of their life cycle (the use scenario is unknown).

Allocation rules

The allocation rules used for this EPD are based on general ITB ’s document PCR A. In the modules A1-A3, material losses in the assembly of the products in the factory are defined on the averaged specific values for the site. Input and output data from the production is inventoried and allocated to the production on the mass basis. The declaration covers a wide range of aggregate product types (averaged). Their production resources and processing stages are basically similar, so it is possible to average the production by product volume.

System limits

99.0% materials and 100% energy consumption were inventoried in a factory and were included in calculation. In the assessment, all significant parameters from gathered production data are considered, utilized energy, and electric power consumption, direct production waste, and available emission measurements. The total of neglected input flows per module A1-A3 does not exceed the permitted maximum of 1 % of energy usage and product mass. Tires consumption for transport was not taken into account. The components like: foils, papers, tapes and other with a percentage share of less than 0.1% were not included in the calculations. It is assumed that the total sum of omitted processes does not exceed 1% of all impact categories. In accordance with EN 15804 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

A1 – A2 Modules: Raw materials supply and transport

The modules A1 and A2 represent the extraction and processing of raw materials. Since the product is extracted from the deposit (natural aggregates) as a process in A3, this module covers the production of explosives and oil used in production.

A3 Module Production

(natural) Gravel aggregates

Exploitation of natural aggregate, sand and gravel deposit. The process consists of two stages: extraction and mechanical processing. Extraction is carried out using the opencast method from below the water surface using a suction-pressure excavator (refuller). The mined material is directed to the dewatering process carried out by the dewaterer using hydrotransport. The first stage of the mechanical processing process is sieve classification on the initial vibrating screen, the purpose of which is to separate fractions. After the rinsing process, the material is spread on a vibrating screen into finished gravel products. Material above 16 mm is directed to the crushing process carried out in an impact crusher. Depending on the demand, the crushed material can be directly dumped as a final product, a 0-31.5 [mm] mixture, or as a semi-finished product it returns to the initial screen. After the rinsing process, the material is spread on a vibrating screen onto the gravel finished products of selected fractions. The finished products are loaded onto customers' vehicles with wheel loaders or stored in finished product storage yards.

(natural) Crushed aggregates

The deposit is exploited using the opencast method using explosives (included in LCA). The blasted material is selectively processed on a stationary line and mobile devices. The material is transported directly from the 0-800 [mm] exploitation wall to the stationary mechanical processing plant using technological guides. The raw

material is directly directed to the jaw crusher container from where it is dosed to the initial crushing process in the jaw crusher. The obtained semi-finished product is directed to the initial vibrating screen where is obtained finished products with continuous grain size, crushed stone or semi-finished products, which are directed to the second crushing stage. In the case where the raw material is of good quality, the entire material 0-250 [mm] can be directed to the second crushing stage. The grit production process is carried out using an impact crusher and two stages of sieve classification, where is obtain the finished product in selected fractions. Finished products are loaded onto customers' vehicles with wheel loaders or stored in finished product storage yards. The average level of renewable electricity in the production of aggregates is at the level of 100%.

(recycled) crushed aggregates

The recycled aggregate production process is carried out on production lines analogous to production from natural raw materials. The demolition material is processed in situ or transported to a mechanical processing plant (for calculation, distances of: 0, 10, 20, 50 and 100 km are considered). The raw material is directed to the jaw crusher container from where it is dosed to the initial crushing process in the jaw crusher. The obtained semi-finished product is directed to the initial vibrating screen where we obtain finished products or semi-finished products, which are further directed to the second crushing stage. In the case where the raw material is of very good quality, the entire material can be directed to the second crushing stage. The grit production process is carried out using an impact or jaw crusher and two stages of sieve classification, where producer obtain the finished product in selected fractions. The finished products are loaded onto customers' vehicles with wheel loaders or stored in finished product storage yards.

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 done for Poland as reference area.

Data quality - production

The values determined to calculate A1 - A3 originate from verified CEMEX LCI inventory data. A1 values (raw materials) were prepared considering Ecoinvent data.

Assumptions and estimates

The impacts of the representative products were aggregated for Poland using weighted average. Data regarding production per 1 kg of product were averaged. It is assumed that demolition material has no built-in/embodied environmental impact.

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 (renawable electricity, explosives, oils), KOBiZE 2023 (combustion factors for selected fuels,). Electricity provider guarantees a certificate of origin of 100% renewable electricity used by CEMEX plants. Specific (LCI) data quality analysis was a part of audit. The time related quality of the data used is valid (5 years).

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 taken into account. In practice, this means that concrete may be compared in a specific application with the selected usage scenario.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to the unit DU – 1 ton of aggregate produced by CEMEX in Poland.

Table 2. System boundaries (life stage modules included) in a product environmental assessment

Environmental assessment information (MA – Module assessed, MNA – Module not assessed, 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**
MA	**MA**	**MA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**

Table 3. Environmental product characteristic per 1 ton of natural aggregates (crushed and gravel)

Environmental impacts: (DU) 1 ton			
Indicator	Unit	A1-A3	A1-A3
		crushed	gravel
Global warming potential (gross value)	kg eq CO_2	3.28E+00	1,03E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11	3.27E+00	1,03E+00
Acidification potential of soil and water	kg SO_2	4.89E-03	2,82E-03
Formation potential of tropospheric ozone	kg Ethene	1.30E-03	8,27E-04
Eutrophication potential	kg $(PO_4)^{3-}$	3.75E-07	1,56E-07
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	3.05E-02	1,16E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	4.54E-04	2,61E-04
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.05E-02	4,27E-03
Use of renewable primary energy resources used as raw materials	MJ	1.28E-01	4,66E-02
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.41E-02	1,26E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	4.12E-05	2,58E-05
Use of non-renewable primary energy resources used as raw materials	MJ	5.20E+01	1,32E+01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.12E+00	4,28E-01
Use of secondary material	kg	6.79E+00	1,46E+01
Use of renewable secondary fuels	MJ	0.00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	7.01E+00	1,47E+01
Net use of fresh water	m^3	2.76E+01	4,57E+00
Hazardous waste disposed	kg	4.02E+00	0,00E+00
Non-hazardous waste disposed	kg	5.37E+01	1,39E+01
Radioactive waste disposed	kg	1.23E-02	5,40E-03
Components for re-use	kg	2.44E-04	2,44E-04
Materials for recycling	kg	0.00E+00	0,00E+00
Materials for energy recover	kg	4.84E-02	7,64E-03
Exported energy	MJ	6.58E-02	2,16E-02

Table 3 Environmental product characteristic per 1 ton of recycled aggregate (including range of deconstruction material transport)

Environmental impacts: (DU) 1 ton						
Indicator	Unit	A1-A3 in situ	A1-A3 10 km	A1-A3 20 km	A1-A3 50 km	A1-A3 100 km
Global warming potential (gross value)[2]	kg eq CO_2	3.16E+00	4.83E+00	6.50E+00	1.15E+01	1.98E+01
Depletion potential of the stratospheric ozone layer	kg CFC 11	3.15E+00	4.82E+00	6.48E+00	1.15E+01	1.98E+01
Acidification potential of soil and water	kg SO_2	7.06E-03	1.27E-02	1.84E-02	3.55E-02	6.39E-02
Formation potential of tropospheric ozone	kg Ethene	8.48E-04	1.50E-03	2.15E-03	4.11E-03	7.37E-03
Eutrophication potential	kg $(PO_4)^{3-}$	6.33E-07	1.02E-06	1.40E-06	2.56E-06	4.48E-06
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	4.24E-02	4.91E-02	5.59E-02	7.61E-02	1.10E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	1.84E-04	2.96E-04	4.07E-04	7.42E-04	1.30E-03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.83E-02	2.04E-02	2.24E-02	2.85E-02	3.87E-02
Use of renewable primary energy resources used as raw materials	MJ	2.00E-01	2.23E-01	2.45E-01	3.12E-01	4.23E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	5.26E-02	5.94E-02	6.62E-02	8.67E-02	1.21E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	1.80E-05	2.39E-05	2.98E-05	4.75E-05	7.69E-05
Use of non-renewable primary energy resources used as raw materials	MJ	4.08E+01	6.55E+01	9.02E+01	1.64E+02	2.88E+02
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.51E-01	2.65E-01	3.79E-01	7.21E-01	1.29E+00
Use of secondary material	kg	4.49E-01	8.02E-01	1.16E+00	2.22E+00	3.99E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	4.49E-01	8.02E-01	1.16E+00	2.22E+00	3.99E+00
Net use of fresh water	m^3	4.42E+01	6.89E+01	9.35E+01	1.68E+02	2.91E+02
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	4.42E+01	6.89E+01	9.35E+01	1.68E+02	2.91E+02
Radioactive waste disposed	kg	1.00E+03	1.00E+03	1.00E+03	1.00E+03	1.00E+03
Components for re-use	kg	0.00E+00	9.11E-05	1.82E-04	4.56E-04	9.11E-04
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	kg	2.09E-03	5.19E-03	8.30E-03	1.76E-02	3.31E-02
Exported energy	MJ	1.33E-04	2.78E-02	5.55E-02	1.39E-01	2.77E-01

Note: A product that is a mixture resulting from a mixture of natural and recycled aggregate is acceptable. The emission values of the mixed product will result from the share of the individual materials in a product based on tables 2 and 3.

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 (sub clause 8.1.3.) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCI audit and verification: Michał Chwedaczuk, 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 (see 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 (v.1.6.,2023)
- 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
- 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 CO_2, SO_2, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2021
- World Steel Association 2017 Life Cycle inventory methodology report for steel products

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

Instytut Techniki Budowlanej
00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 674/2024
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Natural crushed and gravel aggregates and recycled crushed aggregates

Manufacturer:

CEMEX Polska Sp. z o.o.
Krakowiaków 46, 02-255 Warszawa, 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 20th 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

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, September 2024