


EPD ECOPact® – Holcim Romania

ISO 14020; ISO 14025; ISO 14040; ISO 14044; EN 15804; EN 16908; ISO 21930

Edition 1; Revision 0: July 2022

Environmental Product Declaration in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019

1. Programme information

Programme Operator:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Declaration Holder	Holcim Romania 169 A Calea Floreasca Street, Building B Floor 7, District 1, RO 014459, Bucharest, Romania Phone: +4021 231 77 14/15 Contact person: Mihaela Odangiu Email: Mihaela.Odangiu@holcim.com Company identification information: Trade Register No: J40/399/2002 VAT number: RO 12253732 
LCA consultant	ERM, exchequer court, 33 St Mary Axe, London EC3A 8AA, United Kingdom www.erm.com Contact person: Emma Green Email: emma.green@erm.com
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Product group classification: UN CPC 375 CONCRETE
Product category rules (PCR): <i>CEN Standard EN 15804:2019+A2:2019 served as the core PCR. Concrete and concrete elements (EN 16757:2017) C-PCR-003</i>
PCR review was conducted by: The Technical Committee of the International EPD System. Chair: Massimo Marino. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: Dr Hüdai Kara PhD Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025

2. Company Information

This cradle-to gate environmental product declaration is for 1 m³ of average ECOPact® concrete production from the locations fully owned and operated by Holcim in Romania, as follows:

- Brasov - Str. Zizinului, Nr. 121, Jud. Braşov
- Craiova - Str. Râului, Nr. 401, Jud. Dolj
- Tg Mures - Târgu Mureş, Str. Băneasa, Nr. 8, Jud. Mureş
- Chitila - Bucureşti, Şos. Chitilei, Nr. 423, Sector 1
- Ploiesti - Şos. Centura de Est, Nr. 48A, Jud. Prahova
- Cluj - Cluj Napoca, Str. Beiuşului, Nr. 11, Jud. Cluj
- Clinceni - Strada Industriilor, Nr. 6, Jud. Ilfov
- Sibiu - Str. Turda, Nr. 12, Jud. Sibiu
- Oradea - Oradea, Şos. Borşului, Nr. 14/C, Jud. Bihor
- Pantelimon - Sos. de Centura nr.8, Jud. Ilfov
- Timisoara 1 - Timişoara, Calea Moşniţei, Nr. 17, Jud. Timiş
- Tomesti 1 - Soseaua Iasi-Tomesti, km 1, nr.19A, Jud. Iasi
- Progresul - Bucureşti, Str. Bercenarilor nr. 8, Sector 4
- Timisoara 2 - Comuna Sanandrei, DN 69, km 10, Jud. Timiş
- Tomesti 2 - Strada Trei Fantani, FN, Sat Vladiceni, Comuna Tomesti, Jud. Iasi

Holcim Romania is the study commissioner and EPD owner.

To respect the principles of sustainable development, the company implemented, maintained and continuously improves an effective integrated management system, in accordance with the applicable reference standards: SR EN ISO 9001:2015, SR EN ISO 14001:2015, SR ISO 45001:2018; BES 6001:2016.

Sustainability strategy

Holcim Romania sustainability strategy is governed by Holcim Group commitment of becoming a NET ZERO company and spearheading the transition towards low-carbon construction, while promoting a circular economy, from alternative fuels to concrete recycling.

ECOPact is one of Holcim Romania's ECO Solutions, developed under ECONCEPT business model, that brings green cities one step closer to reality, fulfilling our ambition to lead in sustainable and innovative building solutions. Further information is publicly available on

<https://econconcept.holcim.ro/sustenabilitate>

3. Product Information

This EPD provides information concerning ECOPact® ready-mix concrete by Holcim in Romania as detailed in Table 1.



The geographical scope of this EPD is Romanian.

3.1 Technical Specification of Product

Table 1: Technical specification and usage

Aspect	Details
Usage	Residential and civil construction, non-residential works, including special foundations; industrial constructions; works of art; special constructions for transports on water and marine structures.
Identification	EN 206 compliant ready-mixed concrete made with cement type CEM III/A 42,5N-LH (brand name: ECOPact)
Technical and Functional Characteristics	EN 206 complaint (compression strengths and exposure classes), so technical characteristics are given by the European Standard transposed into Romanian legislative norms. Compressive strength classes: C16/20, C20/25, C25/30, C30/37, C35/45, C40/50
Intended Application	The different compressive strengths of concrete combined with exposure classes represent different categories of usage

3.2 Content declaration

Material	Contribution
Cement	14 – 20 %
Aggregate	71 – 79 %
Admixture	0 – 0.5 %
Water	5 – 9 %

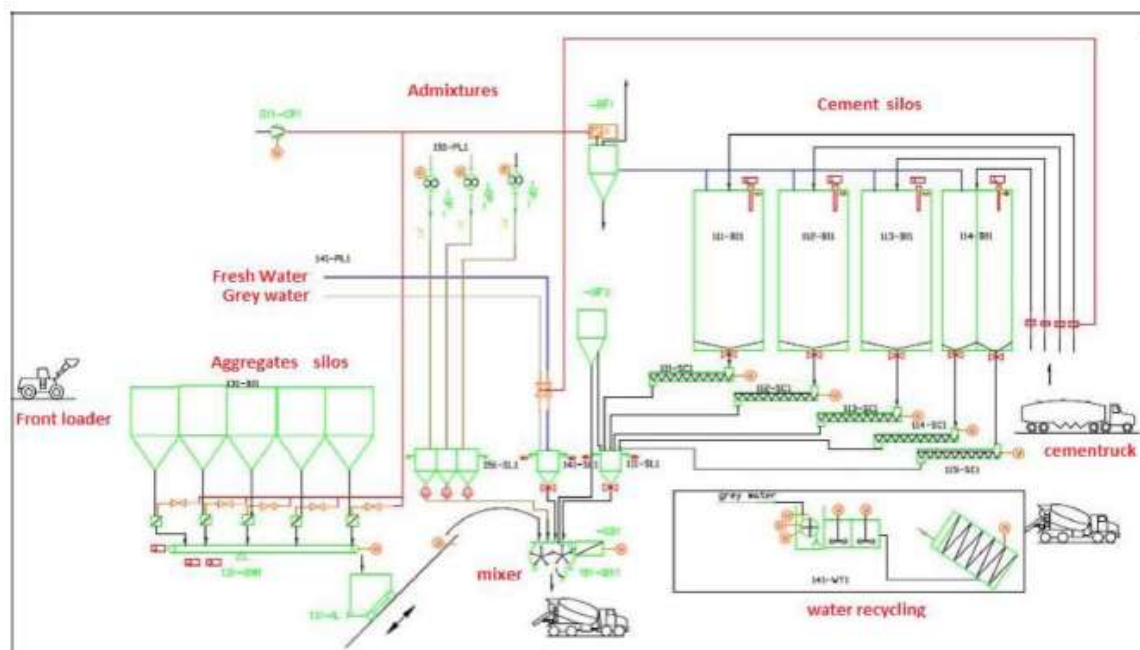
Table 2: ECOPact® composition

The product composition for the product is provided in the Tables below. The binder does not meet the criteria for PBT (Persistent, Bio-accumulative and Toxic) or vPvV (very Persistent and very Bio-accumulative) in accordance with Annex XIII of Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). Furthermore, cement/cementitious binders are a mixture, and it is exempted from REACH registration.

3.3 Manufacturing Process

The main steps in the concrete manufacturing process are as follows, and illustrated in Figure 1:

- Raw material supply and storage
- Raw material preparation
- Mixing

Figure 1: Process flow diagram

Raw material supply, storage, and preparation

Raw materials are supplied from, received, and stored in dedicated storage facilities. Aggregates and Cement are all supplied by Holcim sites in Romania. The process flow of production of Holcim cement and aggregates are communicated in the accompanying LCA reports for average aggregates and average grey cement. Aggregates are transferred from storage facilities towards bunkers by a front loader.

Mixing

Concrete batches are mixed according to batching recipe with the concrete constitutions having been weighted by size and types according to the recipe via the weighting hoppers. The ingredients are blended in a mechanical mixer. Energy for the concrete production is supplied by diesel fuel and electricity. The water recycling system from the Holcim plants allows separation of water and aggregates (resulting from the return of fresh concrete and from the washing of ready-mix trucks) for further reutilization within the production process. No packaging is associated with the final product, the concrete is delivered in bulk.

No packaging is associated with ECOPact®. The products are delivered only in bulk, with concrete trucks.

End-of-Life

Transportation from the demolition site to the processing facility has been assumed to be 50 km. Recycling and disposal ratios vary depending on the regional market, in this EPD data has been taken from the European Statistical office, 89% recycling rate and 11% to landfill. Benefits and loads have been considered to be the reuse of recyclable concrete by substituting aggregate in future concrete production.

3.4 Additional Information

More information about concrete's environmental stewardship and occupational health and safety aspects are detailed within the SDS made publicly available on Holcim Romania portal <https://www.holcim.ro/ro/produse-si-servicii/produse>. All SDS have been developed by Holcim Romania in compliance with the requirements of Regulation (EU) 2020/878 amending the annex II of Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration,

Evaluation, Authorisation and Restriction of Chemicals (REACH) and according to Regulation (EC) No 1272/2008 on the Classification, Labelling and Packaging of substances and mixtures (CLP).

4. LCA Information

4.1 Goal of Study

The goal of this study was to generate an environmental profile of ECOPact® concrete produced and delivered from the locations fully owned and operated by Holcim Romania, to better understand the associated lifecycle environmental impacts and to allow a Type III EPD to be generated and made public via the International EPD System.

4.2 Declared Unit

The declared unit of the EPD is 1 m³ of ECOPact® produced and delivered from the locations fully owned and operated by Holcim Romania. This EPD is established for the weighted average product of these manufacturing plants. The average is based on the mass of binder produced at each plant.

4.3 System Boundary

System boundaries determine the unit processes to be included in the LCA study and which data as “input” and/or “output” to/from the system can be omitted.

This EPD covers the cradle to gate stage (A1 to A3) plus End of Life (C1 – C4) and benefits and loads beyond the system boundary (D), because other life cycle stages are dependent on scenarios and are better developed for specific building or construction works.

System boundaries are according to the modular approach and the cradle to gate stage plus modules C and D is divided into the upstream (A1), core (A2 and A3), and end-of-life phases, as outlined in Figure 2. Life cycle stage that are not covered by the EPD are indicated as MND (Module Not Declared).

Life cycle stages	Information modules	Type of EPD			
		a) Cradle to gate with module C1-C4 and module D ¹⁾	b) Cradle to gate with module C1-C4, module D and optional modules ²⁾	c) Cradle to grave and module D	f) Construction service EPD: Cradle to gate with modules A1-A5 and optional modules
A1-A3 Product stage	A1) Raw material supply	Mandatory	Mandatory	Mandatory	Mandatory
	A2) Transport				
	A3) Manufacturing				
A4-A5 Construction process stage	A4) Transport	—	Optional for goods Mandatory for services (see alternative f) <i>Recommended if a default scenario can be defined</i>	Mandatory	Mandatory
	A5) Construction installation				
B Use stage	B1) Use	—	Optional	Mandatory	Optional
	B2) Maintenance				
	B3) Repair				
	B4) Replacement				
	B5) Refurbishment				
	B6) Operational energy use				
	B7) Operational water use				
C End of life stage	C1) Deconstruction, demolition	Mandatory	Mandatory	Mandatory	Optional
	C2) Transport				
	C3) Waste processing				
	C4) Disposal				
D Benefits and loads beyond the system boundary	D) Reuse, recovery, recycling, potential	Mandatory	Mandatory	Mandatory	—
Declared or functional unit		Declared unit	Declared unit	Functional unit	Declared unit
Inclusion of reference service life (RSL)		Optional	Mandatory if any module in B is included	Mandatory	—

Figure 2: Modules included in the ECOPact® LCA

4.4 Data sources and quality

The geographical system boundary of the LCA is Romania. All processes are valid for the production sites in Romania. The fifteen concrete plants account for 100% of total ECOPact® produced by Holcim in Romania.

All material flows of the processes are based on company and site-specific data gathered for one year of operation, for the period 1st January 2021 – 31st October 2021.

Modelling of the life cycle of Holcim Romania ECOPact® concrete was performed using SimaPro v.9.1 LCA software from PRé.

All relevant background LCI datasets are taken from the EcoInvent database v3.8 (cut-off) released in 2021.

The foreground data has been collected on site and validated based on mass balances. The background data is based on reviewed data from life cycle inventories. As all datasets are validated, the data quality for the entire study can be judged as very good.

4.5 Allocation

The foreground data has been collected on site and validated based on mass balances. The allocation is performed according to the basic rules from EN15804:2012+A2:2019. As no co-products are produced, the flow of materials and energy and also the associated release of substances and energy into the environment is therefore related exclusively to the binder produced.

All data is included based on measured data for each plant. To ensure high representativeness for calculation of the ECOPact® this specific data has been weighted based on the production mass of each plant, as follows:

Site	Percentage
Brasov	19%
Chitila	1.5%
Clinceni	3.5%
Pantelimon	3%
Progresul	10%
Craiova	3%
Ploiesti	1%
Sibiu	11%
Timisoara 1	18%
Timisoara 2	6%
Tg Mures	12.5%
Cluj	5%
Oradea	5%
Tomesti 1	0.5%
Tomesti 2	1%

Table 3: Holcim Romania – ECOPact® Production

4.6 Cut-off Criteria and assumptions

In the process of building an LCI it is typical to exclude items considered to have a negligible (aka relatively inconsequential or immaterial) contribution to results. To do this in a consistent and robust manner there must be confidence that the exclusion is fair and reasonable. To this end, cut-off criteria were defined in

this study, which allow items to be neglected if they meet the criteria. In accordance with EN15804, exclusions could be made if they were expected to be within the below criteria and the total neglected input flows per module do not exceed 5% of energy usage and mass:

- Mass: when using mass as a cut-off criterion, it is appropriate to require the inclusion in the study of all inputs that cumulatively contribute more than a defined percentage to the mass input of the product system being modelled.
- Energy: similarly, an appropriate decision, when using energy as a criterion, is to require the inclusion in the study of those inputs that cumulatively contribute more than a defined percentage of the product system's energy inputs.
- Environmental significance: decisions on cut-off criteria should be made to include inputs that contribute more than an additional defined amount of the estimated quantity of individual data of the product system that are specially selected because of environmental relevance.

Municipal waste recycled on site has been excluded according to the cut-off criteria, since the mass and energy associated with this is negligible.

In addition to exclusions based on cut-off criteria, the following general exclusions from the scope of the study were made as allowed by the PCR:

- Capital goods and infrastructure flows;
- Human activity and personnel-related activity such as travel furniture, office supplies, etc.
- Environmental impacts associated with support functions (e.g., R&D, marketing, finance, management etc.).

Except for the general exclusion noted above, no exclusions based on cut-off criteria have been made. All raw materials and energy inputs were modelled using processes and flows that closely follow actual production raw materials and processes. All material and energy flows have been accounted for. No processing aids or lubricants are used for the manufacture of ECOPact and no production related waste is created by the process.

4.7 Comparability

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

5. Environmental Performance

The environmental impacts are declared and reported using the parameters and units shown in the Tables below. Baseline characterisation factors are taken from EF 3.0 methodology (dated November 2019).

The impact categories presented in the following table refer to 1 m³ of ECOPact® produced from the locations fully owned and operated by Holcim in Romania.

Parameter	Unit	A1 - A3	C1	C2	C3	C4	D	Total
Parameters describing environmental impacts								
GWP-total: Global Warming Potential total ¹	kg CO2 eq.	166	8.58	19.0	1.10	-8.22	-1.38E-02	186.45
GWP-GHG	kg CO2 eq.	163	8.49	18.8	1.07	-30.4	-3.24E-04	161
GWP – Fossil: Global Warming Potential fossil fuels	kg CO2 eq.	1.66	8.58	19.0	1.10	-30.66	-1.38E-02	-0.333
GWP-biogenic: Global Warming Potential biogenic	kg CO2 eq.	9.70E-02	3.03E-03	1.64E-02	9.49E-03	-1.17E-02	-6.91E-05	0.114
GWP-luluc: Global Warming Potential land use and land use change ²	kg CO2 eq.	2.98E-02	1.83E-06	4.40E-06	3.78E-08	1.61E-06	-2.12E-09	2.98E-02
ODP: Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.33E-05	8.92E-02	5.39E-02	5.48E-03	-4.75E-02	-9.96E-05	0.101
AP: Acidification potential	mol H+ eq.	4.19E-01	2.66E-04	1.24E-03	5.80E-04	2.45E-06	-3.66E-06	0.421

¹ The total global warming potential (GWP-total) is the sum of

- GWP-fossil
- GWP-biogenic
- GWP-luluc

² It is permitted to omit GWP-luluc as separate information if its contribution is < 5 % of GWP-total over the declared modules excluding module D.

Parameter	Unit	A1 - A3	C1	C2	C3	C4	D	Total
EP-freshwater: Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	kg P eq	4.64E-02	8.58E+00	1.90E+01	1.10E+00	-8.02E+00	-1.38E-02	20.7
EP-marine: Eutrophication potential, fraction of nutrients reaching marine end compartment	kg N eq.	1.64E-01	3.95E-02	1.10E-02	1.05E-03	-1.03E-02	-2.95E-05	0.205
EP-terrestrial: Eutrophication potential, Accumulated Exceedance	mol N eq.	1.15E+00	4.33E-01	1.19E-01	1.03E-02	-1.15E-01	-3.32E-04	1.60
POCP: Formation potential of tropospheric ozone	kg NMVOC eq.	4.90E-01	1.19E-01	4.59E-02	2.86E-03	-3.12E-02	-9.20E-05	0.626
ADP – minerals & metals: Abiotic depletion potential for non-fossil resources ^{3 4}	kg Sb eq.	2.22E-04	4.41E-06	6.73E-05	1.84E-06	1.13E-06	-9.68E-08	2.97E-04
ADP-fossil: Abiotic depletion for fossil resources	MJ, net calorific value	1.48E+03	1.18E+02	2.88E+02	1.52E+01	1.32E+01	-1.97E-01	1910

³ The abiotic depletion potential is calculated and declared in two different indicators:

- ADP-minerals&metals include all non-renewable, abiotic material resources (i.e. excepting fossil resources);
- ADP-fossil include all fossil resources and includes uranium.

⁴ ultimate reserve model of the ADP-minerals&metals model

Parameter	Unit	A1 - A3	C1	C2	C3	C4	D	Total
potential ³								
WDP: Water (user) deprivation potential, deprivation-weighted water consumption	m ³ world eq. deprived	5.92E+01	1.84E-01	8.76E-01	1.83E-01	8.60E+00	-2.92E-02	69.0
Parameters describing use of resources								
PERE: Renewable primary energy used as energy carrier (fuel)	MJ	8.40E+01	6.64E-01	4.13E+00	1.93E+00	-5.05E-01	-9.35E-03	90.2
PERM: Renewable primary resources with energy content used as material	MJ	4.59E+00	1.02E-01	6.84E-01	1.87E-01	7.43E-03	-1.32E-03	5.57
PERT: Total renewable primary resources	MJ	8.86E+01	7.66E-01	4.81E+00	2.12E+00	-4.97E-01	-1.07E-02	95.8
PENRE: Non-renewable primary resources used as an energy carrier (fuel)	MJ	1.60E+03	1.14E+02	2.83E+02	1.91E+01	1.32E+01	-2.11E-01	2030
PENRM: Non-renewable primary resources with energy content used as material	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
PENRT: Total non-renewable primary resources	MJ	1.60E+03	1.14E+02	2.83E+02	1.91E+01	1.32E+01	-2.11E-01	2030
SM: Secondary materials	kg	3.72E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	37.2

Parameter	Unit	A1 - A3	C1	C2	C3	C4	D	Total
RSF: Renewable secondary fuels	MJ	1.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.100
NRSF: Non-renewable secondary fuels	MJ	1.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.130
FW: Use of net freshwater resources	m ³	-4.55E-01	5.01E-03	2.30E-02	6.14E-03	2.00E-01	-3.94E-04	-0.220
Parameters describing waste production								
HWD: Hazardous waste disposed	kg	1.14E-02	1.14E-03	2.70E-03	6.57E-05	-4.10E-12	-1.99E-06	0.02
NHWD: Non-hazardous waste disposed	kg	3.65E+01	1.60E-01	1.51E+01	8.17E-02	-	-6.63E-03	3.34
RWD: Radioactive waste disposal	kg	9.18E-03	8.13E-04	1.95E-03	5.86E-05	0.00E+00	-1.15E-06	0.01
Parameters describing outputs flows								
CRU: Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
MR: Material for recycling	kg	1.57E-01	0.00E+00	0.00E+00	0.00E+00	-6.43E-16	0.00E+00	0.160
MER: Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
EEE: Exported energy, electrical	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
EET: Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0

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