

Environmental Product Declaration

In accordance with ISO 14025:2006, EN 15804:2012+A2:2019/AC:2021 and ISO 21930:2017 for:

C16/20 - CEM II ready-mixed concrete

from

Duna-Dráva Cement Ltd.



Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of a single product from a manufacturer
EPD registration number:	EPD-IES-0028813:001
Version date:	2026-02-19
Validity date:	2031-02-18

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com



GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 and ISO standard ISO 21930 serve as the core Product Category Rules (PCR)
Product Category Rules (PCR): Construction Products (PCR 2019:14, version 2.0.1)
PCR review was conducted by: Rob Rouwette (review panel chair, start2see Pty Ltd) and Noa Meron (review panel co-chair, thinkstep-anz), they may be contacted through the Programme Operator at support@environdec.com .
c-PCR: Concrete and concrete elements (EN 16757) (c-PCR-003, version 1.0.0), UN CPC 375.
c-PCR review was conducted by: This PCR was developed within CEN standardisation and adopted as a c-PCR by the International EPD System. There was thus no additional open consultation period and no additional review in addition to those within standardisation.

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: Dr.-Ing. Nikolay Minkov, greentability Ltd. Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier:
☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Duna-Dráva Cement Ltd.

Address: 2600 Vác, Kőhídpárt dűlő 2.

Contact: Attila Magda
 National RMC Sales Manager
magdaa@duna-drava.hu

Address and contact information of the LCA practitioner commissioned by the EPD owner:

Ágnes Farkas
 Senior researcher
 Bay Zoltán Nonprofit Ltd. for Applied Research
agnes.farkas@bayzoltan.hu

Description of the organisation:

Duna-Dráva Cement Ltd. (DDC) is a manufacturer of building materials in Hungary, a subsidiary of the German HeidelbergCement AG and the German SCHWENK Zement KG. DDC produces cement and ready-mix concrete, and its services cover the entire spectrum of concrete technology. DDC currently operates 2 cement plants and 30 ready-mix concrete plants in Hungary.

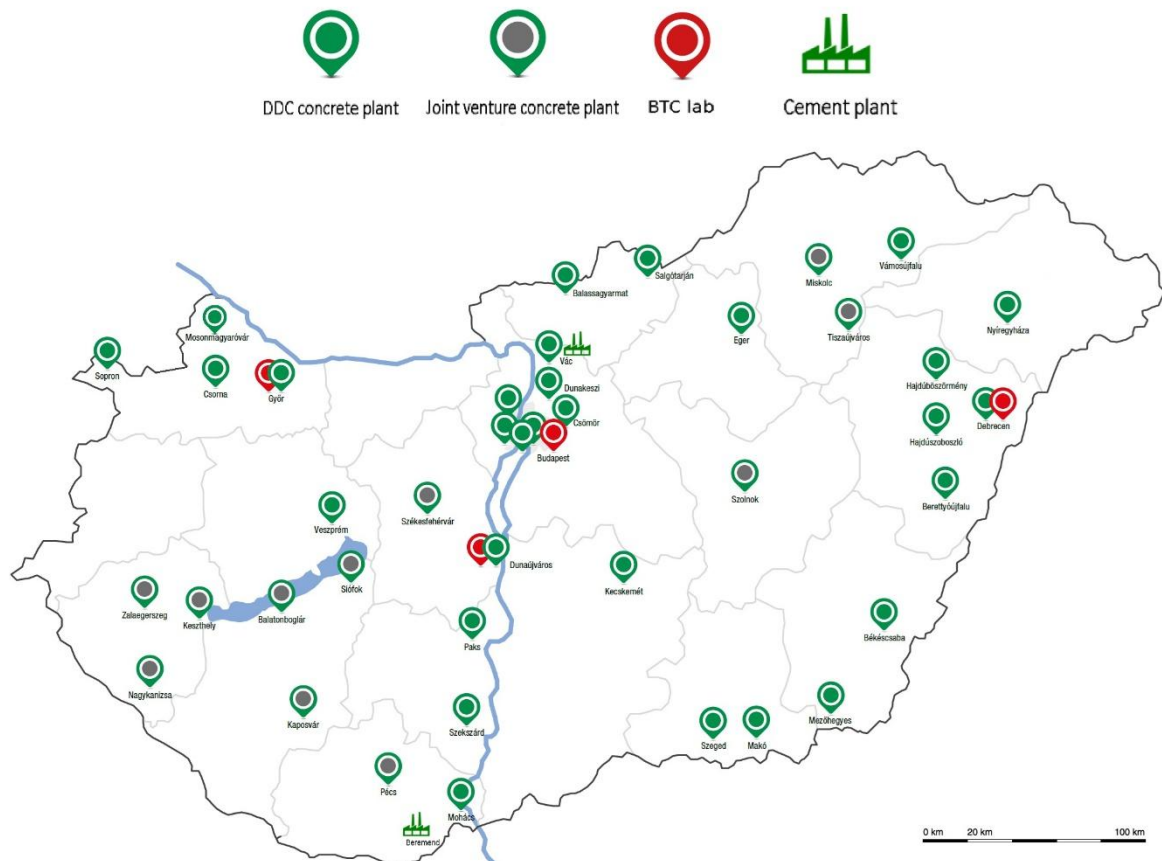


Figure 1 - The plants and laboratories of Duna-Dráva Cement Ltd.

DDC's concrete business unit, as the company's ready-mix concrete production unit, offers a wide range of products and serves its customers at the highest possible standards in many locations across the country. Standard and special concrete types are produced in modern concrete plants that fully meet the challenges of the time, using the most up-to-date control technology.

The business unit has a strong and secure background thanks to DDC, where in addition to ready-mix concrete production, the services also include on-site delivery and concrete pump. As part of our quality assurance activities, we operate an integrated quality management system for the control of manufactured concrete products, which covers ready-mix concrete production, product development and sales. For our concrete plants, the factory production control, as well as the aggregate, fresh concrete and hardened concrete tests, are carried out by Beton Technológia Centrum Ltd. (BTC). Continuous production control also includes the performance of tests with the required frequency and scope (sampling, quality tests), the testing of new concrete recipes and the expansion of our product range.

Product-related or management system-related certifications:

ISO 9001, ISO 14001, ISO 45001

PRODUCT INFORMATION

Product name: C16/20 - CEM II

Product identification: The product is ready-mixed concrete according to its Declaration of Performance and complies with all applicable Hungarian regulations (MSZ 4798:2016; MSZ 4798:2016/1M:2017; MSZ 4798:2016/2M:2018; MSZ 4798:2016/3M:2021; MSZ 4798:2016/4M:2023).

UN CPC code: 375

Product description:

Ready-mixed concrete (RMC) is a pre-mixed, unhardened building material manufactured in batching plants. It consists of a blend of cement, water, and aggregates like sand and gravel, and admixtures to adjust properties according to customer requirements. A mixer or dump truck delivers the ready-mixed concrete to the place of use.



Figure 2 – Visual representation of the product

Intended use: Unreinforced slab; non-load-bearing, unreinforced layer; fence and footing concreting; filling cinder-block wall

Technical properties:

Property	Standard	Measured value (unit)	Class	Value
Consistency - Slump	MSZ EN 12350-2:2019 - Slump test	Slump (mm)	S1	10-40
			S2	50-90
			S3	100-150
			S4	160-210
			S5	≥ 220
Consistency - Flow	MSZ EN 12350-5:2019 - Flow table test	Flow (mm)	F1	≤ 340
			F2	350-410
			F3	420-480
			F4	490-550
			F5	560-620
Compressive strength	MSZ EN 12390-3:2019 - Compressive strength of test specimens	The average expected compressive strength of the concrete at the age of 28 days, with mixed storage (N/mm ²)	F6	≥ 630
			C16/20	28.2

Manufacturing process:

The raw materials (cement, supplementary materials, aggregates, admixtures) required for the production of concrete are transported to DDC's concrete plants by trucks, while water is provided from a network system or a drilled well. Based on the concrete recipes designed by the concrete technologist, the concrete plants produce concrete with a fully automated, computer-controlled system. After the raw materials are weighed, they leave the scales and go to the mixing level, specifically to the mixing drum, where all the components are mixed with an intensity and duration that depends on the concrete quality, at the end of the process the fresh concrete is ready. The homogeneous concrete produced in this way is finally loaded into mixer or dump trucks, which are taken to the construction site, where the concrete is delivered to the formwork, placed and post-treated.

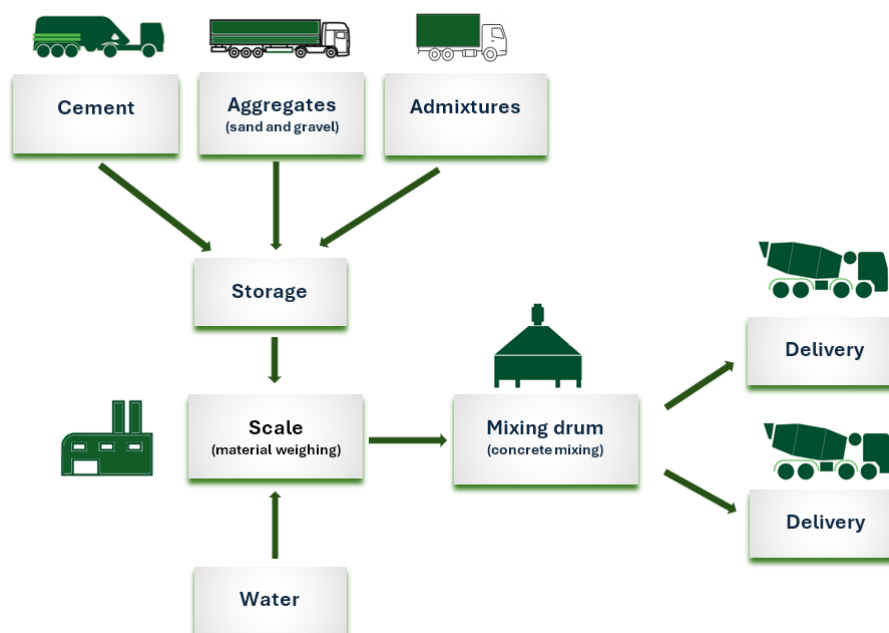


Figure 3 – The ready-mixed concrete manufacturing process

Lifespan: if the product is installed properly, its lifetime is equal to the built structure's lifetime, which can vary based on the structure.

Name and location of production sites:

Name of the plant	Postal code	Town	Street, street number
Bojtár	1037	Budapest	Bojtár u. 76.
Dunakeszi	2120	Dunakeszi	Székesdűlő 8030. hrsz.
Csömör	2141	Csömör	Határ u. 019/38. hrsz.
Basa	1107	Budapest	Basa u. 22.
Csepel	1214	Budapest	II. Rákóczi Ferenc út. 277.
Bányalég	1225	Budapest	Bányalég u. 102.
Sopron	9400	Sopron	Ipar krt. 7.
Mosonmagyaróvár	9200	Mosonmagyaróvár	Éger u. 19.
Csorna, Mobil 9	9300	Csorna	Vasutas u. 3.
Győr	9028	Győr	Fehérvári út 75.
Dunaújváros	2400	Dunaújváros	Lokomotív u. 2.
Paks	7030	Paks	Vasút u. 3584/18. hrsz.
Szekszárd	7100	Szekszárd	Tartsay u. 32.
Mohács	7700	Mohács	Budapesti országút 57.
Veszprém	8200	Veszprém	Tüzér u. 91.
Vác	2600	Vác	Derecske dűlő 0413/2. hrsz.
Balassagyarmat	2660	Balassagyarmat	Kóvári út 28.
Salgótarján	3100	Salgótarján	Kertész út 8.
Eger	3300	Eger	Homok u. 11.
Békéscsaba	5600	Békéscsaba	Ipari út 40.
Makó, Mobil 1	6900	Makó	Újvárosi Vasútállomás útja 10546/2. hrsz.
Mezőhegyes	5820	Mezőhegyes	Külterület 0242/16 hrsz.
Szeged	6728	Szeged	Vásár u. 18.
Kecskemét	6000	Kecskemét	Könyves Kálmán krt. 20.
Hajdúszoboszló	4200	Hajdúszoboszló	Balmazújvárosi útfél, 0544/97. hrsz.
Hajdúböszörmény	4220	Hajdúböszörmény	Külső-Debreceni út 31.
Debrecen	4002	Debrecen	Vértesi út 1.
Berettyóújfalu	4100	Berettyóújfalu	Ipari Park 5818.
Nyíregyháza	4405	Nyíregyháza	Tünde u. 10/A.
Vámosújfalu, Mobil 8	3941	Vámosújfalu	Külterület 066. hrsz.

For further information about the product, visit <https://www.ddcbeton.hu/en/concrete-products>.

CONTENT DECLARATION

The mass (weight) of one unit of a product per declared unit: 2 313 kg/m³

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Sand	552	0	0	0
Gravel	1 394	0	0	0
Cement	255	0*	0	0
Limestone flour	7.51	0	0	0
Water	103.0	0	0	0
Admixtures	1.21	0	0	0
TOTAL	2 313	0	0	0

*: Conservative assumption

Information on the environmental and hazardous/toxic properties of a substances contained in the product: No substance listed under the REACH Regulation is present in this product, either above the limits for registration with the European Chemicals Agency or in excess of 0.1 weight-% of the product.

Packaging content declaration: The product has no packaging.

LCA INFORMATION

Declared unit: **1 m³ of ready-mixed concrete** ready for distribution at the factory gate

Conversion factor to mass: 2 313 kg/m³

Reference service life: if the product is installed properly, its lifetime is equal to the built structure's lifetime, which can vary based on the structure.

Time representativeness: the reference year of the study is the calendar year 2024.

Geographical scope: the whole life cycle takes place in Hungary as ready-mixed concrete can't be transported for long distances.

LCA software used: LCA for Experts by Sphera, MS Excel

LCA databases used: Managed LCA content (Sphera, 2025.02 CUP), Ecoinvent 3.11

Description of system boundaries:

The system boundary is Cradle to gate with options, modules C1-C4, module D and with optional module A4. This is compliant with the requirements of EN 16757 (the ISO standard which is the basis of the EPD International c-PCR).

Module A5 is outside of the system boundary since the installation possibilities are very wide and depend on the party responsible for the construction itself. Modules B1-B7 are outside of the system boundary since it also highly depends on the exact application of the product. This also means that carbonation is not considered in any part of the study and not calculated for any of the modules.

The infrastructure, capital goods, business travel and commuting of personnel, and R&D activities are excluded from the system boundary. The packaging for the raw materials is considered negligible since the vast majority either arrives in bulk or in IBC tanks and are transferred to DDC's IBC tanks by pumps.

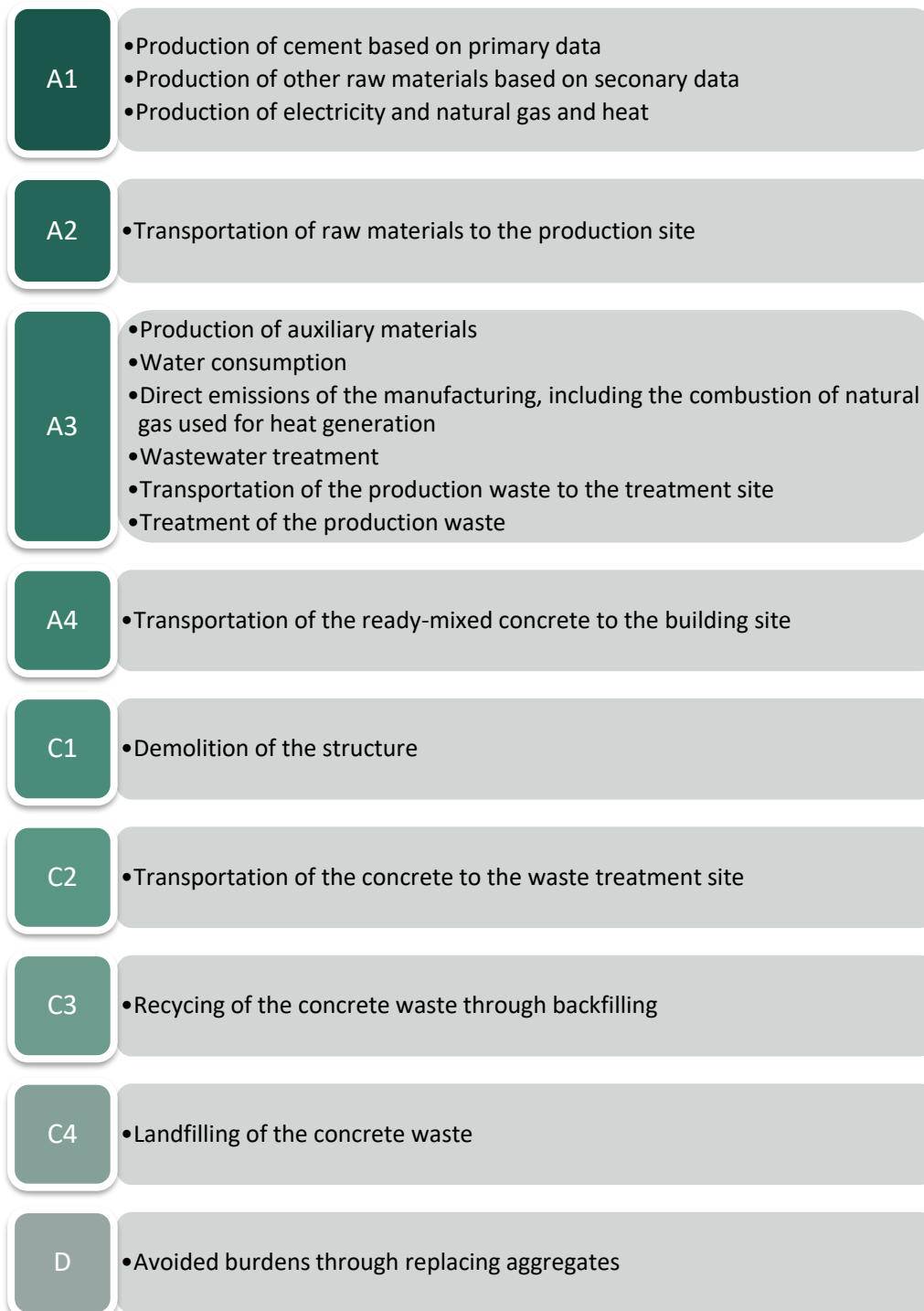
Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundary
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	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
Module declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	x
Geography	HU	HU	HU	HU	-	-	-	-	-	-	-	-	HU	HU	HU	HU	HU
Share of primary data	89.34%																
Variation - products	0%																
Variation - sites	-8.69%	15.45%															

When a module is accounted for, the cell in the "Module declared" row is marked with an "X".

When a module is not accounted for, the cell in the "Module declared" row is marked with "ND", not declared.

Process flow diagram:



More information:

Allocation:

- Cement production: economic allocation was used for the co-products that are consumed by the cement production. As these co-products can be assumed to contribute less than 1% to the total revenue of the producers, they can be considered negligible and are assumed to enter the cement production system burden-free. This is in line with the currently available cement c-PCR (EN16908+A1). Based on reference datasets where both economically allocated and burden-

free versions are available, the GWP-total impact could be 1-2.5% higher per unit of cement if economic allocation was applied.

- Concrete production: In some of the plants the waste concrete was treated as a by-product with negligible market value and local building projects (for example road building projects) used up these materials as filler. Due to the negligible market value, these co-products received 0% of the impacts of the production through economic allocation, which is a conservative assumption for the concrete product, since 100% of the production's impacts are allocated to it.

Cut-off: None of the flows were cut-off.

Data quality assessment:

Name	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Cement production	Collected data	EPD owner	2024	Primary data	80.84%
Production of other raw materials (gravel, sand, water, admixtures)	Database	Sphera, Ecoinvent 3.11	2024	Secondary data	0.00%
Transportation of materials to the manufacturing site	Database	Sphera	2024	Primary data	7.37%
Generation of electricity used in manufacturing	Database	Ecoinvent 3.11	2024	Primary data	1.13%
Total share of primary data, of GWP-GHG results for A1-A3					89.34%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

In the case of some admixtures proxy datasets were used in the modelling due to lack of presentative datasets, which means that for these datasets the technological representativeness was classified as poor. The contribution of these datasets was 0.83% to the GWP-GHG results of A1-A3.

Electricity source:

DDC is using electricity from the grid, so the Hungarian residual mix was applied from the Ecoinvent database for the A3 life cycle phase.

Database: Ecoinvent 3.11
 GWP-GHG: 0.423 kg CO₂eq/kWh

Scenarios for the downstream life cycle phases:

A4 – Transportation of the ready-mixed concrete to the building site

The following parameters were assumed for the distribution life cycle phase, based on primary data:

Parameter	Value
Vehicle	Mixer truck (EURO 4)
Fuel	Diesel
Transport distance	11.4 km
Payload capacity	15.3 t
Returns	Empty returns

C1 – Demolition of the structure

The fuel consumption of the machines used in the demolition of the concrete structure is assumed to be 70 MJ per ton of concrete based on literature sourcesⁱ.

It is also assumed that 100% of the concrete waste is collected for waste treatment.

C2 – Transportation of the concrete to the waste treatment site

The parameters for this scenario were determined based on reasonable assumptions.

Parameter	Value
Vehicle	Truck (average EURO mix)
Total weight	22 t
Fuel	Diesel
Transport distance	50 km
Utilization rate	based on Sphera assumption (61%)

C3 – Waste processing

The majority of mineral demolition waste generated in Hungary is used as backfilling of roads according to Eurostatⁱⁱ. Concrete waste belongs to this flow but it was not quantified separately so it was assumed that the concrete is reused at the same rate as mineral demolition wastes in general.

In 2022 the total mineral demolition waste in Hungary was 3 794 kilotonne and 3 735 kilotonne of this quantity was recovered. Since the majority of the recovered quantity was used as backfilling (2 891 kilotonne), backfilling is the assumed recovery option in the default scenario. More recent reliable data was not available. Based on the above-mentioned values and assumptions, 98.4% of the concrete waste was used as backfilling. The collected concrete waste needs to be further crushed to be used as backfilling, which is included in the selected waste treatment process developed by Ecoinvent. At this stage the material reached the end-of-waste stage and does not require further processing.

In the 100% recycling scenario, it is assumed that 100% of the waste is used as backfilling and none of it is landfilled.

C4 – Disposal

Based on the same Eurostat database and the same assumptions as above, the rest of the concrete waste (59 kilotonne) was sent to landfill in Hungary, which is 1.6% of the total concrete waste.

In the 100% landfilling scenario, it is assumed that 100% of the waste is landfilled and none of it is recycled.

D – Reuse, recovery, recycling potential

As backfilling, the concrete waste can substitute gravel, so gravel production was avoided.

The quality adjustment factor was assumed to be 1 as it has been assessed to be functionally equivalent to gravel in this context by multiple studies^{iii iv v}.

In the 100% recycling scenario the D module was also calculated and for the 100% landfilling scenario there were no benefits.

Characterization methods: EN 15804 based on EF 3.1 reference package.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC:2021

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1.84E+02	3.06E+00	1.63E+01	1.20E+01	1.00E+01	5.66E-01	-4.62E+00
GWP-biogenic	kg CO ₂ eq.	3.07E+01	1.57E-02	3.30E-03	0.00E+00	2.03E-03	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eq.	1.96E-01	3.26E-02	1.67E-03	1.26E-01	1.02E-03	2.32E-03	-2.79E-02
GWP-total	kg CO ₂ eq.	2.15E+02	3.11E+00	1.63E+01	1.20E+01	1.00E+01	5.66E-01	-4.56E+00
ODP	kg CFC 11 eq.	5.77E-07	5.25E-13	2.42E-07	1.45E-12	1.49E-07	1.58E-12	-3.50E-11
AP	mol H ⁺ eq.	1.97E-01	2.23E-02	1.46E-01	7.53E-02	8.95E-02	4.00E-03	-2.39E-02
EP-freshwater	kg P eq.	4.83E-03	8.53E-06	5.25E-04	3.31E-05	3.23E-04	8.41E-07	-1.16E-05
EP-marine	kg N eq.	1.86E-01	1.11E-02	6.79E-02	3.74E-02	4.17E-02	1.05E-03	-8.61E-03
EP-terrestrial	mol N eq.	1.29E+00	1.21E-01	7.42E-01	4.07E-01	4.56E-01	1.14E-02	-9.40E-02
POCP	kg NMVOC eq.	1.91E-01	2.11E-02	2.22E-01	6.93E-02	1.36E-01	3.13E-03	-2.27E-02
ADP-minerals&metals*	kg Sb eq.	5.89E-05	2.11E-07	5.82E-06	8.14E-07	3.57E-06	3.50E-08	-4.99E-07
ADP-fossil*	MJ	8.68E+02	4.06E+01	2.10E+02	1.56E+02	1.29E+02	7.42E+00	-6.93E+01
WDP*	m ³	6.17E+00	1.45E-02	6.43E-01	4.92E-02	3.95E-01	6.12E-02	-5.05E-01

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Additional mandatory impact category indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	1.85E+02	3.09E+00	1.63E+01	1.20E+01	1.00E+01	5.66E-01	-4.56E+00

Additional voluntary impact category indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Particulate matter	Disease incidences	4.78E-06	9.39E-08	4.11E-06	4.81E-07	1.15E-05	4.98E-08	-1.37E-06
Ionising radiation, human health	kBq U235 eq.	1.05E+01	1.10E-02	9.05E-02	2.85E-02	5.56E-02	8.73E-03	-7.44E-01
Ecotoxicity, freshwater	CTUe	3.51E+02	5.27E+01	1.12E+01	2.03E+02	6.90E+00	5.74E+00	-5.33E+01
Human toxicity, cancer	CTUh	1.00E-08	7.12E-10	1.76E-09	2.74E-09	1.08E-09	9.88E-11	-1.19E-09
Human toxicity, non-cancer	CTUh	9.02E-07	3.98E-08	2.67E-08	1.54E-07	1.64E-08	3.69E-09	-5.34E-08
Land use	Pt	1.89E+02	1.79E+01	1.39E+01	6.94E+01	8.56E+00	1.83E+00	-2.20E+01

Resource use indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	8.75E+01	3.06E+00	1.34E+00	1.15E+01	8.22E-01	1.43E+00	-2.51E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	8.75E+01	3.06E+00	1.34E+00	1.15E+01	8.22E-01	1.43E+00	-2.51E+01
PENRE	MJ	8.68E+02	4.06E+01	2.10E+02	1.56E+02	1.29E+02	7.42E+00	-6.93E+01
PENRM	MJ	4.76E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	8.73E+02	4.06E+01	2.10E+02	1.56E+02	1.29E+02	7.42E+00	-6.93E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	3.26E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.69E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	3.57E-01	1.51E-03	1.50E-02	5.55E-03	9.20E-03	1.79E-03	-2.03E-02

The primary energy use indicators were calculated according to option B of the PCR.

Waste indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4.53E-01	1.63E-09	1.88E-01	5.66E-09	1.15E-01	1.62E-09	-4.10E-08
Non-hazardous waste disposed	kg	8.53E+01	5.66E-03	1.39E+00	2.06E-02	8.55E-01	3.70E+01	-9.48E+01
Radioactive waste disposed	kg	8.69E-03	7.66E-05	0.00E+00	2.06E-04	0.00E+00	7.88E-05	-4.58E-03

Output flow indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	4.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+03	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	5.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	6.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional LCA results (other environmental performance results) of the product(s)

Results for additional scenarios for modules A3-D

Mandatory impact category indicators according to EN 15804:2012+A2:2019/ AC:2021

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
GWP-fossil	kg CO2 eq.	1.02E+01	0.00E+00	-4.69E+00	0.00E+00	3.54E+01	0.00E+00
GWP-biogenic	kg CO2 eq.	2.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO2 eq.	1.04E-03	0.00E+00	-2.83E-02	0.00E+00	1.45E-01	0.00E+00
GWP-total	kg CO2 eq.	1.02E+01	0.00E+00	-4.63E+00	0.00E+00	3.54E+01	0.00E+00
ODP	kg CFC 11 eq.	1.51E-07	0.00E+00	-3.56E-11	0.00E+00	9.85E-11	0.00E+00
AP	mol H+ eq.	9.09E-02	0.00E+00	-2.43E-02	0.00E+00	2.50E-01	0.00E+00
EP-freshwater	kg P eq.	3.28E-04	0.00E+00	-1.18E-05	0.00E+00	5.26E-05	0.00E+00
EP-marine	kg N eq.	4.24E-02	0.00E+00	-8.75E-03	0.00E+00	6.54E-02	0.00E+00
EP-terrestrial	mol N eq.	4.63E-01	0.00E+00	-9.55E-02	0.00E+00	7.13E-01	0.00E+00
POCP	kg NMVOC eq.	1.39E-01	0.00E+00	-2.31E-02	0.00E+00	1.96E-01	0.00E+00
ADP-minerals&metals*	kg Sb eq.	3.63E-06	0.00E+00	-5.07E-07	0.00E+00	2.19E-06	0.00E+00
ADP-fossil*	MJ	1.31E+02	0.00E+00	-7.05E+01	0.00E+00	4.64E+02	0.00E+00
WDP*	m3	4.02E-01	0.00E+00	-5.13E-01	0.00E+00	3.82E+00	0.00E+00

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Additional mandatory impact category indicators

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
GWP-GHG	kg CO2 eq.	1.02E+01	0.00E+00	-4.63E+00	0.00E+00	3.54E+01	0.00E+00

Additional voluntary impact category indicators

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
Particulate matter	Disease incidences	1.17E-05	0.00E+00	-1.39E-06	0.00E+00	3.11E-06	0.00E+00
Ionising radiation, human health	kBq U235 eq.	5.65E-02	0.00E+00	-7.56E-01	0.00E+00	5.46E-01	0.00E+00
Ecotoxicity, freshwater	CTUe	7.01E+00	0.00E+00	-5.42E+01	0.00E+00	3.59E+02	0.00E+00
Human toxicity, cancer	CTUh	1.10E-09	0.00E+00	-1.20E-09	0.00E+00	6.17E-09	0.00E+00
Human toxicity, non-cancer	CTUh	1.67E-08	0.00E+00	-5.43E-08	0.00E+00	2.31E-07	0.00E+00
Land use	Pt	8.70E+00	0.00E+00	-2.23E+01	0.00E+00	1.15E+02	0.00E+00

Resource use indicators

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
PERE	MJ	8.35E-01	0.00E+00	-2.55E+01	0.00E+00	8.95E+01	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	8.35E-01	0.00E+00	-2.55E+01	0.00E+00	8.95E+01	0.00E+00
PENRE	MJ	1.31E+02	0.00E+00	-7.05E+01	0.00E+00	4.64E+02	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.31E+02	0.00E+00	-7.05E+01	0.00E+00	4.64E+02	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	9.35E-03	0.00E+00	-2.07E-02	0.00E+00	1.12E-01	0.00E+00

The primary energy use indicators were calculated according to option B of the PCR.

Waste indicators

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
Hazardous waste disposed	kg	1.17E-01	0.00E+00	-4.16E-08	0.00E+00	1.01E-07	0.00E+00
Non-hazardous waste disposed	kg	8.69E-01	0.00E+00	-9.63E+01	0.00E+00	2.32E+03	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	-4.65E-03	0.00E+00	4.92E-03	0.00E+00

Output flow indicators

Results per declared unit							
Indicator	Unit	100% recycling scenario			100% landfilling scenario		
		C3	C4	D	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	2.31E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ABBREVIATIONS

Abbreviation	Definition
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CPC	Central product classification
SVHC	Substances of Very High Concern
ND	Not Declared
DDC	Duna-Dráva Cement Ltd.
RMC	Ready-mixed concrete
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
EP-marine	Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial	Eutrophication potential, Accumulated Exceedance
POCP	Formation potential of tropospheric ozone
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources
ADP-fossil	Abiotic depletion for fossil resources potential
WDP	Water (user) deprivation potential, deprivation-weighted water consumption
GWP-GHG	This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
PENRM	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy re-sources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

REFERENCES

- ISO 14025:2006. Labels and environmental declarations – Type III Environmental declarations – Principles and procedures.
- EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
- ISO 21930:2017 – Sustainability in building construction – Environmental declaration of building products.
- Construction Products (PCR 2019:14, version 2.0.1)
- c-PCR-001 – Cement and building lime (EN 16908:2017+A1:2022) 1.0.0
- c-PCR-003 - Concrete and concrete elements (EN 16757) 1.0.0
- General Program Instructions (GPI) for the International EPD system; version 5.0.1

ⁱ Dos Santos Gervasio, H. and Dimova, S., Model for Life Cycle Assessment (LCA) of buildings , EUR 29123 EN, Publications Office of the European Union, 2018, ISBN 978-92-79-79974-7 (print), 978-92-79-79973-0 (pdf), doi:10.2760/10016 (online), 10.2760/789069 (print), JRC110082.

ⁱⁱ https://ec.europa.eu/eurostat/databrowser/view/env_wastrt_custom_19541475/default/table

ⁱⁱⁱ Tolsma, S. and Torfgård, I. (2018). Recycling of concrete for sustainable road construction: Why are proven methods not currently used? Degree project. Uppsala University, Uppsala. Available at: <http://www.diva-portal.org/smash/get/diva2:1230504/FULLTEXT01.pdf>

^{iv} Behera, M., Bhattacharyya, S.K., Minocha, A.K., Deoliya, R. and Maiti, S. (2014). Recycled concrete aggregate as road base, Waste Management, 34(3), pp. 677–687

^v Mazhar, M. A., Alam, P., Ahmed, S., Khan, M. S., & Adam, F. A. (2023). Sustainable usage of demolished concrete waste as a sub-base material in road pavement. Frontiers in Sustainability, 4.

VERSION HISTORY

Original Version of the EPD, 2026-02-19

