Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

FUGEBETON (C35/45 Slump Concrete in Passive Environmental Exposure Class)

unicon
CEMENTIR HOLDING

The Norwegian EPD Foundation

Owner of the declaration:
Unicon A/S

Product:
FUGEBETON (C35/45 Slump Concrete in Passive
Environmental Exposure Class)

Declared unit:
1 m3

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core
PCR
NS-EN 16757:2022 for Concrete and concrete elements

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-5322-4658-EN

Registration number:
NEPD-5322-4658-EN

Issue date: 06.11.2023

Valid to: 06.11.2028

Updated 27.02.2024

EPD software:
LCAno EPD generator ID: 69382

General information

Product

FUGEBETON (C35/45 Slump Concrete in Passive Environmental Exposure Class)

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Declaration number:

NEPD-5322-4658-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NS-EN 16757:2022 for Concrete and concrete elements

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 m3 FUGEBETON (C35/45 Slump Concrete in Passive Environmental Exposure Class)

Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D

Functional unit:

Not Declared

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

Owner of the declaration:

Unicon A/S
Contact person: Camilla Hjørringgaard
Phone: +45 24 29 13 09
e-mail: camilla.hjoerringgaard@unicon.dk

Manufacturer:

Unicon A/S
Ulvehavevej 61
7100 Vejle, Denmark

Place of production:

Unicon Danmark

, Denmark

Management system:

ISO 9001, DS/EN 206, DS/EN 206 DK NA

Organisation no:

16 06 49 39

Issue date: 06.11.2023

Valid to: 06.11.2028

Year of study:

2022

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Camilla Hjørringgaard

Reviewer of company-specific input data and EPD: Denisse Aurora Páez Gómez

Approved:

Håkon Hauan, CEO EPD-Norge

Product

Product description:

This is a specific product EPD for the concrete type:

Concrete for joints between precast elements. The concrete is produced as a Passive 35 MPa slump concrete with RAPID cement (CEM I 52,5 N (MS) (LA)). This product-EPD covers all variants of this concrete type with and without pozzolans as fly ash. This product-EPD also covers all available consistency and Dmax variants of the concrete type.

This EPD does not cover the additional components as plastic or steel fibers, which can be requested to be added to the concrete by the costumer. An EPD for these components can be supplied separately upon request.

For more information, see UNICON's publications:
https://www.unicon.dk/produkter-services/publikationer/

Product specification

100% ready mixed concrete

Materials	Value	Unit
Ready mixed concrete	2217	kg/m3

Technical data:

Exposure classes:
X0, XC1

Market:

Denmark

Reference service life, product

100 years
(ref. DS/EN 16757:2022 Annex F)

Reference service life, building or construction works

50 years

LCA: Calculation rules

Declared unit:

1 m3 FUGEBETON (C35/45 Slump Concrete in Passive Environmental Exposure Class)

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Aggregate	ecoinvent 3.6	Database	2019
Pigments and Fillers	MD-20026-DA	EPD	2020
Sand	ecoinvent 3.6	Database	2019
Sement	S-P-06379	EPD	2020
Tilsetningsstoffer	EPD-EFC-20210193-IBG1-EN	EPD	2021
Tilsetningsstoffer	EPD-EFC-20210194-IBG1-EN	EPD	2021
Tilsetningsstoffer	EPD-EFC-20210198-IBG1-EN	EPD	2021
Tilsetningsstoffer	Supplier	Supplier specific	2022
Water	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage	Use stage								End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:
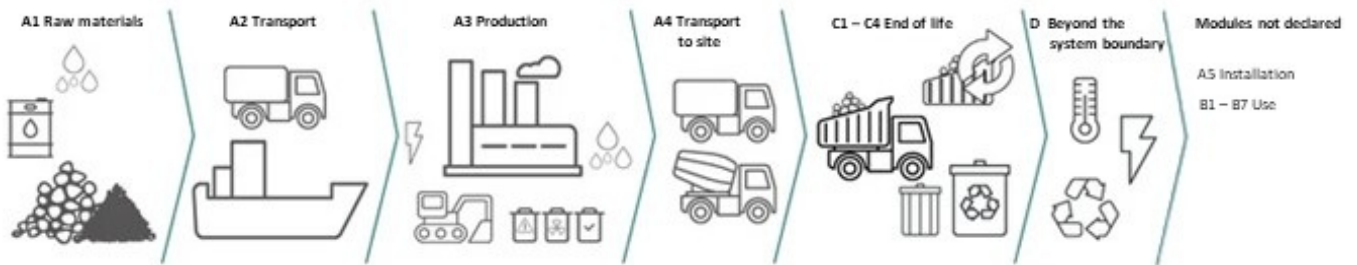
Additional technical information:

Further specification and technical information can be supplied with a concrete declaration upon request.
E-mail: kundecenter@unicon.dk

Concrete produced according to the exposure classes X0, XC1 can be used for the following environments according to DS/EN 206 DK NA:

Concrete inside buildings with very low air humidity in heated rooms (X0), as well as concrete inside buildings with low air humidity in unheated rooms or soil-covered concrete foundations and terrain decks permanently in soil without flowing water or permanently submerged in water (XC1).

This EPD is produced in compliance with Dansk Beton's EPD guidelines (Dansk Betons EPD Retningslinjer). These guidelines are made in collaboration with all members of Dansk Beton, who are using the EPD tool, to ensure a consistent procedure for data collection and calculation across the Danish concrete industry.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Concrete truck, EURO 6 (km) - Europe	53,3 %	17	0,023	l/tkm	0,39

De-construction demolition (C1)	Unit	Value			
Demolition of building per kg of cement-based product, C1 (kg)	kg/DU	2217,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 5 (km) - Europe	53,3 %	25	0,023	l/tkm	0,58

Waste processing (C3)	Unit	Value			
Waste treatment of cement-based product after demolition, C3 (kg)	kg	2145,17			

Disposal (C4)	Unit	Value			
Waste, concrete, to landfill (kg)	kg	71,83			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary aggregates, gravel round (kg)	kg	2145,17			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO_2 -eq	2,99E+02	2,05E+01	2,95E+00	3,30E+00	8,87E+00	5,04E+00	1,54E+00	3,08E-01	-5,01E+00
GWP-fossil	kg CO_2 -eq	2,99E+02	2,05E+01	2,93E+00	3,30E+00	8,87E+00	5,04E+00	1,52E+00	3,08E-01	-4,91E+00
GWP-biogenic	kg CO_2 -eq	3,55E-01	5,31E-03	2,35E-02	1,41E-03	1,66E-03	2,07E-03	1,32E-02	2,62E-04	-9,80E-02
GWP-luluc	kg CO_2 -eq	6,19E-02	4,27E-03	2,24E-03	1,01E-03	6,99E-04	1,47E-03	2,11E-03	6,03E-05	-3,32E-03
ODP	kg CFC11 -eq	5,84E-06	4,54E-06	3,32E-07	7,96E-07	1,92E-06	1,16E-06	3,00E-07	1,50E-07	-8,95E-07
AP	mol H+ -eq	8,52E-01	3,95E-01	1,57E-02	1,06E-02	9,28E-02	2,12E-02	1,23E-02	3,00E-03	-4,42E-02
EP-FreshWater	kg P -eq	4,96E-03	8,79E-05	1,34E-04	2,63E-05	3,23E-05	3,84E-05	9,63E-05	2,30E-06	-1,31E-04
EP-Marine	kg N -eq	1,34E-01	9,18E-02	3,66E-03	2,33E-03	4,10E-02	6,37E-03	3,61E-03	1,13E-03	-1,53E-02
EP-Terrestial	mol N -eq	1,51E+00	1,02E+00	4,37E-02	2,60E-02	4,43E-01	7,04E-02	4,16E-02	1,24E-02	-1,80E-01
POCP	kg NMVOC -eq	4,86E-01	2,71E-01	1,14E-02	1,02E-02	1,24E-01	2,26E-02	1,11E-02	3,55E-03	-4,76E-02
ADP-minerals&metals[1]	kg Sb-eq	9,55E-04	1,69E-04	1,60E-05	5,88E-05	1,36E-05	8,60E-05	1,93E-05	2,72E-06	-4,36E-04
ADP-fossil[1]	MJ	1,19E+03	2,88E+02	4,07E+01	5,36E+01	1,22E+02	7,83E+01	4,73E+01	9,93E+00	-8,31E+01
WDP[1]	m^3	3,81E+03	1,35E+02	3,28E+02	4,11E+01	2,59E+01	6,01E+01	5,22E+03	2,09E+01	-3,90E+03

GWP-total = Global Warming Potential total; 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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. 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

Remarks to environmental impacts

No remarks

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	PM	Disease incidence	9,12E-06	1,13E-06	1,94E-07	3,03E-07	1,12E-05	4,43E-07	1,97E-07	6,39E-08	-9,42E-07
	IRP[2]	kgBq U235 -eq	3,31E+00	1,26E+00	1,66E-01	2,34E-01	5,32E-01	3,42E-01	7,94E-01	4,31E-02	-7,63E-01
	ETP-fw[1]	CTUe	3,30E+03	1,72E+02	4,53E+01	3,92E+01	6,67E+01	5,73E+01	3,35E+01	4,91E+00	-8,55E+01
	HTP-c[1]	CTUh	2,13E-07	0,00E+00	1,07E-09	0,00E+00	2,22E-09	0,00E+00	2,15E-09	1,44E-10	-4,29E-09
	HTP-nc[1]	CTUh	1,18E-06	9,63E-08	3,08E-08	3,79E-08	6,21E-08	5,54E-08	3,00E-08	2,87E-09	-1,05E-07
	SQP[1]	dimensionless	1,70E+02	1,75E+02	4,99E+01	6,15E+01	1,48E+01	8,99E+01	2,68E+01	3,62E+01	1,89E+02

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. 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
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Indicator		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D

Resource use

	Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	PERE	MJ	1,93E+02	2,23E+00	1,82E+01	6,75E-01	6,65E-01	9,86E-01	2,43E+01	1,53E-01	-1,95E+01
	PERM	MJ	8,35E+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
	PERT	MJ	2,01E+02	2,23E+00	1,82E+01	6,75E-01	6,65E-01	9,86E-01	2,43E+01	1,53E-01	-1,95E+01
	PENRE	MJ	1,20E+03	2,88E+02	4,07E+01	5,36E+01	1,22E+02	7,84E+01	4,73E+01	9,93E+00	-8,77E+01
	PENRM	MJ	1,59E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,22E+03	2,88E+02	4,07E+01	5,36E+01	1,22E+02	7,84E+01	4,73E+01	9,93E+00	-8,77E+01
	SM	kg	2,34E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	1,81E+00	8,55E-02	6,63E-01	2,36E-02	0,00E+00	3,45E-02	0,00E+00	3,16E-03	-3,98E-01
	NRSF	MJ	5,98E-01	2,85E-01	2,00E-02	7,91E-02	0,00E+00	1,16E-01	0,00E+00	9,08E-03	-4,09E-01
	FW	m^3	2,53E+00	1,77E-02	6,96E-02	6,10E-03	6,28E-03	8,92E-03	8,10E-02	1,18E-02	-3,05E+00

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 resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

	Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
🗑	HWD	kg	7,76E+00	1,12E-02	1,69E-02	2,93E-03	3,59E-03	4,29E-03	4,73E-03	0,00E+00	-2,00E-02
🗑	NHWD	kg	1,66E+02	1,20E+01	2,42E+01	4,66E+00	1,45E-01	6,82E+00	1,49E-01	7,18E+01	-6,07E-01
🗑	RWD	kg	5,08E-03	2,01E-03	1,48E-04	3,66E-04	8,48E-04	5,35E-04	5,00E-04	0,00E+00	-6,59E-04

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

	Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	CRU	kg	7,32E+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
	MFR	kg	1,54E+00	0,00E+00	2,38E-02	0,00E+00	0,00E+00	0,00E+00	2,15E+03	0,00E+00	0,00E+00
	MER	kg	7,89E-01	0,00E+00	5,62E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EEE	MJ	0,00E+00	0,00E+00	3,71E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	5,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	1,91E-01
Biogenic carbon content in accompanying packaging	kg C	3,55E-03

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Electricity, Denmark (kWh)	ecoinvent 3.6	338,20	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

No remarks

Additional Environmental Information

Additional environmental impact indicators										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	3,00E+02	2,05E+01	3,41E+00	3,30E+00	8,87E+00	5,04E+00	2,83E+00	0,00E+00	-5,25E+00

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

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ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.

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ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.

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NS-EN 16757:2022 for concrete and concrete elements, Ver. 1.0, 04.11.2022, Standard Norway.

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