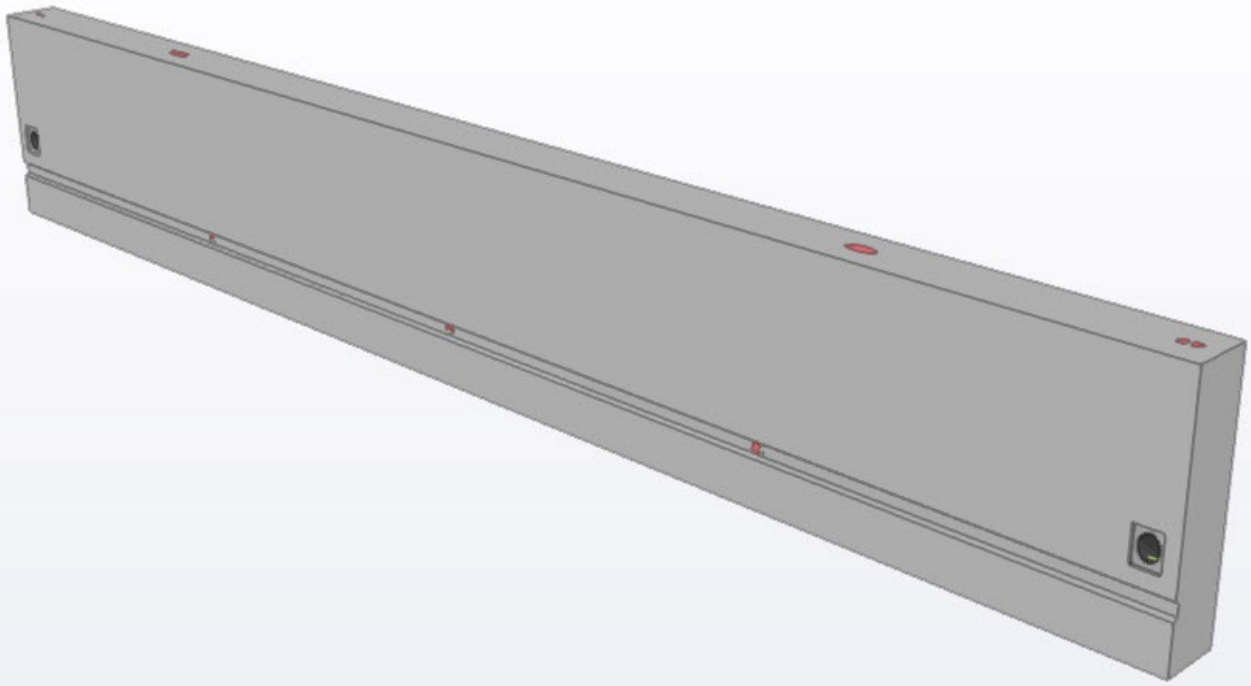
epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Balk Förspänd Uddevalla Biobetong 2



The Norwegian EPD Foundation

Owner of the declaration:
Heidelberg Materials Precast Contiga AB – Concrete

Product:
Balk Förspänd Uddevalla Biobetong 2

Declared unit:
1 tonne

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 020:2021 Part B for Concrete and concrete elements

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 251936

General information

Product

Balk Förspänd Uddevalla Biobetong 2

Owner of the declaration:

Heidelberg Materials Precast Contiga AB – Concrete
Contact person: Håvard Nyman
Phone: +46 0522 636333
e-mail: Havard.Nyman@contiga.se

Program operator:

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

Manufacturer:

Heidelberg Materials Precast Contiga AB – Concrete
Kasenabbevägen 11A,
1662 451 91 Uddevalla, Sverige, Sweden

Declaration number:

Place of production:

Uddevalla, Heidelberg Materials Precast Contiga AB

, Sweden

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 020:2021 Part B for Concrete and concrete elements

Management system:

Holds a local environmental diploma and is certified for ISO45001, 14001 and 9001

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.

Organisation no:

556270-5979

Declared unit:

1 tonne Balk Förspänd Uddevalla Biobetong 2

Issue date:

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Valid to:

Year of study:

2022

Functional unit:

Comparability:

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

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

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. NEPDT03

Developer of EPD: Alexander Noré

Reviewer of company-specific input data and EPD: Håvard Nyman

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.

Approved:

Third party verifier:

Jane Anderson, Construction LCA Ltd

(no signature required)

Product

Product description:

A precast concrete beam element is a reinforced structural component designed to bear loads and distribute weight across a building's framework. It offers strength, efficiency in construction, and is tailored for seamless integration into various architectural designs, enhancing both the functionality and longevity of structures.

Product specification

Materials	kg	%
Additives	36,54	3,65
Aggregate	735,47	73,55
Cement	147,35	14,74
Chemical	3,31	0,33
Metal - Steel	13,94	1,39
Reinforcement	6,64	0,66
Water	56,75	5,68
Total	1000,00	

Technical data:

The declared unit is 1 ton of a concrete beam in concrete quality C45/55, w/c ratio 0.45 and contains an average reinforcement amount of 18,8kg/ton and an average amount of cast-in materials of 1,88kg/ton.
The declared unit applies to a wide range of dimensions with average amounts of reinforcement and cast-in materials.
Cement is Heidelberg Materials Bascement CEM II 42.5 R. See EPD-HCG-20210157-CAA1-EN

Concrete strength C45/55.
Exposure classes up to XC4-XS2-XD2-XF3.
Life length class up to L100 (100 years).

More technical data and information on load capacity for different dimensions is available at Heidelberg Materials Precast Contiga's concrete factory in Uddevalla.

Market:

Sweden

Reference service life, product

Lifetime depends on exposure class. Concrete elements in exposure class XC0 have no limitation in service life.

Reference service life, building or construction works

More than 50 years.

LCA: Calculation rules

Declared unit:

1 tonne Balk Förspänd Uddevalla Biobetong 2

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:

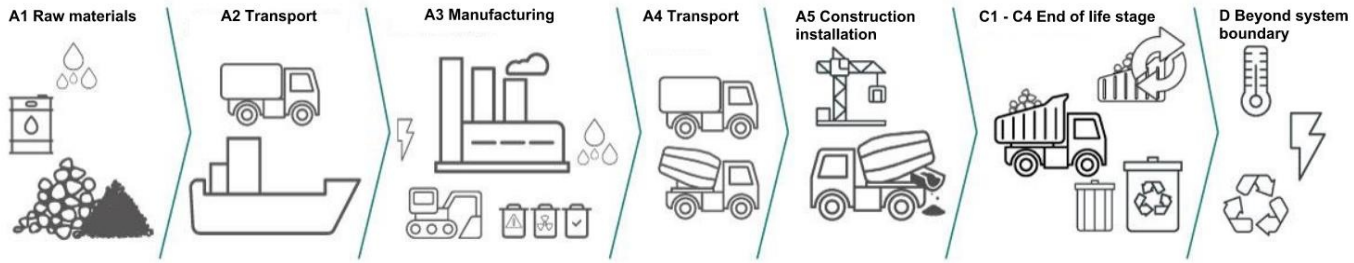
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Additives	Supplier	EPD	2022
Aggregate	ecoinvent 3.6	Database	2019
Cement	EPD-HCG-20210157-CAA1-EN	EPD	2021
Chemical	EPD-EFC-20210193-IBG1-EN	EPD	2021
Chemical	EPD-EFC-20210198-IBG1-EN	EPD	2021
Metal - Steel	Ecoinvent 3.6	Database	2019
Reinforcement	S-P-02400	EPD	2020
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	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:



Additional technical information:

The product can be recycled by crushing.

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)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	85	0,023	l/tkm	1,96

Assembly (A5)	Unit	Value			
Diesel (L)	L/DU	0,87			

De-construction demolition (C1)	Unit	Value			
Demolition of building per kg of cement-based product, C1 (kg)	kg/DU	979,98			
Demolition of building per kg of steel, C1 (kg)	kg/DU	20,02			
Diesel (L)	L/DU	0,87			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	85	0,023	l/tkm	1,96

Waste processing (C3)	Unit	Value			
Materials to recycling (kg)	kg	13,41			
Waste treatment of cement-based product after demolition (kg	kg	666,39			

Disposal (C4)	Unit	Value			
Waste, concrete sludge, rest concrete, to disposal (kg)	kg	313,59			
Waste, scrap steel, to disposal (kg)	kg	6,61			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of steel (kg)	kg	6,49			
Substitution of stone materials (kg)	kg	666,39			

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	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	1,50E+02	2,38E+00	1,40E+00	7,41E+00	3,08E+00	7,08E+00	7,41E+00	4,80E-01	1,37E+00	-8,70E+00
	GWP-fossil	kg CO_2 -eq	1,49E+02	2,38E+00	1,39E+00	7,40E+00	3,08E+00	7,08E+00	7,40E+00	4,73E-01	1,37E+00	-8,66E+00
	GWP-biogenic	kg CO_2 -eq	4,50E-01	1,02E-03	1,27E-02	3,17E-03	5,76E-04	1,33E-03	3,17E-03	4,09E-03	1,17E-03	-3,44E-02
	GWP-luluc	kg CO_2 -eq	1,49E-01	7,31E-04	1,82E-03	2,26E-03	2,42E-04	5,58E-04	2,26E-03	6,55E-04	2,69E-04	-4,23E-03
	ODP	kg CFC11 -eq	4,24E-06	5,74E-07	2,38E-07	1,79E-06	6,64E-07	1,53E-06	1,79E-06	9,33E-08	6,68E-07	-5,04E-07
	AP	mol H+ -eq	3,94E-01	8,19E-03	1,28E-02	2,38E-02	3,22E-02	7,40E-02	2,38E-02	3,83E-03	1,34E-02	-4,92E-02
	EP-FreshWater	kg P -eq	1,64E-02	1,89E-05	3,46E-05	5,89E-05	1,12E-05	2,58E-05	5,89E-05	2,99E-05	1,02E-05	-4,80E-04
	EP-Marine	kg N -eq	5,64E-02	1,81E-03	4,50E-03	5,22E-03	1,42E-02	3,27E-02	5,22E-03	1,12E-03	5,02E-03	-1,21E-02
	EP-Terrestial	mol N -eq	1,12E+00	2,02E-02	5,01E-02	5,82E-02	1,56E-01	3,56E-01	5,82E-02	1,29E-02	5,53E-02	-1,31E-01
	POCP	kg NMVOC -eq	3,87E-01	7,71E-03	1,38E-02	2,29E-02	4,28E-02	9,86E-02	2,29E-02	3,46E-03	1,58E-02	-5,05E-02
	ADP-minerals&metals[1]	kg Sb-eq	1,17E-03	4,22E-05	3,44E-05	1,32E-04	4,72E-06	1,09E-05	1,32E-04	6,00E-06	1,21E-05	-2,59E-04
	ADP-fossil[1]	MJ	8,31E+02	3,86E+01	1,92E+01	1,20E+02	4,23E+01	9,74E+01	1,20E+02	1,47E+01	4,42E+01	-8,59E+01
	WDP[1]	m^3	2,38E+03	2,95E+01	9,73E+02	9,22E+01	8,99E+00	2,07E+01	9,22E+01	1,62E+03	9,31E+01	-8,40E+02

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

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	1,30E-02	2,18E-07	2,71E-07	6,80E-07	8,51E-07	5,92E-06	6,80E-07	6,13E-08	2,85E-07	-8,85E-07
	IRP[2]	kgBq U235 -eq	6,12E+03	1,69E-01	1,60E-01	5,26E-01	1,81E-01	4,21E-01	5,26E-01	2,47E-01	1,92E-01	-2,11E-01
	ETP-fw[1]	CTUe	1,46E+03	2,82E+01	3,32E+01	8,79E+01	2,31E+01	5,32E+01	8,79E+01	1,04E+01	2,19E+01	-4,25E+02
	HTP-c[1]	CTUh	5,22E-07	0,00E+00	1,55E-09	0,00E+00	8,98E-10	1,90E-09	0,00E+00	6,66E-10	6,40E-10	-3,57E-08
	HTP-nc[1]	CTUh	4,81E-06	2,73E-08	3,66E-08	8,50E-08	2,13E-08	4,93E-08	8,50E-08	9,33E-09	1,28E-08	7,14E-07
	SQP[1]	dimensionless	3,21E+02	4,41E+01	5,34E+00	1,38E+02	5,37E+00	1,21E+01	1,38E+02	8,31E+00	1,61E+02	5,41E+01

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.

Resource use												
Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	1,17E+02	4,85E-01	7,17E+01	1,51E+00	2,29E-01	5,29E-01	1,51E+00	7,56E+00	6,81E-01	-1,09E+01
	PERM	MJ	2,80E-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	0,00E+00
	PERT	MJ	1,18E+02	4,85E-01	7,17E+01	1,51E+00	2,29E-01	5,29E-01	1,51E+00	7,56E+00	6,81E-01	-1,09E+01
	PENRE	MJ	9,30E+02	3,86E+01	1,92E+01	1,20E+02	4,23E+01	9,74E+01	1,20E+02	1,47E+01	4,42E+01	-8,73E+01
	PENRM	MJ	1,50E+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	0,00E+00
	PENRT	MJ	9,45E+02	3,86E+01	1,92E+01	1,20E+02	4,23E+01	9,74E+01	1,20E+02	1,47E+01	4,42E+01	-8,73E+01
	SM	kg	6,01E+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	0,00E+00
	RSF	MJ	9,43E+01	1,69E-02	6,18E-02	5,29E-02	5,63E-03	5,63E-03	5,29E-02	0,00E+00	1,41E-02	1,34E-01
	NRSF	MJ	1,77E+02	5,66E-02	1,71E-01	1,77E-01	8,29E-02	8,29E-02	1,77E-01	0,00E+00	4,05E-02	7,38E+00
	FW	m^3	8,28E-01	4,38E-03	5,86E-01	1,37E-02	2,18E-03	5,01E-03	1,37E-02	2,52E-02	5,27E-02	-9,63E-01

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	A5	C1	C2	C3	C4	D
	HWD	kg	1,43E-01	2,11E-03	1,24E-02	6,58E-03	1,25E-03	2,87E-03	6,58E-03	1,47E-03	0,00E+00	-4,33E-02
	NHWD	kg	6,18E+02	3,34E+00	6,38E+00	1,05E+01	5,01E-02	1,15E-01	1,05E+01	4,64E-02	3,20E+02	-3,11E+00
	RWD	kg	6,57E-03	2,64E-04	1,35E-04	8,21E-04	2,94E-04	6,76E-04	8,21E-04	1,55E-04	0,00E+00	-1,85E-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	A5	C1	C2	C3	C4	D
	CRU	kg	1,37E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	5,98E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,80E+02	0,00E+00	0,00E+00
	MER	kg	0,00E+00	0,00E+00	1,05E-02	0,00E+00	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	5,68E-03	0,00E+00	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	8,59E-02	0,00E+00	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	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	7,65E-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
Elektrisitet, Norge (kWh)	ecoinvent 3.6	24,33	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

The product has a very small or no impact on the indoor climate.

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	1,49E+02	2,38E+00	1,40E+00	7,41E+00	3,08E+00	7,08E+00	7,41E+00	4,74E-01	1,37E+00	-1,23E+01

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

ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.
EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
Vold et al., (2022) EPD generator for concrete and concrete elements
Background information for EPD generator application and LCA data, LCA.no report number: 06.22
NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.
NPCR 020 Part B for concrete and concrete elements, Ver. 3.0, 20.09.2021, EPD Norway.

	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web: www.epd-norge.no
Heidelberg Materials	**Owner of the declaration:** Heidelberg Materials Precast Contiga AB – Concrete Kasenabbevägen 11A,, 1662 451 91 Uddevalla, Sverige	Phone: +46 0522 636333 e-mail: Havard.Nyman@contiga.se web: www.contiga.se
LCA.no	**Author of the Life Cycle Assessment** LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
LCA.no	**Developer of EPD generator** LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal