epddanmark

ECO PLATFORM EPD VERIFIED

Owner: Hi-Con ApS
No.: MD-25176-EN
Issued: xx-xx-xxxx
Valid to: xx-xx-xxxx

3rd PARTY **VERIFIED**

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | **ISO 14025 & EN 15804**

Owner of declaration
Hi-Con ApS.
Hjallerup Erhvervspark 1
9320 Hjallerup, Denmark.
VAT: 26020387

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

☐ Product specific
☐ Average
☐ Worst Case

Declared product(s)
1 m^3 precast ultra high strength concrete staircase

Number of declared datasets/product variations: 1

Production site
Hi-Con ApS.
Hjallerup Erhvervspark 1
9320 Hjallerup, Denmark.

Hi-Con ApS purchases green electricity from wind power for their production.

Use of Guarantees of Origin
☐ No certificates used
☒ Electricity covered by GoO
☐ Biogas covered by GoO

Declared/ functional unit
1 m^3 precast reinforced concrete staircase (without staircase railings)

Year of production site data (A3)
2025

EPD version
3

Issued:
xx-xx-xxxx

Valid to:
xx-xx-xxxx

Basis of calculation
This EPD is developed and verified in accordance with the European standard EN 15804+A2.

Comparability
EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity
This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use
The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type
☒Cradle-to-gate with modules C1-C4 and D
☐Cradle-to-gate with options, modules C1-C4 and D
☐Cradle-to-grave and module D
☐Cradle-to-gate
☐Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

☐ internal ☒ external

Third party verifier:

Mie Ostenfeldt
Ostenfeldt Consulting

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MD = module not declared)																
Product			Construction process		Use							End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	MD	ND	ND	ND	X	X	X	X	X

Product information

Product description

The general composition of the ultra high strength concrete recipe for Hi-Con ApS precast staircases is shown in the table below. The values are characteristics to all Hi-Con ApS staircases for which this document is valid. Due to confidentiality reasons, they are specified in ranges and some minor components are not shown.

Material	Weight-% of declared product
Cement	20-30%
Silica fume	5-10%
Sand and gravel	45-55%
Steel reinforcement and fibers	5-10%
Others*	<1-5%

*Others represent specified constituents such as superplasticizers. Water is added at mixing, but part of it evaporates and the rest is part of a chemical reaction, leaving no water in the final concrete. Therefore, water is excluded from the above composition table.

The staircases are precast in wooden molds for which the materials: wood, glue, lacquer, screws and bolts are used.

Product packaging:

No packaging materials are used to package the final concrete elements.

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of ultra high strength staircases on the production site located in Hjallerup, Denmark. Product specific data including materials for the concrete recipe for the precast staircases, energy consumption and waste generation is based on average values collected over three months of production in 2025. In 2026, once one full year of production with the staircase was available, the results were revised.

Background data are based on Managed LCA Content database v. 2025.2 available via LCA for Experts 10.9 and are less than 10 years old. Generally, the background data sets used are of ultra high quality.

The products are manufactured and sold in Denmark. Therefore, a Danish use and EoL scenario is included, and the geographical region covered is Denmark.

Hazardous substances

The product does not contain substances listed in the "Candidate List of Substances of Very High Concern for authorisation"

(http://echa.europa.eu/candidate-list-table)

Product(s) use

All staircases are precast and attached to the wall of buildings. Railing protection is not included in the calculations and results.

Essential characteristics

High strength concrete staircases are covered by European Technical Assessment ETA 17/0330. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website:

https://www.hi-con.dk/

Reference Service Life (RSL)

In agreement with the PCR (EN 16757:2022), the RSL is equal to the required service life (ReqSL) of the building in which the concrete staircase is installed. The RSL is 50 years.

Picture of product(s)

Figure 1: Ultra high strength steel reinforced concrete staircase by Hi-Con ApS.

Figure 2: Ultra high strength steel reinforced concrete staircase by Hi-Con ApS.

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to the declared unit of 1 m^3 reinforced concrete staircase as stated in the table below, which can be scaled to a specific staircase at building level.

Name	Value	Unit
Declared unit	1	m^3
Density	2587,30	kg/m^3
Conversion factor into kg	$3,87*10^{-4}$	-

Functional unit

Not defined.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and EN 16757:2022.

Energy modelling principles

Foreground system:

Guarantees of origin is used for green electricity produced by Danish wind power. For modelling energy production, Danish wind power is used, in accordance with the recommendations from EPD Denmark.

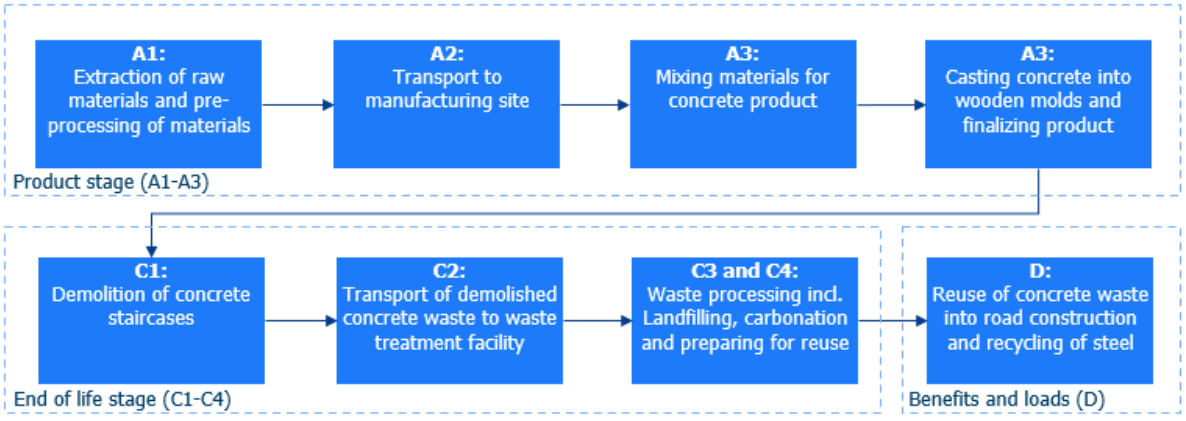
Information about the energy mix in the foreground system:

Energy mix	EF	Unit
Wind power	0,01	kg CO_2e/kWh
District heating	0,07	kg CO_2e/MJ

Background system:

Upstream processes are modelled using residual grid mix. Downstream processes are modelled using consumption mix.

Flowdiagram



System boundary

This EPD is based on a cradle-to-gate LCA, in which 100 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the ”end-of-waste” state or final disposal. The LCA results are declared in aggregated and single form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3 and individually.

The raw materials for the concrete recipe are mixed followed by casing and curing into wooden molds. The production of needed ancillary materials such as lubrication and wax for molds are handled by a supplier and a part of the product stage.

No packaging materials are used for the final concrete balconies.

End of Life (C1-C4) includes:

At the End-of-Life stage, the concrete staircases are demolished, and the concrete is excavated (C1). Next, the concrete is transported to the waste processing site (C2) where it is crushed to gravel size and steel is separated and recycled (C3). This EPD assumes that 97% of the crushed concrete is recycled (D) and the remaining 3% is disposed in landfill (C4). At the disposal of concrete waste on landfill, carbonation in module C4 is considered, complying with EN 16757:2022.

Re-use, recovery and recycling potential (D) includes:

In module (D), the crushed concrete is being used as road filling as a substitution for gravel and reinforcement steel from the concrete substitutes virgin production of steel.

Hi-Con ApS has the ambition to implement several Take-Back options, e.g. where the customer has the option of selling the staircase back to Hi-Con after 50 years. The staircases can then be stored and ideally re-used and undergo an additional life cycle. Since no Hi-Con staircase has reached the End-of-Life phase yet, the Take-Back scheme is not implemented in scale. Therefore, the End-of-Life phase is assessed following a conservative approach.

LCA results

ENVIRONMENTAL IMPACTS PER Ultra high strength concrete staircase [m^3]										
Parameter	**Enhed**	**A1-A3**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO2 eq.]	8,51E+02	7,26E+02	6,66E+01	5,90E+01	1,04E+00	1,04E+01	7,93E+00	-3,60E+00	-1,10E+02
GWP-fossil	[kg CO2 eq.]	8,43E+02	7,23E+02	6,49E+01	5,49E+01	1,04E+00	1,00E+01	7,84E+00	-3,60E+00	-1,10E+02
GWP-biogenic	[kg CO2 eq.]	7,15E+00	1,35E+00	1,72E+00	4,08E+00	3,69E-03	4,24E-01	8,09E-02	-4,52E-03	1,16E-01
GWP-luluc	[kg CO2 eq.]	4,34E-01	4,06E-01	5,11E-03	2,19E-02	3,25E-04	1,03E-03	5,96E-03	5,73E-03	-6,35E-02
ODP	[kg CFC 11 eq.]	4,65E-06	4,64E-06	8,56E-12	7,88E-09	4,88E-13	1,54E-12	1,94E-10	3,89E-12	-7,98E-11
AP	[mol H+ eq.]	3,50E+00	2,84E+00	5,50E-01	1,18E-01	4,09E-03	1,37E-02	1,56E-02	9,88E-03	-2,65E-01
EP-freshwater	[kg P eq.]	2,66E-03	2,26E-03	1,65E-05	3,86E-04	8,01E-07	2,53E-06	2,11E-05	2,08E-06	-5,73E-05
EP-marine	[kg N eq.]	5,27E-01	2,80E-01	2,11E-01	3,66E-02	1,56E-03	5,23E-03	5,12E-03	2,58E-03	-6,63E-02
EP-terrestrial	[mol N eq.]	1,01E+01	7,36E+00	2,31E+00	4,10E-01	1,71E-02	5,87E-02	5,65E-02	2,82E-02	-7,16E-01
POCP	[kg NMVOC eq.]	2,93E+00	2,26E+00	5,82E-01	8,70E-02	5,23E-03	1,46E-02	1,28E-02	7,73E-03	-2,18E-01
ADPm1	[kg Sb eq.]	1,38E-03	1,35E-03	1,82E-06	2,67E-05	9,44E-08	2,98E-07	1,53E-06	8,65E-08	-1,83E-06
ADPf1	[MJ]	9,56E+03	8,12E+03	8,44E+02	5,91E+02	4,37E+01	1,38E+02	1,26E+02	1,83E+01	-8,67E+02
WDP1	[m3 world eq. deprived]	5,60E+01	4,48E+01	1,52E-01	1,11E+01	8,29E-03	2,62E-02	1,84E-01	1,51E-01	-1,26E+00
Caption	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 = Ozone Depletion; AP = Acidifcation; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use									
Disclaimer	1 The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.									

ADDITIONAL ENVIRONMENTAL IMPACTS PER Ultra high strength concrete staircase [m^3]										
Parameter	**Enhed**	**A1-A3**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	5,61E-05	4,24E-05	1,27E-05	9,74E-07	4,96E-08	1,48E-07	1,36E-07	1,23E-07	-4,91E-06
IRP2	[kBq U235 eq.]	9,37E+01	9,32E+01	1,79E-01	3,77E-01	1,03E-02	3,27E-02	8,69E-01	2,16E-02	5,99E-01
ETP-fw1	[CTUe]	7,42E+03	6,65E+03	6,22E+02	1,54E+02	3,23E+01	1,02E+02	4,93E+01	1,44E+01	-1,58E+02
HTP-c1	[CTUh]	1,17E-06	1,11E-06	9,53E-09	4,79E-08	4,95E-10	1,57E-09	6,11E-09	2,44E-10	-1,71E-07
HTP-nc1	[CTUh]	4,64E-05	4,57E-05	1,57E-07	5,67E-07	8,10E-09	2,56E-08	5,54E-08	9,12E-09	-1,48E-07
SQP1	-	3,26E+04	3,14E+04	4,29E+00	1,19E+03	2,67E-01	8,42E-01	5,47E+01	4,52E+00	4,44E+01
Caption	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 = Soil Quality									
Disclaimer	1 The results of this environmental 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 PER Ultra high strength concrete staircase [m³]										
Parameter	**Enhed**	**A1-A3**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	4,77E+03	2,88E+03	5,47E+00	1,89E+03	3,15E-01	9,95E-01	8,59E+01	3,54E+00	1,05E+02
PERM	[MJ]	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]	4,77E+03	2,88E+03	5,47E+00	1,89E+03	3,15E-01	9,95E-01	8,59E+01	3,54E+00	1,05E+02
PENRE	[MJ]	9,56E+03	8,12E+03	8,44E+02	5,91E+02	4,37E+01	1,38E+02	1,26E+02	1,83E+01	-8,67E+02
PENRM	[MJ]	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]	9,56E+03	8,12E+03	8,44E+02	5,91E+02	4,37E+01	1,38E+02	1,26E+02	1,83E+01	-8,67E+02
SM	[kg]	1,16E+02	1,16E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	1,98E+02	1,98E+02	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00
FW	[m3]	1,80E+00	1,50E+00	6,14E-03	2,94E-01	3,42E-04	1,08E-03	3,06E-02	4,42E-03	-8,25E-02
Caption	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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

WASTE CATEGORIES AND OUTPUT FLOWS PER Ultra high strength concrete staircase [m³]										
Parameter	**Enhed**	**A1-A3**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	7,02E-02	7,02E-02	3,11E-08	7,71E-06	1,66E-09	5,24E-09	1,86E-07	4,01E-09	2,95E-07
NHWD	[kg]	6,29E+01	5,95E+01	7,28E-02	3,31E+00	3,88E-03	1,23E-02	8,65E-02	9,15E+01	-9,47E+01
RWD	[kg]	2,78E-01	2,74E-01	1,27E-03	2,46E-03	7,30E-05	2,31E-04	8,65E-03	1,95E-04	8,55E-03

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,62E+02	0,00E+00	0,00E+00
MFR	[kg]	1,62E+00	1,62E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,50E+03	0,00E+00	0,00E+00
MER	[kg]	6,08E-02	6,08E-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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy									

BIOGENIC CARBON CONTENT PER Ultra high strength concrete staircase [m³]		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	6,75E-01
Biogenic carbon cement in accompanying packaging	[kg C]	0,00E+00
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

The raw material extraction and processing (A1) module as well as the transport (A2) are dominating the impact results across all core environmental indicators. This is linked to the production of cement for the concrete recipe for impacts in module A1. For impacts in module A2 it is linked to transport of specific materials from locations far away from Hi-Con ApS' production site.

Technical information on scenarios

End of life (C1-C4)

Scenario information	Value	Unit
Collected separately	2587,3	kg/m^3
Collected with mixed waste		kg/m^3
For reuse	-	kg/m^3
For recycling	2509,7	kg/m^3
For energy recovery	-	kg/m^3
For final disposal	77,6	kg/m^3
Assumptions for scenario development	-	As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Material	Value	Unit
Crushed concrete for road filling	2233,6	Kg/m^3
Recycled steel from steel reinforcement	276*	Kg/m^3

*Excluding losses during recycling

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

Publisher	epddanmark www.epddanmark.dk Template version 2025.1
Programme operator	Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Gritt Cortnum Andersen FORCE Technology Park Allé 345 2605 Brøndby www.forcetechnology.com
LCA software /background data	LCA for Experts (GaBi) v. 10.9 *EN 15804 reference package 3.1*
3rd party verifier	*Mie Ostenfeldt* *Ostenfeldt Consulting* Verified according to Verification Checklist 1 v. 2.9.1

General programme instructions
General Programme Instructions, version 3.0, spring 2025
www.epddanmark.dk

Technical Rules and Guidelines
Technical Rules and Guidelines, version 1.0, spring 2025
www.epddanmark.dk

EN 15804
DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 16757
EN 16757:2022 "Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements"

EN 15942
DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025
DS/EN ISO 14025:2010 – ” Environmental labels and declarations – Type III environmental declarations – Principles and procedures”

ISO 14040
DS/EN ISO 14040:2008 – ” Environmental management – Life cycle assessment – Principles and framework”

ISO 14044
DS/EN ISO 14044:2008 – ” Environmental management – Life cycle assessment – Requirements and guidelines”