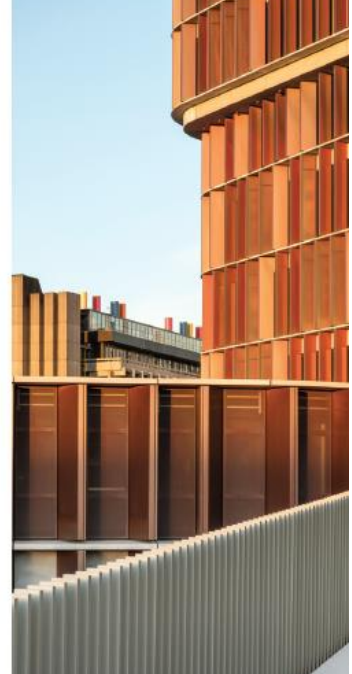
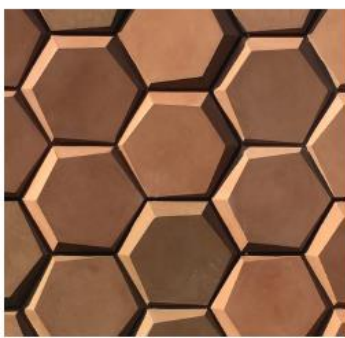
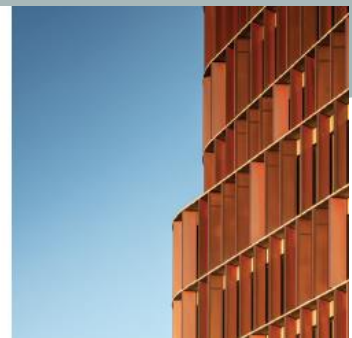


Owner: BB fiberbeton A/S
No.: MD-21008-EN
Issued: 08-03-2021
Valid to: 08-03-2026

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



Owner of declaration

BB fiberbeton A/S
Hjørnegårdsvej 10
Ll. Skensved
VAT no. 72251113



Issued:
08-03-2021

Valid to:
08-03-2026

Programme operator

Danish Technological Institute
www.dti.dk



Basis of calculation

This EPD is developed in accordance with ISO 14025 and EN 15804+A1.

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.

Programme

EPD Danmark
www.epddanmark.dk



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.

Declared products

Glassfibre reinforced concrete elements

EPD type

- Cradle-to-gate
- Cradle-to-gate with options
- Cradle-to-grave

Production site

Hjørnegårdsvej 10, Ll. Skensved, Denmark

CEN standard EN 15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025
<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier:
Ninkie Bendtsen

Products use

The concrete elements are used for facades



Henrik Fred Larsen
EPD Danmark

Declared unit

1 kg of glassfibre reinforced concrete facade elements

Life cycle stages and modules (MND = 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	X	X	X	X	X	X	X	X	X	MND	MND	MND	MND	MND

Product information

Product description

The main product components are shown in the table below. Values are shown in ranges for confidentiality reasons.

Material	Weight-% of declared product
Cement	40-45
Aggregate	40-45
Acrylic co-polymer emulsion	<5.5
Glassfibre	<5.5
Other	<5

Representativity

This declaration, including data collection and the modeled foreground system, represents the production of glassfibre reinforced concrete facade elements from the production site located in Lille Skensved. Product specific data are based on average values collected for the period 2019. Background data are based on supplier specific EPD's and secondary datasets from the GaBi databases, and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Dangerous substances

The concrete elements do not contain substances listed in the "Candidate List of Substances of Very High Concern for authorisation"

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

Essential characteristics (CE)

The glassfibre reinforced concrete (GRC) elements are produced in accordance with the standard EN 1169, which is not a harmonised standard. Furthermore, the GRC elements are produced in accordance with the specification for GRC from the International Glassfibre Reinforced Concrete Association (GRCA). A declaration of conformity is available for all declared product variations.

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

www.bbfiberbeton.dk

Reference Service Life (RSL)

No RSL is declared. This EPD does not include the use stage.

LCA background

Declared unit

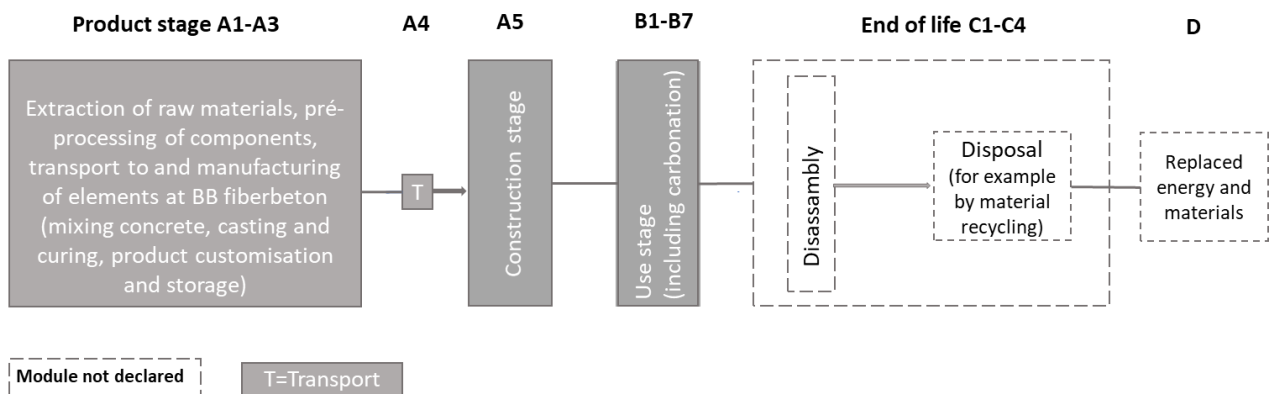
The LCI and LCIA results in this EPD relates to 1 kg concrete elements. The elements have a thickness of 12 mm.

Name	Value	Unit
Declared unit	1	kg
Density	1950	kg/m ³

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804 and the PCR EN 16757:2017.

Flow diagram



Transportation occurs throughout the life cycle, but is only shown in A4.

System boundaries

This EPD is based on a cradle-to-gate with options 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, 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, pre-processing of components, transport to the production

site, packaging and waste processing up to the "end-of-waste" state or final disposal.

Manufacturing processes include concrete mixing, casting and curing, product customisation and storage.

Construction process stage (A4-A5) includes:

A4 – Transport to the building site:

Construction wood transport to building site			
Type of transport and payload capacity	Capacity utilized incl. return (%)	Distance (km)	Diesel consumption (l/tonkm)
Truck (22t)	61	50	1.8E-2

A5 – Installation process, includes both cast-in parts and mounting brackets for installation. Other mounting systems are available, which would lead to different scenarios in the A5 module.

Use stage (B1-B7) includes:

Once the products are installed on the buildings, there is no consumption of materials during use, no maintenance, cleaning or repair/replacements needed for the normal use of BB fiberbeton A/S facade elements, which are strong and durable. Therefore, the only environmental impacts related to the use stage is the carbonation process. The CO₂ uptake by carbonation is included in module B1 and is based on the use of the concrete elements in an outdoor environment with exposure to rain.

LCA results

ENVIRONMENTAL IMPACTS PER KG								
Parameter	Unit	A1	A2	A3	A4	A5	B1	B2-B7
GWP	[kg CO ₂ -eq.]	7,81E-01	5,40E-03	5,85E-02	3,65E-03	2,25E-01	-1,60E-01	0,00E+00
ODP	[kg CFC11-eq.]	1,51E-08	8,35E-19	1,75E-10	5,96E-19	2,57E-15	0,00E+00	0,00E+00
AP	[kg SO ₂ -eq.]	1,82E-03	4,84E-05	1,10E-04	8,30E-06	1,32E-03	0,00E+00	0,00E+00
EP	[kg PO ₄ ³⁻ -eq.]	2,18E-04	6,53E-06	3,57E-05	1,96E-06	6,47E-05	0,00E+00	0,00E+00
POCP	[kg ethene-eq.]	1,12E-04	-1,10E-06	6,12E-06	-2,87E-06	6,68E-05	0,00E+00	0,00E+00
ADPE	[kg Sb-eq.]	6,38E-07	3,34E-10	3,02E-08	2,67E-10	9,47E-06	0,00E+00	0,00E+00
ADPF	[MJ]	8,99E+00	7,15E-02	7,95E-01	4,95E-02	2,70E+00	0,00E+00	0,00E+00
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources							

RESOURCE USE PER KG								
Parameter	Unit	A1	A2	A3	A4	A5	B1	B2-B7
PERE	[MJ]	8,01E-01	3,17E-03	9,24E-01	2,79E-03	6,13E-01	0,00E+00	0,00E+00
PERM	[MJ]	1,09E+00	0,00E+00	6,29E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	1,89E+00	3,17E-03	9,87E-01	2,79E-03	6,13E-01	0,00E+00	0,00E+00
PENRE	[MJ]	7,34E+00	7,17E-02	8,79E-01	4,96E-02	2,92E+00	0,00E+00	0,00E+00
PENRM	[MJ]	1,98E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	9,31E+00	7,17E-02	8,96E-01	4,96E-02	2,92E+00	0,00E+00	0,00E+00
SM	[kg]	1,10E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	7,56E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	4,27E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m ³]	6,54E-03	3,71E-06	9,56E-04	3,23E-06	1,39E-03	0,00E+00	0,00E+00
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 = Use of net fresh water							

WASTE CATEGORIES AND OUTPUT FLOWS PER KG								
Parameter	Unit	A1	A2	A3	A4	A5	B1	B2-B7
HWD	[kg]	4,66E-05	2,59E-09	3,11E-09	2,31E-09	6,96E-09	0,00E+00	0,00E+00
NHWD	[kg]	1,10E-02	1,02E-05	2,80E-03	7,59E-06	3,06E-02	0,00E+00	0,00E+00
RWD	[kg]	2,84E-03	8,67E-08	3,39E-05	6,14E-08	8,77E-05	0,00E+00	0,00E+00

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	6,07E-04	0,00E+00	3,69E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	2,80E-04	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
EET	[MJ]	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							

Additional information

Technical information on scenarios

Transport to the building site (A4)

Parameter	Value	Unit
Diesel	9E-4	L
Transport distance	50	Km
Capacity utilisation (including empty runs)	0.61	%
Gross density of products transported	1950	kg/m ³
Capacity utilisation volume factor	1	-

Installation of the product in the building (A5)

Parameter	Value	Unit
Ancillary materials (steel fittings)	0.066	kg
Water use	0	m ³
Other resource use	0	kg
Energy type and consumption	0	kWh
Waste materials	0	kg
Output materials	0	kg
Direct emissions to air, soil or water	0	kg

Use (B1-B7)

Parameter	Value	Unit
B1	-0.16	Kg CO ₂ -eq



Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

References

Publisher	 http://www.epddanmark.dk
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup http://www.teknologisk.dk
LCA-practitioner	 FORCE Technology Applied Environmental Assessment Park Allé 345 DK-2605 Brøndby www.forcetechnology.com
LCA software /background data	GaBi ts database version 9.5.2.49 incl. databases
3rd party verifier	Ninkie Bendtsen NIRAS Sortemosevej 19 3450 Allerød www.NIRAS.dk

General programme instructions

Version 2.0

www.epddanmark.dk

EN 15804

DS/EN 15804 + A1:2013 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 15942

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

EN 16757

DS/EN 16757:2017 – "Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements"

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”

EN 1169

DS/EN 1169:1999 – “ Precast concrete products – General rules for factory production control of glass-fibre reinforced cement”