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ECO PLATFORM EPD EN 15804 VERIFIED

Owner: Adfil
No.: MD-21074-EN
Issued: 07-01-2022
Valid to: 07-01-2027

3rd PARTY **VERIFIED**

EPD

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

Owner of declaration
Adfil
Industriestraat 39
9240 Zele
Belgium
BE0726.870.587

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
1 kg Adfil microfibres

Number of declared datasets/product variations: 1

Production site
Industriestraat 39
9240 Zele
Belgium

Product(s) use
Adfil microfibres are used as secondary reinforcement in concrete matrices and is added in a rate of 0.5-1 kg/m³ of concrete depending on the application. Typical application areas are in plastic shrinkage reduction, applications such as foundations, floor slabs, precast concrete elements and dry screed, furthermore also in fire resistance with applications mainly in tunnelling. The construction fibres are embedded in the concrete for the entire lifetime of the concrete structure.

Declared/ functional unit
1 kg construction microfibres

Year of data
July 2020 – June 2021

EPD version
First

Issued: 07-01-2022
Valid to: 07-01-2027

Basis of calculation
This EPD is developed 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:

Guangli Du, Aalborg University

Henrik Fred Larsen
EPD Danmark

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	X	X	X	X	X

Product information

Product description

The main product components for 1kg of Adfil microfiber are shown in the table below.

Material	Weight-% of declared product
Polypropylene	97.7%
Additives	2.30%

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of Adfil microfibres on the production site located in Belgium. Product specific data are based on average values collected in the period July 2020 until June 2021. Background data are based on GaBi Professional 2021 and ecoinvent 3.7 databases are less than 10 years old, except for one process, LLDPE, which is used as a packaging material and contributes to less than 0.2% of the total weight. Generally, the used background datasets are of high quality and have a high degree of representativeness.

Picture of product(s)

Hazardous substances

Adfil microfibres 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

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

https://www.adfil.com/home

Reference Service Life (RSL)

RSL of Adfil microfibres is the same as the concrete structure it is embedded in.

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to impacts caused by the production of 1 kg of Adfil microfibres.

Name	Value	Unit
Declared unit	1	kg
Density	905	kg/m^3
Conversion factor to 1 kg.	1	-

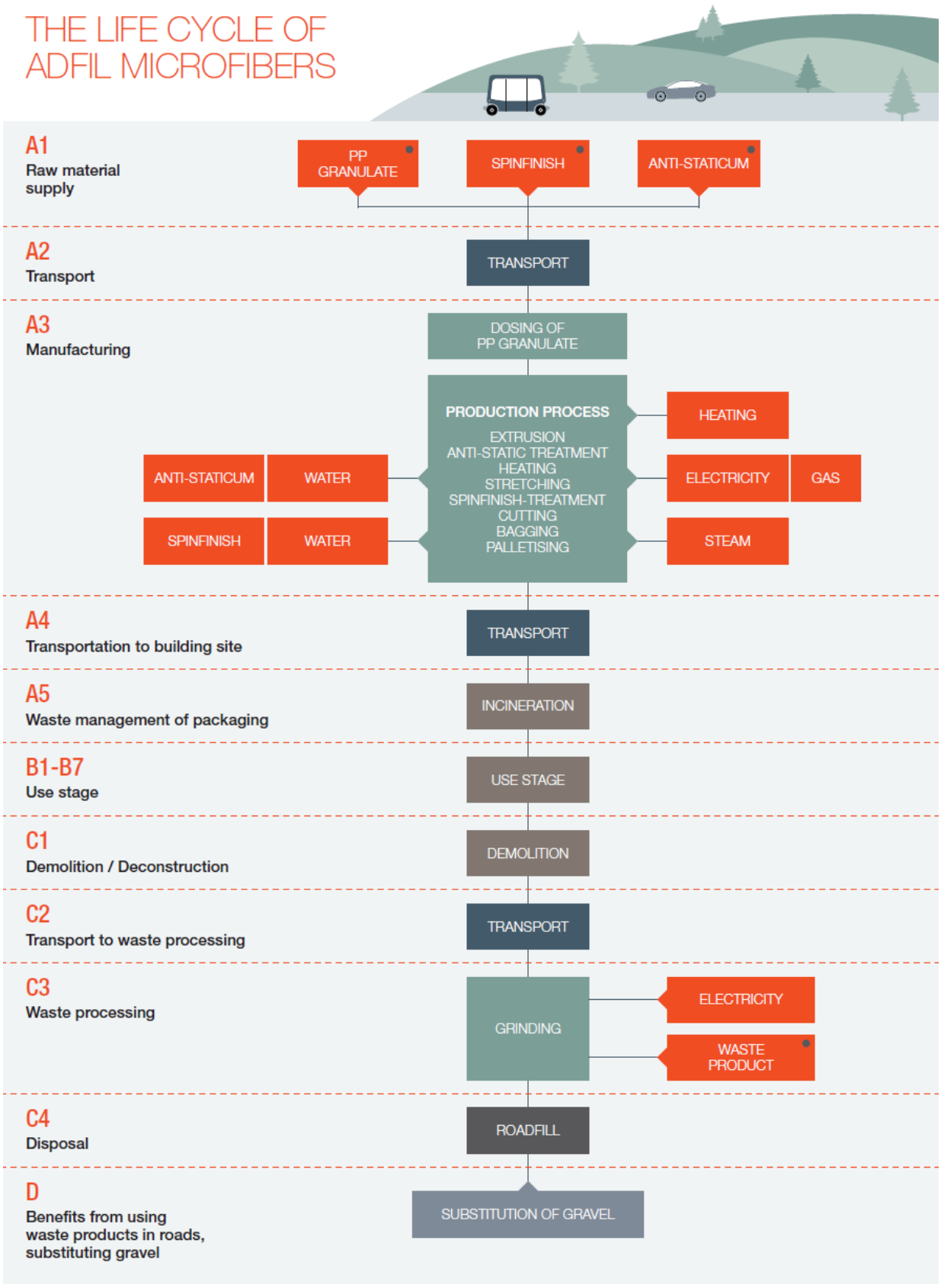
Functional unit

Not defined.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804+A2.

Flowdiagram



System boundary

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

The general rules for the exclusion of inputs and outputs follow 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 and packaging. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

Adfil microfibre production:

Polypropylene (PP) granulate is gravimetrically dosed and mixed in the extruder feeder hopper. This composition is molten and blended in an extruder to a homogeneous polymer melt. After filtration and metering, the liquid polymers are extruded through a die plate where the filaments or film are created. In case of film extrusion, the film is first cut into tapes. To increase the mechanical strength of the filaments, they are drawn out in one step. The filaments undergo a surface treatment step to make the filaments hydrophilic to improve the dispersion in concrete. In case of the tapes (film extrusion), the tapes undergo a fibrillation process to result in a netted structure. In the next step the filaments or tapes are cut into specified length.

The cut fibres are then packed into paper bags or plastic bags or bulk bags. The plastic bag (usually only 1 per box) and the paper bags are put into a cardboard box which are stacked onto a pallet. The pallet is finally wrapped with PE stretch film or PE foil, eventually provided with a pallet cover on request of the customer.

Construction process stage (A4-A5) includes:

A4 – Transportation from the Adfil factory in Belgium to a typical construction site in Europe.

A5 – Accounts for the environmental impacts related to the incineration of the packaging waste handled at the construction site. No impacts are associated with adding Adfil microfibres to the concrete mix.

Use stage (B1-B7) includes:

No impacts are related to the use stage of the product.

End of Life (C1-C4) includes:

C1 – Deconstructing the concrete structure using a mechanical demolition hammer.

C2 – Transportation of the demolished concrete parts to a waste processing site.

C3 – The concrete with Adfil microfiber embedded is grinded to smaller pieces at the size of gravel and used as road fill using a mechanical grinding machine.

C4 – All disposal processes are handled in C1-C3, and no disposal emissions occur in this module, as the entire product is assumed recycled and used as roadfill.

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

D – Adfil microfiber is used as road fill and credited the amount of replaced gravel. The substituted gravel is 0.7 kg/kg Adfil macrofibre.

LCA results

ENVIRONMENTAL IMPACTS PER kg										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1.77E+00	9.28E-02	1.03E-01	0.00E+00	2.61E-04	8.59E-03	0.00E+00	0.00E+00	-1.46E-03
GWP-fossil	[kg CO_2 eq.]	1.88E+00	9.22E-02	1.07E-02	0.00E+00	2.59E-04	8.54E-03	0.00E+00	0.00E+00	-1.50E-03
GWP-biogenic	[kg CO_2 eq.]	-1.15E-01	-1.55E-04	9.24E-02	0.00E+00	8.64E-07	-1.44E-05	0.00E+00	0.00E+00	5.19E-05
GWP-luluc	[kg CO_2 eq.]	7.88E-04	7.48E-04	3.29E-06	0.00E+00	3.76E-07	6.93E-05	0.00E+00	0.00E+00	-7.20E-06
ODP	[kg CFC 11 eq.]	1.16E-09	1.70E-17	1.88E-17	0.00E+00	5.70E-18	1.57E-18	0.00E+00	0.00E+00	-1.33E-17
AP	[mol H^+ eq.]	3.72E-03	1.13E-04	2.61E-05	0.00E+00	5.72E-07	1.04E-05	0.00E+00	0.00E+00	-1.04E-05
EP-freshwater	[kg P eq.]	5.57E-06	2.82E-07	4.10E-09	0.00E+00	6.93E-10	2.61E-08	0.00E+00	0.00E+00	-6.31E-09
EP-marine	[kg N eq.]	9.18E-04	3.59E-05	9.25E-06	0.00E+00	1.27E-07	3.32E-06	0.00E+00	0.00E+00	-4.10E-06
EP-terrestrial	[mol N eq.]	9.74E-03	4.24E-04	1.18E-04	0.00E+00	1.34E-06	3.93E-05	0.00E+00	0.00E+00	-4.51E-05
POCP	[kg NMVOC eq.]	3.84E-03	9.45E-05	2.46E-05	0.00E+00	3.48E-07	8.75E-06	0.00E+00	0.00E+00	-1.18E-05
ADPm[1]	[kg Sb eq.]	7.03E-07	7.47E-09	3.09E-10	0.00E+00	7.51E-11	6.92E-10	0.00E+00	0.00E+00	-2.56E-10
ADPf[1]	[MJ]	7.09E+01	1.23E+00	3.43E-02	0.00E+00	4.56E-03	1.14E-01	0.00E+00	0.00E+00	-2.21E-02
WDP[1]	[m^3 world eq. deprived]	2.50E-01	9.01E-04	1.23E-02	0.00E+00	5.65E-05	8.34E-05	0.00E+00	0.00E+00	-1.66E-04
Caption	GWP-total = Globale 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 kg										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	2.78E-08	7.26E-10	1.53E-10	0.00E+00	4.80E-12	6.72E-11	0.00E+00	0.00E+00	-4.99E-10
IRP[2]	[kBq U235 eq.]	7.47E-02	3.37E-04	2.53E-04	0.00E+00	1.14E-04	3.12E-05	0.00E+00	0.00E+00	-2.39E-04
ETP-fw[1]	[CTUe]	3.78E+01	9.23E-01	1.77E-02	0.00E+00	1.95E-03	8.54E-02	0.00E+00	0.00E+00	-1.23E-02
HTP-c[1]	[CTUh]	8.42E-10	1.91E-11	8.92E-13	0.00E+00	5.39E-14	1.77E-12	0.00E+00	0.00E+00	-9.13E-13
HTP-nc[1]	[CTUh]	3.64E-08	9.66E-10	4.60E-11	0.00E+00	1.96E-12	8.95E-11	0.00E+00	0.00E+00	-9.28E-11
SQP[1]	-	7.69E+00	4.33E-01	9.30E-03	0.00E+00	1.45E-03	4.01E-02	0.00E+00	0.00E+00	-6.05E-03
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 (dimensionless)									
Disclaimers	[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 kg										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	3.49E+00	7.13E-02	6.01E-03	0.00E+00	4.80E-12	6.72E-11	0.00E+00	0.00E+00	-1.46E-03
PERM	[MJ]	1.85E-02	0.00E+00	0.00E+00	0.00E+00	1.14E-04	3.12E-05	0.00E+00	0.00E+00	-1.50E-03
PERT	[MJ]	3.49E+00	7.13E-02	6.01E-03	0.00E+00	1.95E-03	8.54E-02	0.00E+00	0.00E+00	5.19E-05
PENRE	[MJ]	7.10E+01	1.24E+00	3.43E-02	0.00E+00	5.39E-14	1.77E-12	0.00E+00	0.00E+00	-7.20E-06
PENRM	[MJ]	4.39E+01	0.00E+00	0.00E+00	0.00E+00	1.96E-12	8.95E-11	0.00E+00	0.00E+00	-1.33E-17

PENRT	[MJ]	7.10E+01	1.24E+00	3.43E-02	0.00E+00	1.45E-03	4.01E-02	0.00E+00	0.00E+00	-1.04E-05
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.80E-12	6.72E-11	0.00E+00	0.00E+00	-6.31E-09
RSF	[MJ]	0.00E+00	0.00E+00	1.25E-01	0.00E+00	1.14E-04	3.12E-05	0.00E+00	0.00E+00	-4.10E-06
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-03	8.54E-02	0.00E+00	0.00E+00	-4.51E-05
FW	[m^3]	8.61E-03	8.31E-05	2.91E-04	0.00E+00	5.39E-14	1.77E-12	0.00E+00	0.00E+00	-1.18E-05
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 kg

Parameter	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
HWD	[kg]	2.76E-08	5.73E-08	1.68E-10	0.00E+00	1.89E-12	5.30E-09	0.00E+00	0.00E+00	-4.01E-10
NHWD	[kg]	2.99E-02	1.96E-04	3.46E-03	0.00E+00	3.23E-06	1.82E-05	0.00E+00	0.00E+00	-2.91E-02
RWD	[kg]	7.37E-04	2.28E-06	1.65E-06	0.00E+00	6.92E-07	2.11E-07	0.00E+00	0.00E+00	-1.48E-06
CRU	[kg]	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	1.00E-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
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; EE = Exported energy									

BIOGENIC CARBON CONTENT PER kg

Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0
Biogenic carbon content in accompanying packaging	[kg C]	0.03
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

Technical information on scenarios

Transport to the building site (A4)

Scenario information	Value	Unit
Fuel type	Diesel 0.016 L	L
Vehicle type	Truck	
Transport distance	1,000	km
Capacity utilisation (including empty runs)	50	%
Gross density of products transported	905	kg/m
Capacity utilisation volume factor	0.55	

Installation of the product in the building (A5)

Scenario information	Value	Unit
Ancillary materials	0	kg
Water use	0	m^3
Other resource use	0	kg
Energy type and consumption	0	kWh
Waste materials	0.068	kg
Output materials	1	kg
Direct emissions to air, soil or water	0	kg

Reference service life

RSL information	Unit
Reference service Life	Based on concrete structure
Declared product properties	Reinforcement of concrete structures
Design application parameters	As appropriate
Assumed quality of work	As appropriate
Outdoor environment	As appropriate
Indoor environment	As appropriate
Usage conditions	As appropriate
Maintenance	As appropriate

Use (B1-B7)
No impacts in use stage

End of life (C1-C4)

Scenario information	Value	Unit
Collected separately	0	kg
Collected with mixed waste	1	kg
For reuse	0	kg
For recycling	1	kg
For energy recovery	0	kg
For final disposal	0	kg
Assumptions for scenario development		As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Recycled content as road fill	1	kg

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	www.epddanmark.dk
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	*Trine Henriksen and Maria Magnea Steingrimsdottir* COWI A/S Parallelvej 2 2800 Kgs. Lyngby
LCA software /background data	GaBi Professional 2021 and ecoinvent 3.7.1
3rd party verifier	Guangli Du – Associate Professor Aalborg University, Denmark

General programme instructions
Version 2.0
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 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"