

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

StoColor Dryonic® S



The Norwegian EPD Foundation

Owner of the declaration:

Sto SE & Co. KGaA

Product:

StoColor Dryonic® S

Declared unit:

1 kg

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

IBU PCR Part B for coatings with organic binders

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-11160-11111

Registration number:

NEPD-11160-11111

Issue date:

22.05.2025

Valid to:

22.05.2030

EPD software:

LCAno EPD generator ID: 725863

General information

Product

StoColor Dryonic® S

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Declaration number:

NEPD-11160-11111

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR Part B for coatings with organic binders

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 kg StoColor Dryonic® S

Declared unit with option:

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

Functional unit:

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:

Elisabet Amat, GREENIZE projects

(no signature required)

Owner of the declaration:

Sto SE & Co. KGaA
Contact person: Linus Kaltenbach
Phone: +49 7744571010
e-mail: l.kaltenbach@sto.com

Manufacturer:

Sto SE & Co. KGaA
Ehrenbachstraße 1
79780 Stühlingen, Germany

Place of production:

Weizen
Ehrenbachstraße 1
79780 Stühlingen, Germany

Management system:

ISO 14001; ISO 50001; ISO 9001

Organisation no:

DE142834082

Issue date:

22.05.2025

Valid to:

22.05.2030

Year of study:

2023

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. NEPDT143

Developer of EPD: Linus Kaltenbach

Reviewer of company-specific input data and EPD: Angelica Hultin

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

StoColor Dryonic® S is a facade paint with Dryonic® Technology and SunBlock Technology for maximum colour shade variety and stability without the use of biocide film protection. The main components of the product are mineral fillers, a polymer dispersion based binder, water and small amounts of additives. StoColor Dryonic® S can be applied on various substrates by paint brush, by roller, by airless sprayer or by machine.

StoColor Dryonic® S has the following properties:

- biomimetic principle for fastest drying after rain or dew formation
- also available with X-black Technology: heat shield against solar heating
- maximum colour shade variety: all NCS and RAL colour shades including the RAL 2000, 3000, and 5000 ranges, and 4010
- minimum extender material breakdown (not easily scuffed)
- resistance to mechanical stress
- texture-retaining

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

Product specification

The following data is required by the corresponding PCR B. Further information can be found in the Safety Data Sheet on www.sto.de.

1)This product contains substances listed in the candidate list (date: 20.05.2025) exceeding 0.1 percentage by mass: no.

2)This product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: yes.

titanium dioxide, pigment, ≥ 10 - < 20

CAS-nr.: 13463-67-7

3) Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No.528/2012): yes.

1,2-Benzisothiazol-3(2H)-on; in-can preservative;

CAS-nr.: 2634-33-5

Reaction mass of:

5-Chlor-2-methyl-4-isothiazolin-3-on

and

2-Methyl-2H-isothiazol-3-on (3:1); in-can preservative;

CAS-nr.: 55965-84-9

The composition of the product is described in the following table:

Materials	Value	Unit
organic Binder	30 - 40	%
Filler	< 20	%
Water	< 20	%
Pigment	< 20	%
Solvent	< 5	%
Hydrophobic agent	< 5	%
Additive	< 2	%

Technical data:

The technical data stated here is relevant for the use of the declared product. Further information regarding the technical properties can be found in the Technical Data Sheet on www.sto.de. Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

Criterion	Standard/ test specification	Class
Density		1.2 - 1.4 g/cm ³
Water permeability rate w	EN 1062-1	W3 low
Carbon dioxide permeability	EN 1062-6	C1
Diffusion-equivalent air layer thickness	EN ISO 7783-2	V2 medium
Gloss	EN 1062-1	G3

Market:

The main market is Europe.

Reference service life, product

A service life of 20 years is declared, which is according to the Fraunhofer-Institut für Bauphysik the maximum working life of facade paint used for external thermal insulation composite systems (ETICS). [1]

A reference service life (RSL) in accordance with ISO 15686-1,-2,-7, and -8 is not declared.

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 kg StoColor Dryonic® S

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.

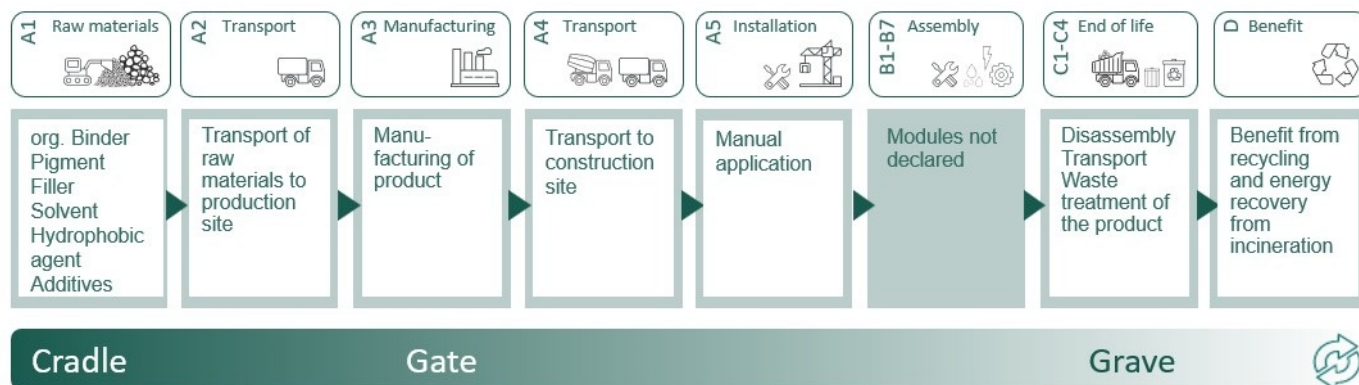
Materials	Source	Data quality	Year
Additives	CEPE RM Database v3.0	Database	2016
Additives	CEPE RM Database v3.0, ecoinvent 3.6	Database	2016
Binders and Resins	CEPE RM Database v3.0	Database	2016
Others	Modified ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Packaging - Wood	Modified ecoinvent 3.6	Database	2019
Pigments and Fillers	CEPE RM Database v3.0	Database	2016
Solvent	CEPE RM Database v3.0	Database	2016
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:

The scope of this EPD is cradle to gate with options, modules C1-C4 and module D. No actions are necessary during User stage.



Additional technical information:

When used as recommended, the waste code can be selected according to the code of the European Waste Catalogue (EWC), category 17.09 "Other Construction and Demolition Waste".

The waste code for unused product is "08 01 12 Waste paint and varnish other than those covered by 08 01 11".

LCA: Scenarios and additional technical information

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

Modules A1-A3 (Manufacturing process): The raw materials are produced by and transported from suppliers. The raw materials are filled in weighting containers and thereafter mixed together. Quality control checks the consistency of the product and adjusts if necessary. The finished product is filled into pails and stored. The product is transported on pallets and delivered to customers with focus on Europe.

A4 (Transport to market/building site): Since the distance to the construction site can vary strongly, a distance of 100 km is used to allow simple scaling for individual projects.

A5 (Installation): The product is applied according to the specification in the technical data sheet at the building site. Installation is generally done manually. Outputs are small amounts of waste from the product itself (assumed to be a maximum of 3%) and waste from packaging materials.

C1 (De-construction, demolition): It is assumed that StoColor Dryonic® S is dismantled using machinery.

C2 (Transport end of life): This stage includes the transportation effects of demolished waste to a waste processing area. The distance between the demolishing area and a waste processing area is assumed to be quite short (less than 100 km).

C3, C4 (Waste processing): Facade paint is not classified as hazardous waste and treated as mixed construction waste. A typical End of life scenario for construction waste in Germany is a mix of recycling and landfill. Since a 100% End-of-life scenario has to be declared according to the PCR, it is assumed as 100% landfill.

D (Environmental costs and benefits of recycling and reuse): Energy credit related to energy recovery from the incineration is included in module D.

Stages not included:

Once installation is complete, no actions or technical operations are required during the use stage until the end of life stage. Stages B1-B7 are therefore not included.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (kgkm)	36,7 %	100	0,043	l/tkm	4,30
Assembly (A5)	Unit	Value			
Waste, packaging, polyethylene, PE plastic parts, to average treatment (kg)	kg	0,020			
Waste, packaging, pallet, EUR wooden pallet, reusable, average treatment (kg)	kg	0,033			
Material loss, including waste treatment (psc)	Units	0,030			
De-construction demolition (C1)	Unit	Value			
Electricity, Germany (kWh)	kWh	0,013			
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (kgkm)	36,7 %	100	0,043	l/tkm	4,30
Disposal (C4)	Unit	Value			
Waste, inert waste, to landfill (kg)	kg	1,00			
Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of thermal energy, district heating (MJ)	MJ	0,017			
Substitution of electricity (MJ)	MJ	0,0011			
Substitution of electricity, in Norway (MJ)	MJ	0,00012			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	0,0019			

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	2,09E+00	9,79E-03	8,16E-03	1,72E-02	5,17E-02	7,62E-03	1,72E-02	0	8,22E-03	-1,15E-04
	GWP-fossil	kg CO ₂ -eq	2,14E+00	9,79E-03	6,57E-03	1,72E-02	1,67E-03	7,48E-03	1,72E-02	0	8,20E-03	-1,11E-04
	GWP-biogenic	kg CO ₂ -eq	-4,60E-02	4,05E-06	7,17E-04	7,12E-06	5,00E-02	1,26E-04	7,12E-06	0	9,58E-06	-2,30E-07
	GWP-luluc	kg CO ₂ -eq	7,39E-05	3,48E-06	8,76E-04	6,12E-06	1,36E-07	9,07E-06	6,12E-06	0	2,02E-06	-3,83E-06
	ODP	kg CFC11 -eq	2,97E-07	2,22E-09	5,58E-10	3,90E-09	1,04E-10	2,93E-10	3,90E-09	0	3,11E-09	-8,10E-06
	AP	mol H ⁺ -eq	1,52E-02	2,81E-05	8,12E-06	4,95E-05	2,36E-06	2,17E-05	4,95E-05	0	7,30E-05	-9,16E-07
	EP-FreshWater	kg P -eq	4,72E-04	7,82E-08	3,65E-08	1,37E-07	3,87E-09	1,13E-06	1,37E-07	0	9,30E-08	-9,88E-09
	EP-Marine	kg N -eq	2,19E-03	5,57E-06	2,77E-06	9,79E-06	1,98E-06	3,36E-06	9,79E-06	0	2,71E-05	-2,99E-07
	EP-Terrestrial	mol N -eq	2,27E-02	6,23E-05	2,09E-05	1,09E-04	8,81E-06	5,32E-05	1,09E-04	0	2,99E-04	-3,24E-06
	POCP	kg NMVOC-eq	7,87E-03	2,38E-05	6,47E-06	4,19E-05	2,78E-06	1,01E-05	4,19E-05	0	8,56E-05	-8,93E-07
	ADP-minerals&metals ¹	kg Sb-eq	1,06E-05	2,70E-07	4,10E-08	4,75E-07	9,36E-09	6,22E-08	4,75E-07	0	7,39E-08	-1,11E-09
	ADP-fossil ¹	MJ	3,40E+01	1,48E-01	6,18E-02	2,60E-01	7,22E-03	1,02E-01	2,60E-01	0	2,26E-01	-1,59E-03
	WDP ¹	m ³	2,03E+01	1,43E-01	7,59E+00	2,52E-01	2,45E-02	1,03E+00	2,52E-01	0	1,39E+00	-1,98E-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	2,26E-07	6,01E-10	5,40E-11	1,05E-09	4,00E-11	8,40E-11	1,05E-09	0	1,56E-09	-5,50E-11
 IRP ²	kgBq U235 -eq	2,99E+02	6,47E-04	4,29E-05	1,14E-03	3,22E-05	3,20E-04	1,14E-03	0	1,03E-03	-1,02E-05
 ETP-fw ¹	CTUe	1,43E+01	1,10E-01	4,43E-02	1,93E-01	6,98E-03	8,69E-02	1,93E-01	0	1,23E-01	-8,65E-03
 HTP-c ¹	CTUh	9,82E-09	0,00E+00	2,00E-12	0,00E+00	0,00E+00	2,00E-12	0,00E+00	0	5,00E-12	0,00E+00
 HTP-nc ¹	CTUh	4,93E-07	1,20E-10	6,20E-11	2,11E-10	9,00E-12	8,70E-11	2,11E-10	0	8,90E-11	-9,00E-12
 SQP ¹	dimensionless	6,34E+00	1,04E-01	-1,94E-02	1,82E-01	1,20E-02	2,41E-02	1,82E-01	0	8,69E-01	-1,06E-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 = $9,0 \cdot 10^{-3}$ = 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	1,45E+00	2,12E-03	8,56E-02	3,72E-03	1,80E-04	1,85E-02	3,72E-03	0	8,08E-03	-9,82E-03	
 PERM	MJ	4,58E-01	0,00E+00	0,00E+00	0,00E+00	-4,58E-01	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	
 PERT	MJ	1,91E+00	2,12E-03	8,56E-02	3,72E-03	-4,58E-01	1,85E-02	3,72E-03	0	8,08E-03	-9,82E-03	
 PENRE	MJ	3,64E+01	1,48E-01	6,18E-02	2,60E-01	7,22E-03	1,02E-01	2,60E-01	0	2,26E-01	-1,59E-03	
 PENRM	MJ	8,71E-01	0,00E+00	0,00E+00	0,00E+00	-8,71E-01	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	
 PENRT	MJ	3,73E+01	1,48E-01	6,18E-02	2,60E-01	-8,63E-01	1,02E-01	2,60E-01	0	2,26E-01	-1,59E-03	
 SM	kg	3,73E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	
 RSF	MJ	7,78E-03	7,58E-05	1,80E-05	1,33E-04	4,75E-06	5,78E-03	1,33E-04	0	1,68E-04	-1,72E-06	
 NRSF	MJ	1,46E-03	2,71E-04	2,38E-05	4,76E-04	1,52E-05	1,87E-05	4,76E-04	0	3,62E-04	-5,82E-04	
 FW	m ³	3,09E-01	1,58E-05	6,66E-04	2,78E-05	3,92E-06	4,63E-05	2,78E-05	0	2,78E-04	-1,18E-05	

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	1,14E-02	7,63E-06	1,04E-03	1,34E-05	0,00E+00	1,01E-05	1,34E-05	0	0,00E+00	-7,47E-08
	NHWD	kg	1,60E+00	7,20E-03	1,55E-03	1,27E-02	2,22E-02	4,28E-04	1,27E-02	0	1,00E+00	-3,76E-05
	RWD	kg	6,90E-05	1,01E-06	5,93E-08	1,77E-06	0,00E+00	4,11E-07	1,77E-06	0	0,00E+00	-8,32E-09

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

"Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3}$ = 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,14E-02	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	6,19E-04	0,00E+00	1,05E-02	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
	MER	kg	0,00E+00	0,00E+00	4,81E-03	0,00E+00	1,64E-03	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
	EEE	MJ	0,00E+00	0,00E+00	2,93E-03	0,00E+00	1,27E-03	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	4,43E-02	0,00E+00	1,92E-02	0,00E+00	0,00E+00	0	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 = $9,0 \cdot 10^{-3}$ = 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	1,36E-02

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	Source	Amount	Unit
Electricity, low voltage, 100% hydro, certificate, 01.01.2023-31.12.2023, Germany (kWh)	Modified ecoinvent 3.6	60,95	g CO ₂ -eq/kWh

Dangerous substances

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

Indoor environment

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	2,14E+00	9,79E-03	8,00E-03	1,72E-02	1,67E-03	8,19E-03	1,72E-02	0	8,21E-03	-1,14E-04

GWPIOBC: 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

Ruud and Iversen (2023) EPD generator for PCR IBU Part B: Requirements on the EPD for Coatings with organic binders, LCA.no report number: 13.23

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