

Environmental Product Declaration

In accordance with 14025 and EN15804 +A2

Reinforced concrete stair flights and landings



The Norwegian
EPD Foundation

Owner of the declaration:
Skonto Prefab SIA



Product name:
Reinforced concrete stair flights and landings

Declared unit:
1 tonne

Product category /PCR:
NPCR PART A: Construction products and services Version: 2.0 and NPCR 020 Part B for concrete and concrete elements

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3902-2862-EN

Registration number:
NEPD-3902-2862-EN

Issue date: 16.11.2022

Valid to: 16.11.2027

General information

Product:

Reinforced concrete stair flights and landings

Program Operator:

The Norwegian EPD Foundation
 Post Box 5250 Majorstuen, 0303 Oslo, Norway
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Declaration Number:

NEPD-3902-2862-EN

This declaration is based on Product Category Rules:

NPCR PART A: Construction products and services
 Version: 2.0 and NPCR 020 Part B for concrete and concrete elements

Statements:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidence.

Declared unit:

1 tonne of reinforced concrete stair flights and landings

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal

external

Sign



Elisabet Amat

Independent verifier approved by EPD Norway

Owner of the declaration:

Skonto Prefab SIA

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Manufacturer:

Skonto Prefab SIA

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 Salaspils parish LV-2119,
 Latvia

Phone: +371 67256829
 e-mail: info@skontoprefab.lv

Place of production:

Granita Street 31 k. 1 Acone, Salaspils parish LV-2119, Latvia

Management system:

EN 13369, EN 14843, ISO 9001, ISO 14001, PEFC ST 2002

Organization no:

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Issue date:

16.11.2022

Valid to:

16.11.2027

Year of study:


2022

Comparability:

EPDs from other programs than EPD Norge may not be comparable.

The EPD has been worked out by:

Bureau Veritas Latvia



Approved Manager of EPD Norway

Product

Product description:

Reinforced concrete stair flights and landings. This is a prefabricated product and is widely used in industrial and public housing projects. The stair height and weight can be changed on demand to adjust to the specifics of the customer's project. The product's lifespan is 50 years, and it is manufactured only within one plant.

Product specification:

The product composition is cement, sand, water, dolomite, reinforcement, acrylic-based polymer blend (additive) and steel mesh.

Materials	KG	%
Cement	141,29	13,91
Sand (fr. 0-4 mm)	323,88	31,89
Water	59,22	5,83
Dolomite (fr. 2/8, 8/16 and 2/16)	448,35	44,15
Reinforcement	41,77	4,12
Additive	0,97	0,10
Total	1015,48	100
Packaging materials	KG	%
Wood spacer	0,003	100

Technical data:

Product is manufactured based on EN 13369, EN 14843 standards, and product's technical information is:

- Length – up to 9 m, Width – up to 4,3 m, Thickness – up to 0.6 m;
- Weight from up to 8,7 T;
- Density 2430 kg/m³.

Market:

Nordic market

Reference service life, product:

50 years

LCA: Calculation rules

Declared unit:

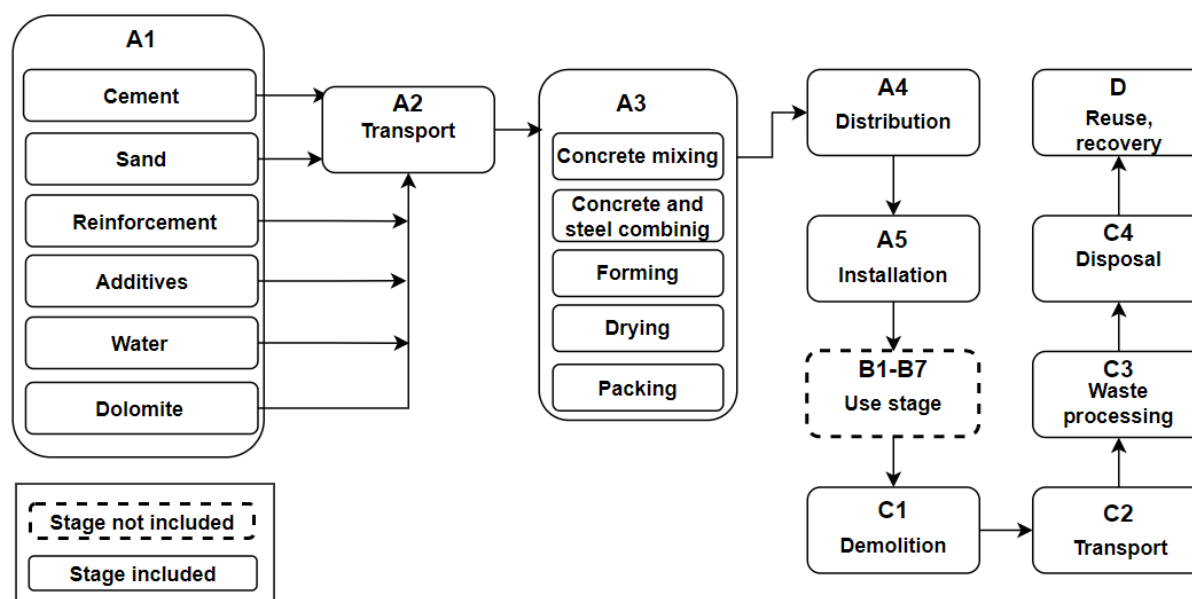
1 tonne of reinforced concrete stair flights and landings

Data quality:

The production data are from 2021, the database data are from 2013 – 2021 i.e., no data is older than 10 years. Ecoinvent 3.8 database and is SimaPro 9.4 software is used for conducting LCA.

Allocation:

Heat, electricity, and other energy use, and waste in production are allocated by product mass based on production data for 2021. The allocation is made following the provisions of NPCR PART A: Construction products and services Version: 2.0 and NPCR 020 Part B for concrete and concrete elements. Incoming energy and water together with waste production in-house are allocated equally among all products through mass allocation. For manufacturing processes and raw materials, the specific country’s mix of heat and electricity was considered. For secondary data on materials’ flow information has been gathered from Ecoinvent 3.8. database. The recycling process and transportation of the material are allocated to this analysis. The processes excluded from the analysis are environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process and personnel-related impacts.



System boundary:

LCA is “Cradle to gate with options, A4-A5, and modules C1-C4 and D”. All major materials, production energy use, and waste are included for product stages A1, A2, A3, A4, A5, C1, C2, C3, C4, and D; the modules B1-B7 are not included. All life cycle impacts are included, see flowchart above. The following information describes the scenarios in the different modules of the EPD. It must be noted that all major raw materials and all the essential energy are included.

Cut-off criteria:

The marginal production process for raw materials and energy flows with a cut-off of 1% not included in the Ecoinvent database is not considered. This cut-off rule does not apply to

hazardous materials and substances, and it is consistent with EN 15804+A2.

LCA: Scenarios and additional technical information

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

Product stage (A1, A2, A3):

- Raw material supply (A1)

The materials needed to produce stair flights and landings are - cement, sand, water, dolomite, and reinforcement. The acrylic-based polymer blend is used in the process but has not been included in the calculation because its quantity is less than 1% in mass.

- Transport of raw materials (A2)

Assumptions for transportation distances are based on manufacturers' data: cement is transported for 135 km, sand for 27 km, acrylic-based polymer for 982 km, dolomite for 98 km, steel mesh for 3846 km, steel bar for 325 km, wood spacer for 50 km, and wood forms for 30 km.

- Manufacturing (A3)

This product stage includes ingredient mixing to create reinforced concrete, forming, drying, and packing of the final product. It includes energy consumption (electricity), use of water, as well as waste and emissions produced within the manufacturing stage.

Transport from production place to assembly/user (A4)

Type	Capacity utilization (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	Value (l/t)
Sweden					
Truck	35%	Lorry,16-32t, EURO6	27,00	0,0431 l/tkm	1,16
Truck	35%	Lorry,16-32t, EURO6	26,91	0,0431 l/tkm	1,16
Boat	-	Ferry	475,99	0,0399 l/tkm	18,99
Latvia					
Truck	35%	Lorry,16-32t, EURO6	25,00	0,0431 l/tkm	1,08

The main share of manufactured product (70%) is delivered from the manufacturer, Skonto Prefab SIA, that is in Salaspils, Latvia to a Riga port by a truck (27 km), and then the product is transported by a boat to a port in Sweden (476 km). From there, it is transported to a construction site in 27 km distance from port. The other share of the produced product (30%) is delivered to a local construction site in Latvia by a truck 25 km. The empty return rate is included in the data from the Ecoinvent database used in this calculation.

Assembly (A5)

	Unit	Value
Auxiliary	m3	0,0059
Water consumption	m3	0
Electricity consumption	kWh	47,57
Other energy carriers	MJ	0
Material loss	Kg	0
Output materials from waste treatment	Kg	0
Dust in the air	Kg	0

Module A5 includes concrete construction installation in a building. Auxiliary material cement is included. Additional packaging waste is not included, because the wood spacer is reused multiple times. Processes regarding machinery production are excluded.

End of Life (C1, C3, C4)

- Demolition (C1)

Based on “NPCR 020 Part B for concrete and concrete elements” the assumption that demolition is performed by excavator with a demolition hammer, and sorting process is done by small excavator.

- Waste processing (C3)

The waste processing phase includes procedures of reinforced concrete sorting and decompositions from other possible building materials. Based on Ecoinvent data reinforced concrete waste is sorted, and 33% of reinforced concrete is recyclable material and 67% of reinforced concrete is disposable material.

- Disposal (C4)

Type	Unit	Value
Hazardous waste disposed	Kg	0
Collected as mixed construction waste	Kg	1000
Reuse	Kg	0
Recycling	Kg	330
Energy recovery	Kg	0
To landfill	Kg	670

Based on Ecoinvent data it is assumed that at this stage 67% of reinforced concrete waste is disposed of at landfill.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	Value (l/t)
Truck	35%	Lorry, 21t	50	0,0988 l/tkm	4,49

Average waste transportation for 50 km by municipal waste collection truck is assumed.

Benefits and loads beyond the system boundaries (D)

Material	Unit	Value
Reinforced concrete	kg	330

Based on previous assumptions in modules C1 – C4, that where made based on Ecoinvent data only 33% of stair flights and landings are recovered and recycled.

LCA: Results

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
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	

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1,94E+02	1,50E+01	-7,95E+00	4,40E+01	3,87E+00	5,31E+00	6,39E+01	5,31E+00	9,43E+00	-8,02E+00
GWP-fossil	kg CO2 eq.	1,92E+02	1,50E+01	2,50E+01	4,40E+01	3,63E+00	5,31E+00	6,39E+01	5,27E+00	9,40E+00	-7,96E+00
GWP-biogenic	kg CO2 eq.	1,71E+00	1,37E-02	-3,30E+01	4,77E-03	9,32E-02	1,98E-03	1,96E-02	3,33E-02	1,09E-02	-1,95E-02
GWP-LULUC	kg CO2 eq.	1,48E-01	6,01E-03	7,79E-02	2,70E-02	1,49E-01	5,26E-04	7,02E-03	3,36E-03	1,72E-02	-4,25E-02
ODP	kg CFC11 eq.	8,74E-06	3,48E-06	3,71E-06	8,99E-06	2,01E-07	1,13E-06	1,39E-05	1,09E-06	2,64E-06	-1,59E-06
AP	mol H ⁺ eq.	7,87E-01	4,27E-02	1,98E-01	1,22E+00	1,60E-02	2,86E-02	4,04E-01	4,68E-02	8,54E-02	-4,58E-02
EP-freshwater	kg P eq.	7,36E-02	9,84E-04	9,31E-03	1,59E-03	1,07E-03	1,63E-04	1,14E-03	1,19E-03	6,61E-04	-8,67E-04
EP-marine	kg N eq.	1,89E-01	8,67E-03	6,47E-02	3,03E-01	4,82E-03	1,14E-02	1,62E-01	1,85E-02	3,36E-02	-1,57E-02
EP-terrestrial	mol N eq.	1,94E+00	9,45E-02	6,52E-01	3,37E+00	4,79E-02	1,25E-01	1,78E+00	2,01E-01	3,68E-01	-1,70E-01
POCP	kg NMVOC eq.	6,70E-01	3,63E-02	1,89E-01	8,75E-01	1,17E-02	3,44E-02	6,28E-01	5,58E-02	1,04E-01	-5,03E-02
ADP-M&M	kg Sb eq.	1,56E-03	5,33E-05	1,63E-04	7,15E-05	4,51E-05	2,71E-06	5,57E-05	1,42E-05	1,75E-05	-5,26E-05
ADP-fossil	MJ	1,82E+03	2,28E+02	4,76E+02	5,80E+02	2,93E+02	7,22E+01	8,70E+02	8,77E+01	1,81E+02	-1,17E+02
WDP	m ³	4,49E+01	6,93E-01	2,77E+01	1,07E+00	3,95E+00	1,13E-01	7,84E-01	1,22E+00	4,65E+00	-5,31E-01

GWP-total: Global Warming Potential; **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; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	2,24E-05	1,21E-06	3,49E-06	1,71E-06	2,16E-07	3,43E-07	9,01E-06	4,86E-06	6,94E-06	-8,72E-07
IRP	kBq U235 eq.	1,88E+01	1,17E+00	5,30E+00	2,69E+00	2,03E+01	3,26E-01	3,89E+00	7,77E-01	8,23E-01	-5,73E-01
ETP-fw	CTUe	5,13E+03	1,79E+02	7,04E+02	3,69E+02	1,20E+02	4,23E+01	4,88E+02	5,76E+01	1,21E+02	-1,14E+02
HTP-c	CTUh	7,44E-07	5,75E-09	1,48E-07	2,33E-08	3,10E-09	4,43E-09	8,74E-09	2,50E-09	3,94E-09	-6,47E-09
HTP-nc	CTUh	3,96E-06	1,81E-07	5,01E-07	2,69E-07	6,27E-08	2,50E-08	3,32E-07	4,68E-08	9,25E-08	-1,23E-07
SQP	Dimensionless	6,70E+02	1,59E+02	4,26E+03	1,40E+02	7,89E+01	9,20E+00	1,52E+02	7,44E+01	2,40E+02	-9,03E+01

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil qual

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	Acidification potential, Accumulated Exceedance (AP)	None
ILCD type / level 2	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2
<p>Disclaimer 1 – 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.</p>		
<p>Disclaimer 2 – 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</p>		

Resource use

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	1,65E+02	2,44E+00	4,06E+01	3,16E+00	1,02E+02	3,14E-01	2,40E+00	3,42E+00	1,19E+00	-1,52E+00
RPEM	MJ	3,88E+01	8,13E-01	8,67E+02	1,39E+00	1,49E+01	9,27E-02	9,90E-01	6,18E-01	6,16E-01	-8,86E-01
TPE	MJ	2,04E+02	3,26E+00	9,08E+02	4,55E+00	1,17E+02	4,06E-01	3,39E+00	4,03E+00	1,80E+00	-2,40E+00
NRPE	MJ	1,82E+03	2,28E+02	4,76E+02	5,80E+02	2,93E+02	7,22E+01	8,70E+02	8,77E+01	1,81E+02	-1,17E+02
NRPM	MJ	2,23E-01	9,59E-03	6,70E-02	3,52E-02	1,82E-02	1,03E-03	1,24E-02	5,26E-03	1,06E-01	-2,75E-01
TRPE	MJ	1,82E+03	2,28E+02	4,76E+02	5,80E+02	2,93E+02	7,22E+01	8,70E+02	8,77E+01	1,81E+02	-1,17E+02
SM	kg	7,38E+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	0,00E+00
RSF	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	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	0,00E+00
W	m ³	2,04E+00	2,58E-02	7,93E-01	3,78E-02	2,86E-01	4,12E-03	3,23E-02	4,02E-02	1,13E-01	-1,82E-02

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE 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; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HW	KG	6,15E-03	5,94E-04	6,10E-04	7,17E-04	6,81E-05	1,98E-04	2,34E-03	1,81E-04	3,71E-04	-8,33E-04
NHW	KG	4,42E+01	1,19E+01	1,97E+01	6,90E+00	1,26E+00	9,64E-02	4,42E+00	8,70E+01	6,72E+02	-6,58E+00
RW	KG	6,92E-03	1,54E-03	2,07E-03	4,02E-03	4,39E-03	4,99E-04	6,14E-03	5,89E-04	1,20E-03	-7,51E-04

HW Hazardous waste disposed; NHW Non-hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
CR	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	0,00E+00
MR	kg	0,00E+00	0,00E+00	2,70E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,30E+02	0,00E+00	3,30E+02
MER	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	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	0,00E+00
ETE	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	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: $9,0 \text{ E-03} = 9,0 \cdot 10^{-3} = 0,009$

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	198,79

Additional Norwegian requirements

Greenhouse gas emission 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).

National electricity grid	Unit	Value
Latvian electricity grid (from Ecoinvent 3.8.)	kg CO2 -eq/kWh	0,158

Additional environmental impact indicators required in NPCR Part A for construction products

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 of Swedish public procurement legislation.

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO2 eq.	1,92 E+02	1,50 E+01	2,50 E+01	4,40 E+01	3,78 E+00	5,31 E+00	6,39 E+01	5,28 E+00	9,42 E+00	-8,00 E+00

GWP-IOBC global warming potential calculated according to the principle of instantaneous oxidation.

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contains dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskitfen, Annex III), see table.

Indoor environment





The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

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	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products

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