epd-norge
Global program operatør

Pending publication with EPD-Norge

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Steni Protego

The Norwegian EPD Foundation

Owner of the declaration:
Steni AS

ID 60640 Steni Protego

Declared unit:
1 m2

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR and NPCR - Part B 010 Part B for Building Boars. Ver. 3.0 NPCR 010:2019 Part B for Building boards

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:
27.03.2028

EPD software:
LCAno EPD generator ID: 301940

General information

Product

ID 60640 Steni Protego

Owner of the declaration:

Steni AS
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Program operator:

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Manufacturer:

Steni AS

Declaration number:

Pending publication with EPD-Norge

Place of production:

Steni AS
Lågendalsveien 2633
3277 STEINSHOLT, Norway

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR and NPCR - Part B 010 Part B for Building Boars. Ver. 3.0
NPCR 010:2019 Part B for Building boards

Management system:

ISO 9001:2015, sert. no.: 0102916

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.

Organisation no:

918 150 145

Declared unit:

1 m2 Steni Protego

Issue date:

Declared unit with option:

A1-A3,A4,A5,B2,C1,C2,C3,C4,D

Valid to:

27.03.2028

Year of study:

2020

Functional unit:

1 m2 of roofing board with a specific function, from cradle-to-grave, with activities needed for a study period of 60 years for the building

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

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

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.

Collected/registered by: Jan Marius Kruse

Reviewer of company-specific input data and EPD: Jan Marius Kruse

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.

Approved:

Sign

Third party verifier:

Håkon Hauan, CEO EPD-Norge

Michael M. Jenssen, Asplan Viak AS

(no signature required

Product

Product description:

Steni Protego is a robust stone-composite panel with
a smooth surface designed for use as exterior ventilated roof-cladding
on all types of buildings. The panels consist of several layers of materials
that are hardened and cured to give durability and a long-lasting surface.

Product specification

Steni Protego comes in standard formats 1195x1195mm and 595x595mm. In addition panesl for right/left and top/bottom of the roof is available.

Materials	kg	%
Additives	0,06	0,46
Binder	2,63	19,28
Coating materials	0,12	0,84
Filler/aggregate	10,25	75,07
Reinforcement	0,59	4,35
Total	13,65	

Packaging	kg	%
Packaging - Plastic	0,01	2,49
Packaging - Wood	0,51	97,51
Total incl. packaging	14,17	

Technical data:

STENI Protego is 6mm thick fiberglass-rainforced stone composite panel with a core of crushed stone, with an avrage wight of 12kg/m2. The panel comes in various colors,

Market:

Main markets; Europe

Reference service life, product

The panel has 60 years as referance service life under normal conditions, assuming installation, use and maintenance instructions are followed.

Reference service life, building

60 years

LCA: Calculation rules

Declared unit:

1 m2 Steni Protego

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. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other LCA databases. The data quality of the raw materials in A1 is presented in the table below.

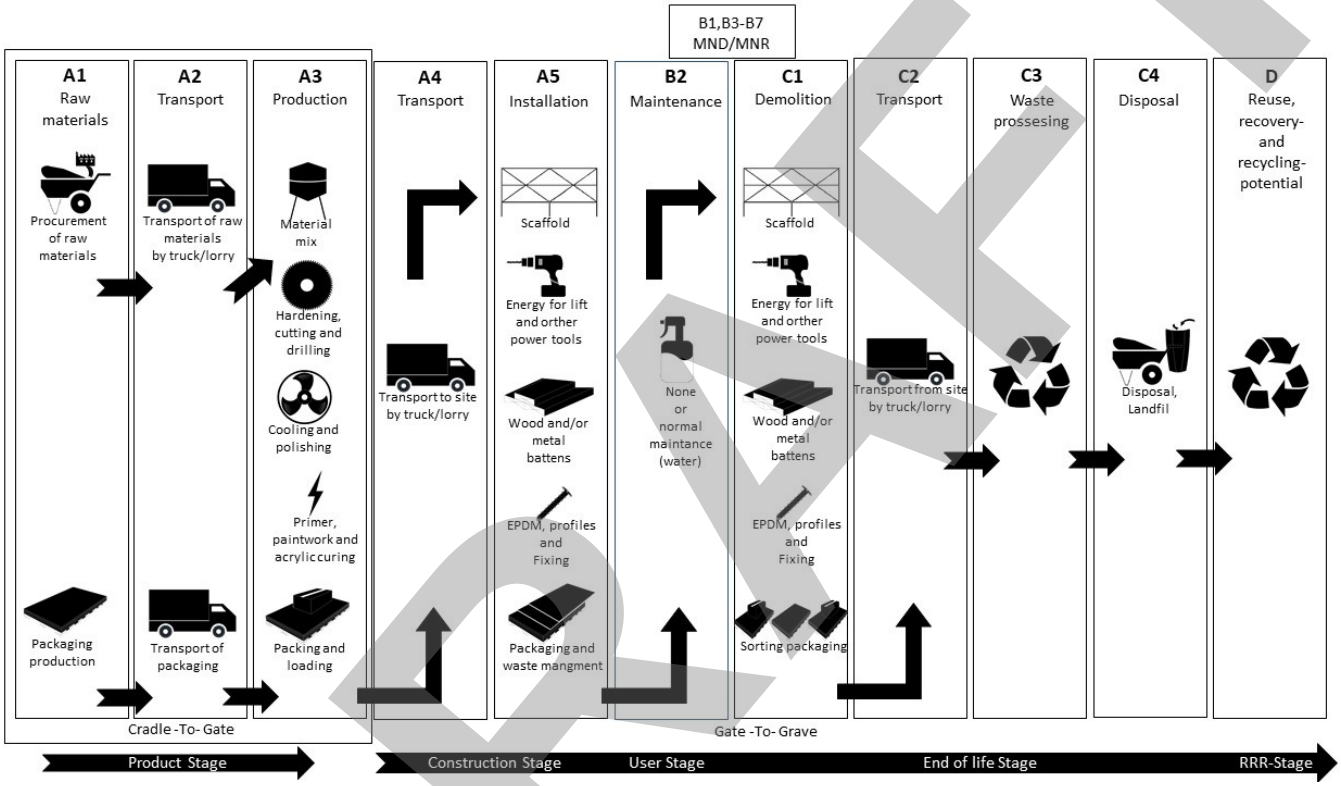
Materials	Source	Data quality	Year
Additives	ecoinvent 3.6	Database	2019
Additives	EPD-EFC-20210196-IBG1-EN	EPD	2021
Binder	ecoinvent 3.6	Database	2019
Binder	ecoinvent 3.6	Database	2020
Coating materials	ecoinvent 3.6	Database	2019
Filler/aggregate	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Packaging - Wood	ecoinvent 3.6	Database	2019
Reinforcement	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	MNR	X	MNR	MNR	MNR	MNR	MNR	X	X	X	X	X

System boundary:

The analysis as shown includes "Cradel To Gate" with the modules A1-A3, and with options A4, A5, B2, C1,C2,C3 and C4.



Additional technical information:

Fire class: B(ROOF) t2 according to EN 13501-5.
TDS is available from www.steni.com

LCA: Scenarios and additional technical information

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

The only maintenance neaded is cleaning with water approximately every 10th year.

After end of life, the panels will be taken down and reused. Panels that cannt be reused is sent to disposal

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonn)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	300	0,023	l/tkm	6,90

Assembly (A5)	Unit	Value			
Electricity mix, Norway	kWh/DU	0,01			
Glue (metals) (kg)	kg/DU	0,15			
Steel details (kg)	kg/DU	0,02			
Waste, mixed plastic, to average treatment (kg)	kg	0,01			
Waste, packaging wood (kg)	kg	0,51			
Wood lath, white (kg)	kg/DU	1,75			

Maintenance (B2)/Repair (B3)	Unit	Value			
Water (l)	kg/DU	0,03			

End of Life (C1, C3, C4)	Unit	Value			
Electricity mix, Norway	kWh/DU	0,01			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonn)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	50	0,043	l/tkm	2,15

Waste processing (C3)	Unit	Value			
Components to reuse in C3	kg/DU	12,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of Steni Colour (kg)	m2/DU	1,00			

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-A3	A4	A5	B2	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	2,31E+01	3,14E-01	6,85E-01	1,04E-05	1,06E-04	9,81E-02	0,00E+00	0	-2,26E+01
	GWP-fossil	kg CO_2 -eq	2,40E+01	3,14E-01	6,76E-01	1,03E-05	1,02E-04	9,80E-02	0,00E+00	0	-2,35E+01
	GWP-biogenic	kg CO_2 -eq	-8,40E-01	1,34E-04	1,39E-03	6,48E-08	3,04E-06	4,06E-05	0,00E+00	0	8,41E-01
	GWP-luluc	kg CO_2 -eq	1,26E-02	9,55E-05	7,74E-03	1,67E-08	4,50E-07	3,49E-05	0,00E+00	0	-1,24E-02
	ODP	kg CFC11 -eq	2,40E-06	7,56E-08	9,98E-08	1,00E-12	7,00E-12	2,22E-08	0,00E+00	0	-2,30E-06
	AP	mol H+ -eq	1,42E-01	1,01E-03	3,14E-03	6,00E-08	4,11E-07	2,82E-04	0,00E+00	0	-1,37E-01
	EP-FreshWater	kg P -eq	7,11E-04	2,49E-06	6,75E-05	8,22E-10	4,37E-09	7,83E-07	0,00E+00	0	-7,07E-04
	EP-Marine	kg N -eq	2,34E-02	2,21E-04	6,85E-04	9,51E-09	7,16E-08	5,57E-05	0,00E+00	0	-2,22E-02
	EP-Terrestial	mol N -eq	2,61E-01	2,47E-03	7,35E-03	1,11E-07	8,96E-07	6,23E-04	0,00E+00	0	-2,49E-01
	POCP	kg NMVOC -eq	1,18E-01	9,68E-04	4,42E-03	3,48E-08	2,35E-07	2,39E-04	0,00E+00	0	-1,14E-01
	ADP-minerals&metals[1]	kg Sb-eq	3,08E-04	5,59E-06	1,39E-05	2,88E-10	2,57E-09	2,71E-06	0,00E+00	0	-2,97E-04
	ADP-fossil[1]	MJ	3,71E+02	5,09E+00	1,15E+01	1,76E-04	1,42E-03	1,48E+00	0,00E+00	0	-3,64E+02
	WDP[1]	m^3	1,07E+03	3,90E+00	6,90E+01	3,15E-03	2,64E-01	1,43E+00	0,00E+00	0	-1,06E+03

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

"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
3. Eutrophication aquatic freshwater shall be in kg P-eq., there is a typo in EN 15804:2012+A2:2019 regarding this unit. Eutrophication calculated as PO4-eq is presented on page 11

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
	PM	Disease incidence	1,47E-06	2,88E-08	2,97E-08	1,00E-12	4,00E-12	6,00E-09	0,00E+00	0	-1,50E-06
	IRP[2]	kgBq U235 -eq	7,80E-01	2,23E-02	3,03E-02	1,22E-06	2,72E-05	6,48E-03	0,00E+00	0	-7,48E-01
	ETP-fw[1]	CTUe	7,26E+02	3,72E+00	2,02E+01	1,90E-04	2,49E-03	1,10E+00	0,00E+00	0	-7,21E+02
	HTP-c[1]	CTUh	7,04E-08	0,00E+00	1,39E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	-7,00E-08
	HTP-nc[1]	CTUh	7,49E-07	3,60E-09	1,52E-08	1,00E-12	3,00E-12	1,20E-09	0,00E+00	0	-7,44E-07
	SQP[1]	dimensionless	1,53E+02	5,84E+00	1,17E+02	4,91E-05	6,70E-04	1,04E+00	0,00E+00	0	-1,49E+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*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-A3	A4	A5	B2	C1	C2	C3	C4	D
	PERE	MJ	4,53E+01	6,41E-02	3,21E+01	2,39E-05	1,96E-02	2,12E-02	0,00E+00	0	-4,52E+01
	PERM	MJ	7,08E+00	0,00E+00	2,45E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	-7,08E+00
	PERT	MJ	5,24E+01	6,41E-02	5,66E+01	2,39E-05	1,96E-02	2,12E-02	0,00E+00	0	-5,23E+01
	PENRE	MJ	4,08E+02	5,09E+00	9,01E+00	1,76E-04	1,43E-03	1,48E+00	0,00E+00	0	-4,01E+02
	PENRM	MJ	1,48E+01	0,00E+00	2,63E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	-1,48E+01
	PENRT	MJ	4,22E+02	5,09E+00	1,16E+01	1,76E-04	1,43E-03	1,48E+00	0,00E+00	0	-4,15E+02
	SM	kg	8,78E-02	0,00E+00	6,47E-03	6,45E-07	1,95E-06	0,00E+00	0,00E+00	0	-8,78E-02
	RSF	MJ	7,19E-01	2,24E-03	1,95E-02	1,91E-06	1,53E-05	7,59E-04	0,00E+00	0	-7,16E-01
	NRSF	MJ	2,38E-01	7,51E-03	3,46E-02	1,89E-06	4,03E-05	2,71E-03	0,00E+00	0	-2,25E-01
	FW	m^3	4,60E-01	5,80E-04	8,31E-03	3,02E-05	1,46E-04	1,58E-04	0,00E+00	0	-4,60E-01

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; 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; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net 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-A3	A4	A5	B2	C1	C2	C3	C4	D
	HWD	kg	4,76E-01	2,79E-04	7,75E-03	3,33E-08	2,69E-07	7,64E-05	0,00E+00	0	-4,76E-01
	NHWD	kg	7,78E+00	4,43E-01	9,71E-02	2,13E-06	1,12E-04	7,21E-02	0,00E+00	0	-7,51E+00
	RWD	kg	8,58E-04	3,48E-05	2,97E-05	1,03E-09	1,33E-08	1,01E-05	0,00E+00	0	-8,09E-04

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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	-2,42E-01
	MFR	kg	2,42E-01	0,00E+00	1,09E-02	6,09E-07	1,54E-06	0,00E+00	0,00E+00	0	-3,97E-02
	MER	kg	3,97E-02	0,00E+00	3,49E-03	1,89E-08	1,56E-07	0,00E+00	0,00E+00	0	-7,58E-01
	EEE	MJ	7,57E-01	0,00E+00	3,58E-01	3,72E-08	1,57E-07	0,00E+00	0,00E+00	0	-1,15E+01
	EET	MJ	1,15E+01	0,00E+00	5,42E+00	5,64E-07	2,37E-06	0,00E+00	0,00E+00	0	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 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	3,44E-03
Biogenic carbon content in accompanying packaging	kg C	2,12E-01

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	Data source	Amount	Unit
Electricity mix, Norway	ecoinvent 3.6	21,18	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

Not relevant

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products										
Indicator	**Unit**	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	2,22E+01	3,14E-01	6,74E-01	1,04E-05	1,19E-04	9,81E-02	0,00E+00	0	

GWP-IOBC: 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.
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