

# Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

## Protan SE 1.6 Roofing Membrane



The Norwegian EPD Foundation

**Owner of the declaration:**

Protan AS

**Produkt:**

Protan SE 1.6 Roofing Membrane

**Declared unit:**

1 m<sup>2</sup>

**This declaration is based on Product Category Rules:**

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

NPCR 022:2018 Part B for Roof waterproofing

**Program operator:**

The Norwegian EPD Foundation

**Declaration number:**

NEPD-5291-4617-EN

**Registration number:**

NEPD-5291-4617-EN

**Issue date:**

02.11.2023

**Valid to:**

02.11.2028

**EPD Software:**

LCA.no EPD generator ID: 113838

## General information

### Product:

Protan SE 1.6 Roofing Membrane

### Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway  
The Norwegian EPD Foundation  
Phone: +47 23 08 80 00  
web: [post@epd-norge.no](mailto:post@epd-norge.no)

### Declaration number:

NEPD-5291-4617-EN

### This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
NPCR 022:2018 Part B for Roof waterproofing

### 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 m<sup>2</sup> Protan SE 1.6 Roofing Membrane

### Declared unit (cradle to gate) with option:

A1-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:

Protan AS  
Contact person: Sara Salman  
Phone: +47 94 01 78 58  
e-mail: [Sara.Salman@protan.no](mailto:Sara.Salman@protan.no)

### Manufacturer:

Protan AS

### Place of production:

Protan AS  
Baches vei 1  
3413 Lier, Norway

### Management system:

ISO 9001 (95-OSL-AQ-6343) og ISO 14001 (NO 97-OSL-SYMI-8015)

### Organisation no:

983 599 060

### Issue date:

02.11.2023

### Valid to:

02.11.2028

### Year of study:

2022

### 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. NEPDT10

Developer of EPD: Øyvind Johnstad Ruud

Reviewer of company-specific input data and EPD: Lars Anisdahl

### Approved:



Håkon Hauan, CEO EPD-Norge

## Product:

### Product description:

Protan SE1,6 is a high quality polyester reinforced thermoplastic waterproofing membrane with high tensile and tear strength.

Protan SE 1,6 is used on exposed roof surfaces. The membrane can be mechanically fastened to the load bearing substrate or installed in a Protan vacuum roof system. The membrane can be used on roofs of all shapes and sizes – whether flat, sloped or curved. The membrane is used on warm/compact roof constructions as well as cold/ventilated constructions.

### Product specification

Protan SE1,6 contains stabilizers which makes the product resistant to high and low temperatures, UV-resistant and flame retardant.

Materials	Value	Unit
PVC	40-42	%
Plasticizer	31-33	%
Polyester textile	5-6	%
Fire-, heat- and UV-stabilizers	20-24	%

### Technical data:

Weight: 1850 g/m<sup>2</sup>

DoP: DoP315-SE-16-E

TG: <https://www.sintefcertification.no/Product/Index/10>

CPR: <https://www.sintefcertification.no/Product/Index/3546>

### Market:

Europe

### Reference service life, product

Typical 40 years

### Reference service life, building

60 years

## LCA: Calculation rules

### Declared unit:

1 m<sup>2</sup> Protan SE 1.6 Roofing Membrane

### 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:

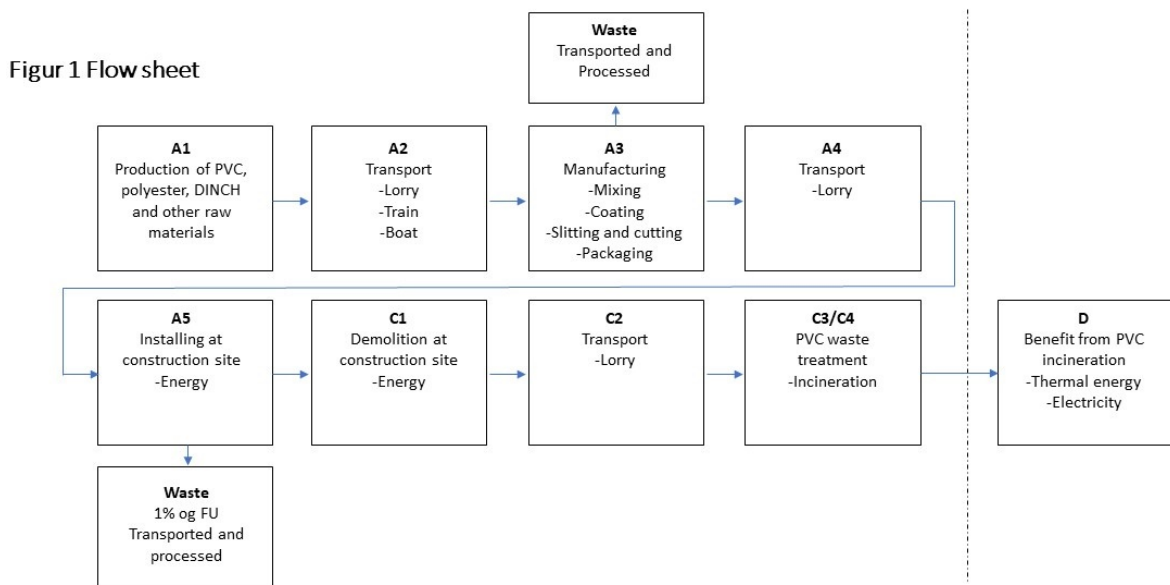
Specific data for the product composition are provided by the manufacturer. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other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

Materials	Source	Data quality	Year
Chemical	ecoinvent 3.6	Database	2019
E-PVC	ecoinvent 3.6	Database	2019
Fillers	ecoinvent 3.6	Database	2019
Fire-, heat- and UV-stabilizers	ecoinvent 3.6	Database	2019
Packaging	ecoinvent 3.6	Database	2019
Plasticizer	ecoinvent 3.6	Database	2019
Polyester textile	ecoinvent 3.6	Database	2019
S-PVC	ecoinvent 3.6	Database	2019
Chemical	LCA.no	Database	2021

### 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:



### Additional technical information:














## LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	300	0,023	l/tkm	6,90
Assembly (A5)					
	Unit	Value			
Electricity, Norway (kWh)	kWh/DU	0,07			
Product loss during installation (percentage of product)	Units/DU	0,02			
Waste, packaging, core board, to average treatment (kg)	kg	0,18			
Waste, packaging, pallet, EUR wooden pallet, single use, average treatment (kg)	kg	0,22			
Waste, packaging, plastic film (LDPE), to average treatment (kg)	kg	0,00			
Transport to waste processing (C2)					
	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	1500	0,023	l/tkm	34,50
Waste processing (C3)					
	Unit	Value			
Waste treatment per kg Polyvinylchloride (PVC) membrane, incineration (kg)	kg/DU	1,85			
Disposal (C4)					
	Unit	Value			
Landfilling of ashes from incineration of Polyvinylchloride (PVC) membrane (kg)	kg	0,29			
Benefits and loads beyond the system boundaries (D)					
	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	1,89			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	28,63			

## 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	C1	C2	C3	C4	D	
 GWP-total	kg CO <sub>2</sub> -eq	3,60E+00	4,84E-02	7,07E-01	0	2,42E-01	3,71E+00	7,00E-02	-1,72E-01	
 GWP-fossil	kg CO <sub>2</sub> -eq	4,21E+00	4,83E-02	8,50E-02	0	2,42E-01	3,71E+00	7,00E-02	-1,66E-01	
 GWP-biogenic	kg CO <sub>2</sub> -eq	-6,14E-01	2,07E-05	6,22E-01	0	1,04E-04	1,51E-03	3,38E-05	-3,43E-04	
 GWP-luluc	kg CO <sub>2</sub> -eq	6,49E-03	1,47E-05	1,23E-04	0	7,36E-05	2,90E-04	8,53E-06	-5,72E-03	
 ODP	kg CFC11 -eq	1,01E-06	1,17E-08	1,96E-08	0	5,83E-08	1,22E-07	4,50E-09	-1,21E-02	
 AP	mol H+ -eq	2,54E-02	1,56E-04	5,20E-04	0	7,78E-04	2,14E-03	1,93E-04	-1,37E-03	
 EP-FreshWater	kg P -eq	2,68E-04	3,85E-07	4,90E-06	0	1,92E-06	1,09E-05	9,98E-07	-1,48E-05	
 EP-Marine	kg N -eq	4,49E-03	3,41E-05	1,05E-04	0	1,70E-04	5,23E-04	5,57E-05	-4,47E-04	
 EP-Terrestrial	mol N -eq	5,15E-02	3,80E-04	1,19E-03	0	1,90E-03	5,61E-03	6,47E-04	-4,83E-03	
 POCP	kg NMVOC -eq	1,79E-02	1,49E-04	3,91E-04	0	7,46E-04	1,59E-03	1,73E-04	-1,33E-03	
 ADP-minerals&metals <sup>1</sup>	kg Sb -eq	2,16E-02	8,61E-07	3,78E-04	0	4,31E-06	7,81E-06	2,19E-07	-1,65E-06	
 ADP-fossil <sup>1</sup>	MJ	9,75E+01	7,85E-01	1,85E+00	0	3,93E+00	4,88E+00	4,31E-01	-2,37E+00	
 WDP <sup>1</sup>	m <sup>3</sup>	2,72E+02	6,02E-01	8,79E+00	0	3,01E+00	9,96E+01	7,32E+00	-2,96E+01	







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<sup>-3</sup> = 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-A3	A4	A5	C1	C2	C3	C4	D	
 PM	Disease incidence	2,32E-07	4,44E-09	5,00E-09	0	2,22E-08	1,39E-08	1,78E-09	-8,29E-08	
 IRP <sup>2</sup>	kgBq U235 -eq	1,70E-01	3,43E-03	3,87E-03	0	1,72E-02	2,37E-02	2,29E-03	-1,52E-02	
 ETP-fw <sup>1</sup>	CTUe	2,28E+02	5,74E-01	4,24E+00	0	2,87E+00	2,34E+02	1,22E+00	-1,29E+01	
 HTP-c <sup>1</sup>	CTUh	4,66E-09	0,00E+00	9,80E-11	0	0,00E+00	5,20E-10	6,40E-11	-2,36E-10	
 HTP-nc <sup>1</sup>	CTUh	1,28E-07	5,55E-10	2,85E-09	0	2,78E-09	5,50E-08	2,43E-09	-1,24E-08	
 SQP <sup>1</sup>	dimensionless	5,64E+01	9,00E-01	1,08E+00	0	4,50E+00	1,78E+00	1,40E+00	-1,59E+01	

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)

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 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	C1	C2	C3	C4	D	
 PERE	MJ	9,98E+00	9,88E-03	4,65E-01	0	4,94E-02	6,22E-01	3,87E-02	-1,47E+01	
 PERM	MJ	5,42E+00	0,00E+00	-5,33E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 PERT	MJ	1,54E+01	9,88E-03	-4,86E+00	0	4,94E-02	6,22E-01	3,86E-02	-1,47E+01	
 PENRE	MJ	6,44E+01	7,85E-01	1,27E+00	0	3,93E+00	4,88E+00	4,31E-01	-2,37E+00	
 PENRM	MJ	3,72E+01	0,00E+00	5,16E-01	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 PENRT	MJ	1,01E+02	7,85E-01	1,79E+00	0	3,93E+00	4,88E+00	4,31E-01	-2,37E+00	
 SM	kg	1,71E-01	0,00E+00	3,00E-03	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 RSF	MJ	2,10E-01	3,45E-04	3,98E-03	0	1,73E-03	1,13E-02	9,51E-04	-2,57E-03	
 NRSF	MJ	5,36E-02	1,16E-03	2,08E-03	0	5,79E-03	0,00E+00	6,31E-03	-8,69E-01	
 FW	m <sup>3</sup>	9,56E-02	8,93E-05	3,89E-03	0	4,47E-04	1,17E-01	4,01E-04	-1,77E-02	

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<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed








End of life - Waste										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 HWD	kg	1,47E-02	4,30E-05	2,72E-04	0	2,15E-04	0,00E+00	2,65E-02	-1,12E-04	
 NHWD	kg	6,45E-01	6,82E-02	4,13E-01	0	3,41E-01	0,00E+00	2,68E-01	-5,61E-02	
 RWD	kg	1,57E-04	5,36E-06	3,04E-06	0	2,68E-05	0,00E+00	1,00E-06	-1,24E-05	

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

\*Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

End of life - Output flow										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 CRU	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 MFR	kg	2,54E-03	0,00E+00	1,69E-01	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 MER	kg	2,36E-03	0,00E+00	2,27E-01	0	0,00E+00	1,85E+00	0,00E+00	0,00E+00	
 EEE	MJ	1,94E-03	0,00E+00	1,59E-01	0	0,00E+00	1,89E+00	0,00E+00	0,00E+00	
 EET	MJ	2,93E-02	0,00E+00	2,41E+00	0	0,00E+00	2,86E+01	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\*10<sup>-3</sup> = 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	1,73E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

## 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, Norway (kWh)	ecoinvent 3.6	24,33	g CO <sub>2</sub> -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-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO <sub>2</sub> -eq	4,12E+00	4,84E-02	7,47E-02	0	2,42E-01	3,72E+00	7,33E-02	-1,70E-01

GWPI-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.  
 ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.  
 Iversen et al., (2018) eEPD v3.0 - Background information for EPD generator system. LCA.no report number 04.18.  
 Ruttenborg et al., (2023) EPD generator for NPCR022:2022 Part B for Roof waterproofing - Background information for EPD generator application and LCA data, LCA.no report number 10.23  
 NPCR Part A: Construction products and services. Ver. 2.0. March 2021, EPD-Norge.  
 NPCR 022 Part B for Roof waterproofing. Ver. 2.0 March 2022, EPD-Norge.

 <b>epd-norway</b> <small>Global Program Operator</small>	<b>Program operator and publisher</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 23 08 80 00 e-mail: <a href="mailto:post@epd-norge.no">post@epd-norge.no</a> web: <a href="http://www.epd-norge.no">www.epd-norge.no</a>
	<b>Owner of the declaration:</b> Protan AS Baches vei 1, 3413 Lier	Phone: +47 94 01 78 58 e-mail: <a href="mailto:Sara.Salman@protan.no">Sara.Salman@protan.no</a> web: <a href="http://www.protan.no">www.protan.no</a>
	<b>Author of the Life Cycle Assessment</b> LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: <a href="mailto:post@lca.no">post@lca.no</a> web: <a href="http://www.lca.no">www.lca.no</a>
	<b>Developer of EPD generator</b> LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: <a href="mailto:post@lca.no">post@lca.no</a> web: <a href="http://www.lca.no">www.lca.no</a>
	ECO Platform ECO Portal	web: <a href="http://www.eco-platform.org">www.eco-platform.org</a> web: ECO Portal