

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

|                                |                              |
|--------------------------------|------------------------------|
| Owner of the declaration:      | Protan AS                    |
| Program operator:              | The Norwegian EPD            |
| Publisher:                     | Foundation The Norwegian EPD |
| Declaration number:            | Foundation                   |
| Registration number:           | NEPD-2036-909-EN             |
| ECO Platform reference number: | NEPD-2036-909-EN             |
| Issue date:                    | 00001116                     |
| Valid to:                      | 31.01.2020                   |
|                                | 31.01.2025                   |

## Protan SE 1,2 Roofing Membrane

Protan AS



[www.epd-norge.no](http://www.epd-norge.no)



## General information

### Product:

Protan SE 1,2 Roofing Membrane

### Program operator:

The Norwegian EPD Foundation  
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### Declaration number:

NEPD-2036-909-EN

### ECO Platform reference number:

00001116

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

CEN Standard EN 15804:2012+A1:2013 serves as core PCR

### 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 m2 Protan SE 1,2 Roofing Membrane

### Declared unit with option:

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

### Functional unit:

### Verification:

Independent verification of data, other environmental information and the declaration according to ISO14025:2010, § 8.1.3 and § 8.1.4

External

Third party verifier:

Sign



Senior Research Scientist, Anne Rønning

(Independent verifier approved by EPD Norway)

### Owner of the declaration:

Protan AS  
Contact person: Olav Haugerud  
Phone: +47 95 94 23 24  
e-mail: [olav.haugerud@protan.no](mailto:olav.haugerud@protan.no)

### Manufacturer:

Protan AS

### Place of production:

Drammen, Norway

### Management system:

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

### Organisation no:

983 599 060

### Issue date: 31.01.2020

### Valid to: 31.01.2025

### Year of study:

2019

### Comparability:

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

### Author of the Life Cycle Assessment:

The declaration is developed using eEPD v3.0 from LCA.no

Approval:

Company specific data are:

Collected/registered by: Sara Salman

Internal verification by:

### Approved:

Sign



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

Protan SE1,2 is a high quality polyester reinforced thermoplastic waterproofing membrane with high tensile and tear strength.

Protan SE 1,2 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 SE1,2 contains stabilizers which makes the product resistant to high and low temperatures, UV-resistant and flame retardant.

| Materials                      | %     |
|--------------------------------|-------|
| PVC                            | 40-42 |
| Plasticizer                    | 31-33 |
| Polyester textile              | 5 -7  |
| Fire-, heat-and UV-stabilizers | 20-23 |

### Technical data:

Vekt: 1400 g/m<sup>2</sup>

DoP: DoP315-SE-12-E

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

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

### Market:

Europe

### Reference service life, product

Typical 35 years.

### Reference service life, building

60 years.

## LCA: Calculation rules

### Declared unit:

1 m<sup>2</sup> Protan SE 1,2 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. Each product type is manufactured on a specific machine at Protan and has its own measuring system for energy consumption. Therefore, allocation is not relevant for calculating energy consumption in A3. The environmental impact and resource consumption for primary production of recycled materials is allocated to the original product system. Processing and transportation of the material to the production site is allocated to the analysis in this EPD

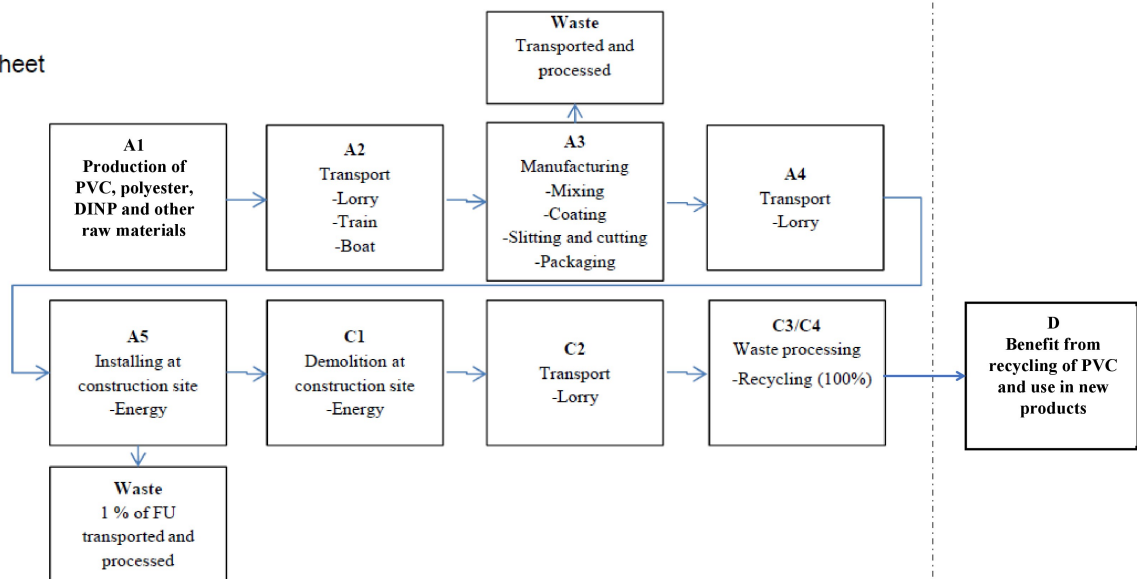
### Data quality:

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 |
|---------------------------------|-----------------------------------|--------------|------|
| Chemicals                       | Chemicals below cut-off           | No data      | 0    |
| Plasticizer                     | PlasticsEurope, Eco-profile DINP  | EPD          | 2014 |
| E-PVC                           | PlasticsEurope, Eco-profile E-PVC | EPD          | 2014 |
| S-PVC                           | PlasticsEurope, Eco-profile S-PVC | EPD          | 2014 |
| Fillers                         | ecoinvent 3.4                     | Database     | 2017 |
| Fire-, heat- and UV-stabilizers | ecoinvent 3.4                     | Database     | 2017 |
| Polyester textile               | Modified ecoinvent 3.4            | Database     | 2017 |

System boundary:

Figure 1 Flow sheet



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)

| Type                 | Capacity utilisation (incl. return) % | Type of vehicle                             | Distance km | Fuel/Energy consumption | Unit  | Value (l/t) |
|----------------------|---------------------------------------|---------------------------------------------|-------------|-------------------------|-------|-------------|
| Truck                | 75,0 %                                | Truck, lorry over 32 tonnes, EURO 6, CU 75% | 300         | 0,019773                | l/tkm | 5,93        |
| Railway              |                                       |                                             |             |                         | l/tkm |             |
| Boat                 |                                       |                                             |             |                         | l/tkm |             |
| Other Transportation |                                       |                                             |             |                         | l/tkm |             |

### Assembly (A5)

| .                                     | Unit           | Value  |
|---------------------------------------|----------------|--------|
| Auxiliary                             | kg             |        |
| Water consumption                     | m <sup>3</sup> |        |
| Electricity consumption               | kWh            | 0,0690 |
| Other energy carriers                 | MJ             |        |
| Material loss                         | kg             | 0,0175 |
| Output materials from waste treatment | kg             | 0,3992 |
| Dust in the air                       | kg             |        |
| VOC emissions                         | kg             |        |

### End of Life (C1, C3, C4)

| .                                     | Unit | Value  |
|---------------------------------------|------|--------|
| Hazardous waste disposed              | kg   |        |
| Collected as mixed construction waste | kg   |        |
| Reuse                                 | kg   |        |
| Recycling                             | kg   | 1,4000 |
| Energy recovery                       | kg   |        |
| To landfill                           | kg   |        |

### Transport to waste processing (C2)

| Type                 | Capacity utilisation (incl. return) % | Type of vehicle                             | Distance km | Fuel/Energy consumption | Unit  | Value (l/t) |
|----------------------|---------------------------------------|---------------------------------------------|-------------|-------------------------|-------|-------------|
| Truck                | 75,0 %                                | Truck, lorry over 32 tonnes, EURO 6, CU 75% | 1500        | 0,019773                | l/tkm | 29,66       |
| Railway              |                                       |                                             |             |                         | l/tkm |             |
| Boat                 |                                       |                                             |             |                         | l/tkm |             |
| Other Transportation |                                       |                                             |             |                         | l/tkm |             |

..

### Benefits and loads beyond the system boundaries (D)

| .                            | Unit  | Value |
|------------------------------|-------|-------|
| Erstatting av takbelegg (kg) | kg/DU | 1,40  |

## LCA: Results

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

| Product stage |           |               |           |          | Construction installation stage | User 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 | Deconstruction 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                                  |

## Environmental impact

| Parameter | Unit                                 | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|-----------|--------------------------------------|----------|----------|----------|----|----------|----------|----|-----------|
| GWP       | kg CO <sub>2</sub> -eq               | 3,54E+00 | 3,01E-02 | 4,35E-02 | 0  | 1,51E-01 | 3,32E-02 | 0  | -2,79E+00 |
| ODP       | kg CFC11 -eq                         | 1,39E-06 | 6,30E-09 | 2,10E-09 | 0  | 3,15E-08 | 1,55E-09 | 0  | -3,08E-06 |
| POCP      | kg C <sub>2</sub> H <sub>4</sub> -eq | 1,32E-03 | 4,64E-06 | 1,15E-05 | 0  | 2,32E-05 | 2,81E-06 | 0  | -7,84E-04 |
| AP        | kg SO <sub>2</sub> -eq               | 1,34E-02 | 7,69E-05 | 9,20E-05 | 0  | 3,85E-04 | 1,03E-04 | 0  | -7,07E-03 |
| EP        | kg PO <sub>4</sub> <sup>3-</sup> -eq | 1,60E-02 | 1,06E-05 | 1,34E-04 | 0  | 5,31E-05 | 1,56E-04 | 0  | -1,32E-03 |
| ADPM      | kg Sb -eq                            | 1,14E-05 | 6,26E-08 | 6,39E-08 | 0  | 3,13E-07 | 4,76E-08 | 0  | -1,82E-05 |
| ADPE      | MJ                                   | 7,84E+01 | 4,96E-01 | 1,91E-01 | 0  | 2,48E+00 | 3,72E-01 | 0  | -6,61E+01 |

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

\*INA Indicator Not Assessed

## Resource use

| Parameter | Unit           | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|-----------|----------------|----------|----------|----------|----|----------|----------|----|-----------|
| RPEE      | MJ             | 7,05E+00 | 8,83E-03 | 2,85E-01 | 0  | 4,42E-02 | 8,19E-02 | 0  | -5,18E+00 |
| RPEM      | MJ             | 8,23E-02 | 0,00E+00 | 7,13E-04 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00  |
| TPE       | MJ             | 7,13E+00 | 8,83E-03 | 2,86E-01 | 0  | 4,42E-02 | 8,19E-02 | 0  | -5,18E+00 |
| NRPE      | MJ             | 5,65E+01 | 5,11E-01 | 2,11E-01 | 0  | 2,55E+00 | 5,11E-01 | 0  | -5,07E+01 |
| NRPM      | MJ             | 3,38E+01 | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 | 0,00E+00 | 0  | -2,90E+01 |
| TRPE      | MJ             | 9,03E+01 | 5,11E-01 | 2,11E-01 | 0  | 2,55E+00 | 5,11E-01 | 0  | -7,97E+01 |
| SM        | kg             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00  |
| RSF       | MJ             | 4,81E-04 | 0,00E+00 | 4,90E-05 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00  |
| NRSF      | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00  |
| W         | m <sup>3</sup> | 6,54E-02 | 1,20E-04 | 2,72E-04 | 0  | 6,00E-04 | 1,81E-04 | 0  | -1,08E-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 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

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

\*INA Indicator Not Assessed

## End of life - Waste

| Parameter | Unit | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|-----------|------|----------|----------|----------|----|----------|----------|----|-----------|
| HW        | kg   | 8,50E-04 | 2,60E-07 | 1,96E-07 | 0  | 1,30E-06 | 1,84E-06 | 0  | -2,56E-03 |
| NHW       | kg   | 2,37E+00 | 4,69E-02 | 3,87E-02 | 0  | 2,34E-01 | 7,67E-03 | 0  | -1,75E-02 |
| RW        | kg   | INA*     | INA*     | INA*     | 0  | INA*     | INA*     | 0  | INA*      |

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

| Parameter | Unit | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D        |
|-----------|------|----------|----------|----------|----|----------|----------|----|----------|
| CR        | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 |
| MR        | kg   | 0,00E+00 | 0,00E+00 | 1,74E-01 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 |
| MER       | kg   | 0,00E+00 | 0,00E+00 | 2,01E-01 | 0  | 0,00E+00 | 0,00E+00 | 0  | 0,00E+00 |
| EEE       | MJ   | INA*     | INA*     | INA*     | 0  | INA*     | INA*     | 0  | INA*     |
| ETE       | MJ   | INA*     | INA*     | INA*     | 0  | INA*     | INA*     | 0  | INA*     |

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 =  $9,0 \cdot 10^{-3}$  = 0,009

\*INA Indicator Not Assessed

## Additional Norwegian 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                       |
|---------------------------|---------------|--------|----------------------------|
| Elektrisitet, Norge (kWh) | ecoinvent 3.4 | 31,04  | g CO <sub>2</sub> -ekv/kWh |

### Dangerous substances

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

### Indoor environment

## 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+A1:2013 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.

Iversen et al., (2018) EPD-generator for Protan AS, Bakgrunnsrapport og livsløpsdata, LCA.no report number 02.08.

NPCR Part A: Construction products and services. Ver. 1.0. April 2017, EPD-Norge.

NPCR 022 Part B for Roof waterproofing. Ver. 2.0 June 2018, EPD-Norge.

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