

Product

Product description:

Protan EX 1,6 is a high quality polyester reinforced thermoplastic waterproofing membrane with high tensile and tear strength. The Product has a polyester fleece backing and is specially designed for re-roofing of bitumen roofs.

Product specification

Protan EX 1,6 contains stabilizers which makes the product resistant to high and low temperature, UV-resistant and flame retardant.

Fire test documentation for different substrates is available on request.

Materials	%
PVC	38-40
Plasticizer	30-32
Polyester textile	8-10
Fire-, heat-and UV-stabilizers	20-22

Technical data:

Vekt: 2030 g/m²

DoP: DoP315-EX-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 m² Protan EX 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. 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

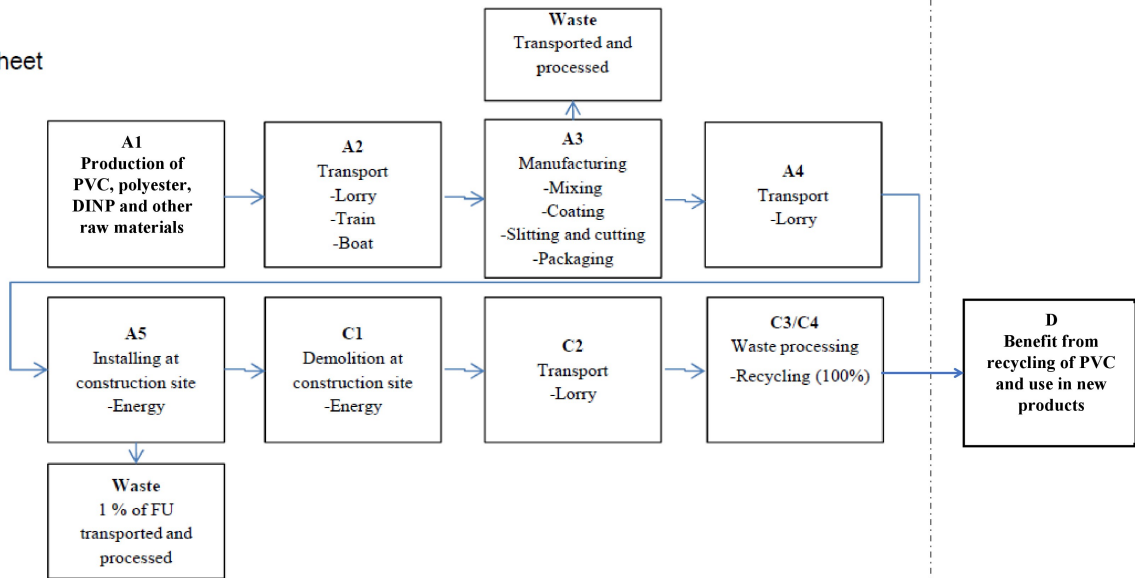
Data quality:

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 DIMP	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
Filt	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 ³	
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	2,0300
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	

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Benefits and loads beyond the system boundaries (D)

.	Unit	Value
Erstatting av takbelegg (kg)	kg/DU	2,03

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	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		

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ -eq	5,05E+00	4,37E-02	4,35E-02	0	2,18E-01	4,82E-02	0	-4,04E+00
ODP	kg CFC11 -eq	2,02E-06	9,14E-09	2,10E-09	0	4,57E-08	2,24E-09	0	-4,47E-06
POCP	kg C ₂ H ₄ -eq	1,91E-03	6,73E-06	1,15E-05	0	3,37E-05	4,07E-06	0	-1,14E-03
AP	kg SO ₂ -eq	1,89E-02	1,12E-04	9,20E-05	0	5,58E-04	1,50E-04	0	-1,03E-02
EP	kg PO ₄ ³⁻ -eq	2,23E-02	1,54E-05	1,34E-04	0	7,70E-05	2,27E-04	0	-1,91E-03
ADPM	kg Sb -eq	1,63E-05	9,07E-08	6,39E-08	0	4,54E-07	6,91E-08	0	-2,64E-05
ADPE	MJ	1,12E+02	7,18E-01	1,91E-01	0	3,59E+00	5,39E-01	0	-9,58E+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*10⁻³ = 0,009

*INA Indicator Not Assessed

Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	1,02E+01	1,28E-02	2,85E-01	0	6,40E-02	1,19E-01	0	-7,51E+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	1,03E+01	1,28E-02	2,86E-01	0	6,40E-02	1,19E-01	0	-7,51E+00
NRPE	MJ	8,18E+01	7,41E-01	2,11E-01	0	3,70E+00	7,41E-01	0	-7,35E+01
NRPM	MJ	4,76E+01	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	-4,20E+01
TRPE	MJ	1,29E+02	7,41E-01	2,11E-01	0	3,70E+00	7,41E-01	0	-1,16E+02
SM	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00
RSF	MJ	6,97E-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 ³	9,24E-02	1,74E-04	2,72E-04	0	8,71E-04	2,62E-04	0	-1,57E-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*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	1,29E-03	3,78E-07	1,96E-07	0	1,89E-06	2,66E-06	0	-3,71E-03
NHW	kg	3,36E+00	6,79E-02	3,87E-02	0	3,40E-01	1,11E-02	0	-2,53E-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*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*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 CO2-ekv/kWh

Dangerous substances

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

Indoor environment

Bibliography

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