ENVIRONMENTAL PRODUCT DECLARATION ISO 14025 and ISO 21930

PROTAN

Protan SE 1,2 Roofing Membrane

EPD
Foundation for Environmental Declarations in Industry

NEPD no.: **032**
Approved 01.10.2007
Valid until 30.09.2010

Independent verification of conformity

We confirm that this environmental declaration has been carried out according to ISO 14044, ISO 14025 and ISO 21930, and Product category rules (PCR) for "Mechanical fixed single ply roof waterproofing membranes (EN 13956)". The documentation has been carried out with the EcoDec-tool.

The declaration has been prepared by:
SINTEF Byggforsk SINTEF

Oslo : 01.10.2007

Independent verifier

Manufacturer

PROTAN AS
Postboks 420 Brakerøya N-3002 Drammen Norway
Organisation no. NO 91 569 809 MVA
ISO 14001: : NS-EN ISO 14001:NO 97-OSL-SYMI-8015
Place of manufacture: Drammen
Market area: Europe

Contact person Lars Anisdahl
Telephone +4732221600
Fax +4732221700
e-mail lars.anisdahl@protan.no

Product information

Scope	Cradle to grave
Year of study	2007
Expected service life of building	60 years
Service life of product	30 years
Thickness	1,2 mm
Functional unit (FU)	m² installed roofing membrane and 60 years

Product description

Protan SE 1,2 roofing membrane is made of plasticised PVC reinforced with a polyester textile.
The intended use is pitched and flat roofs.

Product specification

	Part %	Quantity (kg/FU)
PVC	44,0 %	0,63
Polyester textile	5,7 %	0,08
Plasticiser (DINP)	32,4 %	0,46
Fire-, heat- and UV-stabiliser	18,0 %	0,26
SUM	100,0 %	1,43

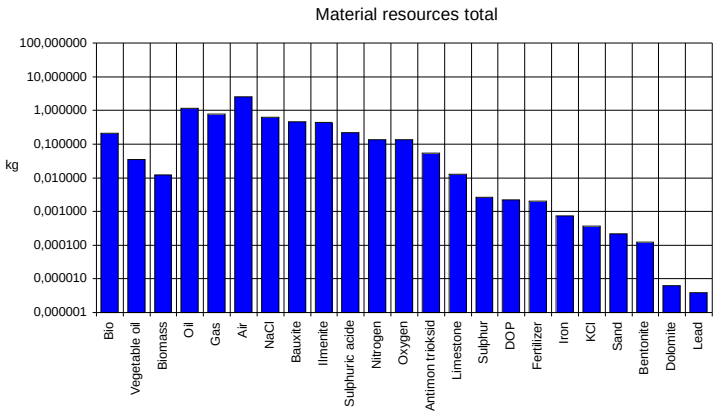
Environmental Indicators		
Global warming	5,7	kg CO2 equiv.
Energy use	28,6	kWh
Recycled materials	0	%
Indoor air classification (Classification according to EN 15251:2007)	Not relevant	

Use of resources

Material resources

All figures refer to functional unit (FU)

R = Recycled materials * = Feedstock	Type	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
Renewable materials									
Bio	*	kg		2,13E-01					2,13E-01
Vegetable oil		kg	3,47E-02						3,47E-02
Biomass		kg	1,20E-02						1,20E-02
Non-renewable materials									
Oil	*	kg	1,17E+00	1,16E-03					1,17E+00
Gas	*	kg	7,74E-01	7,45E-04					7,75E-01
Air		kg	2,56E+00						2,56E+00
NaCl		kg	6,35E-01						6,35E-01
Bauxite		kg	4,57E-01						4,57E-01
Ilmenite		kg	4,48E-01						4,48E-01
Sulphuric acide		kg	2,15E-01						2,15E-01
Nitrogen		kg	1,35E-01						1,35E-01
Oxygen		kg	1,35E-01						1,35E-01
Antimon trioksid		kg	5,32E-02						5,32E-02
Limestone		kg	1,25E-02						1,25E-02
Sulphur		kg	2,58E-03						2,58E-03
DOP		kg	2,22E-03						2,22E-03
Fertilizer		kg	2,03E-03						2,03E-03
Iron		kg	7,25E-04						7,25E-04
KCl		kg	3,67E-04						3,67E-04
Sand		kg	2,13E-04						2,13E-04
Bentonite		kg	1,22E-04						1,22E-04
Dolomite		kg	6,32E-06						6,32E-06
Lead		kg	3,86E-06						3,86E-06
Feedstock Non-renewable		kWh							2,46E+01

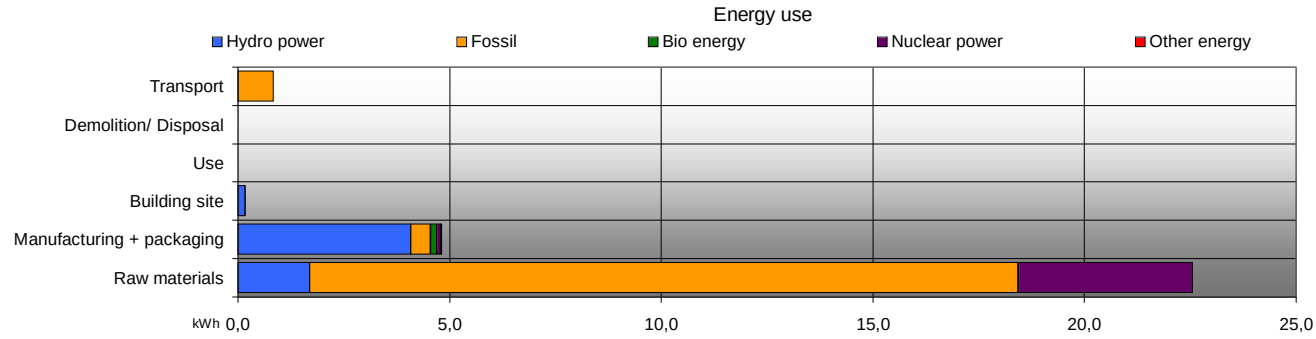


Renewable materials 0 %, Non-renewable materials 100 %, Recycled materials 0 %

The product does not contain tropical wood. No chemicals from the Norwegian observation list are used.

Energy resources

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
Renewable energy								
Hydro power	kWh	1,70E+00	4,09E+00	1,71E-01				5,96E+00
Bio energy	kWh	2,38E-02	1,40E-01					1,64E-01
Non-renewable energy								
Oil	kWh	7,93E+00	4,10E-01	4,45E-04			8,40E-01	9,18E+00
Gas	kWh	7,15E+00	1,34E-01	1,46E-03				7,28E+00
Coal	kWh	1,54E+00	1,63E-01	1,89E-03				1,70E+00
Brown coal	kWh	1,25E-01						1,25E-01
Nuclear power	kWh	4,11E+00	1,08E-01	4,16E-03				4,23E+00
Other energy	kWh	-1,03E-02	2,11E-02	9,55E-04				1,18E-02
							Total	2,86E+01



Water

Potable water	1,0E-02	m³

Land

Land used	0,00	m²

Emissions and environmental impacts

Environmental impacts

All figures refer to functional unit (FU)

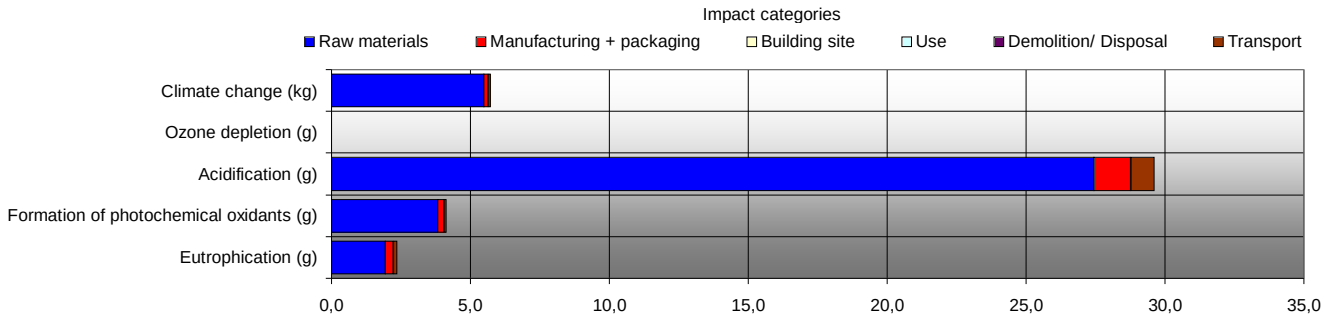
	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
Climate change	kg CO_2 - equiv.	5,49E+00	1,44E-01	1,47E-03			1,13E-01	5,75E+00
Ozone depletion	kg ODP - equiv.	1,86E-10	2,38E-13	1,00E-14				1,86E-10
Acidification	kg SO_2 - equiv.	2,74E-02	1,34E-03	2,03E-06			8,46E-04	2,96E-02
Formation of photochemical oxidants	kg POCP- equiv.	3,82E-03	2,37E-04	2,29E-07			1,02E-04	4,16E-03
Eutrophication	kg PO_4 - equiv.	1,93E-03	2,96E-04	2,17E-07			1,50E-04	2,38E-03

Emissions to air

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
CO_2	g	4,92E+03	1,27E+02	1,23E+00			1,11E+02	5,16E+03
CO	g	2,09E+01	1,30E+00	4,89E-04			4,98E-01	2,28E+01
SO_2	g	1,73E+01	6,64E-01	9,46E-04			4,16E-02	1,80E+01
NO_x	g	1,43E+01	9,69E-01	1,49E-03			1,15E+00	1,64E+01
NMVOC	g	4,48E+00	3,39E-01	1,83E-04			1,30E-01	4,95E+00
Particles	g	2,30E+00	3,42E-01	2,49E-04			8,58E-02	2,73E+00
CH_4	g	2,19E+01	3,57E-01	8,73E-03			5,20E-03	2,23E+01
N_2O	g	2,38E-02	1,74E-02	1,17E-04			1,30E-03	4,27E-02
NH_3	g	1,16E-02	5,39E-04	2,27E-05				1,22E-02
Pb	g	8,94E-02	9,56E-07	4,03E-08			3,90E-06	8,94E-02
Hg	g	1,06E-01	9,56E-07	4,03E-08				1,06E-01
HF	g	3,25E-03	1,40E-07	5,89E-09				3,25E-03
HCl	g	1,10E-01	2,18E-04	3,71E-08				1,11E-01
Benzene	g	7,14E-06	2,38E-07	1,00E-08			2,60E-03	2,61E-03
HCFC-22	g	5,48E-06	6,99E-09	2,94E-10				5,48E-06
Hydrocarbons	g	1,59E+00						1,59E+00
Metals	g	7,22E-02						7,22E-02
Organics	g	5,61E-02						5,61E-02
Aromatic HC not specified	g	5,24E-02						5,24E-02
H2	g	3,64E-02						3,64E-02
Sb	g	5,54E-03						5,54E-03

Emissions to water

Substance/fibre	g	8,27E+00	1,04E-01					8,38E+00
COD	g	1,20E+00	5,17E+00	7,25E-08				6,37E+00
BOD	g	2,05E-01	4,90E-01	4,03E-08				6,95E-01
Phosphorus P	g	2,16E-03	9,56E-07	4,03E-08				2,16E-03
Nitrogen N	g	1,50E-02	4,59E-06	5,88E-08				1,50E-02
Na+	g	4,72E+00						4,72E+00
SO4--	g	4,70E+00						4,70E+00
Cl	g	4,65E+00						4,65E+00

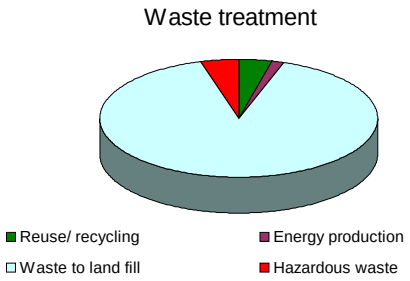


Emissions to indoor environment are not relevant for this product

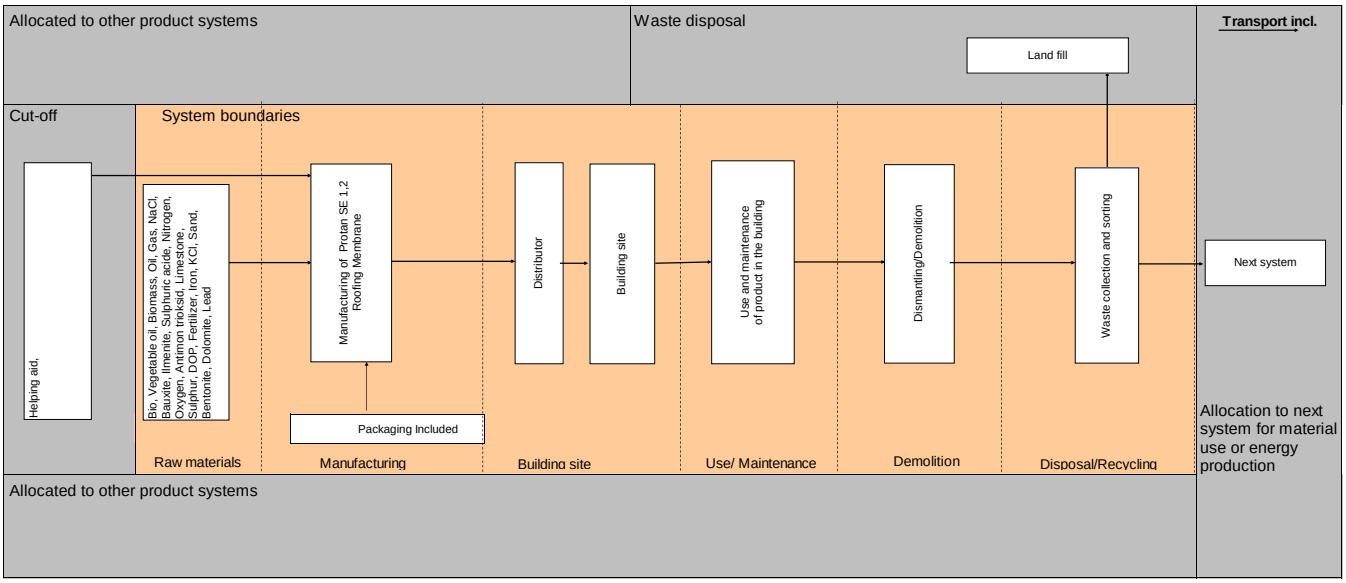
Waste treatment

All figures refer to functional unit (FU)

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Total
Reuse/ recycling	kg	6,35E-02	9,45E-02				1,58E-01
Energy production	kg	6,11E-02	4,02E-04				6,15E-02
Waste to land fill	kg	5,28E-01	1,37E-02	1,91E-02		3,12E+00	3,68E+00
Hazardous waste	kg	1,81E-01	6,17E-05				1,81E-01
Radioactive waste	g	8,77E-01	3,80E-04				8,77E-01



System boundaries



Uncertainty	±	10 %
Scope of data (average)		100 %
Materials with product specific data		52 %
Cut-off		2,38 %

References: Sintef Byggforsk Report 21905