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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

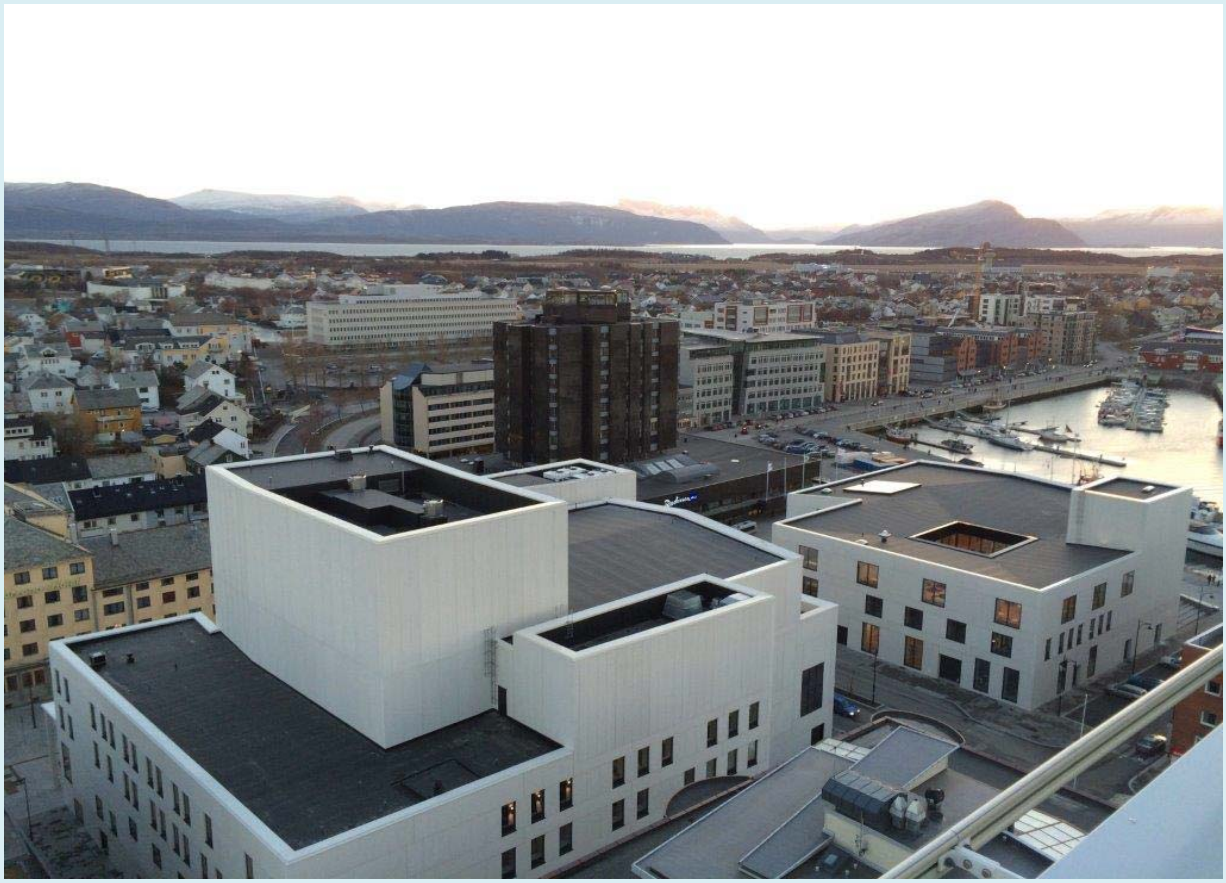
in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	PROTAN AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-323-219-EN
-	
ECO Platform reference number:	00000196
Issue date:	25.06.2015
Valid to:	25.06.2020

SE 1.6 Roof Membrane

PROTAN AS

www.epd-norge.no



General information

Product:
SE 1.6 Roof Membrane

Owner of the declaration:
PROTAN AS
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Declaration number:
NEPD-323-219-EN

Place of production:
Postboks 420 Brakerøya N-3002, Drammen
Blingsmoveien 38 3540, Nesbyen

ECO Platform reference number:
00000196

Management system:
ISO 9001 og ISO 14001 (NO 97-OSL-SYMI-8015)

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
NPCR022Rev1 Roof Waterproofing (12/2012)

Organisation no:
NO 91 569 809 MVA

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 manufacturerinformation, life cycle assessment data and evidences.

Issue date:
25.06.2015

Valid to:
25.06.2020

Declared unit:
1 m^2 produced membrane

Year of study:
2015

Declared unit with option:
-

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

Functional unit:
1 m^2 installed membrane with service life time of 40 years.

The EPD has been worked out by:
Kari Sørnes, SINTEF Byggforsk

Kari Sørnes

Verification:
The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

internal	external
☐	☑

Third party verifier:
Christofer Skaar
Christofer Skaar, PhD
(Independent verifier approved by EPD Norway)

Approved
Dagfinn Malnes
Managing Director of EPD-Norway

Product

Product description:
The intended use for the Protan Roof Membrane is pitched and flat roofs.

Technical data:
Weight: 1880 g/m^2

Technical sertificates and documents:
http://www.protan.no/entreprise/dokumenter-og-sertifikater1/

Product specification:
Protan SE 1,6 roofing membrane is made of plasticised PVC reinforced with a polyester textile.

Materials	kg	%
PVC	850	45
Polyester textile	80	4
Softener (DINP)	600	32
Fire-, heat- and UV-stabilizer	350	19
SUM	1880	100

Market:
Europe

Reference service life, product:
40 years. The service life is specified by the producer and is based on experiance.

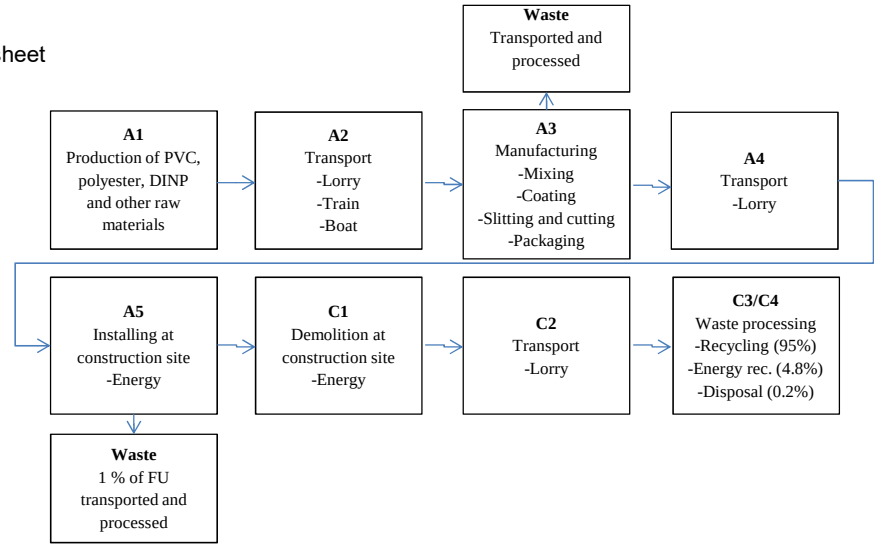
Reference service life, building:
-

LCA: Calculation rules

Declared unit:
1 m^2 produced membrane.

System boundary:
Modules A1-A5 and C1-C4 (see table under subtitle LCA: Results) are considered relevant and are included in the assessment.

Figure 1 Flow sheet



Data quality:
Generic data are mainly collected from Ecoinvent v3. Ecoinvent v2.2 is used where v3 did not have available data. EPDs are used where appropriate. Input-data from producer represents mean production for 2012-2014.

Cut-off criteria:
All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does 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 allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

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	Value (l/t)
Truck	-	16-32ton, diesel, EURO 3	400	0,28 l/tkm	112

Average transport distance from production site to building site is 400 km.

Assembly (A5)

	Unit	Value
Auxiliary	kg	-
Water consumption	m^3	-
Electricity consumption	kWh	0,07
Other energy carriers	MJ	-
Material loss	kg	0,019
Output materials from waste treatment	kg	0,119
Dust in the air	kg	-

Electricity consumption is based on NPCR22:2012.
Material loss is estimated to be 1% per m^2.
Material s to waste treatment includes also packaging.

Use (B1-B7)

According to NPCR22:2012 is B1, B6 and B7 not relevant for the product. The product shall function through the whole technical life time (B2-B5) without any type of maintenance.

Demolition (C1)

	Unit	Value
Electricity	MJ	0,25

The electricty illustrated the need for electrical equipment

End of Life (C3, C4)

	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction waste	kg	
Reuse	kg	
Recycling	kg	1,79
Energy recovery	kg	0,09
To landfill	kg	0,004

End of life treatment is based on waste statistics of plastic based building materials from SSB (2011). Recycling is possible through Roofcollect: www.roofcollect.com

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	-	16-32ton, diesel, EURO 3	400	0,28 l/tkm	
Boat	-	Barge, tanker	750	0,10 l/tkm	

The distances in C2 represents transport to recycling station in Germany.

LCA: Results

The table below shows the analysed module phases according to EN NS 15804:2012.

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

Product stage			Assemby 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	MNR	MNR	MNR	MNR	MNR	MNR	x	x	x	x	MND

Environmental impact

Parameter	Unit	A1- A3	A4	A5	C1	C2	C3	C4	-
GWP	kg CO_2-eqv	4,86	0,13	5,1E-02	1,6E-03	0,19	0,26	3,4E-04	
ODP	kg CFC11-eqv	3,1E-07	2,4E-08	3,1E-09	1,9E-10	3,2E-08	3,2E-09	9,3E-12	
POCP	kg C_2H_4-eqv	1,1E-03	2,4E-05	1,1E-05	3,3E-07	3,4E-05	6,0E-06	6,5E-08	
AP	kg SO_2-eqv	2,1E-02	6,7E-04	2,1E-04	6,2E-06	1,1E-03	1,2E-04	2,2E-07	
EP	kg PO_4^{3-}-eqv	6,9E-03	1,3E-04	7,0E-05	1,0E-06	2,1E-04	2,1E-05	8,7E-08	
ADPM	kg Sb-eqv	2,8E-02	3,5E-07	2,7E-04	1,1E-08	3,8E-07	1,8E-07	4,6E-11	
ADPE	MJ	113,19	2,06	1,06	0,01	2,77	0,24	8,9E-04	

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

Resource use

Parameter	Unit	A1- A3	A4	A5	C1	C2	C3	C4	-
RPEE	MJ	6,09	0,02	0,34	0,28	0,04	4,30	1,5E-05	
RPEM	MJ	1,64	0,00	0,00	0,00	0,00	0,00	0,00	
TPE	MJ	7,73	0,02	0,34	0,28	0,04	4,30	1,5E-05	
NRPE	MJ	121,40	1,97	1,14	0,02	2,67	0,37	9,1E-04	
NRPM	MJ	19,54	0,00	0,19	0,00	0,00	0,00	0,00	
TRPE	MJ	130,88	2,09	1,23	0,02	2,83	0,38	9,7E-04	
SM	kg	0,04	0,00	0,00	0,00	0,00	0,00	0,00	
RSF	MJ	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
NRSF	MJ	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
W	m^3	10,28	0,14	0,29	0,18	0,25	2,80	7,8E-08	

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

End of life - Waste

Parameter	Unit	A1- A3	A4	A5	C1	C2	C3	C4	-
HW	kg	0,01	0,00	0,00	0,00	0,00	0,00	0,00	
NHW	kg	0,04	0,00	0,02	0,00	0,00	1,84	0,04	
RW	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00	

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

End of life - Output flow									
Parameter	**Unit**	**A1- A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**-**
CR	kg	0,06	0,00	0,00	0,00	0,00	0,00	0,00	
MR	kg	0,04	0,00	0,05	0,00	0,00	1,79	0,00	
MER	kg	0,00	0,00	0,05	0,00	0,00	0,09	0,00	
EEE	MJ	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
ETE	MJ	0,00	0,00	0,00	0,00	0,00	0,00	0,00	

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

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase
National production mix from import, low woltage (production of transmission lines, in addition to direct emissions and losses in grid) is applied electricity for the manufacturing prosess (A3).

Data source	Amount	Unit
Econinvent v3 (june 2014), low voltage	23	g CO_2-eqv/kWh

Dangerous substances

- ☑ The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- ☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- ☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.

Name	CAS no.	Amount
-	-	-

Indoor environment
Not relevant.

Carbon footprint
Carbon footprint has not been worked out for the product.

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 — *Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*

ISO 21930:2007 — *Sustainability in building construction - Environmental declaration of building products*

LCA rapport — *PROTAN AS. Membrane for Tunnels, Turf Roof Membrane, SE 1.2 Roofing Membrane, SE 1.6 Roofing Membrane, 2015*

PCR — *Roof Waterprofing NPCR 22:2012*

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