

SINTEF Building and Infrastructure

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 and European Union of Agrément, UEAtc

Protan G, GG and GT roofing and waterproofing membranes

is approved by SINTEF Building and Infrastructure with properties, fields of application and conditions as stated in this document

1. Holder of the approval

 Protan AS
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2. Manufacturer

Protan AS, Drammen

3. Product description

Protan G, GG and GT are three types of roofing and waterproofing membranes, all made of plasticized PVC with a core of glass felt.

Stabilizer and plasticizer are added to the products in order to make them resistant to high temperatures, and to provide crack resistance at low temperatures. Protan G and GT are also made resistant to ultra violet radiation. Protan GT has also fire retardant additives.

Table 1 shows standard measures and tolerances. Other dimensions are available on request.

Protan G 1.5 and GT are manufactured with several surface colours. Protan GG has a light yellow surface colour. The underside of the membranes is dark grey.

4. Fields of application

General

Roofs must have adequate slope to drain water from rain and melting snow. SINTEF Building and Infrastructure recommends that all roofs have an inclination of minimum 1:40.

Ballasted roof

Protan G 1.5 is used as roofing membrane on pitched and flat roofs. The membrane is loosely laid with gravel ballast, tiles on pads or concrete slab. On insulated roofs the roofing may be installed as a normal roof, inverted roof or duo-roof construction.

Table 1

Measures and tolerances for Protan G, GG and GT roofing and waterproofing membranes

Property	Protan G 1.5	Protan GG 2.0	Protan GT 2.4	Unit
Thickness	1.5	2.0	2.4	mm
Tolerance	+0.2 -0.15	+0.2 -0.2	+0.2 -0.2	mm mm
Weight	≥ 1.5	≥ 2.15	≥ 2.5	kg/m ²
Width	2.0	2.0	2.0	m
Tolerance	± 2	± 2	± 2	%
Roll length	15	10	10	m
Tolerance	+2/-0	+2/-0	+2/-0	%
Weight of glass fibre core	50	80	80	g/m ²

The membrane must not be used for mechanically fastened roofing. Examples of applications are shown in Fig. 1–4.

Roofs, terraces, parking decks

Protan G 1.5 is a waterproofing membrane primarily intended for use on terraces with pedestrian traffic. Fig. 2–4 show examples of the membrane used in terrace and roof structures. Protan G 1.5 is laid loosely, with ballast. Protan G is also used as covering in extensive green solutions, see Fig. 7. The membrane can not be mechanically fastened.

Protan GG is a waterproofing membrane primarily intended for use in parking decks, in roofs with planting, and in culverts and in-ground structures. Examples of applications are shown in Fig. 5 and 6. Protan GG is laid loosely, with ballast. The membrane can not be mechanically fastened.

Protan GT is a waterproofing membrane primarily intended for use on terraces with pedestrian traffic. Protan GT is mechanically fastened as shown in Fig. 8.

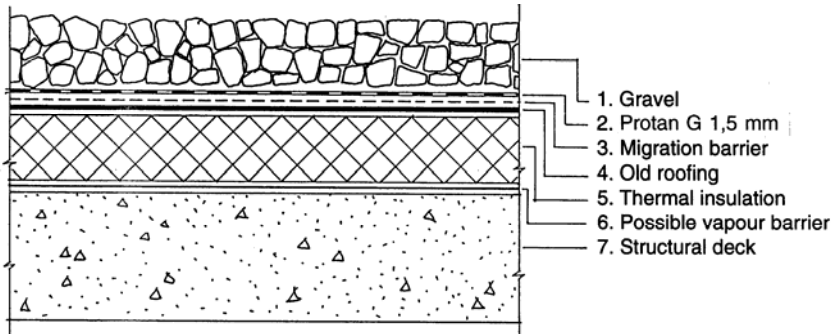


Fig. 1
 Protan G used for renovating old roof/new roofing

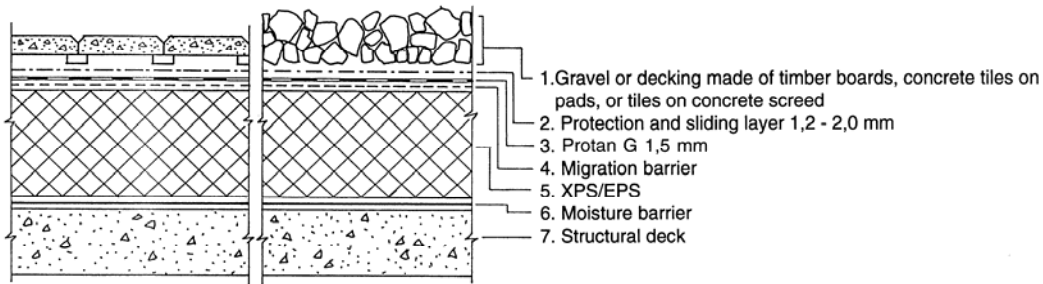


Fig. 2
 Terrace, normal roof construction

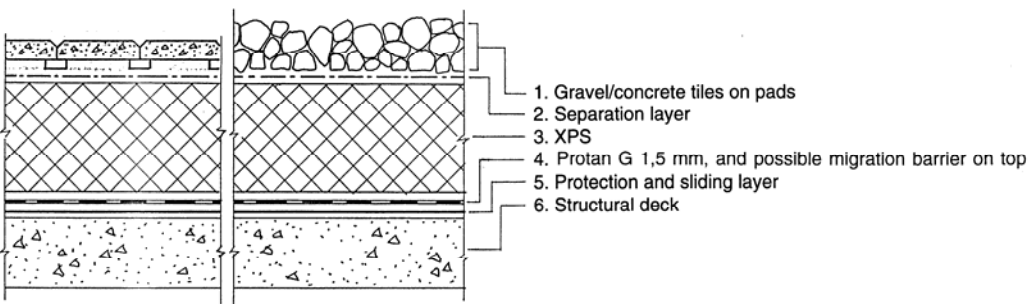


Fig. 3
 Terrace, inverted roof construction

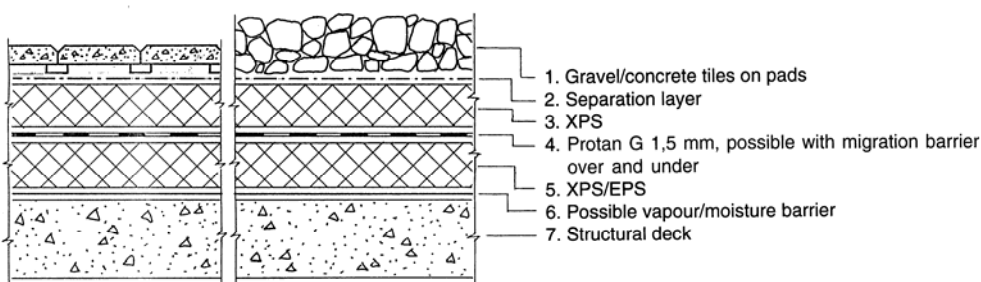


Fig. 4
 Terrace, duo-roof construction

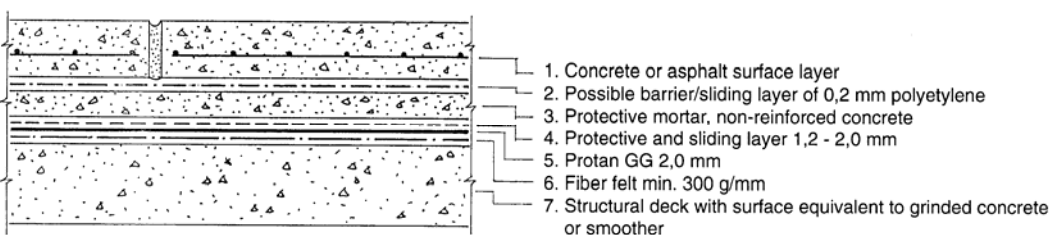


Fig. 5
 Parking deck with concrete surface

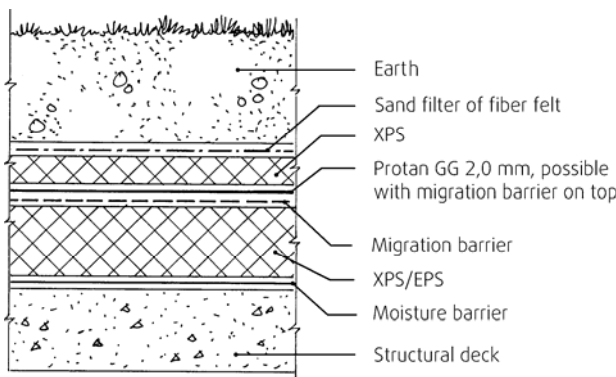


Fig. 6
Roof with planting, culvert

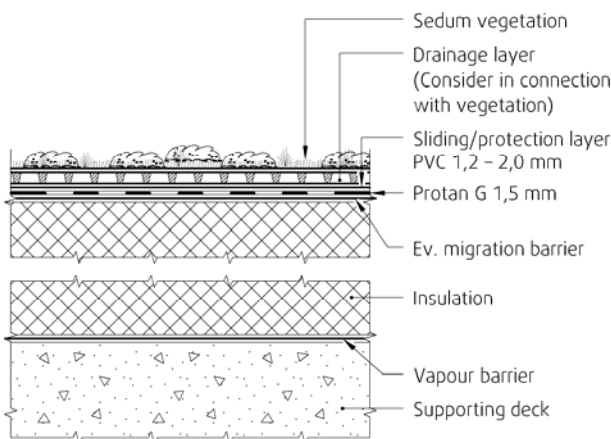


Fig. 7
Protan G used in extensive green solutions

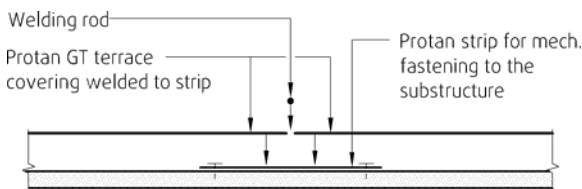


Fig. 8
Fastening system for Protan GT

5. Properties

Material properties

Product properties for fresh material are shown in Table 2.

Safety in case of fire

Protan GT 2.4 satisfies fire classification B_{ROOF} (t2) concerning spread of flames according to EN 13501-5 on non-combustible underlay with high density (i.e. min. 680 kg/m³) as e.g. in concrete or calcium silicate plates.

Protan G 1.5 and GG and have no fire classification.

Durability

Some properties after artificial ageing are given in Table 3. The products have shown satisfying properties after artificial ageing in connection with type-testing and audit testing performed by SINTEF Building and Infrastructure.

Environmental declaration

No environmental declarations have been worked out for the membranes. The products contain no chemical substances listed on the Norwegian authorities' observation list of compounds being harmful to human health or the environment.

Waste-treatment/recycling

The membranes can be recycled at a recycling plant, or sent to an ordinary public waste deposit site at the end of their working life.

6. Special conditions for use and installation

Storage

The membranes should be stored dry, with the rolls placed on pallets at the building site and protected by a covering.

Installation in general

Joints of Protan G, GG and GT are welded with hot air. The membranes shall be installed by an authorised contractor in accordance with the manufacturer's instructions.

Roofs and terraces

Protan G shall be used and installed in accordance with the principles shown in SINTEF Building Research Design Sheet 544.202 and 544.204, plus "TPF Informs No. 5".

Protan G 1.5, GG and GT shall be used and installed on roofs, terraces and parking decks according to the principles shown in SINTEF Building Research Design Sheet 525.207, 525.304, 525.306, 525.307, 544.202 and 544.204.

Fastening/ballast

Necessary ballast is calculated according to Byggforsk Building Research Design Sheet 544.202 and "TPF Informs No. 5". Protan GT shall be mechanically fastened as shown in Fig. 8, or may, under certain conditions, be glued to the underlay.

Underlay

Where fire classification of the underlay is required, the products can be placed on the underlay as defined in item 5 concerning security by fire.

When the membranes are installed on old asphalt roofing without additional insulation or directly on EPS or XPS insulation, a separate migration barrier of minimum 50 g/m² shall be used.

Table 2
Product properties for fresh material of Protan G, GG and GT roofing and waterproofing membranes

Property	Test method EN	Control limit ¹⁾			Unit
		Protan G 1.5	Protan GG 2.0	Protan GT 2.4	
Foldability at low temperature	495-5:2001	≤ -30	≤ -30	≤ -30	°C
Dimensional stability	1107-2:2001	± 0.1	± 0.1	± 0.1	%
Water tightness (10 kPa)	1928:2000 (A)	Tight	Tight	Tight	-
Water tightness (150 kPa)	1928:2000 (B)	Tight	Tight	Tight	-
Tear resistance	12310-2:2000	≥ 110	≥ 130	≥ 130	N
Tensile strength	12311-2:2000 (A)	≥ 450	≥ 600	≥ 600	N/50 mm
Elongation	12311-2:2000 (A)	≥ 180	≥ 200	≥ 200	%
Average peel resistance of joints	12316-2:2000	-	-	≥ 250	N/50 mm
Shear resistance of joints	12317-2:2000	≥ 450	≥ 600	≥ 550 ²⁾	N/50 mm
Resistance to puncture - by impact at +23°C	12691:2006 (A)	≥ 400	≥ 800	≥ 800	mm
- by impact at -10°C	12691:2001	≤ 20	≤ 20	≤ 20	mm diam.
- by static loading	12730:2001 (A)	≥ 15	≥ 15	≥ 15	kg
Water vapour permeability	ISO 12572:2001	$9.5 \cdot 10^{-12}$	$7 \cdot 10^{-12}$	$6 \cdot 10^{-12}$	kg/m ² sPa
Water vapour resistance as equivalent air layer thickness	ISO 12572:2001	20	28	33	m

¹⁾ The stated values are existing control limits for internal control at the producer and supervising control

²⁾ Welded joint according to Figure 8

Table 3
Product properties for aged material of Protan G, GG and GT roofing and waterproofing membranes

Property	Test method EN	Measured value			Unit
		Protan G 1.5	Protan GG 2.0	Protan GT 2.4	
Foldability at low temperature - aged in hot water ¹⁾	495-5:2001	≤ -25	≤ -25	≤ -25	°C
- artificial ageing ²⁾		≤ -25	-	-	°C
Dimensional stability - aged in hot water ¹⁾	1107-2:2001	± 0.2	± 0.2	± 0.2	%
- artificial ageing ²⁾		-	-	-	%

¹⁾ Aged according to method NS-EN 1847 (NS 3531) for 8 weeks at 60 °C

²⁾ Aged according to method NS-EN 1297 with specimen are exposed to UV light, heat radiation, water, and laboratory climate

When the membranes are applied directly on rough underlay without additional insulation, a protection layer of polyester felt or similar shall be used. SINTEF Building and Infrastructure recommends use of ca. 250 g/m² felt when applied directly on concrete underlay and minimum 300 g/m² felt on concrete underlay in constructions with heavy traffic.

7. Factory production control

Protan G, GG and GT are subject to supervisory factory production control according to contract between SINTEF Building and Infrastructure and Protan AS concerning SINTEF Technical Approval.

The manufacturer Protan AS has a quality system which is certified by Det Norske Veritas according to ISO 9001:2000, certificate no. 95-OSL-AQ-6343.

8. Basis for the approval

Material- and design data have been verified by type-testing and audit testing performed by SINTEF Building and Infrastructure during the years 1975–2006.

Performance testing of Protan G 1.5 mm used as membrane in wet rooms is documented in report no. O 3994-26A, dated 01.04.1997, from Norwegian Building Research Institute.

9. Marking

All rolls/packages shall be marked with the manufacturers name, product name and date of production. All rolls are marked with the manufacturer's production code. The approval mark for SINTEF Technical Approval No. 2008 may also be used.



Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402.

11. Technical management

Project manager for this approval is Knut Noreng, SINTEF Building and Infrastructure, Trondheim.

for SINTEF Building and Infrastructure

A handwritten signature in blue ink that reads 'Steinar K. Nilsen'.

Steinar K. Nilsen
Approval manager