



NBI Technical Approval

Norwegian Building Research Institute

Norwegian Member of European Organisation for Technical Approvals, EOTA
Norwegian Member of European Union of Agreement, UEAtc

No. 2008

Issued: 05.02.1995

Revised: 05.01.2006

Valid until: 09.01.2007

Page: 1 of 5

Protan G, GG and GT roofing and waterproofing membranes

are approved by Norwegian Building Research Institute with properties, field of application and conditions as stated in this document.

1. Holder of the approval

Protan AS
P.O.Box 420
NO-3002 Drammen
Tel.: + 47 32 22 16 00 Fax: + 47 32 22 17 00
www.protan.com

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 G 1.2 has also fire retardant additives.

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

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. Field of application

General

Roofs must have adequate slope to drain water from rain and melting snow. NBI 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.

The membrane must not be used for mechanically fastened roofing. Examples of applications are shown in Fig. 1–4. Protan G 1.2 is normally applied fully adhered on exposed surfaces in the form of a flap or turn up where roofing material complying with fire-class requirements is needed.

Table 1

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

	Protan G 1.2	Protan G 1.5	Protan GG 2.0	Protan GT 2.4
Thickness	1.2 mm +0.2/ -0.1 mm	1.5 mm +0.2/ -0.15 mm	2.0 mm +0.2 -0.2 mm	2.4 mm +0.2/ -0.2 mm
Weight	≥ 1.4 kg/m ²	≥ 1.5 kg/m ²	≥ 2.15 kg/m ²	≥ 2.5 kg/m ²
Width	2.0 m ± 2 %	2.0 m ± 2 %	2.0 m ± 2 %	2.0 m ± 2 %
Roll length	20 m +2 %/-0 %	15 m +2 %/-0 %	10 m +2 %/-0 %	10 m +2 %/-0 %
Weight of glass fibre core	50 g/m ²	50 g/m ²	80 g/m ²	80 g/m ²

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. 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. 7.

Wet rooms

Protan G 1.5 is also used as a waterproofing floor membrane in bathrooms and similar rooms where a watertight floor is required see Fig. 8. The membrane is laid on a sub floor of concrete or board underlay, and is covered by a protection layer and a concrete slab as underlay for tiling or other suitable flooring material.

Copyright Norwegian Building Research Institute

Reference:	Contr. O 8279	Subject:	Roofing membranes, waterproofing membranes
Head office:	Norwegian Building Research Institute P.O.Box 123 Blindern, N-0314 Oslo Tel: +47 22 96 55 Fax: +47 22 69 94 38	Local Department:	Norwegian Building Research Institute Høgskoleringen 7b, N-7491 Trondheim Tel: +47 73 59 33 90 Fax: +47 73 59 33 80

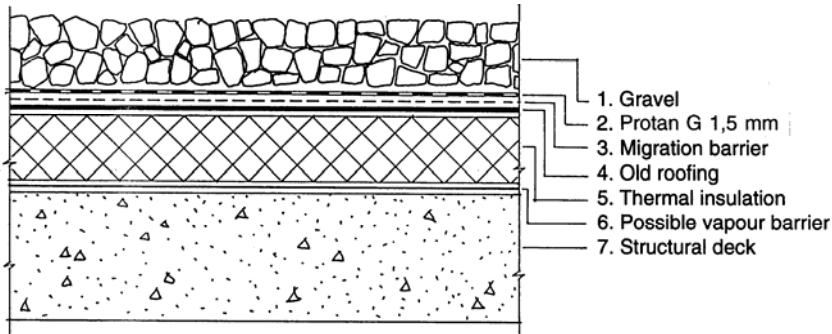


Fig. 1
 Protan G used for renovating old roof/new roofing

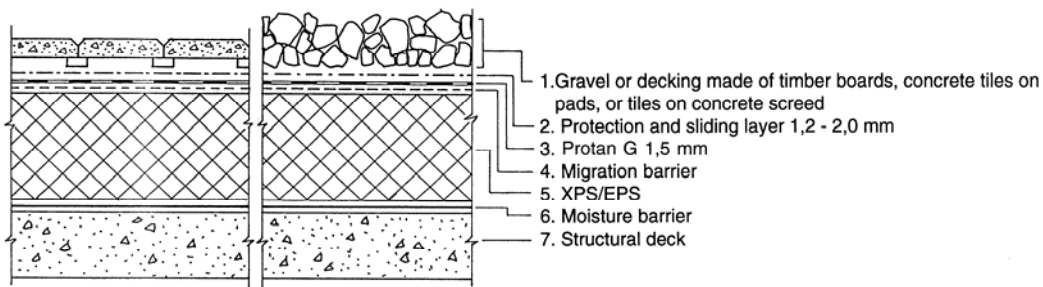


Fig. 2
 Terrace, normal roof construction

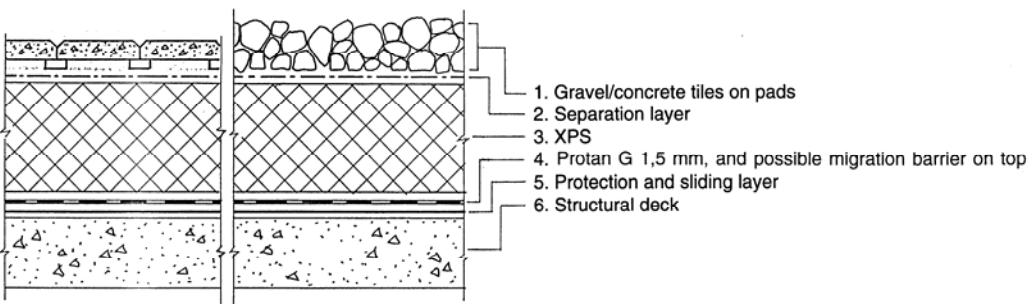


Fig. 3
 Terrace, inverted roof construction

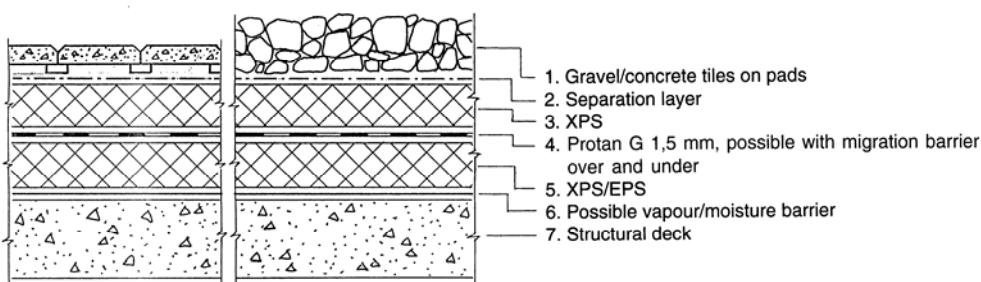


Fig. 4
 Terrace, duo-roof construction

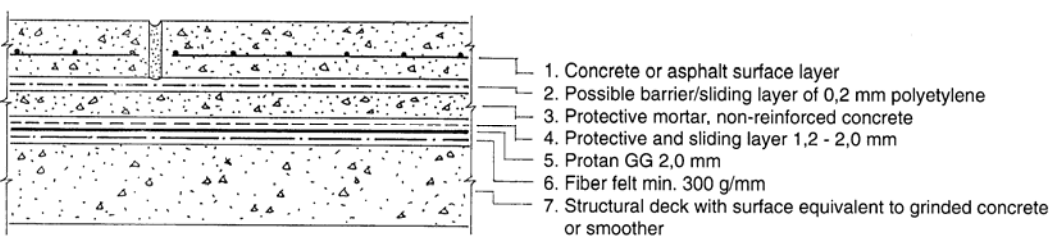


Fig. 5
 Parking deck with concrete surface

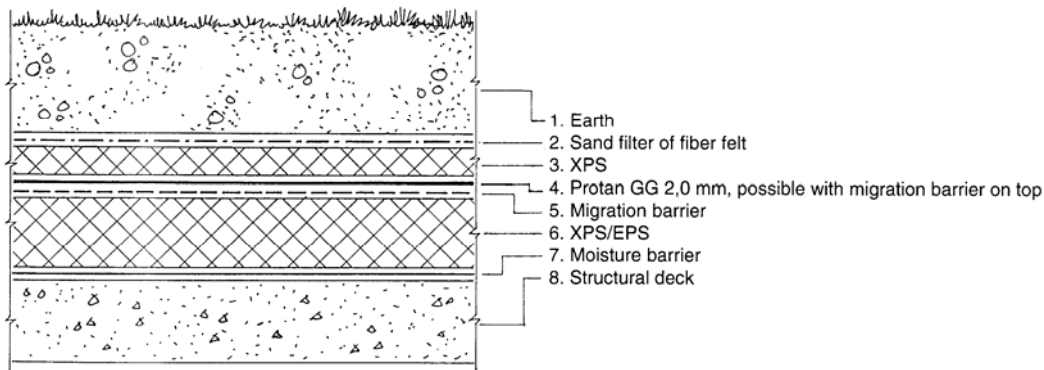


Fig. 6
Roof with planting, culvert

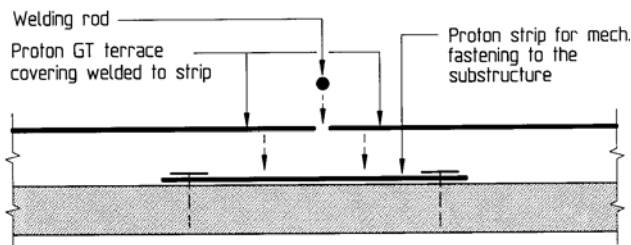


Fig. 7
Fastening system for Protan GT

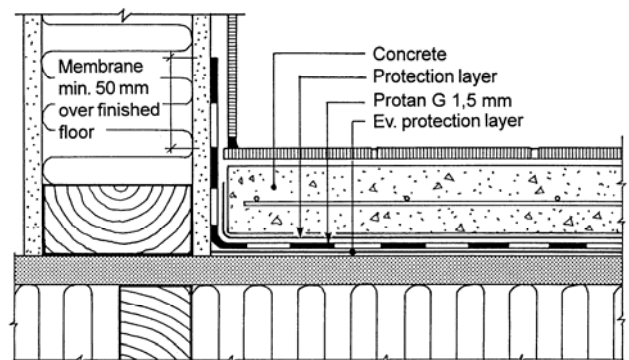


Fig. 8
Example of Protan G 1.5 used as waterproof membrane in bathroom floor

5. Properties

Material properties

Product properties for fresh material are shown in Table 2. Properties measured after accelerated ageing are shown in Table 3.

Safety in case of fire

Protan G 1.2 satisfies fire classification $B_{ROOF}(t2)$ concerning spread of flames according to prEN 13501-5 on wood based underlay, and on non-combustible underlay with high density (i.e. min. 680 kg/m^3).

Protan GT 2.4 satisfies fire classification $B_{ROOF}(t2)$ concerning spread of flames according to prEN 13501-5 on non-combustible underlay with high density (i.e. min. 680 kg/m^3) as e.g. in concrete or calcium silicate plates.

The fire spread testing is performed according to ENV 1187.

Protan G 1.5 and GG and have no fire classification.

Application in wet rooms

Protan G 1.5 has been type-tested according to Nordtest method NT Build 230 "Bathroom floor. Water tightness", and fulfils the requirements specified in "Byggebransjens våtromsnorm", sheet 53.120.

Effects on internal climate

On the basis of submitted data it is assumed that no emissions above irritating levels will influence the internal climate, and no dangerous substances having health effects are released from the products.

Environmental declaration

Specific environmental declarations have not been worked out for the membranes. The products do not contain any substances on the authorities' list of chemicals being potentially harmful to health and environment.

Waste-treatment/recycling

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

Table 2

Product properties for fresh material of Protan G, GG and GT roofing and waterproofing membranes¹⁾

Property	Test method	Control limit/product				Unit
		Protan G 1.2	Protan G 1.5	Protan GG 2.0	Protan GT 2.4	
Water tightness (10 kPa)	NS-EN 1928 (A)	Tight	Tight	Tight	Tight	-
Water pressure tightness (150 kPa)	NS-EN 1928 (B)					
Peel resistance of joints – side lap (T-peel)	NS-EN 12316-2	-	-		≥ 270	N/50 mm
Shear resistance of joints – side lap	NS-EN 12317-2	≥ 400	≥ 480	≥ 650	≥ 550 ²⁾	N/50 mm
Tensile strength L/T	NS-EN 12311-2	≥ 400	≥ 450	≥ 650	≥ 650	N/50 mm
Elongation L/T	NS-EN 12311-2	≥ 180	≥ 180	≥ 200	≥ 200	%
Tear resistance L/T	NS-EN 12310-2	≥ 100	≥ 110	≥ 130	≥ 130	N
Resistance to puncture						
By static load	NS-EN 12370	≥ 150	≥ 150	≥ 200	≥ 200	N
By impact at +23 °C	NS-EN 12691	≤ 15	≤ 12	≤ 12	≤ 10	mm diam.
By impact at -10 °C	NS-EN 12691	≤ 20	≤ 20	≤ 20	≤ 20	mm diam.
Dimensional stability L/T	NS-EN 1107-2	± 0.1	± 0.1	± 0.1	± 0.1	%
Foldability at low temperature L/T	NS-EN 495-5	-30	-30	-30	-30	°C
Water vapour permeability	NS-EN 12572	$12 \cdot 10^{-12}$	$9.5 \cdot 10^{-12}$	$7 \cdot 10^{-12}$	$6 \cdot 10^{-12}$	kg/m ² sPa
Water vapour resistance as equivalent air layer thickness	NS-EN 12572	16	20	28	33	m

The values are acceptance limits for the manufacturer's internal control and for audit testing

- 1) The stated values are control limits existing of internal control at the producer and by supervising control
 2) Welded joint according to Figure 7

Table 3

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

Property	Test method	Value			Unit
		Protan G 1.2	Protan G 1.5	Protan GG 2.0 and GT 2.4	
Foldability at low temperature aged in hot water ¹⁾ artificial ageing ²⁾	NS-EN 495-5	≤ -30	≤ -25	≤ -25	°C
		≤ -25	≤ -25	-	°C
Dimensional stability aged in hot water ¹⁾ artificial ageing ²⁾	NS-EN 1107-2	± 0.2	± 0.2	± 0.2	%
		± 0.2	-	-	%

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

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 NBI Building Research Design Sheet 544.202 and 544.204, plus "TPF Informs No. 3".

Protan G 1.5, GG and GT shall be used and installed on roofs, terraces and parking decks according to the principles shown in NBI 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 NBI Building Research Design Sheet 544.202 and "TPF Informs No. 3". Protan GT shall be mechanically fastened as shown in Fig. 7, 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 see more closely defined in item 5 concerning security by fire.

Wet rooms

Protan G 1.5 membrane shall be installed in bathrooms, washrooms, etc., on an underlay of concrete or wood based floor panels in accordance with NBI Building Research Design Sheet 522.861 and "Byggebransjens Våtroms-norm" sheet 31.110.

A fully covering PVC protection layer must be placed between the membrane and concrete slabs. The PVC wet-room membrane must not be in direct contact with cement based materials in floor-slabs on the ground.

Construction details concerning passage of pipes etc. through the membrane, and connections to other components shall be carried out according to the principles shown in Building Research Design Sheet 541.805 and "Byggebransjens Våtromsnorm", sheet 34.101, 34.201 and 34.315.

The floor-drain annulus must be removed before installation of the membrane. The membrane shall be heated and stretched into the drain, e.g. with a roller. A round hole is then cut in the membrane. It is recommended to apply a sealant approved by Protan under the membrane before re-fitting the annulus.

7. Factory production control

Protan G, GG and GT are subject to supervisory factory production control and product control according to a contract between Norwegian Building Research Institute and Protan AS on NBI Technical Approval.

The manufacturer Protan AS has a quality system which is certified by Det Norske Veritas according to ISO 9001, 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 NBI during the years 1975–2004.

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 NBI 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 the Norwegian Building Research Institute beyond the provisions of Norwegian Standard 8402.

11. Project management

Project manager for this approval is Mr. Knut Noreng, Norwegian Building Research Institute, dep. Materials and constructions, Trondheim.

for Norwegian Building Research Institute

Grete Kjeldsen
Assistant Head of Approvals