BYGGFORSK

NBI Technical Approval

Norwegian Building Research Institute

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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 A/S
P.O.Box 420
NO-3002 Drammen
Tel. + 47 32 22 16 00 Fax + 47 32 22 17 00

2. Manufacturer

Protan A/S, Drammen

3. Product description

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

Stabiliser and plasticiser 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 with 1,2 mm thickness has fire retardant additives.

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

Protan G 1,4 mm and GT are manufactured with several surface colours. Protan G 1,5 mm has light grey, and Protan GG 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.

Roofing with ballast

Protan G is used as roofing membrane on pitched and flat roofs. The membrane is laid loosely with gravel ballast, or fully glued to the underlay. The membrane can not be used for mechanically fastened roofing. Examples of applications are shown in Fig. 1 – 4.

Table 1
Measures and tolerances for Protan G membranes

	Protan G 1,2 mm	Protan G 1,4 mm	Protan G 1,5 mm	Protan GG 2,0 mm	Protan GT 2,4 mm
Thickness	1,2 mm + 0,2 / – 0,1 mm	1,4 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/m²	≥ 1,6 kg/m²	≥ 1,65 kg/m²	≥ 2,15 kg/m²	≥ 2,5 kg/m²
Width	2,0 m ± 2%	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%	15 m + 2%/–0%	10 m + 2%/–0%	10 m + 2%/–0%
Weight of glassfiber core	50 g/m²	50 g/m²	50 g/m²	80 g/m²	80 g/m²

Roofs, terraces, parking decks

Protan G 1,5 mm is a waterproofing membrane primarily intended for use on terraces with pedestrian traffic and in inverted roofs. Fig. 2 – 4 show examples of the membrane used in terrace structures. Protan G 1,5 mm 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.

Bathrooms, washrooms etc.

Protan G 1,5 mm 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 subfloor 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.

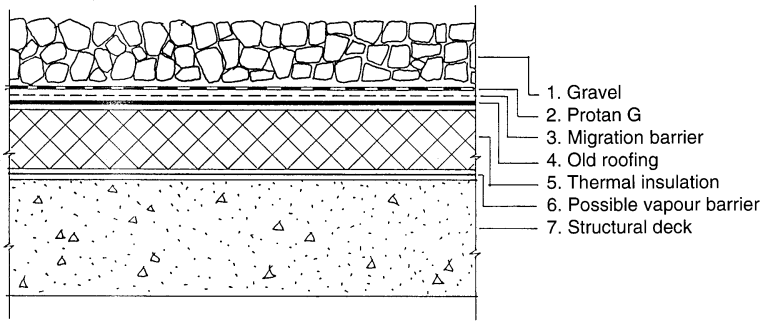

Fig. 1
Protan G used for renovating old roof

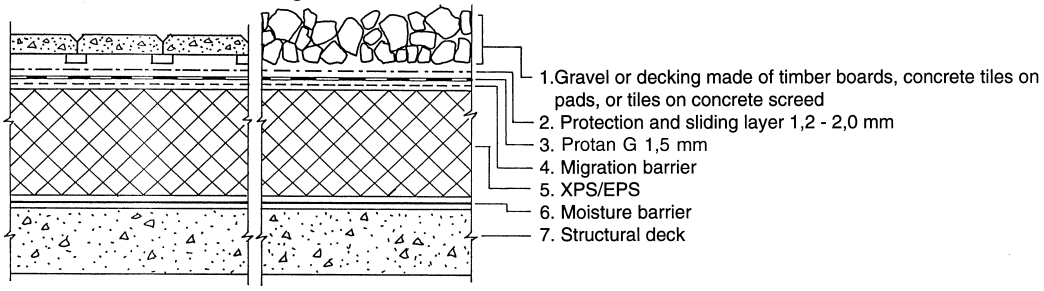

Fig. 2
Terrace, normal roof construction

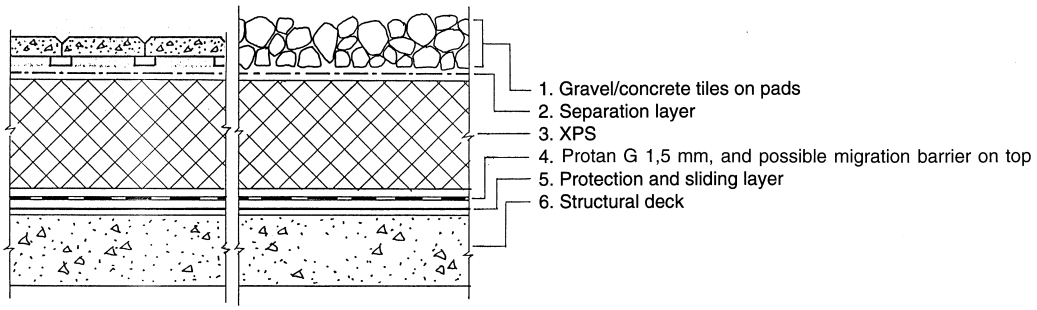

Fig. 3
Terrace, inverted roof construction

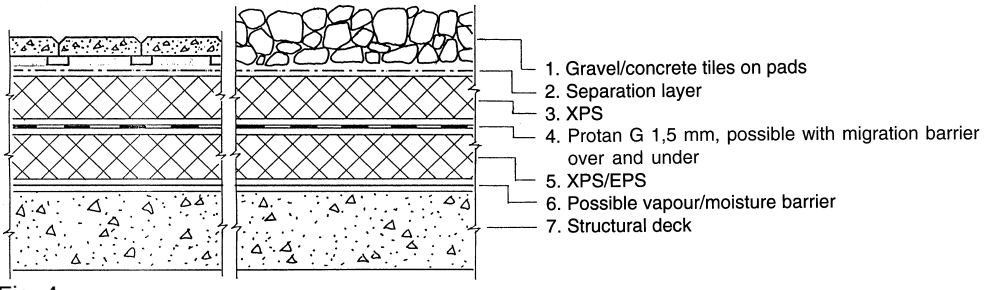

Fig. 4
Terrace, “duo-roof” construction

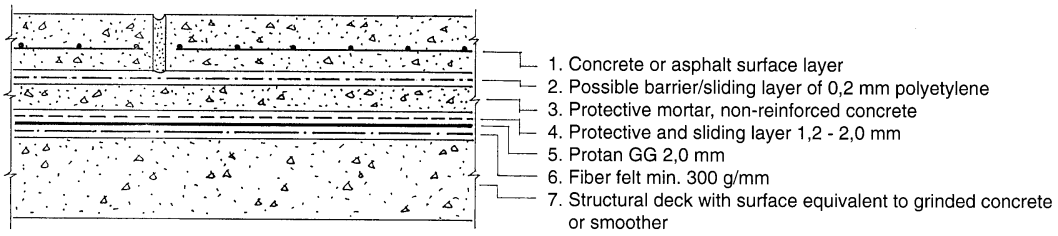

Fig. 5
Parking deck with concrete surface

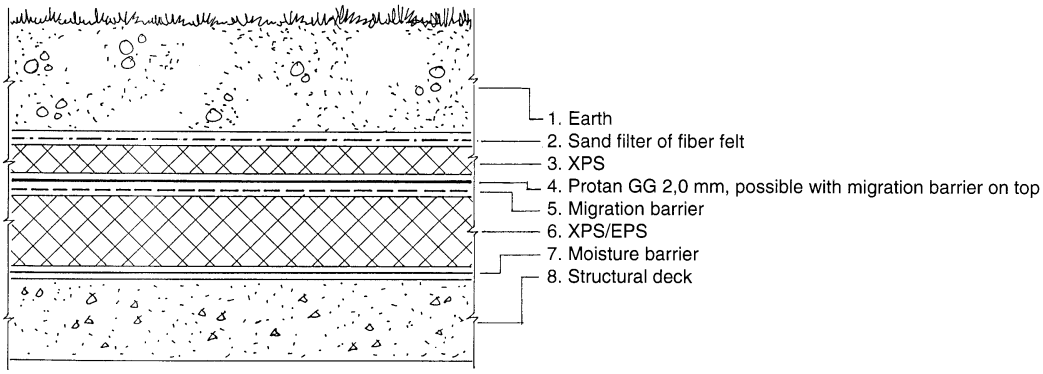

Fig. 6
Roof with planting, culvert

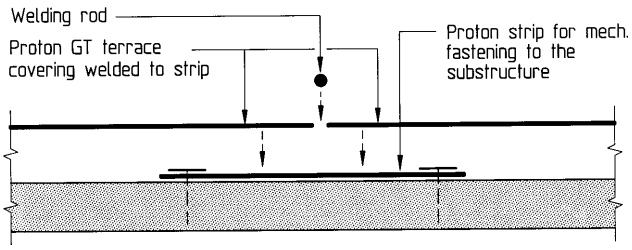

Fig. 7
Fastening system for Protan GT

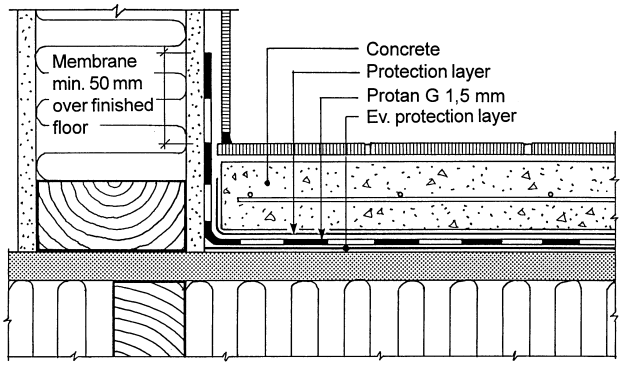

Fig. 8
Example of Protan G 1,5 mm used as waterproof membrane in bathroom floor

5. Properties

Material properties

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

Protan G fulfils all requirements for roofing membrane type T3 specified in Norwegian Standard NS 3531. Protan G 1,5 mm, GG and GT fulfils all requirements for waterproofing membrane type M3 specified in NS 3531.

Safety in case of fire

Protan G 1,2 mm satisfies fire classification Ta concerning spread of flames according to NS 3919 on wood based underlay, and on non-combustible underlay with high density (i.e. min. 680 kg/m³).

Protan G (1,4 and 1,5 mm), GG and GT have no fire classification.

Wet room applications

Protan G 1,5 mm has been type-tested according to Nordtest NT Build 230 “Bathroom floor. Water tightness”, and fulfils the requirements specified in “Byggebransjens våtromsnorm”, sheet 53.120, for loosely laid membranes.

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 membranes

Property	Test method	Control limit [1]				Unit
		Protan G 1,2	Protan G 1,4	Protan G 1,5	Protan GG 2,0 and GT 2,4	
Water tightness (10 kPa)	NS 3531	Tight	Tight	-	-	-
Water pressure tightness (150 kPa)	NS 3531	-	-	Tight	Tight	-
Dimensional stability						
heat	NS 3531/3503	± 0,1	± 0,1	± 0,1	± 0,1	%
water	NS 3531/3502	±0,2	±0,2	± 0,2	± 0,2	%
artificial ageing	NS 3531/8140	±0,2	± 0,2	-	-	%
Tensile strength	NS 3531/3507	≥ 400	≥ 450	≥ 450	≥ 600	N/50mm
Elongation at break	NS 3531/3507	≥ 180	≥ 180	≥ 180	≥ 200	%
Cold crack by folding	NS 3531/3542	≤- 30	≤- 30	≤ - 30	≤ - 30	°C
Tearing strength	NS 3531/3541	≥ 100	≥ 110	≥ 110	≥ 130	N
Penetration on EPS 20 kg/m³ by						
- increasing load, chisel	NT Build 336	≥ 200	≥ 200	≥ 200	≥ 250	N
- impact, + 23° C	NT Build 335	≤ 15	≤ 15	≤ 15	≤ 12	mm diam.
- impact, - 20° C	NT Build 335	≤ 20	≤ 20	≤ 20	≤ 12	mm diam.
Water vapour permeability	NT Build 130	$12 \cdot 10^{-12}$	$10 \cdot 10^{-12}$	$9{,}5 \cdot 10^{-12}$	$7 \cdot 10^{-12}$	kg/m² s Pa
Water vapour resistance as equivalent air layer thickness	NT Build 130	16	19	20	28	m

[1] The values are acceptance limits for the manufacturers internal control and for audit testing

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 1,4	Protan G 1,5	Protan GG 2,0 and GT 2,4	
Cold crack by folding						
aged in hot water	NS 3531/3542	≤ - 30	≤ - 30	≤ - 25	≤ - 25	°C
artificial ageing	NS 3531/8140	≤ - 25	≤ - 25	≤ - 25	–	°C

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 manufacturers 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 mm, 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 525.225, 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.

Wet-rooms

Protan G 1,5 mm 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 "Våtromsnormen" sheet no. 30.100.

A fully covering PVC protection felt 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 "Våtromsnormen", sheet 30.100, 30.200, 30.300 and 53.100.

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 (NBI) and Protan A/S on NBI Technical Approval.

The manufacturer Protan A/S has a quality system which is certified by Det Norske Veritas according to ISO 9001, certificate 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 – 1999.

Performance testing of Protan G 1,5 mm used as membrane in wet rooms is documented in report no. O 3994-26A, dated 01.04.97, 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 manufacturers 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 3403.

11. Project management

The project manager for this approval is Mr. Knut Noreng, Department of Building Technology, Norwegian Building Research Institute, Trondheim, Norway.

for Norwegian Building Research Institute

Trond Ø. Ramstad
Head of Approvals