

# SINTEF Technical Approval

## TG 2415

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 Provided listed on  
[www.sintefcertification.no](http://www.sintefcertification.no)

SINTEF confirms that

## Protan 2X Roofing System

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document



### 1. Holder of the approval

Protan AS  
 P.O.Box 420  
 NO-3002 Drammen  
[www.protan.com](http://www.protan.com)

### 2. Product description

Protan 2X Roofing System is a roofing system that meets the need for early installation of a construction period roofing. The roofing system also includes solutions for slope and gutter designs and final roofing for the finished roof.

#### 1.X = Construction period roofing

The construction period roofing should be installed as early as possible to protect the building from intrusion of water during the construction period. The construction period roofing can be used as working platform and material storage for ongoing construction work which is usually not permitted on a finished insulated roof.

The construction period roofing may consist of either a polymer-modified bituminous underlay membrane with a polyester core, or a plastic- or rubber roofing membrane with polyester reinforcement. The membrane needs to resist weather and mechanical loads. For the construction period roofing to function as a vapour barrier in the finished roof, water vapour resistance must be documented for the used membrane.

The construction period roofing can be installed on an insulation layer on a load-bearing structure of steel plates; as shown figure 1. Alternatively, the membrane can be installed directly on the load-bearing underlay, as shown in figure 2.

#### 2.X = Final roofing

As soon as there is no longer need for the roof as a working platform or storage, a control and possible repair of the construction period roofing must be performed. Insulation and the final roofing membrane of Protan SE is thereafter installed under suitable weather conditions. The construction period roofing will from that point function as a vapour barrier in the compact roof throughout the roof's lifetime. In addition, the system includes solutions for preparing slopes on flat roofs and gutter solutions.

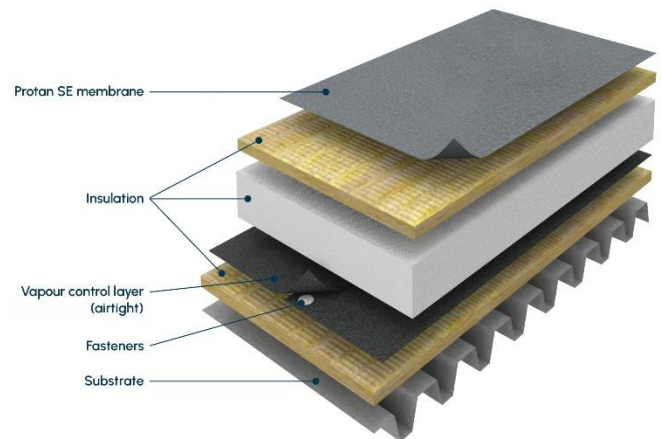


Fig. 1  
 Protan 2X Roofing System.  
 Construction period roofing (vapour control layer) laid on 50 mm mineral wool boards.

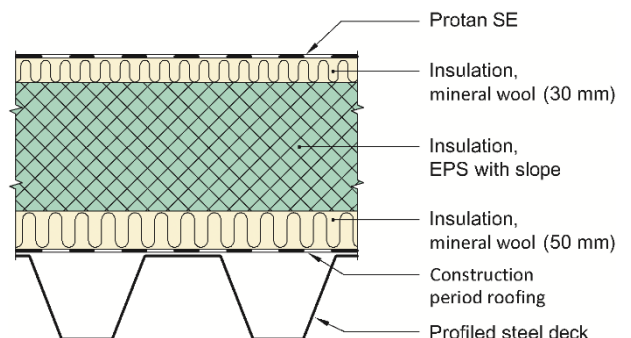


Fig. 2  
 Protan 2X Roofing System.  
 Construction period roofing laid directly on steel plates.

Protan SE roofing membrane, made of pliable PVC with a core of woven polyester, is used as the final roofing membrane in Protan 2X Roofing System. Protan SE is documented in SINTEF Technical Approval no. 2010.

SINTEF is the Norwegian member of European Organisation for Technical Assessment, EOTA, and European Union of Agrément, UEAtc

### 3. Fields of application

Protan 2X Roofing System can be used as a new roof covering for both flat and sloping roofs. The roofing system is primarily used on roofs that are exposed to extraordinary loads during the construction period and for buildings with strict requirements regarding vapour/moisture tightness.

The final roofing membrane of Protan SE is installed as an exposed roof with mechanical or vacuum based fastening. For more information see SINTEF Technical Approval No. 2010 and 2281.

Roofs must have adequate slope to drain water from rain and melted snow. SINTEF recommends in general a minimum slope of 1:40 for all roofs.

### 4. Properties

#### *Product properties*

Product properties for Protan SE are shown in SINTEF Technical Approval No. 2010, table 2.

#### *Properties related to fire*

Information regarding fire classification according to EN 13501-5 for Protan SE roofing membranes is given in SINTEF Technical Approval no. 2010, section *Properties related to fire*.

#### *Wind load capacity*

The wind load capacity for the mechanically fastened Protan SE roofing membrane is given in SINTEF Approval no. 2010 and for vacuum roofs in SINTEF Technical Approval no. 2281.

### 5. Environmental aspects

#### *Substances hazardous to health and environment*

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

#### *Effect on soil, surface water and ground water*

The leaching properties of Protan 2X Tak is evaluated to have no negative effects on soil or water.

#### *Waste treatment/recycling*

The product shall be sorted as residual waste. The product shall be delivered to an authorized waste treatment plant for energy recovery.

The product can by ended service life be delivered to material recycling in recycling system.

#### *Environmental declaration*

An environmental declaration (EPD) has been worked out according to EN 15804 for Protan SE. For complete documentation see [www.epd-norge.no](http://www.epd-norge.no), EPD no.:

- NEPD-2036-909-NO, Protan SE 1,2
- NEPD-1920-845-NO, Protan SE 1,6

### 6. Special conditions for use and installation

#### *Installation*

The joints are welded with hot air. TPF Informerer no. 6 *Branntekniske løsninger for kompakte tak og terrasser* describes which roofing methods can be used on various roof structures. When roofing with hot air or open flame, all combustible insulation must in principle be protected with non-combustible insulation. However, TPF Informerer no. 6 describes exceptions for hot air welding of roofing membranes with fire class B<sub>ROOF</sub> (t2).

The roofing system must be installed by roofers who have been specially approved by Protan AS.

The membrane shall be installed in accordance with Protan's guidelines for design consideration and installation, and in accordance with the principles shown in SINTEF Building Research Design Guide no.:

- 525.207 *Kompakte tak,*
- 544.202 *Takfolie. Egenskaper og tekking og*
- 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger*
- 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak*

plus information sheets issued by Takprodusentenes Forskningsgruppe (TPF), see [www.tpf-info.org](http://www.tpf-info.org):

- TPF informerer nr. 5 *Innfesting av fleksible takbelegg, dimensjonering og utførelse*
- TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*
- TPF informerer nr. 13 *Tak under oppføring – forholdsregler og tiltak ved bruk*

#### *Design considerations for construction period roofing*

Slope, drains and outlets are added as needed and as appropriate. Outlets from the construction period roofing should be temporary and must be sealed when they are replaced by permanent outlets. Where temporary outlets from the construction period roofing are not used, there must be no parapets etc causing standing water.

The construction period roofing must be watertight, which requires watertight execution of joints and good turnups that are clamped with laths at connections and adjacent walls. Construction period roofing that are installed and finished in this way also ensures the necessary airtightness.

During the building period, the zones with most traffic, such as walkways and areas with scaffolding, must be covered to prevent the construction period roofing from being damaged. A repair kit should be available at the building site, so that any minor damage to the construction period roofing can be repaired immediately.

#### *Fastening of construction period roofing*

Construction period roofing shall be mechanically fastened through the joints into the bearing system according to valid guidelines for the roofing material. The fastening must be dimensioned with a view to use vacuum based fixing of the final roof.

#### *Design considerations for the final roofing layer*

Under suitable weather conditions, insulation and final roofing of Protan SE may be installed. Examples for slope design and drain positioning is shown in figure 3. suitable weather conditions are also recommended to avoid internal condensation, particularly in winter. Before the final insulation and roofing (2X) is installed, any standing water on the roof surface must be removed. Control and possible repair of the construction period roofing needs to be done before the thermal insulation shall be installed.

#### *Fastening of final roofing*

The final roofing can be fastened in two different ways: mechanical or vacuum based.

When the roofing is fastened mechanically, the fasteners and design capacities described in SINTEF Technical Approval no. 2010 must be used.

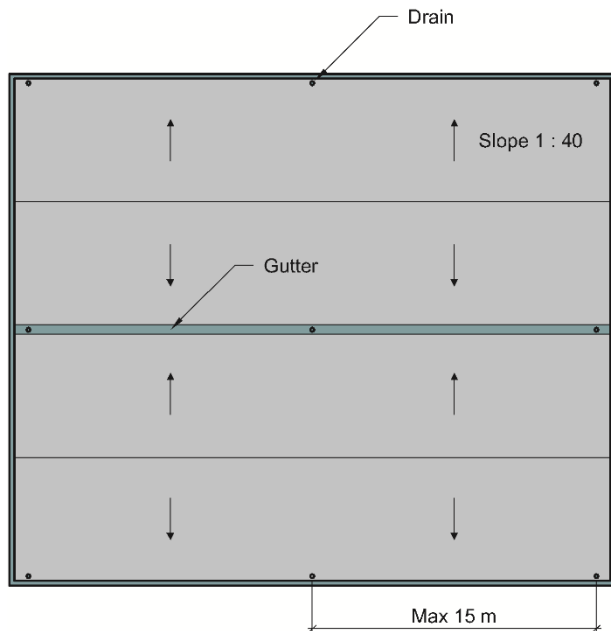


Fig. 3 Principles for slope build up and drain location for the final roofing (2X).

As an alternative to mechanical fastening, a vacuum based system can be used for finishing the Protan 2X Roofing System. See SINTEF Technical Approval no. 2281.

**Gutter design**

The gutters can benefit from being horizontal, in case a drain gets clogged. The gutters must not be lower than the roof surface at the parapet; see figure 4. Further in on the roof surface the gutters must be lowered by min. 20 mm in relation to the roof surface; see figure 5. The gutters must have a spacious width that allows installation of drains. Drains must always be installed with centres minimum 200 mm from vertical surfaces or other vertical details.

Roofing in horizontal gutters must always be done with Protan SE 1.6, with a minimum of welded joints. This can be achieved by using a roofing membrane with underlying transverse or longitudinal flaps. Against the parapet, the distance between underlying flaps will depend on the design wind load, and will normally be in the range 0.6–1.0 m. This gutter design provides a simpler and therefore safer mechanical fastening of the roofing membrane. The roofing membrane will be stretched tighter, creating a surface that efficiently conducts water away.

**Drains**

Drains must be placed in gutters with a distance of maximum 15 m between each drain. All drains must have a local recession of minimum 20 mm in relation to the gutter. With horizontal gutters and recessed drains, the drains are linked in parallel to prevent standing water. This means that if there's a blocked drain the water will be directed to the next drain along the horizontal gutter.

**Leakage detector**

It must always be considered whether leakage detectors should be installed in the roof at suitable places between the vapour barrier and the roofing membrane. These may be simple mechanical devices or electronic sensors.

**Substrate**

Where fire technical class B<sub>ROOF</sub> (t2) is required for the roofing membrane, the membranes can only be laid on substrates as specified in TG 2010, clause 4 *Properties*, section *Properties related to fire*.

Substrates of combustible insulation, such as EPS, must be covered or divided into areas, and replaced with non-combustible insulation around bushings and adjacent constructions, such as parapets and walls, according to pre-accepted performances given in the guidance to *Forskrift om tekniske krav til byggverk § 11-9* and in TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*.

When re-roofing on old bituminous roofing membrane laid on insulation of EPS, the membrane in the old roofing must fulfil the requirements of class B<sub>ROOF</sub> (t2) according to EN 13501-5 on EPS.

When the membrane is installed on old bituminous roofing membrane, on old and rigid PVC roofing or directly on EPS or XPS insulation, a separate migration barrier/separation layer shall be used in accordance with the manufacturer's installation manual. See SINTEF Building Research Design Guide no. 544.202 *Takfolie. Egenskaper og tekking*. for additional requirements for migration barriers and protective layers.

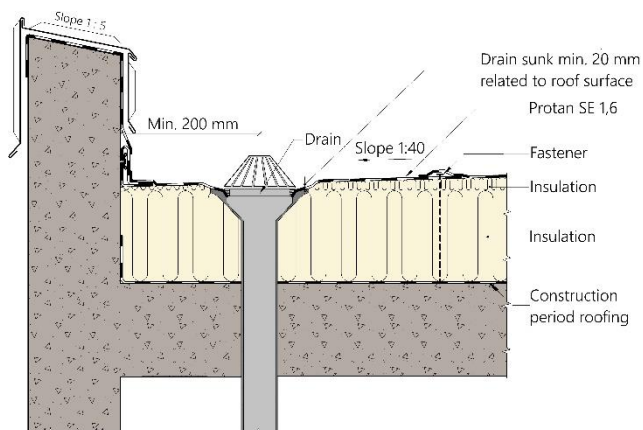


Fig. 4 Example of structure build up at parapets with Protan 2X Roofing System on concrete substrate, with local recession of drains.

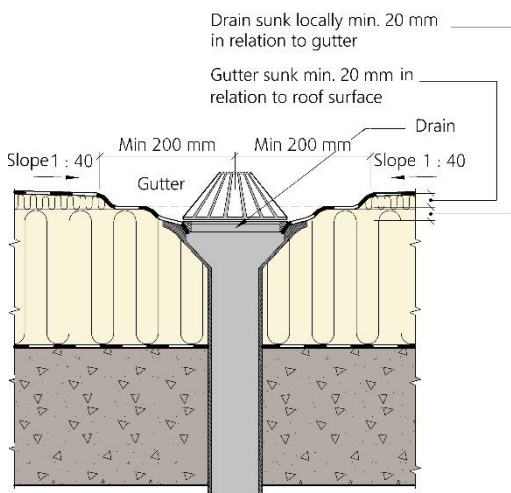


Fig. 5 Example of build up of a lowered gutter on the inner part of the roof surface with local recession of drain, in relation to the gutter.

*Traffic on the roof*

Special precautionary measures should be taken to protect the roofing membrane if the roof is expected to have more traffic than is necessary for inspection and maintenance purposes only.

*Maintenance*

Before starting any welding, as a part of repair work, the roofing membrane must be cleaned locally, in accordance with the vendor's installation manual.

**7. Factory production control**

The membranes are produced by Protan AS, Baches vei 1, 3413 Lier, Norway.

The holder of the approval is responsible for the factory production control in order to ensure that the products are produced in accordance with the preconditions applying to this approval.

The manufacturing of the products and the manufacturer's system for factory production control (FPC) is subject to continuous surveillance in accordance with the contract regarding SINTEF Technical Approval.

Protan AS has a quality management system certified according to EN ISO 9001 and an environmental management system certified according to EN ISO 14001.

**8. Basis for the approval**

The evaluation of the roofing membranes is based on reports owned by the holder of the approval.

The evaluation of design and technical solutions are based on recommendations given in SINTEF Building Research Design Guides.

**9. Marking**

All pallets/packages/of roofing membranes shall be marked with the manufacturers name, product name and production number. All rolls are also marked with week number and year.

Protan SE is CE marked in accordance with EN 13956.

The approval mark for SINTEF Technical Approval TG 2415 may also be used.

**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

for SINTEF



Susanne Skjervø  
Approval Manager