



ROOFING AND MEMBRANES

ROOFING THAT PROTECTS VALUES

Our solutions ensure a
simple building process and
a roof which is ready to face
the forces of nature.

Protan protects values

Protan is a Norwegian industrial group that is a world leader in membrane technology. We develop and supply membranes, roof systems, ventilation systems and technical textiles.

Our head office is in Drammen, Norway, and we have more than 650 employees and a total turnover in excess of NOK 1.2 billion.

Our largest business area is roofing and membranes. We also specialise in tailor-made, flexible ventilation ducts for mines and tunnels. In addition, we supply multi-purpose technical textiles for a range of applications. Protan is also one of the largest roofing contractors in the Nordic region.

With over 70 years' experience, Protan has developed innovative solutions that are adapted to a global market and demanding climates. We work closely with our customers and suppliers to stay at the forefront of technology, the environment and competence. This gives us unique experience and insight that means that we can deliver flexible, tailor-made solutions adapted to local requirements – whether our customers need environmentally friendly watertight roofing, ventilation for demanding environments or other technical protection. Our most important role as an international group is to protect values by supplying world-leading solutions.



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HIGH QUALITY AND LONG LIFE

Protan has been supplying roof coverings and membranes since 1972, and can document the long life of its products from many years of experience in the Scandinavian climate and extensive testing in its own and external laboratories.

The properties, quality and life of a roof covering are dictated by the quality of the raw materials. All raw materials used by Protan are sourced from suppliers who are audited on a regular basis with all incoming materials tested before entering production.

Designed for a Scandinavian climate

Our roof coverings and membranes are very flexible and withstand all kinds of extreme weather. They have been developed for the tough Scandinavian climate, so special attention has been paid to material properties at low temperatures. Long-duration tests show that, even after 30 years, Protan's roof coverings and membranes still retain their beneficial properties and will function for many years beyond their expected life.

Complete system

We have developed a complete roofing system, from roofer training to installation, and inspection and maintenance programmes post installation to ensure that our products and solutions endure.

Confirmed durability

Together with SINTEF Building and Infrastructure, the British Board of Agrément (BBA) has assessed roof life by testing old Protan roofs and provide the following statement in Protan's Agrément Certificate (98/3459) based on the results:

"Accelerated weathering tests and performance in service confirm that satisfactory retention of physical properties is achieved. All available evidence suggests that Protan Mechanically Fastened PVC Roofing Membranes should have life in excess of 30 years."



PROTAN'S TESTING LABORATORY

We develop and test all our solutions and products, as well as inspecting raw materials and production processes, at our laboratory in Drammen, Norway. The Laboratory is approved and audited by Det Norske Veritas which requires us to follow strict routines for testing and documenting raw materials and products.

LONG LIFE

Long-duration tests show that Protan's roof coverings and membranes retain their flexibility and should have a long residual life even after 30 years.

Exposed roofs

Able to withstand extreme stresses
Documented long life
Can be installed in any weather
Hot-air welding with minimal fire risk
Homogeneous, durable joints
Environmentally friendly

SAFE, WATERTIGHT SOLUTIONS

Protan's roof coverings satisfy every requirement when it comes to sustainable roofs of a high technical standard.

Protan SE membrane with Protan Omega profiles.

Newspan Building Solutions Ltd are the designers, fabricators and installers of the structure at Redfields Garden Centre, Fleet, Hampshire.

Robust quality solutions

Our high quality solutions for exposed roofs have a long life, are robust in all climates and provide sustainable roofs of a high technical standard.

The products are secured mechanically, by vacuum, or by full bonding to the roof structure. The roof coverings are ideally suited to flat and sloped roofs on new build and renovation projects. Protan's roof coverings and membranes are reinforced and coated with PVC-P (plasticised).

Protan's roof coverings:

- withstand high and low temperatures
- are UV resistant
- are self-extinguishing
- have excellent puncture resistance
- are welded with hot air

Most suitable

Our products have excellent tear strength, which is particularly important when it comes to preventing wind damage in areas exposed to extreme wind. Our roof covering is the most suitable product to install in severe cold weather, a clear advantage during winters and in cold climates.

Anti slip

The roof membranes have a textured surface, which provides an anti slip surface. Compared with non-textured roof coverings, this provides an important safety factor during both installation and maintenance.

SELF-EXTINGUISHING

Our roof membranes for exposed roofs are self-extinguishing. This means that they do not help fire to spread. They are fire classified according to EN 13501-5 on most substrates.

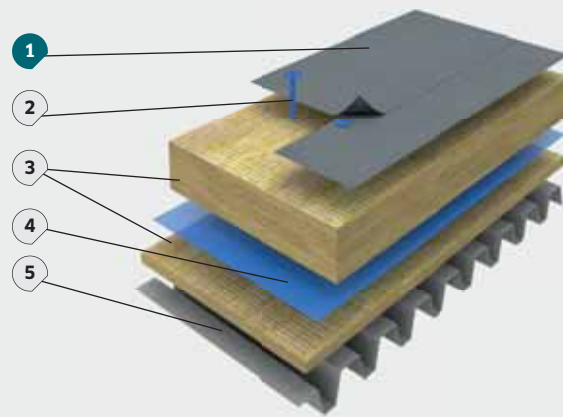
A full overview can be found at www.protan.com and in the SINTEF technical approval for the roof coverings.

NO NAKED FLAMES REQUIRED

Protan's membranes and roof coverings are welded only with hot air, making them a safe method to install a roof. By choosing Protan's solutions, the building owner avoids taking a risk during the installation period.



PROTAN STANDARD OVERLAP SYSTEM



- | | | | |
|---|--------------------------|---|----------------------|
| 1 | Protan SE or EX membrane | 4 | Vapour control layer |
| 2 | Fasteners | 5 | Supporting deck |
| 3 | Insulation | | |

Protan SE or EX is used, **depending on the type of substrate.**

PROTAN STANDARD OVERLAP SYSTEM

For all types of substrate

The Protan Standard Overlap System with mechanical fastening can be installed on all types of substrate, and used on both new build and renovation projects.

The membrane is fastened to the substrate along the longitudinal sheet edges and overlapped by the adjoining roll. The two rolls are welded together using hot air. The material is fused homogeneously together at the overlap, so the joint is at least as strong as the roof covering itself. This is the system most commonly used for exposed roofs.

Protan SE and EX are the membranes used for mechanically fastened applications.



● Membranes for exposed roofs that are fastened mechanically (as in the Protan Standard Overlap System) have a polyester reinforced core.



● Our solutions are robust in any climate and can be installed in almost any weather. The Arctic Circle Centre at Saltfjellet is roofed with Protan membrane.



Rapid safe installation
Fast installation process
Can be installed in any weather
Suited to harsh climates
Strong joints



WIND-EXPOSED

WITHSTANDING THE WIND

Protan offers specially developed roofing systems for wind-exposed roofs and roof surfaces.

WIND-EXPOSED BUILDINGS

Effect of wind on flat roofs

Buildings do not just have to be protected against rain, snow and temperature fluctuations, but also against the wind.

Depending on the location and geometry of the building, the wind pressure on the roof may be extremely high and turbulent. So it is important to ensure that the roof structure and chosen roofing system are able to withstand these forces. Our wind load calculation is based on the European Standard for wind actions (EN 1991-1-4). Using our tested and approved fasteners in combination with our membranes guarantees a high-quality roof.

Negative pressure

Wind causes negative pressure over flat roofs owing to the difference between static and dynamic pressure. In the case of hurricane-force winds, the negative pressure could be several hundred kilograms per m², and is strongest at the corners and edges of the roof surface.

In the case of turbulence, the roof structure is exposed to suction from above, in addition to which there is often pressure from inside as a result of leaks in the building's wall and roof structures.

Specially developed roofing systems

In locations with high wind exposure we recommend our specially developed roofing systems:

- Protan Vacuum Roofing
- Protan Prefabricated Sheets
- Protan Secret Fix System





WIND-EXPOSED

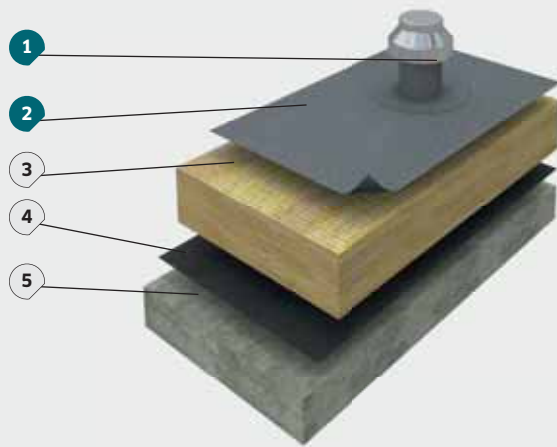


RENOVATION



NEW BUILD

PROTAN VACUUM ROOFING



- | | |
|----------------------------|------------------------------|
| 1 Protan Vacuum Vent | 4 Vapour control layer |
| 2 Protan SE or EX membrane | 5 Supporting deck (airtight) |
| 3 Insulation | |

Depending on the substrate, the following membranes are used:
Protan SE or EX

PROTAN VACUUM ROOF SYSTEM

The stronger wind, the better

Protan Vacuum Roofing is a unique system that does not require fasteners or adhesives to be used on the roof surface. The wind forces create a vacuum effect that sucks the membrane firmly onto the roof structure. The windier it is, the better the system works.

When the vacuum roof is exposed to wind forces, negative pressure is generated in the layer between the membrane and an airtight, load-bearing substrate. This makes our vacuum roofing ideal in harsh climates. No fasteners need to be used on the roof surface, so the vapour control layer is not punctured. The membrane is laid in 2 or 4 metre widths, then air sealed against the parapet and around any penetrations.

Rapid installation

Protan Vacuum Roof System guarantees rapid installation and a speedy building process. The solution has very few joints and is a perfect match for projects with strict air tightness requirements, such as passive houses. Our vacuum roofing system is also ideal for buildings with high humidity, such as swimming pools, breweries, etc. If moisture is trapped in the roof structure, the vacuum system helps to vent it.

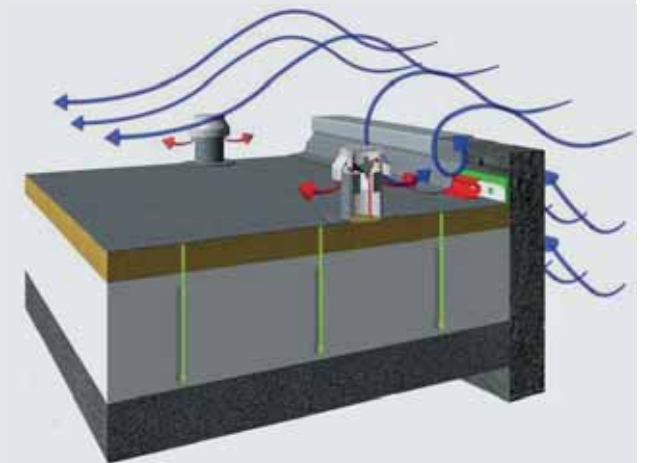
No noise during installation

Drilling noise can be a problem when renovating roofs. Fitting a Protan Vacuum Roof System reduces installation noise significantly, a major benefit for users of buildings such as offices, hospitals, schools and other institutions.

Protan's SE and EX membranes are ideal for the vacuum roofing system.



Unique solution
Rapid installation
No fasteners or adhesives
Ideal in harsh climates



● Several million square metres of Protan Vacuum Roofing have been installed on buildings all over Europe. When the vacuum roof is exposed to wind forces, negative pressure is generated in the layer between the membrane and an airtight, load-bearing substrate.



Rapid, safe installation
Fast building process
Suited to harsh climates
Weather independent
Fewer joints

PROTAN PREFABRICATED SHEETS

Fast weather-tight roofing

Protan Prefabricated Sheets system is the best and fastest solution in wind-exposed areas, so it is ideal when the roof has to be covered quickly.

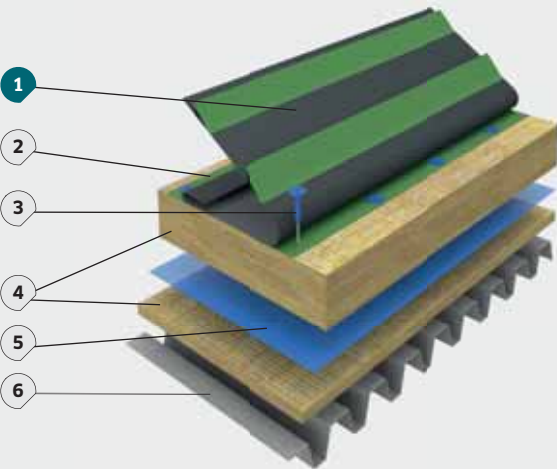
The membrane is provided in 2 or 4 metre widths with high strength strips welded longitudinally on the underside for mechanical fastening. The system is a fast and efficient way of covering large, wind-exposed roofs. It has been developed to simplify installation and reduce installation time on site compared with the Standard Overlap System. The strips welded to the underside of the sheets can be tailored to even the toughest wind conditions.

Protan Prefabricated Sheets provide an optimum roofing system that can be engineered for an individual building. The strips on the underside of the membrane are welded at the factory. The strip spacing can vary depending on how exposed to wind the building is and how close the fasteners need to be. Protan Prefabricated Sheets are particularly suited to areas with strong wind forces.

Large areas of roof can be covered quickly with minimal welding work on site. The sheets make fast installation possible, as large sections of membrane are laid at a time, substantially reducing the amount of welding.



PROTAN PREFABRICATED SHEETS



- | | |
|---------------------------------------|------------------------|
| 1 Protan Prefabricated Sheet membrane | 5 Vapour control layer |
| 2 Longitudinal strips | 6 Supporting deck |
| 3 Fasteners | |
| 4 Insulation | |



Rapid, safe installation
Fast building process
Suited to harsh climates
Weather independent
Fewer joints

PROTAN SECRET FIX SYSTEM

Ideal for wind-exposed roof surfaces

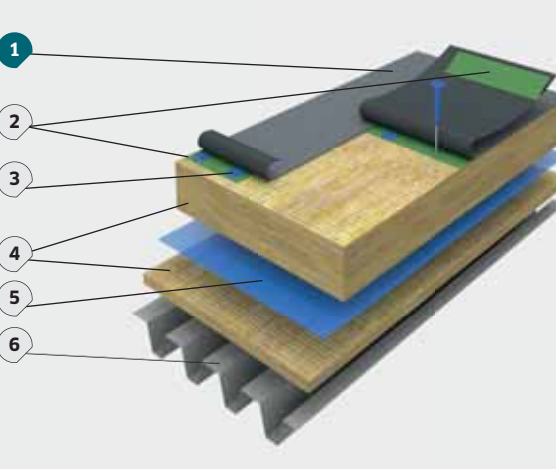
The Protan Secret Fix System uses a membrane in 2-metre widths with extra strong strips welded transversely to the underside for mechanical fastening.

The system is a fast and efficient way of covering the roof's most wind-exposed areas, such as corner and edge zones, but can also be used on the whole roof surface. It has been developed to optimise installation on the roof and reduce the amount of welding compared with the Standard Overlap System.

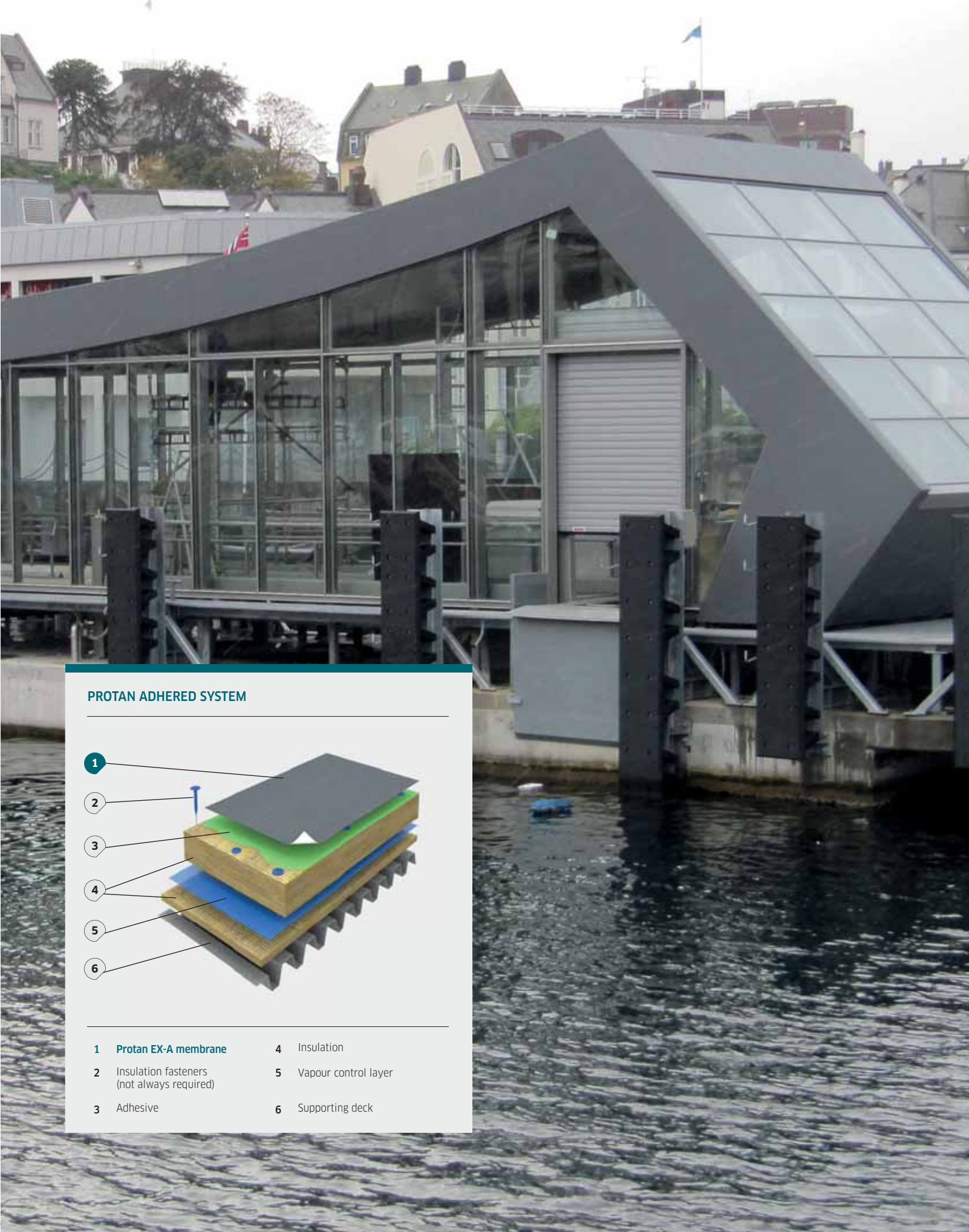
The Secret Fix System is an optimum roofing system that can be engineered for an individual building. The roofing system uses strips on the underside of the membrane which are welded at the factory. The strip spacing can vary depending on how exposed to wind the building is and how close the fasteners need to be.



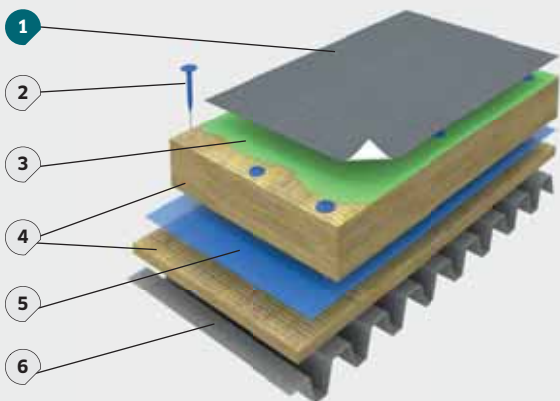
PROTAN SECRET FIX SYSTEM



- | | |
|------------------------------|------------------------|
| 1 Protan Secret Fix membrane | 5 Vapour control layer |
| 2 Transverse strips | 6 Supporting deck |
| 3 Fasteners | |
| 4 Insulation | |



PROTAN ADHERED SYSTEM



- | | |
|--|------------------------|
| 1 Protan EX-A membrane | 4 Insulation |
| 2 Insulation fasteners (not always required) | 5 Vapour control layer |
| 3 Adhesive | 6 Supporting deck |



RENOVATION



NEW BUILD



High quality and long life
High tear strength
Ideal for demanding designs

PROTAN ADHERED SYSTEM

Where mechanical fastening is limited

Fully adhered solutions can be appropriate where perforation of the vapour control layer is undesirable or the substrate makes mechanical fastening difficult or impossible.

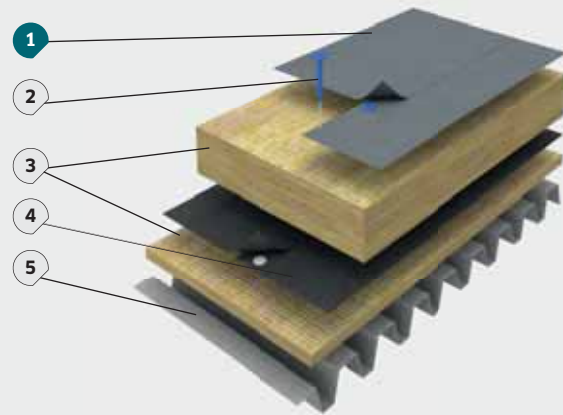
The Protan Adhered System can be used on both hot and cold roof structures, new build and renovation projects. In some countries adhesion is a common roofing method, but this solution cannot be installed during cold or wet weather.

This type of solution can be appropriate on buildings with high humidity, such as swimming pools, and on roofs with, for example, a wood wool deck, where mechanical fastening is difficult.

For fully adhered roofing systems, Protan has developed the Protan EX-A membrane with polyester fleece on the reverse.



PROTAN 2X



- | | |
|----------------------|--|
| 1 Protan SE membrane | 4 Construction period roofing/
vapour control layer |
| 2 Fasteners | 5 Supporting deck |
| 3 Insulation | |



A weather-tight roof fast
Safe work platform
Protects insulation and structure

PROTAN 2X

One layer for the construction period and one for life

With Protan 2X, one layer is installed first to provide watertight roofing during the construction period and a work platform. Then another layer is installed when the building work is complete.

Many roofs are subjected to heavy traffic and used for site facilities at times during the construction period. This means a lot of wear and tear for the roofing and insulation alike, something that roofs are not normally designed to cope with.

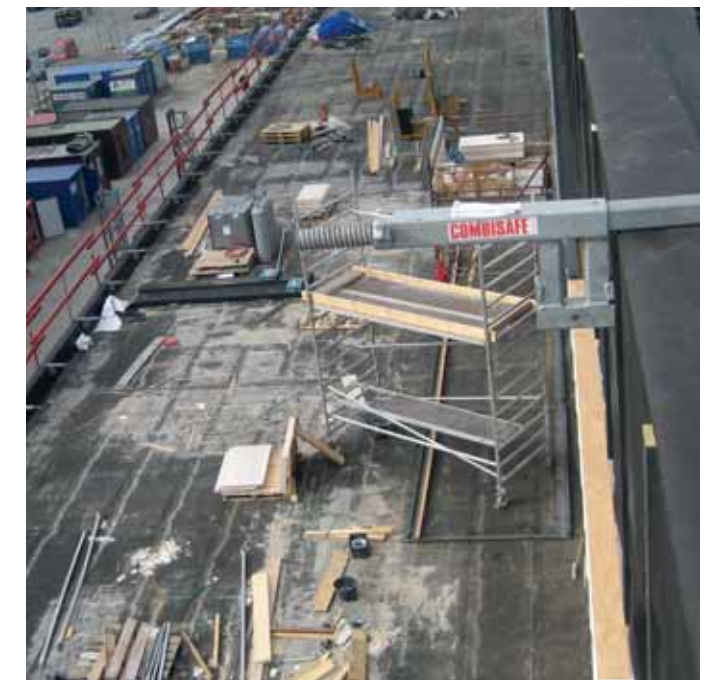
As early as possible

Protan 2X solves these problems with the installation of construction period roofing as early as possible in the building process. Then, when the building work is complete, the roofing is repaired, after which the roof is insulated and covered with a second layer. The membrane is fastened mechanically or secured using the vacuum roof concept. The construction period roofing subsequently acts as a vapour control barrier with fully welded joints in the final structure.

A weather-tight roof fast

Protan 2X offers many advantages. The developer gets a weather-tight roof quickly and can start internal works sooner. The first layer is installed early in the building process and so can help to weatherproof the building, avoiding problems with damage to, and moisture on, the insulation and structure.

Once construction is complete, insulation of the roof is finished and the final roof covering installed.



● With Protan 2X the roof can be used for site facilities during the construction period.



RENOVATION



NEW BUILD

PROTAN COOL ROOF

High solar reflectance – less need for cooling

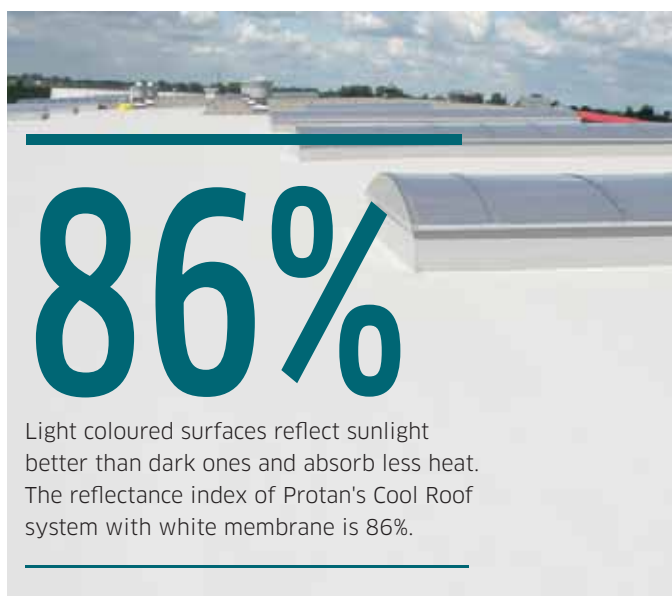
Protan Cool Roof is a system that uses a white membrane with a documented high solar reflectance index (SRI) – and less need for cooling.

A white roof surface with high solar reflectance produces a much lower temperature in a compact roof structure than darker colours. A high solar reflectance index makes the roof more durable, reduces the need for the building to be cooled and counteracts the urban heat island effect, an important factor in a Southern European climate.

In a cool climate it may be beneficial to lay white membrane in front of the fresh air intake of air conditioning units, for example, as the temperature will be several degrees colder than on the rest of the surface.

The product used in a Protan Cool Roof system is white Protan SE, which is fastened mechanically or secured using the vacuum roof concept.

Protan Cool Roof has been tested in accordance with ASTM C 1549-04 and ASTM C 1371-04a using methods approved by the Cool Roof Rating Council (CRRC).



● At the Polaria adventure centre in Tromsø, Protan Cool Roof has been used on the building to represent blocks of ice washed ashore by the harsh Arctic seas.



RENOVATION



NEW BUILD

PROTAN SOLAR ROOF

Ready for on- roof energy sources

Protan Solar Roof is a concept that paves the way for photovoltaic or thermal panels to be installed on roofs covered with Protan membrane.

The right membrane type and quality are selected on the basis of whether the panels are photovoltaic or thermal. The panels can be integrated on the roof or free standing.

Normally the membrane is fastened mechanically when a photovoltaic (PV) or thermal panel array is going to be put on the roof. Protan SE membrane reinforced with polyester is therefore used for these purposes.

The right colour for the job

PV panels work most efficiently when they are kept cool. Light coloured surfaces usually reflect sunlight better than dark colours. Our white Protan Cool Roof and light grey Protan SE Exposed Roof membranes are therefore primarily used when there are plans to install PV panels on the roof. Protan Cool Roof has some of the best solar reflectance values on the market for this type of product and makes an optimum contribution to a Protan Solar Roof system with PV panels.


Thermal solar panels convert solar energy into heat which is used to heat water. This type of solar panel works more efficiently the hotter it is. It is therefore an advantage to have dark surfaces that absorb as much of the heat from the sun as possible. For this purpose we recommend our black or dark grey Protan SE Exposed Roof membrane.



PROTAN'S PRODUCTS FOR EXPOSED ROOFS


PROTAN SE

- Polyester-reinforced membrane used for exposed roof surfaces
- Can be fastened mechanically or using the vacuum roof concept
- Can be installed on all types of substrate
- Can be used for all shapes of roofs - flat, inclined and curved surfaces
- Hot-air welded

THICKNESSES	1.2 mm - 1.6 mm - 1.8 mm - 2.0 mm	
STANDARD WIDTHS	0.67 m - 1.0 m - 2.0 m	
STANDARD LENGTHS	15 m - 20 m (depending on thickness)	
<div>COLOURS</div> <div><div>●</div> Dark Grey F94 <div>○</div> Light Grey F 91 <div>●</div> Copper Green F41 <div>●</div> Red F12 <div>●</div> White/Cool Roof F01 <div>●</div> Black FX9</div> <div>Prices will vary depending on choice of colour.</div>		

PROTAN EX

- Polyester-reinforced membrane with polyester fleece laminated to the reverse
- Special product for direct installation on old roofs or wooden structures
- Can be fastened mechanically or using the vacuum roof concept
- Hot-air welded

THICKNESSES	1.2 mm - 1.6 mm - 1.8 mm - 2.0 mm + polyester fleece	
STANDARD WIDTHS	1.0 m - 2.0 m	
STANDARD LENGTHS	15 m - 20 m (depending on thickness)	


COLOURS

● Dark Grey F94 ○ Light Grey F 91 ● Copper Green F41 ● Red F12 ● White/Cool Roof F01 ● Black FX9

Prices will vary depending on choice of colour.

PROTAN EX-A

- Polyester-reinforced membrane with polyester fleece for full adhesion laminated to the reverse
- Special product designed for full adhesion in exposed, adhered roof structures
- Bonded to load-bearing base
- Hot-air welded

THICKNESSES	1.5 mm - 1.8 mm + polyester fleece	
STANDARD WIDTH	2.0 m	
STANDARD LENGTHS	15 m - 20 m (depending on thickness)	

COLOURS

● Dark Grey F94 ○ Light Grey F 91 ● Copper Green F41 ● Red F12 ● White/Cool Roof F01 ● Black FX9

Prices will vary depending on choice of colour.

EFFECTIVE AND RELIABLE

Robust solution for one
of the roof's most
challenging elements.



Flexible system
Reliable and cost-effective
Simple to install

PROTAN PARAPET SYSTEM

The roof's weapon against high winds

Our parapet system guarantees an elegant, weather-tight, robust solution for one of the roof's most challenging and wind-exposed elements.

The wind forces on a roof are stronger at the roof edge. A roof edge with an upstand is known as a parapet. Wind damage can easily occur unless the roof covering is well secured. Our system is a combination of the Protan Steel Bar and our prefabricated Parapet Skirt with a welded strip or pocket.

Pre-welded

The Protan Parapet Skirt is our membrane with a reinforced strip or pocket pre-welded to the reverse. The Parapet Skirt is supplied in standard colours and dimensions, but can also be supplied in dimensions specified by the customer. High parapets require more fastening on the vertical surface, so in this case the Parapet Skirt comes with extra strips.

Reduced point loading

Protan requires the membrane at the transition between the roof surface and the parapet to be fastened linearly. Our Steel Bar provides a good air seal and linear retention, as well as reducing the risk of point loading at the welds and fastenings. The strength and rigidity of the bar ensures that horizontal and vertical forces in the roofing are transferred to it as an evenly distributed load. We accept several technical solutions for parapet fastening, but Protan's approved steel bars must be used with all of them.

- Prefabricated Parapet Skirt combined with the Protan Steel Bar ensures secure, linear installation on the most wind-exposed parts of the roof, which mainly occur along the parapet.



See next page for diagrams
of various parapet systems

PROTAN PARAPET SYSTEMS

PARAPET WITH POCKET AND EXTRA STRIP FOR HIGH PARAPET

1	Protan SE membrane	5	Insulation
2	Strip on underside	6	Vapour control layer
3	Protan Grip Steel Bar	7	Supporting deck
4	Protan Strip Pocket		

PROTAN PARAPET SKIRT WITH REINFORCED STRIP IN COMBINATION WITH THE PROTAN GRIP STEEL BAR

1	Protan SE membrane	5	Vapour control layer
2	Protan Grip Steel Bar	6	Supporting deck
3	Protan Strip		
4	Insulation		

PROTAN PARAPET SKIRT WITH POCKET IN COMBINATION WITH THE PROTAN STEEL BAR

1	Protan SE membrane	5	Vapour control layer
2	Protan Strip Pocket	6	Supporting deck
3	Protan Steel Bar		
4	Insulation		

PROTAN PARAPET SKIRT WITH STRIP IN COMBINATION WITH THE PROTAN GRIP STEEL BAR AND WELDING CORD

1	Protan SE membrane	5	Insulation
2	Protan Welding Cord	6	Vapour control layer
3	Protan Steel Bar	7	Supporting deck
4	Protan Strip		

PROTAN PREFABRICATED DETAILS

Time-saving, reliable execution

Protan has one of the widest ranges of prefabricated details on the market, including details for corners, pipes and upstands.

Ready to use

Every single component has been carefully developed and designed to ensure a durable, watertight solution with a uniform appearance. They also help with efficiency, as the roofer does not have to spend time making the details on site. The details come ready for use together with other materials for the building site.

Suitable for every application

The details are made from different membrane qualities to fit every application perfectly. They come in a number of different sizes to suit the various applications, and can also be supplied in dimensions specified by the customer.



● Protan has the widest range of prefabricated details on the market. We also supply details in specified dimensions for an optimum solution for your project.

DESIGN ROOF

The roof is the building's fifth façade

Our flexible solutions help to enhance the architecture, as well as the building's appearance and identity. The roof helps to send a message about the building's purpose, character and relationship with the surroundings.

- Protan is the proud supplier of the fifth façade for Statoil's offices at Fornebu – an aesthetic combination of sedum with ballasted and exposed roofs.



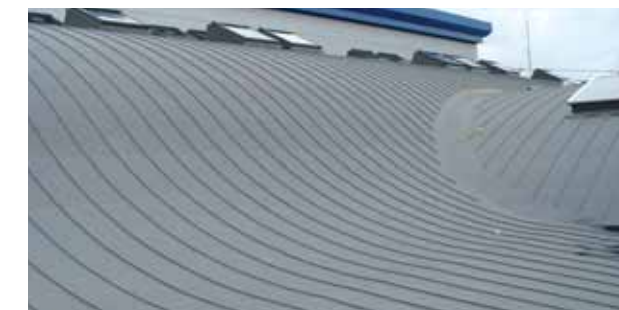
Profiles and different colour choices on a roof can help generate attention and interest for the building. Our products and solutions also guarantee a durable roof with a long life.

Weather-tight roofs with a long life

Our roofing and membrane systems are documented to provide weather-tight roofs with long life expectancies, mechanical strength and minimal maintenance requirements, while covering every requirement in terms of quality, flexibility, adaptability and aesthetics.

Choice of colours and profiles

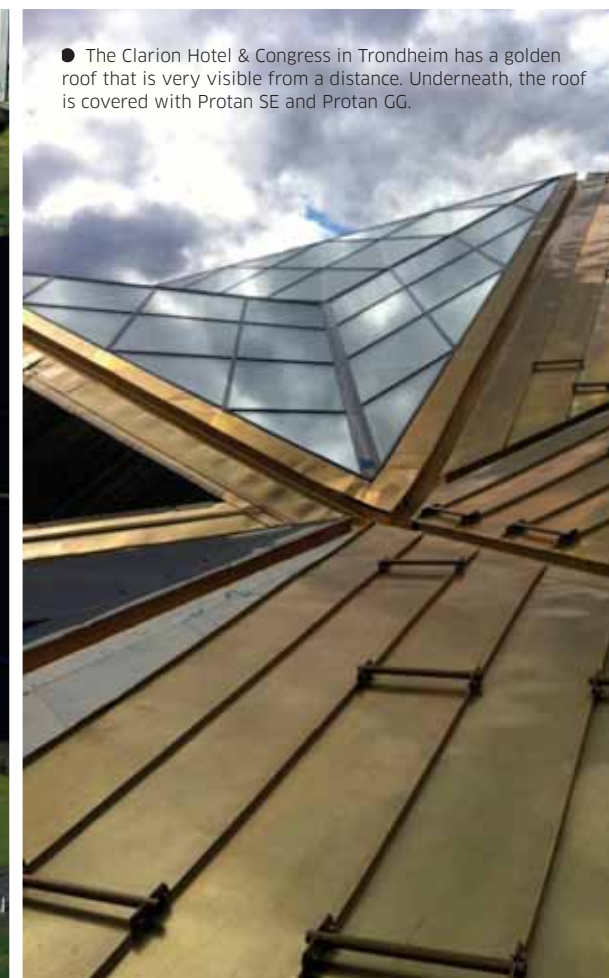
Our Design Roof solutions provide quality, function, design and innovation. Thanks to a free choice of colours and profiles, there are all sorts of ways to create a roof with an exclusive, innovative appearance. Our solutions can be installed simply and safely, regardless of whether the roof is flat, sloped, curved, or has a more demanding design.



Omega profile

The profile is shaped like an "Ω", hence the name. The profiles are welded onto the membrane after installation without perforating it. The shape gives depth and interest to large roof surfaces and can also be used to create pattern effects. The profiles can be spaced at any distance to suit the design of the building.

- The Clarion Hotel & Congress in Trondheim has a golden roof that is very visible from a distance. Underneath, the roof is covered with Protan SE and Protan GG.



- Green roofs combine well with other solutions, like at ICA Uppsala, where the company logo is incorporated in the roof using a combination of sedum roofing and Protan Cool Roof.



Ballasted and green roofs

Durable, watertight solutions
Good protection from the wind
Contribute to natural surroundings

USE THE ROOF!

The space on the roof can be used for more than one purpose, such as creating recreational areas.



Aesthetic design freedom
Protection against external stress
Increased fire safety

MEMBRANES FOR PROTECTED ROOFS

Even better protected

Covered membranes in roof structures are generally referred to as ballasted or protected roofs. The ballast can be concrete slabs, pebbles or soil as the basis for a green roof.

With protected roofs the membrane is protected against direct stress caused by climate and temperature fluctuations, tears, punctures and other mechanical damage.

For both new builds and renovation

Our membranes for ballasted, green and turf roofs are suitable for both new build and renovation projects. They offer excellent quality and a long life.

Natural surroundings

Protected roofs can be used as an open space, recreational area or roof garden. These solutions offer great freedom in terms of aesthetics, contribute to more natural surroundings by using pebbles or plants, and provide better acoustics. The weight of the ballast requires the load-bearing structure to be engineered for the purpose.

With protected roofs there are several options when it comes to positioning the membrane:

- Protan Inverted Roofing System
- Protan Dual Roofing System
- Protan Normal Roofing System

MORE THAN ONE PURPOSE

Protected roofing systems make it possible to utilise the space on the roof – for walking on or as a roof garden, for instance. The picture shows walkways and fire barriers.





RENOVATION



NEW BUILD

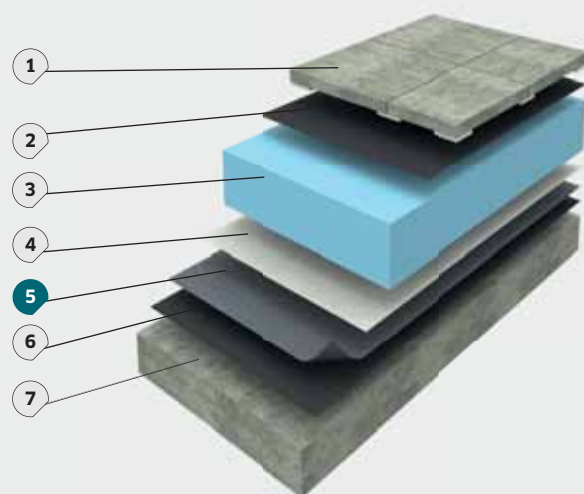
PROTAN INVERTED ROOFING SYSTEM

Membrane under the insulation

Inverted roofs are an insulated, ballasted roof structure with the membrane under the insulation.

The membrane, insulation and ballast are installed on top of the load-bearing structure. To minimise cold bridging and foreign bodies penetrating the layer of insulation and then the membrane, the insulation boards are installed using tongue and groove or in two staggered layers. A separation layer is laid on top of the insulation before the ballast to provide protection. A migration barrier has to be used to prevent contact between the insulation and membrane. The insulation boards are ballasted so as to withstand wind forces and any uplift.

PROTAN INVERTED ROOFING SYSTEM



- | | |
|---------------------------|-------------------|
| 1 Paving slabs or pebbles | 5 Protan G / GG |
| 2 Filter layer | 6 Fleece |
| 3 XPS insulation | 7 Supporting deck |
| 4 Migration barrier | |

PROTAN DUAL ROOFING SYSTEM

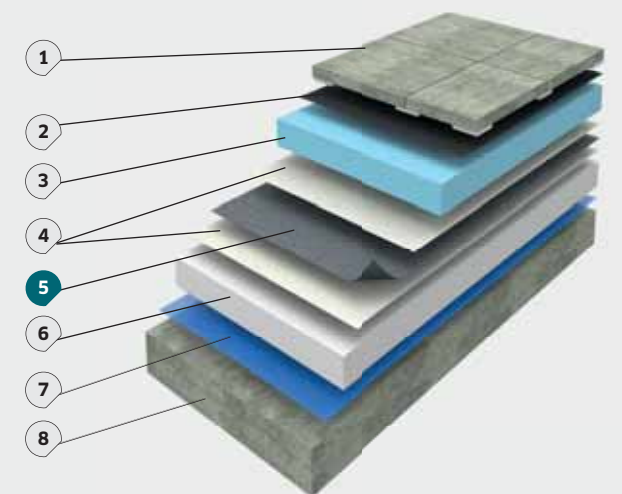
Insulation over and under the membrane

Dual solutions have insulation both over and under the membrane. The membrane is provided with extra protection against temperatures and mechanical loading from both sides.

Insulation with high compressive strength and low water absorption is used on top of the membrane. With these constructions we recommend laying the insulation boards using tongue and groove, or in two staggered layers to minimise cold bridging and foreign bodies from penetrating the insulation layer and then the membrane. A separation layer is laid on top of the insulation before the ballast for protection. Migration barriers are used to prevent contact between the insulation and membrane. The insulation boards have to be ballasted so as to withstand wind forces and any uplift.

The load bearing construction can be installed flat, as the required fall can be incorporated in the insulation under the membrane.

PROTAN DUAL ROOFING SYSTEM

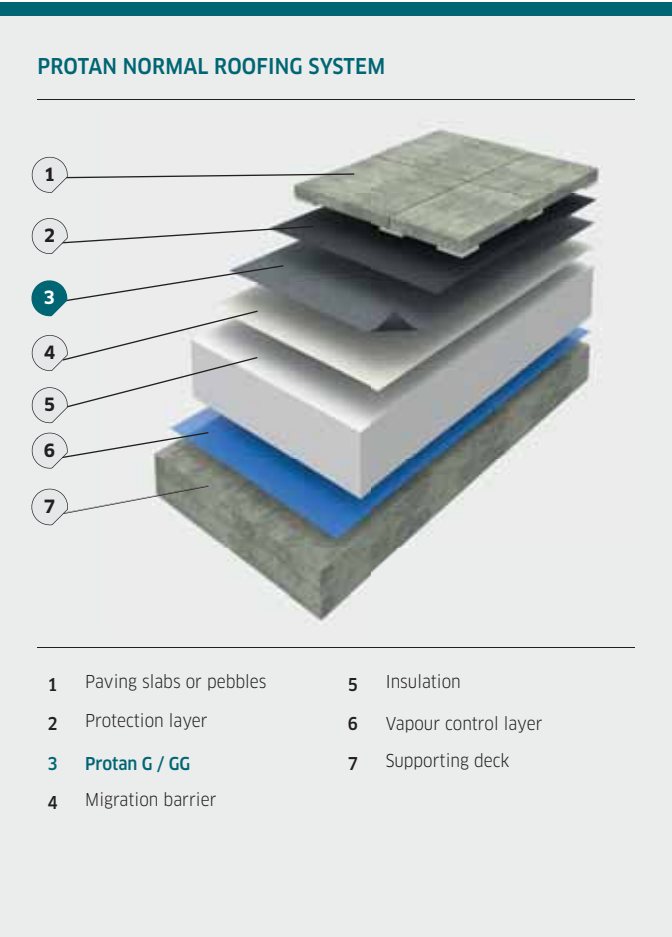


- | | |
|---------------------------|------------------------|
| 1 Paving slabs or pebbles | 5 Protan G / GG |
| 2 Filter layer | 6 Insulation |
| 3 XPS insulation | 7 Vapour control layer |
| 4 Migration barrier | 8 Supporting deck |

PROTAN NORMAL ROOFING SYSTEM

Membrane over the insulation

The Protan Normal Roofing System is an insulated construction with the membrane directly under the ballast.



The roof is built up on the load-bearing structure with the vapour control layer at the bottom, followed by insulation, Protan membrane and then the ballast on top. The ballast is often pebbles or paving slabs. The fall requirements for the construction can be incorporated into the deck substrate or the insulation under the membrane.

Ballast type options

A normal ballasted roof with paving slabs is suitable for situations where foot traffic is expected, such as terraced areas for recreational use or frequent service access. Such roofs are used for both heavy load-bearing structures made of concrete and light load-bearing structures made of sheet steel. The composition principle is the same for both solutions. The heavy structure may be most suited to premises with a high moisture content, for example, while the light structure may be most suited to warehouses and the like. Pebbles may be used as ballast where the foot traffic is limited to minimal maintenance and inspection access only.





Water retention

Environmentally friendly

Aesthetic

PROTAN GREEN ROOFS

Old Scandinavian construction technique

Green roofs with turf and grass are an ancient Scandinavian construction technique that goes back hundreds of years.

Green roofs retain water, as well as offering aesthetic and environmental benefits. In principle they can be used on any roof slope, but are mainly recommended for slopes of up to 30°. The watertight membrane is covered with vegetation.

Good for the environment

Using plants in the composition of the system means that the building is cooler in the summer and insulated better in the winter. Energy consumption can be reduced, and green roofs help to deaden increasing noise in cities, while trapping dust and particles from the air. Plants on the roof also help reduce the greenhouse effect.

Roof gardens mean that we have more recreational areas and make better use of space in cities, and they are new habitats for birds, insects and animals. The water retention can relieve the strain on drainage system in densely built-up areas during heavy rainfall.

Several types

There are several types of green roofs.

- Extensive green roofs
- Intensive green roofs
- Turf roofs



**DID YOU KNOW
THAT...**

...in days gone by birch bark
was used for waterproofing
under turf roofs?

PROTAN TURF ROOFS

Turf installed directly on the membrane

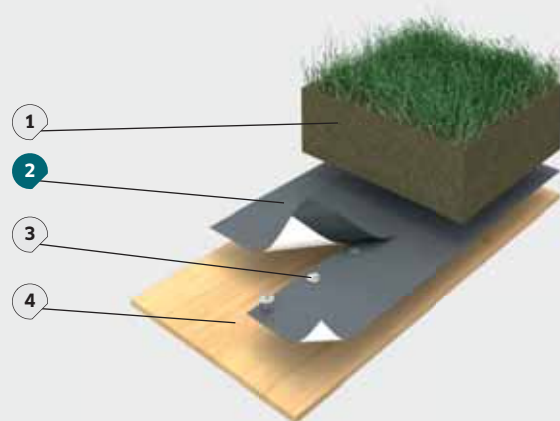
Protan's Turf Roof Membrane is installed on the wooden roof boards with turf directly on top. The resistance of the membrane to roots, combined with its water proofing properties, means that there is no need to use a drainage layer in the solution.

Turf roofs are a special variant of extensive green roofs and widely used on smaller roof surfaces, especially on holiday cottages in the country side. In recent decades, modern versions designed for present-day urban needs have been developed. In the countryside, turf roofs help to create environments that integrate with rural communities, while in cities and densely built-up areas they can soften the urban environment.

- Membrane with polyester core
- Polyester fleece laminated to the reverse protects the membrane against mechanical loading caused by an uneven substrate
- Root, UV and heat resistant
- Fire classified according to EN 13501-5
- Mechanically fastened to the substrate
- Hot-air welded
- Used on all types of turf roofs
- Protects against fire, weather and wind until the turf is in place



PROTAN TURF ROOFS



- | | | | |
|---|---------------------------|---|-----------------|
| 1 | Turf | 4 | Supporting deck |
| 2 | Protan Turf Roof Membrane | | |
| 3 | Fasteners | | |

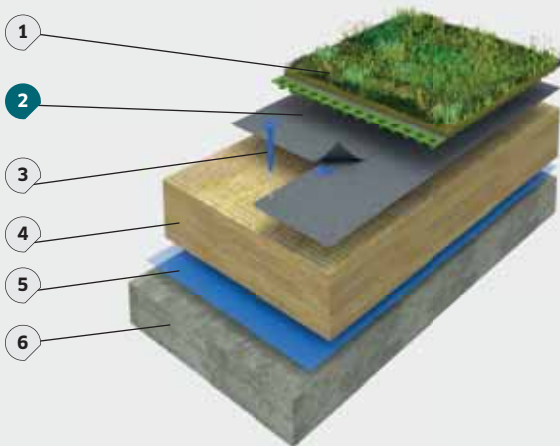


RENOVATION



NEW BUILD

PROTAN EXTENSIVE GREEN ROOFS



- | | | | |
|---|---|---|----------------------|
| 1 | Extensive growing medium (sedum / drainage layer) | 4 | Insulation |
| 2 | Protan SE Titanium+ membrane | 5 | Vapour control layer |
| 3 | Fasteners | 6 | Supporting deck |

PROTAN EXTENSIVE GREEN ROOFS

Thin layer of growing medium

Extensive green roofs are characterised by the roof being covered with a thin layer of soil or growing medium mats, typically planted with succulent and moss species.

The most common type of plant used on an extensive green roof is sedum, so this type of green roof is often referred to as a sedum roof.

Low maintenance

Extensive green roofs generally require little maintenance and offer great potential in terms of applications. They are light weight and do not require a heavy-duty load-bearing structure which is required by intensive green roofs.

Wind

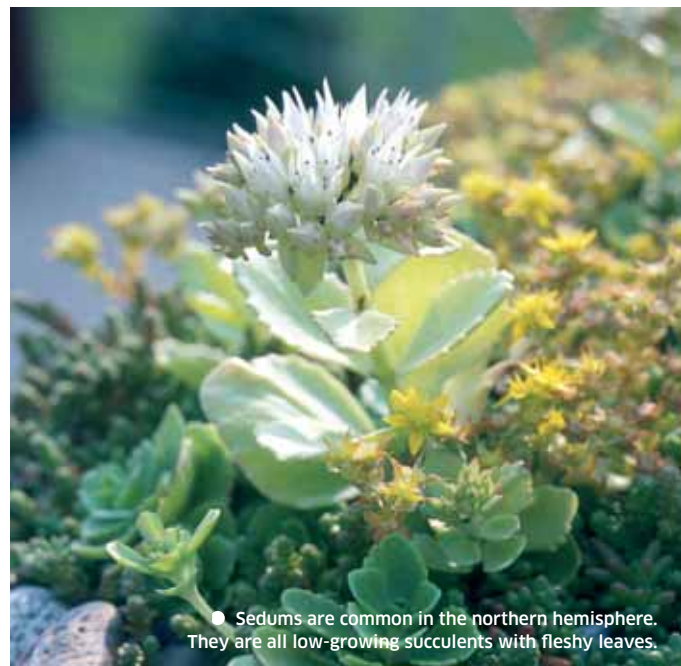
The wind forces on the roof have to be taken into account on all roof structures. The sedum mats can only be laid in the warm season. Due to the low weight of the green roof layers, the membrane has to be calculated to withstand wind loads and may have to be fastened mechanically.

Fire

The membrane has to satisfy fire safety requirements without cover until the sedum mats are installed or in the event that the sedum mats are not fire rated. Our membrane is self-extinguishing and is classified according to EN 13501-5. Larger roofs require fire barriers. At upstands and penetrations the growing medium has to be separated by barriers in the form of concrete blocks, pebbles, etc., to prevent fire from spreading.

Root resistance

Protan SE Titanium+ has been certified root resistant in accordance with the FLL test (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau) and does not require extra protection such as root barriers.



● Sedums are common in the northern hemisphere. They are all low-growing succulents with fleshy leaves.



BETTER CITIES

Green roofs in cities contribute to lower temperatures, biodiversity and better control of rain runoff.



RENOVATION



NEW BUILD

PROTAN INTENSIVE GREEN ROOFS

Roof gardens with trees and shrubs

Intensive green roofs have a thick layer of soil and can be laid out as a roof garden with trees, shrubs and hedges.

The heavy layer of soil provides protection against wind and fire, making it possible to use a loose laid membrane. Intensive green roofs require a strong membrane, so we recommend Protan GG membrane. Protan GG can withstand high water pressure and is not affected by standing water. The membrane adapts with the movement and settlement that occur naturally in structures, and any irregularities in the substrate do not reduce the membrane's performance. It is also resistant to cold temperatures.

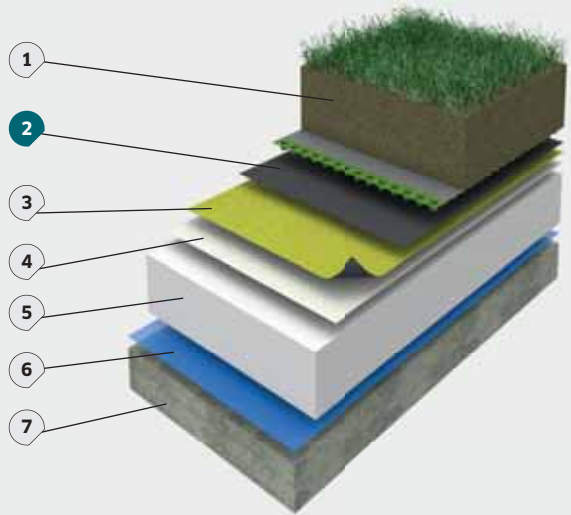
A weather-tight, durable solution

Roofs are required to have a fall to prevent water accumulating on the roof. Protan's solutions with a fall in the insulation under the membrane ensure that the runoff requirement is complied with. Protan GG is designed to withstand heavy loads and high water pressure, as well as having outstanding ageing properties under such conditions.

Root resistance

Protan G and GG have been certified root resistant in accordance with the FLL test (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau) and do not require extra protection such as root barriers.

PROTAN INTENSIVE GREEN ROOFS




- | | | | |
|---|--|---|----------------------|
| 1 | Intensive growth layer (soil / water reservoir / drainage layer) | 5 | Insulation |
| 2 | Separation layer | 6 | Vapour control layer |
| 3 | Protan G / GG membrane | 7 | Supporting deck |
| 4 | Migration barrier | | |

PROTAN'S PRODUCTS FOR BALLASTED AND GREEN ROOFS

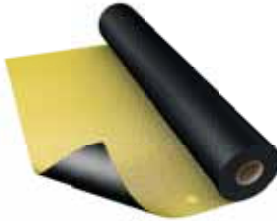
PROTAN G

- Glass fibre reinforced membrane
- Root and humic acid resistant
- Resistant to high and low temperatures, UV radiation and microbes
- Laid loose with pebbles, slab or concrete screed ballast
- Suitable for Normal, Inverted and Dual constructions

THICKNESS	1.5 mm	
STANDARD WIDTH	2.0 m	
STANDARD LENGTHS	7.5 m and 15 m	
STANDARD COLOURS ● Dark Grey F94 ○ Light Grey F91		


PROTAN GG

- Glass fibre reinforced membrane
- Resistant to high and low temperatures
- Used primarily for car park floors, intensive green roofs, culverts and other high load constructions
- Suitable for Normal, Inverted and Dual constructions
- Water pressure resistant membrane for high load constructions, making it ideal for intensive green roofs

THICKNESS	2.0 mm	
STANDARD WIDTH	2.0 m	
STANDARD LENGTH	10 m	
STANDARD COLOUR ● Yellow		


PROTAN SE TITANIUM+

- Polyester reinforced membrane
- Used primarily as a membrane for extensive green roofs (sedum roofs)
- Root, microbe and UV resistant
- Fire classified according to EN 13501-5 on most substrates

THICKNESS	1.6 mm	
STANDARD WIDTHS	1.0 m – 2.0 m	
STANDARD LENGTH	20 m	
STANDARD COLOUR ○ Light Grey F91		

PROTAN TURF ROOF MEMBRANE

- Polyester reinforced membrane
- Polyester fleece laminated and centered to the underside
- Root and microbe resistant
- Resistant to high and low temperatures
- Fire classified according to EN 13501-5 on most substrates
- Mechanically fastened to withstand high winds

THICKNESS	1.6 mm	
STANDARD WIDTH	2.0 m	
STANDARD LENGTH	10 m	
STANDARD COLOUR ● Dark Grey F94		



RENOVATION

ROOF RENOVATION

A new roof over the old one

The lifespan of a roof depends on several factors. Inspection and maintenance are crucial, as is the quality of product and installation alike.

Renovation

Documented long life – high quality
Can be installed in any weather – no delays
No open flames used – welded using hot air
Environmentally friendly
Low life-cycle costs
Architectural profiles for visible roofs

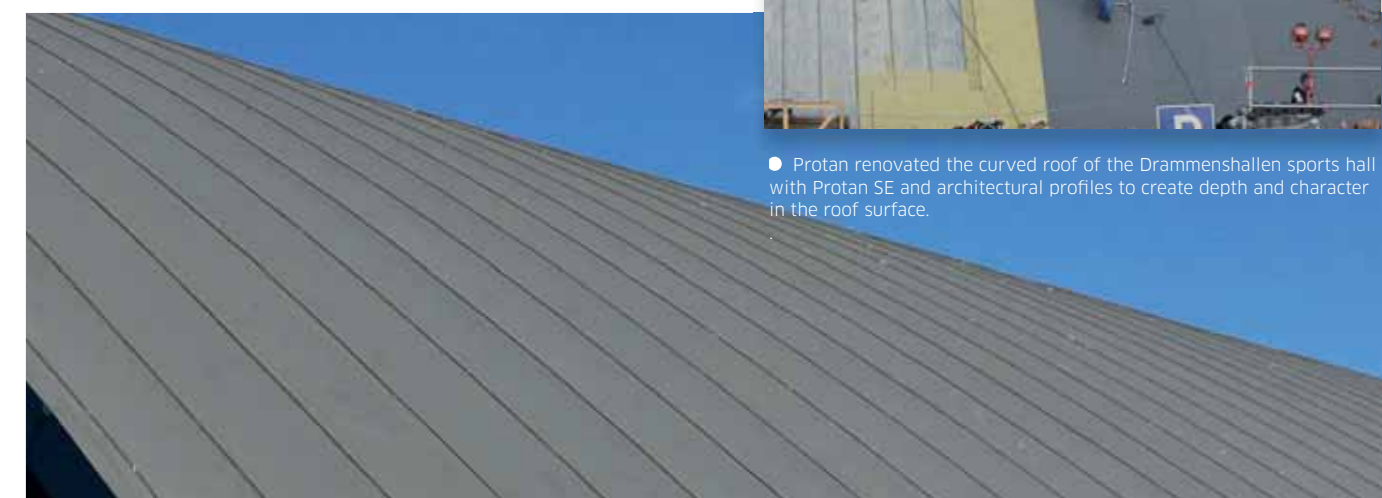
For a good result when renovating a roof, it is vital to assess all the elements in the roof structure and repair them if necessary.

- Does your roof meet current insulation thickness requirements?
- Is the roof designed for increased snow loading?
- Is the roof's drainage adequately calculated?
- Does the roof have a large enough fall to remove rainwater?
- Does the roof meet current fire safety requirements?
- Can the roof be inspected and maintained safely?
- Does any of the work require planning permission?

The condition of the roof should be checked in advance in order to clarify what work needs to be carried out.



● Protan renovated the curved roof of the Drammenshallen sports hall with Protan SE and architectural profiles to create depth and character in the roof surface.



PROTAN EX

Special product for renovation

Protan EX is our special product for renovating bituminous roof coverings. It has been developed for cold climates and can be installed whatever the weather.

- Polyester-reinforced membrane
- Polyester fleece laminated to the reverse
- Can be laid directly on old roofs or wooden structures
- Withstands temperature fluctuations of more than 100°C on the roof surface
- Can be installed on both flat and sloped roofs
- Can be fastened mechanically or secured using the vacuum roof concept
- Hot-air welded
- Available in several colours

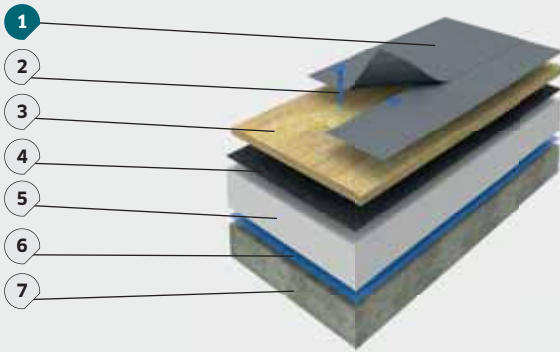
The membrane is provided with a wide range of ready-to-use details. Prefabricated details for drains, ventilation boxes, gutters and parapets reliably take care of weatherproofing.

Used in combination with Protan's profile roofing on sloped and curved surfaces, an architectural profile can create depth and character on the roof surface. This is a great alternative to triangular battens and standing-seam roofing.



Different roof renovation methods

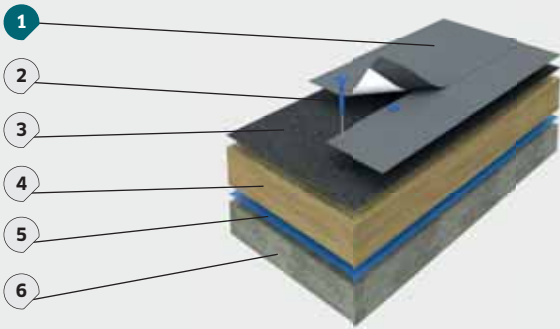
EXTRA INSULATION ON CONCRETE SUBSTRATE



- | | |
|---|------------------------|
| 1 Protan SE membrane | 5 Existing insulation |
| 2 Fasteners | 6 Vapour control layer |
| 3 Retrofitted insulation / new insulation (if required) | 7 Supporting deck |
| 4 Existing roof covering | |

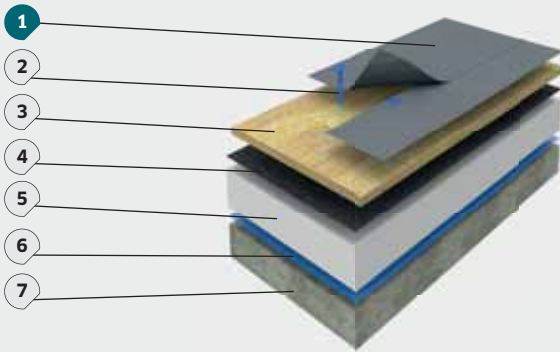
DIFFERENT METHODS WE OFFER FOR RENOVATING ROOFS

DIRECTLY ON EXCISTING ROOF COVERING



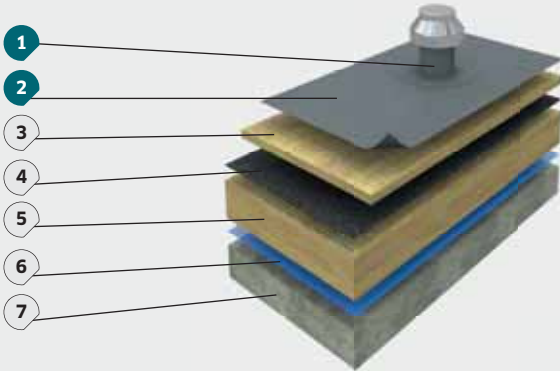
- | | |
|--------------------------|------------------------|
| 1 Protan EX membrane | 5 Vapour control layer |
| 2 Fasteners | 6 Supporting deck |
| 3 Existing roof covering | |
| 4 Existing insulation | |

OLD PEBBLES REMOVED, EXTRA INSULATION



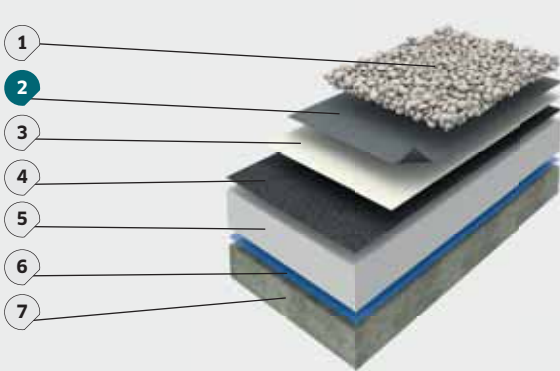
- | | |
|--------------------------|------------------------|
| 1 Protan SE membrane | 5 Existing insulation |
| 2 Fasteners | 6 Vapour control layer |
| 3 New insulation | 7 Supporting deck |
| 4 Existing roof covering | |

VACUUM ROOF WITH ADDITIONAL INSULATION ON A CONCRETE SUBSTRATE



- | | |
|--|------------------------|
| 1 Protan Vacuum Vent | 5 Existing insulation |
| 2 Protan SE membrane | 6 Vapour control layer |
| 3 New insulation | 7 Supporting deck |
| 4 Existing roof covering (airtight and load bearing) | |

BALLASTED ROOF WITHOUT EXTRA INSULATION



- | | |
|--------------------------|------------------------|
| 1 Pebbles | 5 Existing insulation |
| 2 Protan G membrane | 6 Vapour control layer |
| 3 Migration barrier | 7 Supporting deck |
| 4 Existing roof covering | |

EXTRA INSULATION, U VALUE AND FALL

Simple energy saving

Adding extra insulation when renovating a roof is probably the simplest energy-saving measure with the shortest payback period for an existing building.

We recommend considering this when renovating the roof. With an expected life of at least 25-30 years, it will be a long time before there is another favourable opportunity. The indoor climate will improve into the bargain.

Better runoff

Protan is happy to assist with calculating U values and structuring the fall so as to improve runoff on the roof. The insulation can be laid in an even thickness if there is a fall already in the substrate. Where the base is nearly horizontal, tapered insulation can be offered. Tapered insulation is laid towards a low point to ensure drainage towards rainwater outlets. Retrofitting insulation may require increasing upstand, parapet and handrail height. This may require planning permission, so we recommend checking with the local authority.

In the case of extra insulation, Protan SE is used together with a relevant migration barrier in the same way as for new builds, depending on the type of insulation used.

Drains and overflows

Existing drains can be reused in many cases, but must be assessed in collaboration with the roofing contractor or drainage engineer. Fitting overflows is recommended when renovating a roof, as they will also provide warning of blocked drains.



● The expected life of a roof is at least 25-30 years. We therefore recommend considering extra insulation when renovating a roof. It could be a long time before there is another favourable opportunity.

More than roofing

Our task is to protect large valuable assets.

So we want our products, services and technology to be more than good – they have to be the best in the world. We are industry experts with more than 70 years of experience. We know how to produce optimum solutions that are tailored to local conditions and demanding climates.





Prolong the life of your roof
Avoid major, costly damage
Reliable roof asset management

ROOF ASSET MANAGEMENT

Look after your roof

Inspection and maintenance are vital if a roof is to last and perform at its best. Protan has developed tools and services that help you keep track of your roof's condition.

Our extensive experience with roofing and membranes has taught us that major expenses can be avoided and the life of a roof prolonged substantially with simple maintenance and a little prevention. Roofs are our business, we have the experience to spot problems before they happen, and we can recommend remedial work before things get expensive.

By taking roof asset management seriously, you can:

- prolong the life of the roof
- avoid major, costly damage
- predict the need for larger repairs/renovation and thus larger costs
- get an easy to follow maintenance plan, investment plan and budget
- keep the building in operation
- keep a "healthy" roof construction

One of the services we provide is a survey report of your roof. This gives you a picture of the current state of your roof, together with an overview of what needs to be repaired and estimated costs. The report gives you information about the general condition of the roof and expected residual life. It also gives information about the condition of the structure and supporting deck, the thermal insulation properties and a cost-benefit analysis for extra insulation and the condition of details such as drains and pipes.

We can also offer a regular inspection contract, which means that we carry out inspection of your roof once or twice per year. With regular inspection, minor damage will be detected in good time and repairs can be carried out. The need for major work will be identified, giving you a chance to act before it has serious consequences. During visits:

- drains are checked and cleaned
- leaves and twigs are removed
- loose fittings are secured

BE PREPARED

Our extensive experience enables us to spot problems before they happen.



If you want to take advantage of Protan's expertise when it comes to roof asset management, please contact us:
Telephone: **+47 32 22 16 00**
E-mail: **protan@protan.no**

Tools that protect values

Protan is a centre of competence that delivers world-leading products and services. We have developed several unique technical tools that ensure quality, efficiency and cost efficiency throughout the whole project.



ProPlan is roof planning software that quickly identifies the best roofing solution for your project.

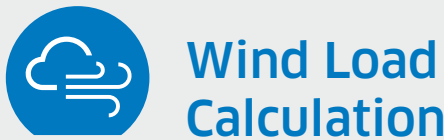
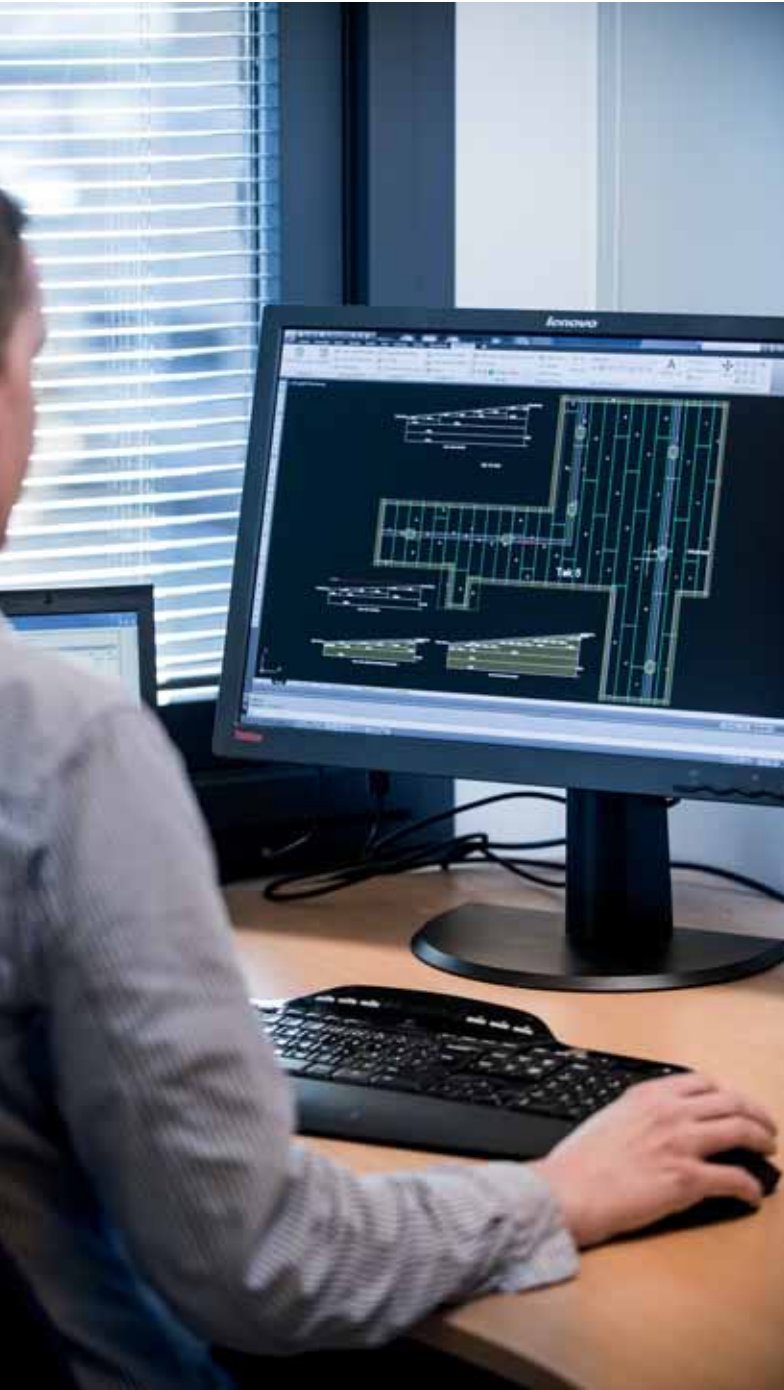
ProPlan specifies what is needed in the way of materials, installation solution, square metres, insulation, fasteners and accessories. Additionally, ProPlan enables calculation of tapered insulation schemes using different manufacturers' products to optimise the design to meet the desired U values and essential fire requirements.

ProPlan visualises the construction in 3D before converting it into a detailed specification, quotation and subsequent manufacturing and site assembly details. Benefits include substantial on-site installation and logistic savings and minimising waste.



ProKalk is a key tool developed and used by Protan to provide the required documentation to the roofing contractor and client at the start of a project. It not only provides accurate project specifications, but it is also key to making precise offers.

This tool is based on the Norwegian Standard 3420. Please contact us if this is a relevant tool to offer in your market.



A critical performance characteristic of a roof is its ability to withstand the environment in which it is installed. This not only is referring to protecting the building from rain, snow and changes in temperature, but also from the wind.

Depending on the building's location and geometry, the wind pressures acting on the roof surface can be extremely high and turbulent. Therefore it is important to ensure that the roof system is secured to withstand these forces. Our wind load calculation enables a roof's requirements to be designed according to the latest European standards (EN 1991-1-4) using high quality, tested and approved fasteners.



Specifications

Protan can provide specifications for your roof. These specifications can be generic or can be tailored to your specific roof and project.

Our intention is to assist architects, engineering and roofing contractors to choose the best products and systems for their roof, and specify them correctly.

Specification requirements differ from country to country, so please contact Protan to find out more.



WE PROTECT VALUES FROM THE NORTHERN EXTREMES OF NORWAY TO ANTARCTICA

PROTAN IN CROATIA



Hotel Rixos Premium, Dubrovnik
Product: Protan SE 1.6, Protan G 1.5,
Protan GG 2.0
Size: total 15,000 m2

PROTAN IN CROATIA



Hotel Rixos Premium, Dubrovnik
Product: Protan GG 2.0
Size: 8,000m2

PROTAN IN HUNGARY



Hotel at Balatonfüred
Product: Protan 1.5 SE and Protan
Omega Profil
Size: 3,300 m2

Designers, fabricators and installers:
Newspan Building Solutions Ltd

PROTAN IN HUNGARY



Sasad Housing Estates, Budapest
Product: Protan 1.5 SE and Protan
Vacuum vents
Size: 16,000 m2

PROTAN IN SLOVENIA



ADRIA mobile, Novo mesto
Product: Protan SE 1.6
Size: 35,000 m2

PROTAN IN SLOVENIA



Sport center Otocec
Product: Protan SE 1.6 dark gray
Size: 5,500 m2

WE PROTECT VALUES FROM THE NORTHERN EXTREMES OF NORWAY TO ANTARCTICA

PROTAN IN ANTARCTICA



The Russian research station
"Progress"
Product: Protan SE 1.2
Size: 3,000 m²

PROTAN IN POLAND



Logistics buildings for Amazon
in Wrocław and Poznań
Product: Protan SE
Size: 315,000 m²

PROTAN IN THE UK



Redfields Garden Centre in Fleet,
Hampshire
Product: Protan SE 1.6
Size: 350 m²

Designers, fabricators and installers:
Newspan Building Solutions Ltd

PROTAN ON THE ARCTIC CIRCLE



The Arctic Circle Centre – a museum/
tourist information centre
Product: Protan SE 1.6
Size: About 800 m²

PROTAN IN LATVIA



Production facility for AMO PLANT,
Jelgava
Product: Protan SE 1.2
Size: 12,000 m²

PROTAN IN NORWAY



Polaria – arctic museum and visitor
centre, Tromsø
Product: White Protan SE 1.2
Size: 4,000 m²

WE PROTECT VALUES FROM THE NORTHERN EXTREMES OF NORWAY TO ANTARCTICA

PROTAN IN GERMANY



Logistics centre for Home24,
Walsrode, Lower Saxony
Product: Protan SE 1.5
Size: 50,000 m²

PROTAN IN THE FAROE ISLANDS



The Nordic House – a forum for
Nordic and Faroese culture
Product:
Protan G with membrane protection
Size: About 2500 m²

PROTAN IN NORWAY



Regional office for Statoil in Oslo
Product:
Protan SE, Protan G and
Protan SE Titanium+
Size: 27,800 m²

PROTAN IN DENMARK



BIG shopping centre, Herlev
Product: Protan SE 1.2
Size: 12,000 m² (roof)
plus 18,000 m² (parking area)

PROTAN IN ESTONIA



VGP Logistics and Industrial Park
near Tallinn
Product: Protan SE 1.6
and Protan SE 1.5
Size: 60,000 m²

PROTAN IN SWEDEN



ICA Maxi shopping centre, Uppsala
Product: Protan Cool Roof
and Protan SE Titanium+
Size: 11,200 m²



Environment and Sustainability

Our objective is to reduce the total consumption of resources in the value chain. Our products are manufactured in Norway from eco-friendly, REACH-approved raw materials using Norwegian hydro-electric power. They are manufactured, used and managed with the minimal use of resources.

Our quality and environmental management systems conform to ISO 9001 and ISO 14001 respectively. We were also one of the first companies in Norway to quality-assure our environmental work through Environmental Product Declaration (EPD) – independent documents that summarise the environmental profile of a finished product in a standardised and objective way. Using our membranes qualifies for BREEAM assessment.

We are an active participant in the European RoofCollect environmental organisation, which collects and recycles materials. The production of our roof coverings and membranes does not generate waste.

Our products and production processes are independently inspected by various accredited testing bodies in the countries where our roof coverings and membranes are used.



For more information
visit our website: protan.com

protan.com

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