

System

Platon

*Membrane for tunnels and
underground construction*



- Drainage
- Protection
- Waterproofing

The Isola history – quality through innovation

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It is not about solving problems, but providing solutions

Isola has been making building materials since 1940 and is at the forefront of product development in Scandinavia.

Isola and System Platon are renowned for efficient and reliable damp control. Isola’s experience and technical expertise provide the quality products requested by the civil construction industry.

Air Gap Technology and its draining capability

Product development is a major aspect of our activity.

A company-wide commitment to manufacturing technology, raw materials and building techniques gives us great opportunity to continuously improve our products to meet and often drive the industry requirements.

Isola invented the studded membrane – and for forty years, have ensured protection

against a wide range of moisture problems.

The design of the studs and the membrane has changed, to meet the challenges of new constructions and buildings.

Studded membranes are components for drainage and waterproofing solutions in tunnels and underground construction. System Platon has the quality, performance and products required for

these demanding applications.

The raw material used in our tunnel membranes is high quality polypropylene and/or polyethylene, with excellent resistance against chemical attack, high degree of flexibility and weldability, low toxicity combustion by-products.

A modern quality assurance system guarantees the continuous high quality standard of the membrane.

System Platon as waterproofing and drainage

Application

- Groundwater seepage through the rock or concrete surface is diverted to the drainage system.
- Ensure a dry inner liner
- Injection layer and mechanical protection for waterproofing

Advantages

- The natural flow of ground water in cracks and fissures is not stopped, but controlled
- Second level of insurance for complete waterproofing
- Drinking water safe and environmentally neutral
- Special product specifications to suit individual projects

Installation

- Installation by well trained contractors in accordance with specific requirements and individual specifications



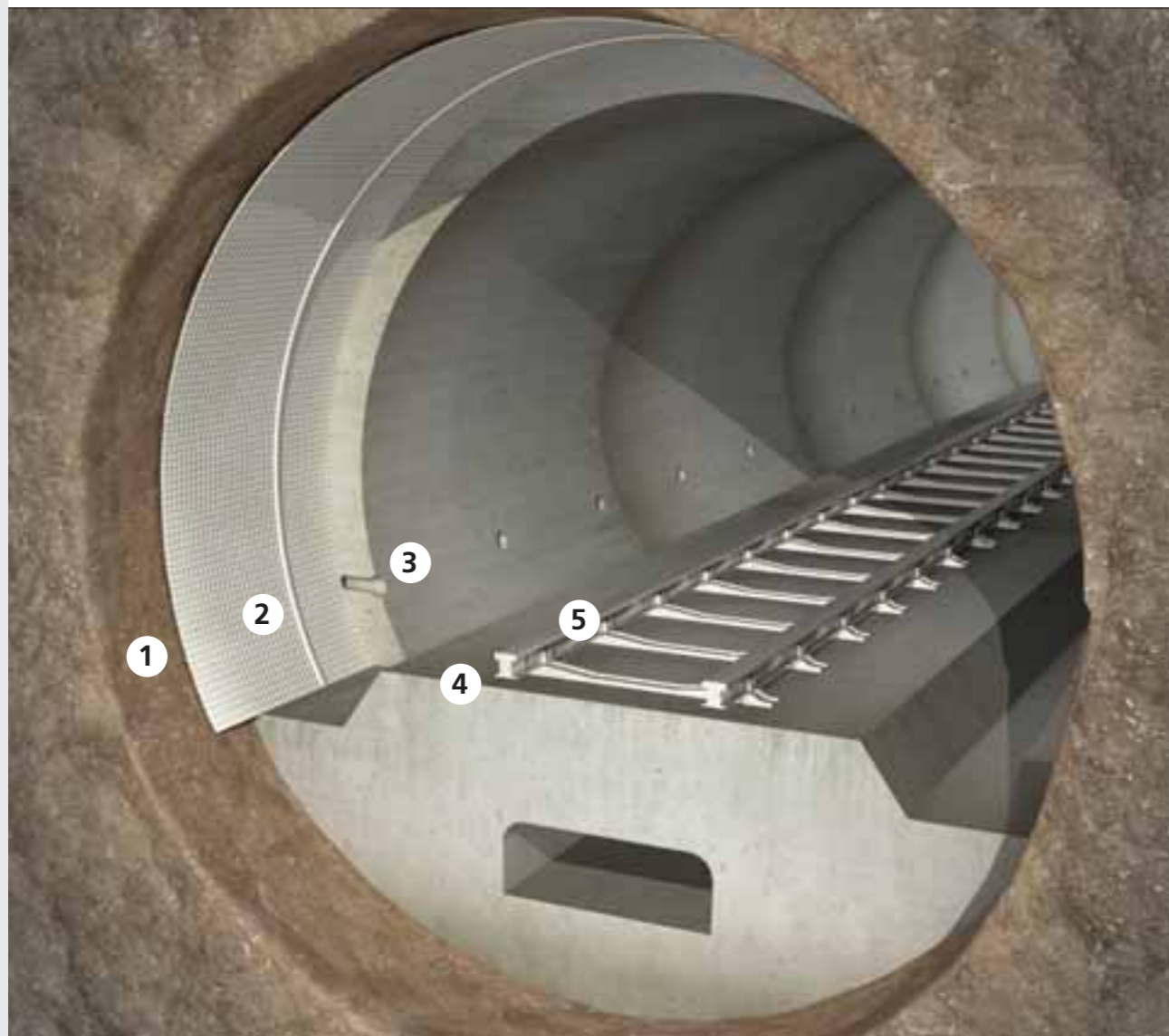
Isola Factory, Eidanger, Norway



Platon Factory, Notodden, Norway



Drained and Waterproof tunnel construction



A TBM excavated tunnel through sound rock normally has a smooth and firm surface. In a drained tunnel system, System Platon Tunnel Membrane can be used as the single layer drainage and waterproofing membrane, instead of the traditional geotextile and flat membrane. The Tunnel membrane may cover the entire tunnel circumference, upper sections only or completed with Platon P20 in the lower section of the tunnel.

Build up

1. Tunnel surface
2. Platon Tunnel Membrane
3. Concrete lining
4. Foundation
5. Railway track

Alternative

In conventional drill and blast or roadheader excavated tunnels, the Platon Tunnel Membrane creates a drainage layer on top of the initial support or smoothing layer shotcrete before casting the final concrete liner. This is an alternative to the traditional geotextile and flat flexible waterproofing membrane solution. The drained water is collected in the drain along the edges of the foundation.

Build up

1. Tunnel surface
2. Platon Tunnel Membrane
3. Concrete lining
4. Foundation

Installation / details

System Platon Tunnel Membrane provides the possibility to seal the joints section by section in a way that makes the drainage and waterproof layer.

The waterproofing is improved by the way the membrane is fixed to the tunnel surface without use of traditional penetrating fixtures.

Welding of joints

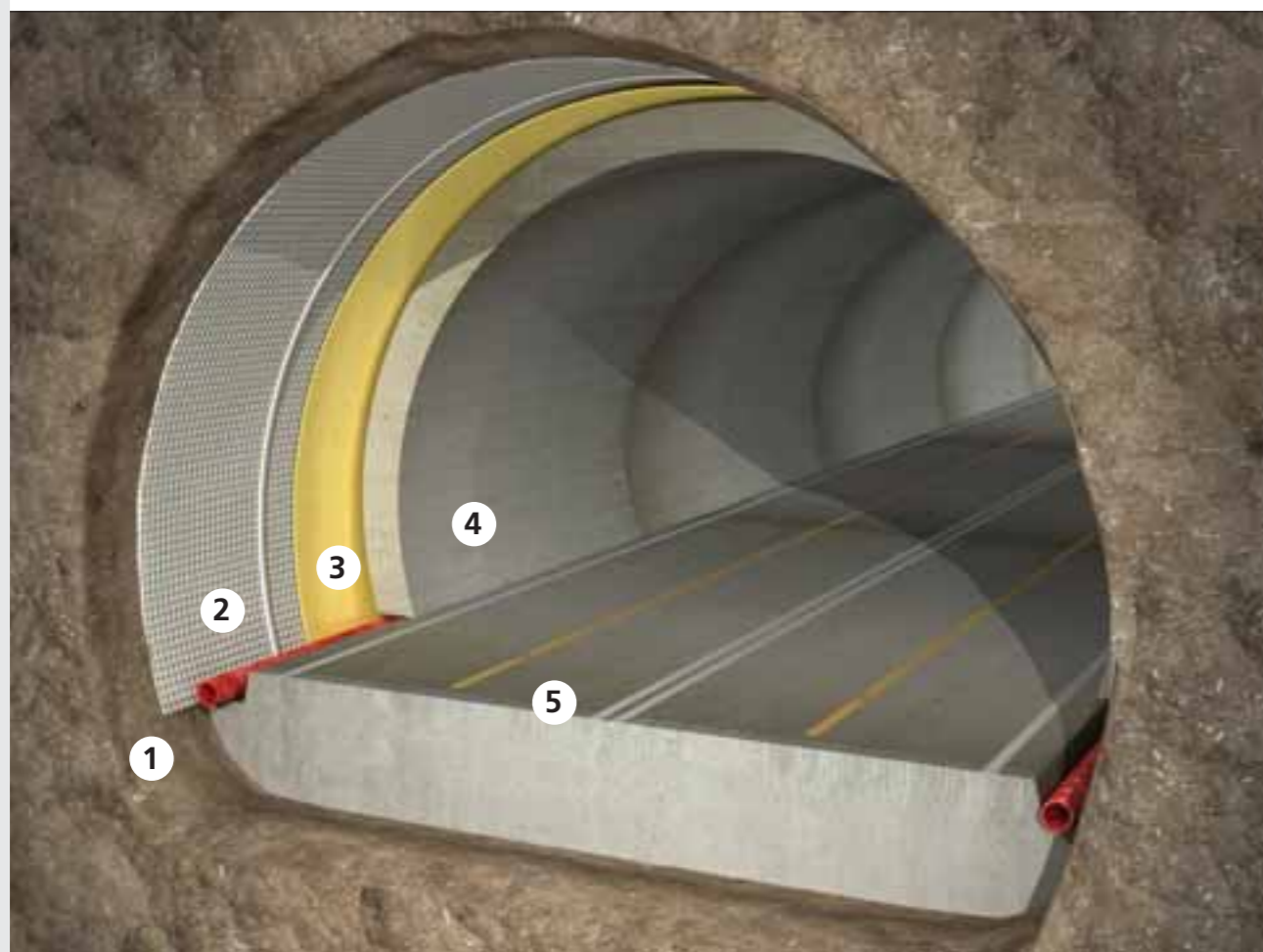
The flat area on both sides of the membrane can be sealed by using a hot air or wedge seam welding equipment suitable for this technique.

Welding of the membrane to roundels

The roundels, made of a compatible material, are an optional fixing method for the membrane to the surface. Roundel and membrane is heated and pressed together.



Drained and Waterproof tunnel construction



In both TBM and drill and blast tunnels it may be preferable to use a flat waterproof liner with a drainage layer between the rock or concrete surface and the waterproofing liner.

Platon Tunnel Membrane maintains a drainage capacity and also protects the flexible liner from rough rock or schotcrete surface.

Installation

The Tunnel Membrane is mechanically fixed to the tunnel surface, where the fixings include a roundel to which the waterproofing membrane can be fixed.

The Platon Membrane can have flat flanges on both sides for seam welding, or one side for unsealed overlapping.

Build up

1. Tunnel surface
2. Platon Tunnel Membrane
3. Waterproof flexible membrane
4. Concrete sections
5. Foundation



Alternative

In tunnels excavated by drill and blast or roadheader technique, the rock surface is often secured by using primary support shotcrete.

System Platon Tunnel Membrane for shotcrete construction is fixed to the secured surface. The undercut stud structure of the Tunnel Membrane sheet creates a key for the final lining shotcrete.

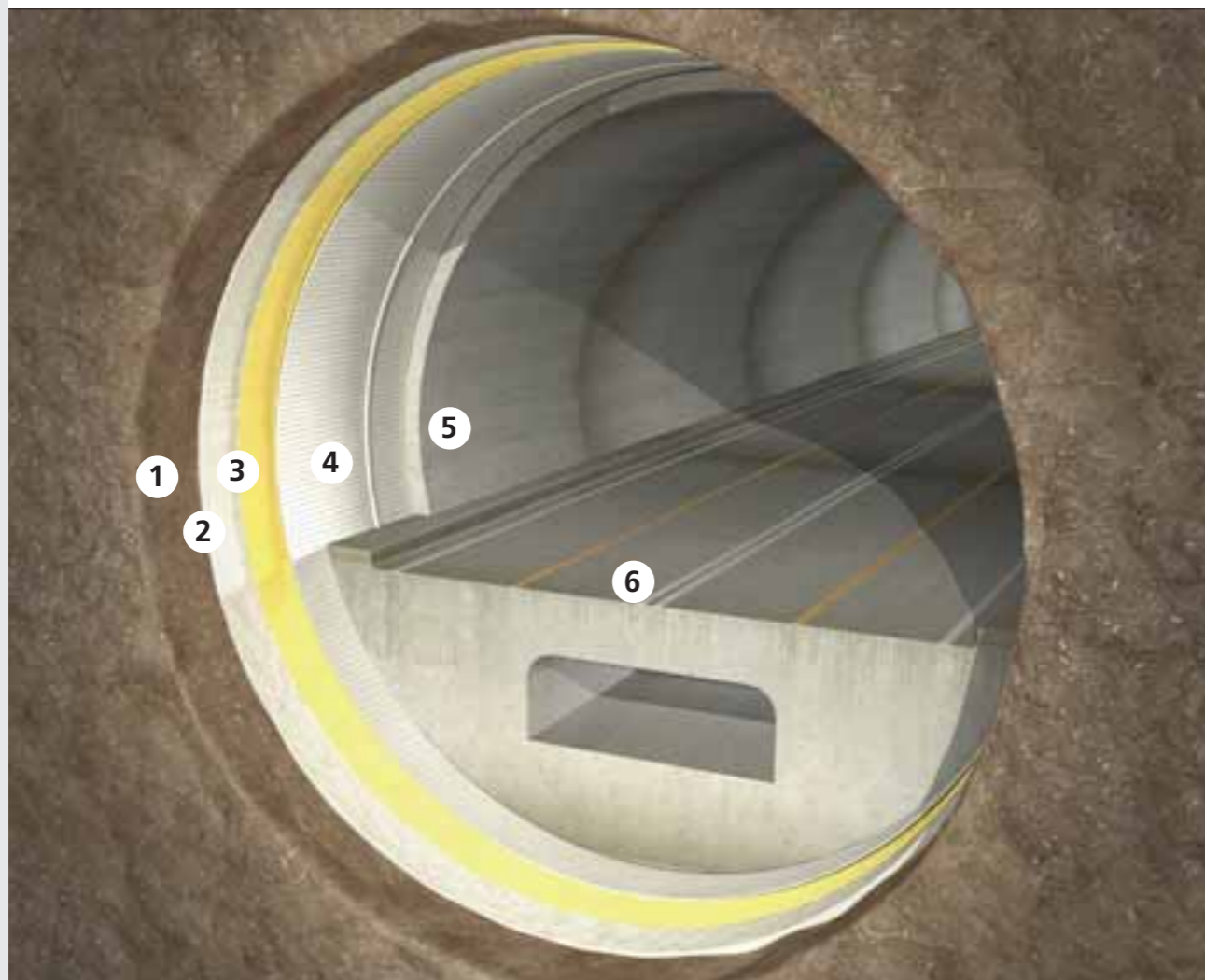
Particularly during the concreting process, the lining prevents the concrete from being washed out.

Build up

1. Tunnel surface
2. Shotcrete
3. Platon Shotcrete Membrane
4. Shotcrete
5. Foundation

Tanked tunnel construction

A protective layer which can be injected into



Platon Tunnel Membrane protects the waterproofing membrane against damage. Waterstop is welded to the waterproofing membrane, creating sections at the length of the concrete sections. The Platon Tunnel Membrane is then welded to the waterstop. By this method each section of the waterproofing liner is protected against mechanical damage and one can later perform grout injection in the sections if leaks are detected.

This method provides the security of both a physical protection barrier to the flexible, flat membrane and a back-up means of leak protection.

Build up

1. Tunnel surface
2. Geo-textile
3. Waterproof flexible membrane
4. Platon Tunnel Membrane
5. Concrete sections
6. Foundation

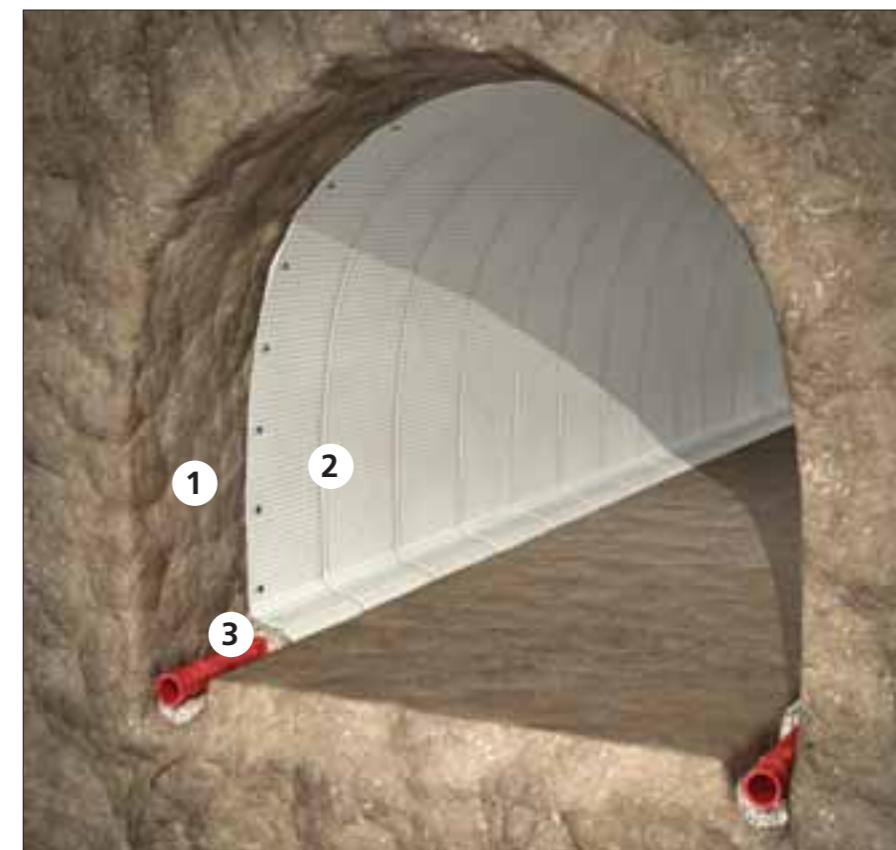
Other applications

Platon as a drainage layer – the “Umbrella Solution”

In low cost tunnels and access roads in mines etc, a layer of Platon Tunnel Membrane will divert water to the drainage channels along the tunnel invert or floor. Overlaps can be sealed if needed.

Build up

1. Untreated rock or shotcrete
2. Platon Tunnel Membrane
3. Drainage collection system



Cut and cover tunnels

In this form of tunnel construction, the Platon Membrane will protect the waterproofing membrane and with a layer of geotextile ensure a drainage capacity.

The Platon Membrane is rolled out on top of the construction before the backfilling is applied.



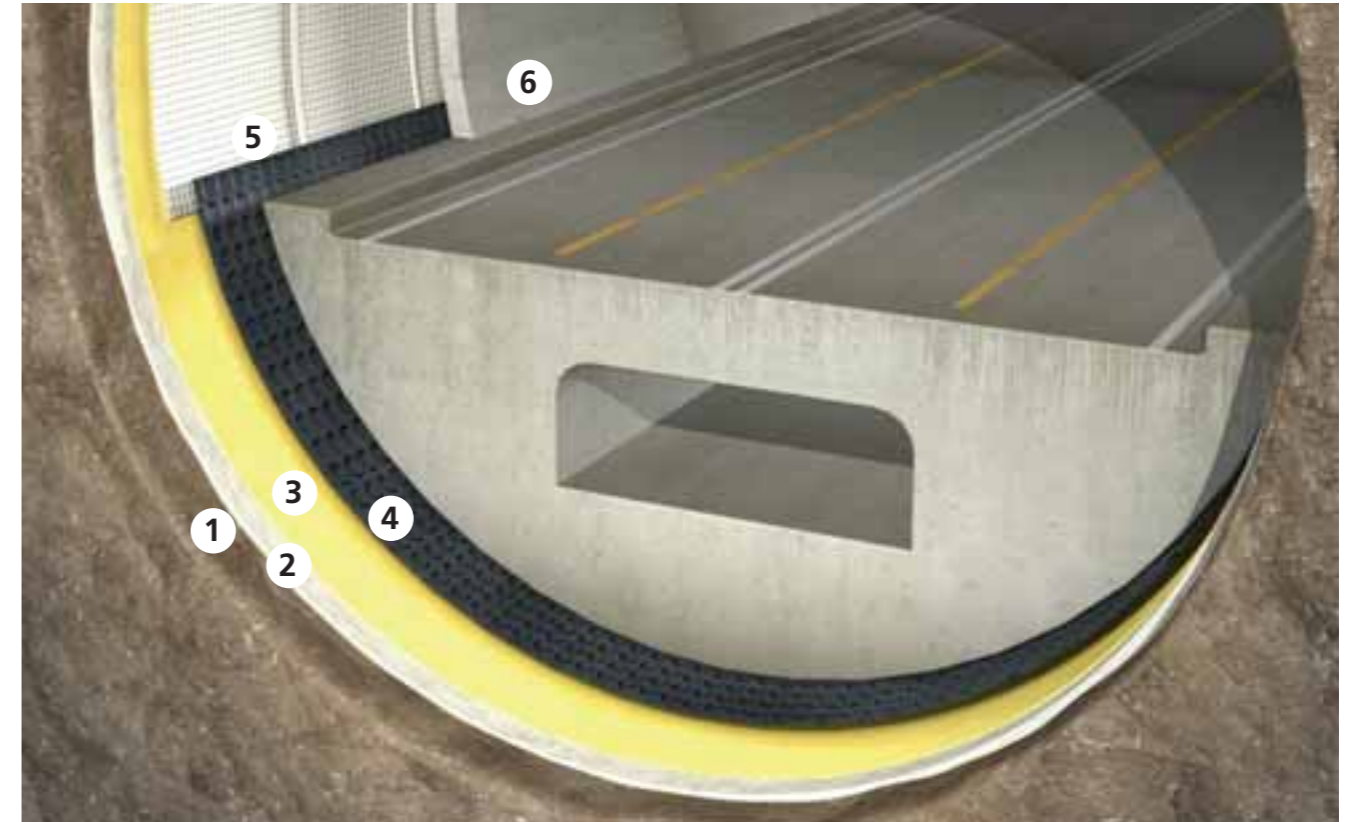
Platon P20 – for increased Drainage Capacity



The drainage capacity of Platon P 20 is many times higher than that of Platon Tunnel Membrane, providing even more security. Thanks to the volume of the air gap, 14 l/m², P20 offers high drainage capacity to deal with higher volume or even extreme volume water ingress.

Build up

- 1. Tunnel wall surface
- 2. Platon P20
- 3. Platon Tunnel Membrane
- 4. Waterproof flexible membrane
- 5. Concrete liner



Platon P20 will create a space for grouting beneath the foundation segment and allow a good flow of grout.

The water drained from the air-gap of P20 and the Tunnel Membrane is collected in the lower section of the foundation and may be transported up into a drain channel in the foundation.

Platon P20 will protect the waterproofing membrane during construction and placement of the concrete invert. Platon P20 has high compressive strength to resist crushing, forming a supporting bed for precast elements and also acts as a spacer providing continuous void space to ensure complete contact grouting.

Build up

- 1. Tunnel wall surface
- 2. Geo-Textile
- 3. Waterproof flexible membrane
- 4. Platon P20
- 5. Platon Tunnel Membrane
- 6. Concrete liner

System Components

- Platon Tunnel Membrane
- Platon P20

Fixing and sealing options:

- Platon Rock Plug
- Platon Brick Plug
- Platon P20 Plug
- Platon Gunned-In Nail with Plug
- Platon Punch
- Platon Sealing Rope
- Roundels to suite
- Seam welding equipment as needed

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