

MAPEPROOF

Waterproofing bentonite sheet for vertical and horizontal surfaces on underground structures



WHERE TO USE

Waterproofing concrete below ground level.

Some typical application examples

Waterproofing horizontal and vertical concrete structures in underground environments, such as below slabs, on retaining walls, on bulkheads and berlines coverings, such as underground car parks, basements, swimming pools, underpasses basements, etc.

TECHNICAL CHARACTERISTICS

Mapeproof consists of two geofabrics in needle-punched polypropylene, with the upper layer in non-woven fabric and the lower layer in woven fabric, which form a sandwich around a uniform layer of natural sodium bentonite. The needle-punch production process uses thousands of special hooked needles. They force part of the fibres from the upper layer of non-woven fabric to pass through the middle layer of bentonite, and to anchor them to the woven geofabric of the lower support layer. Thanks to this special mechanical strengthening system, the natural sodium bentonite contained in **Mapeproof** remains permanently fixed, even after hydration. The special grain distribution of the bentonite together with the type of non-woven geofabric used, guarantee that the non-woven fabric which comes into contact with the concrete pour is saturated with bentonite. These properties combine so that **Mapeproof** becomes a self-sealing composite which, upon contact with water or the humidity from the ground, is transformed into a gel with excellent waterproofing properties.

Mapeproof is not affected if the level of the water table rises and falls, in that the needle-punch pattern in the geotextile guarantees that the bentonite compound is held firm and stable, even when applied vertically.

APPLICATION PROCEDURE

Preparation of the substrate

The surfaces on which **Mapeproof** is to be applied must be even and free of protrusions or voids. The substrates may also be damp, but without pools of water.

Laying on horizontal surfaces

When laying on horizontal surfaces, cast a layer of concrete to form a uniform layer on which to apply the membrane. The light-coloured side of **Mapeproof** is the side which comes into contact with the concrete to be waterproofed, while the dark-coloured side is in contact with the lean concrete or with the ground. Lay **Mapeproof** with staggered joints, overlapping the outer edges by 10 cm. Fix **Mapeproof** in place using nails and **Mapeproof CD** washers approximately every 50 cm. Lap the edges of **Mapeproof** around the perimeter of the formwork, or onto the vertical surfaces, such as bulkheads, piles, adjacent walls, etc. Then pour on the reinforced concrete, which must be designed to withstand the counter pressure from the underlying water table. If pouring is interrupted, the second pour must be sealed using **Idrostop B25** or **Idrostop Soft**, bentonite joints, or with **Idrostop**, hydro-expansive acrylic profile. To improve durability, the base concrete must be chosen according to UNI 11104 (EN 206) standards.

In order to respect the water/cement ratios indicated for the exposure classes contained in the standard and to guarantee excellent performance of the fresh, cured concrete (fluidity, maintenance of workability, mechanical strength after short

and long waiting times, etc.), we recommend using admixtures from the **Dynamon** range (refer to the relevant technical data sheets and contact the MAPEI Technical Services Department to develop the correct mix design).

Laying on vertical surfaces (after pouring)

Before pouring on vertical surfaces, all construction joints between walls and the slab and between wall and wall, must be sealed using **Idrostop B25** or **Idrostop Soft**, bentonite joints, or with **Idrostop**, hydro-expansive acrylic profile. After carrying out pouring according to UNI 11104 (EN 206) standards, all the surface irregularities must be removed and clumps of gravel must be smoothed over using **Mapegrout 430** or **Planitop Smooth & Repair R4**. The metallic spacers must be removed by forming a hollow approximately 2 cm deep, which must then be sealed using **Mapegrout 430** or **Planitop Smooth & Repair R4**. If plastic piping is used as spacers, seal the piping with special plugs and seal the plugs with **Adesilex PG4** two-component, thixotropic epoxy adhesive.

Close to the right angle joint between the wall and the foundations, we recommend forming a coving using **Mapegrout 430** or **Planitop Smooth & Repair R4**, or with mortar made up of sand and cement with **Planicrete** admix at a ratio of 1 to 3, in order to form a support base for blending in between the horizontal surface and the vertical surface. Then apply rolls of **Mapeproof**, starting at the top, making sure that the ends overlap by at least 10 cm. Fix **Mapeproof** in place using nails and **Mapeproof CD** polypropylene washers every 30 cm.

Before filling the excavations, protect the bentonite sheet that has just been applied by overlaying with spun-bound, non-woven fabric with a weight of 250 g/m². Filling must be carried out using carefully selected material without stones and clay-based earth around the membrane, in evenly-compacted layers of 40-50 cm.

Laying on bulkheads and berlinese coverings (before pouring)

Clean the surface using a hydro-cleaning machine, and even out the laying surface and ends of the tie rods to remove all protrusions and hollows, using **Mapegrout T60** fibre-reinforced, controlled-shrinkage thixotropic mortar which is resistant to sulphates, used for renovating concrete, together with 0.25% of **Mapecure SRA** admix. Once the mortar has hardened, apply a sheet of **Mapeproof** on the ends of the tie-rods in order to reinforce the waterproofing in those areas. Then waterproof all surfaces by applying the geomembrane starting from the top. Overlap the ends of the sheets by 10 cm and fix them in place using nails every 30 cm.



Grouting a corner of the sheet with Mapeproof Mastic



Waterproofing vertical surfaces made up of diaphragms



Waterproofing vertical surfaces after pouring



Waterproofing a foundation slab with through piling



Waterproofing a top-down roof with Mapeproof



Waterproofing a horizontal surface with Mapeproof



Waterproofing vertical surfaces with *Mapelastic Foundation*



Waterproofing the foundations of a house

RECOMMENDATIONS

The bentonite barrier must not be laid directly in water.

A structure made from homogenous, compacted concrete adequately calculated must be made on the bentonite barrier.

On vertical surfaces of retaining walls after pouring, as an alternative to **Mapeproof**, **Mapelastic Foundation** may be applied using a trowel, roller or with a spray in two coats at a thickness of 2 mm. Then, before filling in the excavations, apply a protective drainage layer in combination with a layer of non-woven fabric, such as **Polyfond Kit Drain** produced by Polyglass SpA.

If there are elements passing through **Mapeproof**, grout the sheet in those areas with **Mapeproof Mastic** bentonite grouting paste.

Repair any accidental damage to **Mapeproof** with **Mapeproof Mastic** bentonite grouting paste or by replacing the damaged part, according to the size of the damaged area.

PACKAGING

Mapeproof is supplied in three formats:

- rolls of **Mapeproof** measuring 1.1 m x 5 m;
- rolls of **Mapeproof** measuring 2.5 m x 22.5 m;
- rolls of **Mapeproof** measuring 5 m x 40 m.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Mapeproof is an article and referring to the current European regulations (Reg. 1906/2007/CE – REACH) does not require the preparation of the material safety data sheet. During use it is recommended to wear gloves and goggles and follow the safety requirements of the workplace.

PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values) Conforms to the following European harmonised standards: EN 13361, EN 13362, EN 13491, EN 15382	
PRODUCT IDENTITY AND FINAL PERFORMANCE	
Geotextile fabric	
Lower layer of geofabric:	polypropylene fabric
Weight of lower geofabric (g/m²):	140
Upper layer of geofabric:	polypropylene non-woven
Weight of upper geofabric (g/m²):	200
Layer of bentonite	

Type:	natural sodium
Areic mass (EN 14196) (g/m ²) - with reference to a 12% humidity level:	5,100
Swell index (ASTM D 5890) (ml/2 g):	28
Bentonite barrier	
Total areic mass (EN 14196) (g/m ²):	5,440
Hydraulic conductivity (ASTM D 5887) (m/s):	1E-11
Flux (ASTM D5887) ((m ³ /m ²)/s):	5E-9
Static puncture strength (EN ISO 12236) (kN):	2.4
Longitudinal tensile strength (EN ISO 10319) (kN/m):	14.0
Transversal tensile strength (EN ISO 10319) (kN/m):	14.0
Peeling (ASTM D6496) (N/m):	600
Bond strength to concrete (ASTM D 903) (kN/mm):	3.5
Thickness of product (EN ISO 9863-1) (mm):	6.5
Safety of overlaps:	the geocomposite is self-sealing

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product.

Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

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