



# 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 bases, on retaining walls, on bulkheads and berlinese coverings, such as underground car parks, basements, swimming pools, underpasses and basements.

### TECHNICAL CHARACTERISTICS

**Mapeproof** is composed 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 micronised 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 micronised 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.

### 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, apply 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 the **Mapeproof** in place using nails and **Mapeproof CD** washers approximately every 50 cm. Lap the edges of the **Mapeproof** around the perimeter of the formwork, or onto the vertical surfaces, such as bulkheads, piles, adjacent walls, etc. Spread on an even, protective layer of concrete at least 5cm thick, with a similar class group and strength to that used for the foundations. 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



# Mapeproof



Laying Mapeproof on a diaphragm



Example of Mapeproof laid on a horizontal surface



Fastening Mapeproof on a vertical surface using Mapeproof CD washers

sealed using **Idrostop B25** bentonite water-stop, or with **Idrostop** hydro-expansive acrylic tape. To improve durability, the base concrete must be designed according to UNI 11104 (EN 206) standards. In particular, it must be of class XC3 if it does not come into contact with aggressive ground, or of class XC2 if it is immersed in sea water. The minimum requirements of the above-mentioned classes are listed below:

Exposition class	XC3	XS2
Maximum water/cement ratio	0.55	0.45
Minimum strength class	C28/35	C35/45
Minimum cement content (kg/m <sup>3</sup> )	320	360

In order to respect the indicated water/cement ratios, 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 admixes from the **Dynamon** range (refer to the relative technical data sheets and contact the Mapei Technical Assistance Department to develop the correct mix design).

## Laying on vertical surfaces (after pouring)

Before pouring on vertical surfaces, all construction joints between header walls and the base and between masonry and masonry, must be sealed using **Idrostop B25** bentonite water-stop, or with **Idrostop** hydro-expansive acrylic tape. 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 Fast-Set** or **Planitop 400**. The spacers must be removed by forming a hollow approximately 2 cm deep, which must then be sealed using **Mapegrout Fast-Set** or **Planitop 400**. Close to the right angle joint between the wall and the foundations, we recommend forming a “shell” using **Mapegrout Fast-Set** or **Planitop 400**, 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 the **Mapeproof** in place using nails and **Mapeproof CD** polypropylene washers every 30 cm. 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 berlines 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.

## RECOMMENDATIONS

- The bentonite barrier must not be laid directly in water.
- For bentonite barriers applied on horizontal surfaces, we recommend laying on a 15 cm-thick protective layer of concrete.
- A structure made from homogenous, compacted concrete suitable to withstand hydro-static loads must be made on the bentonite barrier.
- The bentonite barrier must only be used for concrete structures.
- On vertical surfaces of retaining walls after pouring, as an alternative to the bentonite barrier, **Mapelastic** may be applied using a trowel or with a spray rendering machine with a special lance for smoothing compound, or two coats of **Mapelastic Smart** using a brush or a roller at a thickness of 2mm. Before refilling, apply a protective layer such as TNT, or a drainage layer.
- If reinforcement rods protrude through the **Mapeproof**, they must be sealed using **Mapeproof Mastic** bentonite grouting paste.
- If the **Mapeproof** is damaged, it must be repaired using **Mapeproof Mastic**, bentonite grouting paste.

## PACKAGING

**Mapeproof** is supplied in three formats:

- rolls of **Mapeproof** measuring 1.1 m x 5 m;

## TECHNICAL DATA (typical values)

In compliance with:

- European EN 13361/2006, appendix ZA
- European EN 13362/2005, appendix ZA
- European EN 13491/2006, appendix ZA

### PRODUCT IDENTITY

#### Geofabrics

**Lower layer of geofabric:** polypropylene fabric

**Weight of lower geofabric (g/m<sup>2</sup>):** 140

**Upper layer of geofabric:** polypropylene non-woven

**Weight of upper geofabric (g/m<sup>2</sup>):** 220

#### Layer of bentonite

**Type:** natural sodium

**Areic mass (EN 14196): (g/m<sup>2</sup>) - with reference to a 12% humidity level:** 5,100 (-100g/m<sup>2</sup>)

**Swelling index ASTM D 5890 (ml/2 g):** 27

**Water content DIN 18121 (5 hours, 105°C) (%):** 10

**Customs class:** 5911 90 90

#### Bentonite barrier

**Total areic mass (EN 14196) (g/m<sup>2</sup>):** 5,460

**Permeability factor (ASTM D 5887) (m/s):** < 1E-11

**Flow (ASTM D5887) (m<sup>3</sup>/m<sup>2</sup>/s):** < 5E-9

**Static punch test (EN ISO 12236) (N):** 2400 (- 50 N)

**Longitudinal tensile strength (EN ISO 10319) (kN/m):** > 14.0 (-0.5 kN/m)

**Transversal tensile strength (EN ISO 10319) (kN/m):** > 14.0 (-0.5 kN/m)

**Peeling (ASTM D6496) (N/m):** > 420

**Bond strength to concrete (ASTM D 903) (N/mm):** > 3.5

**Thickness of product (EN 964-1) (mm):** 6.0

**Safety of overlaps:** the geocomposite is self-sealing



Waterproofing vertical walls with Mapeproof and Mapeproof Smart



Filling in a trench



Waterproofing a horizontal surface with Mapeproof

# Mapeproof

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

FOR PROFESSIONAL USERS.

## WARNING

*While the indications and guidelines contained in this data sheet correspond to the company's knowledge and wide experience, they must be considered, under all circumstances, merely as an indication and subject to confirmation only*

*after long-term, practical applications. Therefore, anybody who undertakes to use this product, must ensure beforehand that it is suitable for the intended application and, in all cases, the user is to be held responsible for any consequences deriving from its use.*

**All relevant references for the product are available upon request and from [www.mapei.com](http://www.mapei.com)**



Waterproofing vertical surfaces after casting



Waterproofing the foundations of a house

