



# Mapeproof<sup>TM</sup> HW

## Bentonite Geotextile Sheet Waterproofing Membrane

FOR PROFESSIONAL USE ONLY



### DESCRIPTION

*Mapeproof HW* waterproofing membrane is composed of sodium bentonite encapsulated between two polypropylene geotextile fabrics – a nonwoven and a woven fabric – at a rate of 1.13 lbs. per sq. ft. (5,5 kg per m<sup>2</sup>). The nonwoven fabric is needle-punched through to the woven fabric, with thousands of fibers mechanically locking the sodium bentonite clay in place. After backfill is placed and confined under pressure, *Mapeproof HW* hydrates and forms a monolithic waterproofing membrane when exposed to moisture. *Mapeproof HW* contains zero VOCs and can be installed in most weather conditions as well as to green concrete.

The swelling characteristics of the sodium bentonite clay in *Mapeproof HW* can seal small concrete cracks caused by ground settlement, concrete shrinkage or seismic action. *Mapeproof HW* also forms a strong mechanical bond to concrete when the concrete is poured onto the nonwoven geotextile fibers.

### FEATURES AND BENEFITS

- Ideal waterproofing for new and rehabilitation projects
- Can be installed over damp or green concrete substrates
- Self-healing if punctured
- *Mapeproof HW* is not affected if the level of the water table rises and falls.
- The needle-punch pattern in the geotextile fabrics guarantees that the sodium bentonite is held firm and stable, even when *Mapeproof HW* is applied vertically.

### WHERE TO USE

- Below-grade vertical and horizontal foundation structures
- Cast-in-place concrete applications including backfilled concrete walls
- Underground tunnels with earth-covered roofs
- Below concrete slabs and elevator pits
- Blindside applications including soldier piles, lagging, steel sheet piling, secant piles, shotcrete and stabilized soil-retention walls

### LIMITATIONS

- Do not install over substrates containing asbestos.
- *Mapeproof HW* is only for below-grade application.
- *Mapeproof HW* is not to be installed over ponding or standing water, snow or ice.
- Not for use over concrete masonry units (CMUs)
- *Mapeproof HW* should only be installed with properly prepared substrates.
- Not designed for above-grade split-slab or plaza deck applications
- *Mapeproof HW* is designed for use under reinforced concrete slabs at least 4" (10 cm) thick over a compacted gravel base. If *Mapeproof HW* is installed over a mud slab, the reinforced concrete slab must be at least 5" (12,5 cm) thick. A structural engineer should be consulted to determine the appropriate thickness of the reinforced concrete slab, based on the hydrostatic conditions that exist at a specific project site.
- Where hydrostatic conditions exist, install *Mapeproof HW* under footings, grade beams and slabs.
- For conditions of contaminated site water, as determined by MAPEI-analyzed water samples, *Mapeproof SW* should be used instead. Where groundwater is present, 0,53 U.S. gal. (2 L) of groundwater will be needed for analysis. Contact MAPEI's Technical Services Department for instructions.
- *Idrostop<sup>TM</sup> 25* waterstop must be installed in all horizontal and vertical construction joints.
- Backfill must be uniformly compacted to a minimum 85% density per the Modified Proctor Test on each lift and must consist of clean, compactible soil. If angular aggregate is desired, it must be 3/4" (19 mm) or less, and free of debris, sharp objects and stones larger than 3/4" (19 mm).

### SUITABLE SUBSTRATES AND SURFACE PREPARATION

- Before installation of *Mapeproof HW*, the substrate must be properly prepared.



- **Underslab:** Substrates may be concrete, earth, sand, pea gravel or crushed stone. Earth and sand substrates should be compacted to a minimum 85% Modified Proctor density and covered with *Mapedrain™* panels. Crushed stone should be compacted, smooth and not larger than 3/4" (19 mm). Concrete should be solid and smooth without ridges, sharp corners or honeycombing. Any voids and aggregate pockets exceeding 1" (2,5 cm) in diameter or a depth greater than 3/4" (19 mm) should be filled with a nonshrink cement-based grout. Complete all required work on elevator pits, sump pits, grade beams and pilings before installing *Mapeproof HW* under a main slab area.
- **Vertical (general):** Substrates may be concrete, shotcrete, wood lagging, steel sheet piling or secant piles. Substrates should be smooth and uniform without sharp protrusions or pockets. Fill tie-rod holes, honeycombs and voids with a nonshrinking cement-based grout to provide a smooth surface. Grind form fins, ridges and sharp corners, and remove excess concrete.
- **Wall lagging:** Install *Mapedrain* panels over wood lagging. *Mapedrain* panels can be installed over wood lagging gaps up to 2-1/2" (6,3 cm) to provide a uniform surface for *Mapeproof HW*. Gaps larger than 2-1/2" (6,3 cm) should be completely filled with cement-based grout, wood or extruded polystyrene (at a minimum of 40 psi [0,28 MPa]) even if *Mapedrain* panels are installed before *Mapeproof HW*. Do not use plywood or other surface treatment that leaves voids in the lagging gaps.

## PRODUCT APPLICATION

### Under Concrete Floor Slabs

1. Place *Mapeproof HW* over properly prepared substrate with the white, nonwoven geotextile side up (facing the concrete pour) and the black, woven geotextile side down (facing the substrate).
2. Overlap all adjoining edges for at least 4" (10 cm) and stagger sheet ends by at least 12" (30 cm).
3. Staple or nail laps together as required to prevent any displacement before and during concrete placement. *Mapeproof Granules* also may be placed in the seams for additional waterproofing performance.
4. When the slab is poured in sections, *Mapeproof HW* should extend for at least 12" (30 cm) beyond the slab edge or rebar. Install *Idrostop 25* in all concrete construction joints.
5. When the installation reaches the outer edge of the slab, continue *Mapeproof HW* up and out of the form for at least 12" (30 cm).
6. At the corner, *Mapeproof HW* should remain in contact with the substrate and inside the surface of the concrete form.
7. After the forms are removed, *Mapeproof HW* on the outside of the form should be positioned and fastened onto the footing or vertical wall.
8. Overlay *Mapeproof HW* for at least 12" (30 cm), with the succeeding vertical waterproofing membrane at the horizontal/vertical transition.
9. At property-line retaining walls, such as soldier piles or lagging, continue the under-slab *Mapeproof HW* application up the retaining wall for at least 12" (30 cm) above the top edge of the slab/footing and secure *Mapeproof HW* to the substrate.
10. Overlap the vertical *Mapeproof HW* waterproofing membrane by at least 6" (15 cm), or at least 12" (30 cm) under hydrostatic head conditions.

### Underslab Penetrations and Pile Caps

1. Cut *Mapeproof HW* to closely fit around penetrations and pile caps.
2. Install *Mapeproof Granules* at least 3" (7,5 cm) in width under the cut edge of *Mapeproof HW*.
3. Apply a fillet of *Mapeproof Sealant* at least 3/4" (19 mm) thick to the top cut edge of *Mapeproof HW* at penetrations, pile caps, grade beams and other detailing. Extend at least 3" (7,5 cm) of *Mapeproof Sealant* onto *Mapeproof HW* and at least 1-1/2" (3,8 cm) of *Mapeproof Sealant* onto penetrations.
4. Install target sheets of *Mapeproof HW*, cut tight to the penetrations.
5. Seal all cut edges of *Mapeproof HW* with *Mapeproof Sealant*.
6. Complete detailing by wrapping *Idrostop 25* around the penetrations.
7. For hydrostatic conditions, *Mapeproof HW* should be installed under grade beams and footings using *Mapeproof Sealant* per the previous installation step.
8. Extend *Mapeproof HW* onto footings for at least 6" (15 cm) when required to tie into vertical wall waterproofing.

### Backfilled Cast-In-Place Concrete Walls

1. Starting at the base of the foundation wall where it meets the footing, install *Mapeproof HW* horizontally, extending out onto the footing for at least 12" (30 cm).
2. Fasten *Mapeproof HW* in place with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
3. Install adjacent rolls of *Mapeproof HW* by overlapping previous rolls by at least 4" (10 cm).
4. After a bottom horizontal course, *Mapeproof HW* sheets can be installed either vertically or horizontally oriented.
5. Stagger all end laps at least 12" (30 cm).
6. Fasten membrane laps 18" (46 cm) on center, or as required to prevent "blousing".
7. Fasten a membrane once every 18" (46 cm) on laps or as required to prevent "blousing".
8. At the grade line, terminate *Mapeproof HW* from 4" to 6" (10 to 15 cm) below the finished grade elevation.
9. Install *Mapeproof Sealant 2"* (5 cm) wide by 1/4" (6 mm) thick on the wall.
10. Install a rigid termination bar with appropriate fasteners a minimum of 12" (30,5 cm) on center.
11. Install backfill. Backfill must be uniformly compacted to a minimum 85% Modified Proctor density on each lift and must consist of clean, compactible soil. If angular aggregate is desired, it must be 3/4" (19 mm) or less, and free of debris, sharp objects and stones larger than 3/4" (19 mm).

### Property Line/Lagging Walls

1. *Mapeproof HW* should be installed with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
2. Starting at the base corner, install the first course of *Mapeproof HW* (horizontally oriented) on the lagging wall, tying into underslab waterproofing if present.
3. Secure sheet edges to the shoring wall using fasteners compatible with the substrate and 1" (2,5-cm) washers no more than 24" (61 cm) on center.

## Product Performance Properties

Laboratory Tests	Results
Thickness – ASTM D5199	1/4" (6 mm)
Mass per unit area, nonwoven polypropylene cap – ASTM D5261	5.9 U.S. oz. per sq. yd. (200 g per m <sup>2</sup> )
Mass per unit area, woven polypropylene carrier – ASTM D5261	3.2 U.S. oz. per sq. yd. (110 g per m <sup>2</sup> )
Mass per unit area, bentonite at 12% moisture – ASTM D5993	1.13 lbs. per sq. ft. (5,5 kg per m <sup>2</sup> )
Mass per unit area, bentonite at 0% moisture – ASTM D5993	1 lb. per sq. ft. (4,9 kg per m <sup>2</sup> )
Hydraulic conductivity – ASTM D5887	2 x 10 <sup>-9</sup> cm/sec.
Swell index – ASTM D5890	> 27 mL per 2 g
Index flux – ASTM D5887	4 x 10 <sup>-9</sup> m <sup>3</sup> /m <sup>2</sup> /s max
Tensile strength (MD/CMD) – ASTM D6768	63/63 lbf/ft. (11,0/11,0 kN/m)
Grab tensile strength – ASTM D4632	135 lbf (600 N)
Static puncture strength – ASTM D6241	450 lbf (2 kN)
Peel strength (MD <sup>2</sup> ) – ASTM D6496	3.6 lbf/in. (625 N/m)
Peel adhesion to concrete – ASTM D903	17.7 lbf/in. (3,1 kN/m)
Hydrostatic pressure resistance – ASTM D5385	231 ft. (70,4 m)

## Shelf Life

Shelf life	5 years when protected from moisture and stored on a skid/pallet covered with polyethylene or tarp. Do not double-stack pallets. Prevent hydration of bentonite until the sheet is installed and under recommended compaction.
Color	Nonwoven fabric: White Woven fabric: Black

Protect containers from freezing in transit and storage. Keep product dry before and during installation.

## CSI Division Classification

Bentonite Waterproofing	07 17 00
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## Packaging and Coverage

Roll: 3'7" x 16'5" (1,1 x 5,0 m), covering 59.2 sq. ft. (5,50 m <sup>2</sup> ); packaged 20 rolls per pallet
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- After a bottom horizontal course, *Mapeproof HW* sheets can be installed either vertically or horizontally oriented.
- Continue *Mapeproof HW* installation up the wall to the finished grade elevation, overlapping adjacent *Mapeproof HW* sheet edges by at least 4" (10 cm) and staggering all sheet roll ends of adjacent panels by at least 12" (30 cm). Do not allow the *Mapeproof HW* overlap joints to run at same elevation as the concrete-pour lift joints; rather, extend *Mapeproof HW* past the concrete pour joints by at least 6" (15 cm).
- At tie-back heads, field-fabricate a metal tie-back cover of the appropriate size to fit over the tie-back plate and allow proper cast-in-place concrete coverage per project requirements.
- The field-fabricated metal tie-back cover should fit over the entire tie-back head without the tie-back plate or cables coming into direct contact with the field-fabricated metal tie-back cover.
- Before installing field-fabricated metal tie-back covers, fill voids in the retention-wall substrate and in the tie-back head assembly with spray foam (at a minimum of 20 psi) or a non-shrink grout.
- Fill field-fabricated metal tie-back covers with a 50/50 mix of *Mapeproof Sealant* and *Mapeproof Granules*, fastening them to the soil-retention wall by using fasteners compatible with the substrate and 1" (2,5 cm) washers.
- Install *Mapeproof HW* over *Mapedrain* panels and the field-fabricated metal tie-back cover.

### Detailing

#### Wall/footing transitions:

- Before installing the first course of *Mapeproof HW*, place *Mapeproof Granules* at the wall/footing transition corner.
- Create a cant at all vertical-to-horizontal transitions by applying a *Mapeproof Granules* or *Mapeproof Sealant* cant measuring 1-1/2" to 2" (3,8 to 5 cm) along that junction.
- Mechanically fasten *Mapeproof HW*, ensuring that the membrane is tight to the corners to prevent bridging.
- Secure *Mapeproof HW* in place with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.

#### Footing corners:

- Before installing the first course of *Mapeproof HW*, place *Mapeproof Granules* at the wall/footing transition corner.
- Create a cant at all vertical-to-horizontal transitions by applying a *Mapeproof Granules* or *Mapeproof Sealant* cant measuring 1-1/2" to 2" (3,8 to 5 cm) along that junction.

3. At the bottom corner of the wall, install *Mapeproof HW* horizontally oriented with 5 ft. (1,52 m) of product on one wall, wrapping the remaining 2 ft. (0,6 m) around the corner on the other wall surface.
4. Cut the bottom edge of *Mapeproof HW* at the corner of the wall a minimum of 12" (30 cm) so that *Mapeproof HW* can be extended on top of the footing.
5. Fasten *Mapeproof HW* into position, a maximum of 24" (61 cm) on center.
6. Cut and install a section of *Mapeproof HW* over the uncovered footing corner area.
7. Apply *Mapeproof Sealant* on top of the *Mapeproof HW* overlap at the corner.

#### Wall inside corners:

1. Before installing *Mapeproof HW* at inside wall corners, apply a continuous *Mapeproof Sealant* fillet measuring 3/4" (19 mm) thick directly in the corner before installing *Mapeproof HW*.
2. Mechanically fasten *Mapeproof HW*, ensuring that membrane is tight to the corners to prevent bridging.
3. Secure *Mapeproof HW* into place with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
4. Detail all *Mapeproof HW* cut edges with *Mapeproof Sealant*.

#### Wall outside corners:

1. Before installing *Mapeproof HW* at outside wall corners, install a 12" (30 cm) detail strip of *Mapeproof HW* and secure into place using fasteners compatible with the substrate and 1" (2,5 cm) washers.
2. Mechanically fasten *Mapeproof HW*, ensuring that membrane is tight to the corners to prevent bridging.
3. Secure *Mapeproof HW* into place with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
4. Detail all *Mapeproof HW* cut edges with *Mapeproof Sealant*.

#### Penetrations:

1. Install *Mapeproof HW* target sheets, cut tight to the penetrations.
2. Apply a *Mapeproof Sealant* fillet at least 3/4" (1,9 cm) thick around penetrations, extending *Mapeproof Sealant* onto the penetrations 1-1/2" (3,9 cm) and onto the membrane 3" (7,6 cm).
3. Cut *Mapeproof HW* to closely fit around penetrations and install over penetrations with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
4. Detail all *Mapeproof HW* cut edges with *Mapeproof Sealant*.

#### Multiple penetrations:

1. In areas where multiple penetrations are close together, it may be impractical to cut *Mapeproof HW* to fit around each penetration. Note that penetrations should have a minimum space of 6" (15 cm) between each penetration.
2. Apply a *Mapeproof Sealant* fillet at least 3/4" (19 mm) thick around penetrations, extending onto penetrations by 1-1/2" (3,8 cm).
3. Apply *Mapeproof Sealant* 1/4" (6 mm) thick onto the substrate between penetrations and extending out away from penetrations by 3" (7,5 cm).
4. Cut *Mapeproof HW* to closely fit around penetrations and install over penetrations with the white, nonwoven side facing out, using fasteners compatible with the substrate and 1" (2,5 cm) washers.
5. Detail all *Mapeproof HW* cut edges with *Mapeproof Sealant*.

#### Detail Requirements

For standard installation details, follow the *Mapeproof* detail drawings. For non-standard installation instructions, contact your local MAPEI representative.

#### STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**



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