

BentoShield® Max LM

BENTONITE GEOTEXTILE WATERPROOFING SYSTEM

SPECIFICATION GUIDELINES

(Updated August 2022)

A. MANUFACTURER

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B. MATERIALS

1. BentoShield® Max LM Waterproof / Tanking Liner

Geomas **BentoShield®** Max LM: 1.10m x 5.00m roll of densely needle punched geotextiles with laminated (LM) virgin PE membrane, encapsulating an average of 5.00 kg per square metre of granular polymer modified sodium bentonite.

Geomas **BentoShield®** Max LM:

Property	Test Method	Value
Hydrostatic Pressure Resistance	ASTM D 5385	110 m
Permeability	ASTM D 5084	1 x 10 ⁻¹¹ m/s
Tensile Strength	ASTM D 6768	13 kN/m
CBR Puncture Force	ASTM D 4833	500 N
Low Temperature Flexibility	ASTM D 1970	Unaffected at -32°C
Geotextile Interlock Peel	ASTM D 6496	60N/m
Thickness	EN 964-1	6mm
Elongation Capacity	ASTM D 5084	18%

2. BENTONITE

Type: Specially selected granular sodium bentonite containing approximately 90% sodium montmorillonite with 10% maximum unaltered volcanic ash and other native sediments. Free swell rating: 2 grams sifted into deionized water swells to occupy a minimum volume of 16 cc.

Grading: Granular bentonite passes 90% through a 20 mesh sieve and less than 10% through a 200 mesh sieve.

3. GEOTEXTILE FABRICS

Product shall consist of one woven and one non-woven (with integrally bonded LDPE liner) polypropylene geotextile interlocked using a needle-punching process. The needle-punching process shall push the fibres of the non-woven geotextile through the bentonite layer and integrate into the woven geotextile to produce several interlocks each square cm over the entire surface area. The geotextile fabrics have the following properties:

Geotextile	Property	Test Method	Value
Woven	Grab Elongation	ASTM D 4632	18%
	Mass/Area	ASTM D 5261	110 g/m ²
Non-Woven	Grab Elongation	ASTM D 4632	150%
	Mass/Area	ASTM D 5261	200 g/ m ²

4. ACCESSORY WATERPROOFING PRODUCTS

Geomas **BentoPaste**: Thixotropic trowel grade bentonite compound, supplied in 10& 25 litre pails, used as a detailing mastic around penetrations, corner transitions and ground level terminations.

Geomas **Granules**: Chemically treated sodium bentonite granules, supplied in 25kg bags, used for lap areas, general detailing, dry, or as a **Paste** by adding water.

Geomas **Waterstop BS**: Flexible bentonite / butyl rubber waterstop, for use in concrete construction joints (including puddle-flange details).

Geomas **GEO BS SS50 Seamtape**: High-tack synthetic rubber bonded to LDPE, supplied in 50mm wide x 25m rolls, for sealing overlaps in BentoShield® Max LM applications to be backfilled.

C. PREPARATION

1. Substrates shall be well levelled and compacted to a minimum of 85% modified proctor density for uniform support of waterproofing membrane. Concrete under-blinding may be necessary as part of the site control of ground water or to ensure no membrane is displaced during the re-bar & concrete application, but is not otherwise a requirement for the BentoShield® Max LM membrane. *A pre-con site survey will be required & written approval by the Geomas Field Services Team & Client RE prior to the omission of the under-blinding requirement.*

2. Horizontal installation surfaces shall be free of *excessive** standing water, particularly where concrete underblinding is not utilised. (BentoShield® Max LM can be installed in most inclement weather conditions, providing the quality / accuracy of the installation is not affected, for example BentoShield® Max LM floating, Waterstop BS submersed, Waterflowing through laps subject to flash freezing).
3. Concrete surfaces shall be free of large voids or projections. Voids and pits in excess of 20 mm diameter, cracks and joints, shall be parged to flush condition using cement grout, BentoPaste or Geomas Paste (granules & water). Projections greater than 20 mm shall be smoothed flush. Specify preparation with concrete work.
4. All through concrete tie holes, etc., must be filled from the outside using Tie-Bolt Filler Non Shrink Grout, covered in a “mushroom” of BentoPaste, either prior to BentoShield® Max LM (post-fix) application, or prior to backfilling (pre-fix /peel-adhered application), where additional BentoShield® Max LM patching will be required.
5. All applicable expansion joints must be treated with the joint protection as specified by the Consultant Engineer and/or Architect.
6. Where chalk or limestone bearing soil/backfill is encountered, or ground contamination is evident/suspected, the Geomas Team must be consulted.
7. All packaging tape shall be removed from the rolls of BentoShield® Max LM prior to their installation.

D. GENERAL INSTALLATION GUIDELINES

1. Install BentoShield® Max LM Waterproofing system in strict accordance with manufacturer’s instructions as applicable to project conditions, and as indicated by the Geomas representative.
2. Install BentoShield® Max LM Waterproofing System with the dark grey / woven side of the geotextile liner facing the concrete to be waterproofed in both horizontal and vertical applications.
3. Install BentoShield® Max LM under all footings, elevator pits, ground beams, pile caps and pad foundations, to form a completely impervious, continuous envelope.
4. BentoShield® Max LM shall be lapped 100 mm at all edges. End laps shall be staggered to avoid corner build-up of more than three layers.

5. All laps, where accessible externally (ie. applications to be backfilled) shall be over-banded with BS SS 50 Seamtape.

For underslab or property-line applications, mechanical fasteners, in the form of 'soft-washer' fixings (supplied by Dynamafix), or box-staples (box-staple system) are used throughout the installation for securing BentoShield® Max LM (mainly at overlaps) as required. Nails are to be applied at 300mm c/c, staples at 200mm c/c.

Alternatively, the BentoShield® Max LM can form a complex lap detail, the PE layers are peeled away from the geotextile by 200mm, the PE layers are then over lapped by 100mm, the PE layers are then bonded using the BS SS50 Butyl Tape inside the lap then sealed over the lap using BS SS50 Butyl Tape, finally the bentonite membrane layers are lapped by 100mm and sealed using further Bentonite Granules.

6. Should BentoShield® Max LM membrane be applied inside the formwork, prior to the casting of concrete, to facilitate the peel-adhesion property of the BentoShield® Max LM membrane to the concrete. Care shall be taken when striking the formwork, to prevent undue damage to the peel-adhered BentoShield® Max LM.
7. Detail BentoShield® Max LM membrane to provide a snug fit around all applicable penetrations (pipes, piles, etc.). Detail all penetrations with a 40 mm fillet of Geomas Paste (granules & water) around the penetration on top of the BentoShield® Max LM. Where concrete underblinding is not used, detail an additional 50 mm chase filled with Geomas Granules around the penetration, under the BentoShield® Max LM.
8. Terminate BentoShield® Max LM at ground level, etc., integrating the BentoShield® Max LM with a damp-proof course/cavity tray (as per architects arrangement), by extending the DPC to overlap BentoShield® Max LM a minimum of 150mm. The BentoShield® Max LM /DPC lap should be closed by a 5 x 50mm fillet of Geomas BentoPaste placed central inside the lap. The whole lap is then secured using Termination Strip.
9. Backfill material shall be of compactable soils and free of construction debris. As test 13, BS1377, backfill shall be clean, well graded and compacted every 300mm to 85% modified proctor (as defined by ASTM 1557) and meet these general specifications:
 - 1) No rocks, stones or boulders larger than 50mm
 - 2) 90% minimum soil particles smaller than 5mm
 - 3) 10% maximum soil particles finer than 74 micron (200 mesh)

10. Inspect the finished BentoShield® Max LM installation and repair any damaged material prior to placing either concrete or backfill on/against the membrane. Ensure the BentoShield® Max LM is not disturbed during placement of concrete or backfill. Wherever possible, ensure lap orientation faces away from the flow of covering materials.
11. Pre-hydration of BentoShield® Max LM (which creates forced bentonite activation) may be prudent, particularly where conditions of ground contamination exist. BentoShield® Max LM can be sprayed with fresh water from a hosepipe prior to placement of concrete.
12. All vertical and horizontal construction joints are to receive Waterstop BS, installed with a minimum of 75 mm concrete cover on all sides, secured with Fixing mesh. Waterstop BS shall be used as a puddle-flange to seal around applicable penetrations. BS WB Adhesive shall be used to secure Waterstop BS where use of Fixing mesh is inappropriate. *Further installation advice by the Geomas-UK Team must be sought prior to the installation of Waterstop BS against Steel Sheet Piles.*
13. For green roof installations, podium decks, whole envelope solutions, please consult your local Geomas Specialist for guidance.

END OF SECTION