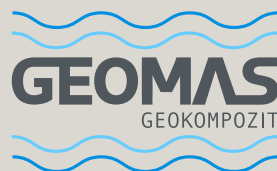




**BentoShield® MAX**

**GEOCOMPOSITE  
WATERPROOFING**





WATERPROOFING SYSTEM

BentoShield® MAX

GEOMAS provides professional solutions...

From design to construction Geomas is available as your solution partner by providing:

- Manufacturing capabilities,
- Supervising and inspection service,
- Design assistance and technical expertise,
- Training programs consisting the theory and practise.



ISO 9001  
BUREAU VERITAS  
Certification



## BentoShield MAX

BentoShield MAX is a specially designed waterproofing system that efficiently overcomes the difficulties confronted by traditional systems. BentoShield MAX claims % 100 guaranteed, durable and self-healing waterproofing solution for the life of the structure.

The sealing technology of BentoShield MAX combines the unique swelling performance of sodium bentonite with high strength polypropylene geotextiles.

During the innovative manufacturing process, millions of fibers of non-woven geotextile are punched through the bentonite layer and all layers are interlocked with each other, securing a uniform and impermeable layer of bentonite.

### Working principle

A special property of natural sodium bentonite is the ability to swell up to 16 times its dry volume when hydrated by water. Under the confining pressure of the geotextiles, this uniform layer of bentonite granules forms a dense and impervious gel. Thus, BentoShield MAX becomes an efficient sealing membrane for the life of the structure.

The swelling action of bentonite can self-seal the concrete cracks caused by ground settlement, concrete shrinkage, or seismic action. Thereby BentoShield MAX remains in place securely even if settlement occurs in substrate.



**1.** Tunnel and metro projects.



**2.** Ponds, lagoons and landscaping applications.



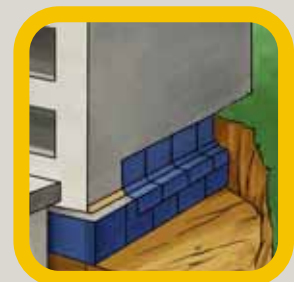
**3.** Concrete or earth covered roofs and terraces applications.



**4.** Property line applications.



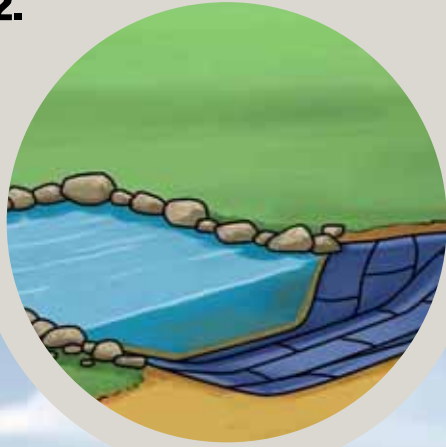
**5.** Underslab applications including pile caps and penetrations.



**6.** Backfilled retaining walls.

BentoShield MAX application areas.

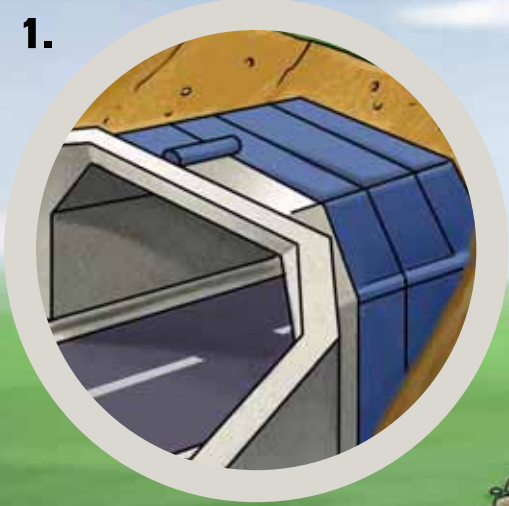
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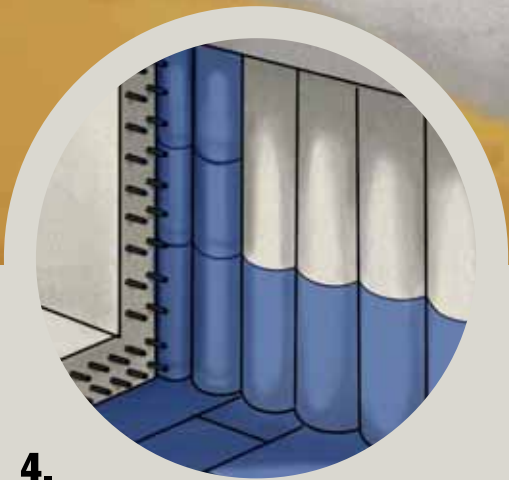
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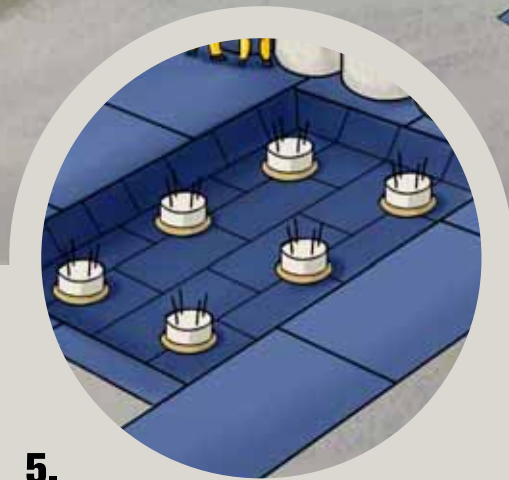
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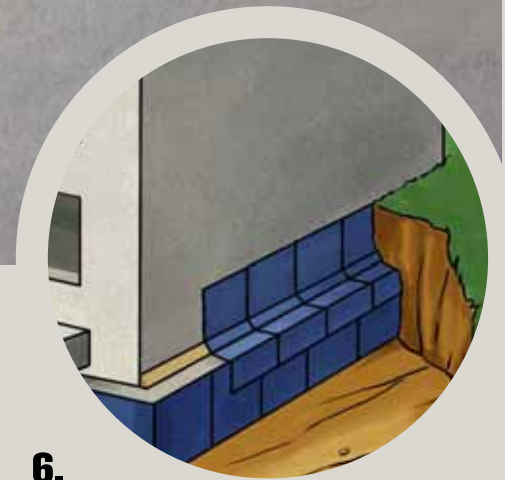
4.



5.



6.



# BentoShield® MAX



Millions of fibers extending the woven geotextile form strong mechanical bonds between the poured concrete and BentoShield MAX.



Needle punched fibers restrain the lateral movement of sodium bentonite between the geotextiles.



BentoShield MAX can be applied by even non skilled operatives just by rolling out the product and nailing the overlaps areas

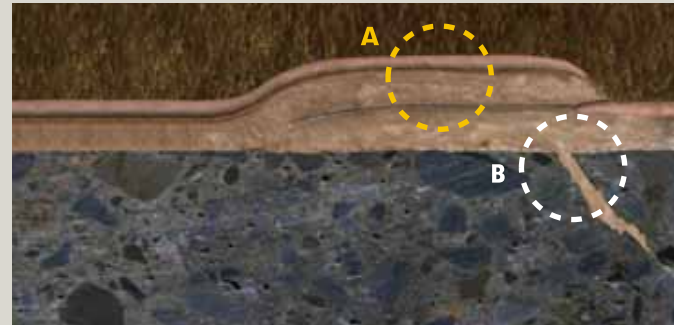
WATERPROOFING SYSTEM

BentoShield® MAX

## Advantages

### Self-Healing Capability

Self healing is the key attribute of BentoShield MAX that sets it apart from any other bitimious, paint on or plastic waterproofing methods. Those methods are ineffective against the construction related damages and cracks caused by the ground settlement whereas BentoShield MAX is able to expand and seal all cracks and renew the intimate contact with the structure.



**A. Bentonite granules provide seamless and impermeable overlaps .**

**B . High swelling bentonite granules, move towards to adjacent damaged areas in order to prevent water penetration.**

### Cost Effective Application

- BentoShield MAX can be applied by just rolling out the product in fast and simple manner.
- It adapts to complex geometric shapes by cutting and there is no need for primer or welding.
- It can be applied directly over properly prepared soil substrate without requiring a mud slab.
- Installation is durable even in temperatures below -40 C or under rain.



**It can be easily cut to take the shape of all complex details and waterproofs by adhering and surrounding them as a mastic.**

### Durable For The Life Of The Structure

Sodium bentonite is a unique natural mineral which had been formed within millions of years. Thus, because of its natural structure, its expected life is named as everlasting. It has excellent resistance to freeze & thaw cycles and settlements.

## Technical properties



2 gr sodium bentonite swell minimum 30 ml in pure water.

### BENTONITE LAYER

<b>Bentonite Content</b> ASTM D5993	5.0 kg/m <sup>2</sup>
<b>Swell Index</b> ASTM D5890	30 ml/2 gr
<b>Fluid Loss</b> ASTM D5891	15 ml

### GEOCOMPOSITE

<b>Thickness</b> EN 964-1	6 mm
<b>Permeability</b> ASTM D5887	$3 \times 10^{-11}$ m/s
<b>Hydrostatic Pressure</b> ASTM D5385	70 m
<b>Elongation Capacity</b> ASTM D5084	%600
<b>Tensile Strength</b> ASTM D6768	13 kN/m
<b>Peel Strength</b> ASTM D6496	60 N/m



BentoShield MAX is packaged resistant to site conditions.

### Standart dimensions and packaging

<b>Dimension*</b>	5 m x 40 m	1.1 m x 5.0 m	2.5 m x 40 m
<b>Area</b>	200 m <sup>2</sup>	5.5 m <sup>2</sup>	100 m <sup>2</sup>
<b>Weight</b>	1100 kg	30 kg	500 kg

\* Depending on project requirements, BentoShield can also supplied in different dimensions.

## Anchilliary products



Sodium bentonite based waterstop strip

### WaterStop BS

WaterStop BS is a flexible and expanding sodium bentonite based waterstop for use in horizontal and vertical construction joints. It is applied to concrete or metal surfaces simply by nailing in any weather conditions.

Instead of extending the water path as in conventional WaterStops, WaterStop BS converts into colloid form and effectively stops water by swelling and forming a strong compression seal.

### BentoPaste

BentoPaste is trowel grade sodium bentonite compound used especially as a detailing mastic around penetrations and corner transitions. After applying on details, BentoShield MAX can be installed without a waiting period.

**Packaging : Containers in 10 and 25 lt.**

### BS Granules

BS Granules is chemically treated sodium bentonite granules especially placed in overlap zones and critical areas for additional sealing. When hydrated, it reinforces the overlap areas by forming an impermeable and seamless layer.

**Packaging : 25 kg bags**

**General Guidelines**

Self-sealing waterproofing system applied with nailing.



During installation, woven geotextile should look toward to the concrete to be waterproofed.

In vertical applications, the upper BentoShield MAX roll should always overlap the lower roll.

BentoShield MAX is installed by simply rolling out the product in horizontal applications.



All adjoining edges of BentoShield MAX rolls should be overlapped minimum 10 cm and staggered to each other minimum 30 cm.

In overlap zones and critical sections, BS Granules is sprinkled for additional seaming.



Simply staple or nail edges of BentoShield MAX rolls to hold together. Ensure that overlapping area is flat, free of debris and distortion.



No  
necessity  
for mud  
slab or  
protection  
board.



BentoPaste reinforces sealing performance of details such as tie-rods, pile caps and penetrations.

BentoShield can be applied directly over BentoPaste without a working period.



The fresh concrete or backfill material should be placed in the direction of overlapping to avoid the interruption under the overlaps.

Backfill material must be free from any sharp objects, large rocks or debris and minimum 85% modified proctor density should be provided.



## Substrate preparation

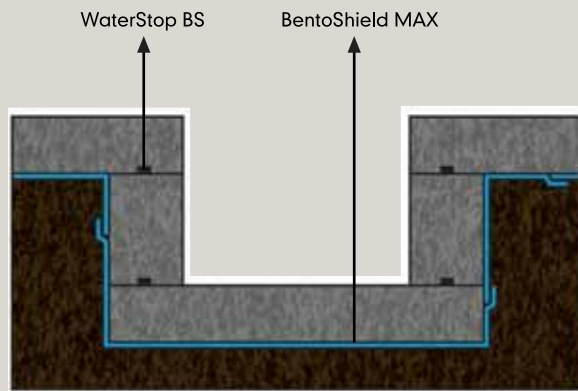
Substrate can be concrete, earth, sand or gravel and should be smooth enough for safe application. In horizontal applications, surface irregularities in masonry or concrete should be removed, earth and sand substrates should be compacted to minimum 85 % Modified Proctor Density.

In vertical applications, honeycombing, large voids and tie-rod holes should be filled with a suitable strength mortar or BentoPaste as necessary.

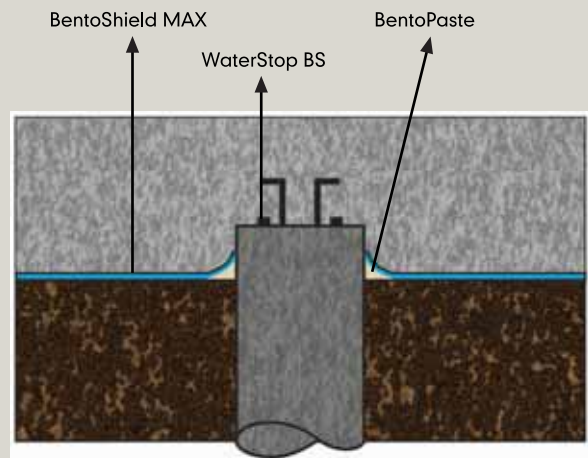
## Underslab applications

BentoShield MAX is designed to work under the confining pressure of minimum 15 cm thick concrete slab. It can be directly applied on compacted soil or blinding layer of concrete.

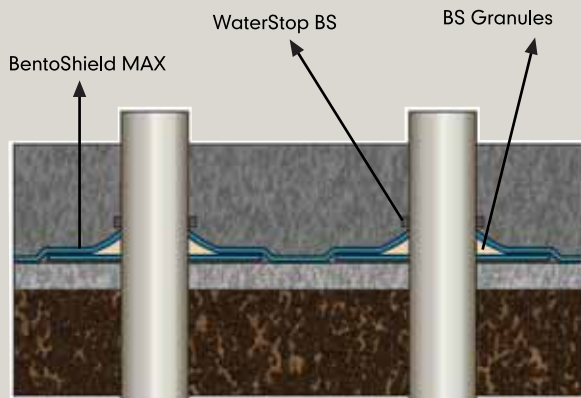
By means of its flexible structure, BentoShield MAX can be cut into hardest geometric shapes in order to fit and envelop all foundation elements such as ground beam, pile caps and penetrations. All the surrounding of those details should be covered with BentoPaste.



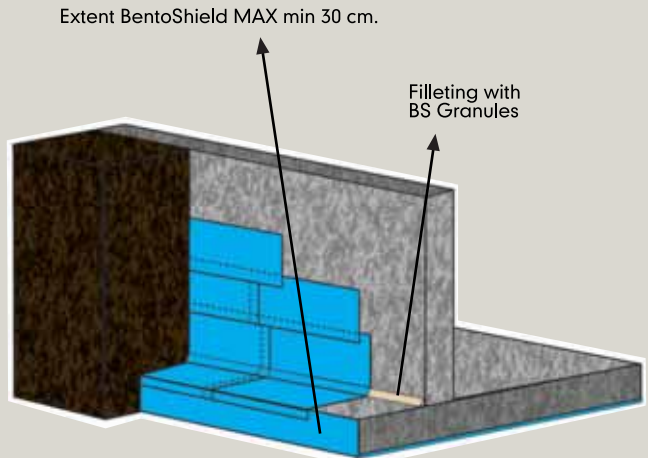
Elevation pits



Pile cap detail



Pipe penetration detail



Typical wall application detail

## Property line construction

BentoShield should be installed as the woven side facing the applicator in property line construction methods such as metal sheet piling, secant and contiguous piling, shotcrete and earth retention walls.

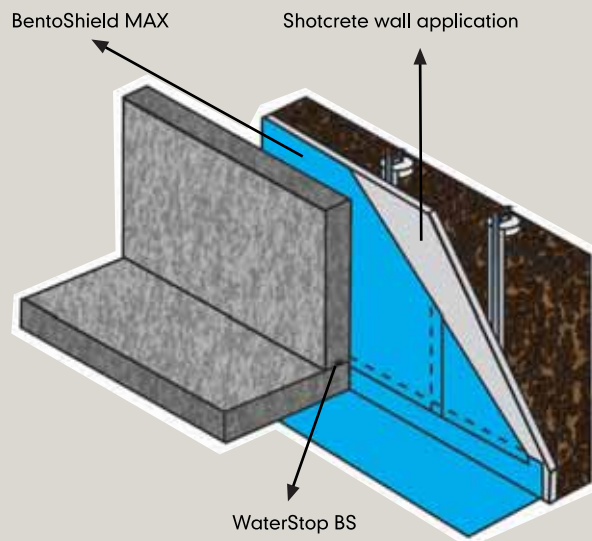
Large gaps should be covered with grout to provide a flat surface to apply BentoShield MAX in safe position. BS granules should be sprinkled in all corners, before installation.

## Backfilled retaining walls

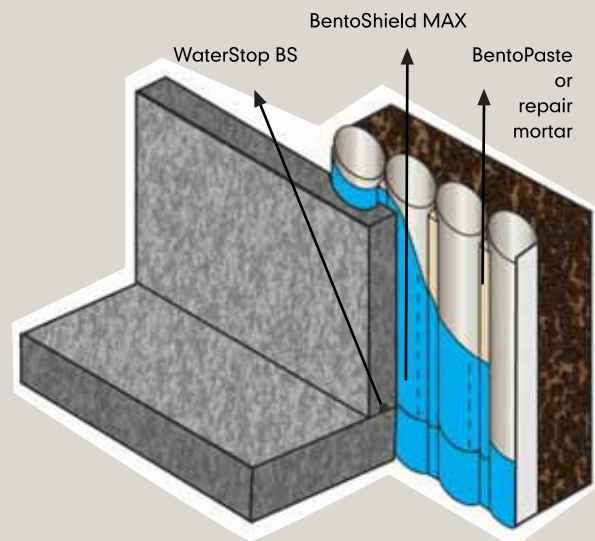
In backfilled wall installations, BentoShield MAX can be fixed vertically to the formwork before the concrete is poured. Alternatively, it can be also applied to cast concrete just before backfilling by fixing with suitable soft washer fixings.

Backfill material must be free from any sharp objects, large rocks or debris and minimum 85% modified proctor density should be provided. Also;

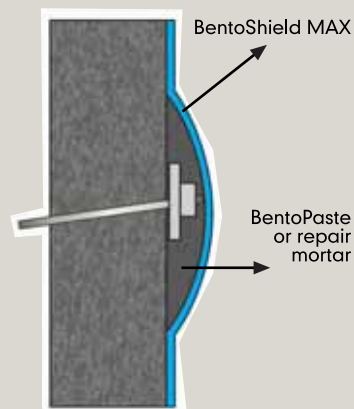
- BS Granules should be sprinkled at any intersection of horizontal and vertical rolls.
- All bolt holes and anchorages must be filled from the outside using a non-shrink grout.
- Embed the top edge of the termination bar with BentoPaste.



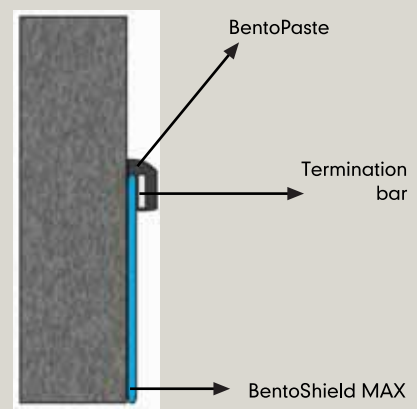
**Shotcrete application over BentoShield MAX**



**BentoShield MAX application over piling**



**Anchorage detail**



**Termination detail on ground level**



BentoShield® MAX

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