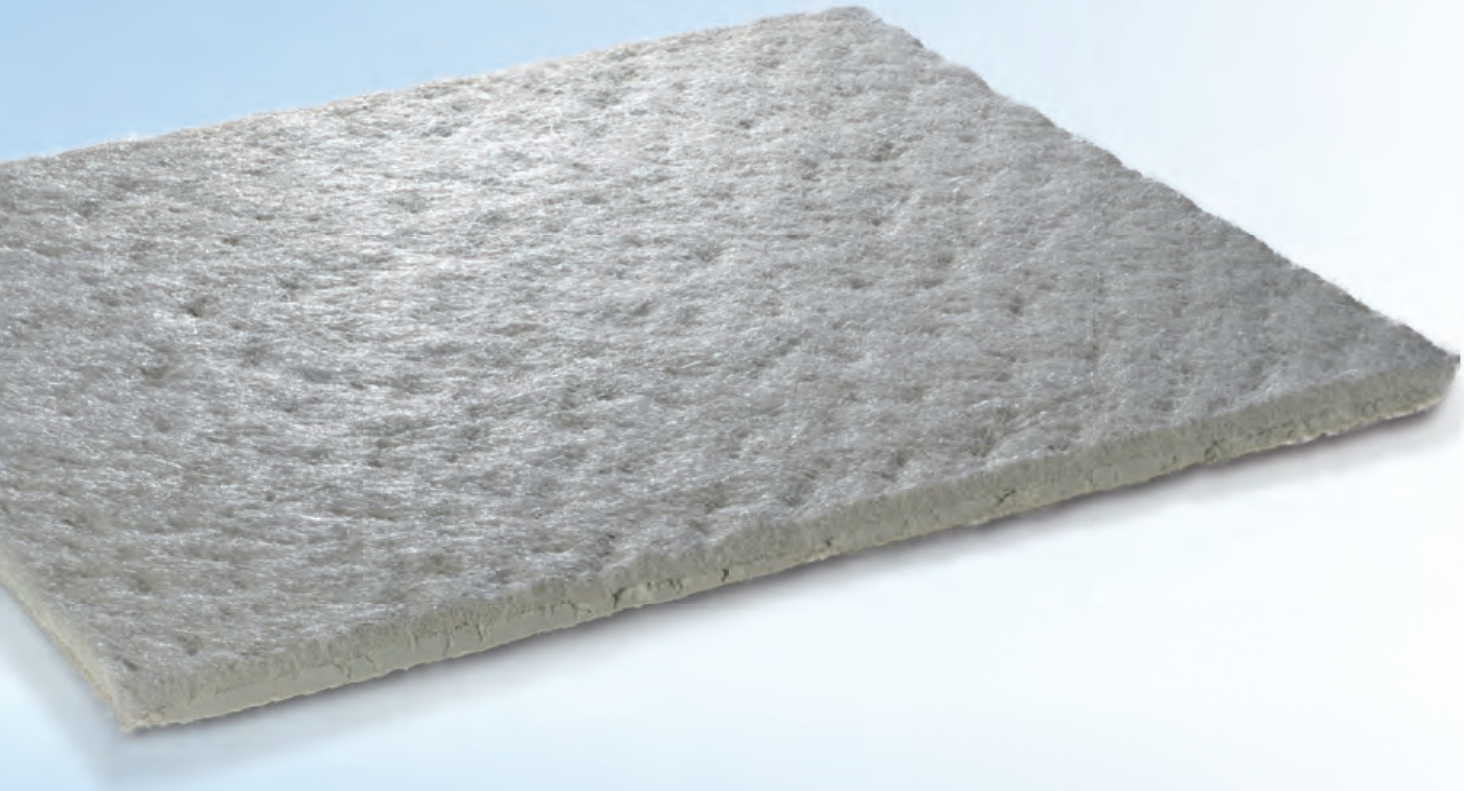
Advantages of needle-punched

BENTOFIX®

Geosynthetic Clay Liners (GCLs) for structural waterproofing



The Inventor of needle-punched Geosynthetic Clay Liners.
Material science - Engineering - Innovation

BENTOFIX® - The Original!

NAUE

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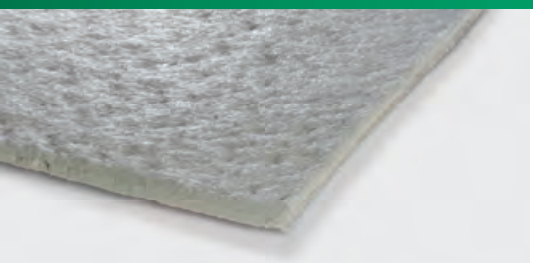
BENTOFIX®

Bentofix® Thermal Lock geosynthetic clay liners (GCLs) - also known as geosynthetic clay barriers (GBR-C) - are needle-punched, reinforced composites that combine two outer layers of durable geotextile and an uniform core of high-swelling powder sodium bentonite clay. This forms a uniform, multi-directional, shear-resistant hydraulic barrier with self-sealing and re-healing characteristics.



- Safe GCL waterproofing applications with high-quality sodium bentonite
- Gas-tight with Bentofix® X (polymer coated)
- Robust geotextiles encapsulate and contain the bentonite
- Immediate sealing performance without the need of an additional priming coat
- Thermal Lock process increases internal shear strength
- Pre- or post-concreting installation
- Self-sealing overlaps
- Bentofix® BFG 5000 meets BS 8102:2009 TYPE A -Grades 1, 2 & 3 requirements for structural waterproofing
- Hydrostatic head tests: BS EN 13562:2000 for 30m Bentofix® X2 BFG 5300
- BBA Certified waterproofing systems (Bentofix® BFG 5000 + Bentofix® X2 BFG 5300)

Bentofix® geosynthetic clay liners (GCL) exemplify how geosynthetics perform best: by interacting with natural elements to create something stronger and more secure.

Needle-punching revolutionised

The needle-punched manufacturing technology greatly increased the internal and external shear strength of GCLs and expanded the range of applications in which GCLs could be used. The needlepunching process firmly bonds the three unique layers of Bentofix® – two outer encapsulating geotextiles and the core of sodium bentonite. This bond creates a single, engineered barrier that utilises the best of both synthetic and natural materials.

The Power of Powder Bentonite

The exceptional, immediate swelling characteristic of powdered sodium bentonite provides a long-term barrier that can “self-seal and re-heal” (e.g., swell to fill potential punctured/damaged zones) and rehydrate to renew the barrier even if it has been exposed to desiccation. The highly engineered geotextile outer layers provide protection against piping of the bentonite, durability to resist damage, and strength to manage the challenges inherent in barrier designs.

The Thermal Lock process permanently locks the needle-punched fibres of the nonwoven geotextile layer with the Bentofix® carrier layer of GCL-types without PE coating and improves the hydraulic conductivity performance at low confining stresses. It also increases the pullout resistance of the fibres - a durability-improving measure that ensures immediate fibre-strength during hydration.

Bentofix® BFG is ideally suited for waterproofing applications since the nonwoven geotextile is entirely impregnated with an additional layer of sodium bentonite powder over its entire surface area and creates an intimate contact with a concrete surface and in overlap areas.

Bentofix® “X” types are additionally coated with a polyethylene membrane ensuring an immediate and enhanced barrier to gas and radon while protecting against desiccation and critical substances.

ADVANTAGE 1

Bentofix® consists of an evenly distributed layer of high-swelling sodium bentonite powder encapsulated between two geotextile components that act as the sealing element. The main advantage of the powder bentonite is its uniform distribution and its immediate sealing performance. When hydrated and permeated under confinement with fresh water the bentonite layer swells and forms a gel-like low permeable barrier. Over a range of confining stresses, Bentofix® GCLs provide an excellent hydraulic performance even under high hydraulic gradient conditions.

ADVANTAGE 2

Reinforced concrete structures are porous by nature and are susceptible to cracking. For a geosynthetic clay liner (GCL) to function correctly, it is essential that the sodium bentonite barrier has direct contact with the reinforced concrete element it is protecting. This prevents fluid flow between the element surface and the sealing system itself. Bentofix® BFG is manufactured such that the nonwoven geotextile is impregnated with an additional layer of sodium bentonite over its entire surface area. The product is installed with the nonwoven geotextile abutting the concrete element. Once hydrated, the gel-like consistency of the hydrated sodium bentonite impregnated into the outer surface of the nonwoven geotextile swells into small cracks or imperfections and moulds to the profile of the reinforced concrete element, sealing against ingress of water. Also, the sodium bentonite impregnated nonwoven ensures that all overlaps of the Bentofix® BFG are sealed, even if panels are cut to size or trimmed to fit around protrusions.

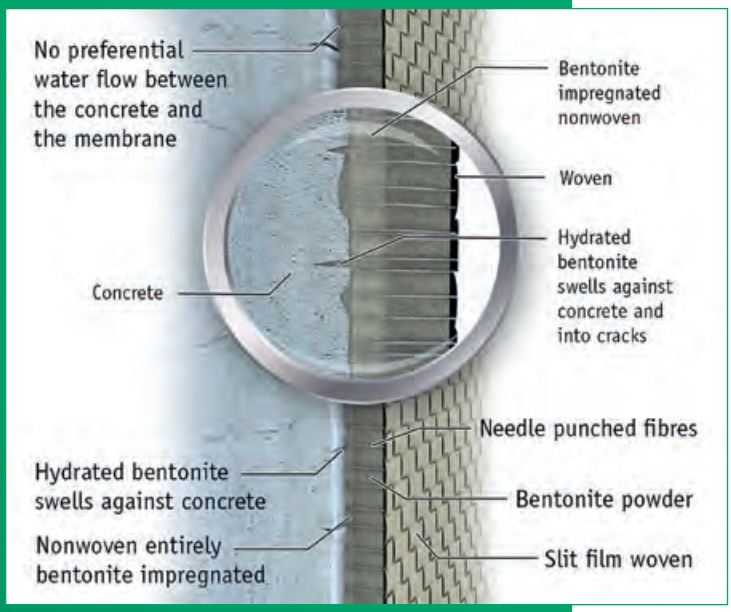


Figure 1
Reduction of water flow between Bentofix® and the concrete structure

BENTOFIX®

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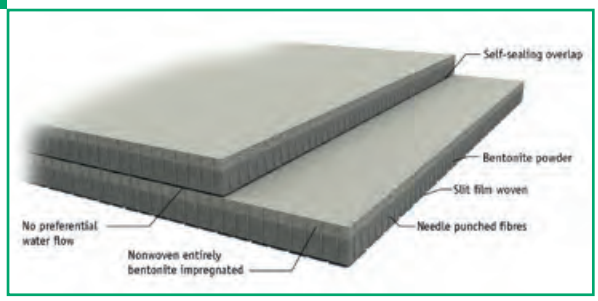

Bentofix® Applications:

- Landfill caps, closures and base seals
- Environmental protection under roads, railways, airports
- Dams and dykes
- Water containment and pond applications
- Structural waterproofing
- Secondary containment
- Mining applications
- Tunnels

CE

TÜV NORD ISO 9001

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 05/4256

BBA certified waterproofing systems (Bentofix® BFG 5000 + Bentofix® X2 BFG 5300)

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