



# TECHNICAL

# BENTOFIX®

The Original Needle Punched membrane for Tanking Basements

# DATA

## Uses

For all below ground waterproofing of concrete structures. **Bentofix® BFG 5000** is a concrete sealing system which efficiently protects reinforced concrete structures, preventing the penetration of water and water vapour and provides protection to the structure from attack by aggressive chemical substances present in the local surrounding soil.

## Advantages

Quick and easy installation in almost all weather conditions. Very difficult to damage on site. Unique Self-Sealing laps.

## Description

The Bentofix® BFG 5000 waterproofing membrane consists of a continuous layer of natural sodium Bentonite, sandwiched between a needle-punched polypropylene (PP) geotextile as the cover layer and a slit film woven geotextile as the carrier layer. The components are needle-punched uniformly together across the entire membrane. The cover layer of the membrane is filled during manufacture with the same Bentonite as used in the core layer as an extra manufacturing process to facilitate impermeable overlap joints.

## Quality Assurance

The Bentofix® BFG 5000 Waterproofing membrane shall be manufactured under strict quality control. The manufacturer is certified to ISO 9001. The components and the final membrane undergo regular and frequent testing in the Naue's laboratories according to the quality management standard ISO 9001.

The component supplier guarantees consistent quality through careful selection, processing and handling at all times. The properties are controlled again on arrival at the membrane factory.

The manufacturer (upon request) will provide its own in-house test documentation covering each delivery of membrane delivered to site. The Bentofix® BFG 5000 membrane is quality assured by independent third party testing. This is carried out in accordance with the quality assurance standard DIN 18200. Proof

of this testing can be provided for approval before orders to supply the Bentofix® BFG 5000 membrane is placed.

## Product

The thickness of the dry membrane is 6 mm, and the total mass per unit area is 5500 g/m<sup>2</sup>. The roll sizes can be: 1.20m x 2.42m, 2.42m x 15m, 4.85m x 30m. The membrane contains powdered natural sodium Bentonite with the minimum quantity of 3,600 g/m<sup>2</sup> when calculated with 0% moisture content. The Bentonite has a montmorillonite content of 90% by XRD and has a maximum 15% moisture content. The cover geotextile shall be a needle-punched, non-woven, polypropylene with a mass per unit area of 300 g/m<sup>2</sup>. The bottom geotextile is a slit film polypropylene woven with a mass per unit area of 200 g/m.

## Installation

**For installation on horizontal concrete slabs** the concrete surface shall not contain any abrupt level differences greater than 8 mm. All standing water shall be removed before the membrane is unrolled on site. The installed membrane can be protected by minimum 50 mm lean mix mortar or similar approved on the same day as it is unrolled.

**Installation on vertical concrete surfaces** is carried out without undue handling of the membrane to avoid excessive loss of Bentonite from the membrane. The membrane is secured to the concrete with the Bentonite impregnated geotextile side facing the concrete. The membrane is secured to the concrete using proprietary Soft Washer pins (min. length. 30 mm) at 300 mm spacing along the 20 mm outside edges and at 500 mm spacing within the area of the membrane if necessary for holding in place. If required the membrane can also be secured to shuttering with light nails or staples and concrete cast against it. The vibrating poker to compact the concrete should not come into contact with the membrane.

**Corners:** Double layers should be used at all corners. The outside edges should be protected by plastic sheeting at the end of each day work to ensure that they are clean and dry to form

the overlap for the next day's work. **Joints between panels or repair patches** should be formed by overlapping the panels or damaged area by at least 150 mm. There should be no wrinkles or creases in the membrane nor foreign material between the membrane pieces within the overlap area. Because of the Bentonite impregnated into the cover geotextile during the manufacturing of the membrane there is no need for extra Bentonite to be used to seal the overlaps. **Sealing penetrations of the membrane** around pipes, structures and other penetrations should be carried out in accordance with the manufacturer's instructions. At no time during installation of the membrane or placing of protective layers should plant or equipment be permitted to travel on the unprotected surface of the membrane. **All through concrete tie holes** must be filled, from the outside, using a proprietary non-shrink grout or similar, covered in a "mushroom" of Bentofix® Paste, either prior to Bentofix (post-fix) application, or prior to backfilling (pre-fix application), where additional Bentofix® patching will be required.

**In the event of damage occurring to the membrane** the damaged area should be overlain by a membrane patch at least 200 mm larger in all directions than the damaged area. The area to be overlain should be cleared of all debris and swept clean. If this causes loss of the Bentonite in the cover geotextile then extra Bentonite powder -min. 0.5 kg/m- (or Bentonite paste when slopes or vertical surfaces are involved) shall be placed around the perimeter of the area and the patch placed in position. Cover materials should be placed separately over patches to avoid these patches from moving when installed horizontally or the patch shall be bolted to the concrete as detailed above.

**If a protective / drainage layer is required** it shall be placed over the membrane using low pressure equipment. The 300 mm of the layer in contact with the membrane should be free of all debris, roots, sharp objects and any stones. The layer should be placed as soon as possible after the membrane is laid and in any event the membrane is to be covered before the end of the working day. The maximum particle size in this 300 mm layer shall be  $\leq 18$  mm. If the Bentonite core has a moisture content  $\geq 50\%$  before the cover layer is installed, then such swollen membrane may need to be removed and replaced with dryer membrane.

### Hydration of Bentofix® Waterproofing Membranes

Normally the membranes do not need to be artificially hydrated. However, if the membrane could come into contact with liquids such as salt water, before it hydrates, the membrane must be artificially hydrated beforehand. Consult Naue for details.

### Construction Joints

All vertical and horizontal construction joints are to receive Bentsotrip®, installed with a minimum of 75 mm concrete cover on all sides, secured with mesh. Bentsotrip®, shall be used as a puddle-flange to seal around applicable penetrations. Adhesive can be used to secure Bentsotrip®, where use of mesh is inappropriate. Refer to Waterproofing Manual for further installation procedures and guidelines.

### Backfilling

Backfill material should be of compactable soils and free of construction debris. As test 13, B.S. 1377, backfill should be clean, well graded, and compacted every 300 mm to 85% modified proctor (as defined by ASTM 1557), and meet these general specifications:

- 1) No rocks, stones or boulders larger than 50 mm.
- 2) 90 % minimum soil particles smaller than 5 mm.
- 3) 10 % maximum soil particles finer than 74 micron (200 mesh).

### Technical Support

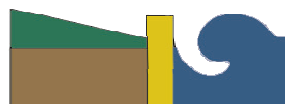
Naue Geosynthetics provides comprehensive design and on site technical service for any project.

### Health and Safety

Refer to Bentofix® BFG 5000 safety data sheet.

### Performance Data

Property	Test	Value
Puncture Force	DIN EN ISO 10319	20kN/m
Mass/Unit Area	DIN EN 965	5500g/m <sup>2</sup>
Permeability	DIN 18130	$<2 \times 10^{-11}$ m/s
Peel Strength	DIN EN ISO10319	$>60$ N/10cm
Montmorillonite Content (Bentonite)	XRD	approx. 90%



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