

Bentorub® +

Hydrophilic bentonite strip for the sealing of construction joints in concrete.



• field of application

- Bentorub®+ is designed for sealing construction joints, cold joints and working joints in concrete, around pipe penetrations, in sewer joints, against slurry walls, sheet piling, etc.
- Can be used in combination with Infiltra Stop in situations, which are deemed to be high risk.

• advantages

- Bentorub®+ is a permanently active system, which swells up to approximately 4V^(*).
- Bentorub®+ is an ecological and user friendly system: simple and quick to install by means of gun nailing or gluing with Bentoglue or MS Fixer.
- The use of Bentosteel will help the installation and will protect the Bentorub®+ strip against damage during pouring or compaction of the concrete.
- The composition of Bentorub®+ prevents premature swelling.
- Bentorub®+ has a proven track record in water treatment plants, water purification plants, underground parking lots, water reservoirs, swimming pools, water tanks, metro works and other concrete structures subject to high water pressure.
- Bentorub®+ can resist hydrostatic pressures of up to 80 metres of water column = 8 bar.
- The durability and performance of the Bentorub®+ will exceed the design life of the structure (bentonite is a product of nature).
- The highly elastic and plastic properties of Bentorub®+ will easily counter-balance the initial concrete shrinkage of the structure.
- Bentorub®+ can fill small honeycombs.
- Bentorub®+ will not dissolve in water and is non-polluting.

• description

Bentorub®+ is a green flexible hydrophilic strip of approx. 25 by 20 mm, made of natural sodium bentonite clay and synthetic rubber. Bentorub®+ is manufactured in lengths of approx. 5 metres. The swelling properties are created by the particle structure of the clay. In contact with water and in confined conditions, Bentorub®+ will swell to approximately 4V and create a waterproofing pressure inside the joint. The expansive clay mass will thus seal these hair line cracks and voids in the joint. The first expansion is delayed to prevent the strip from reacting too soon with possible rainwater, before or during the installation.

• application

1. General

- Bentorub®+ can only function properly in a confined space in order to develop sufficient expansion pressure and assure waterproofing.
- The expansion of Bentorub®+ will create a certain pressure, which needs to be counteracted by at least 7 cm of concrete coverage at both sides (installation in the middle of the joint is preferred).
- Bentorub®+ is preferably applied onto a smooth and dust-free concrete surface. Bentorub®+ can be used under most weather conditions.
- Installation during heavy rain or in prolonged contact with water can result in a premature swelling of the strip, which should be avoided.
- No special precautions should be taken during the preparatory activities (installation of the reinforcement bars, placement of shuttering, etc) in view of the subsequent installation of bentonite strip.
- The Bentorub®+ is applied during the installation of the 2nd phase reinforcement bars, in between inner and outer rows of reinforcing bars.

2. Substrate preparation

- Remove dust, dirt and loose parts by brushing firmly.
- In case of very rough surface, it is recommended to level with Bentostic prior to installation of Bentorub®+. When using Bentostic, Bentorub®+ needs to be fixed with nails.
- Alternatively, use Bentoglue or MS Fixer to level and glue Bentorub®+ in place. This method is only valid for horizontal applications.
- In case of vertical or overhead applications, Bentorub®+ cannot be glued with Bentoglue or MS Fixer, only use Bentosteel and nails.

3. Horizontal applications

Application by nailing with or without Bentosteel.

- Unroll Bentorub®+ in the middle of the joint and press down firmly
- Nail directly to the substrate using 4 nails with washer per m.

Application by means of gluing with Bentoglue or MS Fixer.

- Apply a bead of Bentoglue or MS Fixer of 5 x 10 mm with a caulking gun on the concrete surface.
- Unroll the Bentorub®+ strip and press firmly into the glue. Wait until the glue is dry before pouring concrete (a concrete cover of 7 cm at all sides should always be respected). The roll ends should have a lateral overlapping of 5 to 10 cm. The ends need to be pressed firmly together.
- Additional nailing or gun nailing will provide secure fixing onto the concrete.

4. Vertical and overhead applications by nailing with Bentosteel

- Unroll the Bentorub®+ strip (a concrete cover of 7 cm at all sides should always be respected). The roll ends should have a lateral overlapping of 5 to 10 cm. The ends need to be pressed firmly together.
- Install the Bentosteel wire mesh profile over the Bentorub®+.
- Fix the system by nailing or gun nailing (use nails with washer, approx. 4 per metre).

5. Remarks

- Bentorub®+ can be fixed around pipe penetrations with steel wire or Bentoglue (dry surface) or MS Fixer (dry to moist surface).
- For special applications, such as contact with strongly polluted water or chemicals, it is recommended to consult the De Neef representative. For contact with salt or brackish water, use Bentorub® Salt.

• **technical data/properties**

Property	Value	Norm
Swelling capacity in contact with water	Approx. 4V	Test report KUL University
Density	Approx. 1,44 kg/dm ³	ASTM D71-84
Weight	Approx. 0,72 kg/m	Test report DNC
Cone penetration	35,5	ASTM D217
Expansion pressure in complete confinement	≥ 0,70 N/mm ²	Test report KUL University
Hydrostatic pressure resistance	Up to 80 m water column = 8 bars	Test report DNC
Elongation at break	7500%	Test report KUL University
Maximum allowable bend	No cracks at 180° above 0°C	Test report KUL University
Installation temperatures	-15°C to 60°C	Test report DNC
Operating temperatures	-45°C to 120°C	Test report DNC
Odour	Odourless	

• **appearance**

Green, rectangular plastic strip of approx. 20 by 25 mm, in rolls of approx. 5 metres length.

• **consumption**

The necessary quantities depend on the length of the various (construction) joints, which need to be sealed. It has to be taken into consideration that a lateral overlapping of 5 to 10 cm between 2 lengths of Bentorub®+ is necessary. Bentoglue or MS Fixer consumption can vary greatly depending on the roughness of the concrete.

Design consumption Bentoglue

- Smooth concrete : 65 g/m joint.
- Rough concrete : 130 g/m joint.

Design consumption MS Fixer

- Smooth concrete : 60 g/m joint.
- Rough concrete : 120 g/m joint.

• **packaging**

30 m cardboard boxes containing 6 x 5 m.
Weight per box: ca 21,6 kg net / ca 23 kg gross.
1 pallet = 24 boxes = 720 m.

• **storage**

Bentorub®+ should be stored under cover, clear of the ground. Protect the materials from all sources of moisture and frost. Storage temperature must be between 5°C and 30°C.

Shelf life is unlimited in correct storage conditions.

• **accessories**

To be ordered separately

Bentosteel

- Steel wire mesh profile for Bentorub®+.
- Mesh grid: 10,6 by 10,6 mm. Section: 25,5 mm by 9 mm.
- Length: 1 metre.
- Packaging: 30 x 1 metre.

Bentostic

- Mastic for levelling the surface.
- Green colour.
- Packaging: plastic pails 5 kg.

Bentoglue

Caulk applied adhesive for Bentorub® Salt.

- 310 cm³ = 403 g cartridges
- 12 sausages per cardboard box.
- 75 boxes per pallet.

(See respective Technical Data Sheet)

• **health & safety**

MS Fixer

- Caulk applied adhesive for Bentorub®+.
- 400 cm³ = 600 g sausages.
 - 20 sausages per cardboard box.
 - 48 boxes per pallet.
- (See respective Technical Data Sheets).

For full information consult the relevant Material Safety Data Sheet.

^(*) Tested under laboratory conditions.