

BENTOTELO

Bentonite waterproofing geocomposite

Self-sealing, self-adhering waterproofing geocomposite to concrete, consisting of a layer of nonwoven, a layer of natural sodium bentonite and a polypropylene fabric. The layers are connected by means of a dense needle punching to ensure that the bentonite is self-confining with controlled expansion. This system prevents the bentonite from slipping and accumulating as a result of cutting, tearing, vertical application and handling. Bentotelo is suitable for waterproofing all underground vertical or horizontal concrete structures.

BENEFITS

- Easy and quick application.
- Self-attaching and self-sealing.
- Waterproofs and protects underground concrete structures.
- Perfectly adapts to the shape of the structure.
- Easily repairable in the event of accidental abrasion during installation.
- Resistant to temperature changes, sun and wind.
- High tensile and tear strength.
- Excellent durability.
- Non-toxic and solvent free product.

YIELD

1.0 ft²/ft².

An overlap of at least 15 - 20 cm is recommended.

COLOUR

Hazel/Sand.

PACKAGING

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Sheet thickness: 7.60 mm;
Sheet dimensions: 1.15 x 5.10 m;
Single roll area: 5.87 m²;
Single roll weight: 35.63 kg;

BENTOTELO M

Sheet thickness: 7,60 mm;
Sheet dimensions: 2,55 x 15,00 m;

Single roll area: 38,25 m²;
Single roll weight: 202,73 kg

APPLICATION FIELDS

Product suitable for waterproofing all underground vertical or horizontal concrete structures, foundation slabs on formwork or against diaphragms, piles, berms, as well as lift shafts, garages, silos and subways. *Bentotelo* is ideal for waterproofing concrete tanks for water containment, fire fighting and first rain water. The product is designed to be applied in containment works where excellent waterproofing capacity, long-term stability, ease of application and self-sealing overlaps are required; *Bentotelo* can also be used to waterproof reservoirs.

STORAGE

The product should be stored in its undamaged original packaging in a covered, clean and dry place, protected from water, moisture and frost. Avoid direct contact of *Bentotelo* with the ground by using wooden pallets and ensuring uniform contact between the rolls and the supports. In the event that a covered area is not available for storage, an additional cover should be provided by means of a waterproof sheet. Storage time: 24 months.

PREPARATION OF SUPPORT

The substrate must be completely hardened and of sufficient strength. The surface must be thoroughly clean, dry, well consolidated and free of crumbling and inconsistent parts. In the



DIASEN SRL UNIPERSONALE - Società Benefit

Zona Industriale Berbentina 5 - 60041 Sassoferrato (AN) | Italia | +39 0732 9718
diasen@diasen.com | www.diasen.com | P.IVA 01553210426 | R.E.A. Ancona n. 150933
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case of a newly created cementitious substrate, this must be sufficiently cured and have undergone adequate shrinkage. It is essential that there is no run-off and/or stagnant water. When a water table is present, the water level must be kept low by using special docking systems, until the structure is completed and able to counteract the hydraulic thrust.

FOUNDATION SLAB

When laying horizontally, provide a layer of concrete (screed) to create an even surface for laying *Bentotelo*.

VERTICAL LAYING

In the case of waterproofing the vertical foundation wall (postcast waterproofing), all existing unevenness must be removed. Any hollows must be filled with non-shrink fibre-reinforced mortar.

SLURRY WALL

In the case of vertical laying against a slurry wall (precast waterproofing), the laying surface must be evened out and must not have any unevenness or hollows. Roughness must be eliminated and depressions must be filled with non-shrinking, fibre-reinforced mortar.

APPLICATION OF THE PRODUCT

Horizontal application

1. Position the formwork for casting.
2. Lay the dark-coloured polypropylene non-woven directly on the formwork to a height 5 / 10 cm lower than the thickness of the casting. Turn the sheets over the lean concrete for at least 20 cm.
3. Fasten the sheets on the formwork with metal staples or carpentry nails.
4. Unroll the sheets over the lean-to with the dark side facing the lean-to.
5. The sheets must be laid avoiding generating tensile stresses due to

excessive laying speed. Similarly, the formation of creases due to incorrect laying must be avoided.

6. Fasten the edges of the sheets with nails and washers every 50 cm.
7. After the *Bentotelo* has been laid, cover the sheets with a concrete hood (casting) at least 5 cm thick.
8. At the connection with the foundation wall *Bentotelo* should be turned up to the wall and then covered with a non-woven fabric with a minimum weight of 500 g/m².

Vertical installation – precast application

1. Prior to casting, fill the gap between piles, micropiles, berms, etc. with sand or inert material, if necessary, in order to create a well levelled and even laying surface.
2. Lay the rolls from top to bottom. Place the dark-coloured polypropylene nonwoven fabric in contact with the foundation (piles, micropiles, berms, etc). The lighter-coloured polypropylene fabric must face outwards and therefore be visible. During casting operations, this latter layer will be in contact with the new casting.
3. The sheets must be laid avoiding the generation of tensile stresses due to excessive laying speed. Similarly, the formation of folds due to incorrect laying must be avoided.
4. Make overlaps of at least 15 - 20 cm and fix the *Bentotelo* to the substrate with nails and washers every 50 cm to prevent movement of the sheet at the overlaps.
5. Turn the *Bentotelo* over the substrate to create a continuous waterproof layer. If there are connectors between the confinement structure of the excavation and the structure to be poured, drill holes in the *Bentotelo* for the passage of these connectors. Once the geocomposite has been applied, the connectors should be sealed with a few



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scraps of *Bentotelo* and suitable hydro-expansive mastic.

Vertical installation – post casting application

1. Cut *Bentotelo* sheets to size according to wall heights.
2. The geocomposite should be positioned with the light-coloured surface facing the concrete wall with the edges overlapping by approximately 20 cm. The darker polypropylene nonwoven must face outwards and therefore be visible. During backfilling, the latter layer will be in contact with the ground.
3. Lay the rolls from top to bottom and fix them with nails every 20 cm.
4. The sheets must be laid avoiding generating tensile stresses due to excessive laying speed. Similarly, the formation of creases due to incorrect laying must be avoided.
5. The upper sheets must be laid on top of the lower sheet (tile principle).
6. Once the *Bentotelo* has been laid, the backfill can be carried out. Use fine material, compacting the soil against the sheet in layers to avoid the formation of voids. When backfilling with inert material, protect the *Bentotelo* with a non-woven fabric with a minimum weight of 500 g/m². Do not use construction waste or sharp-edged materials for backfilling.

Waterproofing of reservoirs

1. Well compact the ground before laying the *Bentotelo*. The lateral ground of the reservoir must present a slope such as to avoid landslides or detachments of incoherent material. Place the dark coloured polypropylene nonwoven downwards, i.e. towards the compacted soil.
2. The lighter-coloured polypropylene fabric must face upwards and therefore be visible.

3. The sheets must be laid avoiding the generation of tensile stresses due to excessive laying speed. Similarly, the formation of creases due to incorrect laying must be avoided.
4. Cover the *Bentotelo* with 50 cm of compacted soil.

OVERLAPS SETTING

Bentotelo must be laid in such a way as to guarantee the following minimum overlap values between two contiguous sheets:

- 15 – 20 cm for the longitudinal overlaps (in the unwinding direction of the rolls);
- 15 – 20 cm for the transversal overlaps (corresponding to the short side of the roll).

The transversal overlaps (short side) must be, while applying the product on horizontal surfaces, offset from each other by at least 50 cm in the direction of unwinding of the rolls.

SUGGESTIONS

- Do not apply with imminent threat of rain or frost, in conditions of strong fog or with relative humidity higher than 70%.
- In the presence of aggressive substances in the ground (hydrocarbons, salt water, etc.), before casting the concrete, the *Bentotelo* must be completely wet with fresh water to activate the bentonite.

CLEANING

The equipment used can be washed with water before hardening of the product.

SAFETY

While handling, always use personal protective equipment (PPE) and respect the instructions described in product safety data sheet.



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* These data, even if carried out according to regulated tests are indicative and they may change when specific site conditions vary.

Technical Data *			
Features			Unit
Yield		1,0 m ² /m ²	m ² /m ²
		1.0 ft ² /ft ²	ft ² /ft ²
Aspect	geocomposite		-
Colour	sand/hazel		-
Thickness of the sheet		7,6	mm
		0.30	inches
Upper layer	polypropylene fabric	100	g/m ²
		0.33	oz/ft ²
Central layer	natural sodium bentonite	5000	g/m ²
		16.38	oz/ft ²
Lower/Bottom layer	polypropylene nonwoven fabric	200	g/m ²
		0.65	oz/ft ²
Grammage	5300		g/m ²
Montmorillonite content	≥ 90%		-
Application temperature	+ 5 / +35		°C
	+ 41 / + 95		°F
Usage temperature	- 15 / +40		°C
	+ 5 / + 104		°F
Storage	24 months in original containers and dry areas		Months
Packaging	Dimension	1,25 x 5,10 m	
	Single roll area	6,38 m ²	m
	Weight of a single roll	33,79 kg	
	Dimension	2,55 x 15,00 m	m ²
	Single roll area	38,25 m ²	
	Weight of a single roll	202,73 kg	kg

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Final performances		Unit	Norm	Result
Swelling index	> 30 mL / 2 g	mL/g	ASTM D 5890	-
Water absorption capacity	> 550%	-	DIN 18132	-
Humidity content	max 12%	-	-	-
Permeability	$\leq 1,20 \times 10^{-11}$	m/s	ASTM D 5887	-
Traction resistance				
- Longitudinal	$\geq 10,40$	kN/m	EN ISO 10319	-
- Transversal	$\geq 10,40$			
Adhesion to concrete	2,50	kN/m	ASTM D 903	-
Punching resistance	> 2,50	kN	UNI EN ISO 12236	
Montmorillonite content	$\geq 90\%$	-	-	-



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