

BENTOTELO

Bentonitic geo-composite waterproofing sheet.

Self-sealing and self-bonding waterproofing geocomposite to concrete, composed of a layer of nonwoven fabric, a layer of natural sodium bentonite and a layer of polypropylene fabric. These layers are connected by means of a dense needling that guarantees the bentonite a self-confinement with controlled expansion. With this system, slipping and accumulation of bentonite is avoided as a result of cuts, tears, vertical applications and handling. *Bentotelo* is suitable for waterproofing all vertical or horizontal underground concrete structures.

BENEFITS

- Easy and quick to apply.
- Self-gripping and self-sealing.
- It waterproofs and protects underground concrete structures.
- Perfectly adapts to the shape of the structure.
- Easily repaired in case of accidental abrasions during installation.
- Resistant to sun and sunlight, to strong wind and to sudden changes in temperature.
- 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

Sheet thickness: 7,60 mm;
 Sheet dimensions: 1,25 x 5,10 m;
 Area of the single roll: 6,38 m²;
 Weight of the single roll: 33,79 kg;
 Single rolls.

Sheet thickness: 7,60 mm;
 Sheet dimensions: 2,55 x 15,00 m;
 Area of the single roll: 38,25 m²;
 Weight of the single roll: 202,73 kg;
 Single rolls.

WATERPROOFING – Bentonitic

APPLICATION FIELDS

Product suitable for waterproofing all vertical or horizontal underground concrete structures, foundation slabs on formwork, pile walls, elevator shaft, box, silos, underpasses. *Bentotelo* is ideal for waterproofing concrete tanks for water storage, fire prevention and rain. The product has been designed to be applied in containment works for which excellent waterproofing capacity, stability over time, ease of installation and self-sealing overlaps are required; *Bentotelo* can also be used to waterproof artificial reservoirs.

STORAGE

The product must be stored in its original containers, in shaded, clean and dry premises, always away from sunlight, water and ice. Avoid direct contact of with the ground with *Bentotelo*, using wooden pallets to store the rolls, and taking care of a uniform contact between the roll and the support. In case of a covered premise is not available for storage, it is necessary to cover the rolls with a polyethylene sheet. Storage time: 24 months.

PREPARATION OF SUPPORT

The support must be completely hardened, dry and resistant. The surface must be thoroughly clean, well consolidated, without debris or detaching parts. In case of a newly built cement substrate, this must be sufficiently dry and cured. It is essential that there is no running water or backwater. When a aquifer, the water level must be kept low by using suitable



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embedding systems, until the structure is completed, capable of counteracting the hydrostatic pressure.

Foundation platform

For horizontal laying, provide a concrete layer (lean concrete as cleaning) to create a uniform surface for applying the product *Bentotelo*.

Vertical application

For waterproofing vertical foundation wall (after casting waterproofing), all the roughness present must be removed. Any depressions shall be filled with anti-shrinkage fiber-reinforced mortar.

Diaphragm wall

To waterproof vertical concrete partition wall (pre-cast waterproofing), the substrate where the *Bentotelo* will be laid must be regularized. Therefore, the surface must not present any roughness or hollow: the former shall be eliminated and the latter filled with anti-shrinkage fiber-reinforced mortar.

APPLICATION OF THE BARRIER

Horizontal application

1. Place the formworks for the concrete casting.
2. Spread the dark-coloured non-woven surface of the polypropylene directly on the formworks, to a height of 5/10 cm lower than the thickness of the casting. Turn the sheets over the lean for at least 20 cm.
3. Secure the sheets to the formwork with metal staples or carpentry nails.
4. Unroll the sheets on the lean concrete with the dark side facing the lean concrete.
5. The sheets must be laid avoiding the generation of tensile stresses due to excessive installation speed. Similarly, the formation of creases due to incorrect application must be avoided.
6. Secure the edges of the sheets with nails and washers every 50 cm.
7. At the end of the installation of the *Bentotelo*, cover the sheets with a concrete hood (cast) with a minimum thickness of 5 cm.

8. On the connection with the foundation wall, *Bentotelo* must be turned up to the wall and subsequently covered with a non-woven fabric with a minimum weight of 500 g/m².

Vertical installation – pre-cast application

1. Before proceeding with the casting, if necessary, fill the gap between pilings, micropiles, “berlines” (flexible support structures that are made using micro-pile curtains), with sand or inert material, in order to create a well-leveled and regular laying surface.
2. Lay the rolls from the top down. Place the dark colored polypropylene non-woven surface in contact with the foundation (poles, micropiles, diaphragms walls, “berlines”, etc.). The lighter polypropylene fabric must be facing outwards and therefore must be visible. During casting operations, this last layer will be in contact with the newly casted concrete.
3. The sheets must be laid avoiding generating tensile stresses due to excessive installation speed. Similarly, the formation of creases due to incorrect application must be avoided.
4. Take care of overlapping at least 15 - 20 cm of the sheets, 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 lean to create a continuous waterproof layer.
6. If there are connectors between the confinement structure of the excavation and the structure to be cast, make holes in the *Bentotelo* for the passage of these connectors. Once the geocomposite has been applied, the connectors must be sealed with a few pieces of *Bentotelo* and with the hydro-expansive mastic S-600 (see technical data sheet).

Vertical installation - post-casting application

1. Cut the *Bentotelo* sheets to size, according to the height of the walls.
2. The geocomposite must be laid down taking care of placing the light-coloured surface facing the concrete wall, overlapping the edges of about 20 cm.

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The darker polypropylene non-woven fabric must be facing outwards and therefore be visible. During the backfilling operations, this last layer shall be kept in contact with the ground.

3. Lay the rolls from top down and fix them with nails every 20 cm.
4. The sheets must be laid avoiding generating tensile stresses due to excessive installation speed. Similarly, the formation of creases due to incorrect application must be avoided.
5. The installation of the upper sheets must be carried out overlapping those to the lower sheets (principle of the roof tiles).
6. Once the *Bentotelo* has been laid, you can proceed with backfilling. Use fine materials, compacting the soil in layers against the sheet to avoid the formation of voids/hollows. In case of backfilling with inert material, protect the *Bentotelo* with a non-woven fabric characterized by a minimum 500 g/m². Do not use construction waste or cutting 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 polypropylene fabric must put down facing upwards and therefore be visible.
3. The sheets must be laid avoiding the generation of tensile stresses due to excessive installation speed. Similarly, the formation of creases due to incorrect application must be avoided.
4. Cover the product *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	
	Weight of a single roll	33,79 kg	
	Dimension	2,55 x 15,00 m	
	Single roll area	38,25 m ²	
	Weight of a single roll	202,73 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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DIASEN Srl - Z.I. Berbentina, 5 - 60041 Sassoferrato (AN)
Tel. +39 0732 9718 - Fax +39 0732 971899
diasen@diasen.com - www.diasen.com