



# TILTEX Drop IN

---

# TABLE OF CONTENTS

1. GENERAL .....	3
2. DEFINITIONS .....	5
3. ABOUT EUROBENT .....	7
4. NORMATIVE REFERENCES .....	9
4.1. Harmonized technical specification .....	10
4.2. International Organization for Standardization .....	10
4.3. American Society for Testing and Materials (ASTM) .....	10
5. QUALIFICATION FOR INSTALLER .....	11
6. MANUFACTURE .....	13
7. DELIVERY.....	16
8. UNLOADING .....	18
9. AFTER DELIVERY INSPECTION .....	20
10. STORAGE .....	22
11. INSTALLATION .....	24
11.1. Subgrade Preparation .....	25
11.2. Installation and positioning .....	25
11.3. Watering overlaps .....	25
11.4. Joining .....	26
11.5. Anchoring whole lined surface .....	26
11.6. Anchoring TILTEX on the top of the slope .....	27
11.7. Selection of suitable anchoring materials .....	27
11.8. Overlapping TILTEX Plus .....	29
11.9. Inspection .....	30
11.10. Hydrating .....	30
11.11. Setting .....	31
12. EQUIPMENT RECOMMENDED ON SITE .....	32
13. MAINTENANCE .....	34

---

**GENERAL**

**01**



## 1. GENERAL

The documentation includes a description of TILTEX – GCCM (Geosynthetic Cementitious Composite Mat) to solve the problem of erosion, washout, stabilization and regulation of watercourse beds.

In presented document there are technical specifications of the product, warranty requirements, description of necessary accessories, installation and method of delivery.



GENERAL



---

# DEFINITIONS

02

## 2. DEFINITIONS

**GCCM** - Geosynthetic Cementitious Composite Mat.

**Geotextile** - A semi-permeable woven or nonwoven fabric used to contain the cement in TILTEX.

**Needle-punching** - A process whereby boards of barbed needles incorporate the staple fibers from a nonwoven geotextile, through a cement-sand mix layer, into the matrix of a second geotextile layer.

**ITR** - Internal Test Report, also called MQA or Mill test etc.



DEFINITIONS

---

# ABOUT EUROBENT

03



### 3. ABOUT EUROBENT



Eurobent Sp. z o.o. is a Polish company from Lower Silesia.

Eurobent is a producer of Geosynthetic Liners and entered the GCL production market in 2008, then started to produce liners with other fillings, which led us to the production of cement-filled mats.

The company is a team of young, dynamically developing people. Thanks to the high standards of its products and the professional service Eurobent has earned the trust and respect of one of the largest Geosynthetic Liners consumers in the European market and beyond. At the same time, thanks to many years of experience in the field of geosynthetics production, the company has been able to develop invaluable knowledge in the production of Geosynthetic Liners, which has enabled them to become an innovative and acknowledged competitor on the international market.

The company consists of skilled staff committed to provide the best service and products available on the international marketplace.

Eurobent's laboratory technicians constantly undertake numerous tests on our products to ensure that their high standards are constantly maintained.

Eurobent is committed to constantly reviewing the service we provide, thus ensuring that we not only meet all of our customers' needs and requirements but exceed them. The company aims to provide the highest quality geosynthetic products and also ensure that it would be manufactured, stored and transported in the way to minimize their impact on the environment. The customers can be sure that they purchase an environmentally friendly product from a company that is dedicated and committed to environmental protection.

---

# NORMATIVE REFERENCES

04

## 4. NORMATIVE REFERENCES

### 4.1. Harmonized technical specification

1. **EN 13253:2016**-Geotextiles and geotextile-related products-Characteristics required for use in erosion control (bank protection and shore protection)
2. **EN 13254:2016**-Geotextiles and geotextile-related products-Characteristics required for products used in the construction of reservoirs and dams
3. **EN 13255:2016**-Geotextiles and geotextile-related products-Characteristics required for use in the construction of canals
4. **EN 13256:2016**-Geotextiles and geotextile-related products-Characteristics required for use in liquid waste containment
5. **EN 13257:2016**-Geotextiles and geotextile-related products-Characteristics required for use in solid waste disposals

### 4.2. International Organization for Standardization

1. **EN ISO 10319:2015** – „Geosynthetics – Wide-width tensile test”
2. **EN ISO 12236:2006** – „Geosynthetics – Static puncture test (CBR test)”
3. **EN ISO 13433:2006** – “ Geotextiles and geotextile-related products - Determination of perforation dynamics (Cone Drop test)”
4. **EN 14574** – “Protection efficiency”
5. **EN 12467:2016-8** – “Fibre-cement flat sheets - Product properties and test methods”

### 4.3. American Society for Testing and Materials (ASTM)

1. **ASTM D 6460** – “Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion”
2. **ASTM D 5887** – “Standard Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter”





---

# QUALIFICATION FOR INSTALLER

05

## 5. QUALIFICATION FOR INSTALLER

Recommendations:

**1** The installation team must be familiar with geosynthetic liners installation guidelines and be trained in installation of it.

**2** Installer shall have experience installing geosynthetic liners on at least 5 projects and have installed a minimum of 100 thousand m<sup>2</sup> of geosynthetic liners materials.



QUALIFICATION FOR INSTALLER

---

# MANUFACTURE

06



## 6. MANUFACTURE

TILTEX consists of two interconnected geotextile layers in which a specially formulated dry sand-cement mix is encapsulated. GCCM can contain an additional layer of PE geomembrane, which makes the material waterproof.

Quartz sand in the mix makes it more dense, therefore final material performance is very durable.

It improves chemical and abrasion resistance, and above all it ensures even distribution of water inside the liner.

Needle-punching process provides very strong bonding between upper and bottom layers as well as maintains the sand-cement mix in the mat.

PP fibers play also an extremely important role in the liner performance as millions of reinforcing fibers are embedded in the cement strengthening it, while ensuring certain flexibility to the liner. Thanks to these fibers the whole composite integrity is achieved, as even in case of concrete breaks, the structure is unified.

The possibility to attach additional layer of geomembrane makes the product versatile. The membrane can be LLDPE, HDPE or PVC, depending on the project needs.

Membrane thickness can vary from 0,2mm to even 2,5mm.

The GCCM supplier provides a 30-year product general warranty.

**TILTEX is CE certified according to the following standards (System 2+)**



EN 13253



EN 13254



EN 13255



EN 13256



EN 13257



GCCM should be used for surface slope reinforcement according to the requirements specified below.

Essential characteristics				
Properties of GCCM <sup>(1)</sup>	GCCM 7	GCCM 9	GCCM 10	GCCM 12
Mass per unit area EN 14196	7600g/m <sup>2</sup> (±10%)	9600g/m <sup>2</sup> (±10%)	10600g/m <sup>2</sup> (±10%)	12600g/m <sup>2</sup> (±10%)
Thickness EN ISO 9863-1/-2	7,0 mm (±1mm)	9,0 mm (±1mm)	10,0 mm (±1mm)	12,0 mm (±1mm)
Tensile Strength MD/CMD	EN ISO 10319		20,0 / 20,0 kN/m (-2 kN/m)	
Elongation at break MD/CMD	EN ISO 10319		40 / 40 % (-10%)	
CBR Puncture Strength	EN ISO 12236		3,0 kN (-0,3 kN)	
Dynamic puncture resistance	EN 13433		0 mm (+1 mm)	
Protection efficiency	EN 14574		5,0 kN (-0,5 kN)	
Durability	EN 12226		NPD	
	EN 12224		NPD	
Dangerous substances	PN EN 12467:2016-8 5.6.2		NPD	
Additional characteristics				
Setting start	PN-EN 196-3		> 90 min	
Compressive Strength	PN EN 196-1		40 Mpa	
Bending Strength	PN EN 12467:2016-08 5.4.3		6,0 MPa – Class 1	
Water permeability	PN EN 12467:2016-08 5.4.5-6		No drop of water	
Durability against Freeze-thaw	PN EN 12467:2016-08 5.5.2		R <sub>L</sub> ≥ 0,75 Pass	
Durability against Heat-rain	PN EN 12467:2016-08 5.5.3		R <sub>L</sub> ≥ 0,75 Pass	
Durability against warm water	PN EN 12467:2016-08 5.5.4		R <sub>L</sub> ≥ 0,75 Pass	
Durability against Soak-dry	PN EN 12467:2016-08 5.5.5		R <sub>L</sub> ≥ 0,75 Pass	
Reaction to fire	PN EN 12467:2016-08 5.6		B-s1, d0*	
Resistance to Roots	PD CEN/TS 14416:2014		Passed	
Manning's Value	ASTM D 6460		n = 0,022	
Standard Roll Dimensions	Test Method		Value	
Width x Length	Typical		5,0 x 20 m	2,5 x 20 m 1,0 x 5,0 m
Quantity	Typical		100 m <sup>2</sup>	50 m <sup>2</sup> 5 m <sup>2</sup>

EN 13253, EN 13254, EN 13255, EN 13256, EN 13257 - (System 2+)

1. before hydration
  2. after hydration
- \*complies with EN 13501-1

TILTEX is sized to suit the construction needs, i.e. widths from 1,25 m to 5 m, and lengths of 5 m to 20 m. TILTEX has an update Declaration of Performance allowing the product to be used in construction. TILTEX is delivered and need to be store in the original manufacturer's packaging, laid horizontally on leveled and dry ground, in a dry, airy and dark place, protected from prolonged exposure to sunlight - as recommended by the manufacturer. No other loads shall be placed on the GCCM rolls. The storage area should be inaccessible to rodents.

---

**DELIVERY**

**07**



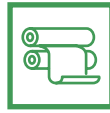
## 7. DELIVERY

TILTEX is delivered in rolls, in special packaging protecting them against moisture and UV, preferably PE sleeves. The sleeve must be tightly closed to prevent moisture from entering the sleeve.

EUROBENT liners are labelled according to EN ISO 10320 for easy identification after unloading and during installation. Each roll shall be marked with the following information:



Manufacturer's name



Product identification



Roll number

TILTEX is usually provided in rolls with a width of 5,0 m and a length of 20 m. Rolls can be also offered in other dimensions, depending on customer needs. The range of possible widths is 1 m to 5.0 m, and they can have the length specified by the customer. Average roll diameter is approximately 60 cm, and the weight is approximately 1000 kg. EUROBENT liners are wound on plastic tubes with an inner diameter of 100 mm. Every roll is packed in a plastic UV resistant sleeve.

Each roll is equipped into a set of two belts. It is recommended while unloading from the truck to put a steel pipe inside to prevent bending of the roll.



Rolls, which due to their weight and size require lifting devices during installation, must be wound onto a core in the form of a tube that allows a beam to be inserted in the core so that the roll can be deployed.



DELIVERY

---

**UNLOADING**

**08**

## 8. UNLOADING

The party directly responsible for unloading the rolls should refer to this manual prior to arrival of the material in order to make sure they have proper unloading equipment and know the procedure. The unloading and on-site handling should be appropriately supervised. During the unloading procedure all material lot and roll numbers should be recorded and compared to the packing list. In addition, each roll of TILTEX should also be visually inspected to determine if there is no perforation in the packaging or other visual material damage.

The exact nature and extent of the damage should also be indicated on the CMR / Bill of Lading along with the specific lot and roll numbers of the damaged materials. Photos of the damaged goods on the truck are required.

Unloading the truck at the construction site is carried out either by forklifts, wheel loaders, excavators or by means of built-in truck cranes.

A suitable crossbeam can be used also for the unloading. The crossbeam pipe (with a maximum diameter of 8 cm) is thrust through the core of the rolls and attached at the ends with chains, belts or ropes to the crossbeam. The unloading is carried out upwards.



If there is no crossbeam available, at least 2 belts are wound around the rolls. The unloading is carried out smoothly upwards or laterally via e.g. crane.

Another unloading option is a forklift, to which a stable mandrel is attached. The truck is unloaded from the back in this manner. Under no circumstances should the rolls be dragged from the truck since liners may be damaged significantly.

TILTEX may also be delivered in shipping containers. In these cases, different unloading equipment and techniques must be employed. Because of limited access to the rolls, it is usually necessary to utilize an extendable-boom forklift with a pole carpet (stinger) attachment.

The rolls are removed by inserting the stinger through the roll cores and lifting/pulling the rolls from the container. To each container we add several loading straps - thanks to that rolls can be tied up - it makes it easier to remove the rolls from the container.



UNLOADING

---

# AFTER DELIVERY INSPECTION

09



## 9. AFTER DELIVERY INSPECTION



1. Each roll shall be visually inspected when unloaded to determine if any packaging or material has been damaged during transit.
2. Repairs to damaged TILTEX shall be performed in accordance with installation manual:
  - a. Rolls with visible damage shall be marked and set aside for closer examination during deployment.
  - b. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant gluing tape prior to being placed in storage to prevent moisture damage.
  - c. TILTEX rolls delivered to the project site shall be only those indicated on manufacturer internal test reports (ITR).

Preserve integrity and readability of roll labels.



AFTER DELIVERY INSPECTION

---

# STORAGE

10

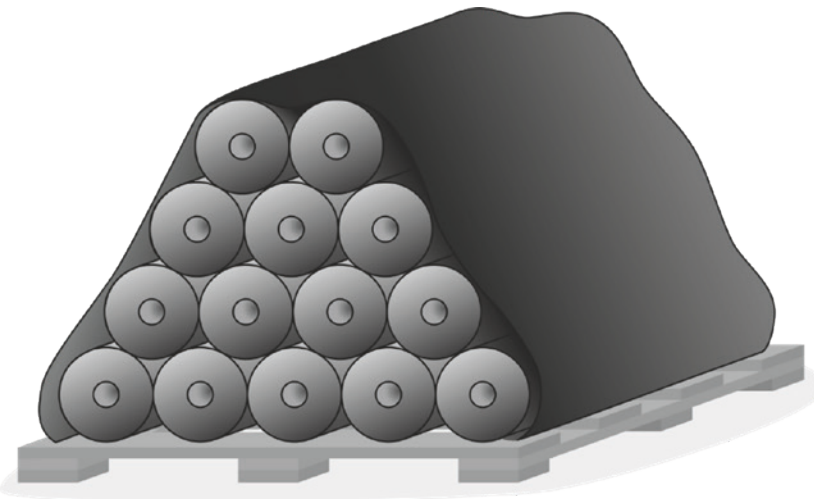
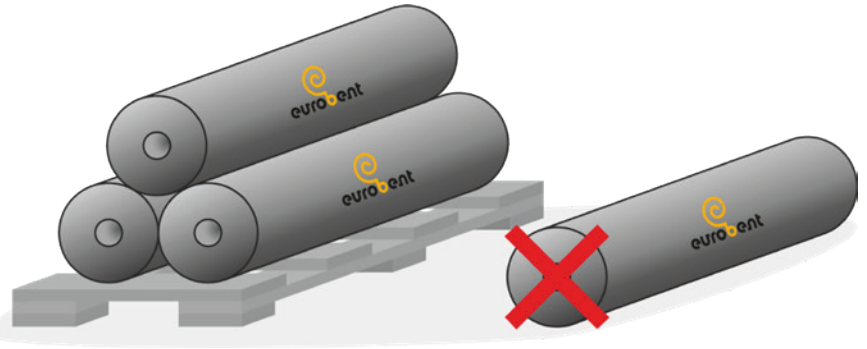


## 10. STORAGE

TILTEX is in rolls with a maximum width of 5,0 m and a length of 20 m. GCCM rolls are wound on tubes with an inner diameter of 10 cm. Every roll is packed in 2 layers of plastic, UV resistant sleeve.

The sleeves are closed with plastic bands. All rolls are equipped with a label containing the basic info: dimensions, lot and roll number.

- Each roll is equipped into a set of two belts. It is recommended while unloading from the truck to put a steel pipe inside to prevent bending of the roll.
- TILTEX rolls that are going to be stored for longer time before installation shall not be placed directly on the ground, but on pallets or similar constructions underneath.
- Rolls should not be stacked in more than 4 rows up.



- TILTEX should not be directly exposed to the bad weather conditions.
- TILTEX can be stored for 24 months with special care and in an ultra-dry environment.
- TILTEX should be stored under roof in dry areas until further use. Open the packaging sleeves only shortly before installation.
- If TILTEX packaging sleeves are damaged, immediately remove any moisture from the inside of the packaging, then seal the sleeves with a patch.



STORAGE

---

# INSTALLATION

11



## 11. INSTALLATION

TILTEX is in rolls with a maximum width of 5,0 m and a length of 20 m. GCCM rolls are wound on tubes with an inner diameter of 10 cm. Every roll is packed in 2 layers of plastic, UV resistant sleeve.

The sleeves are closed with plastic bands. All rolls are equipped with a label containing the basic info: dimensions, lot and roll number.



### 11.1. Subgrade Preparation

TILTEX will fit the underlying surface shape, therefore any sharp rock, organic matter and other objects shall be removed. The trench should have an even profile for ease of future preservation. Avoid empty voids.

The subgrade should be compacted to a relative proctor of at least 90% (it can be checked by the sand cone method). TILTEX can also be used to reinforce existing concrete structures.

It is important that the substrate under the mat is hardened compacted and free from large and sharp objects and vegetation.

### 11.2. Installation and positioning

TILTEX shall be placed on the flat and smooth ground so that no wrinkles or folds appear. Unroll TILTEX liner into the subgrade profile. TILTEX Plus shall be arrayed with geomembrane facing down. Start on the lowest point of the trench and overlap against the slope of the channel in the direction of water flow (like roof tiles).

For easier handling and positioning it is recommended to provide a lifting device which allows to lift the rolls with a

front end loader. The iron core may serve as a device for unloading as well as for installation of the liner.

The orientation of panels on slopes shall be parallel to the slope. The panels should be anchored to the trench at the top of the slope.

When setting subsequent layers ensure there is at least a 10 cm overlap between layers in the direction of water flow.

TILTEX Plus shall be arrayed with geomembrane facing down.

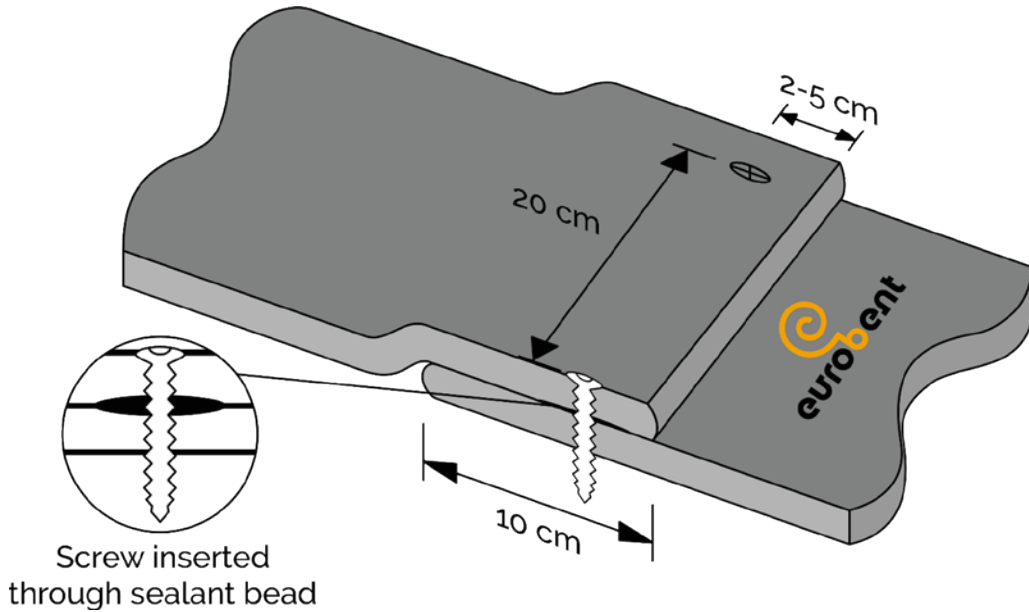
### 11.3. Watering overlaps

Before joining panels, be sure to hydrate the joint area of the bottom panel. This should be done before covering the area with the top panel. To do this, lift the overlap of the top panel and spray the bottom panel in the overlap area with water. Then you cover the overlap by laying whole the top panel on it. This ensures the overlap of the bottom panel to harden as well.

Doing only the final hydration would not let the water reach the overlaps and harden them. Therefore, the overlap of the bottom panel should not be covered without hydrating it first.

## 11.4. Joining

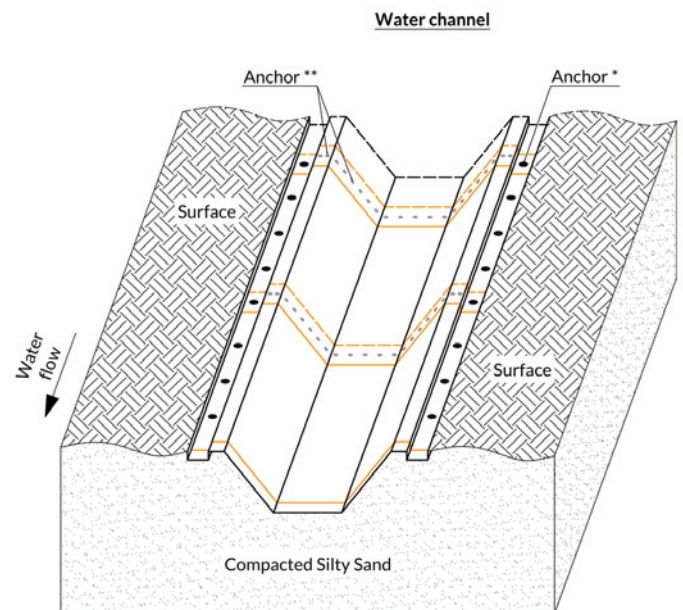
Stick screws or steel bars approx. 5 cm from the edge of the connection. Ensure they are sharp enough to penetrate the TILTEX. Nails length and spacing is dependable on soil conditions and application type – please contact Eurobent to select suitable materials and joining techniques. They should be applied at connections where possible to secure adjacent layers together.



## 11.5. Anchoring whole lined surface

Stick screws or steel bars approx. 5 cm from the edge of the connection. Ensure they have enough sharp point to penetrate the concrete liner. Nails length and spacing is dependable on soil conditions and application type. They should be applied at connections where possible to secure adjacent layers together.

Anchoring can be done with different types of anchors, of which we recommend those shown in the figure below.



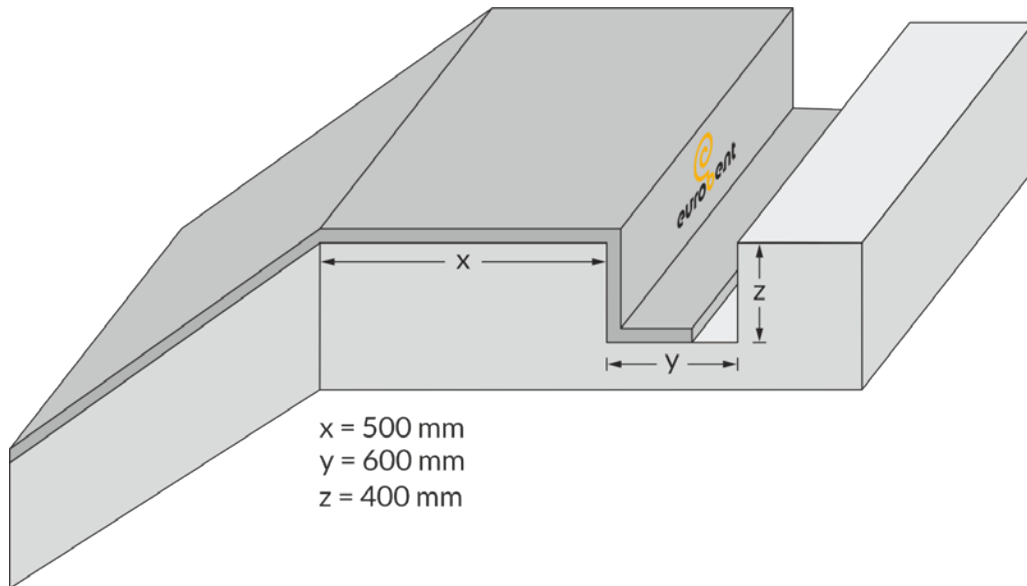
Anchor options	
*	**
<p>U-bar</p>	<p>TL-P4</p>
<p>J-pin</p>	

## 11.6. Anchoring TILTEX on the top of the slope

Stick screw the bolts or steel rods in the middle of the anchor trench in every 0,5 m.

Ensure they have enough sharp point to penetrate the concrete liner. Nails length and spacing is dependable on soil conditions and application type. They should be applied at connections where possible to secure adjacent layers together.

Anchoring can be done with different types of anchors, of which we recommend U-bars.



## 11.7. Selection of suitable anchoring materials

Depending on the substrate, we can offer several anchoring materials. If in doubt, contact Eurobent to choose the right one.

### Anchoring to soil:

**Anchor trench:** The edges of the TILTEX are best buried in the soil. To do this, an anchor trench must be made to prevent the TILTEX panels from being washed up and carried away. Such anchoring is primarily required at the top and bottom of the slope, along ditches and channels. We recommend making the ditch 50 cm deep, 60 cm wide and at a safe distance from the top of the slope. Once the edge of the TILTEX has been placed in the trench, it should be anchored and backfilled with topsoil or poured with concrete.

**Pins:** Eurobent recommends Gripple pins, but other pins may also be used, provided their tip will allow them to penetrate the TILTEX surface and their head is sufficient to hold the TILTEX panels. The length and spacing of the pins should be selected individually according to the site's terrain and soil conditions.

**Ground anchors:** For heavy loads and steep slopes, ground anchors should be used. Eurobent recommends Gripple anchors, but others can also be used. The condition is that they are chosen correctly so that they can penetrate and hold the TILTEX. The length and type of anchors, as well as their placement, is selected individually for the installation site taking into account the terrain and soil conditions.

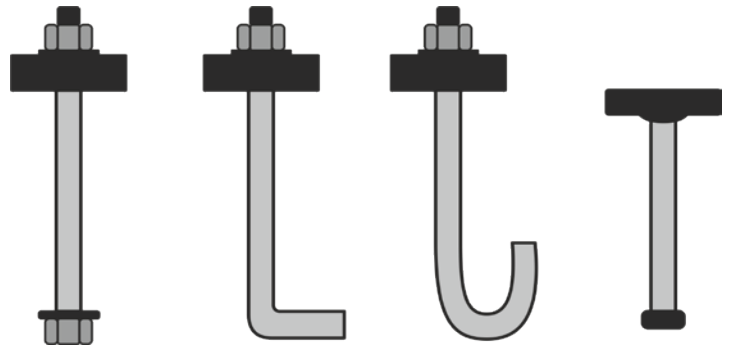




### Anchoring to concrete:

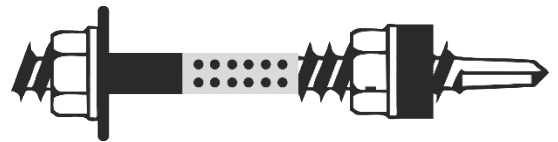
Masonry bolts and anchors for concrete: To fix TILTEX to concrete, use standard screws, nails or masonry anchors whose heads will enable TILTEX to be held. Their length should be selected individually. The head should not be smaller than 15 mm.

Mortar: Mortar can be used on the joints and edges of the TILTEX panels. It will allow you to anchor like an anchor trench, and seal the overlaps. The mortar adheres very firmly to the fibrous surface of the TILTEX. It should be applied to the moistened TILTEX surface.



### Anchoring to rock:

Rock bolts and anchors: On hard and rocky ground, use bolts or anchors suitable for it, the head of which allows the TILTEX to be held. The length and spacing of the anchors should be selected according to the pulling strength requirements and the design.



### Anchoring to steel:

Technical screws: TILTEX should be fixed to the sheet metal with self-tapping screws whose head allows the TILTEX to be held. If the screw head is small, washers should be used to prevent the liner from dragging.



Rings: For fixing TILTEX on steel mesh (e.g. on gabions), use steel rings. Rings come in different sizes and the selection of the correct one should be determined by the conditions on site. Hand-mounted rings or rings using a power tool can be used.

### Anchoring to wood:

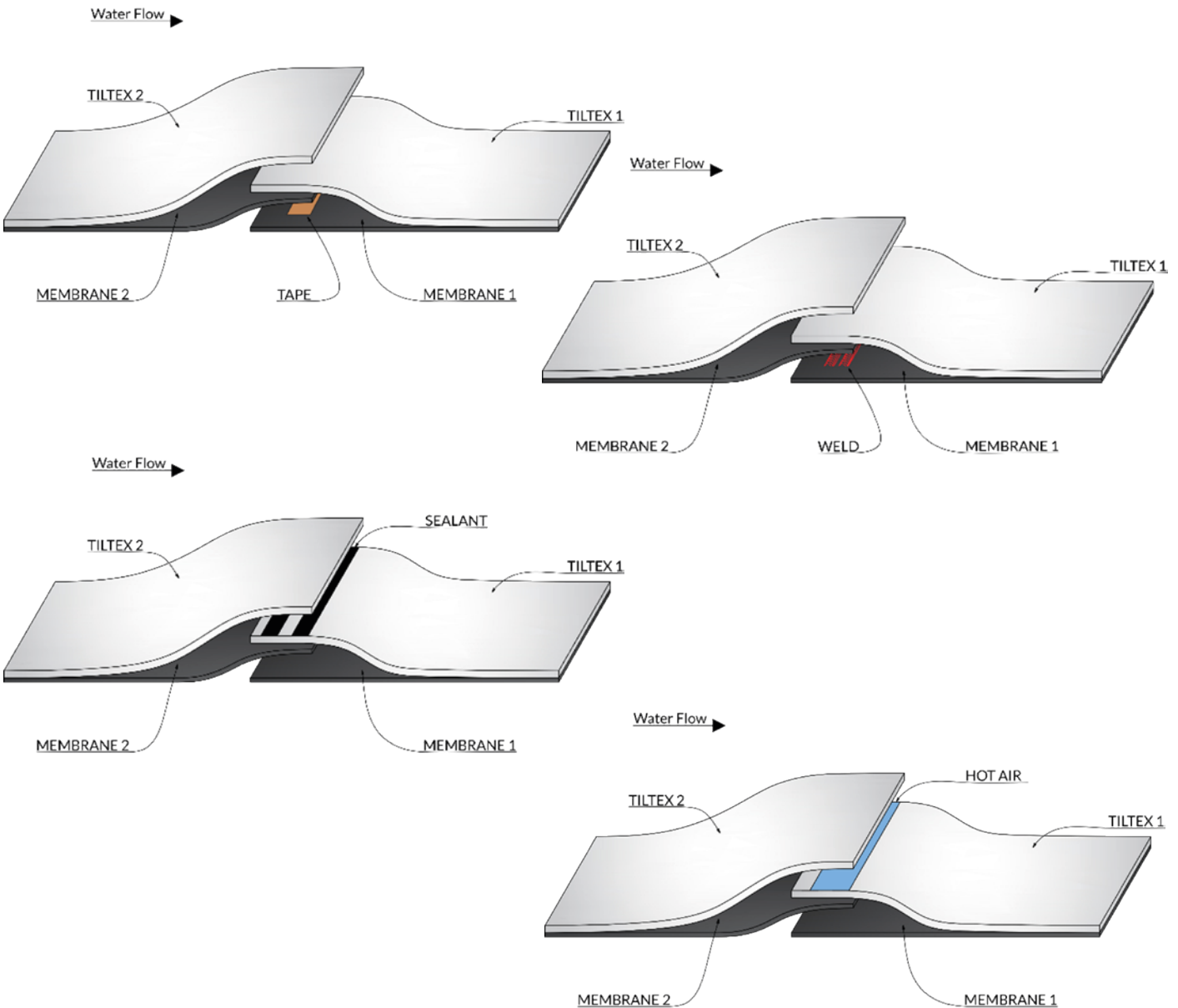
Screws, staples, nails or glue: TILTEX can be fixed to wood using one of the conventional fixing materials. TILTEX is a geosynthetic product that behaves like a non-woven fabric before being soaked. The anchoring material should be selected to protect the TILTEX from pulling out, so the head should be large enough. We recommend a minimum of 15 mm, or the use of a shim.





## 11.8. Overlapping TILTEX Plus

- a. TILTEX shall be folded so that the geomembrane can be visible.
- b. The surface of the geomembrane shall be cleaned using acetone or similar preparation. This action secures the integrity of combining. Clean membrane surface before combining is a must.
- c. The geomembrane of the panel 1 shall be covered with geomembrane of the panel 2, creating overlap.
- d.
  - i. Welding shall be done in accordance with geomembrane welding principles.
  - ii. For thin films, where welding cannot be used, use adhesive tape to join the individual panels together.
- e. After combining the geomembranes, TILTEX shall be unfolded, covering the geomembranes.
- f. The panel 2 shall be unfolded, covering first panel.



We recommend the use of sealant or hot air gun/gas flame, which is applied after the TILTEX panel is rolled up and before covering it with the panel 2. The overlap welding of the TILTEX panels increases the strength of the bond and maintains a uniform surface of the liner covering.

## 11.9. Inspection

After placement (before hydration) an authorized person should perform a thorough visual inspection of the EUROBENT liners rolls and seams.

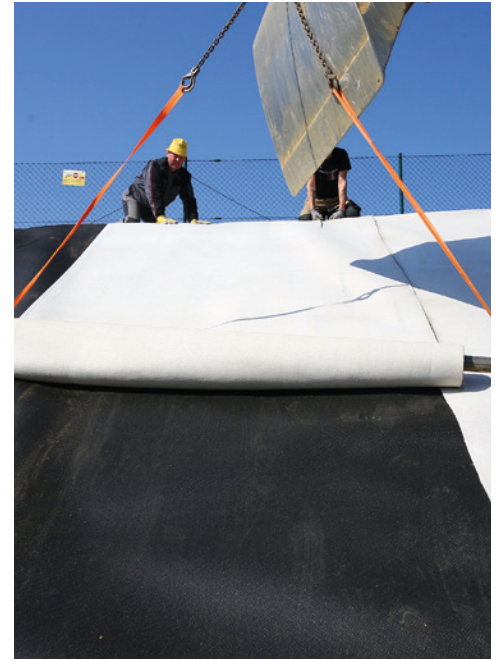
This should be done immediately after placement is completed.

The inspection should cover overlaps, alignment, penetrations, joints, detection of any defects including installation damage.

Detected Improperly Installed areas should be marked and fixed. Repairs should be inspected and approved by the project engineer or authorized person.

The inspection/repair process should be carried out as soon as possible to ensure that no defective area is left unrepaired.

In order to carry out the inspection correctly, an appropriate form is attached to this manual.



## 11.10. Hydrating

After fixing and connecting, spray TILTEX with water. The minimum water to liner ratio is 1:2. There is no risk of overhydrating. To ensure sufficient hydration, TILTEX should be re-sprayed after 1 hour from first hydration.

- The minimum water-to-mass ratio of TILTEX is 1:2.
- The best results are obtained using the spraying method.
- The use of a water high pressure on TILTEX may result in damage to the internal structure of the mat, so this should be avoided - we recommend spraying.
- It is recommended to use water that conforms to the mortar water standard (PN-EN 1008: 2004), but water from any source can be used after testing, also sea water.
- TILTEX must not be moved after the hardening process has begun.
- Do not walk on the TILTEX after hydration until it is hard enough.
- Any disturbance of TILTEX after its hydration may result in deterioration of its properties.
- The setting time of TILTEX is 90 minutes after watering.
- The setting time will be reduced in hot climates.
- Depending on outside temperature and quantity of water used for hydration TILTEX hardens within 24 hours but reaches full strength after 28 days.
- If TILTEX is not activated properly, the rehydration process should be repeated.
- The successful hydration of TILTEX depends on the site conditions. For example, in hot weather, the TILTEX should be irrigated more often and with more water, so that the watered surface remains visibly wet for several hours from first hydration.



INSTALLATION

### Hydration at low temperatures:

- When the temperature is below 5°C but above zero, TILTEX should be covered with a protective sheeting (e.g. foil) immediately after hydration.
- If the temperature is likely to fall below 0°C within the next few hours after installation, water with a minimum temperature of 15°C should be used for hydration and a suitable concrete setting accelerator added. Please contact Eurobent for selection of a suitable accelerator.
- We do not recommend installing and hydrating TILTEX at temperatures below - 4 °C or when it is clear that the temperature may drop to this low level within 24 hours.
- Installation of TILTEX on frozen ground is not recommended as ground movement can occur during defrosting and lead to the formation of voids under the mat, which can affect its proper performance.
- Please note that curing TILTEX at temperatures below 0°C may result in weakening of its final properties.

### Hydration at high temperatures:

- In hot weather, where rapid evaporation of water can occur, we recommend hydrating TILTEX after sunset, when the temps are already starting to drop.
- After hydration, we recommend covering the TILTEX (e.g. with foil) to reduce evaporation.
- Even after covering with TILTEX, we recommend monitoring the moisture status of the carpet and possibly re-hydrating if the top nonwoven is already dry - this process is crucial in the first 24 hours.

## 11.11. Setting

Depending on outside temperature and quantity of water used for hydration, GCCM needs minimum 24 hours to get hard and be ready for use.



INSTALLATION

---

**EQUIPMENT  
RECOMMENDED  
ON SITE**

**12**



## 12. EQUIPMENT RECOMMENDED ON SITE

The QCA inspector shall verify that proper handling equipment exists which does not pose any danger to installation personnel or risk of damage or deformation to the liner material itself.

Suitable handling equipment is described below:

1. **Spreader Bar Assembly** – shall include both a core pipe or bar and a spreader beam. The core pipe shall be used to uniformly support the roll when inserted through the liner core while the spreader bar beam will prevent chains or straps from chafing the roll edges;
2. **Stinger** – a rigid pipe or rod with one end directly connected to a forklift or other handling equipment. If a stinger is used, it should be inserted to its full length into the roll to prevent excessive bending of the roll when lifted;
3. **Straps** – a properly structured and supported pole or “carpet puller” can be used to unload TILTEX rolls onsite. As an alternative, straps with appropriate lifting capacity, located across the roll, can be used as one of the method of lifting and unload TILTEX rolls;
4. Excavator (tracked or wheeled) or front-end loader. Equipment should be suitable for the anticipated load;
5. Carpet knife or safety knife;
6. Felt pens or other pens to write on geotextiles;
7. Measuring tape;
8. Broom;
9. Tape;
10. Geomembrane welding machine (only in case of TILTEX Plus);
11. A water source that will allow TILTEX to hydrate, according to the hydration instructions.



Assembly of TILTEX rolls to the slope may be accomplished by means of:

- anchor trench made on the crown of the slope with the size of e.g. 30x40 cm,
- steel pins with the diameter of e.g. 8 mm, „J” or „U” shaped, with arm’s length of min. 25cm, in the quantity depending on the slope inclination,
- mechanical soil anchors with a pressure plate.
- glue - sealant

The materials for fixing TILTEX should be stored in dry places with protection against excessive corrosion of steel elements.

---

# MAINTENANCE

13

## 13. MAINTENANCE

Once TILTEX is installed, there is usually no cleaning or maintenance required.

For example, in channel lining applications, TILTEX covers both banks and slopes, preventing silt build-up and accumulation.

TILTEX has also high resistance to vegetation rooting in the channel, reducing the risk of blockages and subsequent leaks.

However, applications that in their design have features conducting silt buildup in the channel will require periodic cleaning and maintenance to remove impurities.

In all water management applications, the TILTEX surface is a natural substrate for moss growth, but this does not adversely affect the properties of the material.

It can also happen that if the TILTEX panels are not properly bonded, the fine windblown gravel builds up in these spaces and this in turn creates the conditions for unwanted vegetation to grow. This deposit must then be removed, primarily to prevent rooting vegetation from weakening the joint quality and to prevent blockages from forming.

In the case of low-gradient and periodically dry canals, debris carried by the wind, such as leaves, may accumulate in the top, but is most often washed away during e.g. storms; this debris may need to be removed occasionally if the water flow is not sufficient to provide the treatment function.

In any case, periodic inspection of TILTEX lined areas is recommended.

There are three levels of surface maintenance: manual (brushing and snow removal), powered (pressure washing and grubbing) and equipment maintenance (excavators and dredgers).



### 1 Manual maintenance

A plastic brush can be used to remove debris and sweep it from TILTEX surface. In areas where larger amounts of debris accumulate, a shovel is recommended. Brushing and shoveling should be done in the direction of the overlaps to avoid directing debris into the joints.

### 2 Powered maintenance

Vacuuming and mechanical water jet spraying can be used on the laid TILTEX mat to remove finer surface debris and unwanted moss growth. Pressure washing of the top layer of TILTEX should be done very carefully due to the risk of abrasion of the upper surface fibers of the TILTEX.

### 3 Maintenance with heavy equipment

For larger projects and where location and access allow, it may be practical to use machinery or debris removal equipment, such as an excavator. However, care must be taken not to damage the TILTEX surface.

Light equipment should be used to dredge TILTEX lined channels and it is important that dredging is carried out by a qualified operator and only in the direction of overlapping joints, taking care not to damage the integrity of the joints and the mat surface.

Ensure that the excavator tracks are kept at least 0.5 m from the channel crown to avoid damage to anchor trenches.



  
KEEP ROLLING





Eurobent Sp. z o.o.  
Kliczkowska 42  
58-100 Świdnica  
Poland

tel. +48 74 852 13 19  
[www.eurobent.com](http://www.eurobent.com)  
[office@eurobent.com](mailto:office@eurobent.com)