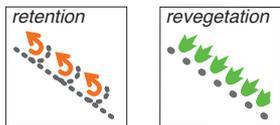
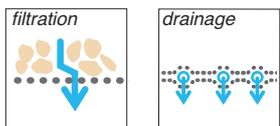
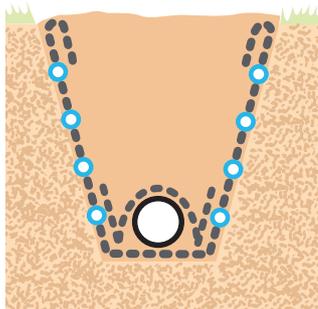
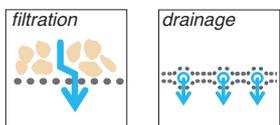
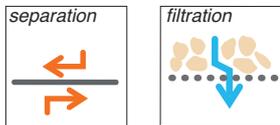




Embankment stabilization



Separation and filtration of material layers

▲ to separate, filter, and improve bearing capacity, the layers of granular material shall be separated by a thermally bonded, needle-punched nonwoven geotextile of the **bontec NW optim** type, with an optimal 40% to 50% elongation at break, and a modulus of resistance 20 kN/m for 100 grams at failure, as per NFENISO 10319. Thanks to the thermally bonded structure, the pore size in the soil shall be stable for controlled filtration.

▲ the surface of the product shall be slightly rough to increase the “grip” with the soil and improve the bearing capacity.

▲ the manufacturer, with ISO 9001 certification, shall have an engineering department capable of advising the designer and installer.

Trench drains

▲ trench drains shall be executed using a geocomposite of the **teradrain** type positioned in V form against the walls of the trench; a main drain shall be placed at the bottom of the trench on the geocomposite, and covered with a 1-metre strip of filtering geotextile such as **Bontec NW 16 optim**.

▲ the geocomposite shall consist of a combination of needle-punched nonwoven geotextiles and a network of regularly spaced 20 mm perforated mini-drains.

▲ the product shall have a filtration opening of 78 µm on the external filtering surfaces, supported at all points by the nonwoven draining core; the whole system shall be self-healing in the event of localized tearing.

▲ the vertical drainage capacity of a mini-drain shall be 720 litres/hour. The circular shape of the mini-drains shall enable them to resist very high pressures of 900 kPa in the soil, and not collapse in the long term.

▲ the ultimate tensile strength of the product shall be 28 kN/m with a 45% elongation at break.

▲ the mass per unit area shall be 650 g/m².

▲ the product must be sized by computation.

Cellular geocontainer drainage blanket

▲ in order to capture seepage arriving via the embankment, prevent erosion failure and stabilize the covering of materials, the drainage blanket shall be executed using a needle-punched, nonwoven, cellular geocontainer structure such as **teracro**.

▲ the product shall have a filtering base on which are bonded twisted strips forming filtering barriers 13 cm high, and a network of regularly spaced 20 mm perforated mini-drains.

▲ the product shall have a filtration opening of 100 µm, supported at all points by the nonwoven draining core; the whole system shall be self-healing in the event of localized tearing.

▲ the vertical drainage capacity of a mini-drain shall be 720 litres/hour. The circular shape of the mini-drains shall enable them to resist very high pressures of 900 kPa in the soil, and not collapse in the long term.

▲ the system in ready-to-use rolls shall be unrolled on the embankments and head-anchored in a trench.

▲ the materials shall be added to a minimum thickness of 15 cm.

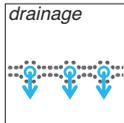
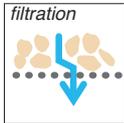
▲ the product and anchoring shall be sized in accordance with the XP G38-067 standard.

▲ the manufacturer, with ISO 9001 certification, shall have an engineering department capable of advising the designer and installer.

The technical specifications may be changed at any time. Please make sure you have up-to-date technical data sheets. **teragéos** is not liable for the use of its products.

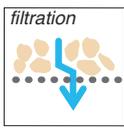
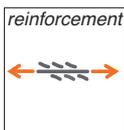


Embankment stabilization



Drainage trenches

- ▲ the drainage trenches shall be executed using a geocomposite of the **teradrain** type consisting of a combination of needle-punched, nonwoven geotextiles and a network of regularly spaced 20 mm perforated mini-drains.
- ▲ the product shall have a filtration opening of 78 µm on the external filtering surfaces, supported at all points by the nonwoven draining core; the whole system shall be self-healing in the event of localized tearing.
- ▲ the vertical drainage capacity of a mini-drain shall be 720 litres/hour. The circular shape of the mini-drains shall enable them to resist very high pressures of 900 kPa in the soil, and not collapse in the long term.
- ▲ the ultimate tensile strength of the product shall be 28 kN/m with a 45% elongation at break, so as to withstand the application tension.
- ▲ the mass per unit area shall be 650 g/m².
- ▲ the product must be sized by computation.

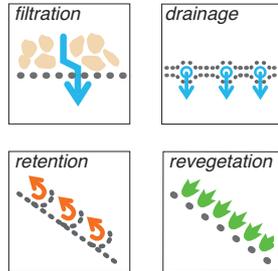


Reinforced earth retaining structure

- ▲ the construction of stiffened embankments and backfill retaining structures shall be executed by the reinforced earth technique, with alternating layers of compacted materials and reinforcing geotextiles.
- ▲ the reinforcing geotextile shall be a high-modulus woven polyester sheet relatively insensitive to creep, of the **bontec Force HS** type, of ultimate tensile strength 100 to 600 kN/m as per NFE-NISO 10319, 10% elongation at break, and modulus of resistance 1000 to 6000 kN/m. The pore sizes shall be less than 400 µm.
- ▲ in a long-term application, the design working load must not exceed one-third of the product's nominal strength: verify the sizing in accordance with the XP G 38-064 standard.
- ▲ in the case of a soil that is lime-treated or aggressive for polyester, the **bontec Force SG** product range shall be in woven polypropylene, with an ultimate tensile strength of 16 to 340 kN/m as per NFENISO 10319, and an elongation at break of 8% to 26%. The pore sizes shall be less than 540 µm.
- ▲ in a long-term application, the design working load must not exceed one-sixth of the product's nominal strength: verify the sizing in accordance with the XP G 38-064 standard.
- ▲ in the case of a soil showing high mechanical damage for the woven geotextile reinforcement on compacting, or in the case of a soil requiring filtration and drainage, the reinforcing sheets used shall be in the form of a geocomposite reinforced with high-modulus polyester reinforcing cables, of the **teraforce** type, protected on either side by a nonwoven polypropylene sheet performing the hydraulic functions of filtration and flow rate capacity, and the mechanical function of protection from puncturing and damage.
- ▲ the nonwoven mass shall be 400 g/m² and the elongation at break less than 10%.
- ▲ the product shall be sized in accordance with the XP G38-064 standard.
- ▲ the manufacturer, with ISO 9001 certification, shall have an engineering department capable of advising the designer and installer.



Embankment stabilization



Flexible drainage channels, trenches, gutters

▲ to collect runoff water at the top and bottom of the embankment, before they can undermine the slope, watertight recovery channels shall be executed, either visible or covered with earth.

▲ the visible channels of the **teracan** type shall have UV resistance, a CBR puncture resistance of 8 kN, a dynamic puncture resistance of 0 mm, an ultimate tensile strength of 50 kN/m, and a mass per unit area of 1500 g/m².

▲ the product shall consist of an impervious membrane in polyethylene protected on the underside by a puncture-resistant geotextile. This waterproof part can be used to line the ditch. The upper part shall be reinforced by a polyethylene geogrid and a nonwoven geotextile, to increase its mechanical strength and protect the waterproofing system.

▲ the edges of the roll, intended for anchoring and buried in the soil, shall be exclusively filtering so as to prevent their undermining.

▲ the product shall be supplied ready-to-use, in 2 m, 3 m or 4 m widths.

▲ roll packaging: width x 25 m.

▲ the earth-covered channels of the **terapro FOS** type shall have a CBR puncture resistance of 4 kN, a dynamic puncture resistance of 0 mm, an ultimate tensile strength of 30 kN/m, and a mass per unit area of 1000 g/m².

▲ the manufacturer, with ISO 9001 certification, shall have an engineering department capable of advising the designer and installer.