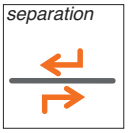
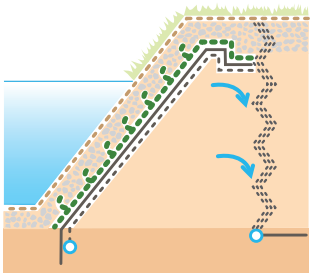
Dykes



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.



Stabilization of the upstream cladding

▲ in order to stabilize the small 100-250 mm breakwater rockfill blocks or the top soil and promote root development, a needle-punched, nonwoven cellular geocontainer structure of the teracro type, having a filtering base on which are bonded twisted strips forming filtering barriers 13 cm high, 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.

▲ a woven sheet in natural coconut fibres of the teranat type, 500 g/m², shall be unrolled and tacked to the surface of the earth so as to limit the impact of surface runoff pending plant shooting.

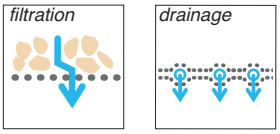
Waterproofing of the upstream cladding

▲ waterproofing shall be executed with a heat-sealable geomembrane barrier such as teraline, in plasticized PVC, 20/10th mm thick, of light grey colour, UV stabilized and having a health compliance certificate (French “ACS”), of ultimate tensile strength 16 MPa, with 300% elongation at break.

▲ joining shall be performed by a company having ISO certification for the installation of geomembranes, and Asqual-certified welding and site management personnel.

▲ the site report shall demonstrate the conformity of the work with the Asqual references for calibration of welding machines and resistance of test samples.

▲ all welds shall be inspected by compressed air and identified on an as-built drawing.



Chimney drain

▲ the dyke-structure chimney drain 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.

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

▲ the product must be sized by computation.

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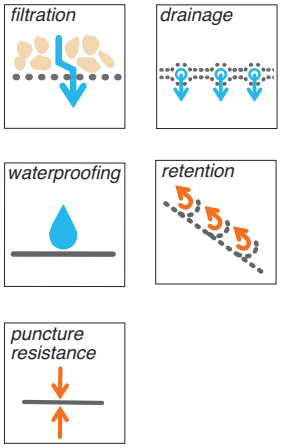
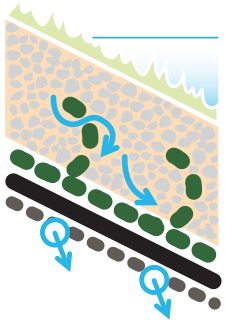
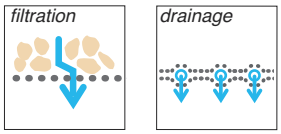
Dykes



Draining, puncture-resistant, waterproofing base

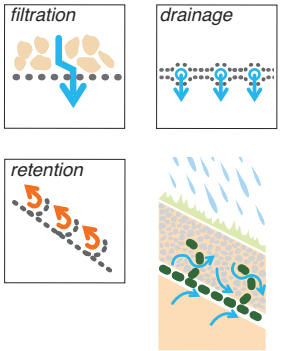


▲ the draining, puncture-resistant, geotextile base of the **teradrain** type shall be executed using a geocomposite consisting of a combination of needle-punched nonwoven geotextiles and a network of regularly spaced 20 mm perforated mini-drains.
▲ the product shall have a filtration opening of 100 µm on the filtering surface on the soil side, 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 60 kN/m with a 100% elongation at break.
▲ the CBR static puncture resistance shall be 10 kN, with a dynamic perforation of 0 mm, so as to perform the mechanical protection function.
▲ the mass per unit area shall be 1200 g/m².
▲ the product must be sized by computation.

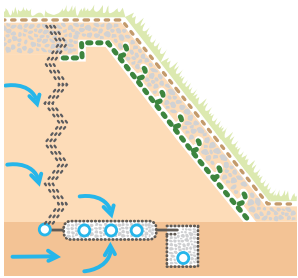


Downstream drainage blanket

▲ in order to capture seepage under and through the dyke and prevent erosion failure, the downstream drainage mat 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, and 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 perform the separation function.
▲ the mass per unit area shall be 650 g/m².
▲ the product must be sized by computation.



Stabilization of the downstream cladding and revegetation



▲ in order to stabilize the top soil and promote root development, a nonwoven, needle-punched cellular geocontainer structure of the **teracro** type having a filtering base on which are bonded twisted strips forming filtering barriers 13 cm high, shall be unrolled on the embankments and head-anchored in a trench.
▲ top soil shall be added to a minimum thickness of 15 cm.
▲ the product and anchoring shall be sized in accordance with the XP G 38-067 standard.
▲ the manufacturer, with ISO 9001 certification, shall have an engineering department capable of advising the designer and installer.
▲ a 500 g/m² woven sheet in natural coconut fibres, of the **teranat** type, shall be unrolled and tacked to the surface of the earth so as to limit the impact of surface runoff pending plant shooting.

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