



COMBINED HYDROMULCHING Ref : HMC "BS 1.5



CCTP BASE BLOCKED SYSTEM PLANTED SOIL 1.5

Type :

Slope reinforcement combining the Platipus anchor system with hydromulching is recommended in the following cases:

- Severe erosion resulting in one or more instability(ies) or surface landslide lens(es) with a depth ≤ 80 cm, slope ≤ 70°.
- On soft ground, not solid
- No need for geotechnical studies (stability to large landslide verified)
- With average and poor soil constraints

WARNING :

Each project has its own specificities, which sometimes require an adjustment in the quantities of inputs, particularly anchors. A load survey using our test equipment can be carried out on site to fine-tune the layout of the anchors.

The data contained in this document are averages used on similar projects.

For more information, the Euro-Tec technical team is at your service - www.euro-tec.fr

Scope of application :

This SCC describes the procedure for stabilising an embankment and/or blocking a This is achieved by combining durable, flexible anchors with a "sliding lens".





1.5 m, a reinforcement mesh and a geotextile for vegetation, which will then be sown by HYDROMULCHING.

This combination not only increases mechanical resistance to tearing out, but also manages atmospheric run-off while limiting the visual impact.

1- DESCRIPTION OF SUPPLIES

1-1 Characteristics of BIODEGRADABLE GEOTEXTILE

The geotextile will be of the EURO-TEXTILE CP 400 type or equivalent in accordance with the characteristics described in the table below.

CHARACTERISTICS	
Type of fibre	100% coconut
Origin	India
Construction (No. of strings per dcm ²)	4.5 x 4.5
Permeability of coir structure (%)	64

1-2 Characteristics of DELTAX mesh®

This is a high-performance alloy steel mesh consisting of a 2 mm wire, with a grade higher than 1770 MPa and covered with an Al/Zn alloy coating with a minimum thickness of 150 kN/m^2 .

It has a mesh size of 101 x 175 mm with an inscribed diameter of 82 mm and a tensile strength of over 50 kN/ml.

The plies are joined together using 4 mm high tensile strength wire staples, which ensure that all forces are transmitted to the adjacent plies.

The top, bottom and side edges of the mesh will be reinforced with Ø10mm galvanised steel edge ropes attached to the mesh with staples every two meshes.

PERFORMANCE	
Tensile strength, strain (ASTM D4595-86)Production direction (kN/m)	53
 Crosswise (kN/m) 	20





Strain resistance (ASTM A975-11)	
 Direction of production (%) 	65mm 6.5
Crosswise (%)	



DELTAX® installation

DELTAX® mesh comes in rolls 3.9 m wide by 30 m long. Its low weight (600g/m²) makes it easy to transport, store and handle. Each roll can be handled by two people.

- 1. The installation area must be free of any gullies, coarse elements or vegetation that would make it difficult to position the single-twist mesh It must be ensured that it fits perfectly over the entire treated surface and that it is in perfect contact with the EURO-TEXTILE CP 400.
- 2. The sheets are unrolled in the direction of the slope, perpendicular to the foot of the embankment, then stapled together using binding staples or secured with an overlap between each anchoring.
- 3. A system equally spaced anchors will be used to secure it to the ground,





1-3 Anchor characteristics

Platipus "S4" type anchor or equivalent Features :

- S4 aluminium anchor, standard: BS EN 1706:2010, aluminium & aluminium alloy
- Ø 3.5 mm galvanised cable, BS EN 12385:2002
- Anchor surface area 8,200 mm2
- Minimum anchoring depth 1.2 m

Visual of the "S4" anchor: Euro-Tec/Platipus



Anchor specifications are given in the Technical Report:







1.4 - Characteristics "DUAL" HYDROMULCHING supplies

1-4-1 Description of "pedogenesis accelerator" supplies

■ VALOR-SOIL pedogenesis accelerator or equivalent.

VALOR-SOIL is a fibrous complex that acts as a pedogenesis accelerator, applied at the same time as hydromulching seeding to establish a herbaceous layer on poor, leached, draining or contaminated substrates as an alternative to a massive addition of topsoil.

Composition

* Bark fibre defibrated using the method 6	60 %	
* Wood fibre defibrated using the HORTIFIBR	E method : 33 %	
* Mycorrhizal TRILLIS biochar :	4	. %
specific surface area >420 m²/g according to t	the <i>Emett and Teller</i> method	
minimum of 50 propagules per gram of Glomu	us intraradices	
* Freezing agent (Cyamopsis tetragonoloba) :	3	%

Carbon sequestration :

Biochar at a dosage of 150 kg/ha enables 364 kg/ha of CO2 to be sequestered in the soil. Certification of biochar carbon credits by PURO EARTH

1.4-2 supplies of "seedlings" by HYDROMULCHING

1-4-2-1 Seeds

The company will prove the origin of the herbaceous species in the mixtures by means of the certificates of origin issued by the Service Officiel du Contrôle des semences (SOC) and marked on the seed bags.

These certificates, which are less than 6 months old, indicate for the certified species :

- The supplier's name or code,
- The batch number
- Species and variety

After each job, the contractor must provide the client or project manager with all the information needed to check the quality and quantity of the seeds used (SOC labels).





1-4-2-2 Soil conditioners

All fertilisers and soil improvers must comply with EEC regulations.

Germination activator: VEGE-MAX or equivalent
 Concentrated liquid supply of humic acids and lignosulphonic acids.
 100% soluble.

VEGE-MAX is a soil improver with a high C/N ratio that maintains, improves and protects the physical and chemical properties, structure and biological activity of the soil.

At the soil-root interface, VEGE-MAX strengthens the clay-humus complex, improving the soil's air/water balance, water retention capacity and cation exchange capacity (CEC).

Composition:

Dry matter	21 %
Organic carbon (corg)	10.1 %
Corg/N	20.2
Total potassium oxide (K2o)	5 %
Electrical conductivity	150 mS/m
pH value	13

 Organo-mineral fertiliser (NFU 42-001) type VERT-EXPERT NATURE or equivalent

Obtained from plant and animal organic matter including algae, castor oilcake, vegetable oilcake and C3 sterilised animal powders.

Composition:

Dry matter content (weight of OM / raw product)		90%
(fruit cake and pulp, composted poultry manure, etc.)		
Organic matter on raw product (rate)	50%	
Organic mineral fertiliser NPK 6-3-6 + 0.5 FER		NF U42-001
Total nitrogen (N) :		6 %
Of which organic :		5.5 %
Phosphorus :		3%
Potassium :		6%





1-4-2-3 Roofing products

■ EURO-MAT "FGM" fibrillar erosion-resistant membrane or equivalent

A EURO-MAT fibrillar membrane is a fibrous complex applied by hydromulching, composed of fibrous materials stabilised with binders and colloids - germination and growth activators are also incorporated.

Formulation :

Raw materials : Betula payrefera / Populus tremuloides / Pinus % wood fibre : 75 % +- 2% Interlockingreinforcement fibre: organic 9% +/- 1%. % Binder / activator : 15 % +/- 1 % % Traceur : Green or Natural % Water retention capacity / dry weight (ASTM D7322) 1500

1-4-2-4 The water in the hydraulic mixture

The water used to make up the hydraulic mixture must have chemical characteristics compatible with the germinative activity of the seeds and the emergence of the seedlings.

The Company is responsible for obtaining the necessary authorisations to pump water.

Before the start of the worksite, the Company must provide the project owner, without the latter being held liable, with proof of the pumping authorisations obtained from the competent authorities.





2- DESCRIPTION OF IMPLEMENTATION

1- Preparing the substrate

Level the substrate to create a flat surface free from vegetation, roots, stones etc. and fill in any holes or gullies. The substrate must be stable and properly compacted, particularly if the areas are backfilled.

2- Laying the CP 400

The geotextile is packaged in such a way as make it easy to transport, store and handle - No heavy equipment is required for installation, as each roll can be handled by one or two people.

Position the geotextile perpendicular to the foot of the slope - Stretch the geotextile in such a way that it does not wrinkle, while leaving it sufficiently mobile to "follow" the micro-relief of the substrate. The geotextile is then staked or stapled to keep it in close contact with the substrate. This operation is essential and ensures the uniform development of the herbaceous layer.

3- Laying the mesh **DELTAX®** coverings

Unroll the mesh perpendicular to the foot of the embankment, ensuring an overlap of 0.15 between the strips.







4- Installation of "S4" anchors

4-1 Specific installation tools

- A thermal pile driver

A sinking rod

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S4" anchors are driven using a thermal pile driver and a driving rod, which are readily available for hire or sale.



The equipment is preferably fitted with a petrol engine, which is fully in line with a CSR approach that aims to protect people by limiting emissions that are sources of fine particles in particular, and by limiting noise.





Cric de serrage – SJ5



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Drill the "S4" anchors (photo below) to a depth of 1.30 metres, creating a mesh every 1.44 m^2 or according to the layout plan provided (example below)





Layout plan

Using a manual or thermal pile driver or an excavator fitted with an HWB and the appropriate driving rod, drive the anchoring system into the ground to the required depth:







Remove the press rod from the ground either by hand or using the removal tools:



Place the support plate and sleeve through the cable. Push the sleeve _____against the floor to hold the system in place _____



Position the lever on the support plate :







Cut off any excess cable. Repeat steps 1 to 4.1C along the entire slope until the surface protection material is clamped between all the anchors. Install additional anchors if necessary:



5- Implementation of "DUAL" HYDROMULCHING

Seeding will be carried out by HYDROMULCHING using specific equipment of the EuroMulcher type, complying with the EC directive defining requirements in terms of health and safety (Directive 98/37/EC) and the compatibility of construction site equipment with electromagnetic waves (Directive 98/336/EC). An EU plate attesting to compliance with these directives must be affixed to the equipment and a certificate of approval must be given to the SPS (health and safety coordinator).

The equipment will preferably be fitted with a petrol engine, which is fully in line with a CSR approach that aims to protect people by limiting emissions that are sources of fine particles in particular and by limiting noise.

To ensure a "neat application that respects the works and ancillary facilities, the equipment will also be fitted a semi-rigid hose reel, a shut-off valve and removable nozzles.

A description of the equipment and the CE approval certificate must be attached to the tender.





5-1 Phasing implementation

HYDROMULCHING "DUAL" is applied in 2 passes, leaving some drying time between the two.

- 1st pass with "Pedogenesis accelerator" supplies
- 2nd pass with "Hydromulching" supplies

A third "reinforcement" pass will be made 6 to 12 months after the "SEMIS" pass, using supplies from art 1-3-2 "second pass".

5-2 Dosages per hectare PASSAGE "Pedogenesis accelerator

It is applied in one pass:

	First
	pass
VALOR-SOIL pedogenesis accelerator (Bt/ha)	260

5.3 - Dosages per hectare "sowingby HYDROMULCHING

It is applied in two passes, with a "top-up6 to 12 months after the initial HYDROMULCHING.

	First pass	Second Passage
Euro-seeding mixture ref (Kg/ha)	250	-
VEGE-MAX growth activator 5L/ha)	50	50
Fertilizersorgano-mineral VERT-EXPERT "NATURE (kg/ha)	600	1 000
Fibrillar anti-erosion matrix EURO-MAT FGM (Bt/ha)	176	

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Principle cross-section COMFORTING HYDROMULCHING solution Ref: "HMC - BS



Case studies COMFORT HYDROMULCHING following slip lens Ref : " HMC - BS " SNCF 69 - Designed by FOURNAN / ERECA - 2020





