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FullService
GREEN SOLUTIONS

Systems, products and know-how
for a better environment

EROSION CONTROL SYSTEMS

BIONETS, BIOMATS AND OTHER SYSTEMS FOR THE EROSION CONTROL AND THE SOIL PRESERVATION

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Soil erosion is a natural process defined as the wearing away of the top layer of soil where the soil particles making up the top-soil are worn away due to water. The main factors that influence erosion are rainwater, wind and the concentration and the down-flow of water on slopes. Even though this is a process which is mostly natural, it is often aggravated by human activities.

The erosive process can be diminished and largely avoided by protecting the soil and by creating a support for vegetation.

This is why **we at Full Service offer natural products such as bionets, biomats and other systems that can protect the soil against runoff by facilitating the settlement of the vegetation, that is the real anti-erosion system**.

BENEFITS OF BIOMATS AND BIONETS

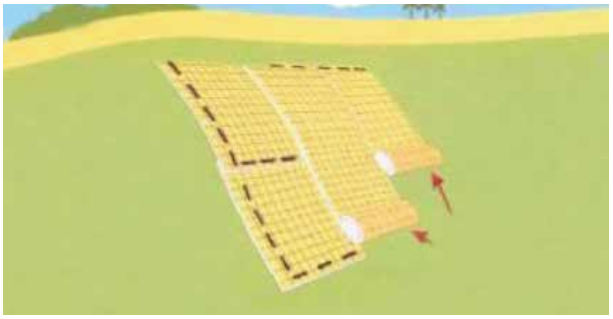
- HIGH **WATER HOLDING CAPACITY**
- They **PROTECT THE SOIL** against erosion
- They create a **MICROCLIMATE IDEAL FOR GERMINATION**
- Thanks to their decomposition over time, **THEY INCREASE SOIL FERTILITY**
- **THEY SUPPORT THE VEGETATION GROWTH**

DIFFERENCES BETWEEN BIONETS AND BIOMATS

Bionets are composed of natural coir fibers, jute or sisal, woven or knotted so as to create an **open structure** that can adapt to the substrate.

Biomats are composed of layers of straw, coir, straw/coir, wood or other biodegradable fibers assembled in order to create a **half-open weaved** and deformable structure.

APPLICATION AND INSTALLATION GUIDE



PHASE 1 > Site preparation The site has to be prepared by removing materials such as stones, debris, etc., that could compromise the quality of the application.

PHASE 2 Apply the bionet at about 30 cm from the top of the slope and fix the net with a staple every 30 cm. Bury the upper part of the net for at least 30 cm.

PHASE 3 Unroll the net downward to the slope as shown in the picture. Apply staples every 60-150 cm depending on the situation (on the slope and on the wind). Don't drop the net.

PHASE 4 To connect a new roll, overlap the end of the previous roll on the new roll for 10-15 cm. This will enable a certain protection from the opening of the join in case of extreme hydric flows.

PHASE 5 The lower part of the bionet has to be fixed to the soil by applying a staple every 30 cm.

The BIONETS

Bionets are 100% biodegradable and ecofriendly, they last from 2 to 6 years and they absorb water. The plait of the mesh eliminates the erosive effect of the water that flows on the surface, thus protecting the soil and the seed against runoff. Their open structure fosters the vegetative growth and their outstanding duration and tensile strength makes them suitable to solve serious erosion problems, even in case of high slopes.

Bionets are a temporary solution, so after the application it is better to foresee a seeding, better if through hydroseeding.

BIONET 500

JUTE FIBERS BIONET

The loose and soft plaits that compose the mesh of the Bionet Jute 500 have a big thread diameter, so they ensure a high elasticity. This is important to ease the water absorption necessary for the erosion control and to ease the application (the net adapts very well to all types of soil).

The jute netting decomposes quickly thanks to its high content of cellulose (85%) and just 15% of lignin, which is a more resistant material. The jute net loses stability within the second vegetative season becoming less effective against erosion agents, **so it should be applied only for vegetative consolidations that can be realized within one season**.

FIELDS OF APPLICATION: *1:1,5 slopes.*

Fiber content	100% jute fibers
Fiber weight	500 gr/m²
Tensile strength long. MD	10 kN/m
Tensile strength diag. CMD	8 kN/m
Size	Size 8 sections of 1,23 x 68 m²

COIR BIONET

COIR FIBERS BIONET 400/700/900 GR/M²

Coir fibers have longer fibers and a higher lignin content, so **they are more tear resistant and have a longer duration in comparison to jute fibers**. For this reason coir nets are used on longer and/or steeper slopes and also when you want to ensure a long-term protection. **Coir fibers bionets are reliable and advisable both for ground jobs and hydraulic applications**. The horizontal threads reduce the vertical water flow, so the water trapped in the net penetrates slowly into the soil. The smaller the mesh size is, the more the soil particles are held by the net. For applications on banks, small meshes are recommended.

FIELDS OF APPLICATION: *high banks and all types of slope with medium erosion possibility.*

Coir Bionets are available in three different versions

	400	700	900
Duration	~24 months	~24-36 months	~36-48 months
Fiber content	100% coir	100% coir	100% coir
Fiber weight	400 gr/m²	700 gr/m²	900 gr/m²
Tensile strength ASTM 1682	5,9 kN/m	14,4 kN/m	20 kN/m
Size	50 x 2 m	50 x 2 m	50 x 2 m

Other products for erosion control

BIOROLLS

Biorolls are cylinders of various diameters and lengths filled and pressed with vegetal fibers (straw or coir) and contained in PP or coir fibers nets. **Their main function is to reduce the speed of water, thus containing erosion and supporting revegetation**.

FIELDS OF APPLICATION: *along canals to stabilize banks, along coasts to slow down the impact of the weaves, for revegetation projects.*

Diameter	20 / 30 / 40 cm
Lenghts	2 / 3 / 6 m

BIODISKS

Biodisks are used for a localized mulching that protects young plants and trees since they provide moisture, thus supporting the right development of the roots. **They protect the roots of the plant from direct sunlight exposure and they keep under control the growth of the weeds at the basis of the plant**.

Diameter	25 / 30 / 40 / 50 cm (other diameters are available upon request and quantities)
Duration	~ 12 - 24 months

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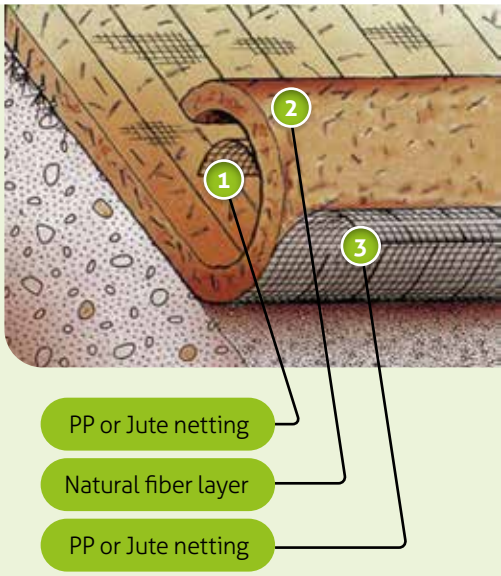
Erosion control blanket
BIOMAT

Biomats are composed of an even central layer of natural biodegradable and modular fibers enclosed on both sides by organic (like jute) o synthetic (like polypropylene) micro-nets.

Inside Biomats there can also be various seed mix and fertilizers to support germination.

Pre-seeded biomats have a micro-net on one side and a cellulose layer on the side in contact with soil.



BIOMAT P

STRAW FIBERS BLANKET WITH DOUBLE NETTING

Biomat P ensures a soil protection up to 12 months. The double netting ensures an **effective protection against erosion and facilitates a good vegetation growth**.

FIELDS OF APPLICATION: *surfaces with little erosion, canals (moderate flow) and slopes up to 2:1.*

Fiber content	100% straw fibers
Netting	PP netting on both sides
Fiber weight	~350 gr/m²
Tensile strength ASTM 1682	2,1 kN/m
Size	2,40 x 42 m

BIOMAT PS

SEEDED STRAW FIBERS BLANKET

Biomat PS has a thickness of 12-15 mm. Between the two photodegradable nettings there is a paperlayer that **contains seed, fertilizer and microorganisms**, applied together with the vegetal fibers when creating the blanket.

FIELDS OF APPLICATION: *slopes 3:1 - 1,5:1.*

Fiber content	100% straw fibers
Weight	~ 600 g/m²
Fiber weight	~ 400 g/m²
Seed weight	~ 30 g/m²
Mulchlayer weight	~ 100 g/m²
Paperlayer weight	~ 30 g/m²
Tensile strength ASTM 1682	2,1 kN/m
Size	2,40 x 25 m

BIOMAT PC

STRAW/COIR FIBERS BLANKET

Biomat PC ensures a soil protection **up to 24 months**. The combination of its two matrix ensures an **extra protection for the vegetation growth**.

FIELDS OF APPLICATION: *canals and slopes up to 1:1.*

Fiber content	50% straw - 50% coir fibers
Netting	Top netting: medium; bottom netting: light
Fiber weight	~350 gr/m²
Tensile strength ASTM 1682	2,1 kN/ m
Size	2,40 x 42 m

BIOMAT C

COIR FIBER BLANKET WITH DOUBLE NETTING

Biomat C is a 100% coir fibers blanket that degrades slowly so to permit a **protection against erosion in the long term**.

FIELDS OF APPLICATION: *very steep banks, canals and landfill slopes.*

Fiber content	100% coir fibers
Netting	Top netting: medium; bottom netting: light
Fiber weight	~ 350 gr/m²
Paperlayer weight	~ 30 gr/m²
Tensile strength ASTM 1682	2,1 kN/ m
Size	2,40 x 42 m

CURLEX II

WOOD FIBERS BLANKET

Curlex II ensures a soil protection **up to 24 months**. Wood fibers improve the water absorption, thus **enabling the vegetation to settle faster**.

FIELDS OF APPLICATION: *canals and slopes up to 1.5:1.*

Fiber content	100% wood fibers
Fiber weight	~ 400 gr/m²
Tensile strength ASTM	3,9 kN/ m - 2,4 kN/ m
Fiber length (MIN 80%)	~ 15,2 cm
Size	2,43 x 30,87

BIOMAT M

MULCH COIR FIBERS BLANKET

The **biodegradable Biomat M** is a blanket with a mulchlayer **that stops the weeds growth and that protects the plant against parasitic and diseases**. The natural top layer harmonizes with the environment, protects the bottom layer from ultraviolet rays, controls the water flow along the slope and regulates the soil temperature. **The bottom layer prevents the loss of moisture, controls the erosion and provides a non-chemical control of weeds**.

FIELDS OF APPLICATION: *slopes up to 1:1.*

Fiber content	100% coir fibers
Netting	Top netting: light
Fiber weight	~ 530 g/ m²
Size	2,40 x 30 m

BIOMAT FIRE FREE F2

FIREPROOF BLANKET

Biomat Fire Free F2 is a blanket composed of natural fibers, which is **fireproof** according to the standard DIN 4102-1. The fibers that make up the blanket undergo a special treatment that makes them unique of their kind. **The fibers are 100% biodegradable and last up to 24-48 months**. **Biomat Fire Free F2** blankets are available in various versions: pre-seeded blankets, traditional blankets, reinforced blankets and mulch blankets.

Fiber content	100% vegetal fibers
Netting	Top netting: medium; above: light, PP, UV degradable
Fiber weight	~ 490 g/ m²
Tensile strength ASTM 1682	2,1 kN/ m
Size	2,40 x 42 m

BIOMET 700

ANTI-EROSION GEOCOMPOSITE

Preassembled geocomposite composed by a coir bionet combined with a plastic and zinc-coated wire mesh. It is a product for the soil protection used to cover earth and rocky slopes, to grass moat and canal banks, to protect from animals and to support hydroseeding during environmental restorations. It is also used for the hydraulic protection. It is flexible and provides a covering strong and extremely adaptable to the morphology of the soil. It is permeable, covers the slope quickly and prevents runoffs under the cover. Unlike plastic materials, it bears the prolonged action of sunlight. After decomposition, the great amount of coir increases the vegetative growth.

Fiber content	100% cocco
Fiber weight	~ 700 g/m²
Net weight	1400 gr/m²
Tensile strength dry (long./diag.)	19,6 x 9,5 kN/m
Size	25 x 2 m

BIOGABIONS

Biogabions are realized with **biocomposites composed** of a natural weaved coir fibers net, a coir fibers biofelt with high mechanical strength and durability and natural aggregates that can be found on site.

They are used for the **morphological reconstruction of slopes** and for the **environmental restoration and stabilization** to restore the original ecosystem.

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