



# Greenfix

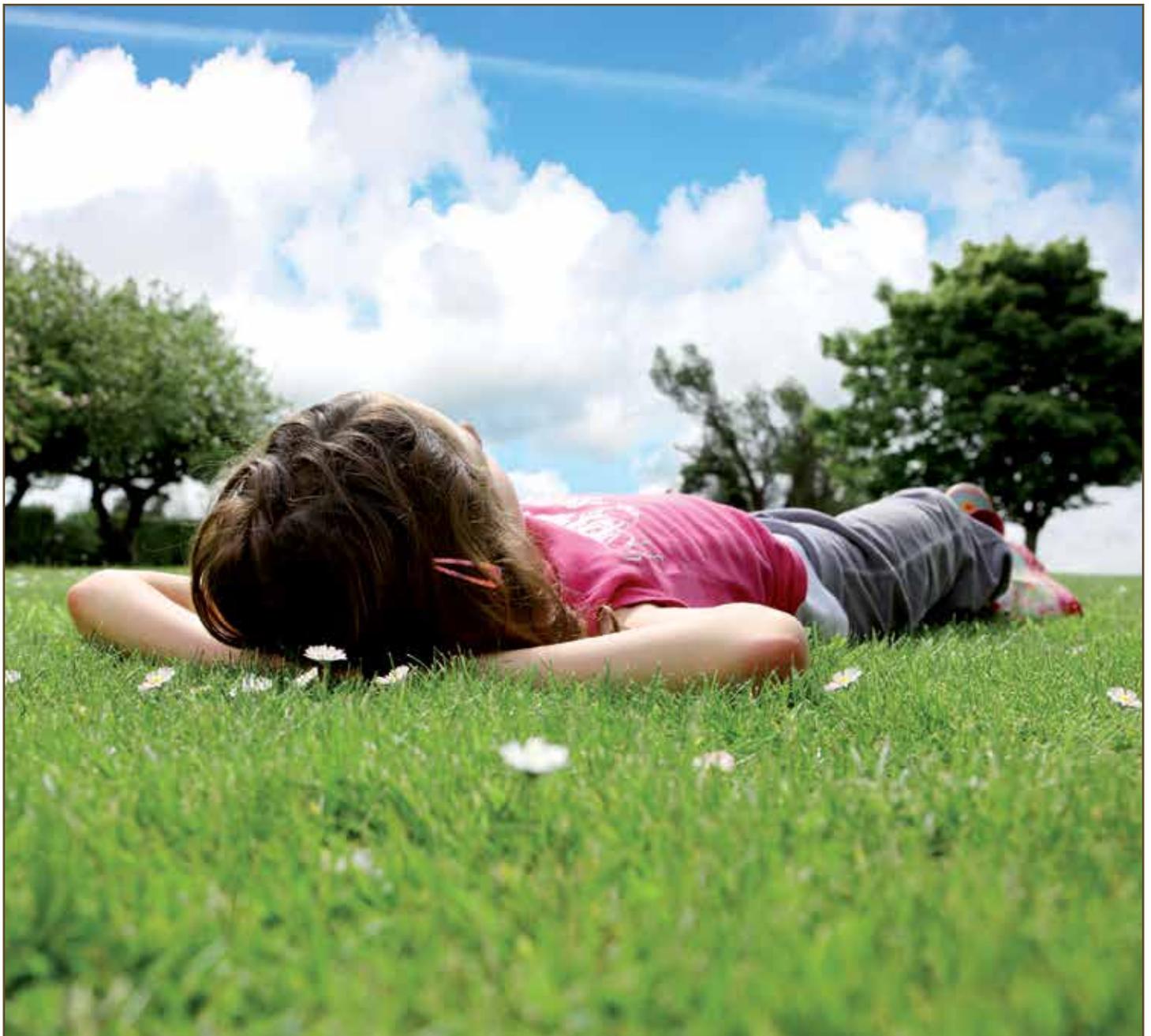


## **Organic Erosion Control Blankets & Plant-Care Products**

# Welcome to GREENFIX

Since 1972, GREENFIX Range of Products have been making lives of civil engineers easier by supplying and supporting a complete line of reliable, cost-effective erosion control blankets. The GREENFIX Group has developed the most comprehensive range of products and systems to combat the complex and diverse problems associated with erosion control.

With own offices and representatives in more than 50 countries worldwide, the GREENFIX Group provides a professional and tight sales network. We have been responsible for pioneering and developing today's erosion control solutions with natural fibre blankets.



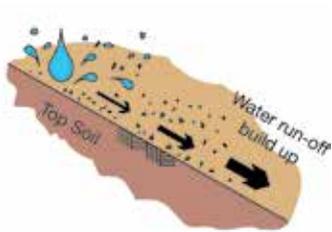


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## EROSION CONTROL BY GRASS ESTABLISHMENT

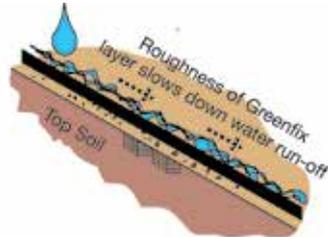
Erosion is the process of wearing away lands and structures by wind, running and falling water, by flow of water and sediment moved along by the water, waves, glaciers etc. It can be moderated and mostly avoided by creation of vegetative structures. Since vegetation establishment is not possible in unprotected areas, it is necessary to protect these vulnerable spots subject to destruction

by erosional impacts. Old fashioned protective methods up to the 1970's included complete soil sealing with concrete, plastics and other unorganic materials. GREENFIX developed the "soft-engineering" method with blankets from organic fibres which protect from erosive forces and enhance vegetative establishment at the same time.



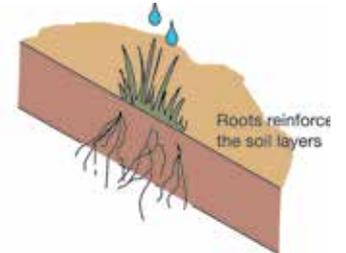
**Fig.1: Erosion process**

Particles displaced by external energy source e. g. rainfall!



**Fig. 2: Erosion protection**

Energy absorbed by GREEN-FIX erosion control layer



**Fig. 3: Vegetation protection**

Grasses & plants absorb impact



4.1 Erosion control with GREENFIX **Eromat** Type 4



4.2 Slope was lightly seeded with customer's specific seed mix prior to blanket installation



## THE GREENFIX METHOD

GREENFIX blankets consist of a top layer of organic, decomposable natural fibres such as coir, straw, hay stitched to a bottom layer of seed holders and a top and bottom supporting lightweight polymer or biodegradable sand-

wich type netting. The organic fibres as main part of the blanket gradually disintegrate into the soil and as the mat structure disappears, the vegetative cover develops. The GREENFIX philosophy was born!



5.1 failed hydroseeded motorway slope



5.2 motorway slope prepared with Greenfix **Covamat**, vegetation established within 6 weeks

### Banks

When the hydroseeded grass sward failed there was soil erosion and silting-up of the road drain. Although it was winter, the worst possible time, GREENFIX

ready-seeded biodegradable mats (**Covamats**) were quickly installed.

#### Current uses include

- Freshly top-soiled embankments
- Protecting tidal zone reinstatements
- New slope cuttings
- Protecting natural monuments
- Lining new water courses
- Facing reinforced soil structures
- Establishing wild flowers
- Landfills and open-cast mining
- Balancing ponds
- Lake edging
- Road ditching
- Ski-run vegetation

# Covamat plus

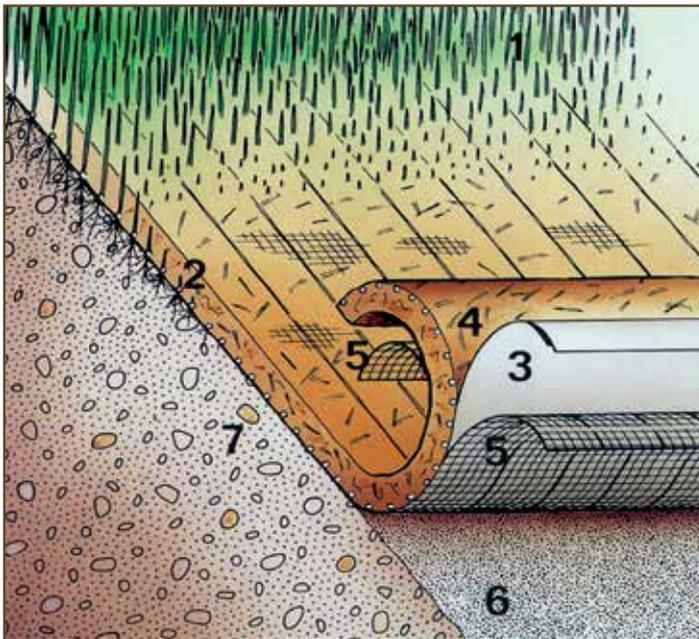
## EROSION CONTROL AND VEGETATION ESTABLISHMENT IN ONE STEP!

GREENFIX is Europe's leading provider of erosion control and soil stabilisation systems. Our unmatched products and excellent service has led to the development of the bench mark **Covamat plus** range which has been specifically designed for erosion control on freshly soiled slopes and new cuttings.

The standard **Covamats** are 10-15 mm thick quilted straw/ hay and/ or coir fibre mats with added mulches and a choice of seeds incorporated during manufacture. **Covamat plus** improves poor soil conditions due to the incorporation of specially developed organic fertilizers

and dry micro-organisms. This combination of seed, fertilizer and microorganism helps to guarantee the best possible germination results for the grass seed within our **Covamats**. Once the GREENFIX **Covamat** has been laid and irrigated, the dehydrated and granulated (fertilizer) material serves as a natural slow-release nutrient source.

We can incorporate any seed mix into our **Covamat** blankets supplied by you or our specialized suppliers. We will be pleased to advise specific seed requirements for any soil type and vegetation requirements from grasses to wildflowers.



### Covamat plus Composition

1. Already established grass sward
2. Seeded matrix during mat production
3. Seed retaining paper
4. Natural fibre layer
5. Sandwiching PP- or Jute mesh
6. Vulnerable soil
7. Protected soil

### Covamat plus Composition

This section features our experience! Between the natural fibre layer and the seed retaining paper we incorporate:

- mulch layer
- fertilizer SOF-A-100
- seed mix selection
- dry micro-organisms

# Covamat fresh



## THE FASTEST GERMINATION SPEED FOR PRE-SEEDED EROSION CONTROL BLANKETS

Newly developed organic erosion control blankets with all the benefits of **Covamat plus** and the added component of 5mm top soil. The soil layer allows the incorporated seeds to start to germinate almost immediately which means the blankets must be installed on delivery to site. GREENFIX **Covamat fresh** has the fastest germination speed for pre-seeded erosion control blankets in our industry as a result of the soil addition.

The 'fresh-series' are available in various fibre combinations and nettings for short-, medium- and long-term degradation. As with the **Covamat plus** standard or specific seed mixes can be incorporated during mat production.

Take the advantage of these **Covamat fresh** products into your project!

### Covamat Plus & Covamat fresh in use ...



7.1 Approx. 60.000 sqm of GREENFIX **Covamat fresh** have been installed at the ring road of Antwerp/ Belgium



7.2 Motorway slope protection with GREENFIX **Covamat plus** in Lisbon/ Portugal



7.3 Protection of a road side channel with GREENFIX **Covamat plus**



7.4 Strong root development and full vegetation establishment within 2-3 weeks after installation

# Eromat

## SIMPLE AND COST-EFFECTIVE EROSION CONTROL

Organic erosion control mats without seeds for slope and embankment stabilisation in various versions of fibre combinations for short-, medium- and long-term degradation and different supporting net incorporation to meet specific tensile strength requirements. These mats require underseeding for fast vegetation establishment. **Eromats** are approximately 7 mm thick quilted straw/ hay and/ or coir fibre mats for separate seeding

or planting. With our own manufacturing facilities we are constantly developing and upgrading, enabling us to produce the GREENFIX **Eromat** blankets with balanced fibre distribution of a very high quality giving the best possible results in erosion control.



8.1 Ask for GREENFIX **Eromats** individual roll lengths for fastest installation.



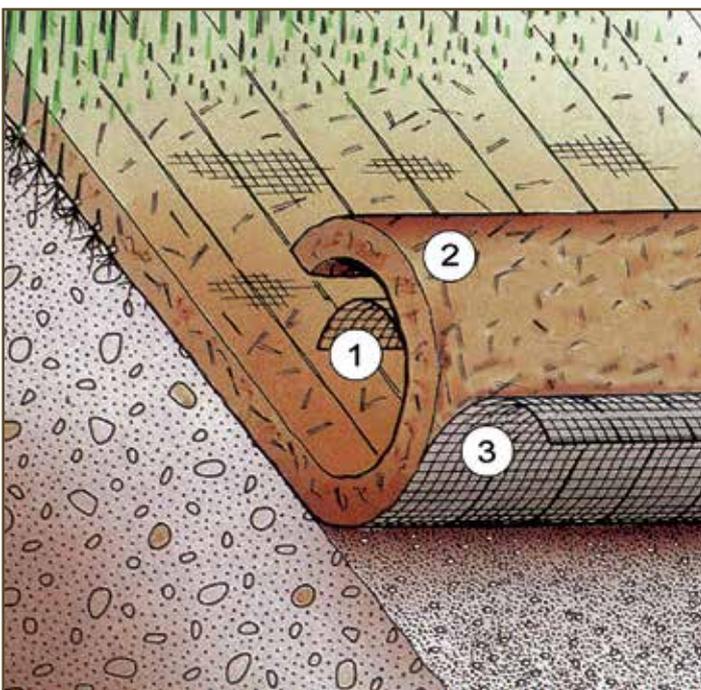
8.2 Slope protection with GREENFIX **Eromat** on a steep rail-road slope



8.3 Application of GREENFIX **Eromat** for a retention reservoir (during installation)



8.4 Marram grass transplants established through GREENFIX **Eromat** to stabilize dunes



### Eromat Composition

1. Sandwiching PP – or Jute mesh
2. Natural fibre layer
3. Sandwiching PP – or Jute mesh

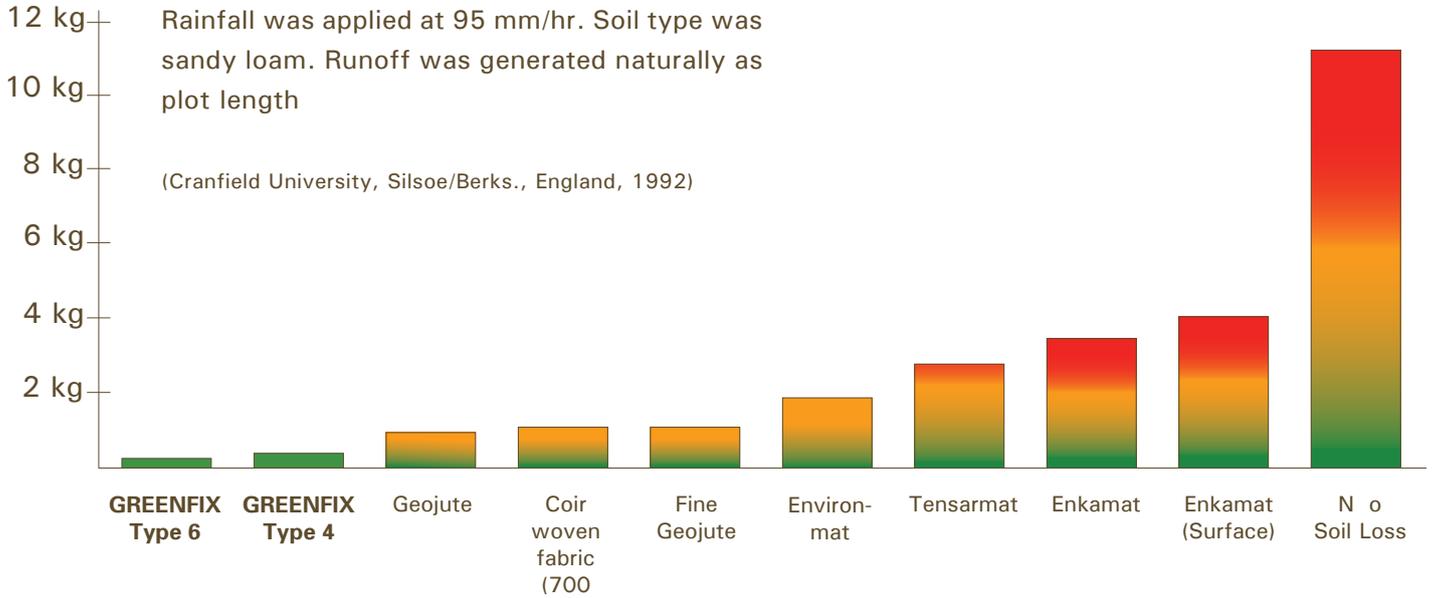


8.5 Landfill application with **Eromat** Type 5



8.6 Immediate erosion protection with GREENFIX **Eromat**

## SOIL LOSSES UNDER HIGH INTENSITY RAINFALL (RUN-OFF GENERATED)



9.1 Application with GREENFIX **Eromat** Type 6



9.2 8 months after installation



9.3 Application with GREENFIX **Eromat** Type 6B



9.4 One year after installation

# Covamat & Eromat

## NATURAL PRODUCTS FOR NATURAL SOLUTIONS



10.1 The use of **Covamat plus** with biodegradable nettings



10.2 Vegetation establishment 12 weeks after installation

### Rivers, Streams and Ditches

Engineers required a new river channel due to regular overflows. Natural features were achieved within

weeks by applying GREENFIX **Covamats** to protect the flooded embankment sections from water scour.

#### GREENFIX Covamats & Eromats

##### Features

- Up to 10 mm of a dense natural fibre matrix allows water to percolate.
- Randomly arranged fibres create air spaces and moisture-retaining mulches.
- Mats seeded during manufacture with seeds of your choice.
- Unseeded mats for overlaying broadcast seeds.
- Choice of polymer or jute mesh as outer layer sandwiching the inner biodegradable matrix.
- Manageable roll sizes and weights.

##### Benefits

- Erosion causing energies are absorbed while offering instant 100 % soil protection. Can be installed in running water trapping sediment fines.
- Seeds and indigenous plants can establish from within and below the blankets, generating a natural range of plants.
- Seeding and erosion control in a single operation.
- Mulching effect of the matting improves all-year round establishment.
- Choice between medium-term stabilization of surface root matrix or a totally biodegradable system.
- Mats can be placed manually, often concurrently with the soiling operation. They are simple to install and especially valuable for complicated situations.

## FIRE FREE FIBRES BLANKETS

All natural fibre blankets have the disadvantage that in sunny periods the fibres quickly become dry and can catch fire by just a cigarette.

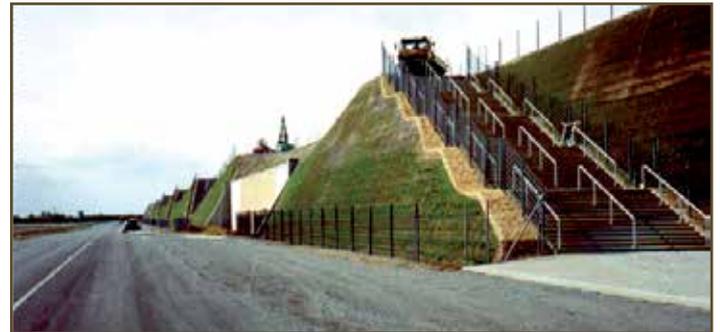
The new product range GREENFIX f<sup>3</sup> combines all the benefits of **Covamats**, **Eromats**, **Mulchmats**, **Rockmats**, as well as GREENFIX **Type 75** and provides additional fire protection according to DIN 4102-1.

The new GREENFIX f<sup>3</sup> unique grass fibres are of European origin and are specially treated according to best environmental practices, so that these fire free fibres are 100 % biodegradable within 36 to 60 months.

The new GREENFIX f<sup>3</sup> product range offers more than just a competition to coir fibre products!



11.1 Vegetation establishment and vermin protection with GREENFIX f<sup>3</sup> **Rockmat**



11.2 Vegetation of a retaining wall with GREENFIX f<sup>3</sup> blankets

### GREENFIX f<sup>3</sup> blankets available as ...

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>· <b>Covamat plus</b><br/>Ready-seeded-blankets</li> </ul> | <ul style="list-style-type: none"> <li>· <b>Covamat fresh</b><br/>Ready seeded blankets with 5 mm top soil</li> </ul> | <ul style="list-style-type: none"> <li>· <b>Rockmats</b><br/>Long-term erosion control solution</li> </ul>               |
| <ul style="list-style-type: none"> <li>· <b>Eromats</b><br/>Cost effective blankets</li> </ul>    | <ul style="list-style-type: none"> <li>· <b>GREENFIX Type 75</b><br/>Permanent turf reinforcement mats</li> </ul>     | <ul style="list-style-type: none"> <li>· <b>Mulchmats</b><br/>Weed control and plant protection without seeds</li> </ul> |

# Rockmat

## LONG TERM EROSION CONTROL SOLUTION

The patented GREENFIX **Rockmats** combine the benefits of **Eromat** with additional steel wire reinforcement and long-term protection to vulnerable slopes. Superb vegetation establishment is possible due to the **Eromat** blanket shielding young seedlings.

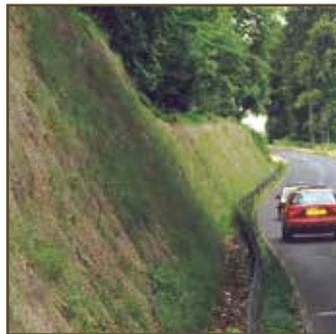
GREENFIX **Rockmats** provide a highly effective vermin protection layer where rabbits and foxes etc. are likely to create slope instability due to burrowing activities. Additional steel wire reinforcement ensures slope face degradation from water run-off or frost impacts.

The GREENFIX **f<sup>3</sup> Rockmats** made of our unique special fibre mix are in addition giving fire proof according to DIN 4102-1.

The **f<sup>3</sup> (Fire Free Fibres) Rockmats** have been specially designed to be used in situations where fires present a risk as a result of cigarettes, matches or other fire sources. Highways, Railway, Petrol Stations and vulnerable public areas can benefit from using the new GREENFIX **f<sup>3</sup> Rockmats**.



12.1 GREENFIX **Rockmat** Type 5D installation on 65° steep slope



12.2 Erosion protected slope after six weeks



12.3 Preparation of a collapsed slope due to heavy rainfalls



12.4 Successful installed GREENFIX **Rockmat** Type 6D in New Caledonia

### Rockmat Applications

- Calcareous and rock slopes
- Windy sites
- Temporary cuttings
- Coastal & dyke protection
- High energy erosion area
- Vermin protection

# Greenfix Type 75



## PERMANENT TURF REINFORCEMENT MAT

The GREENFIX **Type 75** Composite Turf Reinforcement Series features a three-dimensional mat structure which permanently anchors. It reinforces the root and stem systems of vegetation under high shear stress while the matrix materials provide effective immediate erosion control. GREENFIX **Type 75** mat offers exceptional mulching characteristics through all three phases of vegetation development.

### Typical Applications

- Roadside Ditches
- Stream Bank Protection
- Shoreline Protection
- Golf Course Swales
- Areas with high flow volumes



13.1 Shoreline protection with GREENFIX **Type 75 C**



13.2 Vegetation establishment within weeks

# Embankment Mat

## HIGH REINFORCEMENT AND 100 % BIODEGRADABLE

Special **Embankment Mats** with high strength coir nettings. Two different mesh sizes of coir nettings are stitched to soil separating coir fibre layer. This heavy duty mat consists entirely of coir fibres. It is the ultimate

answer to combat extremely high erosion potential or high velocity of water flow. The **Embankment Mats** are available in pre-seeded or unseeded version.



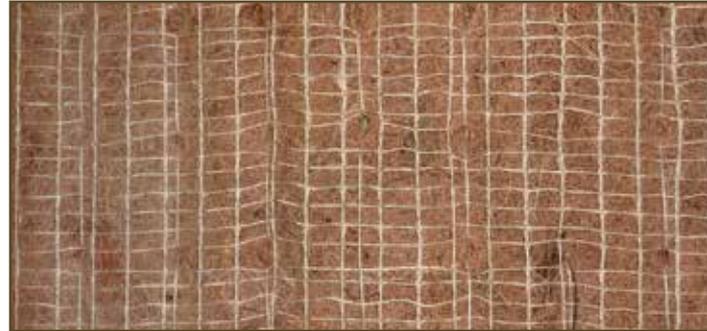
13.3 Ready installed **Embankment Mat** Type 700



13.4 Successful germination of the incorporated seed mix

# Choice of Nettings

GREENFIX erosion control blankets provide effective and all-natural erosion control and vegetation establishment in an environmentally- and wildlife-friendly manner.



Products can be supplied with organic or synthetic nettings depending on their application.

## Jute Mesh

100% organic fibre blankets are stitched on both sides (top and bottom) with Jute Netting H65. The fibre blanket is 100% decomposable. Since jute netting is of short endurance (< 12 months) vegetation should establish within one germination period.



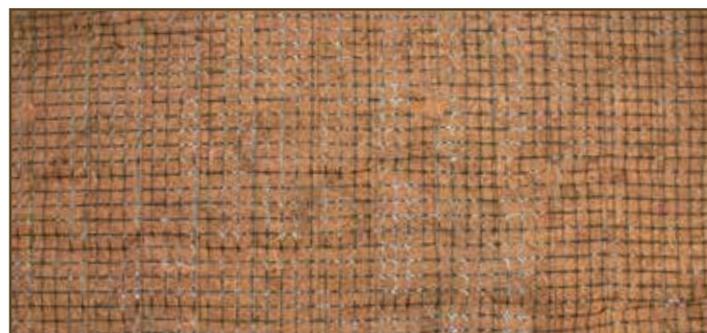
## Oxygrid

Oxygrid is a supporting/reinforcing PP-netting subject to mechanical decomposition. It is absolutely environmentally safe. Decomposition period depends on moisture, heat, and oxydation conditions. Oxgrid is an excellent alternative to Jute Mesh. Stitching consists of PP-Multifilament stitching threads.



## Standard Netting

Basically all fibre blankets are stitched with non-UV resistant PP-Nettings and PP-Multifilament stitching threads. The supporting/reinforcing netting destabilizes and decomposes during the years and will be covered by vegetation. It is not recommended for hydraulic constructions and areas which are later on to be used as pasture land.



## Reinforced Netting

For extremely steep slopes and high wind energy sites we offer special reinforced PP-nettings to meet customer's specified tensile strength.

# Product Application Guide



	Product	Functional/ Longevity	Material	Primary Usage
<b>COVA-</b>	Type 1	12 months	100 % straw/hay fibres, seed mix embedded in mulch layer, top and bottom degradable PP-mesh	3:1 - 2:1
	Type 1B	12 months	100 % straw/hay fibres, seed mix embedded in mulch-layer, top and bottom biodegradable Jute-mesh	3:1 - 2:1
	Type 2	18-24 months	50 % coir fibres - 50% straw/hay, seed mix embedded in mulch-layer, top and bottom degradable PP-mesh	2:1 - 1:1
	Type 2B	12 months	50 % coir fibres - 50% straw/hay, seed mix embedded in mulch-layer, top and bottom biodegradable Jute-mesh	2:1 - 1:1
	Type 3	36 months	100 % coir fibres, seed mix embedded in mulch-layer, top and bottom degradable PP-mesh	1:1 or >
	Type 3B	12 months	100 % coir fibres, seed mix embedded in mulch-layer, top and bottom biodegradable Jute-mesh	1:1 or >
<b>ERO-</b>	Type 4	12 months	100 % straw/hay fibres, top and bottom degradable PP-mesh	4:1 - 3:1
	Type 4B	12 months	100 % straw/hay fibres, top and bottom biodegradable Jute-mesh	3:1 - 2:1
	Type 5	18-24 months	50 % straw/hay and 50 % coir fibres, top and bottom degradable PP-mesh	2:1 - 1:1
	Type 5B	12 months	50 % straw/hay and 50 % coir fibres, top and bottom biodegradable Jute-mesh	2:1 - 1:1
	Type 6	36 months	100 % coir fibres, top and bottom degradable PP-mesh	1:1 or >
	Type 6B	12 months	100 % coir fibres top, and bottom biodegradable Jute-mesh	1:1 or >
	Type 7	36-48 months	100 % heavy duty coir fibres, top and bottom degradable PP-mesh	1:1 or >
<b>ROCK-</b>	Type 5D	18-24 months	TYPE 5 stitched together with a galvanized wire mesh acc. to DIN1200, mesh-width 25 mm, wire dia. 0,8 mm	up to 65°
	Type 6D	24-36 months	TYPE 6 stitched together with a galvanized wire mesh acc. to DIN1200, mesh-width 25 mm, wire dia. 0,8 mm	up to 70°
	Type 7D	30-40 months	TYPE 7 stitched together with a galvanized wire mesh acc. to DIN1200, mesh-width 25 mm, wire dia. 0,8 mm	up to 75°
<b>GREENFIX F<sup>3</sup></b>	Type F <sup>3</sup> -1 <i>F<sup>3</sup>-Covamat</i>	36-60 months	100 % unique European grass fibres, seed mix embedded in mulch-layer, top and bottom degradable PP-mesh	1:1 or >
	Type F <sup>3</sup> -2 <i>F<sup>3</sup>-Eromat</i>	36-60 months	100 % unique European grass fibres, top and bottom degradable PP-mesh	1:1 or >
	Type F <sup>3</sup> -2D <i>F<sup>3</sup>-Rockmat</i>	36-60 months	100 % unique European grass fibres, TYPE F <sup>3</sup> -2 stitched together with a galvanized wire mesh acc. to DIN1200, mesh-width 25 mm, wire dia. 0,8 mm	up to 70°
<b>GREENFIX PERMANENT</b>	Type 75 SC	≥ 36 months	3D PE-Netting, 10 mm thick + 400 g/sqm, stitched together with a 50 % straw/hay and 50 % coir fibre mat (Type 5), top strong + bottom light weight PP-Netting	1:1 and high flow channels
	Type 75 C	≥ 48 months	3D PE-Netting, 10 mm thick and 400 g heavy stitched together with a 100 % coir fibre mat, top strong + bottom light weight PP-Netting	> 1:1 and high flow channels
	Type 100 P	84 or < months	3D PE-Netting, 10 mm thick + 400 g heavy stitched together with a 100% PP-fibre mat, top strong + bottom light weight PP-Netting	> 1:1 and high flow channels

# Bio Netting

## JUTE-NETTING

This wide-meshed GREENFIX **Jute Netting** is made from unbleached Jute fibres without any chemical treatment. The loose and soft yarn twist guarantees a big strand diameter and thus a high stretch elasticity. This is important for high water absorption required from erosion control mesh (absorbs 500 % of its dry condition) in combination with the optimal mesh size.

The netting adapts extremely well to soil surface structures when loosely laid. The mesh strings function like „mini-walls“ so that daily impacting water is not erosive anymore and turns into harmless leaking water. Soil surface and seed material is protected against run-off. Moreover the open size mesh guarantees with only 35 % soil coverage sufficient open space for germination. Other advantages are protection of seedlings against temperature variations, shadowing and water storage within the coarse mesh strands.

A so-called micro climate is created which allows fast germination also under unfavourable climatic conditions.

Application of Jute Netting is recommended for slopes with inclination ratio 1:1,5. GREENFIX **Jute Netting** is decomposing fast due to its high contents of cellulose (85 %) and only 15 % of longer endurable lignins. Under favourable decomposing conditions which are moisture, heat and oxygen the GREENFIX **Jute Netting** loses its stability latest within the second vegetation phase, losing its effectiveness against erosional influences. Due to these facts GREENFIX **Jute Netting** should only be applied for vegetative establishments which can be realized within one single vegetation period. General methods with GREENFIX **Jute Netting** are pre-dry-seedings prior to netting installation or the hydro-seeding method after the netting has been installed.



16.1 First vegetation is growing through the **Jute-Netting**



16.2 Immediate installation after end of construction



16.3 Installation on a 1:1,5 slope



16.4 Five weeks after installation

# Bio Netting



## COIR NETTING

GREENFIX **Coir Nettings** are made of 100 % non chemically treated coirfibres, woven as basket weave in different mesh sizes. Coirfibres have a high lignin content and are thus resistant to fast decomposition. They endure much longer compared to other fibre blankets. In addition they are much more resistant to tear. Due to these facts, Bio-Engineering methods for surface stabilizations use GREENFIX **Coir Nettings** if the germination period applies for more than one vegetation period. All GREENFIX **Coir Nettings** are reliably recommendable for dry land and hydraulic applications. Horizontal net strands minimize vertical water flow and the water trapped in the netting is forced to slowly penetrate the soil. Surplus water runs

off over the surface. The smaller the size of mesh, the more it can hold the soil within, holding the soil particles inside the mesh.

For hydraulic application the netting slows down flowing speed giving more surface roughness to the waterbed. Waterbed and embankment applications call for small mesh sizes (KG0900/KG0700).

Larger mesh sizes (KG0400) should be applied on higher embankment zones and all slopes with average erosion possibility. Wet Seeding/Hydroseeding is recommended after installation for nettings type KG0400/KG0700.



17.1 GREENFIX **Coir Netting** KG0900 in use on a tidal area of a river



17.2 10 weeks after installation and hydroseeding



17.3 Shoreline Protection with **Coir Netting** KG0700



17.4 Installation of Greenfix **Coir Netting** KG0700 on a 50° slope

# Fixing Materials & Accessories

## FIXING MATERIALS

Various mat fixing products made of steel or wood are available for effective mat fixing. They avoid lift-up and thus removal of the mats from the area to be protected or vegetated.

For the best performance of the mats, utmost attention is required for effective securing and fixing.



18.1 Variety of fixing pins to meet various soil conditions

The wooden pins are made of 100 % biodegradable durable natural wood / mostly hard wood (Oak or Beech). The wooden pins have a top cross to ensure good soil contact.

We recommend to use approximately 1-3 pins per m<sup>2</sup> for all erosion control blankets and for the mulchmats 3-4 pins per m<sup>2</sup> depending on quantity of plants per m<sup>2</sup>.



18.2 The easy and quick installation of GREENFIX Blankets



18.3 GREENFIX **Fertilizer SOF-A-100** contains a high natural value of important trace elements and vitamins. Included clay minerals increase the storage capacity of nutrients

### GREENFIX Fertilizer

GREENFIX **Fertilizer SOF-A-100** is an organic slow-release additive which provides soil improvement. **SOF-A-100** is made of the mycelia of the soil fungus *penicillium chrysogenum*.

Due to its biological nature (decomposed biomass of a soil fungus) GREENFIX **Fertilizer SOF-A-100** is a well balanced combination of nutrients and therefore well adapted to a microbiological decomposition process in the soil.

### Benefits of the GREENFIX Fertilizer SOF-A-100

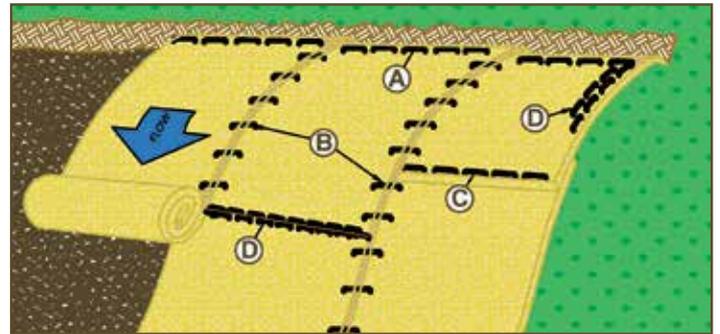
- Activates soil organics
- Stimulates the root development
- Increases soil vitality and leaching
- Regenerates the soil
- Contributes to humus formation
- Long term benefits
- Resistant to frost
- No fertilizer-burn
- Organic natural biodegradable material

# Installation Guide

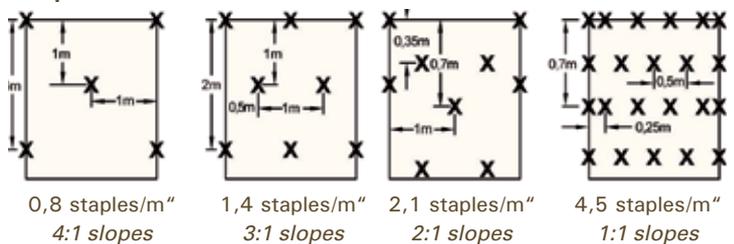


## Slope Installation Detail

1. Dig a 15 cm x 15 cm trench both up-slope, down-slope and along the top side of the channel. Prepare the slope soil surface (raking, seeding and fertilizing).
2. Begin by placing the center blanket a minimum of 30 cm down-slope of the up-slope trench. Secure the blanket at the bottom of the trench with staples placed 30 cm apart. Backfill and compact the trench. Apply seed and fold the blanket over soil, secure with a row of staples placed 30 cm apart across the width of the blanket (Letter A).
3. Roll the blanket vertically down the slope. Secure using the appropriate staple pattern below, specified by slope. 4. Parallel blankets must be overlapped by a minimum of 10 cm and secured with a row of staples placed approximately 30 cm apart (Letter B).
5. The direction of water flow. Connect the blankets by placing staples approximately 30 cm apart across the width of the blankets.
6. The end of blanket must be secured in a 15 cm x 15 cm trench with a row of staples placed at 30 cm intervals (Letter E).

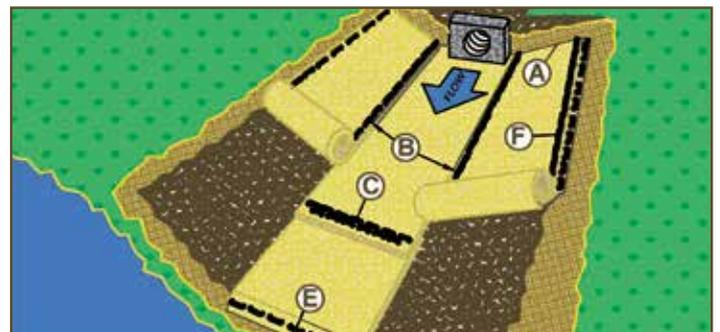


### Staple Patterns:

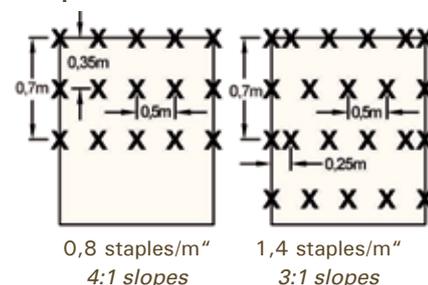


## Channel Installation Detail

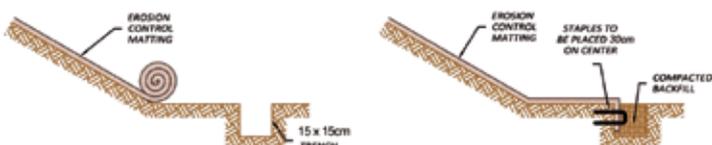
1. Dig a 15 cm x 15 cm trench both up-slope and down-slope of the area the matting is to be applied. Prepare the slope soil surface (raking, seeding and fertilizing).
2. Begin by placing the blanket a minimum of 30 cm down-slope of the up-slope trench. Secure the blanket at the bottom of the trench with staples placed 30 cm apart. Backfill and compact the trench. Apply seed and fold the blanket over soil, secure with a row of staples placed 30 cm apart across the width of the blanket (Letter A).
3. Roll the blanket vertically down the slope. Secure using the appropriate staple pattern below, specified by the slope.
4. Continue placing blankets up the slopes on both sides with a minimum 10 cm overlapping (Letter B), and securing each blanket in the beginning trench (Letter A).
5. Additional horizontal blankets can be joined using a minimum 10 cm overlapping or shingle style in the direction of water flow. Connect the blankets by placing staples approximately 15 cm apart across the width of the blankets (Letter C).
6. The end of the blanket must be secured in a 15 cm x 15 cm trench by a row of staples placed at 30 cm intervals (Letter E).
7. At the top edge of the side slope, fasten the blanket in a 15 cm x 15 cm trench placed at 30 cm intervals. Install an additional row of staples 15 cm down slope of the trench along the width of the fabric (Letter F).



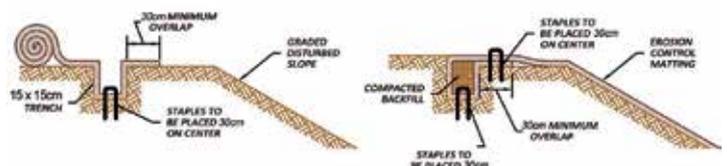
### Staple Patterns:



## Down-slope Trench Installation Detail (Letter E)



## Up-slope Trench Installation Detail (Letter A)



# GREENFIX Recultex

## NATURAL CELLULAR SYSTEM

**Recultex Erosion Control Fabrics** are made of natural coirfibre tissue as warp-knitted fabric with tear resistance of not less than 20-25 kgs per thread. It enables slope installation independent from seasonal influences and combines the advantage of an organic fibre tissue manufactured on an industrial basis. The **Recultex** fabrics guarantee high stability and resistance to tear, while offering minimized weight and volume during transportation. Recommen-

dable for efficient installations and maximum labour cost savings.

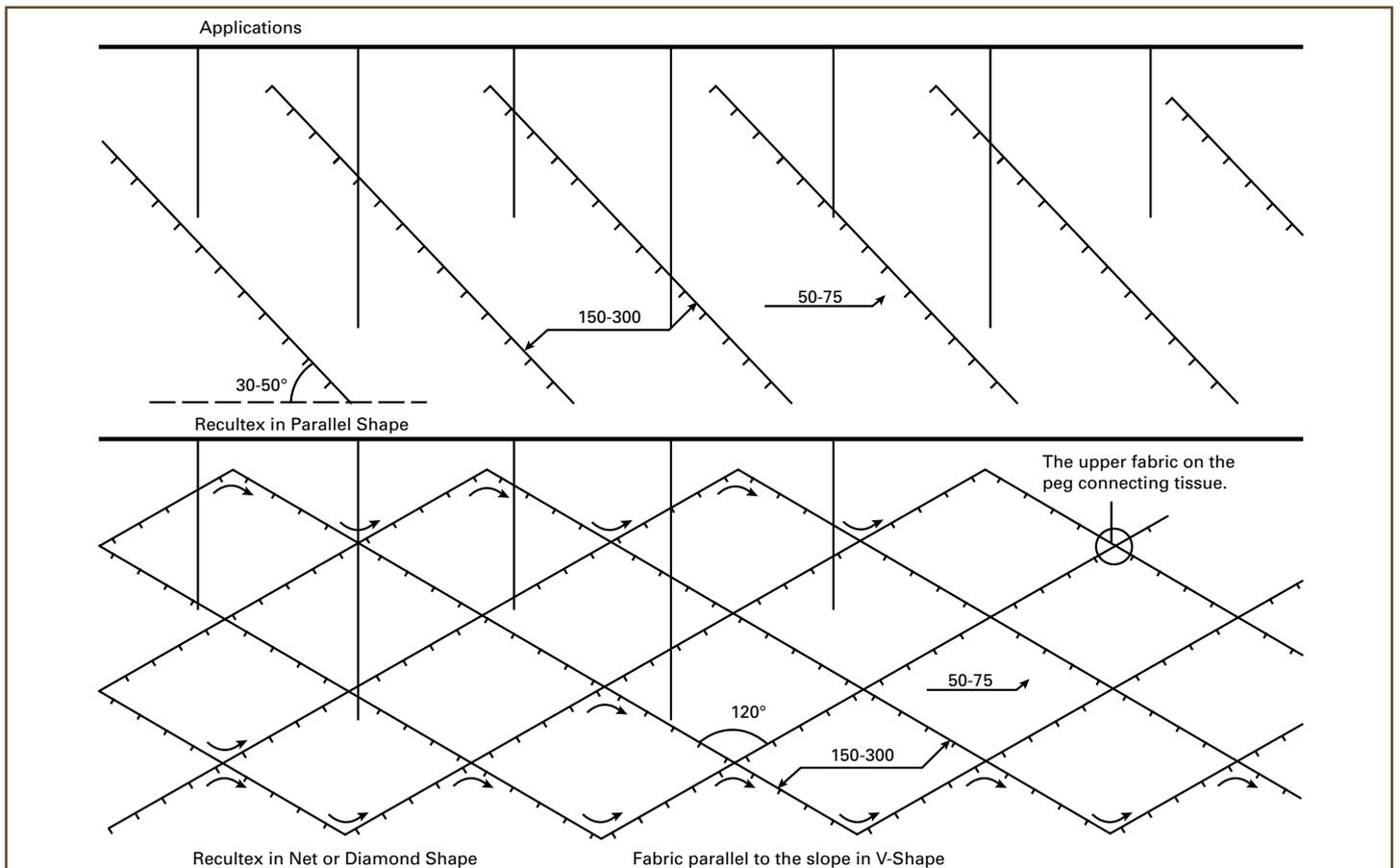
The **Recultex Erosion Control Fabrics** are the economic alternative to wooden branch fascines and willow braidings. Main application methods are creation of supporting walls for top soil spreadings to virgin soils. All installation designs may be applied such as diamond, diagonal or parallel shapes.



20.1 Recultex installation in diamond shape



20.2 Filling the shapes with topsoil



# Coir Logs & Wattles



## BIO-WATER-ENGINEERING

European manufactured GREENFIX **Coir-Logs** are used as organic logs surrounded with PP or Coir netting. These are used as edgings for river and channel embankment sections, in particular to absorb wave impact as well as for revegetation and colonisation projects.

The natural product combination will support the development of plants in disturbed wet land areas. By the eco-friendly application of natural materials, we are able to restore nature which has been disturbed by other forces.

The less cost effective GREENFIX **Wattles** are made of 100 % Europe's finest quality agriculture straw fibres surrounded with an outer high strength, white PE netting with UV inhibitors. Placed on slopes to help capture sediment, promote revegetation, control stormwater runoff and provide channel and shoreline stabilization.

Straw integrates with the soil in time, adding organic material to the soil and retaining moisture for vegetation.



21.1 Channel application with our **Coir-Logs**



21.2 Embankment protection with GREENFIX products



21.3 Slope application with **Coir Logs**



21.4 Combination of GREENFIX Blankets & Logs

### Advantages of **Straw Wattles**

- GREENFIX **Wattles** are relatively low-cost-solution to solve erosion problems.
- GREENFIX **Wattles** store moisture for vegetation.
- They can replace silt fences or straw bales on steep slopes.
- Netting will photodegrade, eliminating need of waste collection after straw has decomposed.

# Bio-Mulchmat

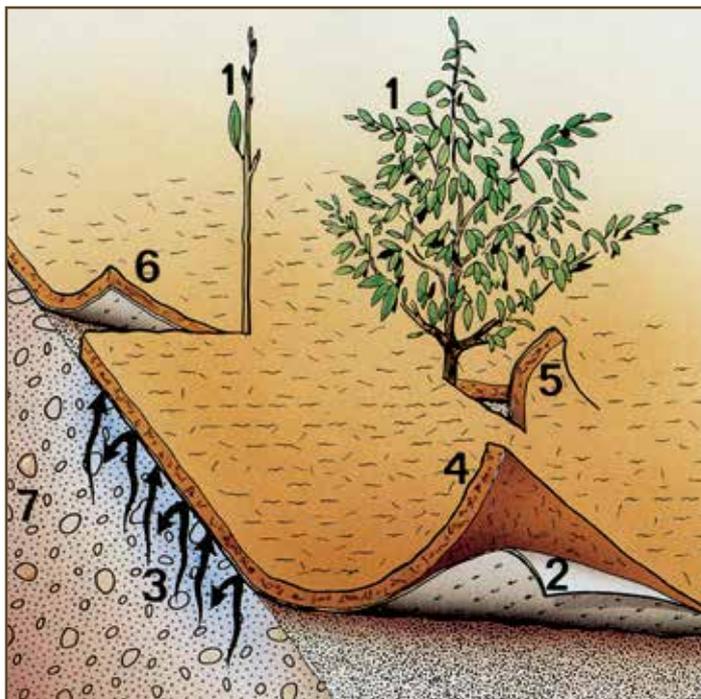
## WEED CONTROL, MULCHING AND EROSION PROTECTION

Where landscape planting is required, particularly on slopes, GREENFIX **Mulchmats** provide mulching, moisture control, non-chemical weed control, soil erosion protection and soil temperature balance in one single product. Nursery-like conditions can be achieved easily and by environmentally friendly means.

GREENFIX **Mulchmats** enhance growth without the need of further mulching, chemicals or large scale maintenance. The natural upper layer blends with landscaping, protects the bottom membrane from ultra-violet

light, controls water shed from gradients and regulates soil temperature. The bottom membrane prevents loss of moisture, controls erosion and provides non-chemical control of weeds. The bottom membrane is a twin sheet with offset slittings to allow water penetration.

GREENFIX **Mulchmats** provide weed control and mulching typically for at least 3 years. Mulch spats are available for individual plant protection in ready cut versions with a centre hole for plant insertion.



### GREENFIX **Mulmat** example

1. New plants.
2. Photodegradable mulch-foil with perforation provides full weed control.
3. Soil moisture retained.
4. 7 mm natural-fibre matrix permits solar heating of soil and subsequent heatingretention for maximum growth rates.
5. Plant insertion by flap method.
6. Plant insertion by edge method.
7. Protected soil.



22.1 Strong plant growth with mulch blankets



22.2 **Mulchmat** installation in south France

### Highway slope application

GREENFIX **Mulchmats** being installed on a highway slope as a full-surface covering method with slit insertion for plant settings, after GREENFIX **Mulchmats** have been laid. The civil engineers have required maximum plant establishment and growth rates for visual and acoustic barriers. The GREENFIX **Mulchmat** system features all requirements for modern engineering solutions.

# Bio-Mulchmat



## THE NATURAL WAY TO CARE FOR YOUNG PLANTS



23.1 Highway on Cyprus:  
Economizing of irrigation  
water and less maintenance  
for reduced accident risk of  
workers



23.2 Nursery application:  
Faster and stronger  
plant growth



23.3 Creative roof-greening:  
Solution with **Mulchmats**  
never requires maintenance  
again



23.4 Norwich Bypass/ England:  
Individual plant protection  
with ready-slitted GREENFIX  
**Mulchpats**



### Private Gardens

Professional landscaping in private gardens. GREENFIX **Mulchmats** are available in different roll sizes and widths in order to fit in every garden. Save up to 90% on irrigation water for an environmental friendly future.



### Public Areas

GREENFIX **Mulchmats** application on sports ground. Especially public areas require less maintenance for the planting areas. Our **Mulchmats** helping the authorities to spend time on other public works by having nursery like results.

# Bio-Mulchmat

## DRAFT FROM TEST CENTRE BOLZANO/ITALY FOR AGRICULTURE AND FORESTRY

The following table shows the influence of various test materials for tree protection from weeds development during the above mentioned growth periode (Test period: April 1990 to February 1991).

kind of material applied or weed suppression	stem circumference increased by cm	branch growth in length (cm)
GREENFIX Mulchmat	1,8	424
cover-up Geotextile	1,5	346
cover-up Plastic-Vleeece	1,4	274
Mechanical treatment	1,2	306
Chemical spraying	1,2	291
cover-up with tree bark	1,2	287
cover-up with wood chips	1,1	310
sowing-in with white clover	0,8	151

### Test Result

„GREENFIX Mulchmat Type 9 had an excellent influence on the development of growth for the tested young trees. Due to the coirfibre layer the soil temperatures remained

stable and moisture was abundantly conserved due to the off-set perforated double bottom foil layer.“



24.1 Nursery application of GREENFIX Type 9



24.2 Industrial area application



24.3 Young plants will love the greenhouse-effect

# Bio-Mulchmat



25.1 established planting at a bridgehead



25.2 row crops with GREENFIX **Type 9** along motorway



25.3 Mulchmat Installation in Sweden



25.4 watercourse design with Mulchmat **Type 9**

## GREENFIX Mulchmats

### Features

**Soil fertility:** The biodegrading upper layer is separated from the soil by a membrane.

**Economical:** Easy to install. No special labour. Non-chemical weed control for many seasons.

**Weed control:** Backing membrane smothers unwanted plants and prevents weed germination.

**Soil temperature:** 7-10 mm thick fibre quilted construction.

**Mulching:** Special twin mulch-foil prevents moisture loss but allows water into soil.

**Specification:** Easy to specify and available in roll widths or square sizes to suit the planting scheme.

### Benefits

Less plant stress and reduced plant losses.

Allows solar radiation to raise and maintain the soil temperature for fast growth.

Avoids nitrogen sink effect experienced with bark mulches.

Simple to control that correct material has been supplied. Mat dimensions ensure economic labour expense.

Low installation and maintenance cost.

# Plant-Care Products

## THE GREENFIX BURLAP SYSTEM

GREENFIX **Rootball-Mat** was developed to allow all-year round supply for trees and shrubs from containerized plant stocks. The **Rootball-Mat** consists of a double layer of natural fibres with an inbetween stitched biofoil. By being stitched it is air and water penetrable and holds with its unique fibre/ foil structure sufficient moisture within the rootball, thus avoiding well known dry-out if not sufficiently irrigated.

This GREENFIX **Burlap-System** has been successfully tested in nurseries for several years and is well accepted!

GREENFIX cost-saving and plant-friendly burlapping method replaces presently applied system of additional work steps like taking plants out of the soil, potting-in plants, wrapping for transportation, taking plant out of container before replanting.



26.1 Measuring the benefits of GREENFIX **Stem Protection**



26.2 The **Rootball-Mat** stays with the trees when planting it in



26.3 Strong and healthy plant growth



26.4 Combination of Stem Protection System and **Rootball-Mats**

## THE GREENFIX STEM PROTECTION SYSTEM

GREENFIX **Stem Protection Sleeves** made from air-penetrable coirfibre mats for temperature control on tree bark. **Protection Sleeves** are also available with additional wire mesh inlay so that young stems are protected by wild animal attacks. Developed as two-piece sleeve specially for nurseries it accomodates stem growth.

With just one action the flexible Jute-Sleeve can be quickly openend and closed to allow stem growth increase measurements simply and fast. GREENFIX **Stem Protection Sleeves** reduce development of undesired wild stem twigs and thus reduce tree maintenance cost.

### Advantages

- Excellent air penetration
- Wild attack protection
- Coirfibre layer offers best thermo-protection
- Protection during construction phases
- Simple control of stem growth increase
- Reduction of tree maintenance cost

# Greenfix & More



## SPECIAL APPLICATIONS

Special Applications are always welcome and create our daily business. Our engineers are able to support you from start of your design up to the end of construction. Our

distribution network guarantees a worldwide site support. We welcome all enquiries for an environmental solution.



27.1 Gabion Construction at jobsite



27.2 GREENFIX **Plant Mats** for flowers in greenhouses



27.3 Spagnum Rearing on Greenfix **Floating Mat**



27.4 Sound Barrier Wall with GREENFIX **Vegetation Mats**



27.5 GREENFIX **Hydromulch**



27.6 Stem Protection with GREENFIX **Reedmat** and GREENFIX **Coir Rope**



27.7 GREENFIX **Covamat** installation at a new Ski-Jump in RUHESTEIN



27.8 XEROFLOR GREENROOF SYSTEM / Detroit - USA  
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# mst

geotextiles

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