

Greenfix



Organic Erosion Control Blankets & Plant Care Products

Welcome to GREENFIX



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It doesn't matter...

...whatever you will do tomorrow...

...where ever you will be tomorrow...

...whoever you will meet tomorrow...

we from GREENFIX just want you to be able
to enjoy the nature tomorrow...

GREENFIX... developing tomorrows ideas®



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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. SOILTEC 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, SOILTEC 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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Introducing

Greenfix

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.

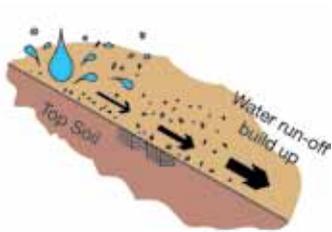


Fig. 1: Erosion process

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

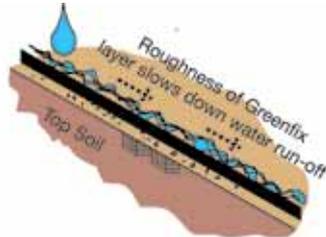


Fig. 2: Erosion protection

Energy absorbed by GREENFIX erosion control layer

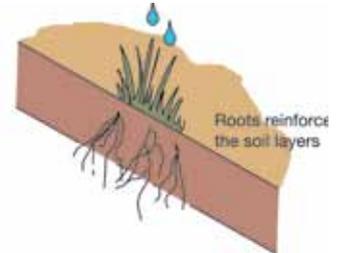


Fig. 3: Vegetation protection

Grasses & plants absorb impact



Roadworks

Erosion control with GREENFIX Eromat Type 4S. Slope was lightly seeded with customer's



specific seed mix prior to blanket installation.

Introducing

Greenfix

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 disintegrates into the soil, and as the mat structure disappears, the vegetative cover develops. The GREENFIX philosophy was born!



■ 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 opencast mining
- Balancing ponds
- Lake edging
- Road ditching
- Ski-run vegetation

Covamat plus

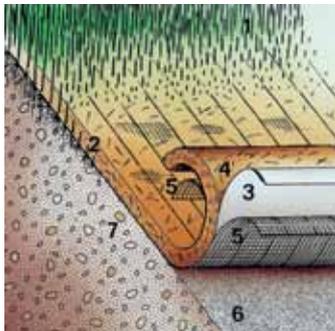
EROSION CONTROL AND VEGETATION ESTABLISHMENT IN ONE STEP!

GREENFIX is Europe's leading provider of erosion control and soil stabilisation systems. Our unmatched products and service excellence 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 a 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 a specially developed organic fertilisers and dry micro-organisms. This seed, fertiliser and dry

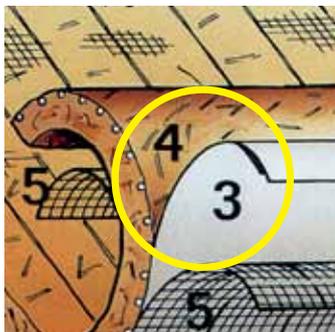
micro-organism combination helps to guarantee the best possible germination results for the grass seed within our **Covamats**. Once the GREENFIX **Covamat** has been laid and irrigated, the dehydrated and granulated (fertiliser) material serves as a natural slow-release nutrient source.

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



Covamat plus Composition

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



Covamat plus Composition

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

- mulch layer
- fertiliser SOF-A-100
- seedmix 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 ...



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



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



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



Ready installed **Covamat plus** on a landfill job for temporary erosion protection

SIMPLE AND COST-EFFECTIVE EROSION CONTROL

Organic erosion control mats without seeds for slope and embankment stabilisation in various versions on 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.



Slope protection along a surface drain with GREENFIX **Eromat**



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

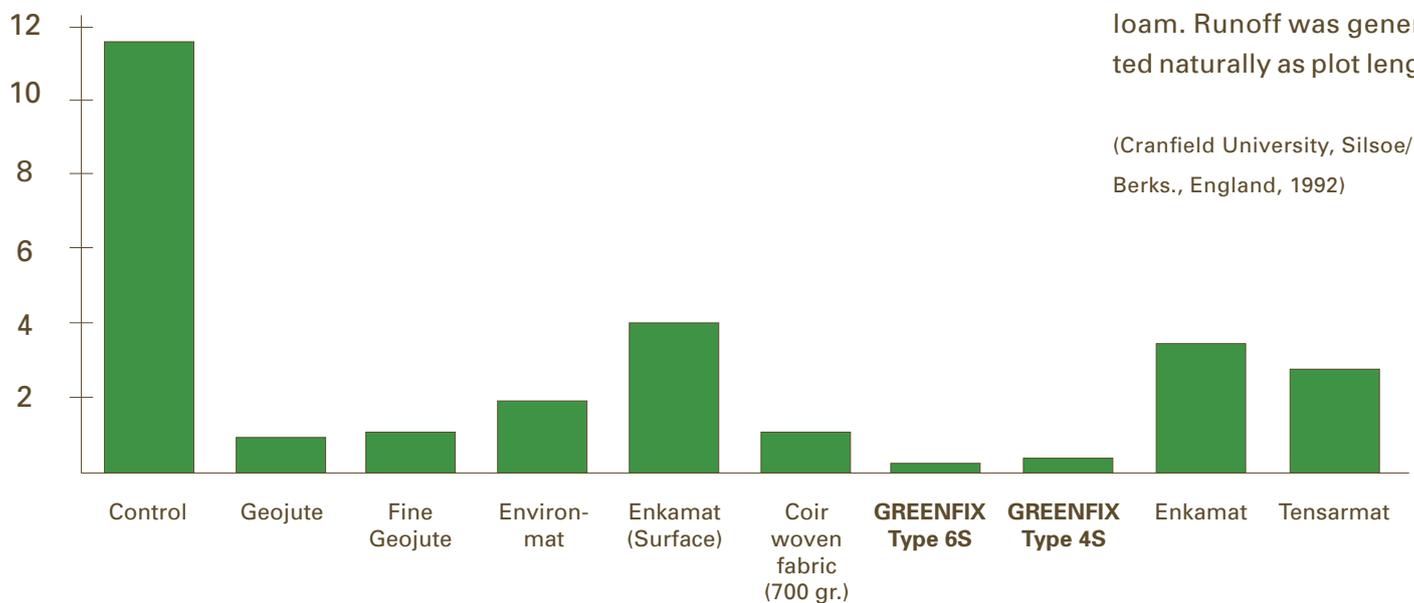


Application of GREENFIX **Eromat** for a detention reservoir (during installation)



Marram grass transplants established through GREENFIX **Eromat** to stabilize a sand mound

SOIL LOSSES UNDER HIGH INTENSITY RAINFALL (RUNOFF GENERATED)



Rainfall was applied at 95 mm/hr. Soil type was sandy loam. Runoff was generated naturally as plot length

(Cranfield University, Silsoe/ Berks., England, 1992)

Covamats & Eromats

NATURAL PRODUCTS FOR NATURAL SOLUTIONS



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



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.

Bio-Mulchmat

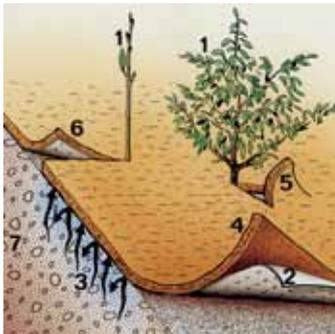
WEED CONTROL, MULCHING AND EROSION PROTECTION

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 operation. Nursery-like conditions can be achieved easily and by environmentally friendly means.

GREENFIX **Mulchmats** enhance growth without the need for 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 heating retention for maximum growth rates.
5. Plant insertion by flap method.
6. Plant insertion by edge method.
7. Protected soil.



Strong plant growth with mulch blankets



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



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



Nursery application:
Faster and stronger plant growth



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



Norwich Bypass/ England:
Individual plant protection with ready-slitted GREENFIX Mulchspats.

GREENFIX Mulchmats

Features

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

Economical: Easy to install. No special labour.

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.

Non-chemical weed control for many seasons.

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.

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.

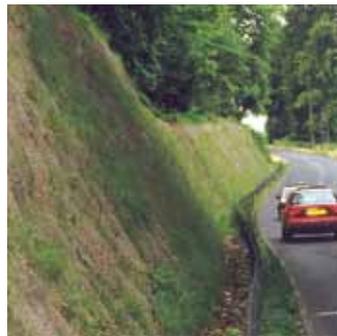
GREENFIX **Rockmats** provide a highly effective anti-vermin protection layer where rabbits and foxes etc. are likely to create slope instability due to burrowing activities. Additional steel wire reinforcement ensures slope face degradation from water run off or frost impacts.

The GREENFIX **f³ Rockmats** made of our unique special fibre mix are in addition giving fire proof according to DIN 4102-1.

The **f³** (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 **f³ Rockmats**.



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



Erosion protected slope after six weeks



Preparation of a collapsed slope due to heavy rainfalls



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

Rockmat Applications

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

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 f³ combines all the benefits from **Covamats**, **Eromats**, **Mulchmats**, **Rockmats**, as well as GREENFIX 75 and provides additional fire protection according to DIN 4102-1.

The new GREENFIX f³ unique grass fibres are European origin and specially treated according to best environmental practices, so that these fire free fibres are 100 % biodegradable within 36 to 60 months.

The new GREENFIX f³ product range offers more than just a competition to coirfibre products!



Vegetation establishment and anti-vermin protection with GREENFIX f³ **Rockmat**



GREENFIX f³ **Covamat**
(six weeks after installation)



Plant protection on a traffic island with GREENFIX f³ **Mulchmat** in the South of France.

GREENFIX f³ blankets available as ...

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

Greenfix 75

PERMANENT TURF REINFORCEMENT MAT

The GREENFIX 75 Composite Turf Reinforcement Series features a three-dimensional mat structure which permanent anchors. It reinforces the root and stem systems of vegetation under high shear stress, while the matrix materials provide effective immediate erosion control. GREENFIX 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

Embankment Mat

HIGH REINFORCEMENT AND 100 % BIODEGRADABLE

Special **Embankment Mats** with high strength coir nettings. Two different mesh sized coirwebs are stitched to soil separating coirfibre layer. This type of heavy duty entirely organic mat combination is most suitable for

surface stabilisations on subject to extreme erosion slopes and water sections with high velocity water flows. The **Embankment Mats** are available in pre-seeded or unseeded version.



GREENFIX **Embankment Mat** Type 400S in use



Protection of the embankment through grass establishment

Bio-Logs & Whattles

BIO-WATER-ENGINEERING

European manufactured GREENFIX **Coir-Logs** are used as organic fascines surrounded with 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 **Bio-Logs** were delivered with plant holes for quick insertion of water plants

The less cost effective GREENFIX **Whattles** are made from 100 % Europe's finest quality agriculture straw fibres surrounded with an outer high strength, black 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.



Environmental friendly solution with **Covamat fresh** and **Bio-Logs**

Advantages of **Straw Whattles**

- GREENFIX **Whattles** are relatively low-cost-solution to solve erosion problems.
- GREENFIX **Whattles** 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-Nettings & Oxygrid

GEO-JUTE AND GEO-COIR

Manufactured from unbleached jute fibre, **Geo-Jute** is a lightweight yet effective net for use in prevention of erosion. **Geo-Jute** will typically degrade in one season and is used where short term protection is required. It holds up to five times its own weight in water and when used in conjunction with hydroseeding it is suitable for the establishment of new grass seedlings.

Manufactured from 100 % high quality bristle coir fibres, **Geo-Coir** erosion control netting is produced from spun coir twine and is available in two versions, 700 g/m² and 900 g/m².



Bio-Nettings in use ...

Both materials, **Geo-Jute** and **Geo-Coirs**, provide a strong and durable short to mid term protection with an anticipated decomposition longevity of over 5 years. They can be invaluable for the establishment of new grass seedlings.

GREENFIX OXYGRID

GREENFIX offers the newly developed **Oxygrid** reinforcement netting for Greenfix biodegradable erosion control blankets. **Oxygrid** uses a controlled degradation technology incorporated into the netting during the manufacturing process. **Oxygrid** will favourize degradation caused by light, heat and moisture conditions after the useful life of the reinforcing netting.

The GREENFIX **Erosion Control Blankets** manufactured with **Oxygrid** combine the benefit of high tensile strength in the first growing season and gives our customers confidence of a strong blanket for erosion control combined with assured total decomposition leaving no unwanted materials in the soil.

Fixing Materials & Accessories

FIXING MATERIALS

Different 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.

The wooden pins are made from 100 % biodegradable durable natural wood. The wooden pins have a top cross-wooden-piece to ensure good soil contact.

We recommend to use approximately 1-3 pins per m² for all erosion control blankets and for the mulchmats 3-4 pins per m² depending on quantity of plants per m².



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

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

Benefits of the GREENFIX Fertiliser 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
- Is resistant to frost
- No fertiliser-burn
- Organic natural biodegradable material

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.



Measuring the benefits of GREENFIX Stem Protection



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



Strong and healthy plant growth



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

The Greenfix Principal

IN HARMONY WITH NATURE

Because our products have been developed to degrade in harmony with the natural growing process, all Greenfix materials:

- Leave no harmful pollution in the soil
- Do not present a hazard to wildlife
- Use recycled and waste fibres which minimises impact on the environment.

SOILTEC understands that a soft engineering approach is not always practical but by promoting a natural vegetative design solution, the impact of hard works that may be required is reduced, an increase in bio-diversity is created and an aesthetic and cost effective solution is possible.

SOILTEC also recognises the importance of selecting the correct plants and seeds that will develop and enhance the specific site conditions.

Since 1972, we have refined our experience in material application as well as seed and plant selection and often use local seeds as part of our total design solution.

SOILTEC offers the assurances of proven high quality materials and design, with many years of practical hands-on knowledge and experience to be Europe's leading producer and expert in erosion control solutions.

SOILTEC is an active member of the International Erosion Control Association (IECA) and as a result we have gained an even greater indepth knowledge of the various erosion problems that can and do occur.

We are in an unmatched position because our solutions are based on previous experience and our product development has continued improved over many years.

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