VMAX HIGH PERFORMANCE TURF REINFORCEMENT MATS

Product Brochure

Salix are a leading provider of VMax high performance turf reinforcement mats (TRM's) designed to protect and stabilise soil, preventing erosion through reinforced vegetation. Our range of products are engineered to deliver exceptional performance in high flow applications and flood events.

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Shear Stress Turf being installed

VMax High Performance Turf Reinforcement Mats

Vegetation and in particular grasses and herbaceous plant species are a robust, cost effective, and sustainable erosion control solution for the protection of soils. However vegetation has a limited threshold, at which stems will breakaway and underlying soils will become exposed leading to surface erosion, which can result in shallow slope failures. In such events turf reinforcement mats (TRM's) can improve the performance of vegetation greatly.

TRM's have high performance levels that can sustain high flow events for long durations, as they provide a 3-D structure that slows flow velocities at the soil interface and physically supports the base of the grass stems. A composite fibre layer prevents seed and soil loss from day one of application whilst vegetation establishes.

Our TRM's have been tested independently at several research institutions and results are published openly from one to 50-hour flow durations. Testing is based on soil loss and vegetation damage, as these are the key factors that lead to surface erosion and eventual bank failures.

Salix provide a range of TRM's depending on site conditions and are happy to provide guidance on product selection to suit site conditions.

Specifying the right seed mix for the right habitat and environment is also a key factor for good vegetation growth. Salix are on hand to advise and offer a range of our UK native seed mixes, including custom mixes and our own specific mix for resisting erosion. Our mix includes a wide variety of species that have been selected to give a good range of rooting depths and root architecture.

Intimate contact between the TRM, ground and seed is imperative for protection performance and vegetation establishment. Therefore good ground preparation and choice of fixings are key to success. Salix can supply fixings and installation guidance, ensuring a smooth installation.

Designed to protect and stabilise soil, preventing erosion through reinforced vegetation

Benefits

Our Turf Reinforcement Mats offer numerous benefits, including:

Soil Erosion control:

Our TRM's provide high levels of protection (unvegetated 3m/s) to the soil whilst vegetation establishes. The combined TRM 3D structure and vegetation root matrix, locks into underlying soils significantly improving soil stability under high flow events.

Slowing Flows:

Our TRM's allow healthy vegetation development, slowing down flows and reducing downstream erosion impact.

Flexible & Easy Installation:

Lightweight and versatile, TRM's can be easily installed in a variety of environments. They can be anchored using wooden fixings or metal pins which can be drilled in to increase pull out performance.

Durability:

Manufactured from UV stabilised polypropylene, the product is microbiologically and chemically inert, providing a design life of 50+ years.

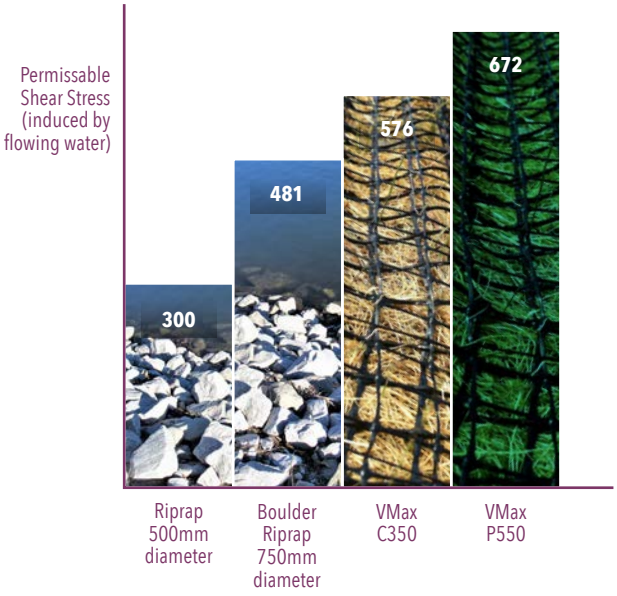
Biodiversity:

TRM's support a variety of vegetation, typically grass species on spillways and flood banks, providing habitat, improving biodiversity over traditional hard engineering.

Sustainable:

TRM's can often replace or reduce the need for rock armour in certain applications, providing a significant cost saving and embodied CO^2.

Vegetated Erosion Control Product Performance



VMax products provides a cost-effective, environmentally friendly, "green" alternative to rock and concrete for many erosion control projects.

VMax³ C350

VMax C350 installed on a spillway with a Rock mattress tie-in detail for a hydraulic jump zone

Spillway fully vegetated and protected one year later

VMax³ C350 is composed of a permanent, high-strength, three-dimensional matting structure, incorporated with a 100% coconut-fibre matrix that supplements the permanent matting structure's grass germination and erosion control capabilities.

Proven in extensive laboratory and field research, as well of thousands of applications all around the world, C350's high-strength, 3-D matting structure boosts the shear resistance of vegetation up to 576 Pascals.

VMax P550

VMax P550 on reinforced river bank

VMax P550 fully vegetated one year later

A high tensile strength TRM with additional benefit of a PP fibre composite layer.

The 3D skeleton follows best practice as concluded in CIRIA 116 Design of Reinforced Grass Waterways for enhanced reinforcement. The PP fibre layer provides additional erosion control performance during the grass establishment period. VMax P550 is our highest performing TRM making it ideal for overtopping on spillways.

VMax C500

A new hybrid product with added performance of VMax C350 with a coir fibre core layer.
A high tensile strength 3D skeleton composite Geomat.

Installing VMax C500 over prepared seeded soil

Early germination through VMax C500

VMax Shear Stress Turf

VMax Shear Stress Turf installed with lifting beam

VMax Shear Stress Turf 3 months after installation

Salix have the facilities to contract grow turf using the VMax range of TRM's. VMax C350 or C500 is used as the reinforcement element within the turf giving unprecedented protection performance.

Shear Stress Turf is a unique pre-vegetated erosion control solution typically used in areas where forces exerted by water exceed the shear limits of unvegetated TRMs from day one of installation.

Applications include high flow channels, stream banks, shorelines and spillways where rock rip rap, articulated concrete blocks and poured concrete were once the only suitable alternatives for erosion protection.

This is supplied under contract grow terms, with a lead time during the growing season of circa 12-16 weeks.

Statement on Large Scale Testing & UK validation

Many companies publish performance data for vegetation that is reinforced with various Geomats.

Many are based on bench scale tests results, or taken from incorrectly extrapolated data or from actual events where the TRM geomat did not mechanically fail, but where no mention is made that all the vegetation layer was stripped and catastrophic erosion occurred from under the TRM.

Salix only use data from third party, independent, large scale flume testing and UK and/or UK topping and high flow events.

Product Name	Maximum Permissible Un-Vegetated Performance	Maxiumum Permissible Fully Vegetated Performance	Permissible Shear Stress (Fully Vegetated) Short Duration Flow (in PA)	Permissible Shear Stress (Fully Vegetated) Long Duration Flow (in PA)
Salix C350	3.2m/s	6m/s	480	576
Salix C500	3.8m/s	7.6m/s	672	632
Salix P550	3.8m/s	7.6m/s	672	632
Salix Woven TRM	NA	7.6m/s	766	NA

Natural coir fibers, which provide a unique combination of strength, durability, and environmental benefits

Applications

1 *Vmax C350 installed with a rock roll and coir roll toe revetment*

1 *Established Vmax C350*

1. High Energy Watercourses:

TRM's can be used to protect watercourse banks from high flows and soil erosion during storm events or flooding. This helps to maintain the integrity of the watercourse meanwhile supporting vegetation allowing the bank to blend in without the need for introducing grey engineering.

2 *VMax C500 installed with rock rolls*

2 *VMax C500 established on a steep embankment around a rail bridge*

2. Asset Protection:

Around assets such as bridges or steepened embankments for railways or highways, flow velocities can speed up, leading to undermining and damage around the earth embankment. VMax TRM's can be used with our other products such as rock rolls to reinforce embankments, providing protection to the asset.

Applications

3 *VMax C350 installed for flood protection*

3 *Ariel view of flood bank*

3. Flood Embankment and Spillways:

VMax TRM's can be used to provide permanent protection for flood embankments and spillways during overtopping events. This helps to maintain the integrity of the embankment reducing risk of catastrophic events.

4 *VMax C350 installed in a drainage channel*

4 *Established VMax C350 installed in a drainage channel*

4. Drainage Channels:

VMax TRM's are used to protect high flow drainage channels, for SuDS schemes often used in conjunction with a rock mattress scour apron.

All our coir based products are carbon neutral.

Applications

5 *VMax C500 to protect a steep embankment on housing development*

5 *VMax C500 installed with ground anchors to protect a steep embankmentembankment*

5. Embankment Stabilisation:

TRM's have high tensile strength, meaning they can be combined with ground anchors on steep slopes to stabilise the ground and prevent shallow slips. While supporting vegetation to form a green reinforced slope.

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