Engineered Turf Reinforcement

Sustainable erosion control solutions to replace non-vegetating hard armour
Meeting today’s environmental challenges

Synthetic erosion mats and blankets have become a logical choice for cost effective, technically proven, permanent solutions to promote stabilisation and control erosion. Cirtex offer these environmentally sensitive alternatives to hard armour solutions.

Turf Reinforcement Mats (TRMs) and High Performance Turf Reinforcement Mats (HPTRMs) offer maximum performance for the widest range of erosion control challenges.

Cirtex TRM’s and HPTRM’s are designed to provide channel stabilisation, slope or bank protection, re-vegetation and inlet and outlet control works.

Platipus® Percussion Anchors are ideal in steep embankments to protect against surface erosion and solve shallow plane instability challenges using a system of patented ground anchors.

The difference...

The most technologically advanced Turf Reinforcement Mats available
Each Cirtex solution is the result of a comprehensive innovation, design, production and testing process. A leader in research and market education, Cirtex enables customers to find the right solution to difficult technical and environmental challenges.

Proven erosion solutions with X3® fibre technology
The PyraMat® HPTRM use patented X3® fibre technology with a unique matrix of voids to promote re-vegetation and moisture retention. X3® fibre has superior UV resistance and offers enhanced performance in long term channel and slope protection situations.

Performance tested
Extensive product testing at the University of Colorado (USA) Hydraulics Laboratory and GAI Accredited Independent Laboratories, has quantified performance under a range of hydraulic conditions. Testing specifications follow ASTM standards for internationally recognised benchmarks.
Match the right product for top performance

Soil loss through water borne forces is a major environmental problem today.
The use of appropriate ground stabilisation treatments in combination with appropriate vegetation re-establishment is a very useful technique. Cirtex TRMs are designed to provide these highly-capable, cost-effective treatments.

Tough enough for arid conditions
In arid and semi-arid environments and where vegetative cover may be difficult to maintain, long term performance is assured against UV deterioration.

Smart and sustainable
Cirtex TRMs are excellent sustainable alternatives to hard armour. Cirtex HPTRMs can replace rock rip rap, concrete channels, rock mattress or interlocking concrete block systems with more natural visual appearance, ground water recharge, sediment containment and overall cost reduction.

SEE THE DIFFERENCE

X3® TRM FIBRE
CONVENTIONAL TRM FIBRE

X3® 3-dimensional fibres are incorporated to create a thick matrix of voids to trap and house more sediment, soil and water to promote rapid vegetation growth. These features and superior tensile strength double the chance for long term vegetation survival.

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PyraMat® HPTRMs are designed to handle the most demanding erosion control applications. The PyraMat® three-dimensional construction makes HPTRMs ten times stronger than traditional TRMs.

With its unique construction and fibre technology, PyraMat® locks in seed and soil for permanent reinforced vegetation. Its outstanding resistance to ultraviolet degradation makes PyraMat® a preferred product in arid and semi-arid environments where soil protection is needed but where full vegetation may be difficult to achieve.

Pyramat HPTRMs feature a patented matrix of X3® fibre pyramids that keep soil in place under high flow conditions. Unique woven construction can provide up to 10 times the tensile capacity of 1st Generation synthetic erosion mats with even greater shear capacity, improved UV resistance, longevity and improved flexibility for intimate ground contact to promote rapid seedling growth and minimal soil loss.

Pyramat HPTRMs for high flow channels, extreme slopes, pipe inlet and outlets and other demanding applications. Patented PyraMat three-dimensional construction is ten times stronger than traditional TRMs. The 3D polypropylene matrix features X3® fibre which locks in seed and soil for permanent reinforced vegetation. Outstanding UV resistance makes PyraMat ideal in arid and semi-arid environments where soil reinforcement is needed but full vegetation is not expected.

OVERVIEW OF PYRAMAT® HPTRM ON SLOPE
FEATURES AND BENEFITS

- Uses X3® polypropylene fibre technology to create a lofty 3-dimensional polypropylene geotextile
- Very high soil/root system interlock and reinforcement capacity
- Specifically designed to minimise animal entrapment
- High tensile strength stands up to extreme conditions of loading
- UV protection offers superior levels of protection and long term performance

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>TEST VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
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<tr>
<td>Mass/Unit Area</td>
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<td>Colour</td>
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<td><strong>Mechanical</strong></td>
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<td><strong>Endurance</strong></td>
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<tr>
<td>UV Resistance @ 6000hours</td>
<td>ASTM D-4355</td>
<td>&gt; 90%</td>
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<tr>
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<tr>
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<td>Manning’s “n”†</td>
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</tr>
<tr>
<td>Roll Sizes</td>
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</tr>
</tbody>
</table>

**PYRAMAT®**

- Code: 76307
- Grade: PyraMat
- Roll Size: 3.2m x 25m
- Area: 2.6 x 27.4m

For more information on our products contact us 0800 CIRTEX | INFO@CIRTEX.CO.NZ
The high-performance T-RECS® Turf Reinforcement Mat is a permanent three dimensional, woven polypropylene geotextile designed for steep slopes up and is an ideal non-hard armoring solution for high velocity channels.

T-RECS® is manufactured with a patented process of cross directional monofilament fibers woven into multiple dimensions featuring the T-RECS® Technology with dome characteristics. This unique process and feature aids in the performance of the product and gives additional support to the vegetation. The product provides reinforcing capabilities and interlocking root system, while assisting the vegetation establishment. Product can be either surface applied or soiled filled to maximize performance.

The T-RECS® meets Type 5.A, 5.B, and 5.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18.

**FEATURES AND BENEFITS**

- Cross-directional, monofilament structure
- Unique ‘dome’ shape giving greater surface coverage and improved adherence to soft subgrade
- Interweaving dome shape allows maximum seed, soil and water to be trapped, promoting faster vegetation and a stronger root system.

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
<th>Roll Size</th>
<th>Area</th>
</tr>
</thead>
<tbody>
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<td>Tan</td>
<td>1.8m x 27.4m</td>
<td>49.32m²</td>
</tr>
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<td>13057</td>
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</tr>
<tr>
<td>PROPERTY</td>
<td>TEST METHOD</td>
<td>TEST VALUE</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td><strong>Physical</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mass/Unit Area(^3)</td>
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<tr>
<td>Thickness</td>
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</tr>
<tr>
<td>Light Penetration (% Passing)</td>
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<td>43%</td>
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</tr>
<tr>
<td>Colour</td>
<td>Visual</td>
<td>Green or Tan</td>
<td></td>
</tr>
<tr>
<td>Resiliency</td>
<td>ASTM D-6524</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>ASTM D-6575</td>
<td>1.7cm/kg</td>
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<td>Roll Size</td>
<td>Measured</td>
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</tr>
<tr>
<td><strong>Mechanical</strong></td>
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</tr>
<tr>
<td>Tensile Strength -MD(^3)</td>
<td>ASTM D-6818</td>
<td>41kN/m</td>
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</tr>
<tr>
<td>Elongation - TD</td>
<td>ASTM D-6818</td>
<td>41%</td>
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</tr>
<tr>
<td>Tensile Strength - TD(^3)</td>
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<td>41kN/m</td>
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<tr>
<td>Elongation - TD</td>
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<tr>
<td>Resiliency</td>
<td>ASTM D-6524</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td><strong>Endurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV Resistance @ 6000hours</td>
<td>ASTM D-4355</td>
<td>91%</td>
<td></td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetated Shear Stress(^\ast)</td>
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<td>718 Pa</td>
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<tr>
<td>Vegetated Velocity</td>
<td>ASTM D-6460</td>
<td>7.6 m/s</td>
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</tr>
<tr>
<td>Manning's &quot;n&quot;(^\dagger)</td>
<td>ASTM D-6460</td>
<td>0.028</td>
<td></td>
</tr>
<tr>
<td>Germination/Seedling Emergence</td>
<td>ECTC Method 4</td>
<td>636% Improvement</td>
<td></td>
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</tbody>
</table>
ECP2 Turf-reinforcement mats are a 3 dimensional matrix of UV stabilised polypropylene fibres, allowing vegetation to be established in high-stress environments.

ECP2 Turf-reinforcement mats allow for an aesthetically pleasing vegetated finish for slopes prone to erosion and scour. ECP2 Turf mats can handle flow velocities up to 6.1 m/s when vegetated making these a viable alternative to traditional hard armour methods of scour protection such as concrete and gabion type structures. Along with slopes, ECP2 is also very effective when used in swale drain applications and stormwater overflow paths.

ECP2 allows grass to be used in overflow paths and swale drain applications providing an easily maintainable solution. The use of reinforced grass in swale drain applications helps to minimise the transmission of waterborne sediments into our waterways.

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</thead>
<tbody>
<tr>
<td>76261</td>
<td>Green</td>
<td>2.3m x 36.6m</td>
<td>84.18m</td>
</tr>
</tbody>
</table>

**FEATURES AND BENEFITS**

- Allows Aesthetically Pleasing Vegetated Finish
- UV stabilised for Greater Service Life
- Excellent Flow Velocity Performance
- Assists with Vegetation Growth
**PROPERTY** | **TEST METHOD** | **TEST VALUE**
--- | --- | ---
**Physical** |  |  
Mass/Unit Area | ASTM D-6566 | 406g/m² 
Thickness | ASTM D-6525 | 10.2mm 
Light Penetration (% Passing) | ASTM D-6567 | 18% 
Colour | Visual | Green 
**Mechanical** |  |  
Tensile Strength MD/CD | ASTM D-6818 | 5.84kN/m 
Elongation MD/CD | ASTM D-6818 | 31/19% 
Resiliency | ASTM D-6524 | 80% 
**Endurance** |  |  
UV Resistance @ 1000hours | ASTM D-4355 | 82% 
**Slope Performance Design Values*** |  |  
Manning’s N |  | 0.028 
C Factors | ASTM D-6459 | 0.01 
Slope Length (L) | ≤ 3:1 | ≤ 3:1 - 2:1 | >2.1 
<15m | 0.012 | 0.025 | 0.092 
15m - 30m | 0.036 | 0.065 | 0.115 
> 30m | 0.080 | 0.108 | 0.145 
**Channel Performance Design Values*** |  |  
Unvegetated Shear Stress | ASTM D-6460 | 125 Pa 
Unvegetated Velocity | ASTM D-6460 | 3.0 m/s 
Vegetated Shear Stress | ASTM D-6460 | 574 Pa 
Vegetated Velocity | ASTM D-6460 | 6.1 m/s 

*Large Scale Results obtained by a 3rd Party GAI Accredited Independent Laboratory
Stabilizing slopes offer significant challenges. Many times the lack of deep rooted vegetation, excess water, poor drainage, and over steepening make them susceptible to erosion or instability. Platipus® Anchors has over 30 years of experience and has proven that the combination of Percussive Driven Earth Anchors (PDEAs) and a high strength facing material to support the load generated by the PDEA will stabilize and prevent erosion in these applications.

The Platipus ARGS Range consisted of 3 main anchor types.

**Platipus® S2 Anchor**

The Platipus® S2 ARGS Percussive Driven Earth Anchor (PDEA) assembly comes in a variety of configurations with up to 1m of 3mm stainless steel wire tendon, two sizes of HDPE load plate and either a copper ferrule or wedge grip option. The anchor system should be driven through the surface covering material to a minimum depth of 450mm to provide an ultimate holding capacity of up to 250kg.

**Common facing materials used with Platipus S2 Anchors**

- Turf Reinforcement Matting
- Turf Pavers
- Geotextiles
- HDPE Coverings

**Platipus® S4 & S6 Anchors**

The Platipus® S4 ARGS Percussive Driven Earth Anchor (PDEA) is the perfect solution for granular / non-cohesive soil. The larger S6 ARGS should be used in cohesive conditions. Both assemblies include a length of 4mm stainless steel wire tendon, a choice of load plates and a stainless steel conical wedge grip. They should be driven to a minimum depth of 750mm beyond the failure plane and have an ultimate holding capacity of 1000kg. Anchor depth, spacing and loads should be determined by a qualified Geotechnical Engineer.

**Common facing materials used with Platipus S4 & S6 Anchors**

- High Performance Turf Reinforcement Matting (HPTRM)
- High Strength Geotextiles & Geogrid
- Double Twist Wire Mesh
FEATURES AND BENEFITS
• Over 30 years of experience
• 1000’s of successfully completed projects
• Fast & easy installation
• Immediate & quantifiable loads
• Simple & cost effective
• Low environmental impact
• Can be incorporated with a number of surface reinforcement mattings
• Pre-contract site evaluation & anchor testing
• Strong technical guidance, on-site training & support available

PLATIPUS® (ARGS)
Code    Grade
76314   Platipus S2 Anchor GEO 1m Kit
76313   Platipus S2 ARGS 1m Kit
76369   Platipus S4 ARGS 1.5m Kit
76371   Platipus S6 ARGS 1.5m Kit
76372   Platipus S6 ARGS 3m Kit

INSTALLATION
1. Remove rocks / debris and re-profile the slope
2. Apply erosion control matting
3. Install anchors to engineered depth / spacings and re-vegetate

For more information on our products contact us 0800 CIRTEX  |  INFO@CIRTEX.CO.NZ
Many other GeoSynthetic solutions available please phone us on 0800 CIRTEX or visit CIRTEX.CO.NZ

- Landfills and Environmental Barrier Systems
- Stormwater Management
- Coastal Protection
- Retaining Walls
- Erosion and Sediment Control
- Subgrade Stabilisation
- Pavement Reinforcement
- Subsoil Drainage Filtration
- Dewatering