

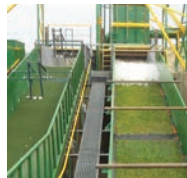
ARMORMAX[®]

ENGINEERED EARTH
ARMORING SOLUTION



ARMORMAX® Engineered Earth Armoring Solution, manufactured by Propex GeoSolutions, is the most advanced flexible armoring technology available for severe erosion and surficial slope stability challenges. The ARMORMAX® system can be used in erosion control applications where additional factors of safety are required, including protecting earthen levees from storm surge and wave overtopping, and stream, river and canal banks from scour and erosion. In addition, this system is ideally suited to protect storm water channels in arid and

semi-arid environments where vegetation densities of less than 30% coverage are anticipated. For slope stability applications, the system can be further engineered to provide surficial slope stabilization to resist shallow plane failures. Consisting of our PYRAMAT® woven three-dimensional High Performance Turf Reinforcement Mat (HPTRM) with X3® fiber technology and Engineered Earth Anchors (EEAs), you can count on the ARMORMAX® system to hold its ground.



Durable Armoring System

Lightweight protection layer securely anchored to the subgrade for long-term design life.

Withstands Extreme Hydraulic Stresses

The PYRAMAT® HPTRM component of ARMORMAX® has been tested at CSU comparable to traditional armoring methods.

Resists Non-Hydraulic Event Damage

High strength survivability woven surface resists non-hydraulic stresses like debris and maintenance operations.

Secures Erosion Control Applications

The anchors act as a tie-down mechanism securing the HPTRM firmly to the ground for additional safety factors.

Stabilizes Slope Stability Applications

Engineered to provide surficial slope stabilization to resist shallow plane failures.

OTHER FEATURES & BENEFITS

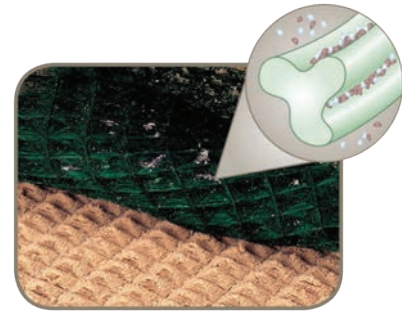
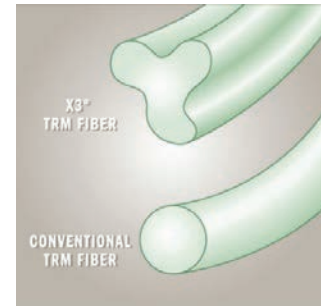
- Provides up to 75 years of design life.
- Supports the EPA Green Infrastructure initiative.
- Recognized as a stormwater Best Management Practice (BMP) and is proven to reduce erosion and reinforce vegetation for low-impact, sustainable design.
- Easy to handle, lightweight components for rapid installation.
- Use of lightweight equipment and unskilled labor facilitates installation with limited site access.
- Aesthetically pleasing and more cost effective than conventional methods such as rock riprap and concrete paving.

Outperforms and is more cost effective than conventional methods, including:

- Rock riprap
- Rock slope protection
- Gabions
- Concrete blocks or paving
- Fabric formed revetments

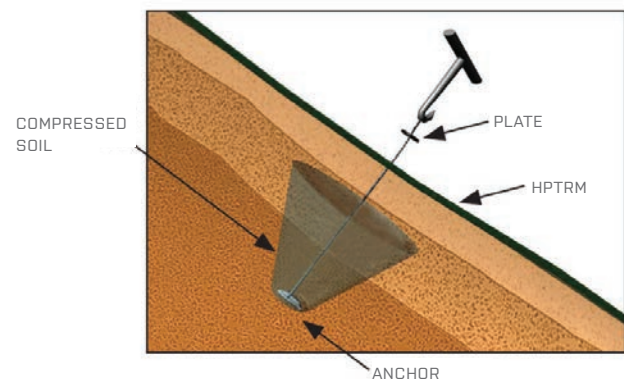
WOVEN THREE-DIMENSIONAL HPTRM PROTECTION LAYER FEATURING X3® FIBER TECHNOLOGY

- Unique X3® fiber shape provides over 40% more surface area than conventional fibers to capture the moisture, soil and water required for rapid vegetation growth.
- Exhibits extremely high tensile strength as well as superior interlock and reinforcement capacity with both soil and root systems.
- Maximum ultraviolet protection for long-term design life.
- Netless, rugged material construction stands up to the toughest erosion applications where high loading and/or high survivability conditions are required.



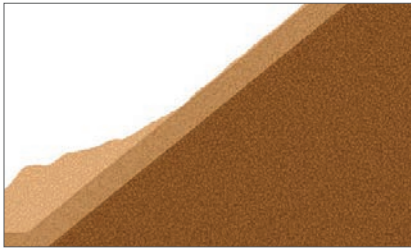
EARTH ENGINEERED ANCHORS SECURE THE MAT TO THE GROUND

- Made of corrosion resistant material to provide considerable mechanical strength and durability during installation and in service.
- Connected to a zinc-aluminum coated carbon steel or stainless steel tendon to fully enhance corrosion resistance particularly at the soil air interface.
- As the load exerted on the soil by the ARMORMAX® system increases, a body of soil above the anchor is compressed and provides resistance to any further anchor movement, permanently securing the mat to the ground.

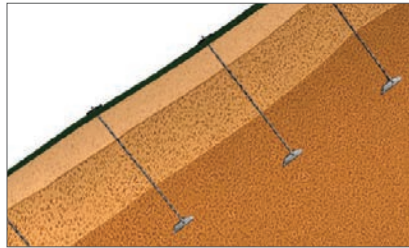


▼ SLOPE STABILITY APPLICATIONS

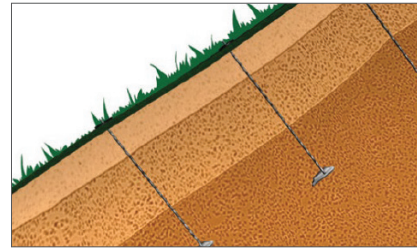
The figures below illustrate the ARMORMAX® system in slope stability applications. The system is comprised of the PYRAMAT® HPTRM and typically Type B2 Earth Engineered Anchors (EEAs) as specified by the project engineer.



SHALLOW PLANE FAILURE



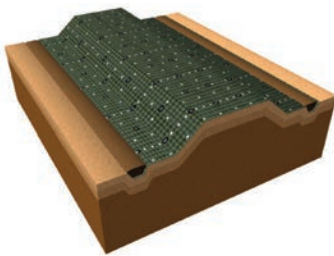
APPLY ARMORMAX SYSTEM



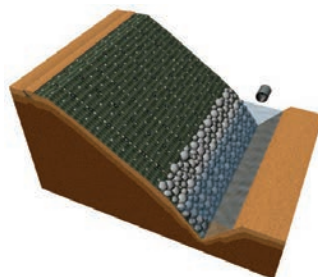
VEGETATION GROWTH

▼ EROSION CONTROL APPLICATIONS

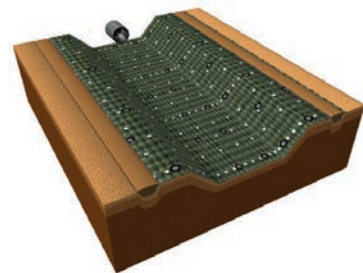
The figures below illustrate the ARMORMAX® system for erosion control applications. The system is comprised of the PYRAMAT® HPTRM and typically Type B1 Earth Engineered Anchors.



LEVEE ARMORING



ARID/SEMI-ARID
STORMWATER CHANNELS



CANAL, STREAM AND RIVER
BANK PROTECTION

TITAN ADVANTAGE

- Clear installation guidelines.
- Comprehensive engineering and technical support service.



▼ **ARMORMAX KEY PHYSICAL PROPERTIES**

PROPERTY	TEST METHOD	ENGLISH	METRIC
ORIGIN OF MATERIALS			
% U.S. Manufactured		100%	100%
PHYSICAL			
Thickness ²	ASTM D-6525	0.40 in	10.2 mm
Light Penetration (% Passing) ³	ASTM D-6527	10%	10%
Color	Visual	Green or Tan	
MECHANICAL			
Tensile Strength ²	ASTM D-6818	4000 x 3000 lbs/ft	58.4 x 43.8 kN/m
Elongation ²	ASTM D-6818	40 x 35 %	40 x 35 %
Resiliency ²	ASTM D-6524	80%	80%
Flexibility ⁴	ASTM D-6575	0.534 in-lb	616,154 mg-cm
PERFORMANCE			
UV Resistance % Retained at 6,000 hrs ⁴	ASTM D-4355	90%	90%
UV Resistance % Retained at 10,000 hrs ⁴	ASTM D-4355	85%	85%
ENDURANCE			
Velocity (Vegetated) ^{4,5}	Large Scale	25 ft/sec	7.6 m/sec
Shear Stress (Vegetated) ^{4,5}	Large Scale	16 lb/ft ²	766 Pa
Manning's n (Unvegetated) ^{4,6}	Calculated	0.028	0.028
USACE / CSU Wave Overtopping	Large Scale	USACE Approved	
Seedling Emergence ⁴	ASTM D-7322	296%	296%
ROLL SIZES ⁷		8.5 ft x 90 ft 15.0 ft x MR	2.6 m x 27.4 m 4.6 m x MR

PHYSICAL		ENDURANCE/COMPONENT MATERIALS	
Anchor Head Length	3.4 in	Anchor Head	Die cast aluminum
Anchor Head Width	1.0 in	Cable Tendon	Zinc-aluminum carbon steel
Anchor Head Bearing Area	2.5 in ²	Load Bearing	Die cast zinc
Anchor Head Weight	0.1 lbs	Load-Lock Mechanism	Die cast zinc w/ ceramic roller
PERFORMANCE		Crimped Ferrule	Aluminum
		MECHANICAL	
Load Range (Cohesive through Non Cohesive Soils)	Up to 500 lbs	Ultimate Strength	1,100 lbs
Embedment Depth	Up to 5 ft	Working Load	800 lbs

- **Material Composition:** Proprietary ultraviolet protection package in PYRAMAT HPTRM, and the durability of the anchor provides long-term design assurance.
- **Tensile Strength:** PYRAMAT HPTRM boasts 4000 x 3000 lb/ft (58.4 x 43.8 kN/m) of tensile strength, which exceeds the U.S. EPA definition of a High Performance Turf Reinforcement Mat.
- **Seedling Emergence:** PYRAMAT HPTRM features X3® fiber technology, which offers 40% more fiber surface area to capture the critical sediment and moisture needed to increase seed germination within the first 21 days.
- **Flexibility:** Allows the system to conform and maintain intimate contact with the prepared subgrade.
- **Anchor Loading Capacity:** Based on anchor size, tendon length and on-site soil parameters the anchor foot provides up to an ultimate of 500 to 3000 lbs of pullout resistance per Earth Engineered Anchor. Actual holding strengths depend upon soil characteristics, anchor type and installation techniques.

NOTES:

1. The property values listed above are effective 07/13/2015 and are subject to change without notice.
2. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum Average Roll Value (MaxARV), calculated as the typical plus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will meet to the value reported.
4. Typical Value.
5. Maximum permissible velocity and shear stress has been obtained through vegetated testing programs featuring specific soil types, vegetation classes, flow conditions, and failure criteria. These conditions may not be relevant to every project nor are they replicated by other manufacturers. Please contact us for further information.
6. Calculated as typical values from large-scale flexible channel lining test programs with a flow depth of 6 to 12 inches.
7. Master Roll (MR) is to be up to 600 feet in length.



TITAN ENVIRONMENTAL CONTAINMENT

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TRUST. QUALITY. VALUE