

# LANDLOK® TURF REINFORCEMENT MATS



Our Landlok® Turf Reinforcement Mats (TRMs) are the industry's most advanced solutions for applications requiring immediate, long-term erosion protection, vegetative reinforcement and water quality enhancement capabilities. Our first generation TRMs are constructed of a dense web of 100% polypropylene fibers positioned between two biaxially oriented nets. When vegetated, they provide twice the erosion protection of vegetation alone.

Now we've taken the same woven technology in our High Performance Turf Reinforcement Mats (HPTTRMs) and used it to design the next generation of TRMs. These netless, composite-free three-dimensional second generation TRMs feature a rugged material construction that combines superior tensile strength, flexibility and UV stability. This allows them to deliver better, long-term performance over traditional methods like rock riprap and concrete paving and increased design life over first generation netted, fused, glued or stitch-bonded TRMs. All Landlok TRMs feature our patented X3® fiber technology, which provides 40% greater surface area for trapping and protecting seed and soil.

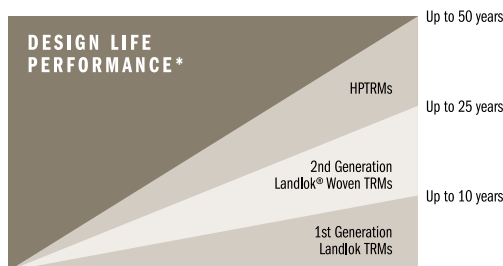
## 1ST GENERATION LANDLOK® TRMs FEATURES & BENEFITS

- ▶ Provides permanent turf reinforcement to enhance vegetation's natural ability to filter soil particles and prevent soil loss during storm events
- ▶ 100% synthetic and UV-stabilized components
- ▶ Utilizes X3 fiber technology for up to 40% greater surface area to protect emerging seedlings and sediment retention
- ▶ Promotes infiltration which leads to groundwater recharge
- ▶ More aesthetically pleasing than conventional methods (i.e. rock riprap and concrete paving)
- ▶ Superior product testing and performance
- ▶ Easier installation than conventional solutions (no heavy equipment required)

## 2ND GENERATION LANDLOK® WOVEN TRMs FEATURES & BENEFITS

All the features and benefits of first generation Landlok TRMs, plus:

- ▶ A unique, patented matrix of pyramids formed with X3 fibers that gridlocks soil in place under high-flow conditions
- ▶ 3-D woven material with superior tensile strength for loading and/or survivability requirements
- ▶ Greater flexibility to maintain intimate contact with subgrade, resulting in rapid seedling emergence and minimal soil loss
- ▶ Completely interconnected yarns that provide superior UV resistance throughout the TRM
- ▶ A combination of superior characteristics for long-term performance and a longer design life than first generation Landlok TRMs
- ▶ Meets requirement of 5 mm<sup>2</sup> or less mesh size to prevent wildlife entanglement in any sensitive habitats






\*Design life performance may vary depending upon field conditions and applications.

**Outperforms and is more cost-effective than conventional erosion control methods, including:**

- ▶ Rock riprap
- ▶ Concrete paving
- ▶ Erosion Control Blankets (ECBs)

## LANDLOK® TURF REINFORCEMENT MATS PRODUCT FAMILY TABLE

PRODUCT	DESCRIPTION	FUNCTIONAL LONGEVITY	COLOR	FIBER TYPE	# OF NETS	FHWA FP-03, SECTION 713 COMPLIANCE
 LANDLOK® 450	1ST GENERATION TRM	PERMANENT	TAN OR GREEN	POLYPROPYLENE X3® FIBER TECHNOLOGY	2	TYPE 5A, 5B, 5C
 LANDLOK 1051	1ST GENERATION TRM	PERMANENT	TAN	POLYPROPYLENE X3 FIBER TECHNOLOGY (GEOTEXTILE BACKING)	1	TYPE 5A, 5B, 5C
 LANDLOK 300	2ND GENERATION TRM	PERMANENT	TAN OR GREEN	POLYPROPYLENE X3 FIBER TECHNOLOGY	0 (WOVEN)	TYPE 5A, 5B, 5C

# LANDLOK® TURF REINFORCEMENT MATS

## APPLICATION SUGGESTIONS FOR LANDLOK® TURF REINFORCEMENT MATS

	APPLICATION	FUNCTIONAL LONGEVITY	PRODUCT STYLE	INSTALLED COST <sup>1</sup>	ANCHOR SUGGESTIONS <sup>5</sup>
SLOPES <sup>2</sup>	UP TO 1H:1V	PERMANENT	LANDLOK® 300	\$10.00 - 15.00/yd <sup>2</sup> \$11.96 - 17.94/m <sup>2</sup>	2.5 ANCHORS/yd <sup>2</sup> 3 ANCHORS/m <sup>2</sup>
	UP TO 1.5H:1V	PERMANENT	LANDLOK 450	\$9.00 - 14.00/yd <sup>2</sup> \$10.77 - 16.75/m <sup>2</sup>	2 ANCHORS/yd <sup>2</sup> 2.5 ANCHORS/m <sup>2</sup>
	UP TO 2H:1V				
CHANNELS <sup>3</sup>	SHEAR STRESS UP TO 10 lb/ft <sup>2</sup> (479 N/m <sup>2</sup> ) VELOCITY UP TO 18 ft/sec (5.5 m/sec)	PERMANENT	LANDLOK 450	\$9.00 - 14.00/yd <sup>2</sup> \$10.77 - 16.75/m <sup>2</sup>	2.5 ANCHORS/yd <sup>2</sup> 3 ANCHORS/m <sup>2</sup>
	SHEAR STRESS UP TO 12 lb/ft <sup>2</sup> (576 N/m <sup>2</sup> ) VELOCITY UP TO 20 ft/sec (6.1 m/sec)	PERMANENT	LANDLOK 300	\$10.00 - 15.00/yd <sup>2</sup> \$11.96 - 17.94/m <sup>2</sup>	2.5 ANCHORS/yd <sup>2</sup> 3 ANCHORS/m <sup>2</sup>
BANKS <sup>4</sup>	WAVE ACTION < 1 ft (30 cm)	PERMANENT	LANDLOK 1051	\$10.00 - 15.00/yd <sup>2</sup> \$11.96 - 17.94/m <sup>2</sup>	2.5 ANCHORS/yd <sup>2</sup> 3 ANCHORS/m <sup>2</sup>

NOTES: 1. Installed cost estimates range from large to small projects according to material quantity. The estimates include material, seed, labor and equipment. Note that costs vary greatly in different regions of the country. 2. For slopes steeper than 1H:1V, please see our Pyramat® HPTRM product brochure. 3. Values shown are short-term fully vegetated maximums. For channels with a shear stress greater than 12 lb/ft<sup>2</sup> (576 N/m<sup>2</sup>) and velocity greater than 20 ft/sec (6.1 m/sec), please see our Pyramat HPTRM product brochure. 4. For wave action greater than 1 ft (30 cm), please see our Pyramat HPTRM product brochure. 5. For anchor size and style, please see our TRM Installation Guidelines.

## KEY PHYSICAL PROPERTIES OF LANDLOK® TURF REINFORCEMENT MATS

- ▶ **Tensile Strength:** High-strength and low-strain minimizes seed, root damage and material under heavy loads.
- ▶ **Flexibility:** Greater flexibility allows our TRMs to conform and maintain intimate contact with the prepared grade, increasing the ease of successful installation.
- ▶ **Seedling Emergence:** Landlok TRMs, now with X3® fiber technology, offer 40% more fiber surface area to capture the critical sediment and moisture needed to increase seed germination within the first 21 days.
- ▶ **UV Resistance:** All Landlok TRM components are constructed with the top-tested UV stabilizers, such as carbon black and hindered amine light stabilizers (HALS).

### SEVEN STEPS FOR SUCCESSFUL TRM SELECTIONS\*

<b>1</b> SELECT APPLICATIONS	<b>2</b> DETERMINE FUNCTIONAL LONGEVITY	<b>3</b> ANTICIPATE CLIMATE (ARID, SEMI-ARID OR TEMPERATE)	<b>4</b> UNDERSTAND TRADITIONAL SOLUTION	<b>5</b> PREDICT NON-HYDRAULIC STRESSES (MAINTENANCE STRESSES)	<b>6</b> KNOW VEGETATION TYPE	<b>7</b> CALCULATE HYDRAULIC STRESSES
------------------------------	---	--	--	--	-------------------------------	---------------------------------------

\*See Propex Engineering Bulletin or EC-DESIGN® software for more information.

**LANDLOK® TURF REINFORCEMENT MAT PROPERTY TABLE<sup>1</sup>** ENGLISH & METRIC UNITS

	PROPERTY	TEST METHOD	VALUE <sup>2</sup>	LANDLOK® 450	LANDLOK® 1051	LANDLOK® 300
PHYSICAL	MASS PER UNIT AREA	ASTM D-6566	MARV	10.0 oz/yd <sup>2</sup> 340 g/m <sup>2</sup>	14 oz/yd <sup>2</sup> 475 g/m <sup>2</sup>	8.3 oz/yd <sup>2</sup> 281 g/m <sup>2</sup>
	THICKNESS	ASTM D-6525	MARV	0.4 in 10.1 mm	0.4 in 10.1 mm	0.3 in 7.6 mm
	LIGHT PENETRATION	ASTM D-6567	TYPICAL	20%	5%	50%
	COLOR	VISUAL	–	GREEN, TAN	TAN	GREEN, TAN
MECHANICAL	TENSILE STRENGTH	ASTM D-6818	MARV	400 x 300 lb/ft 5.8 x 4.3 kN/m	300 x 225 lb/ft 4.3 x 3.2 kN/m	2400 x 2000 lb/ft 35.0 x 29.2 kN/m
	TENSILE ELONGATION	ASTM D-6818	MAXIMUM	50%	85%	50%
	RESILIENCY	ASTM D-6524	MARV	90%	80%	75%
	FLEXIBILITY	ASTM D-6575	TYPICAL	0.026 in-lbs 30000 mg-cm	0.022 in-lbs 25000 mg-cm	0.195 in-lbs 225000 mg-cm
ENDURANCE	FUNCTIONAL LONGEVITY	OBSERVED	TYPICAL	PERMANENT	PERMANENT	PERMANENT
	UV RESISTANCE	ASTM D-4355	MINIMUM	80% @ 1000 HOURS	80% @ 1000 HOURS	90% @ 3000 HOURS
PERFORMANCE	SEEDLING EMERGENCE <sup>3</sup>	ECTC DRAFT METHOD #4	TYPICAL	409%	220%	296%
	ROLL WIDTH	MEASURED	TYPICAL	6.5 ft 2.0 m	6.5 ft 2.0 m	8.5 ft 2.6 m
PACKAGING	ROLL LENGTH	MEASURED	TYPICAL	138.5 ft 42.2 m	138.5 ft 42.2 m	106 ft 32.3 m
	ROLL WEIGHT	CALCULATED	TYPICAL	63 lb 28.6 kg	87 lb 39.5 kg	52 lb 23.5 kg
	ROLL AREA	MEASURED	TYPICAL	100 yd <sup>2</sup> 84 m <sup>2</sup>	100 yd <sup>2</sup> 84 m <sup>2</sup>	100 yd <sup>2</sup> 84 m <sup>2</sup>

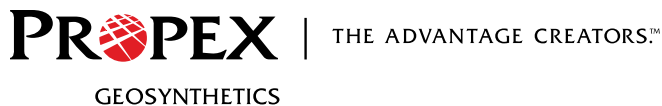
NOTES: 1. The listed property values are effective 08/2006 and are subject to change without notice. 2. MARV indicates Minimum Average Roll Value calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the reported value. 3. Calculated as percent increase in average plant biomass with tall fescue grass seed in sand 14 days after seeding versus traditional monofilament TRMs and HPTMRs.

**LANDLOK® TURF REINFORCEMENT MAT PERFORMANCE VALUES** ENGLISH & METRIC UNITS

MATERIAL	FUNCTIONAL LONGEVITY	SHORT-TERM MAXIMUM SHEAR STRESS AND VELOCITY						MANNING'S "n"		
		VEGETATED <sup>4, 7</sup>		PARTIALLY <sup>5</sup>		UNVEGETATED <sup>6</sup>		0"-6"	6"-12"	12"-24"
LANDLOK® 450	PERMANENT	10 lb/ft <sup>2</sup> 479 N/m <sup>2</sup>	18 ft/sec 5.5 m/sec	8 lb/ft <sup>2</sup> 383 N/m <sup>2</sup>	15 ft/sec 4.6 m/sec	5 lb/ft <sup>2</sup> 239 N/m <sup>2</sup>	12 ft/sec 3.7 m/sec	0.035	0.025	0.021
LANDLOK 1051	PERMANENT	10 lb/ft <sup>2</sup> 479 N/m <sup>2</sup>	18 ft/sec 5.5 m/sec	n/a	n/a	5 lb/ft <sup>2</sup> 239 N/m <sup>2</sup>	12 ft/sec 3.7 m/sec	0.036	0.026	0.020
LANDLOK 300	PERMANENT	12 lb/ft <sup>2</sup> 576 N/m <sup>2</sup>	20 ft/sec 6.1 m/sec	–	–	–	–	0.030	0.028	0.018

NOTES: 4. Maximum permissible shear stress has been obtained through fully vegetated (70% to 100% density) 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 Propex for further information. 5. Maximum permissible shear stress has been obtained through partially vegetated (30% to 70% density) 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 Propex for further information. 6. Maximum permissible shear stress has been obtained through unvegetated (0% to 30% density) 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 Propex for further information. 7. Maximum permissible shear stress achieved after only 14 weeks of vegetative establishment versus the industry standard of two full growing seasons.

For downloadable documents like construction specifications, installation guidelines, case studies and other technical information, please visit our web site at [geotextile.com](http://geotextile.com). These documents are available in easy-to-use Microsoft® Word format.



Propex Inc. PH: 423 899 0444  
6025 Lee Highway, Suite 425 PH: 800 621 1273  
PO Box 22788 FAX: 423 899 7619  
Chattanooga, TN 37422 [www.geotextile.com](http://www.geotextile.com)

Geotex®, Landlok®, Pyramat®, X3®, SuperGro®, Petromat® and Petrotac® are registered trademarks of Propex Inc.

THIS PUBLICATION SHOULD NOT BE CONSTRUED AS ENGINEERING ADVICE. WHILE INFORMATION CONTAINED IN THIS PUBLICATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE, PROPEX DOES NOT WARRANT ITS ACCURACY OR COMPLETENESS. THE ULTIMATE CUSTOMER AND USER OF THE PRODUCTS SHOULD ASSUME SOLE RESPONSIBILITY FOR THE FINAL DETERMINATION OF THE SUITABILITY OF THE INFORMATION AND THE PRODUCTS FOR THE CONTEMPLATED AND ACTUAL USE. THE ONLY WARRANTY MADE BY PROPEX FOR ITS PRODUCTS IS SET FORTH IN OUR PRODUCT DATA SHEETS FOR THE PRODUCT, OR SUCH OTHER WRITTEN WARRANTY AS MAY BE AGREED BY PROPEX AND INDIVIDUAL CUSTOMERS. **PROPEX SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM PROVISION OF SAMPLES, A COURSE OF DEALING OR USAGE OF TRADE.**