

Section 35 43 00 – Permanent Geosynthetic Turf Reinforcement Mat

GENERAL

1.01 SUMMARY

A. This section specifies a permanent Geosynthetic Turf Reinforcement Mat (TRM) with soil infill, to prevent long-term soil and vegetation loss resulting from excessive water flow (velocity and shear stress) in which unreinforced vegetation could not resist. The soil fill will interact within the TRM and root structure of the vegetation to create a composite reinforced system.

B. Related Sections: Other Specification Sections, which directly relate to the work of this Section include, but are not limited to the following:

1. *Section 01 57 13 - Temporary Erosion and Sedimentation Controls*
2. *Section 31 25 00 - Erosion and Sedimentation Controls*
3. *Section 31 35 00 - Slope Protection*
4. *Section 32 91 00 - Planting Preparation*
5. *Section 32 92 00 - Turf and Grasses*
6. *Section 35 30 00 - Shoreline Protection*

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation and list of materials.

B. Certifications: Manufacturer shall submit a letter of certification that the product meets or exceeds all physical property, endurance, performance and packaging requirements.

C. Alternative products: An alternative product submitted as an equal to the specified product within this specification will require the following minimum documentation: Performance data (Permissible Velocity or Permissible Shear Stress and Soil Loss under uniform flow conditions in a vegetated state). Said data must be developed by Colorado State Testing Facility. In addition, a written statement describing any noncompliance items of the alternative product. The manufacture must provide a list (minimum of 3 projects) of previous projects that are similar to this project in hydraulics, environmental conditions, size and installation procedures utilizing the product within 50 miles of this project site.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in UV and weather-resistant factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, weather, excessive temperatures and construction operations.

PRODUCTS

2.01 MANUFACTURERS/OR THEIR REPRESENTATIVES

A. PROFILE Products LLC
750 Lake Cook Road – Suite 440
Buffalo Grove, IL 60089
800-508-8681 (Fax 847-215-0577)
www.profileproducts.com

B. Substitutions: Manufacturers others than those noted above should be a member of the Geosynthetic Institute (GSI) and/or the North American Geosynthetics Society and/or the International Geosynthetics Society (IGS).

2.02 MATERIALS

A. Turf Reinforcement Mat shall be Futerra 7020, manufactured for the purpose of permanent channel lining and turf reinforcement. The TRM shall be made from 100% synthetic material and contain no biodegradable or photodegradable components or materials.

1. The TRM shall be a homogeneous, three dimensional matrix made of continuous monofilament yarns which are thermally fused at the crossover points to provide a structure that will maintain its three dimensional stability without laminated or stitched layers. No nettings or stitching or infill synthetic fiber shall be permitted as a structure component of the actual TRM due to the sensitive wildlife area. The TRM shall have a sufficient Area Holding Capacity and a minimum 95% open space available for soil and root interaction. The TRM shall not lose its structural integrity or performance and shall not unravel or separate when TRM is cut in the field.

2. The TRM shall exhibit no buoyancy factor (i.e., the specific gravity of the fibers used should be greater than 1.0) so as to allow the TRM to maintain intimate contact with the soil (particularly between fasteners) under low flow or submerged conditions.

3. The TRM shall meet the property values shown below.

	Test Method	Units	Value
Physical			
Mass Per Unit Area	ASTM D 6566	oz/yd ²	12.0
Thickness (Min)	ASTM D 6525	inches	0.75
Tensile Strength (MD)	ASTM D 6818	lb/ft	240.0
Area Holding Capacity	Calculated	in ³ /yd ²	500
Light Penetration (Min)	ASTM D6567	%	50
Ground Cover (Max)	ASTM D6567	%	50
UV Resistance (1000 hrs)	ASTM D 4355	%	95
Resiliency (Min)	ASTM D 6524	%	80
Endurance			
Functional Longevity ¹	Observed	Months	>36
Performance			
Permissible Veg. Velocity ²	ASTM D6460	ft/sec	20.0
Permissible Veg. Shear ²	ASTM D6460	lb/ft ²	17.0

1. Functional longevity is an estimate of product functionality and is dependent upon moisture, light, microbial and other environmental conditions.

2. Large scale testing conducted at Colorado State University.

2.03 ACCESSORIES

A. Anchoring Devices: The TRM shall be secured in place using heavy-duty metal staples. The metal staples shall be U-shaped, a minimum of 6 inch long (each leg), one and one half (1-1/2) inches wide, and shall be fabricated from 9 gauge diameter metal wire. If difficulties arise installing the staples, then 10 inch pins fabricated from 9 gauge with one and one half (1-1/2) inch diameter washer or 7 inch gutter spike with one and one half (1-1/2) inch diameter washer shall be used. In some cases where loose soil conditions exists and anchors of stated length do not properly secure the TRM to the ground, then longer staples should be used such as 8-12 inch long staples or pins.

EXECUTION

3.01 PREPARATION

A. The installation site shall be prepared by clearing, grubbing and excavation or filling the area to the design grade.

B. The surface to receive the TRM shall be prepared to relatively smooth conditions free of obstructions, rocks, dirt clods, roots, stumps, depressions, debris and soft or low density pockets of material. The material shall be capable of supporting a vegetative cover.

C. Erosion features such as rills, gullies, etc. must be graded out of the surface before TRM deployment. Smooth roll drum compaction (as required by the Engineering plans) will be required before deploying TRM to make sure the TRM makes immediate contact with the soil and to ensure that the soil has been compacted.

D. Cut trenches for initial anchor trenches, termination trench and longitudinal anchor trenches (12 inches wide and 12 inches in depth) as shown on the drawings.

E. Where appropriate, cut intermediate check slots at 25-35 ft. apart, perpendicular to channel flow direction (6 inches wide and 9 inches in depth) depending on channel alignment. An acceptable alternative to trenched check slot is a "stapled" check slot constructed by placement of two rows of staples/pins staggered 3 inches apart and separated by 3 inches at a 20 ft interval or No. 2 re-bar with ends bent 90° with J-hooks spaced 3 – 4 ft apart to secure re-bar to the ground.

3.02 INSTALLATION

A. Care shall be taken during installation to avoid damage occurring to the TRM as a result of the installation process. Should the TRM be damaged during installation, a TRM patch shall be placed over the damaged area extending 3.28 ft beyond the perimeter of the damage.

B. Install anchoring devices at a frequency of 3 pins/staples per square yard. Additional anchoring devices may be required depending on site conditions or alignment of the slope or channel. Always staple (1' centers) the seams between individual TRM rolls.

C. When overlapping successive TRM rolls, the rolls shall be overlapped upstream over downstream and/or upslope over downslope.

D. For channels, begin at the downstream end in the center of the channel. Inspect trenches for position accuracy and depth and re-dig to required dimensions. If trenches have not yet been constructed, dig initial anchor trenches, check slot trenches and longitudinal anchor trenches as illustrated in installation guidelines or as directed on the plans. Unroll approximately 10 ft of the TRM, positioning the roll face down (as it unrolls) over the initial anchor trench, extending several inches beyond the trench with the roll sitting on the down stream side of the anchor trench. Positioning the roll in this manner permits backfilling and compaction of soil into the trench while allowing installer to proceed with proper deployment of TRM by unrolling upstream, over the anchor trench.

E. Position second TRM with a minimum 4-inch overlap of the previous TRM and secure it into the anchor trench. After entire width area is installed with the TRM, then backfill and compact the anchor trench.

F. Continue deploying TRM upstream to the next check slot. Overlay a minimum of 18 inches the ends of rolls with the next roll(s) being deployed, or position in bottom of check slot, anchor and backfill and compact check slots. Continue the processes until you reach the upstream starting point of the TRM.

G. For slopes, construct top anchor trench 1-3 ft beyond crest of slope, or as illustrated in drawings or shown in manufacturers recommended installation guidelines. Position TRM roll at crest of slope with

sufficient material to line the entire anchor trench plus enough material left over to cover the trench. Position adjacent rolls to facilitate 6 inch overlaps. Anchor TRM in trench with appropriate pins/staples at 1 foot centers. Once several rolls are anchored in trench, begin to backfill and compact trench to original elevation. The preferred method of deploying roll down slope is to stand in front of the roll and pin it as it rolls out down the slope, minimizing foot traffic on TRM, which will eliminate depressions under the mat. Always allow the mat to drape over the soil, never pulling it taut, to minimize tenting. Place additional pins into any apparent depressions to maintain contact with the soil.

H. Soil fill the TRM and cover with 2.0 inches of soil as shown on plans, applied in a manner not to damage the TRM..

I. Strictly comply with manufacturer's installation instructions and recommendations, along with the drawings and specifications.

J. Hydro Mulch with Flexterra. See the Hydro Mulch specification for specified product, material and application rates.

3.03 CLEANING AND PROTECTION

A. Clean spills promptly. Advise owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

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