

Section 02350
[Scourstop TM] Permanent Transition Mats

1 GENERAL

1.1 SECTION INCLUDES

- A. Permanent Transition Mats used in conjunction with integral soil anchors and the appropriate soil cover(s) provide scour and erosion protection preventing soil and vegetation loss resulting from excessive water flow (velocity and shear stress).

1.2 RELATED SECTIONS

- A. Section [02200] – [Site Preparation]
- B. Section [02300] – [Earthwork]
- C. Section [02900] – [Planting]

1.3 UNIT PRICES

- A. Method of Measurement: By the square yard (or square meter - as indicated in contract documents) including seams, overlaps, and wastage.
- B. Basis of Payment: By the square yard (or square meter - as indicated in contract Documents) installed.

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 792, method A – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
 - 2. D 4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
 - 3. D 4595 – Standard Test Method for Tensile Properties of Geotextiles by the Wide- Width Strip Method
 - 4. D 6460 - Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater- Induced Erosion
 - 5. D 6525 - Standard Test Method for Measuring Nominal Thickness of Permanent Rolled Erosion Control Products
 - 6. D 6566 - Standard Test Method for Measuring Mass Per Unit Area of Turf Reinforcement Mats
 - 7. D 6818 – Standard Test Method for Ultimate Tensile Properties of Turf Reinforcement Mats
- B. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation Program (LAP).
- C. American Association of State Highway and Transportation Officials (AASHTO)
- D. National Transportation Product Evaluation Program (NTPEP).

1.5 DEFINITIONS

- A. Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed the value reported.
- B. Typical Value: Physical property value referred to as average, mean or “target” value. Also referred to as the statistical average value.

1.6 SUBMITTALS

- A. Submit under provisions of Section [1300] [Submittals]:
 - 1. Certification: The contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or other pertinent information to fully describe the Transition Mat (TM). The Certification shall state that the furnished TM meets or exceeds the MARV requirements of the specification as evaluated under the Manufacturer's quality control program. A person having legal authority to bind the Manufacturer shall attest to the Certification.
 - 2. The contractor shall submit five (5) copies of the manufacturer's data, specifications, samples and a list of previous project installations of a TM.
 - 3. The contractor shall submit a manufacturer's certification that the proposed material complies with the requirements specified herein and are suitable for the intended purpose.
 - 4. No material shall be shipped to the Project Site until the manufacturer certification is submitted to and approved by the Engineer.
 - 5. The contractor and/or the engineer shall meet with a manufacturer's representative on site prior to beginning installation. A letter shall be submitted prior to installation that this meeting has occurred and any concerns about the installation procedures have been addressed.
 - 6. Alternative products to be submitted as an equal to the specified product within this specification will require the following minimum documentation: Performance data (Permissible Velocity and Permissible Shear Stress) for full scale flume testing along with corresponding soil loss data in a day one and fully vegetated state. Said data must be developed by independent third party testing from a recognized testing facility. For culvert applications, demonstrated prototype culvert outfall testing with appropriate velocities shall also be provided. A written statement describing any noncompliance items of the alternative product should be included in the submittal.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

Manufacturer's shall maintain a written Quality Assurance policy / manual and make said policy / manual available to the Engineer at his request.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Product labels shall clearly indicate the manufacturer or supplier name and product name.

B. Each TM pallet shall be wrapped with a material covering that will protect the TM from damage due to shipment, sunlight, and storage.

C. During storage, TM panels shall be adequately covered to protect them from the following: site construction damage, extended ultraviolet radiation, chemicals that are strong acids or strong bases, flames including welding sparks, excessive temperatures, and any other environmental conditions that may damage the physical property values of the TM.

2. PRODUCTS

2.1 DISTRIBUTOR

A. Distributed by: Cascade Geosynthetics 3610 N. Suttle Road, Bldg B Portland, OR 97217
Phone: (971) 339-1020, www.cascadegeos.com

C. Substitutions: Manufacturers others than those noted above should be a member of the International Erosion Control Association (IECA) and gain engineer approval 30 days prior to bid date.

2.2 MATERIALS

A. Transition Mat:

1. The TM shall be Scourstop manufactured for the purpose of permanent scour protection and erosion control in high stress or flow areas. The TM shall be made from 100% synthetic material (high density polyethylene) and contain no biodegradable or photodegradable components or materials. The TM shall contain a minimum of 15% HDPE recycled content as measured by mass per unit area.
2. The TM shall be a dimensionally stable and resilient mat providing mechanical protection for soil covers that hold soil particles and sediment in place. The TM shall provide permanent, uniform adherence of the soil covers to the soil profile. It shall have 50% open space available for vegetative establishment.
3. The TM shall be a semi-rigid mat which provides impact resistance and high tensile strength. When anchored the TM maintains intimate soil contact while providing a minimum of 40 lbs of holding capacity per square foot to resist uplift forces due to high velocity.

4. The TM shall meet the requirements of Table 1. Proposed equals must be approved by the engineer a minimum of 30 days prior to bid date. Test results documenting that the transition mat has been tested under controlled flow conditions for hydraulic performance characteristics in accordance with ASTM D-6460 must be submitted along with the manufacturer's certification that the TM's design and components meet or exceed all of the requirements set forth in this specification.

TABLE 1 - PERMANENT TRANSITION MAT

Property	Test Method	Units	Value (MARV or Typical)
Physical			
Mass/Unit Area	ASTM D 6566	lb/sf	0.93 MARV
Thickness	ASTM D 6525	inches	0.437 MARV
Wide Width Tensile (MD/TD)	ASTM D 4595	lb/ft	2600 MARV
Percent Open Area	Calculated	%	50 Typical
Density/Specific Gravity	ASTM D 792 Method A	g/cm3	0.938 MARV
UV Stability	ASTM D 4355	%	90 MARV
Performance			
Velocity	Flume Testing ¹	ft/sec	
Day 1 Performance	ASTM D-6460		19.0
Fully Vegetated			31.0
Shear	Flume Testing ¹	lb/ft ²	
Day 1 Performance	ASTM D-6460		13.0
Fully Vegetated			16.0
Culvert Outfall Test	Prototype		
Exit Velocity		fps	16
Discharge		cfs	90

¹ Acceptable facilities include Utah State University, Colorado State University

2.3 ACCESSORIES

A. Anchoring Devices

1. The anchoring devices for the TM are an integral component of the Scourstop system. The soil anchors shall be a polymer material molded into a bullet tip. It shall be 2 inches long by 1 inch wide with a .0495 inch diameter opening lengthwise through the anchor. The anchors shall be connected with a pre- attached tether extending up to 36 inches.
2. Tether strapping material shall be ½ inch wide polypropylene material with a minimum tensile strength of 700 pounds.
3. Double Lock Washers shall be a flanged bushing type device with a diameter of 2.75 inches. The washer shall be .5 inches in height and fully recess into the TM openings leaving only .125 inches above the transition mat. The washer shall also employ a double lock mechanism that attaches to the tether and bullet anchor.

B. Soil Covers

1. Soil covers utilized underneath the transition mat shall be in accordance with the soil cover(s) manufacturer's recommendation and shall be appropriately selected for the given application and soil conditions present. Typical soil covers may be turf reinforcement mats, geotextiles, sod or a combination of these materials.

3.0 EXECUTION

3.1 PREPARATION

- A. The installation site shall be prepared by clearing, grubbing, and excavating or filling the area to the design grade.
- B. The surface to receive the soil cover(s) and TM shall be prepared to relatively smooth conditions free of obstructions, 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 the soil cover(s) and TM deployment. Smooth roll drum compaction may be required before deploying the soil cover and TM to make sure they maintain intimate contact with the soil.
- D. Anchor trenches, termination trenches and longitudinal anchor trenches for the chosen soil cover material shall be installed per manufacturer's recommendations.
- E. Where appropriate, use 1' wide transition mat strips for intermediate check slots at 20-25 ft intervals perpendicular to channel flow direction along the soil cover(s) apron past the termination of the TMs. The TM check slot panels should be anchored on 1' centers with the 36" bullet anchors.
- F. Prior to final placement of the transition mat and soil cover(s) the prepared surface should be inspected and approved by the Engineer.

3.2 INSTALLATION

- A. Soil cover(s) and TMs are shown on the drawings to depict the locations and portions of the work where they are to be installed. The transition mats shall be placed on the soil cover(s) in such a manner as to produce a relatively planar surface.
- B. Each transition mat shall be placed longitudinally end to end (overlapped when appropriate) in the configuration specified so as to incur minimal waste. All placement of TM panels shall be in accordance with the manufacturer's recommendations and the Contractor's approved shop drawings unless otherwise specified by the Engineer.
- C. When overlapping successive TM panels, the panels shall be overlapped upstream over downstream, and/or upslope over downslope. Each TM panel shall be secured to the soil cover(s) and ground with bullet anchors driven 12" to 36" deep as per manufacturer's recommendation.
- D. Install bullet anchors at the recommended rate based upon manufacturer's requirements for engineered hydraulic events and different soil types (cohesive or non cohesive). Always anchor through both panels at the edges when overlapping panels. Additional anchors may be needed to fully conform the mats to the soil profile.

E. Care shall be taken during installation so as to avoid damage occurring to the soil cover(s) and the TM as a result of the installation process. Should the soil cover(s) material be damaged during installation, a soil cover(s) patch shall be installed extending 3' beyond the perimeter of the damaged area. New TM panels and anchors shall be placed over the damaged area when the damaged TM material cannot be reused.

F. The designated soil cover(s) material shall always be installed under the transition mats and may extend downstream of the TM panels the distance and width specified for each location in the plans. Soil cover(s) shall be installed both per the manufacturer's specifications and per the transition mat specifications.

G. Alternative installation methods must be approved by the Engineer prior to execution.

H. Broadcast seed and fertilizer over and under the soil cover(s) and TMs when appropriate. I.

Apply supplemental water over the area as directed by site personnel during the initial germination stage to help ensure vegetative establishment and cover.

J. The soil cover(s) apron should not be mowed until there is dense vegetation and should be mowed to no less than a 6" depth in the initial growing season.

END OF SECTION