Project Name:
Project Number:

Section 31 32 19

Specification for Geotextile Used in Soil Stabilization and Layer Separation

1. GENERAL

1.1 SECTION INCLUDES

A. Geotextile to stabilize and reinforce an aggregate cover material (subbase, base, select embankment, etc.) of an unpaved or paved roadway.

1.2 RELATED SECTIONS

A. Section 02 50 00 - Site Remediation
B. Section 01 89 13 - Site Preparation Performance Requirements
C. Section 31 00 00 - Earthwork
D. Section 32 10 00 - Bases, Ballasts, Pavements, and Appurtenances

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. AASHTO Standards:

1. T088-10-UL - Particle Size Analysis of Soils
2. T090-00-UL - Determining the Plastic Limit and Plasticity Index of Soils
3. T099-10-UL - The Moisture-Density Relations of Soils Using a 5.5lb (2.5 kg) Rammer and a 12in (305 mm) Drop.
4. M288 - Geotextile Specification for Highway Applications

B. American Society for Testing and Materials (ASTM):

1. D422 - Standard Test Method for Particle-Size Analysis of Soils
2. D4354 - Practice for Sampling of Geosynthetics for Testing
3. D4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
4. D4439 - Terminology for Geotextiles
5. D4491 - Test Methods for Water Permeability of Geotextiles by Permittivity

6. D4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
7. D4751 - Test Method for Determining Apparent Opening Size of a Geotextile
8. D4759 - Practice for Determining the Specification Conformance of
9. Geosynthetics
10. D4873 - Guide for Identification, Storage, and Handling of Geotextiles
11. D6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
12. D6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil
13. D6767 - Standard Test Method for Pore Size Characteristics of Geotextiles by Capillary Flow Test
14. C1559 – Standard Test Method for Determining Wicking

C. Federal Highway Administration (FHWA) - Geosynthetic Design and Construction Guidelines, Publication No. FHWA HI-95-038, April 1998.

D. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation Program (LAP)

E. International Standards Organization (ISO) - 9001:2015

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 value reported.

1.6 SUBMITTALS

A. Submit the following:

1. Certification: The contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, and chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer. Certifications from Private Label distributors will not be accepted.

2. If an alternate product is submitted full scale performance testing performed by an Independent testing agency shall be if quantifies the structural benefit of the geotextile. The benefit must meet or exceed the benefit of the design geotextile.

3. Coefficient of Interaction (C_I) test results performed by a lab with GRI accreditation should be provided to confirm conformance to the specified value.

4. Manufacturer's installation Guidelines shall be provided.

5. One 1' x 1'sample shall be provided.

6. Quality Standards: The contractor shall provide to the Engineer the Manufacturer's Quality Control Plan along with their current GAI-LAP and ISO 9001:2015 certificates.

7. Alternate products must be submitted 15 days prior to bid date to engineer and should include information on five similar projects in size and scope.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The geotextile Manufacturer shall have all the following credentials:

   a. ISO 9001:2015 Quality Management System
   b. Geosynthetic Accreditation Institute (GAI) Laboratory Accreditation Program (LAP)

B. The geotextile Manufacturer shall have a GAI-LAP accredited laboratory at the location of production capable of performing the ASTM tests as outlined in the specification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Geotextile labeling, shipment, and storage shall follow ASTM D4873. Product labels shall be color-coded to specifically identify each product and clearly show the Manufacturer's name, style name, and roll number.

B. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.

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

2. PRODUCTS

2.1 MANUFACTURERS

A. TenCate™ Geosynthetics Americas
365 South Holland Drive
Pendergrass, GA, USA 30567
1-800-685-9990
1-706-693-2226
1-706-693-4400, fax
www.tencategeo.us

2.2 MATERIALS

A. Geotextile:

1. The geotextile shall be woven from super high-tenacity polypropylene yarns in conjunction with wicking yarns with a weave pattern to maximize strength, water flow, soil interaction, wicking capabilities and soil retention. The yarns shall be from high-tenacity long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins or polyamids. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.

2. Geosynthetic must be able to directionally draw water via capillary action.

3. The geotextile shall meet the requirements of Table 1. All numeric values in Table 1 except AOS represent MARV in the specified direction. Values for AOS represent maximum measured opening size.

TABLE 1 – SOIL STABILIZATION AND WICKING GEOTEXTILE

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Wide Width Tensile Strength	ASTM D4595	lbs/ft (kN/m)	5280 (77.0)	5280 (77.0)
Wide Width Tensile Strength @ 2% strain	ASTM D4595	lbs/ft (kN/m)	480 (7.0)	1080 (15.8)
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	40 (0.425)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.4	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	30 (1222)	
			Minimum Test Value	
Pore Size (050)	ASTM D6767	microns	85	
Pore Size (095)	ASTM D6767	microns	195	
Wet Front Movement [1] (24 minutes)	ASTM C1559[2]	inches	6.0 Vertical direction	
Wet Front Movement [1] (983 minutes) Zero Gradient	ASTM C1559[2]	inches	73.3 Horizontal direction	

[1] 'STP': Standard Temperature and Pressure, Tested Value
[2] Modified

When sewn, seams are required, refer to Manufacturer's Installation Guidelines for overlap / seam requirements.

3. Approved geotextiles are as follows:

Mirafi® H_2R*i*

2.3 QUALITY CONTROL

A. Manufacturing Quality Control: Testing shall be performed at an on-site laboratory accredited by GAI-LAP for tests required for the geotextile, at frequency meeting or exceeding ASTM D4354.

B. Manufacturer's certifications and testing of quality assurance samples obtained using Procedure B of ASTM D4354. A lot size for conformance or quality assurance sampling shall be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

3. EXECUTION

3.1 See Manufacturer's Installation guidelines provided in the submittal.

END OF SECTION