SECTION 1710

GEOSYNTHETICS

1710.1 DESCRIPTION

This specification covers the requirements for paving fabrics and geosynthetics and securing pins installed for subsurface drainage, separation, base course reinforcement and subgrade stabilization. This also covers the requirements for separation geotextile for erosion control.

1710.2 REQUIREMENTS

a. General.

(1) Compose all geosynthetics of at least 85% by weight polyolefins or polyesters.

(2) Use geosynthetics resistant to chemical attack, mildew and rot.

(3) Package in protective wrapping, store, handle and identify all geosynthetics according to ASTM D 4873.

(4) Do not use torn or punctured geosynthetics.

(5) Woven geotextiles with slit-tape or slit-film filaments in both the machine direction (MD or warp) and the cross-machine direction (CD, weft or fill) are prohibited.

(6) When seams are required for geotextiles, use "Butterfly" seams that have a Federal Standard designation of Type SSD-1. Place the stitching approximately 1 inch from the fold. Make sure the two fabric edges are even and have been completely penetrated by the seam. Use polyester, polypropylene or Kevlar thread with durability equal to or great than the material used in the fabric. Seam strength requirements shall be as specified in the Contract Documents.

b. Securing Pins. When required, provide steel securing pins that are nominally 1/4 inch diameter, 18 inches long, pointed at one end and fitted with a 1-1/2inch outside diameter steel washer at the other end.

c. Paving Fabric. Provide a nonwoven geotextile that complies with the general physical and the geotextile property requirements for an AASHTO M 288 paving fabric unless otherwise specified in the Contract Documents. Use a paving grade asphalt recommended by the manufacturer and conforming to the provisions in the AASHTO M 288 Appendix Section 1.6, unless otherwise specified in the Contract Documents, to saturate the paving fabric, as well as bond it to the existing pavement.

d. Subsurface Drainage. Provide a woven or nonwoven geotextile that complies with the general physical and the geotextile property requirements for an AASHTO M 288, Class 2, subsurface drainage geotextile unless otherwise specified in the Contract Documents.

e. Separation Geotextile. Provide a woven or nonwoven geotextile that complies with the general physical and the geotextile property requirements for an AASHTO M 288, Class 2, separation geotextile unless otherwise specified in the Contract Documents. See **subsection 1710.2a.(5)** regarding the use of slit-tape geotextiles.

f. Base Course Reinforcement. Provide a single-layer geogrid or woven geotextile that complies with the properties in **TABLE 1710-1** for reinforcement of an aggregate base course. MD: Machine Direction, CD: Cross-machine Direction.

TABLE 1710-1: BASE COURSE REINFORCEMENT GEOSYNTHETIC MIMIMUM AVERGE ROLL VALUES			
Property	**Test Method**	**Requirements**	
Tensile Strength (at 5% strain)	ASTM D 4595	580 lb/ft MD	900 lb/ft CD
Tensile Strength (at 2% strain)	ASTM D 4595	280 lb/ft MD	450 lb/ft CD
Coefficient of Soil Interaction	GRI-GT6/GG5	0.8	
Junction Strength (geogrid)	GRI:GG2	25 lbs	
Permittivity (geotextile)	ASTM D 4491	0.40 sec^{-1}	
Apparent Opening Size* (geotextile)	ASTM D 4751	30 U.S. Sieve (0.0232 inches)	
Aperture Stability (geogrid)	**	Minimum of 0.32 m-N/Deg (MD direction)	

* ASTM D 4751: AOS IS A MAXIMUM OPENING DIAMETER VALUE

** The Aperture Stability is based on resistance to in-plane rotational movement measured by applying a 20 kg-cm (2 m-N) moment to the central junction of a 9 inch by 9 inch specimen restrained at its perimeter in accordance with U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity.

The coefficient of interaction is based on the soil being a granular, non-cohesive material with less than 10% fines. If these base soils are not available, perform a site specific design and increase the base course thickness, accordingly.

g. Subgrade Stabilization. Provide a woven geotextile, geogrid or geogrid/geotextile combination, as specified in the Contract Documents, for subgrade stabilization that complies with the properties in **TABLE 1710-2**. This table is only applicable for subgrades with CBR values greater than 1. For subgrades with CBR values less than 1, a site specific design will be required.

TABLE 1710-2: SUBGRADE STABILIZATION GEOSYNTHETIC MIMIMUM AVERGE ROLL VALUES			
Property	**Test Method**	**Requirements**	
Tensile Strength (at 5% strain)	ASTM D4595	810 lb/ft MD	1340 lb/ft CD
Tensile Strength (at 2% strain)	ASTM D4595	410 lb/ft MD	620 lb/ft CD
Coefficient of Soil Interaction	GRI-GT6/GG5	0.8	
Junction Strength (geogrid)	GRI:GG2	25 lbs	
Permittivity (geotextile)	ASTM D4491	0.40 sec^{-1}	
Apparent Opening Size[a] (geotextile)	ASTM D4751	30 U.S. Sieve (0.0232 inches)	

[a]ASTM D 4751: AOS is a Maximum Opening Diameter Value

h. Pavement Waterproofing Membrane. Provide an asphalt saturated paving fabric coated with a rubberized asphalt adhesive that complies with the properties in **TABLE 1710-3**.

TABLE 1710-3: PAVEMENT WATERPROOFING MEMBRANE MIMIMUM AVERGE ROLL VALUES		
Property	**Test Method**	**Requirements**
Permeance-Perms	ASTM E 96 Method B	0.10 perms (max)
Pliability (180° bend on a 1/4" mandrel @ -25°F)	ASTM D 146	No cracking in fabric or rubber
Puncture Resistance	ASTM E 154	200 lbs
Tensile Strength	ASTM D 882	50 lbs/in

If required, provide a material for a prime coat (comprised of refined asphalt and a rapidly drying solvent) that complies with the requirements of **DIVISION 1200.**

1710.3 TEST METHODS

Test geosynthetic materials according to the ASTM test methods cited in **subsection 1710.2**.

1710.4 PREQUALIFICATION

a. All material provided under this specification must be prequalified through the Engineer of Tests.

b. Manufacturers interested in prequalifying material under this specification must provide, to the Engineer of Tests, at least a 1 foot by 1 foot sample of the material, installation instructions for the material, certification that the properties of the type of material submitted meet the requirements of this specification, current NTPEP testing results associated with the type of material submitted and any other information requested by the Engineer of Tests.

c. The submittals will be evaluated for compliance with this specification, and the manufacturer will be notified of the results.

d. Approved materials will be placed on the prequalified list maintained by the Bureau of Construction and Materials. Products will remain on the prequalified list as long as the field performance and NTPEP test results of the product are satisfactory.

1710.5 BASIS OF ACCEPTANCE

a. Prequalification as specified in **subsection 1710.4**.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600** for each shipment. A shipment consists of all material arriving at the job site at substantially the same time but in no instance greater than 1 week. Each week will constitute a new time period requiring a new Type C certification even if the site has been supplied continuously from the previous week.

c. Visual inspection of the material at the job site for quality of workmanship and damage incurred during shipping or job site storage.