Section 910. GEOSYNTHETICS

910.01. General Requirements. Geosynthetics must be composed of long-chain synthetic fiber of at least 85 percent, by weight, polyolefins or polyesters. Geosynthetics must be capable of resisting degradation from chemicals, mildew, rot, and ultraviolet (UV) light.

Deliver and store geosynthetics in packaging capable of resisting UV radiation, contaminants, and moisture. Label each unit of material with product information including supplier and lot identification. Do not expose geosynthetics to direct sunlight for prolonged periods. Repair or replace damaged geosynthetics at no additional cost to the Department.

910.02. Testing. Geosynthetic testing will be in accordance with the specified ASTM, or Department methods, as modified by this section.

Geotextiles must meet the minimum physical property requirements shown in Table 910-1. The directional property values listed in Table 910-1 specify values for the weaker principle direction.

910.03. Geotextiles. Geotextiles are flexible, permeable fabrics, consisting of synthetic fibers or yarns oriented into a dimensionally stable network. Woven geotextiles must have sealed or selvaged edges to prevent raveling.

A. Geotextile Blanket. Geotextile for filtration applications, including trench lining, ditch lining, streambed protection, pipe wrap, joint wrap, drainhole and weephole filter, granular blanket separation, and filter bags must be non-woven and meet the requirements shown in Table 910-1 for geotextile blanket.

B. Geotextile Liner. Geotextile for erosion control in riprap and similar applications must be non-woven and meet the requirements shown in Table 910-1 for geotextile liner. Geotextile for use with heavy riprap must be non-woven and meet the requirements shown in Table 910-1 for heavy geotextile liner.

C. Geotextile Separator. Geotextile used to prevent intermixing of dissimilar aggregate or soil layers must meet the requirements shown in Table 910-1 for geotextile separator. Geotextiles separators with grab tensile elongation-at-break less than 50 percent must meet the requirements shown in Table 910-1 for woven geotextile separator. Geotextiles with grab tensile elongation-at-break equal to or greater than 50 percent must meet the strength requirements shown in Table 910-1 for non-woven geotextile separator.
D. Stabilization Geotextile. Geotextile used to prevent intermixing of soft subgrade and subbase materials must meet the requirements shown in Table 910-1 for stabilization geotextile.

910.04. Silt Fence Geotextile. Select geotextile for fabricating silt fence from the Qualified Products List. Geotextile for silt fence must have a nominal height of 3 feet and must meet the requirements shown in Table 910-1 for silt fence. Geotextile for silt fence must have a retained strength of at least 70 percent after 500 hours of UV exposure, when tested in accordance with ASTM D 4355.

910.05. Drainage Geocomposites. Drainage geocomposites must meet the requirements shown in Table 910-1 and this subsection.

Prefabricated geocomposites for drainage applications must consist of a geotextile bonded to or wrapped around a polymer core having corrugated, dimpled, tubular, or net (mesh) configurations. Geocomposites must have sufficient flexibility and durability to withstand installation, handling, and permanent loading stresses.

Fittings for geocomposite installations must be manufactured by the geocomposite manufacturer or meet the published specifications of the geocomposite manufacturer. Tape used to seal connections must be manufactured with adhesive resistant to moisture and organic growth and recommended by the manufacturer for underground service conditions.

Obtain the Engineer's approval for all components of the geocomposite system before installation.

A. Prefabricated Drainage System (PDS). PDS for underdrain applications must consist of a polymer core, completely wrapped with geotextile.

The geotextile must be tightly stretched around the core and bonded to itself, to the core, or both. Geotextile must have a peel strength of at least 35 pounds per foot when tested in accordance with ASTM D 1876. Core must be at least 1 inch thick and allow transverse flow from both directions. The geocomposite must have a crush strength of at least 6,000 pounds per square foot at no greater than 18 percent deformation, when tested in accordance with MTM 411.

B. Wall Drain. Wall drains for single direction cross-planar flow must consist of an impermeable polymer core, with geotextile bonded to one side. The geocomposite must have a minimum crush strength of 4,000 pounds per square foot at no more than 18 percent deformation when tested according to MTM 411.
C. Geocomposite Net. The Engineer may allow geocomposite net consisting of geotextile blanket bonded to both sides of a mesh core as an alternate to open-graded aggregate drainage layers.

The Engineer will approve the geocomposite net based on durability, drainage capacity, crush resistance, tensile strength, and thickness.
<table>
<thead>
<tr>
<th>Geotextile Category</th>
<th>Property</th>
<th>Test Method</th>
<th>Grab Tensile Strength (min) (lb)</th>
<th>Trapezoid Tear Strength (min) (lb)</th>
<th>Puncture Strength (min) (lb)</th>
<th>Mullen Burst Strength (min) (psi) (a)</th>
<th>Permittivity per second</th>
<th>Apparent Opening Size (max) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geotextile Blanket (c)</td>
<td></td>
<td></td>
<td>90</td>
<td>45</td>
<td>45</td>
<td>140</td>
<td>0.5</td>
<td>0.21</td>
</tr>
<tr>
<td>Geotextile Liner</td>
<td></td>
<td></td>
<td>200</td>
<td>75</td>
<td>75</td>
<td>200</td>
<td>0.5</td>
<td>0.21</td>
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<tr>
<td>Heavy Geotextile Liner</td>
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<td>270</td>
<td>100</td>
<td>100</td>
<td>400</td>
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<td>0.21</td>
</tr>
<tr>
<td>Woven Geotextile Separator (&gt;50% elongation)</td>
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<td>100</td>
<td>400</td>
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<td>0.425</td>
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<tr>
<td>Non-Woven Geotextile Separator (&gt;50% elongation)</td>
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<td>200</td>
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<td>75</td>
<td>200</td>
<td>0.05</td>
<td>0.425</td>
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<tr>
<td>Stabilization Geotextile</td>
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<td>100</td>
<td>400</td>
<td>0.05</td>
<td>0.50</td>
</tr>
<tr>
<td>Silt Fence</td>
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<td>100 (d)</td>
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<td>—</td>
<td>—</td>
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<td>0.60</td>
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<tr>
<td>Drainage Geocomposites (e)</td>
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<td></td>
<td>90</td>
<td>45</td>
<td>65 (e)</td>
<td>200 (e)</td>
<td>0.5</td>
<td>0.21</td>
</tr>
</tbody>
</table>

a. ASTM D 3786-87. The fluid displacement rate for the Mullen burst test equipment must be 170 mL/min ±5 mL/min. Subtract tare strength from the ultimate burst strength as specified in ASTM.
b. The Engineer will allow filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) as an alternate test method to ASTM D 4751 for non-woven geotextiles.
c. For pipe wrap where backfill around the pipe meets granular material Class II requirements; geotextiles, including knitted polyester sock, which meet the following minimum requirements in the applied condition are permitted: Mass/Unit Area: 3.0 oz/yd²; Mullen burst strength: 100 psi; maximum apparent opening size must be 0.30 mm for pavement and foundation underdrains, and 0.60 mm in other areas.
d. Elongation at the specified grab tensile strength no greater than 40% for silt fence.
e. Geotextile placed over a continuous tubular core must have at least 100 psi Mullen burst strength and 40 lb minimum puncture strength.