



SECTION 47 - GEOTEXTILES

47- 1 GENERAL

This item covers the furnishing of all materials, equipment, labor and supervision necessary to install geotextile fabrics, of the types indicated, at the locations indicated on the plans or as directed by the Engineer.

47- 2 MATERIAL

47-2.1 Filter Fabric

Fabric shall conform to Section 88-1.03 of the State of California Standard Specifications with the following additional requirements:

- A. The 85 percent size of the underlying material, divided by the nearest opening size of Apparent Opening Size (AOS) sieve (nearest U.S. Standard Sieve) of the fabric shall be equal to or greater than one.
- B. Open area shall not to exceed 36 percent.

To reduce the chance of clogging, no cloth should be used with an open area less than 4 percent, or an AOS with openings smaller than the openings of a U.S. Standard Sieve Sized 150 micrometers No. 100.

When appropriate for the soil conditions, filter fabric shall be Mirafi 140NC, or approved equal.

47-2.2 Subgrade Stabilization Geotextile

The use of geotextiles for subgrade stabilization under pavement construction is anticipated on the job, although specific locations, types and quantities will, by necessity, have to be field-determined. To provide for isolated instability problems in subgrade excavations under pavement, a quantity of subgrade stabilization geotextile, of two types, has been included in the bid, and the Contractor will be expected to maintain an adequate amount of each on site for such eventualities. In addition, adequate quantities of biaxial geogrid is required for the construction of bioswale ditches at the locations shown on the plans.

Either of the following materials will be acceptable for pavement subgrade stabilization. For bioswale ditch construction, biaxial geogrid as described in paragraph B, below, is required.

- A. Subgrade Stabilization Fabric shall be a woven or non-woven engineering geosynthetic, specially designed for subgrade separation and support, conforming to the requirements in Section 213-2 of the Standard Specifications.



B. Geogrid shall be Tensar Geogrid BX-1200, or approved equal. Reinforcement shall be a biaxially oriented geogrid with high tensile modulus in relation to the material being reinforced; with large apertures; thick ribs and continuity of tensile strength through all ribs of the structure. The geogrid shall maintain its reinforcement and interlock under normal construction practices, and shall be resistant to both ultraviolet degradation and all forms of biological degradation normally encountered in the material being reinforced. The geogrid shall be a single-layer grid that meets the dimensions and properties outlined below. Multi-layered grids fastened together shall not be acceptable. The biaxial geogrids shall also conform, in all respects, to the property requirements listed in Table 1:

TABLE 1			
PROPERTY	TEST METHOD	UNITS	VALUE
Tensile			
Peak Tensile MD ¹	GRI GG1	lb/ft	1200 (min)
Tensile @ 2% MD	GRI GG1	lb/ft	410 (min)
Tensile @ 5% MD	GRI GG1	lb/ft	810 (min)
Peak Tensile CMD ¹	GRI GG1	lb/ft	1970 (min)
Tensile @ 2% CMD	GRI GG1	lb/ft	600 (min)
Tensile @ 5% CMD	GRI GG1	lb/ft	1320 (min)
Modulus @ 2% Strain	GRI GG1 ²	lb/ft	18,500 (min)
Apertures			
MD dimensions	I.D. Calipered	in	1.0 (nom)
CMD dimensions	I.D. Calipered	in	1.3 (nom)
open area	COE Method Modified ³	%	70 (min)
Junctions ⁴			
Thickness	O.D. Calipered	in	0.16 (nom)
Efficiency	GRI GG2	%	90 (min)
Strength	GRI GG2	lb/ft	1080 (min)
Secant Aperture	Grid Aperture Test	cm-kg/deg	6.50

Notes:

- 1) MD - Machine Direction which is along roll length.
CMD - Cross Machine Direction which is across roll width.
- 2) Secant Modulus at 2% elongation measured by Geosynthetic Research Institute Test Method GG1 – 1987 “Geogrid Tensile Strength.” No offset allowances are made in calculating Secant Modulus.



- 3) Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.
- 4) The value of the Peak Tensile Strength times Junction Efficiency shall be greater than 756 lb/ft..
- 5) Grid Aperture Stability Test developed by Dr. T. Kinney at the University of Alaska, Fairbanks.

47- 3 CONSTRUCTION METHODS

Upon exposure of unstable subgrade materials, and when it is determined by the Engineer to be necessary, subgrade stabilization geotextile, either fabric or geogrid, shall be placed at the locations directed by the Engineer. The Contractor will place the geotextile in accordance with the manufacturer's recommendations, or in conformance with Section 300-10 of the Standard Specifications, whichever is more stringent. The material will then be backfilled with an adequate depth of sound aggregate or PMB, and compacted as required to provide a stable construction platform so that pavement construction can continue. The Contractor shall conform to the geotextile manufacturer's recommendations regarding overlap, pinning, backfill and other construction methods.

47- 4 METHOD OF MEASUREMENT

The quantity of geotextile to be measured for payment shall be the number of square yards of material of the type indicated (filter fabric, subgrade stabilization fabric or geogrid) placed and accepted by the Engineer. Measurement will be made in place. Overlap will not be measured for payment.

[Geotextiles will not be measured for payment but will be considered incidental to the item for which they are required.]

47- 5 BASIS OF PAYMENT

Payment shall be made at the contract unit price per square yard for "Filter Fabric", which price shall be full compensation for providing and installing this item, and for all labor, supervision, equipment, tools, and incidentals necessary to complete the item.

Payment shall be made at the contract unit price per square yard for "Subgrade Stabilization Fabric", which price shall be full compensation for providing and installing this item, and for all labor, supervision, equipment, tools, and incidentals necessary to complete the item.

Payment shall be made at the contract unit price per square yard for "Geogrid", which price shall be full compensation for providing and installing this item, and for all labor, supervision, equipment, tools, and incidentals necessary to complete the item.



[No payment will be made for geotextiles which will be considered incidental to the bid items for which they are required.]

No additional payment will be made for difficulties encountered when installing geotextile fabric in areas of night construction, or in other areas subject to construction phasing restrictions.

Payment will be made under:

[Item 47.1 Filter Fabric.....per square yard]

[Item 47.2 Subgrade Stabilization Fabricper square yard]

[Item 47.3 Geogridper square yard]

END OF SECTION 47