

2005

3733

Geotextiles

3733.1 SCOPE

This Specification covers geotextiles (permeable fabrics) for use in a variety of typical construction applications. Types of geotextile are classified by typical use as follows:

- Type I - For use in wrapping subsurface drain pipe or for other specified drainage applications.
- Type II - For use in wrapping joints of concrete pipe culvert and as a cover over drain field aggregate.
- Type III - For use under Classes I and II random riprap, gabions, andrevet mattresses.
- Type IV - For use under Classes III and IV random riprap, hand-placed riprap, and quarry-run riprap.
- Type V - For use in separating materials (stabilization).
- Type VI - For use in earth reinforcement and Class V random riprap.

3733.2 REQUIREMENTS**A General**

Geotextile shall be a woven, nonwoven, or knit fabric of polymeric filaments or yarns such as polypropylene, polyethylene, polyester, or polyamide formed into a stable network such that the filaments/yarns retain their relative position to each other. Knit fabric will only be allowed for use as perforated pipe wrap. The geotextile shall be inert to commonly encountered chemicals and shall be free of any chemical treatment or coating that might significantly reduce porosity or permeability.

Geotextile shall be uniform in texture, thickness and appearance, and be free of defects, flaws or tears that would significantly alter its strength or filtering properties. All authorized repairs shall be completed to the satisfaction of the Engineer.

All rolls of geotextile or geotextile-wrapped perforated pipe shall be delivered to the Project with an opaque plastic covering to prevent degradation due to ultraviolet rays of the sun or contamination with mud, dirt, dust or debris. Rolled geotextile shall be identified by manufacturer, product name, and roll number, both on the outside wrap and inside the core, as well as other requirements of ASTM D 4873 (Identification, Storage, and Handling). Geotextile shall not be left exposed to the sun for a period in excess of 7 days without being covered by the appropriate protective soil or rock layer. The Engineer may require replacement of any geotextile exposed to the sun for periods longer than 7 days or if the geotextile is contaminated with foreign matter.

When geotextiles are used for stabilization (Type V) or earth reinforcement (Type VI), the Contractor shall produce sewn seams meeting the strength requirements of Table 3733-1.

B Physical Properties

Geotextile shall conform to the requirements of Table 3733-1:

TABLE 3733-1
Geotextile Property Requirements

Geotextile Property	Test Method (ASTM)	Type (A)						
		I		II	III	IV	V	VI
		Fabric	Knit Sock (B)					
	Units							
B1 Grab Tensile Strength minimum, each principal direction	D4632 kN (pounds)	0.45 (100)	--	0.45 (100)	0.45 (100)	0.90 (200)	0.90 (200)	(C)
B2 Elongation minimum, each principal direction	D4632 percent	--	--	--	15	15	--	(C)
B3 Seam Breaking Strength minimum (D)	D4632 kN (pounds)	0.40 (90)	--	0.40 (90)	0.40 (90)	0.80 (180)	0.80 (180)	(C)
B4 Apparent Opening Size (AOS) maximum opening size or range (E)	D4751 mm (U.S. Std. sieve size)	0.425 (40)	0.425 (40) as applied	0.30 (50)	0.30 (50)	0.30 (50)	0.60 (30)	0.85 (20) (G)
B5 Permittivity minimum (F)	D4491 falling head (per sec)	0.7	2.75 relaxed	0.5	0.3	0.3	0.05	0.05 (G)
B6 Puncture Strength minimum	D6241 N (pounds)	--	800 (180)	--	--	--	--	--
B7 Wide Width Strip Tensile Strength min. ea. principal direction	D4595 kN/m (pounds/ft)	--	--	--	--	--	--	(C)

(A) Minimum average roll values (MARV) based on average of at least three tests per swatch (sample). (Manufacturers' MARV shall meet or exceed these requirements.)

(B) Sock shall meet requirements of ASTM D6707-01, classification Type H: fabric. Sock shall be knit of polymeric materials, exhibit minimum snag or run potential, be factory-applied so as to maintain uniform installed mass, and conform to the outside diameter of the tubing with a snug fit throughout.

(C) Requirements are site specific and shall be as specified in the Contract. In no case shall these values or the properties be less than shown for Type V. (Type V typically does not have a Wide Width Strip Tensile Strength requirement.)

(D) This shall apply when seaming is specified or permitted in the Contract. Strength Specifications shall apply to both factory and

field seams. Minimum thread strength for sewing shall be 110N (**25 pounds**). All seams shall be sewn with a Federal Type 401 stitch (two spool sewing machine) and shall be installed facing upward.

- (E) Where maximum opening size is shown. For U.S. sieve sizes, AOS Number must be equal to or larger than the Number specified.
- (F) Permittivity: $P = K/L$ per second, where K = fabric permeability and L = fabric thickness.
- (G) When used for Class V random riprap, maximum AOS size shall be 0.3 mm (**#50**) sieve and minimum permittivity shall be 0.3 per second (same as for Type IV geotextiles).

C Quality Control

The geotextile manufacturer is responsible for establishing and maintaining a quality control program so as to ensure compliance with this Specification.

3733.3 CERTIFICATION, SAMPLING AND TESTING

A Certificate of Compliance

Along with each shipment of geotextile, a Certificate of Compliance shall be furnished by the supplier in accordance with 1603. This certificate shall be accompanied by a document stating the manufacturer's minimum average roll values (MARV) for the geotextile. (MARV are two standard deviations below the mean value of all rolls tested.) In addition, the manufacturer shall maintain test records and make them available to the Engineer upon request. A copy of the Certificate of Compliance must accompany each geotextile sample sent to the Materials Laboratory for testing.

B Sampling and Testing

Geotextiles must be sampled and tested prior to use, except in special circumstances with the Project Engineers approval. In the presence of the Engineer, sampling shall be by random selection in the field at the rates shown in the Schedule of Materials Control. Swatches shall be full roll width and at least 1 m (**3 feet**) long (discard first 1 m (**3 feet**) of fabric from outside of roll) or 3 m (**10 feet**) long for pipe wrap. Samples shall be available for testing at least 21 days prior to intended use. Seam samples shall be at least 2 m (**6 feet**) long, in addition to the regular sample, and be joined in a manner and with a machine the same or equal to that to be used on the Project.