

DELAWARE MATERIAL SPECIFICATION

GEOTEXTILES, WOVEN AND NONWOVEN MS 222

1. **SCOPE**

This specification is applicable to the quality control of both woven and nonwoven geotextiles.

2. **QUALITY**

Geotextiles shall be manufactured from synthetic long chain or continuous polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamide, or polyvinylidene-chloride. The Geotextile shall be formed into a stable network of filaments or yarn that retain their relative position to each other, are inert to commonly encountered chemicals, and are resistant to ultraviolet light, heat, hydrocarbons, mildew, rodents, and insects. The geotextile shall be free of any chemical treatment or coating that might significantly reduce its permeability and shall have no flaws or defects that significantly alter its physical properties. The geotextile shall be exposed to ultraviolet radiation (sunlight) for no more than 15 days total in the period of time following manufacture until the fabric is covered with soil, rock, concrete, etc. Unless otherwise specified, the requirements for materials are as follows:

a. **Woven Geotextile**

Woven geotextile shall conform to the physical properties listed in Table 1. The woven geotextile shall be manufactured from monofilament yarn that is woven into a uniform pattern with distinct and measurable openings. The fabric shall be manufactured so that the yarns will retain their relative position with regard to each other. Yarn composition shall be at least 85% by weight of propylene, ethylene, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors to enhance its resistance to ultraviolet or heat exposure. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.

b. **Nonwoven Geotextile**

Nonwoven geotextile shall conform to the physical properties listed in Table 2. Nonwoven geotextile shall be manufactured from randomly oriented fibers bonded together by the needle-punched process. In addition, one side may be slightly heat bonded.

(Note: Non-needle punched, heat bonded nonwoven may be used for Class IV in Table 2.)

c. **Shipping, Product Identification, Certification, and Test Data**

The geotextile shall be shipped in rolls wrapped with a protective covering to keep out mud, dirt, dust, debris, and direct sunlight. Each roll of geotextile shall be clearly marked to identify the brand, type, and the individual production run. (See ASTM D-4873, Standard Guide for Identification, Storage, and Handling of Geotextiles.)

The geotextile shall meet the specified requirements (Table 1 or 2) for the product style or type shown on the label. Product properties as listed in the "Specifiers Guide" (latest issue), Geotechnical Fabrics Report, Industrial Fabrics Association International, 345 Cedar Building, Suite 450, St. Paul, Minnesota 55101, and that represent minimum average roll values, will be acceptable documentation that the product style or type meets these specified requirements.

For products that do not appear in the above directory, or do not have minimum average roll values listed, typical test data from the identified production run of the fabric will be required for each of the specified tests (Table 1 or 2).

All geotextiles will be subject to sampling and testing by qualified testing laboratories at any time from initial site delivery until final installation.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE 1. REQUIREMENTS FOR WOVEN GEOTEXTILES

PROPERTY	TEST METHOD	CLASS I
Tensile Strength – lbs. <u>1/</u>	ASTM D 4632 Grab Test Method	200 min. in any principal direction
Bursting Strength - psi <u>1/</u>	ASTM D 3786 Diaphragm Tester	450 min.
Elongation - % <u>1/</u> Failure	ASTM D 4632	35 max.
Puncture – lbs. <u>1/</u>	ASTM D 4833	100
Ultraviolet Light Resistance	ASTM D 4355 500 hrs. expos.	70% min. tensile Strength retained
Apparent Opening Size (AOS)	ASTM D 4751	As specified with a min. size \geq #100 <u>1/</u>
Percent Open Area	CWO-02215-86	4.0% min.

1/ **Minimum average roll value (weakest principal direction).**

2/ **U.S. standard sieve size.**

TABLE 1. (CONTINUED)

CLASS II & III	CLASS IV
120 min. in any principal direction	150 min. in any principal direction
300 min.	250 min.
35 max.	35 max.
55	60
70% min. tensile strength retained	70% min. tensile strength retained
As specified with a min. size \geq #100 <u>2/</u>	As specified with a min. size \geq #100 <u>2/</u>
4.0% min.	4.0% min.

TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES

PROPERTY	TEST METHOD	CLASS I
Tensile Strength – lbs. <u>1/</u>	ASTM D 4632 Grab Test Method	180 min.
Bursting Strength – psi <u>1/</u> min.	ASTM D 3786 Diaphragm Tester	320
Elongation - % <u>1/</u> Failure	ASTM D 4632	100 max.
Puncture – 1 lbs. <u>1/</u>	ASTM D 4833	80
Ultraviolet Light Resistance	ASTM D 4355 500 hrs.	70% tensile strength retained
Apparent Opening Size (AOS)	ASTM D 4751	Size \leq #40 max. <u>2/</u>
Permittivity -	ASTM D 4491	0.70

-
- 1/ Minimum average roll value (weakest principal direction).
 - 2/ U.S. standard sieve size.
 - 3/ A heat-bonded (non-needle punched) nonwoven fabric may be used for this.

TABLE 2. (CONTINUED)

CLASS II	CLASS III	CLASS IV <u>3/</u>
120 min.	90 min.	120 min.
210 min.	180 min.	210 min.
100 max.	100 max.	100 max.
40	35	50
70% tensile strength retained	70% tensile strength retained	70% tensile strength retained
Size \leq #40 max. <u>2/</u>	Size \leq #40 max. <u>2/</u>	Size \leq #40 max. <u>2/</u>
0.70	0.70	0.70