

## SECTION 02147

## DRAINAGE COMPOSITES

## 1 GENERAL

## 1.1 SUMMARY (NOT APPLICABLE)

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- |  |   |
|--|---|
| ASTM D 4355  | (1984) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus) |
| ASTM D 4533<br>Geotextiles                                     | (1985) Trapezoidal Tearing Strength of Geotextiles  |
| ASTM D 4632<br>Geotextiles (Grab Method)                       | (1986) Breaking Load and Elongation of Geotextiles  |
| ASTM D 4833<br>Geotextiles, Geomembranes, and Related Products | (1988) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products                         |

## 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTALS:

## SD-09 Reports

## Test Reports; FIO.

Certified copies of laboratory test reports attesting that the drainage composite conforms to the standard specified herein. These tests shall be made by an approved commercial laboratory or by a laboratory maintained by the manufacturers of the materials and shall be submitted at least 30 days prior to commencement of work, and shall be approved prior to use on the project.

## 1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

### 1.4.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded and stored with the minimum of handling. Materials shall not be stored directly on the ground. During shipment and storage, drainage composites shall be wrapped in a heavy-duty protective covering. The storage area shall be such that the composite is protected from mud, soil, dust, debris, and temperatures greater than 140 degrees F.

### 1.4.2 Handling

Drainage composites shall be handled in such a manner as to insure delivery to area of placement in sound, undamaged condition.

## 2 PRODUCTS

### 2.1 DRAINAGE COMPOSITES

The drainage composite shall consist of a filter fabric and a drainage mat meeting the requirements specified below. The filter fabric and drainage mat may be separate materials or a composite of the two materials bonded together during manufacture.

#### 2.1.1 Filter Fabric

Filter fabric shall be non-woven pervious sheet of long chain polymeric filaments of polypropylene or polyester, formed by needle punching into a pattern with distinct and measurable openings. The filter fabric shall provide an Equivalent Opening Size (EOS) no finer than the US Standard Sieve No.[\_\_\_\_\_] and no coarser than the US Standard Sieve No.[\_\_\_\_\_]. EOS is defined as the number of the US Standard sieve having openings closest in size to the filter cloth openings. The fabric shall conform to the physical strength requirements in Table I. The edges of the fabric shall be selvaged or otherwise finished, as required, to prevent the outer material from pulling away from the fabric .

#### 2.1.2 Drainage Mat

The drainage mat shall be nylon, polyethylene or other high-strength plastic of adequate size to carry groundwater from the filter fabric to the drainage outlet and of adequate strength to prevent crushing during installation or by lateral earth pressures during in-service use. The mat configuration shall provide multi-directional water flow.

TABLE I. Physical Strength Requirements

<u>Physical Property</u>	<u>Test Procedure</u>	<u>Acceptable Test Results</u>
Tensile Strength (unaged fabric)*	ASTM D 4632	215 pounds per inch minimum

		in any principle direction
Puncture Strength (unaged fabric)*	ASTM D 4833	90 pound minimum
Elongation at Failure (unaged fabric)*	ASTM D 4632	60 percent minimum
Trapezoidal Tear Strength (unaged fabric)*	ASTM D 4533	80 pounds minimum
Resistance to Ultraviolet Light	ASTM D 4355	TBD

\*NOTE 1: Unaged fabric is defined as fabric in the condition as received from the Manufacturer or Distributor.

### 3 EXECUTION

#### 3.1 INSTALLATION OF DRAINAGE COMPOSITES

The drainage composite shall be placed against the structure after the elastomeric membrane waterproofing has been applied. The composite shall be laid smooth and free of tension, stress, wrinkles, folds, or creases. Drainage mat material shall be cut back at the edges where the composite is terminated so that sufficient filter fabric material is left to overlap and join to structures or wrap around drain pipes. Care shall be taken during installation to prevent damage to the drainage composite, waterproofing, or the structure.

#### 3.2 CONTRACTOR'S RESPONSIBILITY

Any drainage composite with defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, storage, handling, installation, or backfilling will be rejected by the Contracting Officer and will be replaced or repaired by the Contractor, as directed, at no additional cost to the Government.