

PC-8 GEOSYNTHETICS

Refer to: ITD Standard Specifications, Sections 640 and 718.

For assistance, contact the Geotechnical Engineer at the ITD Headquarters Materials Section.



BMP Objectives

- Perimeter Control
- Slope Protection
- Borrow and Stockpiles
- Drainage Areas
- Sediment Trapping
- Stream Protection
- Temporary Stabilizing
- Permanent Stabilizing

Definition and Purpose

Geosynthetic is defined as a planar product manufactured from a polymeric material that is used with soil, rock, or other geotechnical-related material as an integral part of a civil engineering project, structure, or system. Most geosynthetics are made from synthetic polymers of polypropylene, polyester, or polyethylene. Geosynthetic products available today include, but are not limited to, geoweb, geogrids, geonets, geomeshes, geocomposites, and geotextiles.

Geotextile is a permeable geosynthetic made of textile materials. Geotextile type is determined by the method used to combine the filaments or tapes into the planar structure.

Appropriate Applications

Geosynthetic applications are normally defined by the primary function of the following:

- **Filtration:** Geosynthetics can be used as filters to prevent soils from migrating into the adjacent material, such as drainage aggregate, while allowing water to flow through the system (e.g., the use of geotextile in trench drains, silt fence, etc.).
- **Drainage:** Geotextiles or geocomposites can be used as drainage, or conduit, by allowing water to drain from or through low-permeability soils.
- **Separation:** Geosynthetics can be used as a separator to separate the two dissimilar materials and prevent them from mixing, such as the use of geotextile between fine-grained subgrade and granular base course below a roadway.
- **Reinforcement:** Geogrids or geotextiles can be used as reinforcement to increase shear strength of soils, thereby providing a more competent structural material. Examples of this application include the use of geogrid to reinforce a steep slope, or to strengthen a base course in a pavement system.

- Erosion control: Geosynthetics can be used to minimize the movement of soil particles due to flow of water. An example of this application is geotextile used between riprap and the stream bank to minimize erosion of soil below the riprap.

The primary advantages of geosynthetics are:

- Relatively low cost for many applications
- Ease and convenience for many applications
- Quick and effective protection against erosion problems
- Design methodologies are available for many uses
- Wide variety of geosynthetic products are available to meet specific needs
- May be removed and reused if economically feasible

Limitations

- Effectiveness may be reduced drastically if the geosynthetic is not properly selected, designed, or installed.
- Many geosynthetics are sensitive to light degradation and must be protected prior to installation.
- Geosynthetics that are not degradable should not be used where their presence or appearance is aesthetically unacceptable.

Design Parameters

- For geotextiles used in applications such as drainage, erosion control, silt fence, or separation, refer to the Standard Specifications for material property requirements.
- For other geosynthetic materials, follow manufacturers' recommendations.
- Call the Geotechnical Engineer at ITD Headquarters for help in selecting geosynthetics for appropriate design and application.

Construction Guidelines

- For geosynthetic materials, follow manufacturers' recommendations.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications during construction.
- Periodic inspection and maintenance will be required based on post-construction site conditions.
- Make any repairs necessary to ensure the measure is operating properly.
- If geosynthetic is damaged or missing, repairs or replacements shall be made immediately to restore full protection.
- Geosynthetics used for temporary erosion control may be removed and reused, if this can be done without leaving the area susceptible to erosion.