

# GEOSYNTHETIC REINFORCED MODULAR BLOCK RETAINING WALLS

Prepared by:

TenCate™ Geosynthetics North America  
365 South Holland Drive  
Pendergrass, GA 30567  
Tel. (706) 693 – 2226  
Fax (706) 693 – 2044  
[www.tencate.com](http://www.tencate.com)

May 18, 2010

General

This document is prepared to help ensure that the geosynthetic reinforcement, once installed into a modular block retaining wall system, will perform its intended design function. To do so, the geosynthetic must be identified, handled, stored, and installed in such a way that its physical property values are not affected and that the design conditions are ultimately met as intended.

### **Material Identification, Storage and Handling**

The geosynthetic will be rolled on cores having strength sufficient to avoid collapse or other damage from normal use. Each roll will be wrapped with plastic covering to protect the geosynthetic from damage during shipping and handling, and will be identified with a durable gummed label, or the equivalent, clearly readable on the outside of the wrapping for the roll. The label will show the manufacturer's name, the style number, and the roll number.

While unloading or transferring the geosynthetic from one location to another, prevent damage to the wrapping, core, label, or the geosynthetic itself. If the geosynthetic is to be stored for an extended period of time, the geosynthetic should be located and placed in a manner that ensures the integrity of the wrapping, core, and label as well as the physical properties of the geosynthetic. This can be accomplished by elevating the geosynthetic off the ground, laying flat or standing on end while ensuring that it is adequately covered and protected from ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, fire or flames including welding sparks, temperatures in excess of 70°C(160°), and human or animal destruction.

### **Foundation Soil/Subgrade Preparation**

The foundation soil/subgrade should be excavated to the lines and grades as shown on the construction drawings or as directed by the Engineer. Over-excavated areas should be filled with compacted backfill material. The foundation soil/subgrade should be proofrolled prior to backfill and geosynthetic placement. This exercise should be performed prior to each subsequent geosynthetic layer installed. The soil fill shall be compacted to 95% of optimum dry to AASHTO T99. It is recommended that cohesive soils be compacted in six (6) to eight (8) inch compacted lifts and granular soil in nine (9) to twelve (12) inch compacted lifts.

### **Geosynthetic Installation**

Before unrolling the geosynthetic, verify the roll identification, length, installation orientation and the installation location with the construction drawings. While unrolling the geosynthetic, inspect it for damage or defects. Damage that occurs during storage handling or installation shall be repaired as directed by the Engineer.

The geosynthetic should be laid at the proper elevation and orientation on the construction drawings and as specified by the wall facia manufacturer, or as directed by the Engineer. Correct orientation of the geosynthetic is of extreme importance and shall be verified by the Contractor. The geosynthetic shall be cut to length as shown on the construction drawings using a razor knife, scissors, sharp knife, or equivalent.

After the geosynthetic has been laid in place, it should be tensioned by hand until taut, free of wrinkles and lying flat. Adjacent geosynthetic panels, in the case of 100 percent coverage in plan view, should be connected as necessary to ensure 100 percent coverage, unless otherwise specified on the construction drawings. Adjacent geosynthetic panels should be butted on one another and connected as required. Joint spacings are entirely contingent upon the contractor's ability to prevent wrinkles or separation of panels during fill placement. Geosynthetic panels may be secured in-place with staples,

pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the Engineer.

The geosynthetic may **not** be spliced in the primary strength direction through overlap, sewing or mechanical connection. Therefore the geosynthetic should be installed on one continuous piece with the primary strength direction extending the full length of the reinforced area.

Place only that amount of geosynthetic required for immediately pending work to prevent undue damage. After a layer of geosynthetic has been placed, the succeeding layer of soil shall be placed, compacted and prepared as appropriate. After the specified soil layer has been placed, the next geosynthetic layer shall be installed. This process shall be repeated for each subsequent layer of geosynthetic and soil.

### **Backfill Placement**

The geosynthetic is laid directly on the horizontal surface of a compacted fill and covered with the next layer of fill. Deployment of fill should be performed as directed by the Engineer in charge of construction quality assurance. Soil fill shall be compacted to 95 percent of optimum dry density and plus or minus two percentage points of the optimum moisture content, according to AASHTO T-99. It is recommended that cohesive soils be compacted in six (6) to nine (9) inch compacted lifts and granular soils in nine (9) to twelve (12) inch compacted lifts. Fill should be compacted as defined by the project specifications or as directed by the Engineer.

Backfill should be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in and/or movement of the geosynthetic. Care should be taken to control the timing and rate of placement of fill material to ensure that damage does not occur due to compaction or site vehicles traveling on the exposed geosynthetic.

Backfill within three (3) feet of the wall face will typically be compacted with hand equipment. Density shall be made every soil lift or as directed by the Engineer. Backfill shall be graded away from the wall crest and rolled at the end of each workday to prevent ponding of water on the surface of the reinforced mass. The site shall be maintained to prevent the flow of water from overtopping the wall crest during construction and after the completion of the wall.

Most rubber-tired vehicles can be driven at slow speeds, less than ten (10) mph and in straight paths over the exposed geosynthetic without causing damage to the geosynthetic. Sudden braking and sharp turning should be avoided. Tracked construction equipment should not be

operated directly upon the geosynthetic. A minimum fill soil thickness of six (6) inches is required prior to operation of tracked vehicles over the geosynthetic. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geosynthetic.

### **Drainage**

Groundwater infiltration of surface runoff can cause saturation of the reinforced soil fill that will significantly reduce soil strength and reduce the wall's factor of safety. If the wall was not designed with the extra reinforcement to handle these reduced strengths, then a drainage system should be provided to prevent the fill from becoming saturated.

### **Block Wall Requirements**

Be sure to check the installation guidelines from the modular block/facing manufacturer and the Engineer to determine any possible construction conflicts prior to the beginning of construction. All conflicts are to be resolved by the Engineer.

**Disclaimer:** TenCate assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.