

SILT FENCE SYSTEMS

SCDOT Designation: SC-M-815-2 (01/26)

APPROVED:

Division Administrator



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FEDERAL HIGHWAY ADMINISTRATION

1.1 Description

Silt fence systems are used as a temporary perimeter control around sites where there will be soil disturbance due to construction activities. Silt fence systems consist of standard geotextile, High Filtering, or High Flow filter fabric stretched across posts. The lower edge of the fence is vertically entrenched into the ground and covered by compacted backfill. Silt fence systems may be a single or double row of silt fence and may also include silt fence breaks in areas that receive high concentrated flows.

1.1.1 Standard Silt Fence

Standard silt fence utilizes standard woven geotextile fabric from *SCDOT Qualified Products List 34*. Standard silt fence is installed as a single row of silt fence unless a double row is required. High Filtering or High Flow silt fence (see 1.1.2 and 1.1.3 below) or Perimeter Control (see *SCDOT Supplemental Technical Specification SC-M-815-17*) may be used interchangeably with standard silt fence with Resident Construction Engineer (RCE) approval.

1.1.2 High Filtering Silt Fence

High Filtering silt fence utilizes "High Filtering" fabric from *SCDOT Qualified Products List 34*. High Filtering silt fence provides additional filtering of total suspended solids (TSS) per ASTM testing. It is used to address Sensitive Waters and may also be specified for other downstream concerns at the discretion of the design engineer or RCE. See 1.1.4 below for recommendations on using High Filtering silt fence in a double row silt fence configuration.

1.1.3 High Flow Silt Fence

High Flow silt fence utilizes "High Flow" fabric from *SCDOT Qualified Products List 34*. High Flow silt fence provides higher flow rates through the fabric per ASTM testing. It may be used in situations where high or concentrated flow is anticipated in order to prevent overtopping of the silt fence at the discretion of the design engineer or RCE. See 1.1.5 below for recommendations on using High Flow silt fence as a silt fence break.

1.1.4 Double Row of Silt Fence

Install a double row of silt fence where required per United States Army Corps of Engineers permit or per Plans. When installing a double row of silt fence, the first row should be installed at the appropriate offset distance from the toe of slope, see Section 1.3.1 for location details. Install the two rows of silt fence a minimum of 5 feet apart, or as much as practical, to ensure maintenance can be provided.

Unless otherwise specified, the two rows may be made of any approved SCDOT silt fence. However, any time a High Filtering silt fence is used as part of a double row silt fence installation, it should be the second (or downstream) row relative to the approaching flow.

If a double row is required but installation of two rows of silt fence is not feasible then either of the following options may be considered with proper approval by the RCE:

1. Install one row of High Filtering silt fence; or

2. Install one row of any approved SCDOT silt fence followed by either Perimeter Control (see *SCDOT Supplemental Technical Specification SC-M-815-17*) or a Floating Turbidity Curtain (see *SCDOT Standard Drawing 815-805-00*) instead of the second (or downstream) row relative to the approaching flow.

1.1.4.1 Double Row of Silt Fence for Sensitive Waters

In locations where silt fence is installed immediately adjacent to (within 30 feet of) Sensitive Waters as defined by the SCDOT Transportation Construction General Permit (Trout Waters, Outstanding Resource Waters, and Shellfish Harvesting Areas), a double row of silt fence is required and the second (downstream-most) row is to be a High Filtering silt fence. The first (upstream-most) row may be any approved SCDOT silt fence.

1.1.5 Silt Fence Breaks

Silt fence breaks should be used in areas where flow concentrates and would otherwise overtop a standard silt fence system. Silt fence breaks may be constructed out of wire mesh and stone, riprap and stone, or stacked sediment tubes (see *SCDOT Standard Drawing 815-605-05*) or may consist of High Flow silt fence.

1.2 Materials

Provide material for silt fence systems complying with the requirements specified herein, on the Plans, on standard drawings or details, or as approved by the RCE.

1.2.1 Posts

Silt fence systems may utilize either steel or hardwood posts. Steel posts are preferred for standard geotextile silt fence systems. No silt fence may be pre-attached to posts prior to installation. High Filtering or High Flow silt fence systems should select and install posts per manufacturer's specifications when applicable.

Use posts with the addition of a soil stabilization plate (minimum cross section area of 17 square inches) welded or attached near the bottom in areas with sandy soils to ensure post stability. When the post is driven to the proper depth, the plate will be below the ground level for added stability. Lower State Counties require soil stabilization plates: Jasper, Beaufort, Charleston, Berkeley, Georgetown, Horry, Hampton, Colleton, Dorchester, Williamsburg, Marion, Allendale, Bamberg, Orangeburg, Calhoun, Clarendon, Florence, Dillon, Barnwell, Sumter, Lee, Darlington, Marlboro, Aiken, Lexington, Richland, Kershaw, and Chesterfield. Upper State Counties may at the discretion of the RCE require a soil stabilization plate if sandy soils are encountered on site: Edgefield, Saluda, Newberry, Fairfield, Lancaster, McCormick, Greenwood, Laurens, Union, Chester, Abbeville, Anderson, Greenville, Spartanburg, Cherokee, York, Oconee, and Pickens. Attach soil stabilization plates to posts according to Table 1.

*If posts with soil stabilization plates are unavailable then reduce the post spacing to maximum 4 feet on center.

Table 1: Soil Stabilization Plate Requirements

Post Length (feet)	Top of Soil Stabilization Plate Relative to Bottom of Steel Post (inches)
5.0 and 5.5	13.0
6.0, 6.5, and 7.0	15.25
8.0	17.5
10.0	19.5

1.2.1.1 Steel Posts

Furnish steel posts meeting the following minimum physical requirements:

- Minimum length of 5 feet.
- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard "T" shaped section.
- Weighs 1.25 pounds per foot ($\pm 8\%$).
- May be painted or unpainted

1.2.1.2 Hardwood Posts

Furnish hardwood posts meeting the following minimum physical requirements:

- Made of hardwood, not pine or softwood species.
- Minimum length of 4 feet.
- Minimum nominal dimension of 2-inch x 2-inch.

1.2.2 Filter Fabric

Silt fence systems may utilize standard geotextile filter fabric, High Filtering filter fabric, or High Flow filter fabric. Provide filter fabric from the most recent edition of *SCDOT Qualified Product List 34*.

Do not treat or coat the filter fabric with materials which might adversely alter its physical properties after installation. Do not use fabric with defects or flaws that significantly affect its physical and/or filtering properties. Provide a filter fabric with a minimum roll width of 36 inches.

Protect the filter fabric with a suitable wrapping for protection against moisture and extended ultraviolet exposure before placement.

1.2.2.1 Standard Geotextile Filter Fabric

Ensure that the standard geotextile filter fabric is composed of fibers consisting of long chain synthetic polymers composed of at least 85% by weight of polyolefins, polyesters, or polyamides. Ensure that the fibers are formed into a network so that the filaments or yarns retain dimensional stability relative to each other.

Provide standard geotextile filter fabric meeting the minimum physical requirements of Table 2.

Table 2: Minimum Geotextile Filter Fabric Performance and Physical Requirements

Physical Property*	Test Method	Required Value
Filtering Efficiency Performance	ASTM D 5141 or Equivalent	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D 4491	4 gal/min/ft ² Minimum
Tensile Strength	ASTM D 4632	90 lbs
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%

*Unless otherwise indicated, numerical values represent the MARV.

1.2.2.2 High Filtering Filter Fabric

Provide High Filtering filter fabric meeting the minimum physical requirements of Table 3.

Table 3: Minimum Performance and Physical Requirements for High Filtering Filter Fabric

Physical Property*	Test Method	Required Value
Filtering Efficiency Performance	ASTM D 5141 or Equivalent	90% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D 4491 or ASTM D 5141	4 gal/min/ft ² Minimum
Tensile Strength	ASTM D 4632	90 lbs
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%

*Unless otherwise indicated, numerical values represent the MARV.

1.2.2.3 High Flow Filter Fabric

Provide High Flow filter fabric meeting the minimum physical requirements of Table 4.

Table 4: Minimum Performance and Physical Requirements for High Flow Filter Fabric

Physical Property*	Test Method	Required Value
Filtering Efficiency Performance	ASTM D 5141 or Equivalent	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D 4491 or ASTM D 5141	20 gal/min/ft ² Minimum
Tensile Strength	ASTM D 4632	90 lbs
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%

*Unless otherwise indicated, numerical values represent the MARV.

1.2.3 Silt Fence Breaks

Silt fence breaks may be constructed using different methods, each utilizing the materials described below:

- Wire Mesh and Stone Aggregate: see standard drawing 815-605-05
- Rock Ditch Check: see standard drawing 815-605-05
- Stacked Sediment Tubes: see standard drawing 815-605-05
- High Flow Silt Fence: Provide a High Flow filter fabric from *SCDOT Qualified Products List 34* that meets requirements of Table 4.

1.3 Construction Requirements

1.3.1 Location and Spacing

Construct the silt fence system in accordance with the Plans, SCDOT Standard Drawings, manufacturer's product-specific requirements (when applicable), or as approved by the RCE. Install the silt fence system before major construction in an area is started.

Install the fence perpendicular to the direction of flow at the proper distance from the toe of slope to provide sediment storage and access for maintenance and cleanout, as shown in Table 5. When a double row of silt fence is utilized, these distances are applicable for the first (or upstream) row relative to the approaching flow. The second (or downstream) row relative to the approaching flow should be spaced at least 5 feet from the first row or as much as practical, to ensure maintenance can be provided.

Table 5: Silt Fence Installation Dimensions

Height of Fill (ft)	Fill Slope	Minimum Silt Fence Offset from Toe of Slope (ft)	Check Length (ft)**
< 6	2:1 to 6:1	2	2
6-10	2:1	12*	5
	3:1	7*	4
	4:1	5*	3
	5:1 or 6:1	3	3
> 10	2:1	12*	5
	3:1	8*	5
	4:1	6*	4
	5:1 or 6:1	4	4

* These minimum offsets may be reduced when curb and gutter or some other feature reduces the flow of water down the slope. The smaller offsets of each group of height of fill cannot be reduced.

** Silt fence checks will have a maximum length of 5 feet or until they tie back into the slope.

1.3.2 Installation

Install silt fence systems as described in this section and in further installation guidance provided by *SCDOT Standard Drawing 815-605-00* for Temporary Silt Fence and *SCDOT Standard Drawing 815-605-05* for Silt Fence Breaks. High Filtering or High Flow silt fence systems may be designed as a system that includes specific posts and attachment mechanisms specified by individual product manufacturers. Follow all manufacturer's installation instructions when using these systems.

Typical silt fence system installation guidance is as follows:

1. Install posts to a minimum depth of 2 feet. Posts should protrude 1 to 2 inches minimum above the fabric. Space posts on a maximum of 6-foot centers.
2. When placing fabric by hand, excavate a trench approximately 6 inches wide and 6 inches deep and place a minimum of 12 inches of geotextile fabric into the 6-inch deep trench, extending the remaining 6 inches towards the upslope side of the trench. Backfill the trench with soil or gravel and compact. Bury a minimum of 12 inches of fabric into the ground when pneumatically installing silt fence with a slicing method.

3. Attach fabric to the posts using heavy-duty plastic ties (or staples may be used for hardwood posts) that are evenly spaced and placed in a manner to prevent sagging or tearing of the fabric. In all cases, ties should be affixed in no less than 4 places.
4. Install the fabric to a minimum height of 24 inches above the ground. When necessary or as directed by the RCE, the height of the fence above ground may be greater than 24 inches.

Purchase geotextile fabric in continuous rolls and cut to the length of the barrier to avoid joints. When joints are necessary, wrap the fabric together at a support post with both ends fastened to the post, with a 6-inch minimum overlap. A 12-inch minimum overlap is required in tidal areas.

Install silt fence checks every 100 feet at a maximum and at low points.

In areas where conditions warrant, larger posts or reduced post spacing may be required to provide an adequate fence to handle the stress from sediment loading.

In riverine or tidal areas, extra silt fence height may be required. The minimum post length will be twice the exposed post height. Post spacing will remain the same and extra height fabric will be 4, 5, or 6 feet depending upon average high tide for projects adjacent to coastal waterways or average high water elevations in riverine systems, and/or as defined on the construction plans.

1.3.3 Inspection and Maintenance

Inspect the silt fence system every 7 days. Immediately correct any deficiencies. Check for sediment buildup and fence integrity. Check where runoff has eroded a channel beneath the fence, or where the fence has sagged or collapsed by fence overtopping.

Remove fabric and replace whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence system. In addition, review daily the location of silt fence systems in area where construction activities have changed the natural contour and drainage runoff to ensure that the silt fence systems are properly located for effectiveness. Install additional or different silt fence systems as directed by the RCE where deficiencies exist.

Maintain the silt fence system until its capacity has been reached or erosion activity in the area has been stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third the height of the fence, especially if heavy rains are expected. Remove trapped sediment or stabilize on site.

If a silt fence system or portion of fence is located in an area where removing the sediment is not possible, install a second silt fence, if necessary, at the direction of the RCE. In this case, payment for both silt fence systems and portions involved is made at the unit price for silt fence systems.

Remove the silt fence system within 30 days after final stabilization is achieved or after temporary Best Management Practices (BMPs) are no longer needed. Permanently stabilize disturbed areas resulting from silt fence system removal. The fence material remains the property of the contractor and may be used in other locations provided the materials meet the appropriate requirements contained in this Specification and/or on the Plans.

1.3.4 Acceptance

The RCE will approve all silt fence system installations.

1.4 Measurement

Silt Fence Systems - The quantity of the silt fence system is the length of silt fence system (standard, High Filtering, or High Flow) installed and maintained and is measured by the linear foot (LF) of silt fence system in-place, complete and accepted.

Silt Fence Extra Height - The quantity of silt fence extra height is the length of extra height silt fence installed and maintained and is measured by the linear foot (LF) in-place, complete and accepted.

Repair/Replace of Silt Fence System - The quantity for the repair/replace of silt fence system is the length of silt fence system repaired or replaced because of failure of the silt fence system not the fault of the contractor and is measured by the linear foot (LF) along the line of silt fence system, complete and accepted.

Removal of Silt Retained by Silt Fence System - The quantity for the removal of silt retained by silt fence system is the length of silt fence system in front of which silt deposit was removed as ordered by the RCE and is measured by the linear foot (LF) along the line of silt fence system, complete and accepted.

Silt Fence Break - The quantity for silt fence breaks is the number of silt fence breaks installed, measured by each (EA) silt fence break in-place, complete, and accepted.

1.5 Payment

Silt Fence Systems - Payment for silt fence systems is full compensation for installing silt fence systems (standard, High Filtering, or High Flow) as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of silt fence systems, providing filter fabric, posts, and ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

Silt Fence Extra Height - Payment for silt fence extra height is full compensation for installing extra height silt fence as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of extra height silt fence, providing filter fabric, posts, and ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

Repair/Replace of Silt Fence System - Payment for replace/repair silt fence systems is full compensation for repairing or replacing damaged or malfunctioned silt fence systems as specified or directed and includes furnishing or repairing filter fabric, posts, ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

Removal of Silt Retained by Silt Fence Systems – Payment for removal of silt retained by silt fence systems is full compensation for removing and disposing of sediment deposits accumulated by silt fence systems as specified or directed and includes all material, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications and other terms of the Contract.

Silt Fence Break - Payment for silt fence breaks is full compensation for installing silt fence breaks as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, disposing of silt fence breaks, providing all materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

Table 6: Bid Item Number

Bid Item Number	Description	Units
8153000	Silt Fence	LF
8153005	Silt Fence Extra Height	LF
8153025	High Flow Silt Fence	LF
8153030	High Filtering Silt Fence	LF
8153090	Replace/Repair Silt Fence System	LF
8154050	Removal of Silt Retained by Silt Fence Systems	LF
8153035	Silt Fence Break – Sediment Tube	EA
8153040	Silt Fence Break – Rock Ditch Check	EA
8153045	Silt Fence Break – Wire and Stone	EA